

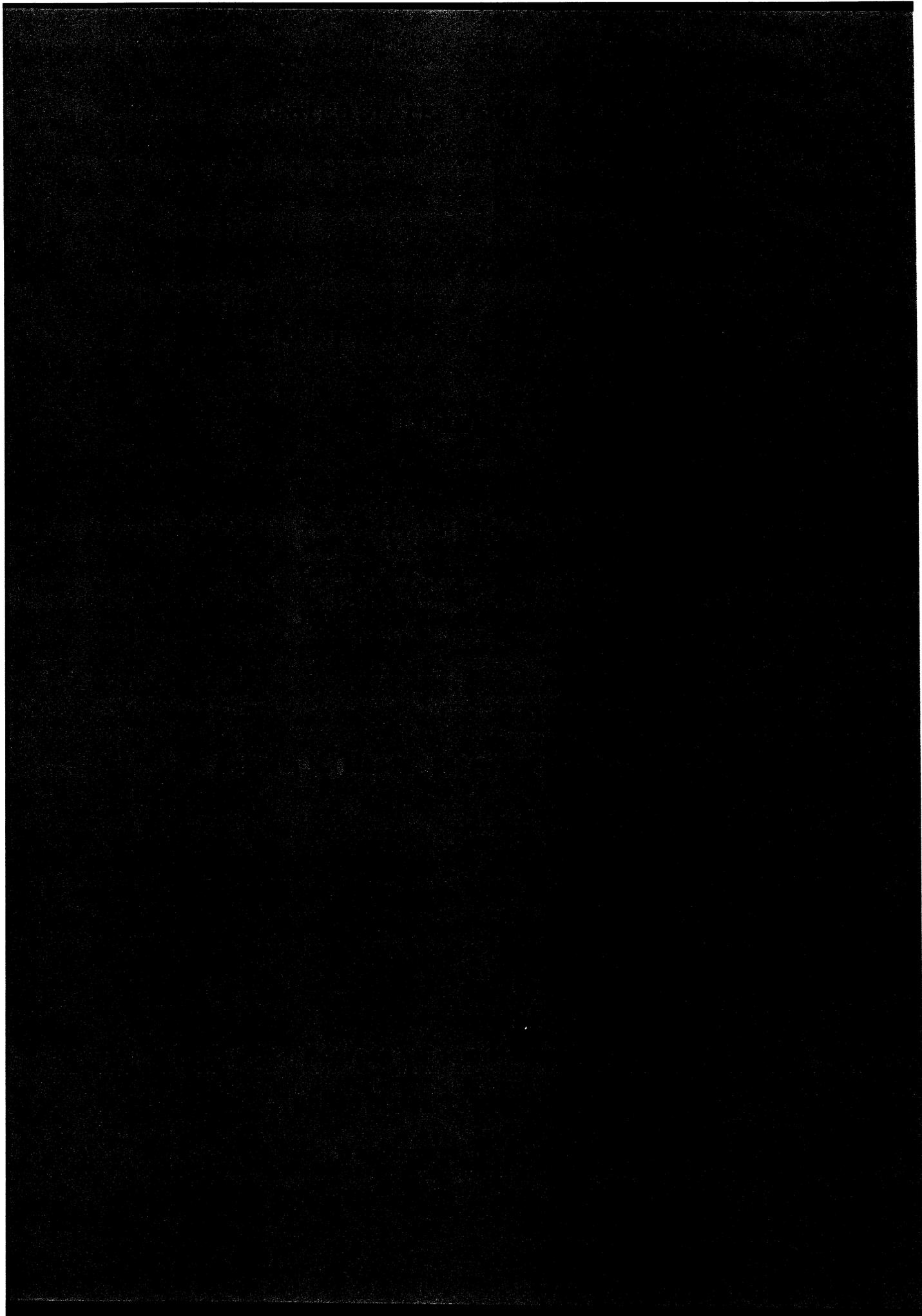
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UNITED STATES TARIFF COMMISSION

CERTAIN WRITING INSTRUMENTS
AND NIBS THEREFOR

Report on Investigation No. 337-30
Under the Provisions of Section 337
of Title III of the Tariff Act of 1930, as Amended



TC Publication 678
Washington, D. C.
June 1974



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UNITED STATES TARIFF COMMISSION
Washington, D.C.

June 28, 1974

In the matter of an investigation) Docket No. 30
with regard to the importation and) Section 337
domestic sale of certain writing)
instruments and nibs therefor) Tariff Act of 1930, as amended

Introduction

On November 23, 1971, Venus Esterbrook Corp.,^{1/} New York, N.Y., hereinafter referred to as complainant, ^{2/} filed a complaint with the U.S. Tariff Commission requesting relief under section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), alleging unfair methods of competition and unfair acts in the importation and sale of certain writing instruments and nibs therefor. Complainant alleged that its U.S. Patent No. 3,338,216 covers certain writing instruments and nibs therefor and that the importation and sale of such writing instruments and nibs by Major Line, Inc., Santa Fe Springs, Calif.; Ultra, Inc., Warren, Mich.; Accuray Products, Inc., Wallington, N.J.; Micropoint Engineering Co., Sunnyvale, Calif.; and Carter's Ink Co. of Cambridge, Mass.-- hereinafter referred to as respondents--has the effect or tendency to destroy or substantially injure an efficiently and economically operated industry in the United States, or to prevent the establishment of such an industry.

^{1/} On Oct. 5, 1973, Venus Esterbrook became a wholly owned subsidiary of Faber-Castell, Inc.

^{2/} The terms "complainant" and "respondent" frequently appear in this report. Commissioners Leonard and Young wish to enter the following: The use of these terms is limited to serving as a convenient means of identifying certain parties before the Commission and is not to be construed, by implication or otherwise, as an indication that the Commission proceedings are adjudicatory as opposed to factfinding.

Notice of receipt of the complaint and initiation of the preliminary inquiry was published in the Federal Register (36 F.R. 23596), on December 10, 1971. Interested parties were given until January 17, 1972, to file written views pertinent to the subject matter. However, at the request of interested parties, an extension until February 22, 1972, was granted, followed by a further extension, until April 17, 1972, being granted after the complaint was amended on February 9, 1972. Copies of the complaint and the notice of time for filing written views were served on all known interested parties.

Having conducted a preliminary inquiry in accordance with section 203.3 of the Commission's Rules of Practice and Procedure (19 C.F.R. 203.3), the U.S. Tariff Commission, on September 14, 1972, ordered a full investigation. No temporary exclusion order was recommended. Notice of the full investigation was published in the Federal Register of September 21, 1972 (37 F.R. 19675).

On February 5, 1973, the Commission denied a motion filed on behalf of Kiriu Seiko Co., Ltd. (Japanese exporter of pens), one of the interested parties, to dismiss the investigation on the grounds that there is no industry in the United States injured or prevented from being established by the acts alleged by the complainant. The motion was denied without prejudice to the right to raise the same issue in the proceeding at a later time. The attorneys for the moving party and the complainant were advised of the Commission's action by letter.

A public hearing was held on March 6, 7, and 8, 1973 (notice of which was published in the Federal Register of January 9, 1973 (38 F.R. 1160), and all interested parties were given opportunity to be present and to produce evidence.

At the public hearing, Kiriu Seiko again moved to have the investigation dismissed on the grounds that there is no domestic industry to be protected. The Commission ruled against the request on March 7, 1973. On March 8 a recess was ordered. The hearing was resumed on April 9, 1973, notice of resumption having been published in the Federal Register of March 16, 1973 (38 F.R. 7154).

On November 12, 1973, the Commission held a further public hearing to consider only legal argument on the question of whether the proceeding should be dismissed on the grounds that there is no domestic industry to be protected nor one prevented from being established. Notice of this hearing was published in the Federal Register of October 17, 1973 (38 F.R. 28874).

Appearances of record were entered on behalf of Venus Esterbrook Corp., Carter's Ink Co., Micropoint Engineering Co., Kiriu Seiko Co., Ltd., Teibow Co., Major Line, Inc., Sanford Corp., and Pilot Pen Co., Ltd.

Finding of the Commission

The Commission does not find unfair methods of competition and unfair acts in the importation into the United States of certain writing instruments and nibs therefor or in their sale by the owner, importer, consignee, or agent of either, the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States, or to prevent the establishment of such an industry.

Statement of Chairman Bedell and Commissioners
Leonard and Young 1/ 2/

Section 337 of the Tariff Act of 1930 declares unlawful unfair methods of competition and unfair acts in the importation of articles into the United States, or in their sale by the owner, importer, consignee, or agent of either, the effect or tendency of which is (a) to destroy or substantially injure an efficiently and economically operated domestic industry, or (b) to prevent the establishment of such an industry, or (c) to restrain or monopolize trade and commerce in the United States. 3/

In the instant investigation, we find that the criteria of section 337 are not met. On the basis of the evidence adduced at the hearings, included in submissions of the parties, and developed from an independent investigation by the Commission, we have concluded that (1) of all the imported writing instruments that are alleged to be covered by the claims of complainant's U.S. Patent No. 3,338,216, only one model may possibly be so covered, and (2), assuming the model in question is covered by the claims of complainant's patent, the importation and sale of this model does not have the effect or tendency to destroy or substantially injure, or prevent the establishment of, an industry efficiently and economically operated in the United States.

1/ Vice Chairman Parker and Commissioner Ablondi concur in the result.

2/ Commissioner Moore finds that sec. 337 is not violated for the reason that the complainant's nibs which are the essential elements of its patented writing instruments were not produced in the United States, and therefore there is no industry in the United States, nor is one prevented from being established, within the purview of sec. 337.

3/ The effect or tendency of unfair practices to restrain or monopolize trade and commerce is not at issue in this investigation.

Further, specifically on the basis of the factual situation of this case, we have concluded that the importation of nibs per se is not an unfair method of competition and unfair act under section 337. Our reasoning in support of these conclusions is set forth below.

Alleged unlawful practice under section 337

The only unfair method and act alleged in this investigation is the importation and sale of certain pens and nibs therefor which are made in accordance with the claims of U.S. Patent No. 3,338,216, which is owned by the complainant. The patent describes a certain writing instrument including a specific plastic nib (having a star-shaped opening extending the entire length thereof through which ink flows by capillary action) and a nib holder, spaced from the filler (ink reservoir), for retaining the nib. Complainant asserts that the importation and sale of certain writing instruments (which are alleged to be covered by the claims of the said patent) and of plastic nibs for such writing instruments (which contribute to practice of the claims of said patent) are unlawful under section 337. The complainant specifically alleges that it is injured by the unlicensed importation of complete writing instruments which are sold in the United States by several companies (such as Micropoint Engineering

Co., Major Line, Inc., and others), as well as by the importation of plastic nibs which are assembled domestically into complete writing instruments by Carter's Ink Co. These writing instruments contain plastic nibs which have varying cross-sectional configurations. 1/ All these writing instruments are alleged by the complainant to be covered by the claims of its patent. Writing instruments which incorporate imported plastic nibs are also produced domestically by the Sanford Corp., but there has been no allegation that either the Sanford nibs or their complete writing instruments are covered by the complainant's patent.

The relevant domestic industry

The domestic industry under consideration consists of that portion of complainant's operations which is engaged in the manufacture of the patented writing instruments; 2/ there are no domestic licensees of the patent.

1/ Illustrations of cross-sectional views of representative nib configurations appear in app. A. App. A also contains a cross-sectional illustration of the complainant's writing instrument, including the configuration of the nib.

2/ U.S. Tariff Commission, Convertible Game Tables and Components Thereof: Report to the President . . ., TC Publication 652, March 1974, p. 8. Substantially the same definition, modified to suit the facts in each case, was used by the Commission in Lightweight Luggage: Report on Investigation No. 337-28 . . ., TC Publication 463, February 1972, p. 6; Sphygmomanometers: Report on Investigation No. 337-26 . . ., TC Publication 457, January 1972, p. 6; and Articles Comprised of Plastic Sheets Having an Openwork Structure: Report on Investigation No. 337-29 . . ., TC Publication 444, December 1971, p. 5. The Court of Customs and Patent Appeals stated In re Von Clemm, 108 USPQ 371 (1955), p. 373: "In our opinion the holding by the Tariff Commission that Linde's Synthetic Crystals Division is an industry efficiently and economically operated in the United States is amply supported by the record. There is nothing in the statute which requires that an industry must be of any particular size, or that more than one company must be involved before the protection provided by the statute may be invoked."

About 40 people are employed by the complainant in the manufacture and packaging of the patented writing instruments. These same employees also work on other products. In the complainant's plant in Lewisburg, Tenn., the barrel and cap portions of the writing instruments are molded by complainant's personnel and then assembled with an inner cap, clip, nib, nib holder, and decorator ring to form a complete writing instrument. The nib and nib holder are not produced in the United States; they are purchased from a Japanese producer that is a foreign licensee under the patent.

Scope of U.S. Patent No. 3,338,216 1/

Claim 1, the only independent claim in the patent, provides the broadest claim coverage; it reads as follows:

In a writing instrument including--

- (a) an elongated hollow casing defining an ink reservoir,
- (b) a filler for the ink reservoir and
- (c) a nib holder for mounting a nib at one end of the casing,
- (d) the nib holder being spaced from the filler,
- (e) a nib comprising
 - (1) an elongated member having a star-shaped opening disposed centrally thereof and extending the entire length thereof,
 - (2) a writing tip at one end of said nib disposed exteriorly of the casing and
 - (3) a rear terminal end opposite said one end of said nib adapted to engage the filler to draw ink therefrom,
 - (4) said star-shaped opening having a plurality of legs of a size to permit flow of ink therethrough by capillary action.

1/ This patent has never been involved in court litigation. See app. B for copy of patent which was filed Jan. 11, 1966, and issuing Aug. 29, 1967.

To interpret the scope of this claim, consideration was given, among other things, to (1) the claim itself, 1/ (2) the patent specification, (3) the drawings, 2/ and (4) the history of the prosecution of the case before the U.S. Patent Office (the file wrapper). 3/ In the instant patent, the detailed description in the specification provides a general description of the writing instrument claimed and the assembly thereof, not making specific reference to any particular configuration of the nib. It then goes into the details of the preferred embodiment of the nib (used in the combination) which is described as being--

. . . preferably made from a resilient, flexible material which is impervious to various types of writing fluids . . . a suitable material for the nib has been found to be an extruded thermoplastic resin The nib is generally of circular cross section . . . and has a star-shaped opening . . . disposed centrally thereof and running the entire length of the nib to permit flow of ink therethrough by capillary action

The drawings show only one type of nib construction and that is the one which is specifically described as quoted above. More particularly, the nib is shown to be a single, integral unit having a star-shaped opening disposed centrally thereof and running the entire length of the nib.

1/ Ziegler v. Phillips Petroleum Company, 171 USPQ 44 (N.D. Tex. 1971), p. 49: "The claims of the patent define the scope of the monopoly granted to the patentee. Every term recited in the patent claim is a limitation on the patentee's monopoly, and nothing is an infringement which does not fall within the terms in which the patentee has chosen to express his invention."

2/ Laitrom Corp. v. Deep-South Packing Co., Inc., 170 USPQ 190 (5th Cir. 1971), reversed on other grounds, 173 USPQ 769 (Sup. Ct. 1972).

3/ Graham v. John Deere Co. of Kansas City, 148 USPQ 459 (Sup. Ct. 1966); Farrell Marine Devices, Inc. v. United States, 152 USPQ 328 (Ct. Cl. 1966); Autogiro Co. of America v. United States, 155 USPQ 697 (Ct. Cl. 1967); Safe Flight Instrument Corp. v. McDonnell-Douglas Corp., 169 USPQ 328 (C.D. Cal. 1971); and Welch v. General Motors Corp., 170 USPQ 22 (E.D. Va. 1970). Graham v. John Deere Co. of Kansas City, 148 USPQ 459.

Turning to the file wrapper, claim 1 was rejected by the Patent Office as unpatentable over Schreur 1/ in view of Kornfeld 2/ because Schreur shows a writing instrument having a nib formed of a plurality of filaments (forming capillary passages) held together by a shroud in the body member of the writing instrument; and Kornfeld shows a nib of plastic material with a star-shaped opening having a plurality of legs which permit the passage of ink. It was the examiner's opinion that it would involve an obvious substitution of one well-known writing nib for another equally well-known writing nib and that it would be only a matter of design to make the nib opening shown by Kornfeld the same size and shape through the entire length of the nib.

To overcome the examiner's rejection, claim 1 was amended to include the language: ". . . the nib holder being spaced from the filler." While the drawing does disclose a spacing between the nib holder and filler material, the specification is totally silent about the significance of this spacing, and, in fact, makes no mention of it whatsoever. Although no reference was made as to why this particular amendment to the claim language overcame the ground for rejection of the claim, much stress was made in the attorney's remarks on the fact that--

The nib, as set forth in claim 1, is an elongated member having a star-shaped opening disposed centrally of and extending the entire

1/ U.S. Patent No. 3,203,025, filed Aug. 15, 1962, and issuing Aug. 31, 1965. See app. B.

2/ Austrian Patent No. 200,473, published Nov. 10, 1958. See app. B.

length of the nib having a plurality of legs of a size to permit flow of ink therethrough by capillary action It has been found that this type of nib is extremely economical to make and has several functional advantages. For example, the star-shaped opening extending the entire length of the nib produces a continuous flow by capillary action and eliminates the danger of leakage while at the same time producing a very fine line substantially comparable to conventional steel tip ground pen points.

Moreover, in discussing the Kornfeld patent, it is further stated in the attorney's remarks that--

This reference does not disclose a nib having a star-shaped opening wherein the legs are of a size to permit flow of ink therethrough by capillary action while one end engages in a filler of ink absorbent material.

Respecting the Schreur reference, the attorney's remarks stated:

Clearly this reference does not disclose or suggest the idea of using an elongated nib having a star-shaped opening running the entire length thereof which produces the functional advantages noted above

The significance of these statements made in the file wrapper are most pertinent with respect to limiting the scope of claim 1, particularly when viewed in light of the case law cited in footnote 2 on page 9 supra. 1/

1/ In Farrell Marine Devices, Inc. v. United States, 152 USPQ 328 (Ct. Cl. 1968), p. 335, the Commissioner stated:

The structural qualifications relied on by the applicant to secure allowance of a claim by the Patent Office cannot be thereafter disregarded as irrelevant.

The court stated in Autogiro Co. of America v. United States, 155 USPQ 697 (Ct. Cl. 1967), p. 704:

The file wrapper also has a broader and more general use. This is its utilization, like the specification and drawings, to determine the scope of the claims. For example, the prior art cited in the file wrapper is used in this manner. In file wrapper estoppel, it is not the prior art that provides the guidelines, but the applicant's acquiescence with regard to the prior art. In its broader use as a source material, the prior art cited in the file wrapper gives clues as to what the claims do cover

Further, in Safe Flight Instrument Corp. v. McDonnell-Douglas Corp., 169 USPQ 328 (C.D. Cal. 1971), p. 335, the court said:

Claims of the '540 patent are to be construed not only in light of specifications and drawings, but also with reference to the file history; claims are to be explained by and read in conjunction with the specification and in light of definitions and admissions made by the applicant.

The court concluded in Welch v. General Motors Corp., 170 USPQ 22 (E.D. Va. 1970), p. 25:

When prior art is distinguished in argument before the examiner on the ground of its lack of certain characteristics, although the applicant does not simultaneously narrow his claims, this court concludes that the construction of claims thereafter accepted must be limited by applicant's representations.

Accordingly, based on the patent specification, drawings, and file wrapper, it is our opinion that claim 1 appears to be directed to a writing instrument having all the elements recited on page 8 supra, with the main contribution therein being directed to "(d) the nib holder being spaced from the filler" and "(e) a nib comprising (1) an elongated member having a star-shaped opening disposed centrally thereof and extending the entire length thereof," and "(4) said star-shaped opening having a plurality of legs of a size to permit flow of ink therethrough by capillary action."

Thus far, we have shown how claim 1 of the patent in issue is limited by the file wrapper, with no attempt having been made to apply prior art patents not introduced during the prosecution of the patent before the U.S. Patent Office. 1/ Prior art patents which were not cited during the prosecution of the patent in question were introduced at the public hearing. These patents, 2/ together with

1/ FMC Corp. v. F. E. Myers & Bro. Co., 155 USPQ 299 (6th Cir. 1967), p. 306: "A patent must be construed in light of the state of the art to which it pertains." Tate Engineering, Inc. v. United States, 166 USPQ 329 (Ct. Cl. 1970), p. 335: "the language of a claim must be interpreted, not only in the light of the file wrapper, specification and drawings, but also with an eye on the prior art."

2/ Austrian Patent No. 202,897, published Apr. 10, 1959; German Patent No. 396,082, dated Mar. 29, 1923; British Patent Nos. 364,808 and 413,764, accepted, respectively, Jan. 14, 1932, and July 26, 1934; U.S. Patent No. 3,424,539, filed on Feb. 9, 1965 (antedating the filing date of the patent in issue); and Japanese Utility Model Registration 34-3714, effective date in 1965. See app. B.

other prior art found by the Commission, 1/ convince us that if the patent in issue teaches anything new, it is limited to a writing instrument comprising an integral, single-piece, elongated nib member with a star-shaped opening disposed centrally and extending throughout the length thereof 2/ and not one having a nib made up of a plurality of rods or a folded member even though there be formed at the center thereof a star-shaped opening extending throughout the length of the nib. Accordingly, because of the prior art, we conclude that a writing instrument including a nib having all the other limitations, as recited in claim 1, but made of a plurality of strands or a folded unit of integrally connected strands, rods, et cetera, is not within the scope of claim 1.

A claim of a patent, as a general rule, is not avoided by using a plurality of pieces instead of one, or one piece instead of a plurality. However, as in the instant case, when the one-piece construction is the essence of the invention and is necessary to distinguish the invention from the prior art, claim 1 cannot be expanded to cover a writing instrument having a nib comprised of a

1/ U.S. Patent Nos. 3,003,181; 3,003,182; 3,044,101; and 3,141,187, all dated earlier than the patent in issue, clearly show writing instruments each containing a filler material making contact with a felt nib, with the nib being retained in the casing by a nib holder spaced from the filler material. See app. B.

2/ It would appear that there is no particular novelty in substituting, in a writing instrument, one nib for another unless there is novelty in the nib per se. This is particularly true when it is observed that the instant inventor of the patent in question also has another patent (U.S. Patent No. 3,325,851; see app. B), filed shortly before the patent in question, teaching substantially the same structure, including the spacing between the nib holder and filler material, but showing instead of a plastic nib (about which the Commission is concerned) a felt nib.

plurality of members. 1/ Moreover, where a patent is a minor improvement in a rather crowded art, as is the patent in issue, the doctrine of equivalence has a very limited application. 2/

Conclusions as to unfair method and act

The writing instruments in issue.--We have concluded that the only unfair method and act which could possibly be included within the protection of section 337 is the importation and sale of the Micropoint pen, Model No. 549 (Fine-Stik). This writing instrument has a nib with a snowflake-shaped opening, centrally disposed and running through the entire length thereof for carrying ink by capillary action; it is the only writing instrument presently being imported which may fall within the scope of claim 1 of the patent in question. Since this patent appears to limit the number of legs for ink flow to four or more, 3/ there is a question whether the Micropoint Model No. 549 is covered by the claims of the patent. In viewing the nib having the snowflake-shaped cross section, it is possible to conclude that it has only three legs for ink flow, since, as it will be observed, from the center opening

1/ Magnetics, Inc. v. Arnold Engineering Co., 163 USPQ 513 (N.D. Ill, 1969), p. 517: "The fabrication of a die from one piece of material was an essential part of both patents' inventive concept, thus precluding infringement by two-piece molds."

2/ Tate Engineering, Inc. v. United States, 175 USPQ 115 (Ct. Cl. 1972) and Autogiro Co. of America v. United States, 155 USPQ 697 (Ct. Cl. 1972) both uphold the well-known rule that a minor improvement patent has only a narrow range of equivalents and state: "The doctrine of equivalence is subservient to file wrapper estoppel."

3/ The patent in question states, in col. 3, lines 26 through 29:

. . . Further it has been found that while six circumferentially equispaced legs provide good transfer of ink, four may be suitable and a number greater than six may also provide the desired ink flow. (Emphasis added.)

there are only three legs. However, it should be further noted that each of the three legs ultimately forks into two branches. Accordingly, there is a question whether this is a three-legged or six-legged configuration and thus, whether the Micropoint Model No. 549 is covered by the claims of the patent in issue.

The nibs in issue.--Plastic nibs equivalent to the type used in the patented writing instrument are currently incorporated in a recorder pen device which is not covered by the claims of the patent in issue. In addition, these same types of plastic nibs can be used in writing instruments (1) which do not have a "filler", as required by claim 1 of the patent, or (2) where the nib holder contacts the filler. Accordingly, we have determined that the nib, an element of claim 1, can be considered to be a substantially staple article of commerce, having applications other than in the particular writing instrument recited in claim 1 of the patent. Therefore, we conclude that the importation of nibs per se would not be an unfair method of competition or an unfair act under section 337.

Effect or tendency to injure

The second requirement of the statute is that the effect or tendency of the unfair methods of competition and unfair acts is to destroy or substantially injure an efficiently and economically operated domestic industry. It has been demonstrated in the foregoing section that, of all the imported writing instruments which complainant alleges to be covered by its U.S. Patent No. 3,338,216, the only writing instrument that may be so covered is Model No. 549 (still being imported and sold by Micropoint Engineering Co.). Assuming for the purpose of this discussion that claim 1 of the patent reads on the

Model No. 549, then in order that complainant may be afforded relief under section 337, it needs to be shown that the importation and sale of Model No. 549 has the effect or tendency to destroy or substantially injure the domestic industry, i.e., that segment of complainant's operations which is devoted to the production of writing instruments covered by U.S. Patent No. 3,338,216. We have concluded that no such showing has been established.

Writing instruments having a plastic nib--a category which includes the patented pens, pens alleged to be covered by complainant's patent (including Micropoint's Model No. 549), and other pens--constitute a small part of a large market for writing instruments, a market which encompasses pens and markers of varied constructions and shapes. Though writing instruments differ greatly in specific characteristics, a great proportion of such instruments are substitutable for one another in a market comprising a variety of writing instruments, such as fountain pens, refillable and nonrefillable ballpoint pens, and various types of markers--including fine-line markers. It is difficult, therefore, to distinguish between the writing instruments falling within a general category such as fine-line markers, except on the basis of price, and, furthermore, it may be equally difficult to differentiate between pens which are classified within any one of the other product groups, again except on the basis of price.

In the aggregate, some 2 billion writing instruments (other than pencils) have been sold annually in recent years in the United States (see table in app. C). Sales of fine-line markers, which subsume, according to industry sources, the writing instruments in issue, amounted

to more than 500 million, valued at more than \$86 million, in 1973. In that year, sales of complainant's patented pens and those of the single imported pen which the Commission believes may be covered by the patent, together accounted for less than one-tenth of 1 percent of the total number of fine-line markers sold.

A further segmentation of the fine-line writing instrument market would narrow the scope to all those pens that have a plastic nib, i.e., complainant's patented pens and all the imported pens that were alleged to be covered by the patent. ^{1/} In viewing this latter class of writing instruments, it is to be noted that the types of imported writing instruments that have been alleged by complainant to be covered by the patent (or obtained by the Commission in the course of its investigation) were introduced into and sold in quantity in the U.S. market prior to 1971--the year in which the first model (the Vega) of complainant's writing instrument covered by the patent was introduced. U.S. consumption of pens with plastic nibs rose rapidly from less than 500,000 units in 1969 to more than 7 million units in 1972. Within that group of writing instruments, the significance of the Micropoint Model No. 549 (the model that the Commission believes may be covered by the patent) diminished; it accounted for a very substantial share of consumption of pens with plastic nibs in 1969, but less than 10 percent in 1972.

^{1/} All of these writing instruments that have come to the attention of the Commission are of the throwaway type.

In contrast, the share of consumption accounted for by complainant's Vega rose from a small percentage in 1971 to more than a third in 1972. In 1973, complainant introduced two additional models covered by the patent. It is estimated that complainant's current share of the market for writing instruments with plastic nibs is larger than, or at least the same as, in 1972.

In the most narrow comparison--that of complainant's patented pen with Micropoint's Model No. 549--there occurred a complete reversal of the position of the former relative to the latter in terms of the number of units sold during the period 1971-73. While in 1971 the sales of Micropoint's Model No. 549 were by far the larger, in 1972 and 1973 the sales of complainant's pens were several times larger than those of Micropoint's Model No. 549. A similar reversal occurred in the profit position of the complainant on the patented pens. While in 1971 and 1972 substantial net operating losses were sustained on the patented writing instrument (mainly as a result of the cost of extensive promotional efforts in introducing the new pen), in 1973 a very healthy profit was realized.

Prevention of the establishment of an industry

It was noted in the preceding section that, in 1971, several years after the complained-of imported writing instruments had been introduced in the U.S. market, the complainant entered the market with its patented product. The record establishes that, despite a late

entry into an already established market for pens with plastic nibs, the patented product has increased its position from a relatively minor share of the market in 1971 to a dominant share of the market in 1973, and that an industry has not been prevented from being established.

Conclusion

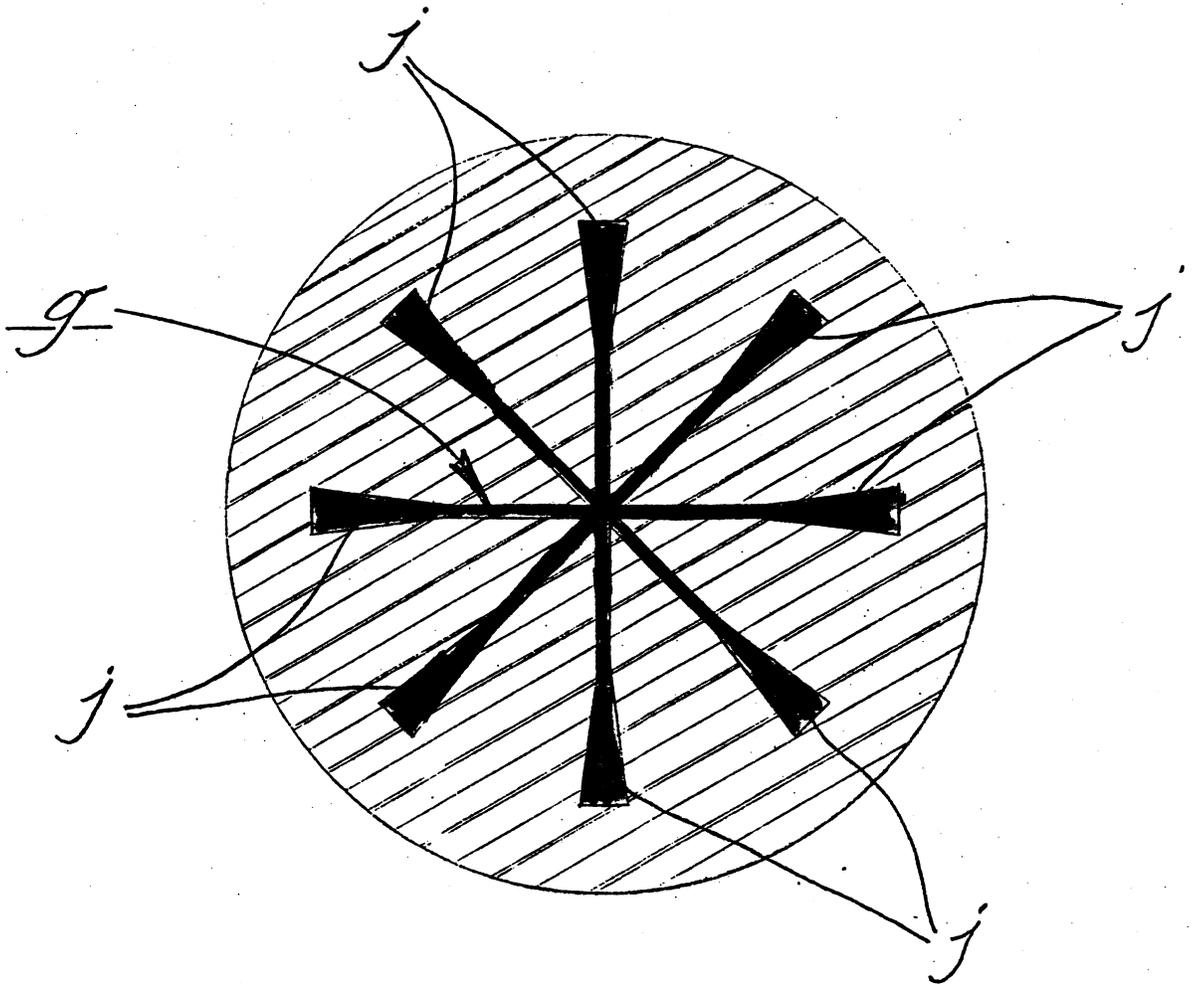
On the basis of the foregoing, we conclude that in the instant case the criteria of section 337 of the Tariff Act of 1930 have not been met.

Appendix A

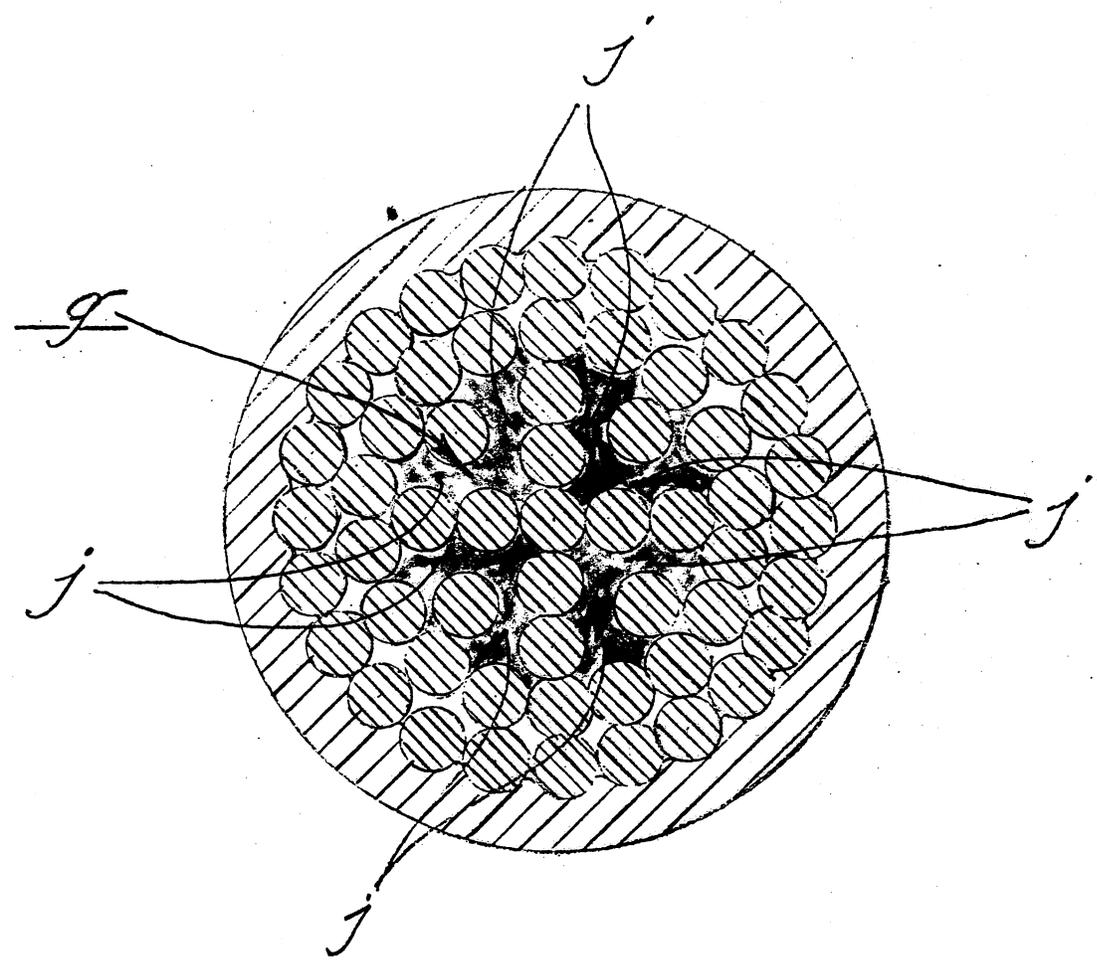
1. Magnified cross-sectional views of nibs
2. Enlarged cross-sectional view of the "Vega" writing instrument



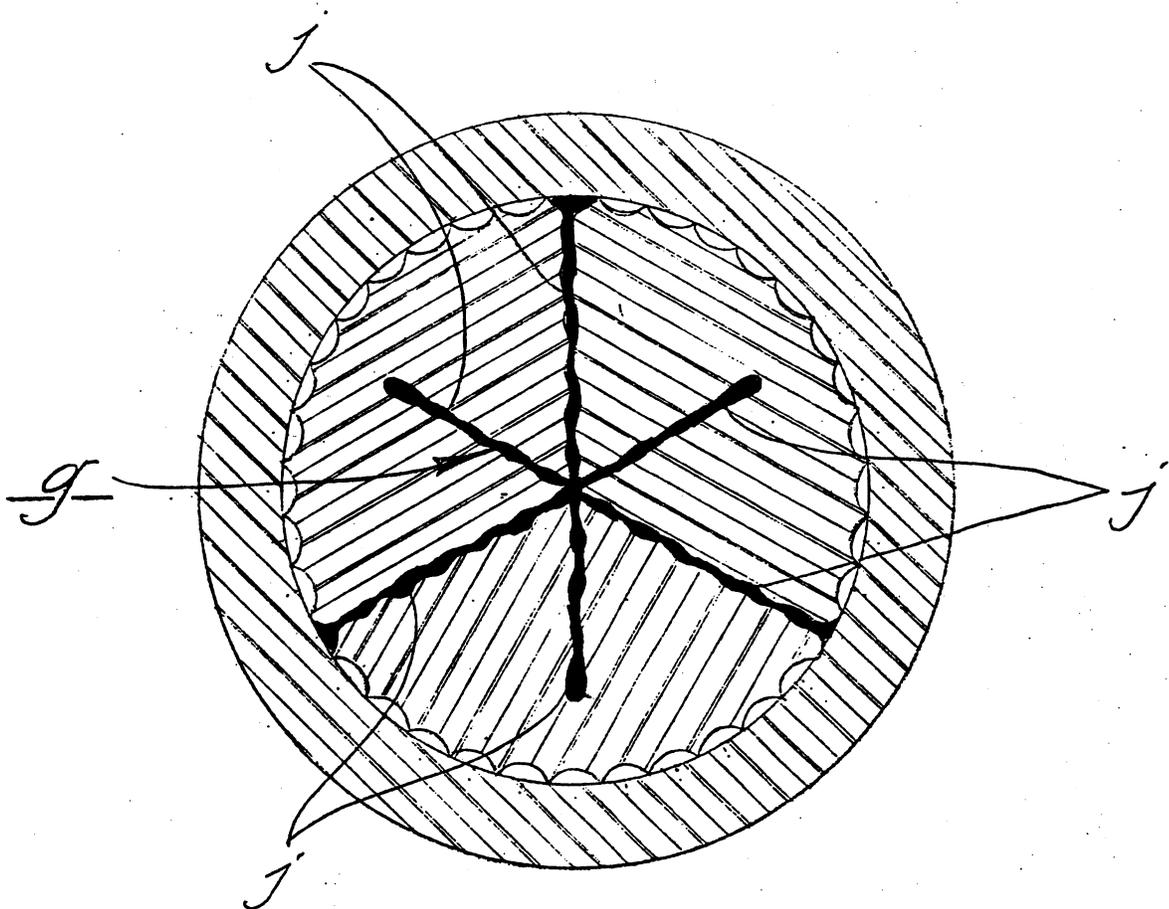
VENUS ESTERBROOK
"VEGA"



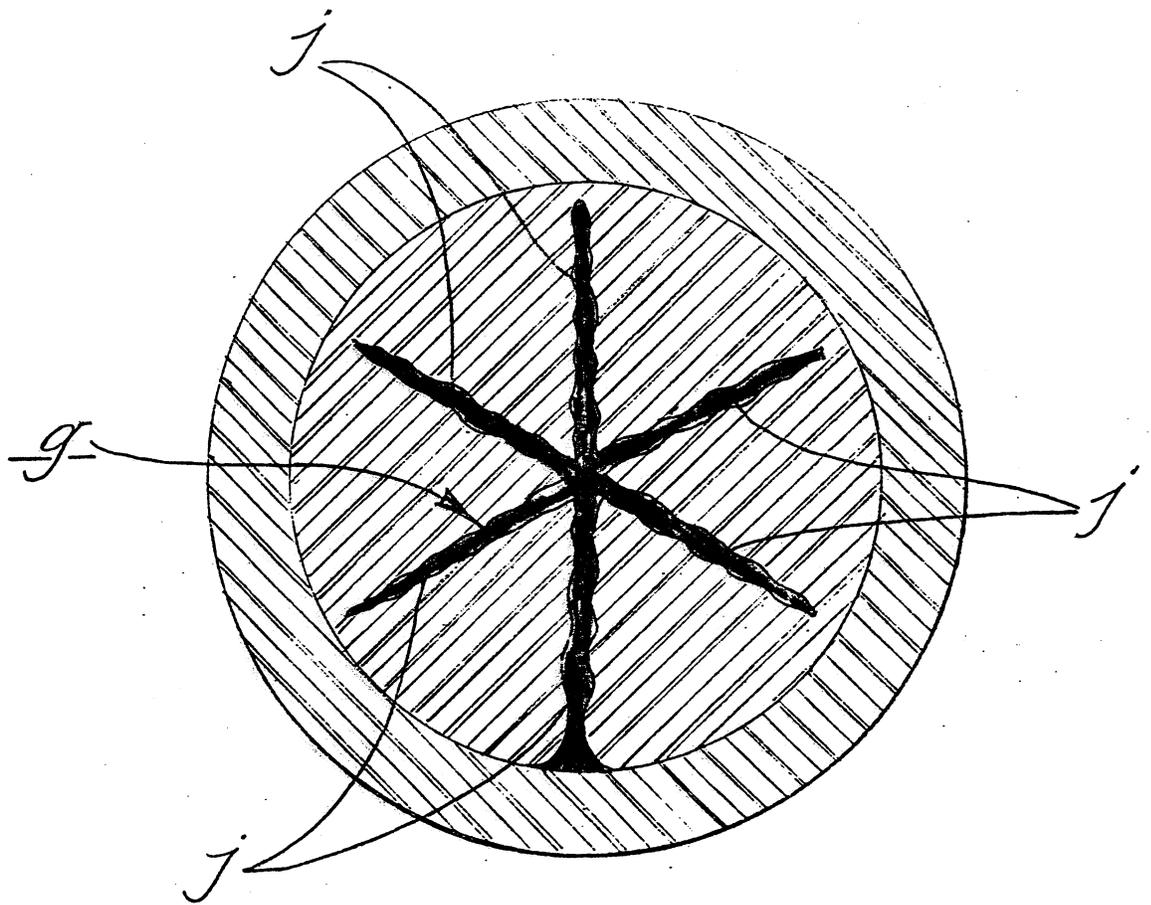
IMPORTED MODEL



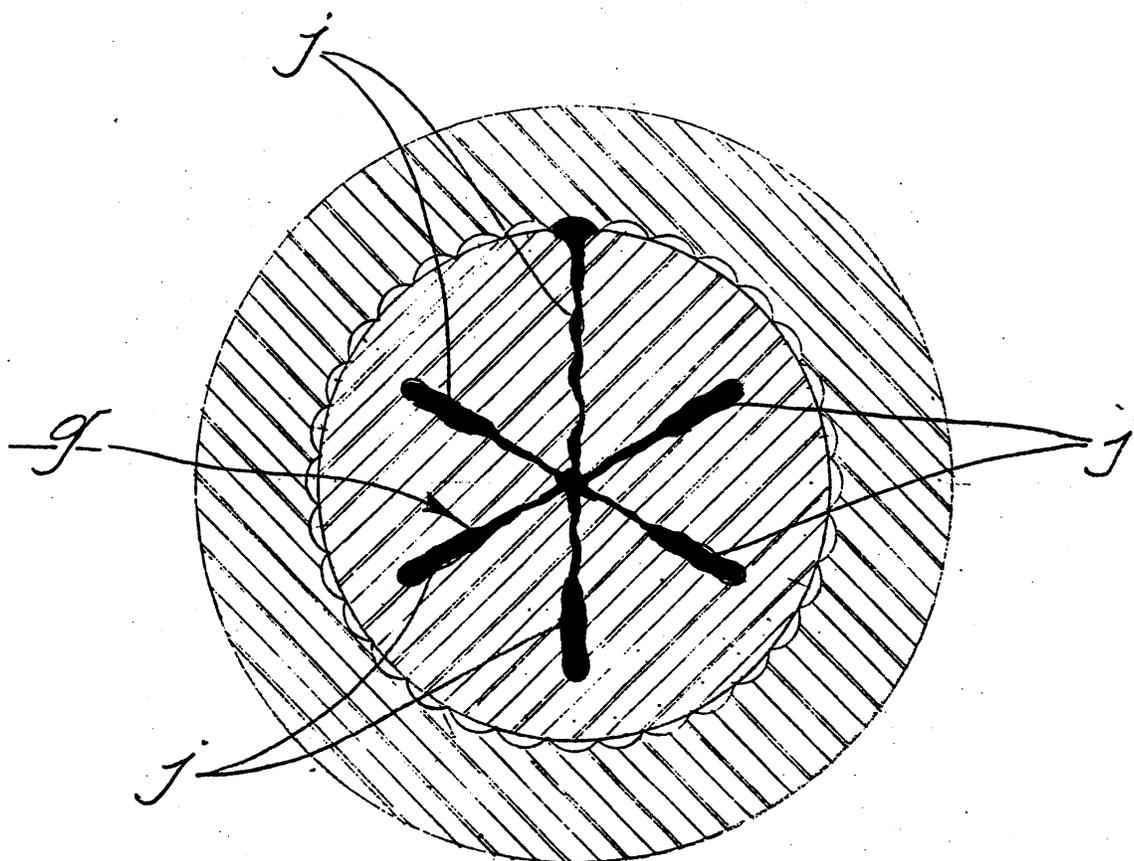
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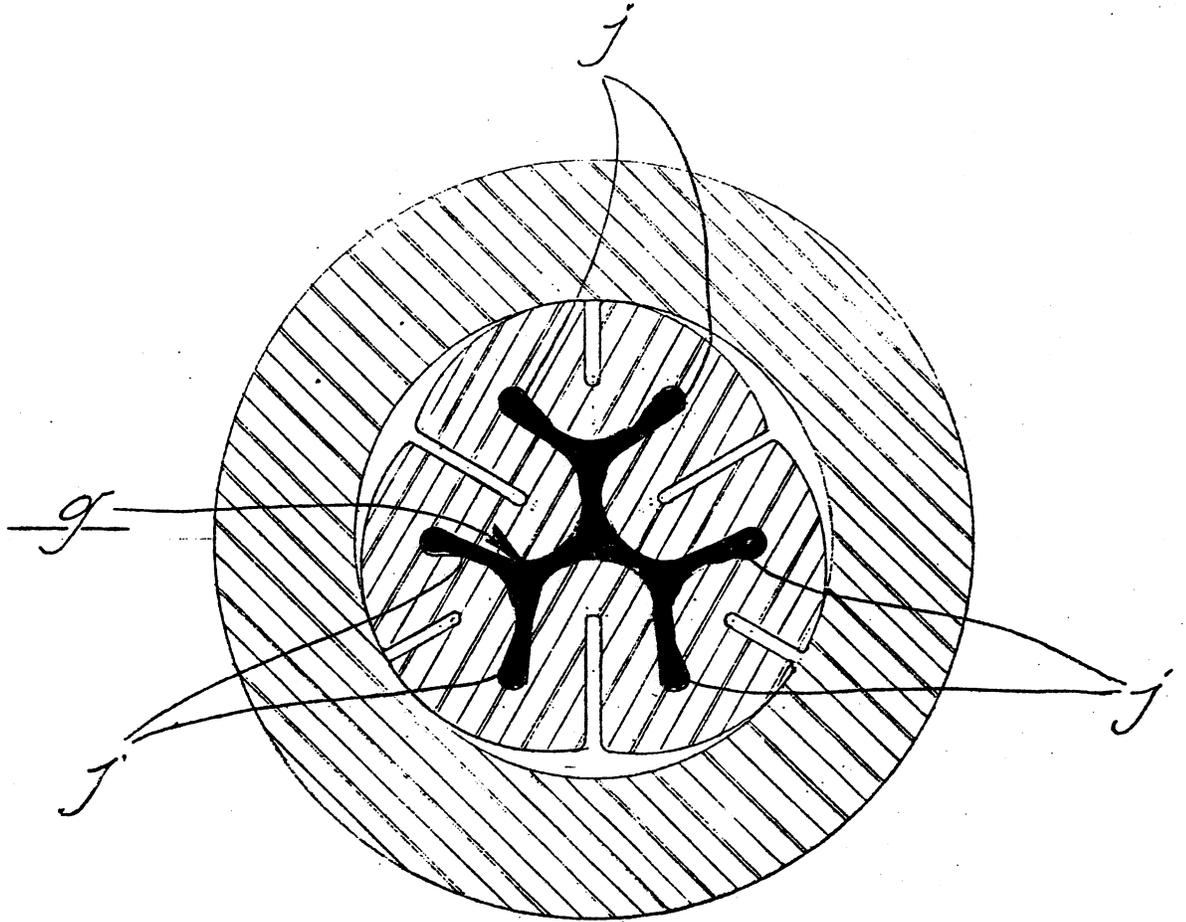
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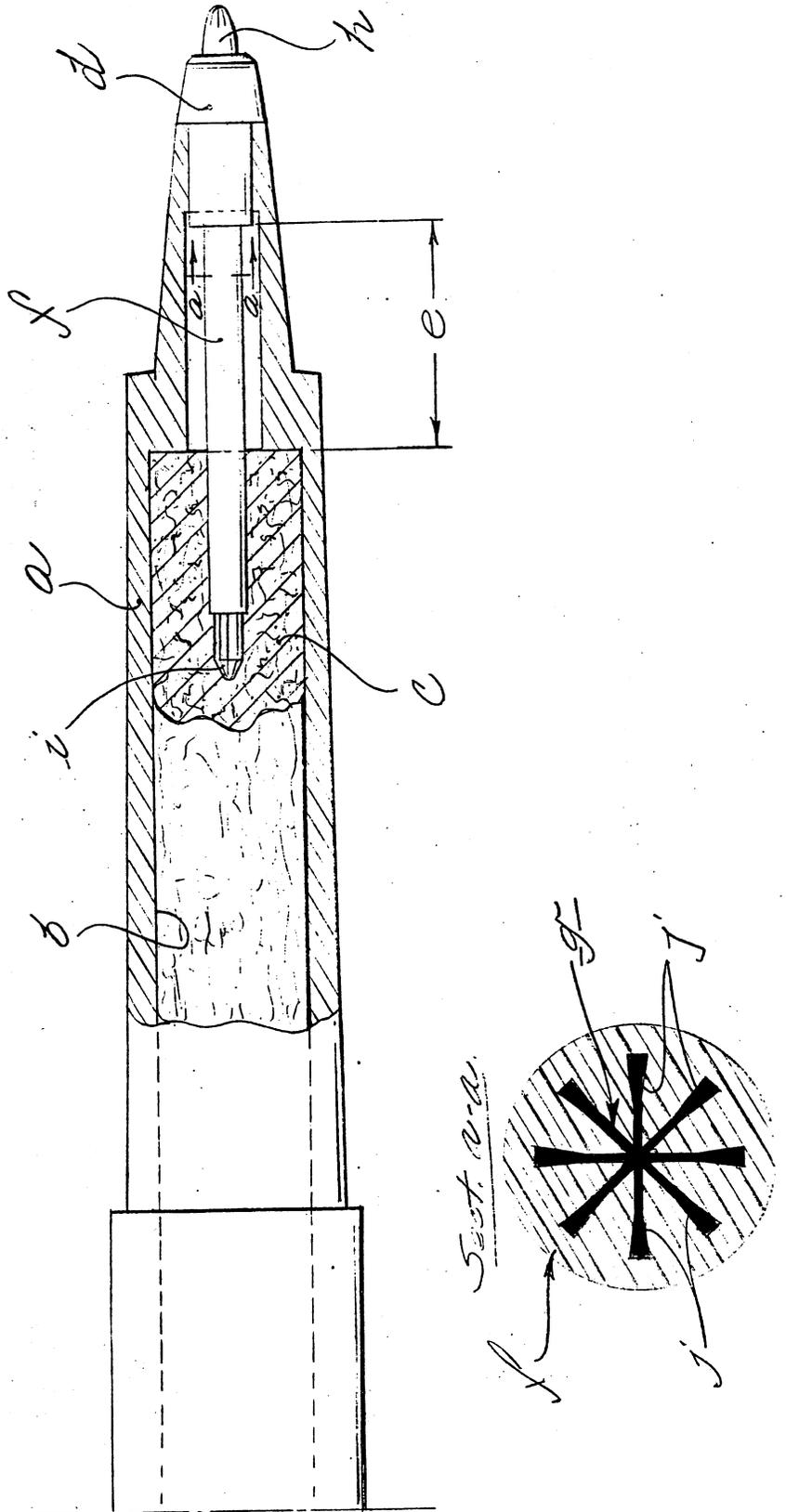
IMPORTED MODEL



IMPORTED MODEL
MICROPOINT MODEL NO. 549



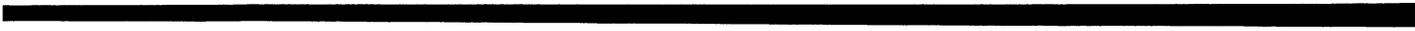
VENUS ESTERBROOK
"VEGA"





Appendix B

Copies of U.S. and Foreign Patents



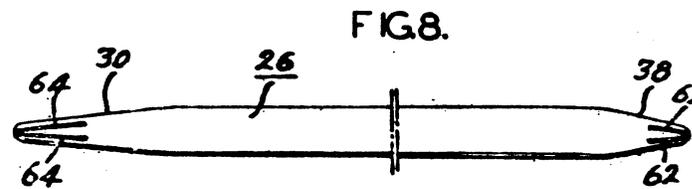
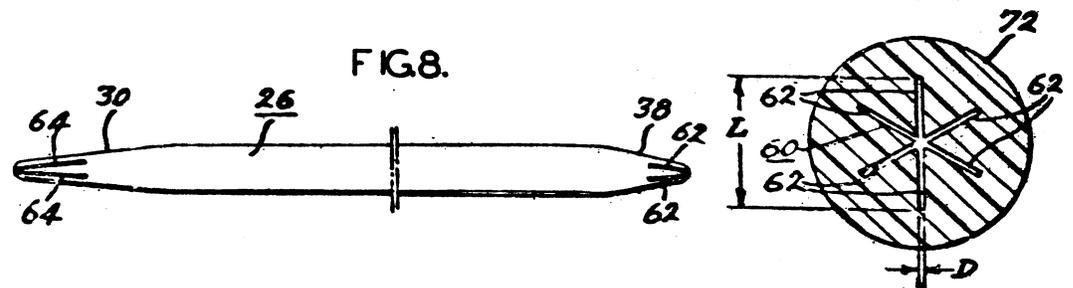
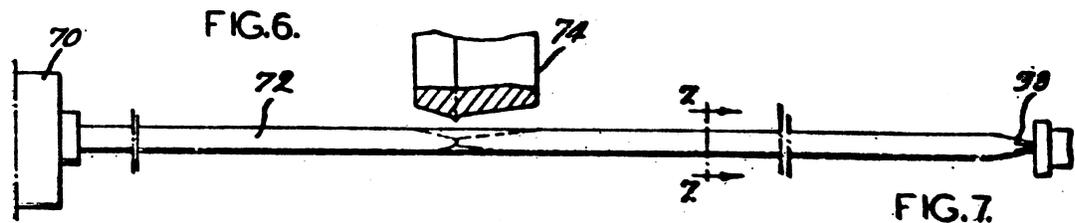
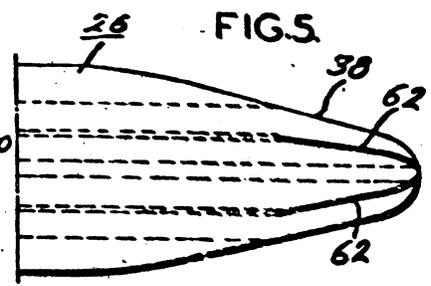
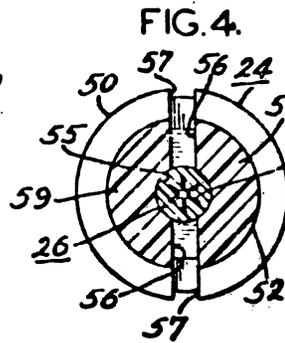
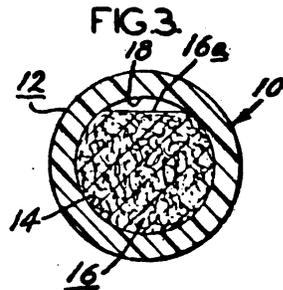
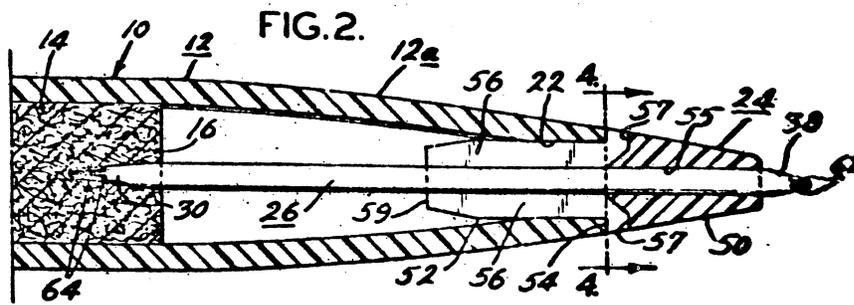
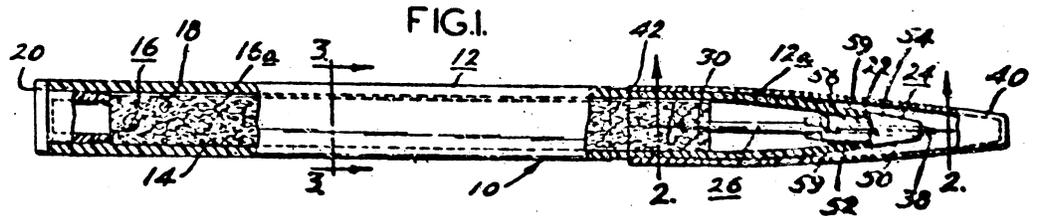
Aug. 29, 1967

F. W. ROLLER, SR

3,582,206

WRITING INSTRUMENT

Filed Jan. 11, 1966



INVENTOR:
FRANK W. ROLLER, SR.
BY *Howson & Howson*
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3,338,216

WRITING INSTRUMENT

Frank W. Roller, Sr., Haddonfield, N.J., assignor to The Esterbrook Pen Company, Cherry Hill, N.J., a corporation of New Jersey

Filed Jan. 11, 1966, Ser. No. 519,996

7 Claims. (Cl. 120-45.6)

ABSTRACT OF THE DISCLOSURE

A nib for a writing instrument including an elongated hollow casing the interior of which defines an ink reservoir, a filler of ink absorbent material housed in the ink reservoir and a nib holder for mounting a nib at one end of the casing which is spaced from the filler. The nib is an elongated member made of a flexible, resilient material such as Delrin and has a star-shaped opening disposed centrally thereof and extending the entire length of the nib. One end of the nib defines a writing tip and is disposed exteriorly of the casing and the opposite end of the nib is adapted to engage in the filler to draw ink therefrom, the star-shaped opening having a plurality of legs of a size to permit the flow of ink therethrough by capillary action.

The present invention relates to writing instruments generally of the type including an ink reservoir, a nib holder adapted to support a writing nib at one end of the reservoir positioned to receive ink by capillary action from an ink carrier housed in the reservoir. More specifically, the present invention relates to a new and improved type of nib for use in a writing instrument of this type.

An object of the present invention is to provide a writing instrument including a new and improved type of nib which is economical to make and which is very effective for the purposes intended.

Another object of the present invention is to provide a nib for a writing instrument characterized by novel features of construction and arrangement which produces a very fine line, insures continuous flow of ink and wherein there is substantially no danger of leakage.

These and other features of the present invention and various features and details of a writing instrument made in accordance with the present invention are hereinafter more fully set forth with reference to the accompanying drawing, wherein:

FIG. 1 is a side elevational view of a writing instrument in accordance with the present invention partly in section so that the internal construction thereof may be seen more readily;

FIG. 2 is an enlarged sectional view taken on line 2-2 of FIG. 1;

FIG. 3 is an enlarged sectional view through the casing of the instrument taken on line 3-3 of FIG. 1;

FIG. 4 is an enlarged sectional view taken on lines 4-4 of FIG. 2 through the tip of the writing instrument;

FIG. 5 is an enlarged fragmentary view of the tip of the nib;

FIG. 6 is a schematic illustration of a method for making a nib in accordance with the present invention;

FIG. 7 is an enlarged sectional view taken through the body of the nib along line 7-7 of FIG. 6; and

FIG. 8 is an enlarged view of the nib per se.

Referring now to the drawing and particularly to FIG. 1, there is shown a writing instrument generally designated by the numeral 10. The writing instrument 10 includes an elongated hollow barrel or casing 12 open at both axial ends and which forms an ink reservoir 14 and an elongated ink carrier or filter 16 housed in the reser-

voir 14. The ink carrier 16 is preferably made of a material such as felt capable of storing a large quantity of ink and as illustrated in FIG. 3, is of generally circular cross section having a longitudinally extending flat side edge portion 16a to define a longitudinally extending vent channel 18 between the flat on the reservoir and the inner peripheral surface of the barrel or casing 12.

The back end of the barrel 12 is closed by a plug 20 held in place by a press fit. The front end of the barrel 12 diverges inwardly to define a restricted opening 22 at its forward end to receive a nib holder 24 which in turn supports a writing nib 26. As illustrated, the writing nib 26 is supported in a manner so that its inner terminal end 30 engages in one end face of the ink carrier 16 and its writing tip 38 projects beyond the nib holder. By this arrangement, ink flows by capillary action from the inner terminal end 30 of the nib 26 to the writing tip 38 as will be explained in more detail hereinafter.

The writing instrument may include a cap 40 which frictionally engages over the tapered front end portion 12a of the barrel 12 to cover the writing tip 38 when the instrument is not in use and which is easily detached from the barrel when it is desired to use the writing instrument. The cap abuts a shoulder 42 on the barrel so that when it is applied over the nib the cap is spaced from and does not press against the writing tip 38.

The nib holder 24 as best illustrated in FIGS. 1, 2 and 4 comprises a forward section 50 which is generally cone-shaped and a generally cylindrical rear section 52 of smaller cross section than the largest cross sectional dimension of the cone to define a shoulder 54 at the juncture of the front and rear sections. The nib holder is provided with a central opening 55 of circular cross section. The rear section which is of a size to resiliently engage in the opening 22 in the front of the barrel, is provided with axially extending, diametrically opposed slots 56 defining axial air passages communicating with the interior of the barrel, the slots 56 extending forwardly into a portion of the cone-shaped forward section 50 to define radial air passageways 57. By this construction, the rear section of the nib holder is divided into a pair of opposed flexible wing segments 59.

A suitable material for the barrel 12, cap 40, plug 20, and nib holder 24 is a flexible resilient plastic material for example, nylon or propylene.

Now in assembling the writing instrument of the present invention, the ink carrier 16 is placed inside of the reservoir 14 of the barrel from the rear axial end thereof. The rear plug 20 is then pressed into place in the rear axial end of the barrel. Thereafter, a suitable supply of ink may be deposited in the opening 22 in the front of the barrel to saturate the carrier. The nib 26 is then positioned inside of the nib holder with the writing tip 38 projecting slightly beyond the front end of the holder. The pilot portion or rear section of the nib holder 24 is then engaged in the opening 22 in the front of the barrel, the wings 59 having a cross section to provide a snug press fit with the barrel. It is noted that when the nib holder is inserted, the wings 59 press against the nib 26 to hold it in a firm position in the holder. When the nib holder is completely assembled, the rear terminal end 30 of the nib presses into the front face of the ink reservoir to insure good transfer of ink from the filler to the writing tip. The writing instrument is now ready for use, the air passageways providing the desired venting of the inside of the barrel.

Considering now more specifically the details of construction of the nib 26, the nib is preferably made from a resilient, flexible material which is impervious to various types of writing fluids that may be used in the writing instrument. A suitable material for the nib has been found to be an extruded thermoplastic resin, such as that sold

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by the F. I. du Pont de Nemours and Company under the trade name "Delrin." The nib is generally of circular cross section as shown in FIG. 7 and has a star-shaped opening 60 disposed centrally thereof and running the entire length of the nib to permit flow of ink therethrough by capillary action. Further as illustrated, the writing tip is conical and preferably tapers at an included angle of about 30°. The rear terminal end 30 of the nib is also cone shaped having a rounded end portion. However, it has been found that for optimum transfer of ink through the nib by capillary action, the included angle of taper of the rear section is preferably smaller than the cone-shaped writing tip. Further, the star-shaped opening 60 in the nib defines six circumferentially equispaced venting legs 62 in the writing tip and a similar number of absorption legs 64 in the rear terminal end 30 of the nib. Each of these legs is of comparatively small cross section D. It has been found that for optimum flow of the ink through the nib, the cross sectional dimension D of the legs may be in the order of 0.005 inch to 0.0025 inch. The width of the legs in the nib will depend on the type of ink used, the viscosity of the writing fluid and other factors. The external diameter of the nib may vary, however, the length L of aligned legs of the nib should be in the range of from 0.020 to 0.030 less than the external diameter of the nib. Further it has been found that while six circumferentially equispaced legs provide a good transfer of ink, four may be suitable and a number greater than six may also provide the desired ink flow.

There is illustrated in FIG. 6 a schematic arrangement for producing nibs of the type described above. As illustrated therein, the nib material may be extruded through a suitable die 70 to provide an elongated rod 72 having the central star-shaped opening therein. As the rods are extruded, a double-faced grinder 74 engages the rod at a selected location to provide a nib of the desired length and simultaneously form the rear section and writing tip of the nib. It is, of course, to be understood that this method is one means of making a nib, and that other suitable means may be employed for making the nib having the characteristics of the nib described above.

It is further noted that even though the nib of the present invention is illustrated and described in conjunction with a writing instrument having an ink carrier made of felt, the nib may also be used in a writing instrument where the ink is stored in a cartridge or the like.

While a particular embodiment of the present invention has been illustrated and described herein, it is not intended to limit the invention and changes and modifica-

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tions may be made therein within the scope of the following claims.

I claim:

1. In a writing instrument including an elongated hollow casing defining an ink reservoir, a filler for the ink reservoir and a nib holder for mounting a nib at one end of the casing, the nib holder being spaced from the filler, a nib comprising an elongated member having a star-shaped opening disposed centrally thereof and extending the entire length thereof, a writing tip at one end of said nib disposed exteriorly of the casing and a rear terminal end opposite said one end of said nib adapted to engage the filler to draw ink therefrom, said star-shaped opening having a plurality of legs of a size to permit flow of ink therethrough by capillary action.
2. In a writing instrument as claimed in claim 1 wherein the nib is made of a resilient, flexible material.
3. In a writing instrument as claimed in claim 2 wherein said material is a thermoplastic resin.
4. In a writing instrument as claimed in claim 1 wherein said writing tip is conical and preferably tapered at an included angle of approximately 30° and wherein the rear terminal end of the nib is cone shaped and is tapered at an included angle less than the angle of taper of the writing tip.
5. In a writing instrument as claimed in claim 1 wherein the star-shaped opening in the nib defines six circumferentially equispaced venting legs in the writing tip and a similar number of absorption legs in the rear terminal end thereof.
6. In a writing instrument as claimed in claim 5 wherein each of said legs is of comparatively small cross section of between approximately 0.005 inch to 0.0025 inch.
7. In a writing instrument as claimed in claim 5 wherein the length of aligned legs of the nib are approximately 0.020 to 0.030 less than the external diameter of the nib.

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LAWRENCE CHARLES, *Primary Examiner.*

Aug. 31, 1965

C. SCHREUR

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WRITING INSTRUMENT

Filed Aug. 15, 1962

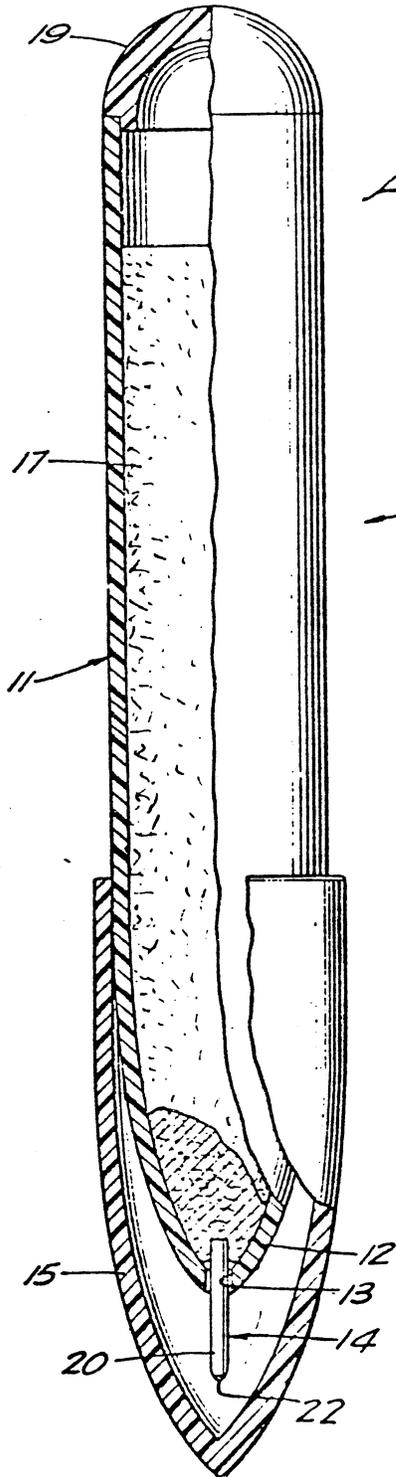


FIG. 1.

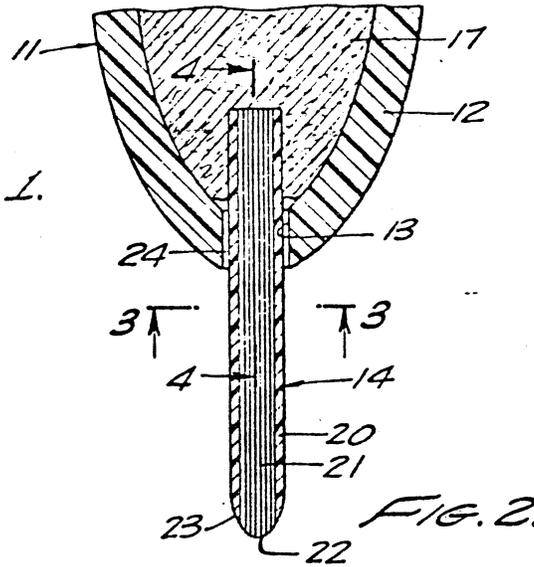


FIG. 2.

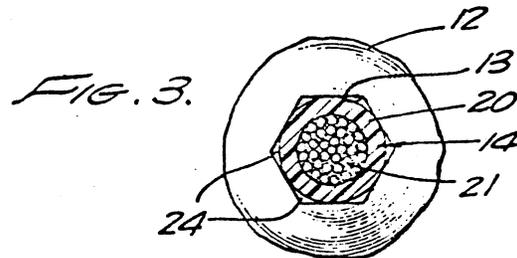


FIG. 3.

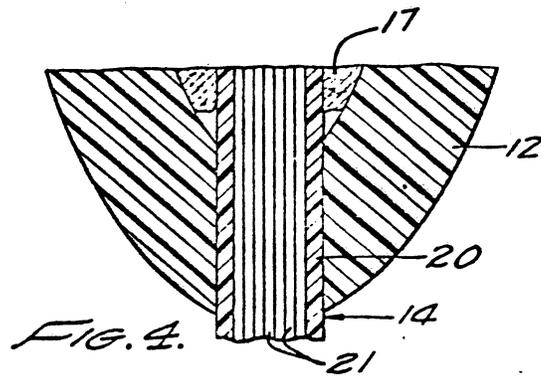


FIG. 4.

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United States Patent Office

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Patented Aug. 31, 1965

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WRITING INSTRUMENT

Clarence Schreier, Escondido, Calif., assignor to Pacific Research Laboratory, Escondido, Calif., a partnership
 Filed Aug. 15, 1962. Ser. No. 217,212
 21 Claims. (Cl. 15—563)

This invention relates to writing instruments and more particularly to an instrument of the type having a reservoir supply of ink in continuous communication with a stylus or writing nib comprising a very slender flexible bundle of fibers or filaments for feeding ink to the exposed end by capillary action and as needed for leaving a very narrow, thin mark upon the surface contacted, and which capillary feeding core is encapsulated except at its ends by a tubular shroud.

Proposals have been made heretofore to provide hand-held marking devices employing a thick-bodied relatively stiff fibrous nib formed of felting, wicking or the like and functioning to feed ink in a wide strip onto the surface being marked and employing the ink-feeding characteristics of felting and wicking. Writing devices of this type are used to advantage in many fields and serve admirably for marking with large or wide symbols, as for example, in the sign painting art and by merchants and artisans when marking rough surfaces as shipping cartons, lumber, building materials, parcel post packages and the like. Such markers, commonly referred to as fountain brushes, are quite unsuitable for fine work such as that desired for normal writing and accounting purposes requiring sharply defined, narrow, quick-drying lines produced by a nib incapable of flooding as essential characteristics. Felt nibs as heretofore proposed in marking devices have insufficient rigidity and wearing characteristics for practical use as a writing instrument if an attempt is made to slim the nib down to a slender small-diameter contour. The service life is totally unacceptable and the load-supporting characteristics are so small as to require the user to tense the muscles in an attempt to hold the nib lightly contacted with the paper or other writing surface thereby tiring the user after only a very short period of writing. If an attempt is made to sharpen a large cross-section nib of felting to provide a fine writing point, somewhat greater rigidity and supporting capacity is obtained but the sharp point wears away after a brief period of use and there is a pronounced tendency for the sharpened nib to flood as well as to produce a broad line unless the instrument is supported deftly with only the point proper in light contact with the writing surface.

With the foregoing shortcomings and disadvantages of prior proposals in mind, it is pointed out that it is a prime purpose of the present invention to provide an improved writing instrument retaining certain advantages of fibrous and felt-tipped fountain brush-type marking devices while avoiding many of the limitations, defects and shortcomings of the fountain brush. Thus there is provided by the present invention a simply constructed, inexpensive, lightweight hand-held writing instrument of the fountain type featuring a generally rigid writing nib comprising an extremely small diameter bundle of closely compacted filaments, fibers or other equivalent means for feeding ink by capillary action and featuring a thin-walled tubular shroud having numerous functions. Typically the capillary ink-feeding core of the nib may comprise a multiplicity of fine fibers cooperating to provide a large number of very fine capillary passages between their adjacent side walls and having little or no load-supporting capability by themselves, the latter important and essential requirement being performed by the encapsulating or surrounding shroud of thin-walled flexible material. For example, this shroud may comprise a suitable plastic

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immune to attack by the constituents of the ink and having wearing qualities greatly enhancing the wearing properties of the capillary core material. Only the opposite ends of this core are left uncovered, the inner ends being in intimate contact with the ink supply and the outer ends being exposed just sufficiently to convey the ink into contact with the surface being written upon. The end of the shroud is rounded to form a continuation of the wear-rounded exposed outer end of the core.

In normal usage the nib is held at an angle inclined to the surface being written upon with the result that the lowermost edge of the nib shroud forms a glide surface firmly and accurately supporting the writing force applied to the instrument and effective in holding the adjacent end portion of the capillary material in contact with the surface to apply ink thereto.

Accordingly, it is a primary object of the present invention to provide an improved writing instrument featuring a novel nib and capable of making a fine line imprint of predetermined width on a wide range of surfaces and irrespective of whether these surfaces are rough, porous, smooth, glossy, etc.

Another object of the invention is the provision of an inexpensive hand-held writing instrument having an elongated very small diameter nib featuring a capillary core encapsulated in a protective generally rigid shroud for the core, adding support and rigidity thereto and assuming a major portion of the wear-resisting characteristics of the nib assembly.

Another object of the invention is the provision of a writing instrument having a small diameter tubular nib mounted within the lower end thereof and designed to bear against the writing surface and to cooperate with a core filling in forming a multiplicity of capillary ink-feeding channels.

Another object of the invention is the provision of a nib for a writing instrument comprising a thin-walled tubular housing charged throughout its length with capillary ink-feeding means effective to supply ink as needed to the surface-contacting end of the nib.

Another object of the invention is to provide an ink-feeding nib comprising a seamless abrasion resistant plastic tube charged with fibrous material exposed at the opposite ends of the tube and forming a multiplicity of capillary ink-feeding channels.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing to which they relate.

Referring now to the drawing in which a preferred embodiment of the invention is illustrated—

FIGURE 1 is an elevational view partly in section of a writing instrument incorporating the present invention; FIGURE 2 is a fragmentary cross-sectional view on an enlarged scale taken through the nib-supporting portion of the instrument;

FIGURE 3 is a fragmentary cross-sectional view on an enlarged scale taken along line 3—3 on FIGURE 2; and

FIGURE 4 is an enlarged fragmentary sectional view taken lengthwise of the writing instrument at the junction of the nib with the main body, as is indicated by the line 4—4 on FIGURE 2.

Referring more particularly to FIGURE 1, there is shown one preferred embodiment of a writing instrument designated generally 10 embodying the features of the present invention. This instrument includes a tubular main body 11 of any suitable material such as molded plastic. Main body 11 has a tapering lower end 12 formed in its axial tip with a noncircular opening 13 supporting therein a nib 14. When not in use, nib 14 is preferably guarded by a protective cap 15 having a friction

fit with either end of the cylindrical main body of the instrument.

Body 11 is intended to be charged with a suitable writing fluid desirably retained by absorbent material 17. This material may consist of a wide variety of substances well known to the art, such as porous fibrous material, felt, a mass of inert granular particles and others. If desired, the upper end of body 11 may be provided with a removable cap 19 permitting recharging of material 17 with a new charge of ink after the initial charge has become exhausted.

Referring more particularly to FIGURES 2, 3, and 4, it will be understood that nib 14 constituting an important component of the present invention includes a generally rigid but slightly flexible open ended tube 20 enclosing a snugly compacted core of capillary ink-feeding material 21. The dimensions of the nib components are shown in exaggerated and greatly amplified scale to facilitate an understanding of the construction, a fact which will be appreciated when it is noted that the exterior or outer diameter of tube 20 is preferably not substantially greater than 50 mils and its internal diameter is about 35 mils. The thickness of the tube wall is, therefore, seen to be about 7 mils. The thickness may be varied depending upon the properties of the constituent material.

Although metal such as brass or aluminum may be employed for the nib, excellent results are obtained with extruded plastic materials immune to attack by the ink to be employed. Tetrafluoroethylene, known commercially under the trade mark Teflon, is particularly suitable because of its strength, toughness, unusually high resistance to abrasion and to attack by ink fluids, its long-wearing characteristics and its exceedingly low coefficient of friction.

Shroud 20 is charged with capillary ink-feeding material of any suitable character as, for example, a multiplicity of very fine fibers or filaments of either an absorbent or nonabsorbent character. More specifically it is found that excellent results are achieved using a core filling of untwisted 3700 denier, 200 filament nylon yarn, this material being drawn through the tube until it is completely charged with these filaments. The upper or interior end of the nib enclosed by holder 11 desirably projects upwardly into the absorbent ink-retaining material 17, or it may be cut off substantially flush with the adjacent end of encapsulating tube 20. The lower ends of the filaments project slightly beyond the outer or writing end of the nib and these are desirably rounded off generally in the manner indicated at 22 in FIGURE 2. The adjacent rim edge of shroud 20 is similarly rounded or chamfered to provide a smooth glide surface 23 merging with and forming a continuation of the rounded tip end 22 of the capillary material. It will, therefore, be recognized that surface 23 is a generally narrow frustoconical band, a small area of which provides a glide surface or shoe which rides in contact with the surface being written upon as the pen is held in the conventional, normal inclined position with respect to this surface. Likewise it will be recognized that the adjacent rounded end 22 of the filaments is in contact with the writing surface and effective to feed ink to this surface in a very narrow band determined by the very small portion of the rigid glide surface 23 actually in contact with the writing surface. Furthermore, only a relatively small percentage of this glide surface can be brought into contact with the writing surface at any time and it is this small surface which determines the width of the line of ink left by the passage of the nib over the surface.

Since the shroud, rather than the core material, takes the applied writing force, the relatively flexible fibers constituting core 21 are not deflected and absorb little or none of either the friction or writing applied forces. In consequence the filament ends in contact with the surface are not spread by the writing pressure but are merely

maintained in very light contact with the surface, and this is true irrespective of the direction from the vertical to which the pen is inclined when starting to write.

Shroud 20 is the main component resisting wear of the nib. If selected from a material having a small coefficient of friction, as is desired, the shroud is found to be extremely long wearing and highly effective in protecting and prolonging the service life of core filling 21.

Another feature of the invention is best shown in FIGURES 2 and 3 and has reference to the mounting of nib 14 in main body 11. Preferably mounting opening 13 is noncircular in cross-section, such as of the hexagonal shape shown in FIGURE 3. The smaller diameter of this hexagonal opening is somewhat less than the exterior diameter of shroud 20 with the result that the shroud has a snug frictional fit within the opening yet leaves a plurality of voids or very small openings 24 serving as air vents to admit air as the ink supply is consumed during use of the instrument. The air vents also accommodate temperature and pressure changes without permitting leakage of the ink supply. Should nib 14 become damaged or unusable for any reason, it can be easily withdrawn and replaced by an identical replacement nib.

The mode of operation of the described writing instrument will be quite apparent from the foregoing detailed description of its components and their operative relationship to one another. As will be readily apparent, the tip of nib 14 may be applied to the surface to be written upon with any portion of glide surface 23 in contact with the writing surface and serving as a glide shoe. Varying writing pressures are absorbed substantially entirely by shroud 20 with but slight or imperceptible flexure of the nib body. Small scale repeated flexure of the nib transversely of its length does occur in normal writing but in an amount so small as to be well within the elastic limit of the nib assembly. Irrespective of this repeated flexure, the nib will instantly return to its original straight condition as the pressure is relieved and this is true even though extreme deflection of the nib occurs through accident or other cause.

Desirably absorbent material 17 is charged with an ink formulation which feeds readily by capillary action and which dries rapidly even on nonporous substrates such as glass, metal, plastics and the like nonporous surfaces, and which resists removal by a wide range of solvents. A suitable ink meeting these requirements consists of 10% ester gum, 5% oil soluble dye, and 85% toluene. Numerous other ink compositions having generally similar characteristics to those just mentioned and known to the art may also be used.

While the particular writing instrument herein shown and disclosed in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiments of the invention and that no limitations are intended to the details of construction or design herein shown other than as defined in the appended claims.

I claim:

1. A writing instrument having a main body provided with a chamber charged with ink-storing means there-within, an elongated flexible tubular writing nib having an end projecting outwardly from said main body with the interior end thereof in communication with said ink-storing means, said nib comprising a multiplicity of filaments cooperating to provide a capillary ink-feeding system between said ink-storing means and a writing surface when in contact with the outer end of said nib, and a relatively rigid impervious encapsulating shroud snugly enclosing said capillary system substantially throughout the length thereof exteriorly of said main body with its outer end adapted to contact the surface being written upon and functioning to lend writing rigidity to the outer end of

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said filaments and preventing evaporation and drying of ink from the sides of said nib.

2. A writing instrument as defined in claim 1 characterized in that the wear resisting characteristics of said shroud are at least greater than those of said filaments whereby the outer end of said shroud wears away automatically and as an incident to the use of the pen to produce writing thereby exposing new increments of said filaments and supplementing the wear resisting characteristics of said filaments in prolonging the service life of said nib.

3. A writing instrument having an elongated tubular main body charged with ink-storing means therewithin, a long slender flexible tubular writing nib supported in and projecting from one end of said main body with its inner end arranged to be supplied with ink from said ink-storing means, said nib being characterized by a core of fine elements arranged parallel to one another in closely compacted form effective to feed ink by capillary action from said ink-storing means past the exposed outer end of said elements onto a surface in contact with the exposed outer end of said nib as the nib is moved across said surface, and semi-rigid but flexible open-ended tubular shroud means enclosing substantially the full length of said fine elements exteriorly of said instrument body and constituting the means for holding said fine elements snugly and closely compacted therewithin and for lending flexible writing stability to said fine elements.

4. A writing instrument as defined in claim 3 characterized in that said main body is provided with fine bare air vent means through the wall of said main body exteriorly of said nib shroud and closely adjacent the connection of the latter to said instrument body.

5. A writing instrument as defined in claim 3 characterized in that said shroud is formed of thin-walled non-metallic material having sufficient flexibility to withstand repeated slight flexure without taking a set or fracturing.

6. A writing instrument as defined in claim 5 characterized in that said shroud has greater wear-resisting characteristics than said fine ink-feeding elements whereby the latter serve primarily to feed ink to the tip of the shroud in contact with the surface being written upon.

7. A writing instrument as defined in claim 3 characterized in that said shroud comprises a tube of flexible plastic material immune to attack by the ink writing fluid charged within said ink-storing means.

8. A writing instrument as defined in claim 3 characterized in that the exposed outer end of said nib is not substantially thicker than 125 mils.

9. A writing instrument as defined in claim 3 characterized in that said capillary ink-feeding elements comprise a small bundle of fine filaments arranged parallel to one another axially of said shroud with the interior ends thereof in intimate contact with said ink-storing means.

10. A writing instrument as defined in claim 3 characterized in that said ink-feeding elements enclosed by said shroud mutually cooperate to form a multiplicity of capillary passages effective to advance ink axially of said nib to spread a narrow line of ink onto a surface as the outer end of said nib is passed over a surface and irrespective of the position of said surface with respect to the end of the nib.

11. A writing instrument comprising a hollow tubular housing charged with capillary ink-storing means, a writing nib projecting from one end of said tubular housing, said nib comprising a thin-walled tube compactly and snugly enclosing capillary ink-feeding material comprising a compact flexible bundle of filaments which bundle is in contact at its inner end with said ink-storing means, the outer end of said bundle of ink-feeding material being

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semi-spherical in contour and terminating beyond but substantially at the outer end of said tube and being effective to feed ink onto a surface as the semi-spherical nib tip is moved along the surface.

12. A writing instrument as defined in claim 11 in that said nib is adjustable lengthwise of the end of said housing whereby a desired length of said nib can be exposed to vary the degree of flexibility of the nib to suit individual users.

13. A writing instrument as defined in claim 12 characterized in that said nib has a firm frictional fit in an opening through one end of said instrument housing and being forcibly adjustable axially of said opening, said frictional fit being effective to hold the nib firmly supported and against axial movement under normally applied writing pressure but being movable to a different position under deliberately applied pressure.

14. A writing instrument as defined in claim 13 characterized in the provision of minute atmospheric air vent means between the interior and exterior of said housing in an area in close proximity to said nib.

15. A nib adapted to be mounted in a holder for a supply of writing fluid, said nib comprising an elongated thin-walled slightly flexible tube open at its opposite ends, said tube having one end thereof rounded to provide a smooth glide surface when said nib is placed in contact with a surface to be written upon at a conventional writing angle for a hand-held writing instrument, said tubing being formed of semi-rigid wear-resisting material and being charged with a snugly-fitting flexible core comprising a multiplicity of filaments extending the length of said tube, the outer exposed ends of said filaments being contoured to provide an outwardly protruding semi-spherical surface merging smoothly with the similarly rounded glide surface on the outer end of said flexible tube and which core of filaments is effective to feed ink to a writing surface in contact therewith and with said glide surface.

16. A nib as defined in claim 14 characterized in that said thin-walled tube is formed of resilient nonmetallic material and capable of flexing repeatedly without assuming permanent deformation in response to changing load forces normally applied to nibs when in use.

17. A nib as defined in claim 14 characterized in that said thin-walled tube is seamless plastic material.

18. A nib as defined in claim 15 characterized in that said nib has an external diameter not in excess of 50 mils.

19. A nib as defined in claim 18 characterized in that the same has an internal diameter of approximately 35 mils.

20. A nib as defined in claim 19 characterized in that said tube is formed of flexible plastic material such as tetrafluoroethylene having a very low coefficient of friction.

21. A nib as defined in claim 19 characterized in that said core comprises untwisted nylon yarn.

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CHARLES A. WILLMUTH, *Primary Examiner.*

GEORGE A. NINAS, Jr., JEROME SCHNALL,
Examiners.



ÖSTERREICHISCHES PATENTAMT
 PATENTSCHRIFT NR. 200473

Kl-70 a-11

Ausgegeben am 10. November 1958

ING. ANTON KORNFELD IN WIEN

Schreibspitze

Angemeldet am 10. November 1956. — Beginn der Patentdauer: 15. April 1958.

Es ist eine Füllfeder mit einer Schreibspitze vorgeschlagen worden, die aus Metall oder auch aus Kunststoff hergestellt und mit einem zentralen Kanal an dem der Schreibspitze abgewendeten Ende versehen ist, der mit dem Tintenbehälter über ein Röhrchen in Verbindung steht. Der Kanal reicht nur ein kurzes Stück in die Schreibspitze, während von ihrer Spitze sich kreuzende, über ihre gesamte Kugelfläche reichende Einschnitte vorgesehen sind, die daher auch noch in den Kanal reichen. Die Schreibspitze muß daher, insbesondere wenn sie aus elastischem Werkstoff, wie z. B. Kunststoff, besteht, um ein unbeabsichtigtes Austreten der Schreibflüssigkeit und Klecksen zu verhüten, von einem besonderen Führungsstück umfaßt sein, das nur ein kurzes Stück der Schreibspitze freiläßt. Die Füllfeder wird auf diese Weise im Aufbau ziemlich umständlich.

Die Erfindung betrifft eine Schreibspitze aus Kunststoff mit einem für den Zutritt der Tinte (Schreibpaste) dienenden zentralen Kanal, in den von der Spitze ausgehende, sich kreuzende Einschnitte münden und bezweckt eine Vereinfachung der Bauart der bekannten Schreibspitzen, um sie gegebenenfalls sofort in ein die Schreibflüssigkeit (Paste) enthaltendes Rohr einstecken zu können, wie dies bei Kugelschreiberpatronen mit Schreibspitzen bekannt ist. Im wesentlichen besteht die Erfindung darin, daß der Kanal mit einer Verjüngung bis nahe an die Spitze heranreicht und die von der Spitze ausgehenden Einschnitte innerhalb der Begrenzungsfläche der Schreibspitze liegen und eine Breite von etwa der halben Weite des Kanals aufweisen.

In der Zeichnung ist eine Schreibspitze gemäß der Erfindung in einer beispielsweise Ausführungsform in größerem Maßstab dargestellt. Fig. 1 zeigt einen Längsschnitt durch die Schreibspitze und Fig. 2 eine Stirnansicht hiezu.

Die Schreibspitze besteht aus einem zylindrischen Schaft 1, der mit einer nach außen vor-

springenden Ringstufe 2 in die eigentliche Kegelform aufweisende Spitze 3 übergeht. Von der Stirnfläche des Schaftes 1 geht ein zentraler im Querschnitt kreisförmiger Kanal 4 aus, dessen Durchmesser ungefähr ein Drittel des Außendurchmessers des Schaftes 1 ist und der mit einer kegelförmigen Verjüngung 5 versehen ist, die bis nahe an die etwas abgerundete Kegelspitze heranreicht, von welcher Einschnitte 6 mit einer Breite B ausgehen, die ungefähr dem halben Durchmesser W des Kanals 4 entspricht. Im Ausführungsbeispiel sind drei sich kreuzende Einschnitte 6 vorgesehen, doch können auch bloß zwei sich im rechten Winkel kreuzende Einschnitte angeordnet sein. Die Einschnitte 6 reichen in die kegelförmige Verjüngung 5, liegen aber innerhalb der Begrenzungsfläche der Schreibspitze, die unter Umständen auch von der Kegelform abweichen kann.

Durch die erfindungsgemäße Ausbildung der Schreibspitze behält diese auch bei Benutzung elastischerer Kunststoffe ohne Verwendung zusätzlicher Umfassungsfutter ihre Form bei, wobei bei der Verformung der Schreibspitze durch den beim Schreiben auftretenden Druck durch die sich teilweise öffnenden Einschnitte 6 genügend Schreibflüssigkeit (Paste) austreten kann, ohne jedoch zum Klecksen Anlaß zu geben, während ein Austreten der Schreibflüssigkeit im Ruhezustand der Schreibspitze mit Sicherheit vermieden ist.

Unter Umständen können anstelle eines einzigen Kanals auch mehrere Kanäle vorgesehen sein, die in die Einschnitte 6 münden.

PATENTANSPRUCH:

Schreibspitze aus Kunststoff mit einem für den Zutritt der Tinte (Schreibpaste) dienenden zentralen Kanal, in den von der Spitze ausgehende, sich kreuzende Einschnitte münden, dadurch gekennzeichnet, daß der Kanal (4) mit einer Verjüngung (5) bis nahe an die Spitze heranreicht und die von der Spitze ausgehen-

den Einschnitte (6) innerhalb der Begrenzungsfläche der Schreibspitze liegen und einer Breite (4) aufweisen.

(Hiezu 1 Blatt Zeichnungen)

Osterreichisches Patentamt
Patentschrift

Nr. 200473

Kl. 70 a, 11

1 Blatt

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U. S. PATENT OFFICE

FIG. 1

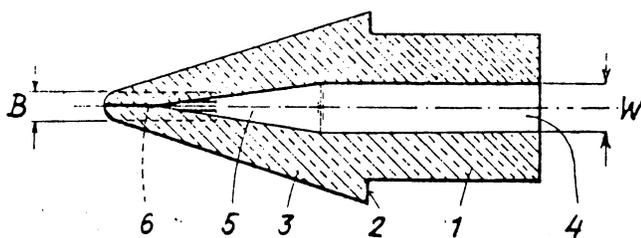
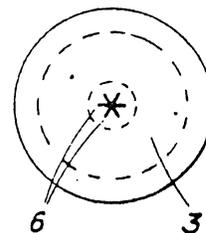


FIG. 2



TRANSLATION of Austrian Patent No. 200,473 of Kornfeld.

Austrian Patent Office

APPENDIX B-10

Class 70a, 11

PATENT NO. 200,473

Published 10 November 1958

The engineer Anton Kornfeld, of Vienna.

WRITING TIP

Applied for 10 November 1956.
Patent life begins 15 April 1958.

There has been proposed a fountain pen having a writing tip made of metal or even of synthetic material, and provided with a central channel at the end turned away from the writing tip, this channel being in communication through a small tube with the ink reservoir of the pen. The channel extends for only a short distance into the writing tip, while slits are provided that cross one another and extend over the entire ball surface, thereby extending also into the channel. For this reason the writing point, particularly when it is made of an elastic material, such for example as a synthetic substance, must in order to prevent accidental emergence of the writing fluid and to avoid making blotches, be surrounded by a special guide-piece, which exposes only a short piece of the writing tip. Thus the fountain pen is of rather complicated construction.

The invention concerns a writing tip of synthetic material, with a central channel serving for the access of the ink (writing paste), into which open slots that run from the tip and that cross one another, and the invention has the purpose of simplifying the form of construction of the known writing tips, for the purpose of if need be making it possible to insert into it a tube which contains the writing fluid (paste), as is known for the cartridges for ball-point pens having writing tips. The invention consists essentially in that the channel extends with a reduction almost to the tip, and the slots that run from the tip are situated within the delimiting surface of the writing tip, and have a breadth of approximately half the width of the channel.

The drawing shows to an enlarged scale a special form of construction of a writing tip according to the invention, and given by way of example. Fig. 1 shows a longitudinal section through the writing tip, and Fig. 2 shows a side view of it.

The writing tip consists of a cylindrical shaft 1, that by an outwardly projecting annular step 2 merges into the actual tip 3 of conical form. From the end face of the shaft 1 there runs a central channel 4 of circular section, its diameter being approximately one third of the outer diameter of the shaft 1, and it is provided with a conical taper-down 5 that extends almost to the somewhat rounded-off conical tip, from which run slots 6, of a breadth B of about half the diameter W of the channel 4. In the example of construction there are provided three slots 6 that cross one another; however it is also possible to provide only two slots that cross one another at right angles. The slots 6 extend into the conical reduction 5, but they however lie within the delimiting surface of the writing tip, which may if desired also deviate from the conical form.

By means of the form of construction of the invention for the writing tip, that tip, even when using elastic synthetic material without any supplementary surrounding casing, retains its form, whereby the deformation of the writing tip through the pressure occurring while writing enables, through the partial opening of the slots 6, sufficient writing fluid to emerge (paste), without however causing blotches, while an emergence of the writing fluid while the writing tip is not in use is reliably prevented.

Under certain circumstances there may be provided, instead of a single channel, a plurality of channels that run into the slots 6:

PATENT CLAIM

A writing tip of synthetic material, with a central channel for the access of the writing fluid (writing paste), into which open slots that run from the tip and that cross one another, characterized in that the channel (4) extends with a reduction (5) almost to the tip, and the slots (6) that run

from the tip are situated within the delimiting surface of the writing tip, and have a breadth (B) of approximately half the width (W) of the channel (4).
Translated by W.G. Weekley, West Nyack N.Y. 10994.

Österreichisches Patentamt
Patentschrift

Nr. 202897

Kl. 70a, 5

1 Blatt

MAY 1959

U. S. P.

FIG. 1

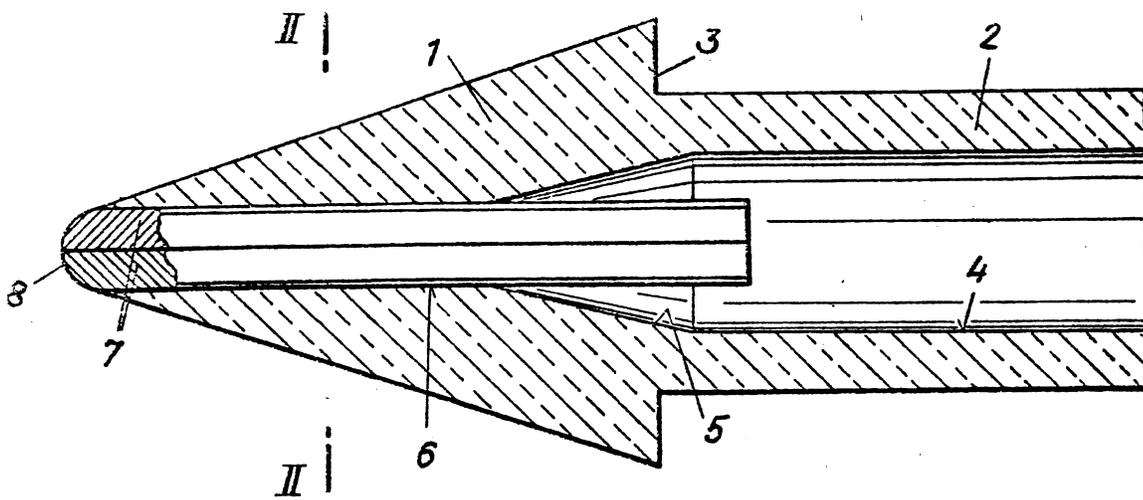


FIG. 2

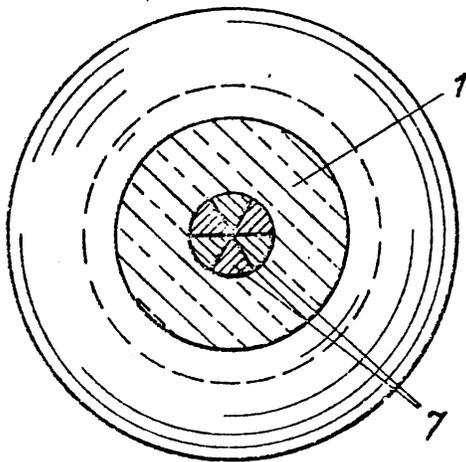
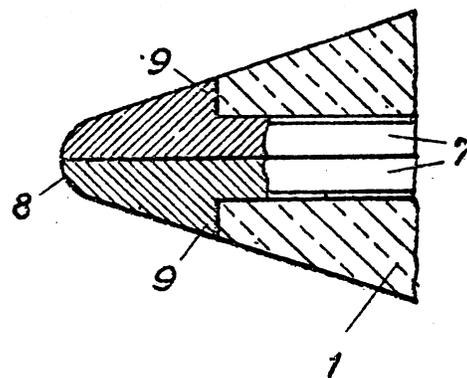


FIG. 3





ÖSTERREICHISCHES PATENTAMT
 PATENTSCHRIFT NR. 202897

Kl. 70 a, 5

Ausgegeben am 10. April 1959

ING. ANTON KORNFELD IN WIEN

Schreibkörper

Angemeldet am 15. Jänner 1958 (A 307/58). - Beginn der Patentdauer: 15. September 1958.

Es sind Füllfederhalter bekannt, die einen aus Metall oder auch aus Kunststoff bestehenden Schreibkörper aufweisen, der im wesentlichen kegelförmig ausgebildet ist und mit einem zentralen kurzen Kanal versehen ist, während von seiner Spitze sich kreuzende bis in den Kanal reichende Einschnitte vorgesehen sind. Die Schreibspitze muß daher, insbesondere wenn sie aus elastischem Werkstoff, wie z. B. 5 Kunststoff besteht, um ein unbeabsichtigtes Austreten der Schreibflüssigkeit und ein Klecksen zu verhindern, von einem besonderen Führungsstück umfaßt sein, das nur ein kurzes Stück der Schreibspitze freiläßt. Die Füllfeder wird auf diese Weise im Aufbau ziemlich umständlich.

Bei einem andern Gerät zum Auftragen von Tinte oder Farben auf eine Schreib- oder Zeichenfläche ist in einem kegelförmigen, nachgiebigen Endstück aus Gummi od. dgl. ein zentrisch angeordneter Kanal 10 angeordnet, den ein dochtförmiger Körper bis zur Spitze ausfüllt, welcher mit seinem andern Ende in den die Schreib- oder Zeichenflüssigkeit enthaltenden Raum des Gerätes ragt.

Ferner ist ein Schreibgerät bekannt geworden, in dessen Tintenbehälter ein aus eng aneinanderliegenden Stäbchen harten Materials zusammengesetzter Körper, der selbst wieder Stäbchenform aufweist, 15 ragt, wobei aber zwischen den Stäbchen feine Längskanäle für den Durchtritt der Tinte vorgesehen sind. An Stelle der Längskanäle können die Stäbchen ringsektorförmigen Querschnitt aufweisen und derart in der Mitte einen Längskanal bilden. Die Stäbchen sind etwa in der Mitte ihrer Länge und an der Mündung des Tintenbehälters je durch einen Ring zusammengehalten, so daß die Stäbchen an einer seitlichen Bewegung zueinander gehindert sind. Solche Schreibgeräte sind jedoch nur für flüssige und nicht für pasten- 20 förmige Tinten (Schreibpasten) geeignet. Es ist auch schon vorgeschlagen worden, derartige Stäbchen mit Durchflußkanälen für die Tinte in einer elastischen Fassung zu halten, doch haben sich derartige Schreibgeräte nicht bewährt, da sie zum Klecksen neigten.

Die Erfindung betrifft einen Schreibkörper aus elastischem Material, insbesondere aus Kunststoff, der eine elastische Fassung für einen die Form eines Stäbchens aufweisenden und selbst aus eng aneinanderliegenden Stäbchen zusammengesetzten Körper bildet und besteht im wesentlichen darin, daß der aus 25 den Stäbchen harten Materials gebildete Körper aus mehreren, sich zu einem vollen Querschnitt zusammensetzenden, vorzugsweise sektorförmigen, eng aneinanderliegenden, gegebenenfalls zusätzlich gegen Verschiebung gesicherten Stäbchen besteht, die mit ihren der Schreibspitze abgewendeten Enden frei in den zentralen Kanal des mit dem die Tinte (Schreibpaste) enthaltenden Tintenbehälter verbindbaren zylindrischen Fortsatzes des Schreibkörpers hineinragt. Durch die erfindungsgemäße Bauart wird eine gegenüber den Kugelschreiberspitzen wesentlich vereinfachte und billigere Bauart erzielt. 30

In der Zeichnung ist der Erfindungsgegenstand in zwei beispielsweise Ausführungsformen in wesentlich größerem Maßstab dargestellt. Fig. 1 zeigt einen Längsschnitt durch den Schreibkörper, Fig. 2 einen Schnitt nach der Linie II-II der Fig. 1 und Fig. 3 eine etwas abgeänderte Ausführungsform im Schnitt.

Der Schreibkörper ist von einem kegelförmigen Teil 1 und einem zylindrischen, daran anschließenden Fortsatz 2 gebildet, zwischen welchen eine Ringstufe 3 vorgesehen ist. Von der freien Stirnfläche des Schaftes 2 führt ein zentraler, im Querschnitt kreisförmiger Kanal 4 in das Innere des Körpers, welcher Kanal über eine Kegelfläche 5 in eine, in der Spitze des kegelförmigen Teiles 1 ausmündende zylindrische Ausnehmung 6 geringeren Querschnittes übergeht. Der Schreibkörper besteht aus einem elastischen Material, insbesondere aus Kunststoff. In die Verjüngung 6 kann unter Pressung bei geringer Aufweitung 40 des Schreibkörpers 1 an seiner Spitze ein die Form einer Bleistiftmine aufweisender Körper eingesetzt werden, der aus mehreren im Querschnitt sektorförmigen, sich zu einem Kreisquerschnitt ergänzenden,

die Schreibspitze 8 bildenden, aus hartem Werkstoff, insbesondere Metall, bestehenden Stäbchen 7 zusammengesetzt ist. Die Stäbchen sind in der Verjüngung 6 gegen axiale Verschiebung durch Reibung gehindert. Sie können im Ziehverfahren hergestellt werden und liegen mit ihren Radialflächen dicht aneinander, so daß die Tinte (Schreibpaste), die von der auf den Fortsatz 2 aufgeschobenen oder in den Kanal 4 desselben eingeschobenen Tintenbehälter (Patrone) in den zentralen Kanal 4 gelangt, erst austreten kann, wenn die gerundete Spitze 8 über die Schreibfläche gleitet, weil dann die Stäbchen durch den beim Schreiben auftretenden Druck sich an ihren Berührungsflächen gegenseitig etwas voneinander abheben und der Tinte den Austritt zur Schreibspitze 8 ermöglichen, ein Klecksen jedoch ausschließen. Obwohl Versuche ergeben haben, daß durch den eine elastische Fassung für die Stäbchen 7 bildenden kegelförmigen Teil 1 des Schreibkörpers ein gegenseitiges Verschieben der Stäbchen 7 in der zylindrischen Ausnehmung 6 verhindert ist, können die Stäbchen 7 durch besondere seitliche Ansätze 9, die sich gegen eine vordere Ringfläche des Teiles 1 anlegen, gesichert sein (Fig. 3). Gegebenenfalls können die Stäbchen auch innerhalb ihrer Fassung Ansätze aufweisen und die Schreibspitze mit den Stäbchen im Spritzverfahren verbunden sein. Die Stäbchen können aber auch aus im Querschnitt gleichschenkeligen Dreiecken bestehen, die sich zu einem gleichseitigen Vieleck ergänzen, oder unter Umständen aus vier, in Querschnitt quadratischen Stäbchen bestehen, die sich zu einem größeren Quadrat ergänzen, wobei die Ecken der Stäbchen, die an den Kanten der gebildeten Mine zu liegen kommen, abgerundet sein können. Die Länge der zylindrischen Verjüngung 6 des zentralen Kanales 4 und die Elastizität des verwendeten Kunststoffes regeln die Menge der austretenden Tinte (Paste) und damit die Strichstärke der Schreibspitze.

PATENTANSPRUCH:

• Schreibkörper aus elastischem Material, insbesondere aus Kunststoff, der eine elastische Fassung für einen die Form eines Stäbchens aufweisenden und selbst aus eng aneinanderliegenden Stäbchen zusammengesetzten Körper bildet, dadurch gekennzeichnet, daß der aus den Stäbchen (7) harten Materials gebildete Körper aus mehreren sich zu einem vollen Querschnitt zusammensetzenden, vorzugsweise sektorförmigen, eng aneinanderliegenden, gegebenenfalls gegen Verschiebung zusätzlich gesicherten Stäbchen (7) besteht, die mit ihren der Schreibspitze (8) abgewendeten Enden frei in den zentralen Kanal (4) des mit dem die Tinte (Schreibpaste) enthaltenden Tintenbehälter verbindbaren zylindrischen Ansatzes (2) hineinragen.

(Hiezu 1 Blatt Zeichnungen)

AUSTRIAN PATENT 202,897

WRITING ELEMENT

April 10, 1959

One is familiar with fountain pens which show a writing element made of metal or plastic, which is essentially conically developed and is equipped with a central short conduit, while incisions leading from the point and crossing each other, reach into the conduit. The writing point, especially when it is made of elastic material like plastic, has to be covered with a slide piece in order to avoid accidental spilling of the writing fluid, leaving only a small portion of the writing point free. Thus, the fountain pen is rather clumsy in its construction.

A different model for accessing ink or color onto a writing or drawing surface is equipped with a conical, yielding end piece made of rubber or the like and arranged to a central conduit which is filled with a cored element up to the point. The other end of the cored element reaches into that part which contains the writing or drawing fluid.

Further, a writing element has become known into whose ink container reaches a part consisting of little rods made of hard

material, which part again appears in a shape of a little rod. The little rods contain small longitudinal conduits to allow for the flow of ink. Instead of longitudinal conduits the rods may consist of circular cross sections and thus form a longitudinal conduit in the middle. At the middle of their length and at the opening of the ink container the rods are each fastened together by a ring, so that the rods are prevented from a sidewise movement toward each other. Such writing equipment, however, is only applicable for liquid and not paste-like ink (writing paste). It has been suggested to equip the rods with flow-through channels for ink with an elastic mounting; however, such writing equipment does not prove practical since accidental spilling of the ink could not be avoided.

This invention discloses a writing point made of elastic material, particularly of plastic, which shows an elastic mounting for the part resembling a rod and which is also comprised of closely connected rods. Essentially, this element, consisting of hard metal rods and forming a full cross section, preferably sectorwise, closely aligned and possibly adjusted to rods acting against shifting, reaches with its writing point upward turned ends freely into the central conduit.

The ink container can be connected to the conduit and reaches into the cylindrical advance (extension) of the writing element. According to this invention, an essentially less complex structure than the ball point pen is achieved.

The drawing shows the invented element in two examples in considerably larger scale. Figure 1 shows a cross section of the writing equipment; Figure 2 shows a section according to lines II-II of Figures 1 and 3 a slightly different structure.

The writing element is formed by a conical part 1 and a cylindrical extrusion thereto connected, in between which is provided a circular step 3. From the free front surface of shaft 2 leads a central, in cross section, circular conduit 4 into the interior of the body, which conduit reaches over a conical surface 5 into the point of conical part 1, extending to the smaller cross section conical extension 6. The writing element consists of an elastic material, particularly of plastic. At the narrowing 6 may be inserted a lead mine when the point of writing element slightly spreads under pressure, which lead mine consists of numerous, in cross section sectorlike, eventually making up cross section of writing point 8, consisting of the hard material, especially metal, rods 7. The

rods are prevented from axial dislocation through friction at narrowing 6. They may be manufactured in a pull-method and are closely attached with their radial surface, so that the ink (writing paste) which is either advanced in extension 2 or in the conduit 4, only can access as the rounded writing point 8 glides over the writing surface. As pressure through writing is applied, the rods slightly spread from their touching point, thus allowing the ink to flow to writing point 8, yet avoiding accidental spilling.

Even though tests have shown that though the elastic mounting for the rods 7 form the concial part 1 of the writing element and avoid dislocation of rods 7 in the cylindrical extension 6, the rods 7 can be secured in that especially sidewise extensions 9 adjust to the front ring surface of part 1 (Figure 3). It is also possible to equip the rods with extensions within their mounting and connect the writing point with the rods in a squirting method. The rods can also consist in the cross section of an evensided triangle, eventually forming a larger square where the corners of the rods which come to rest at the corners of the lead mine, can be rounded off. The length of the narrowing 6 of the central conduit 4 and the elasticity of the used material regulate the amount of accessing ink

(paste) and also the strength of the stroke of the writing point.

CLAIM

Writing element made of elastic material, especially of plastic, which shows an elastic mounting appearing in the form of a rod and whose element consists of closely connected rods, characterized in that the element made of rods of hard material (7) and which element consists of numerous rods (7) which form closely connected to a full cross section, preferably sectorlike, which reach with their writing point 5 upwardly turned ends free into the central channel (4) into the ink container containing ink (writing paste) connectable to the cylindrical extension (2).

1924

Zu der Patentschrift 396082
Kl. 70b Gr. I

Abb. 1.

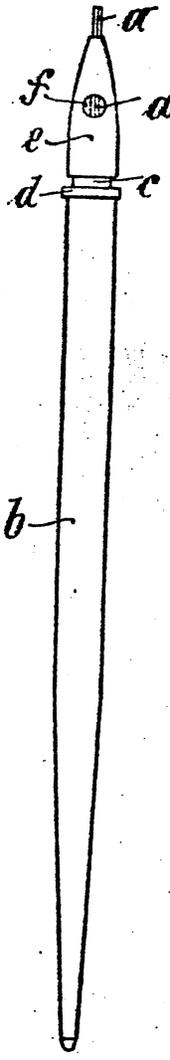


Abb. 2.

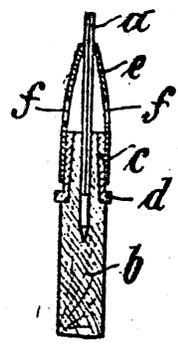


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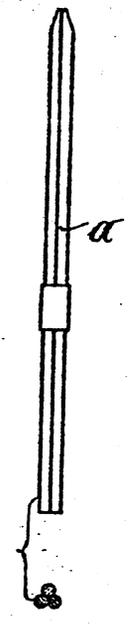


Abb. 4.

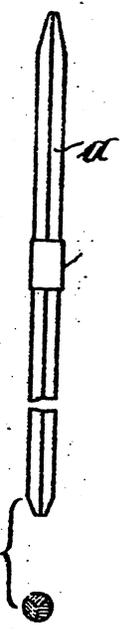


Abb. 5.

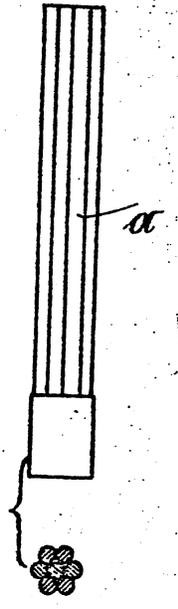


Abb. 6.

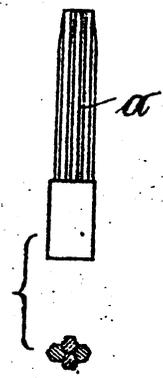


Abb. 7.

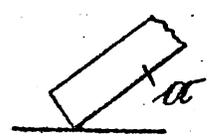
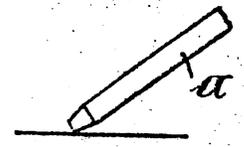


Abb. 8.



396082

Alexander Simon in Halberstadt.

Schreibgerät mit auswechselbaren Schreibspitzen.

Patentiert im Deutschen Reiche vom 29. März 1923 ab.

Schreibgeräte mit auswechselbaren Schreibspitzen sind schon in verschiedenen Ausführungen bekannt geworden. Es ist auch bekannt geworden, eine Schreibfeder aus einem Drahtbündel zu benutzen, das aus unelastischen Drähten besteht. Den Gegenstand der Erfindung bildet die weitere Ausgestaltung dieser bekannten Vorschläge, und zwar besteht das neue Schreibgerät aus einem Bündel oder Pinsel aus steifen feinen Stahlborsten. Im Gegensatz zu den bekannten Schreibgeräten wird dieses Borstenbündel am Ende rechtwinklig zur Achse des Bündels abgeschliffen und dadurch eine Schreibkante gebildet, die sich rings um das Schreibbündel herumzieht, so daß das Bündel auf beliebiger Stelle auf die zu beschreibende Unterlage aufgesetzt werden kann. Da bei den bekannten Schreibgeräten keine Schreibkanten gebildet sind, sondern nur Schreibspitzen, so entsprechen diese Ersatzfedern in der Wirkung nicht derjenigen der üblichen Stahlfedern, während bei dem neuen Schreibgerät die Wirkung der Stahlfedern vollwertig ersetzt wird, indem beim Schreiben von Haarstrichen nur die Schreibkante zur Benutzung gelangt, beim Schreiben von Grundstrichen dagegen die volle Borstenbreite, vermehrt um die Elastizität der Borsten.

Auf der Zeichnung ist das Schreibgerät in mehreren Ausführungsbeispielen veranschaulicht, und zwar zeigen:

Abb. 1 eine Außenansicht desselben,

Abb. 2 einen Längsschnitt durch das Kopfende des Schreibgerätes,

Abb. 3, 4, 5 und 6 weitere Ausführungsformen der Borstenbündel in stark vergrößertem Maßstabe, während

Abb. 7 und 8 die Lage der verschiedenen Pinselenden zum Papier zum Schreiben darstellen.

Die Bündel oder Pinsel bestehen aus mehr oder weniger dünnen, je nach gerichteten Stahl-

draht (Stahlborsten) oder anderen geeigneten ebenso zugerichteten Stoffen. Am Ende oder in der Mitte sind die Bündel durch Lötung, Schweißung oder mechanisch zusammengefaßt, und zwar in solcher Lage zueinander, daß die Achsen der Borsten parallel, der Querschnitt des Pinsels symmetrisch zu einem Kreise oder Oval ausgebildet ist, wie die Querschnittfiguren zu den Abb. 3, 4, 5 und 6 andeuten. Die Anzahl der Drahtenden, aus denen das Schreibbündel besteht, ist mindestens drei bis sieben oder mehr.

Das Bündel *a* wird mit dem zusammengefaßten Ende in einen Halter *b* gesteckt, der am oberen Ende zweckmäßig aufgeschlitzt ist, um das Schreibbündel leicht in den Halter einführen und auswechseln zu können. Die geschlitzten Enden des Halters können durch eine Hülse *c* zusammengehalten werden, die zweckmäßig innen etwas konisch ausgebildet und hinten mit einem Bund *d* versehen ist, um die Hülse leicht vom Halter abstreifen zu können. Es kann jedoch an Stelle dieser Feststellvorrichtung für das Schreibbündel jede andere geeignete Vorrichtung benutzt werden. Durch die Festklemmung des Borstenbündels im Halterkopf wird es ermöglicht, das Bündel mehr oder weniger lang aus seiner Fassung herausragen zu lassen und in der gewünschten Stellung festzuklemmen.

Der zweite Teil des Schreibgerätes besteht beispielsweise aus einer Hülse *e* aus Metall oder einem anderen geeigneten Stoffe, die an dem einen Ende so weit ist, daß sie auf den Halter *b* bzw. die Klemmhülse *c* aufgeschoben werden kann. Die Hülse *e* dient zugleich zur Aufnahme des Pinsels *a*, welcher durch eine an dem spitzen Ende der konischen Hülse vorgesehene feine Öffnung hindurchgeführt ist, die gestattet, daß das Ende des Pinsels mit leichter Reibung durch die Öffnung hindurchgeführt werden kann. Die Hülse besitzt in

der Nähe der konischen Spitze in bekannter Weise eine oder mehrere Öffnungen *f*. Der Gebrauch der Schreibvorrichtung ist derart, daß der Stahlpinsel *a* in seinem Halter befestigt wird, worauf die konische Hülse *e* mit der weiten Öffnung so über den Stiel *b* bzw. die Klemmhülse *c* gezogen wird, daß der Pinsel durch das Loch an der konischen Spitze mehr oder weniger herausragt. Hiernach kann das Schreibgerät wie eine gewöhnliche Feder benutzt werden, indem sie in die Tinte eingetaucht wird, um damit zu schreiben. Die Tinte tritt durch die Öffnungen *f* in die Hülse *e* ein und fließt durch die kapillarischen Zwischenräume beim Schreiben zwischen den Borsten an der Spitze des Pinsels wieder heraus. Die Spitze des Pinsels kann verschieden gestaltet sein. Entweder ist sie rechtwinklig zur Achse der Borsten geschliffen (Abb. 5 und 7) oder die Borsten sind außerdem noch mehr oder weniger an der Außenseite zugeschliffen (Abb. 3, 4, 6, 8). Die Haarstriche entstehen beim Schrägaufwärtsschreiben durch die rechtwinklige (Abb. 7) bzw. zugespitzte (Abb. 8) Schreibkante des Pinsels, und zwar an beliebigen Stellen der Schreibkante. Ebenso entstehen die Grundstriche beim Schrägabwärtsziehen des Pinsels durch die Breite desselben, vermehrt um die Elastizität der Stahlborsten. Wenn der Pinsel nur wenig aus der Hülse *e* hervorragt, so schreibt er hart, wenn er weiter vorsteht, entsprechend weicher. Durch Brechen der Schreibkante läßt sich auch die Schreib-eigenschaft der Kugelspitzfedern erreichen.

In der beschriebenen Form bildet das Schreibgerät bereits einen Halbfüllfederhalter. In der konischen Spitze wird je nach der höheren oder tieferen Lage der Löcher *f* bereits eine solche Menge Tinte geschöpft, daß ein Eintauchen in das Tintenfaß nur selten nötig ist. Die konische Spitze verhindert ein unzulässiges Anhaften der Tinte an der Außenseite der Hülse, besonders wenn sie poliert und für Tinte nicht angreifbar ist. Das unbeabsichtigte Ausfließen der Schreibflüssigkeit aus dem Pinsel ist ebenfalls nicht zu befürchten, denn die nach unten führenden Öffnungen sind derart fein, daß zur Überwindung der Flüssigkeitsadhäsion Druckkräfte nötig sind, die im Gebrauch nicht auftreten. Bei richtiger Bemessung des Durchlasses des Schreibpinsels durch die Hülse ist ein Abtropfen der Tinte vollkommen ausgeschlossen.

Diese wertvollen Eigenschaften des Schreibgerätes treten noch mehr bei dem Bau von Füllfederhaltern mit dieser Schreibspitze hervor. Die Weglassung der Löcher *f* und die

Verwendung eines hohlen Stieles *b*, auf den die Hülse beispielsweise tintendicht aufgeschraubt ist, und die Befestigung des Pinsels *a* an einem Steg von geringen Abmessungen, der die beiderseitigen Hohlräume in Stiel und Hülse in Verbindung läßt, sind die geringen Unterschiede zwischen dem zuerst beschriebenen Halter und einer Füllfeder, deren Tintenfassungsraum wegen Fortfallens der Federhalte- und Dichtungseinrichtungen außerordentlich groß ist. Wegen der schon vorher besprochenen Adhäsionserscheinungen ist ein Ausfließen der Tinte bei dem Füllschreibgerät nicht zu befürchten, daher genügt es, eine einfache Schutzkappe auf die Hülse *e* beim Nichtgebrauch des Gerätes zu stecken, die den Schreibpinsel vor Beschädigung schützt.

Die hauptsächlichsten Vorteile der neuen Bauart liegen darin, daß die Abnutzung gegenüber Stahlfedern außerordentlich gering ist. Die konische Hülle oder der Tintenhalter verschleißt bei geeignetem, gegen Tinte widerstandsfähigem Stoff überhaupt nicht. Was die Schreibborsten anbetrifft, so tritt zwar eine Abnutzung der Schreibkante ein; diese kann jedoch gegebenenfalls wieder gerade geschliffen werden, wenn nicht vorgezogen wird, die Borsten frisch zu ersetzen, wenn sie abgeschrieben oder unbrauchbar geworden sind. Das neue Schreibgerät eignet sich auch zum Durchschreiben, im Gegensatz zu den gewöhnlichen Federn, welche nicht den dazu nötigen Druck aushalten und hergeben. Ebenso eignet es sich zum Stenographieren. An Stelle gleichstarker Stahlborsten lassen sich auch dünne und dicke Drähte miteinander in symmetrischer Form verwenden.

PATENT-ANSPRÜCHE:

1. Schreibgerät mit auswechselbaren Schreibspitzen, dadurch gekennzeichnet, daß diese aus einem Bündel oder Pinsel aus steifen, dünnen Stahlborsten (*a*) bestehen, an denen durch rechtwinklig zur Achse der Borsten erfolgtes gerades Abschleifen derselben eine Schreibkante rings um das Borstenbündel gebildet ist, wodurch Haar- und Grundstriche, erstere nur vermittelt der Schreibkante, letztere durch die Breite der Borsten, vermehrt durch die Elastizität derselben, herstellbar sind.
2. Schreibgerät nach Anspruch 1, dadurch gekennzeichnet, daß das die Schreibspitze bildende Borstenbündel aus dünnen und dicken Borsten in symmetrischer Form besteht.

Hierzu 1 Blatt Zeichnungen.

GERMAN PATENT 396,082

March 29, 1923

WRITING ELEMENT WITH EXCHANGEABLE WRITING POINT

Writing elements with exchangeable writing points have been known in various models. Further, a writing quill has been known which is made of a bundle of elastic wires. The object of this invention further develops the models known in the art in that the new writing element consists of a bundle or brush made of fine steel bristles. Contrary to writing elements so far known, this bristle bundle is smoothed at its ends at a right angle to the bundle and thus forms a writing edge, extending over the entire writing bundle, so that the bundle can be placed in various positions on a base to be described. Since the writing elements known in the art do not show writing edges, but only writing points, these substitution quills do not correspond to the effect of the common steel quills, as the new writing quill completely replaces the effect of the steel quill in that, while writing extremely narrow strokes, only the writing edge is being used, and when writing broader strokes the entire bristle width

comes to use, increasable through the elasticity of the bristles.

The drawings show a writing element in various styles, in which:

Figure 1 is an external view

Figure 2 is a longitudinal cut through the head piece

Figures 3, 4, 5 and 6 show further developments of the brush bundle, on larger scale, while

Figures 7 and 8 show the position of the various brush ends in relation to the paper while writing.

The bundles or brushes consist of more or less thin, straight steel wires (steel bristles) or other suitable, similar material. At their end or in the middle of the bundles are soldered or melted together, or mechanically connected, and in particular in such a fashion that the axis of the bristles are parallel while the cross cut of the brush is symmetrically a circle or oval, as shown in the cross sections of Figures 3, 4, 5 and 6. The number of wires of which the writing bundles consists is at least three to seven or more.

The bundle a is inserted with the combined end into the holder b, which is suitably opened at the end, so as to allow for each insertion or exchange. The split ends of the holder can be held together by a shell, which is suitably conically shaped and equipped with

a tie d so as to dislocate the shell easily from the holder.

However, any other fastening mechanism can be used. As the bristle bundle is fastened at the holder's head it is possible to let the bundle extend from its fastening any desired length and then secure it in the desired position.

The second part of the writing element consists for instance of a shell e made of metal or any other suitable material which is at one end wide enough to be pushed into the holder b or fastening sheel c. The shell e serves at the same time for acceptance of brush a, which is pushed through a fine opening located at the conical end of the shell which allows for the end of the brush to be pushed easily through the opening with light friction. The holder has near its conical point in a known manner various openings f. The use of the writing element is such that the steel brush a is fastened in its holder, whereby the conical shell e is pulled with its wide opening over the shaft b, i. e., the jammir shell c and the brush extends more or less through the hole at the conical point. After this the writing element can be used as a common quill in that it is dipped into ink to be used for writing. The ink enters through opening f into the shell e and flows through the capillary interval between the bristles at the point of the brush while writing. The point of the brush

may have many shapes. It is either smoothed at right angles with the bristles (Figures 5 and 7) or the bristles are more or less smoothed at the exterior sides (Figurss 3, 4, 6 and 8). The very fine lines are achieved when writing in an upward slanting fashion through the right angular (Figure 7), i. e., pull point (Figure 8) writing edge of the brush, with the desired position of the writing edge. In the same manner the basic strokes are achieved when pulling the brush and its width slantingly upward. This is increased by the elasticity of the shell bristles. If the brush extends only a little from the shell e, the brush writes hard; when extended more, it writes softer. Through tilting the writing edge one can achieve ball point writing characteristics.

In the above described the writing element forms already half a fountain pen. At the conical point is through the either higher or lower position of the holes f already enough ink absorbed so that a refill is hardly necessary. The conical point eliminates unintentional sticking of ink at the exterior of the shell, especially when it is polished. Th accidental flow of writing fluid from the brush is also avoided because the downward openings are so fine that the pressure is necessary to overcome the fluid adhesive, which situation does not occur when it is not in use. When correctly ajdusts the flow of the writing brush through the shell a dropping of ink is totally impossible.

These valuable characteristics of the writing element are further advantageous when used for the construction of fountain pens with these writing points. The elimination of holes f and the use of a hollow stem b, upon which the shell is, for example, screwed ink-tight, and the fastening of the brush a onto a stick of small dimensions which connects the two sided intervals in the stem and shell, the small differences between the above described pen and the fountain pen whose ink intake is extremely large because there is no necessity for the quill holder and density structure. Because of the above described adhesive characteristics accidental flow of ink need not be feared and it is sufficient to place a cover upon shell c when the element is not in use to guard the writing brush against defects.

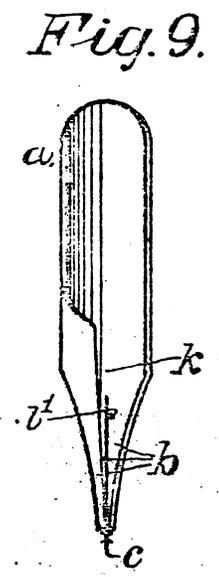
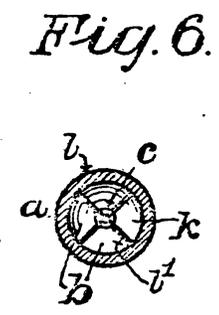
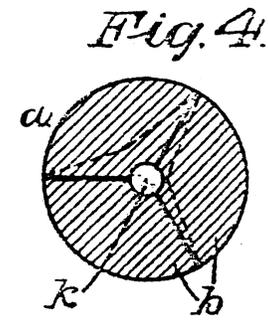
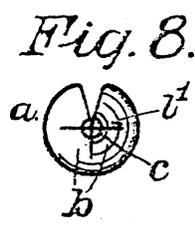
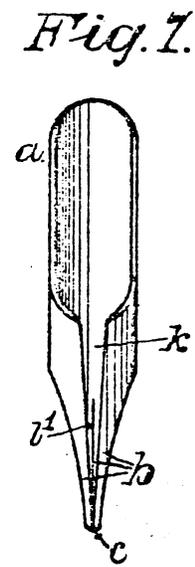
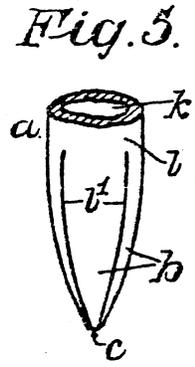
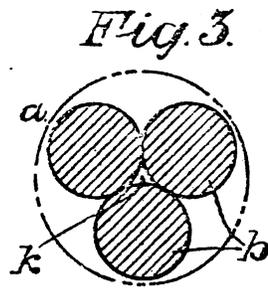
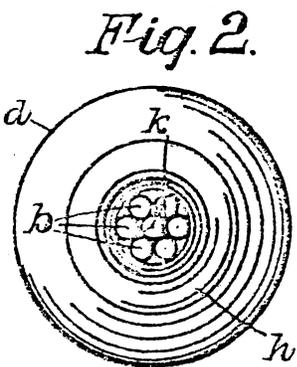
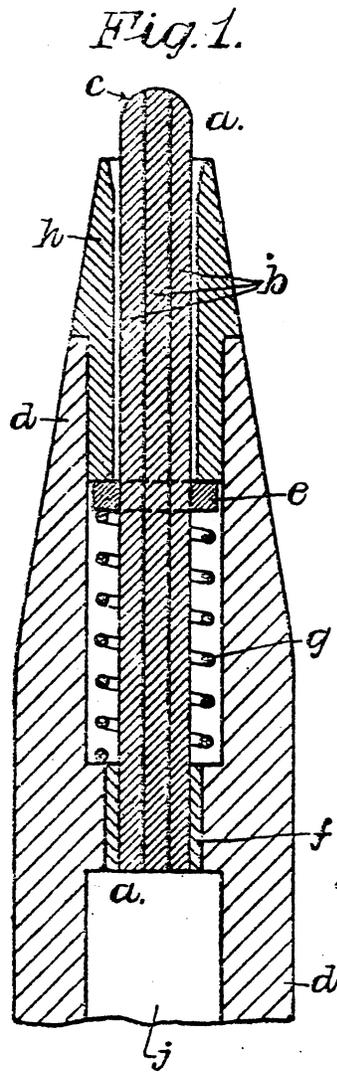
The main advantages of the construction are mainly that little wear is experienced compared to steel quills of the conical shell of the prior art. Useful ink-resisting materials impose hardly any wear on the ink holder. As to the writing bristles, although wear does appear on the writing edge, however, it can be smoothed straight, if not preferred to renew the bristles. the new writing element is also useful for writing through copies contrary to common pens which do not yield to the necessary pressure.

It is also applicable for stenography. In place of equally strong steel bristles one can use thin and thick wires in symmetrical form.

CLAIMS

1. Writing element with exchangeable writing points, characterized in that it consists of a bundle or brush of still, thin steel bristles (a), over which bristle bundle is formed a writing edge by straight smoothing, whereby fine and broad strokes, on the one hand, only with the writing edge, the latter through the width of the bristles, increased through the elasticity of such, can be achieved.
2. Writing element according to claim 1, characterized in the writing point consists of thin and thick bristles arranged symmetrically, thus forming the writing point.

[This Drawing is a reproduction of the Original on a reduced scale.]



PATENT SPECIFICATION

364,808



Application Date : Dec. 18, 1930. No. 38,136 / 30.

Complete Left : Oct. 17, 1931.

Complete Accepted : Jan. 14, 1932.

PROVISIONAL SPECIFICATION.

Improvements in Writing Implements.



I, ALBERT FRANK STANLEY KENT, of
 6, Elm Road, Acton, near Bristol,
 Doctor of Science, University Professor,
 British subject, do hereby declare the
 nature of this invention to be as
 follows:—

This invention relates to writing
 implements and has for its object
 the production of an implement
 which shall possess the smoothness and
 facility in use of a lead pencil whilst
 producing a trace having the legibility
 and permanence of that of an ordinary
 pen or stylograph.

By my invention I prepare a writing
 implement as follows:—I take three or
 more appropriately shaped portions of
 metal and fit them together side by side
 in such a manner as to form a terminal
 mass composed of three or more portions
 all of which are properly supported on
 stems strips or the like and from this ter-
 minal mass the actual writing point is
 worked. The point itself is carefully
 formed of any desired size according to
 whether a broad a medium or a fine trace
 is desired; and the portion which is in-
 tended to come into contact with the
 writing surface is finished as a highly
 polished hemisphere. The material used
 for the construction of the point may be
 similar to that ordinarily used for the
 points of gold or other pens or it may be
 of steel as for example that known as
 "stainless" steel or of some other suit-
 able material. Where an expensive
 material such for example as iridium or
 its alloys is used portions of it may be
 mounted on stems strips or the like of
 suitable metal and where less expensive
 material is used appropriately shaped por-
 tions may be taken the intention in every
 case being to construct an aggregate
 formed of three or more units closely fitted
 together from which the actual writing
 point may be worked.

Alternatively an element may be pre-
 pared resembling a portion or the whole
 of a cylinder split longitudinally for a
 portion of its length so as to form three
 or more connected portions each of which
 is tapered and may be provided with a
 tip of hard metal. The side strips may

[Price 1/-]

be bent inwards and the three or more tips
 may be fitted together and worked into a
 hemispherical surface of the size desired.
 A portion of the cylinder may be so folded
 as to provide a channel for ink to pass to
 the point or additional lamellæ may be
 provided for this purpose. An element
 prepared in this manner may be made
 suitable in size and form for fitting into
 an ordinary or specially designed reser-
 voir or other penholder.

Alternatively again an element may be
 made resembling an ordinary pen nib in
 which however the central member is not
 split but is continued so as to form one
 of the group of three or more points the
 other two or more being provided by bend-
 ing inwards and prolonging the sides of
 the nib one or both of which may be split
 so as to provide additional points if de-
 sired or the central member may be split
 as usual thus providing two of the three
 or more points the other one or more being
 provided by bending inwards and prolong-
 ing the side or sides of the nib. If de-
 sired the arrangement of the points and
 (or) the orientation of the element in a
 holder may be such that instead of the
 writing paper coming into contact with
 two points simultaneously as in the case
 of an ordinary pen it makes contact with
 one point only the other two or more act-
 ing principally as a means of feeding ink
 to the point one advantage of such an
 arrangement being that the writing point
 in contact with the paper is a part of a
 solid hemispherical surface without break
 or irregularity of any kind and without
 any roughnesses to interfere with its per-
 fectly smooth and silky gliding over the
 paper and to facilitate this one of the
 points may be of greater size than the
 remainder. But if desired it may be
 arranged so that two or more of the points
 make contact with the writing surface
 simultaneously, the two or more points in
 this case nevertheless being fitted closely
 together so that the writing point
 although formed of several separate parts
 yet in consequence of these fitting closely
 to one another is enabled to act as a highly
 polished hemisphere of metal and to glide
 over the surface of the paper without let
 or hindrance.

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From the fact that the writing point ends in a hemisphere it is of no consequence how the implement is held with regard to the writing surface and no necessity exists as in the case of an ordinary pen for orientating the implement in a particular manner since however held the ideal surface that is to say a part of a sphere is that presented to the paper over which in consequence the implement glides with a freedom comparable to that of a first class lead pencil.

Owing to the method of construction it is possible for the holder in which the implement is fixed to be arranged on the "self-filling" principle.

The implement may be arranged either as a "stylograph" or in connection with an ordinary or a fountain penholder in which latter case the new element may be made to take the place of an ordinary nib. Dated this Seventeenth day of December, 1930.

A. F. STANLEY KENT

COMPLETE SPECIFICATION.

Improvements in Writing Implements.

I, ALBERT FRANK STANLEY KENT, Doctor of Science, University Professor (British Nationality), of Holm Ray, Iron Acton, near Bristol, in the County of Gloucester, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

It has, heretofore, been proposed to form a writing pen nib or style of two or more separately longitudinally-arranged pieces held—so as to be separable in the writing operation—in an india-rubber or other elastic setting. Such a writing implement, however, possesses, a defect in that, due to the relative displacement of its component parts when in use, there is a tendency for the flow of ink to become irregular, there being a paucity of ink at one time and a surfeit of ink—resulting in blotting or flooding—at another time.

My invention has for its object to obviate the said drawback, and is characterised in that the component members of a nib or style formed of a plurality of longitudinally disposed strips or portions of metal or other suitable material are rigidly connected together i.e. without capacity for relative lateral movement.

In experimental practice with reservoir pens fitted with nibs or styles constructed in accordance with my invention, the flow of ink is certain and equable and I find that there is no tendency for the ink to "blob" from the nib or style when the reservoir is nearly empty—a disadvantageous feature of all fountain pens as at present constructed.

Further, in as much as the cross sectional area of the feed channels of my nibs or styles are—due to the rigid connection of the nib or style components, one with another—maintained constant (i.e. prevented from any variation) ink flow during the writing operation may be

predetermined to exact requirements in the manufacture of the pens.

In order that my invention may be more fully understood, reference is now made to the accompanying sheet of explanatory drawings which illustrate, by way of examples only, several modes of constructing the writing implement.

In said drawings:—

Fig. 1 shows, in longitudinal section, the application of one suitable form of writing point to a stylographic pen, and

Fig. 2 is a plan view of same.

Figs. 3 and 4 are transverse sections of alternative forms of writing points.

Fig. 5 is a perspective view, and Fig. 6 a plan view, of a further form of writing point.

Figs. 7 and 8 illustrate, in side elevation and inverted plan view, respectively, another alternative; and

Figs. 9 and 10 are similar views of a further modification.

In the several views like characters of reference denote like or equivalent parts wherever they occur.

Referring first to Figs. 1 and 2, a generally represents a writing point composed of seven wire strips *b* of circular cross section which are closely fitted together side-by-side to provide a wire unit from which the actual writing point is made by suitably rounding and polishing the outer end of the nib or style so formed to create a hemispherical tip *c*.

In the particular example illustrated, the bunch of wire strips *b* constituting the writing point *a* are rigidly secured together so as to be incapable of relative lateral displacement by means of an intermediate binding ring or collar *e* of suitable material and project at their inner ends through a friction sleeve or band *f* between which, and said ring or collar *e*, a helically coiled wire spring *g* is interposed to normally maintain the binding

ring in contact or engagement with the inner end of the hollow tapered metal tip *h* wherethrough the writing point extends. Thus the hemispherical writing end or tip *c* of the built-up point *a* is normally situated a convenient distance beyond the outer extremity of the stylograph tip *h*, and ink may flow in an equable manner from the container or reservoir *j* of the holder *d* to the writing tip *c* whilst the pen is in use by way of the several longitudinal feed channels *k*—the cross sectional areas of which, due to the rigid connection one with another of the wires of the point are maintained constant—created between the abutting wires *b* of the writing point. Or, if desired, an extra channel or channels may be provided between the container or reservoir *j* and the chamber in which the spring *g* is contained. Further, the movement of the ring or collar *e* is of assistance in regulating the flow of ink to the writing tip *c*.

The writing point may, of course, consist of any desired number of wire strips *b*, rigidly secured together, and the wires themselves may be of any convenient gauge, according to whether a broad, medium, or fine trace is required, the intention in every case being to construct an aggregate formed of two, three (as shown in Fig. 3) or more strips closely fitted together and shaped and polished at their outer or terminal ends to provide a hemispherical or substantially hemispherical writing tip.

The material used for the construction of the writing point *a* may also be similar to that ordinarily used for the points of gold or other pen nibs, or the writing point may be made of steel, as for example that known as "stainless" steel, or any other suitable material, but where an expensive material as iridium or its alloys is used, such material is preferably applied only to the tips of the several wires strips constituting the writing point.

A writing point prepared in the manner before described may also be adapted for fitment to ordinary penholders, or may readily be applied to fountain pens of sac self-filling or ordinary reservoir type, assuming, of course, that the wire strips forming the point are rigidly bound together in manner suitable for their intended application.

In the alternative construction illustrated in Fig. 4, the writing point consists of three similarly shaped metal strips *b* which are of such shape that when rigidly bound together there is created a writing point *a* of circular cross section provided with a central feed pass-

age *k* which extends longitudinally through the point from the rear end thereof to the hemispherical tip formed at the other end. Or, if so desired, two, three or more metal strips of any other appropriate angular section may be closely fitted together to form a writing point having a more or less triangular-shaped feed passage; two such variations are conveniently illustrated by dotted lines in Fig. 4, the sectioned portions outside the dotted lines together constituting the writing point.

In the construction illustrated in Figs. 5 and 6, a writing implement resembles the whole or a part of a tube or small cylinder *l* of metal or other suitable material which is slit longitudinally as indicated at *l'* for a portion of its length so as to form or create thereon two, three— or, as shown in the example, four— or more integrally connected strips *b* each of which is tapered and may be provided with a tip of hard metal. Said rigid strips *b* are bent inwards and the ends thereof are fitted together and worked into a hemispherical writing tip *c* of the size required. In this arrangement a portion of the tube *l* may be so bent or folded as to serve as a channel for ink to pass to the tip *c*, or additional lamellae may be provided for this purpose. Alternatively, ink may flow to the tip *c* through the hollow interior *k* of the tubular element *l*. A writing point constructed in the manner just described may be made suitable in size and form for fitment to an ordinary or specially designed reservoir or other penholder.

In the modification illustrated in Figs. 7 and 8, the writing implement resembles an ordinary pen nib in which the central or longer member is centrally slit at *l'* to form two of a group of four integrally connected strips the other two strips, as shown, being created by laterally prolonging the sides of the nib and bending the same inwardly; the whole group of rigid strips being also bent towards each other and rounded at their ends to provide the hemispherical tip *c*.

In the construction just described, the writing point is conveniently constituted by four strips *b* made, preferably, of metal. It will, however, be understood that, if so desired, some or all of said strips may be further slit to produce a writing point consisting of five or more rigid strips; or, alternatively, as shown in Figs. 9 and 10, one of the side strips may be omitted in order to provide a writing point having only three strips *b* which, at their outer or terminal ends, are suitably bent to form a substantially hemispherical writing tip *c*.

If desired also, the arrangement of the rigid strips *b* and/or the orientation of the writing implement *a* in a holder may be such that instead of two or more strips bearing on the writing paper one point only bears on the paper, the other two or more strips of the writing element acting principally as a means of feeding ink to the writing tip *c*; one advantage of such an arrangement is that the strip in contact with the writing material constitutes, in effect, a part of a solid hemispherical surface which is without break or irregularity of any kind and without any roughness to interfere with its perfectly smooth and silky gliding over the paper. To facilitate this object, the outer or terminal end of one of said strips *b* may be of greater size than the remainder. Two or more rigidly connected strips, as in the examples illustrated in Figs. 6 to 10, inclusive, may, however, be arranged to make contact with the writing surface simultaneously, but since the strips, in these instances, are fitted closely together they constitute a portion of a writing point which, although composed of several strips, provides an unbroken hemispherical tip which will, of course, move freely over the surface of the paper.

It is to be particularly noted that by reason of the fact that each of the several writing points illustrated in the drawings terminates in a hemispherical tip, it is of no consequence how the instrument is held with regard to the writing surface and no necessity exists, as is the case with ordinary pen nibs, for orientating the implement in a particular manner since, however held, the ideal surface—that is to say a part of a sphere—is presented to the paper over which, in consequence, the point glides with a freedom comparable only with that of a good quality lead pencil.

Another important characteristic of my writing implement is that, in addition to providing a writing point, it serves also as an ink feed, so obviating necessity for fitment to the pen body or holder of a special feed bar such as is used with ordinary fountain or reservoir pens.

A point-protecting cap may be provided with an internal rubber or other cleaning pad, so that the writing point itself will be cleaned by contact with the pad each time the cap is applied to the pen body or holder.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In or for use with a writing pen or pen holder, a nib or style formed of a plurality of longitudinally-arranged pieces rigidly connected together—i.e. without capacity for relative lateral displacement during the writing operation—for the purposes specified.

2. A writing implement, as claimed in Claim 1, produced by longitudinally-slitting a small tubular member to provide three or more integrally connected strips which are bent inwardly and fitted together at their outer or terminal ends for the purpose specified.

3. A writing implement as claimed in the preceding Claim 2, in which the hollow interior of the tubular writing member or an appropriately bent or folded portion of said tubular member constitutes a longitudinal feed passage or channel leading to the tip.

4. A writing implement as claimed in Claim 1, consisting of a central member having one or two side pieces laterally prolonged and bent inwardly, such side pieces or/and said central member being slit longitudinally to provide a group of three or more integrally connected strips which are bent inwardly at their outer or terminal ends for the purpose specified.

5. A writing implement as claimed in the preceding Claim 1, provided with means, substantially as described, whereby the writing point may be cleaned, as and when desired.

6. A writing implement substantially as hereinbefore described and illustrated in Figs. 1 and 2, Fig. 3, Fig. 4, Figs. 5 and 6, Figs. 7 and 8, or Figs. 9 and 10 of the accompanying drawings.

7. A writing implement combined with or mounted in a holder substantially as hereinbefore described and illustrated in Figs. 1 and 2 of the accompanying drawings.

Dated this 12th day of October, 1931.

JOHN HINDLEY WALKER,
139, Dale Street, Liverpool, and
125, High Holborn, London, W.C. 1,
Agent for the Applicant.

Printed by Lovell & Malcolmson, Ltd.—1932.

ERRATUM.

SPECIFICATION No. 364,808.

Page 2, line 33, for "separately" read
"separate"

PATENT OFFICE,

February 19th, 1932.

This drawing is a reproduction of the original in its original state

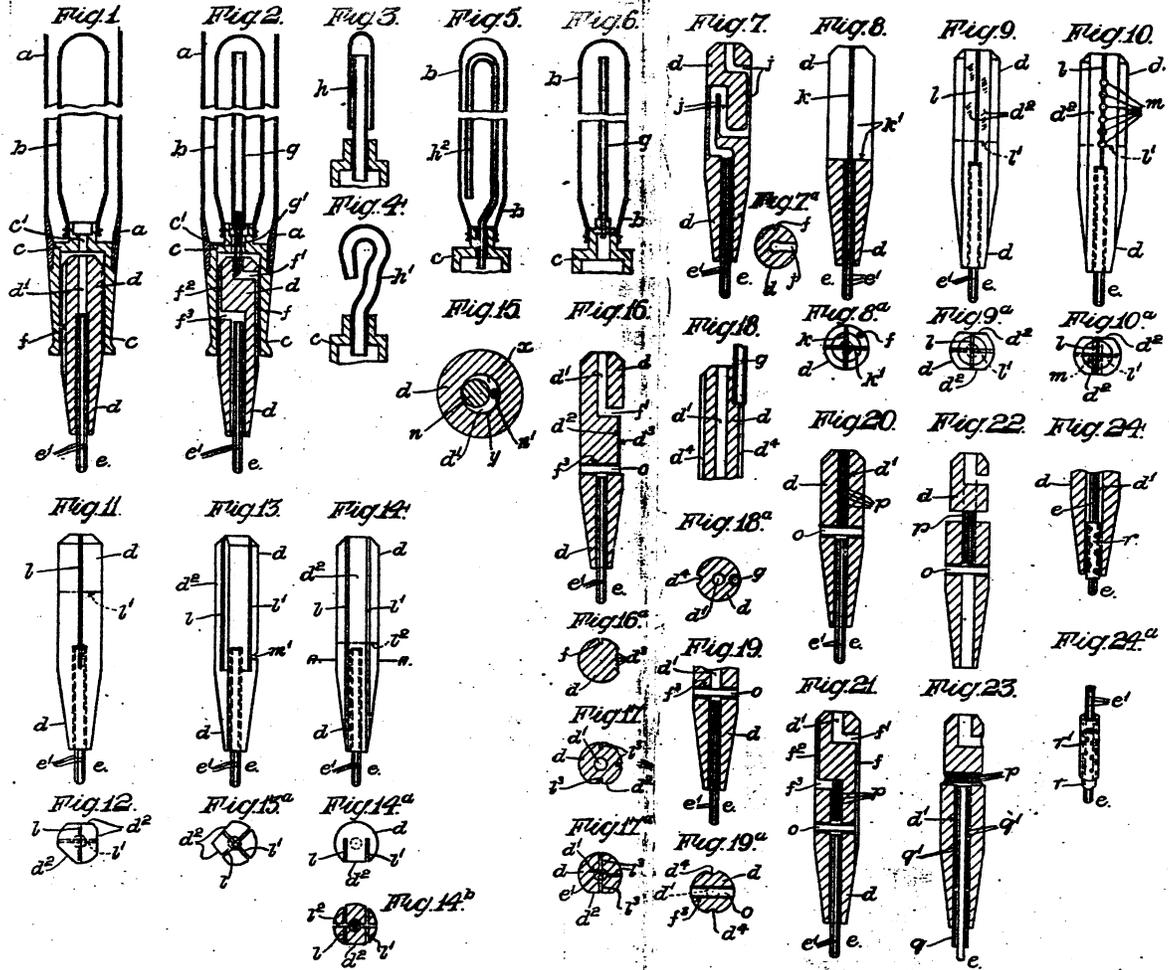


Fig. 25. Fig. 26. Fig. 27. Fig. 28.

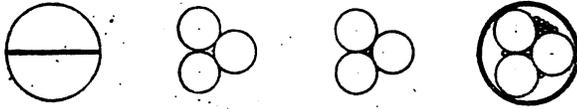


Fig. 29. Fig. 30. Fig. 31. Fig. 32.

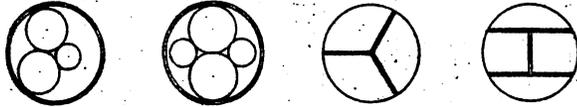


Fig. 33. Fig. 34. Fig. 35. Fig. 36.

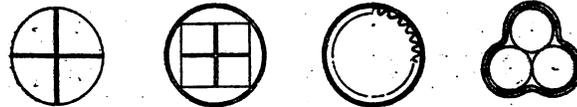


Fig. 37. Fig. 40. Fig. 41.

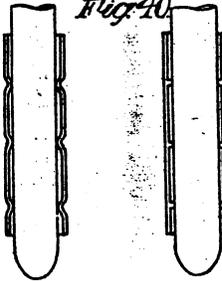
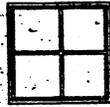
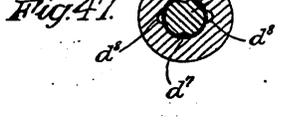
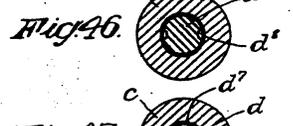
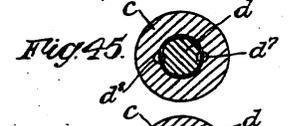
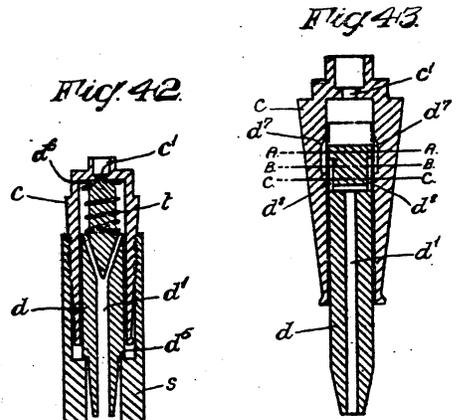


Fig. 38.



Fig. 39.



PATENT SPECIFICATION

Application Date: Jan. 31, 1933. No. 2941/33.

413,764

" " Feb. 28, 1933. No. 6007/33.

One Complete Left: Jan. 31, 1934.

Complete Accepted: July 26, 1934.

PROVISIONAL SPECIFICATION.

No. 2941, A.D. 1933.



Improvements in or relating to Writing Implements.

I, ALBERT FRANK STANLEY KENT, M.A., D.Sc., Oxon., (British Nationality), of Holm Ray, Iron Acton, near Bristol, do hereby declare the nature of this invention to be as follows:—

This invention relates to a new or improved form of writing implement adapted for use in the manner of an ordinary fountain pen or stylograph, but which possesses novel features of construction such as will obviate the known limitations of pens and stylographs: these limitations in the case of fountain pens are unevenness of trace caused by the usual forms of flexible nibs; liability of the nibs to clog, to fracture easily, and rapidly to become so badly worn as to need frequent replacement; scratching of the writing surface; unreliable inkflow which causes undue spreading of ink so as to render the writing illegible and appreciable ink loss; whilst in the case of stylographs the necessity for a rear ventilation orifice often causes ink leakage, whilst foreign matter works into the ink-conducting passage so as to impair the ink flow and cause excessive local wearing of the components.

According to my invention, I provide a writing instrument which may be cheaply produced, is of strong and robust construction yet light in weight, produces a constant and definite trace which may readily be varied at the will of the user to obtain a broad, medium, or fine trace: the instrument will never wear out, has a solid point, and, furthermore, may be filled in the manner of an ordinary self-filling fountain pen. It cannot become clogged or "blob" owing to its special feed, is automatically self-cleaning, and possesses the smoothness and facility in use of a lead pencil. Also, no necessity exists, as is the case with fountain pens, for orientating the instrument in a special manner, whilst it is admirably adapted for figure work or book-keeping and for the making of carbon copies.

[Price 1/-]

Broadly, my invention resides in providing a writing implement having a main casing or barrel containing a collapsible ink reservoir or sac with a feed bar member extending through the forward end of the main casing into communication with the ink reservoir or sac and with a writing point element or unit of peculiar construction extending into and fixedly or elastically held within the feed bar member, convenient sac-actuating means also being carried by the casing or barrel to effect collapse of the ink reservoir in the ink-charging operation.

In one convenient mode of embodiment of the invention, the writing point element or unit may consist of two or more short pieces of wire or other suitable metallic strips of any convenient cross sectional configuration which are arranged side-by-side and forced at their rear ends into a central passage of a feed bar member made, say, of vulcanite, the writing unit so created being rounded or otherwise shaped at its outer free end to provide a suitable writing tip or point whereto ink may be delivered from the collapsible ink reservoir by way of one or more channels produced by the wires or strips upon formation of the writing point, and also by way of the central feed bar passage wherein the writing unit is anchored. In another embodiment, the writing point may consist merely of a single piece or of several pieces of metal known as "pinion" wire having any desired number of teeth to form the necessary feed channels or any other suitably grooved or fluted metal strip, which may be surrounded by a steel or other tube as described later, and which is forced at its rear part into the central passage of the feed bar member and is appropriately rounded at its opposite free end to provide a suitable writing tip. If desired, wires or strips may be laid in the channels formed by the flutings, so as to assist in the flow and regulation of ink to the point, whilst in a further embodiment the

writing point element may be in the form of a metal tube appropriately slit and bent inwardly at its outer free end to create a rounded tip with a single internal feed channel leading to such tip. In some of the points a tube of steel or other material may be used as a continuation of the feed bar, and this tube may be slit for a portion of its length, or otherwise perforated, or a portion of its circumference may be ground away. In all of these points the feed bar may be slit longitudinally to provide extra ink passages which are open to the atmosphere.

In these embodiments, the writing point element or unit is securely attached to and held against movement within the feed bar member, but if so desired, the point, as a whole, may be held elastically within the feed bar so as to be capable of limited yielding motion in a longitudinal direction and thus permit of extremely smooth movement of the rounded tip over a writing surface. To this end the feed bar may be so formed or constructed internally as to create a compartment for a small coiled wire spring which is arranged to bear at its rear end on a suitable locating shoulder or stop of the feed bar member and likewise operates at its forward end upon a projection or shoulder of the writing point unit, which, in this case, is guided in its longitudinal movement by appropriately spaced bearing portions of the feed bar member, or the feed bar together with the writing point may abut against a spring suitably fixed at its rear end.

Since it is imperative that there shall be no "spreading" or relative lateral movement of the writing point constituents in the constructions wherein the point is composed of two or more wires or strips, a band, collar, or sleeve is used tightly to bind the metallic sections if the point be held in an elastic manner within the feed bar member, or the strips may be securely connected together by solder or in other convenient manner.

The feed bar may be frictionally engaged in the forward end of the main casing or barrel portion of the instrument and is attached to or otherwise associated at its rear end with the adjacent portion of the ink reservoir or sac, whilst the metallic writing point element or unit connected with the feed bar is in communication with the interior of said sac by way of a comparatively large passage or channel constituting, preferably in a side of the feed bar member, a secondary ink reservoir or chamber which in turn, opens by way of a fine lateral orifice or duct in the feed bar to the central feeding passage thereof in which the writing point

unit is held or mounted. A further duct or channel forming a continuation of said feeding passage and leading directly to the interior of the sac may also be provided in the rear part of the feed bar member. Alternatively the feed bar may be slit for a portion of its length from either or both ends, one such slit being at an angle to the other slit. The two slits overlap in or near the centre of the feed bar so as to form ink passages throughout its length or the ink passages may be enlarged by multiplying the slits so that the feed bar comes to consist of a series of strips or bars. Alternatively the ink passages may be in the form of one or more spirals or screw-like channels formed in the feed bar member. Thus, upon expansion of the sac after collapse or deflation of the same by appropriate functioning of the actuating means provided for the purposes, ink will be induced through the respective feeding passages of the feed bar member into the sac, and, during writing, the secondary reservoir or chamber of the feed bar in conjunction with the fine lateral orifice leading from the base of said chamber to the rear of the point unit or the slits in the body of the feed bar will serve to conduct and regulate the flow of ink to the writing point in a manner suitable to meet individual requirements, and at the same time the ink flow by way of said lateral orifice of the feed bar or said body slits will serve to divert the main ink supply in the collapsible sac into the supplemental reservoir or chamber and co-operate with the air admitted into that part of the passages of the feed bar beyond said orifice to prevent the passage of ink to the writing point other than by way of the feed bar reservoir.

If desired the writing point may be made by slitting a rod of metal or other material for a portion of its length and suitably shaping the divided end.

Sealing of the implement against leakage when carried in the pocket may be effected by means of a sleeve, or by a movement of the feed bar occluding the ink passage, or by any of the known methods.

Preferably, the ink charging operation is carried out by means of a sac-collapsing assembly consisting of a pressure bar disposed longitudinally within the main casing or barrel and adapted to be laterally displaced upon actuation of an external lever located in a slotted part of the casing and pivotally connected with an internal spring ring, or the like.

The simplicity of this implement, the peculiarities of its double, open, or spiral feed, and the possibility of its automatic

413,764

filling, separate it off from other writing implements of the fountain pen and stylograph classes.

Dated this 30th day of January, 1933.

JOHN HINDLEY WALKER,
139, Dale Street, Liverpool, and
125, High Holborn, London, W.C.1,
Agent for the Applicant.

PROVISIONAL SPECIFICATION.

No. 6007, A.D. 1933.

Improvements in Writing Implements.

1. ALBERT FRANK STANLEY KENT, of Holm Bay, Iron Acton, Bristol, Doctor of Science, University Professor, a British subject, do hereby declare the nature of this invention to be as follows:—
- This invention relates to improvements in writing implements and especially to such as are known as stylographs or ink pencils and describes a novel form of the above which possesses advantages over those already in existence.
- By my invention I construct a writing implement as follows:—
- A number of wires or elongated portions of metal or other suitable material are grouped together longitudinally in such a manner as to form capillary or larger channels between and surrounding them. The wires or elements may be connected together by soldering or other appropriate means, and the stiffness of the writing implement may be controlled by the distance to which such soldering extends. If the soldering is carried nearer to the point a stiffer element is produced, whilst if the soldering ceases at a greater distance from the point a more flexible element is the result.
- The group of wires or the like is rounded at one extremity to form the writing point.
- Ink is supplied to the point in the following manner:—
- An elongated portion, such for example, as a cylinder of suitable material such as ebonite is taken and a channel is formed in it in which the group of wires is inserted. In one design a central hole is bored longitudinally in an ebonite cylinder and the group of wires or the like inserted into it to such a distance that an appropriate length of the pointed end projects. The end of the ebonite cylinder adjacent to the writing point may be coned or sloped for greater convenience and to improve the appearance.
- In order to provide a local reservoir for the ink and to convey it directly to the writing point the ebonite cylinder may be penetrated by one or more slits extending to a convenient distance from the point or from the rear end or from both. These slits which may be at an angle to one another also form a portion of one of the channels by means of which the pen is filled and are thus kept free from all obstruction. They are supplied with ink from the ordinary sac or reservoir contained in the barrel of the pen either directly or through a channel engraved on the side of the ebonite cylinder and leading from its rear end to one extremity of the forward slit or slits. The engraved channel may take the form of or be in addition to a spiral groove on the surface of the ebonite cylinder. In another form the ebonite cylinder is arranged so that it does not completely surround the group of wires near the point but appears as one or a number of wings or projections alongside the group of wires. Alternatively or in addition one or more flats may be formed on the ebonite cylinder and these flats in connection with the surrounding walls of the pen section form channels for the passage of ink and air. These channels are kept free of obstruction by the clearing action of the ink during the process of filling the pen, whilst by arranging a free communication between the air contained in the reservoir and the atmosphere the danger of flooding is greatly reduced. The implement may be sealed against leakage during carrying in the pocket either by a longitudinal movement of the ebonite cylinder being employed to occlude the aperture from the sac or reservoir or alternatively by arranging the ink passage from the reservoir in the barrel of the pen to the writing point partly as a hollow worked in the inner wall of the pen section surrounding the ebonite cylinder and partly as a hollow worked on the outer surface of the ebonite cylinder or similar member. So long as these two channels are in alignment the whole passage is open, but on rotating either pen section in relation to ebonite cylinder, or ebonite cylinder in relation to pen section the two portions of the channel being no longer in alignment the passage is closed.
- Dated this twenty-seventh day of February, 1933.
- A. F. STANLEY KENT.

COMPLETE SPECIFICATION.

Improvements in or relating to Writing Implements.

I, ALBERT FRANK STANLEY KENT, M.A., D.Sc., Oxon., (British Nationality), of Holm Ray, Iron Acton, near Bristol, in the County of Gloster, do hereby
 5 declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to a new or improved stylographic writing implement (hereinafter, for convenience of reference, designated "pen") such, for example,
 15 as described in my prior Patent No. 364,808 adapted for use in the manner of an ordinary fountain pen or stylograph, but aims to obviate the known limitations of pens and stylographs now in common
 use.

20 According to my invention, I provide a reservoir pen which may be cheaply manufactured, is of strong and robust construction, yet light in weight, and produces a constant and definite trace.
 25 The pen cannot become worn out as it possesses a solid writing point; it may be filled in the manner of an ordinary self-filling fountain pen; it cannot become clogged, being automatically self-cleaning;
 30 and possesses the smoothness and facility in use of a high grade lead pencil, being thus admirably adapted for figure work, book-keeping, and the making of carbon copies.

35 A self-filling stylographic pen, according to my invention, is characterised in that a solid writing point is associated with a feed bar and provision is made (a)
 40 for the admission and emission of air and of ink to and from the reservoir by way of a channel or channels formed in said feed bar or/and the surrounding point
 section of the pen, and (b) for the passage of ink by way of a channel or channels
 45 formed in or on the point and if necessary completed by the fitment of said point to the feed bar. Thus the necessary balance of pressure is maintained between the ink reservoir and the atmosphere, the main-
 50 tenance of this balance being one of the main factors concerned in the satisfactory functioning of the pen, without occasional shortness of ink on the one hand or flooding on the other.

55 In constructing a pen under my invention, I provide a solid writing point comprising a plurality of wires or elongated portions of metal or other suitable material grouped together to form channels of

capillary or larger size between and around them. Said wires or elements which are carefully rounded at the extremity and finely polished—may be connected together for a portion of their length by soldering or other appropriate means, and the stiffness of the writing point may be controlled partly by the distance to which such soldering extends. If, in a writing point of given length, the soldering extends nearly to the apex or outer end a stiff point is produced whilst the point is more flexible if the soldering ceases at a greater distance from the apex. For the purpose of supplying ink to the point, I provide a feed member, as for example, a cylindrical feed bar of suitable material such as ebonite, wherein there is formed a channel adapted to receive said writing point. In one design a central channel is bored longitudinally in an ebonite cylinder and the group of wires constituting the writing point is inserted into it to such a distance that an appropriate length of the rounded and polished end projects therefrom.

In these embodiments, the writing point element or unit is securely attached to and held against movement within the feed bar member, but if so desired, the point as a whole may be held elastically within the feed bar so as to be capable of limited yielding motion in a longitudinal direction and thus permit of extremely smooth movement of the rounded tip over writing surface. To this end the feed bar may be so formed or constructed internally as to create a compartment for a small coiled wire spring which is arranged to bear at its rear end on a suitable locating shoulder or stop of the feed bar member and likewise operates at its forward end upon a projection or shoulder of the writing point unit, which, in this case, is guided in its longitudinal movement by appropriately spaced bearing portions of the feed bar member, or the feed bar together with the writing point may abut against a spring suitably fixed at its rear end and be capable of limited yielding motion in a longitudinal direction. Movement of the feed bar may if desired be utilised in sealing the instrument against leakage in the manner herein described.

The end of said cylinder adjacent to the writing point may be coned or sloped for greater convenience and to improve its appearance. In order to feed ink to the writing point, said cylinder may

penetrated by one or more slots extending to a convenient distance from near the front or from the rear end or from both ends. These slots, which may be at an angle or inclination one to another, also form a portion of one of the channels by means of which the pen is filled, and are thus kept free from all obstruction.

Local reservoirs may be provided by forming appropriate cavities or channels in the cylinder or in the surrounding point section of the pen, or in both. Said slots are supplied with ink from the ordinary sac or reservoir contained in the barrel of the pen, either directly or through channels or a channel engraved on or in the cylinder and leading from its rear end to or towards the extremity of the forward slot or slots. Said channel may take the form of or be in addition to a spiral groove on the surface of the cylinder.

The flow of ink to the writing point may further be controlled and regulated by means of a tube of suitable material which surrounds the writing point element and upon which one or several constrictions are formed, or upon the inner surface of which projections are formed.

In another form, said feed cylinder or bar does not completely surround the point near its writing end, but appears as one or a number of wings or projections alongside the group of wires. Or the ink may be led directly to a central channel in the feed cylinder wherethrough it flows to the space surrounding the group of wires forming the writing point, and thence passes towards the apex of the cylinder, being also conveyed through the spaces between the individual elements of the writing point unit. Or, alternatively, the ink may be led along a channel or channels created at the side of the feed cylinder and between it and the point section for a variable distance, being afterwards led to the writing point by means of straight or curved transverse, oblique, or tortuous channels in or in association with the feed cylinder.

The channel along which the ink is led may consist of a portion of the feed cylinder in association with the contiguous surface of the point section and either of these may be provided with fine longitudinal or transverse channels. The channel between said cylinder and the point section may be continued to open at the extremity of the latter as an air vent and to act as a channel for the ink in the process of filling the pen.

In a construction such as that just described, or in those previously referred to, an air tube may be led from the sac or reservoir in the barrel of the pen to the centre or to the side of said feed cylinder,

the air duct being continued thence along the side of the cylinder to open at the extremity of the point section. Such an air tube and duct functions in known manner, partly as a means of adjusting the pressure within the ink reservoir and partly as a channel for the egress of air and to a less extent for the ingress of ink in the process of filling the pen.

I will further describe my invention with the aid of the accompanying sheets of explanatory drawings which illustrate, by way of examples only, various modes of carrying the same into effect.

In the several views like characters of reference denote like or equivalent parts wherever they occur.

Referring first to the pen illustrated in longitudinal section, Fig. 1, *a* represents an outer barrel or casing, *b* a rubber sac or ink reservoir disposed within said barrel *a*, *c* a point section, *d* a cylindrical feed bar provided with a central channel *d*¹, *e* a writing point composed of a plurality of wires *e*¹ arranged side by side and soldered together, and *f* is a channel formed in the side of the feed bar *d*.

The writing ink passes from the reservoir *b* through passage *c*¹ formed in the point section *c* and through the central channel *d*¹ in the feed bar *d* to the wires *e*¹ composing the writing point member *e*: air is admitted through said side channel *f* of the feed bar *d*. In the operation of charging the pen with ink, air is emitted and ink subsequently induced inwards along said channel *f* and passage *c*¹; and also through channels in the writing point *e* and passage *d*¹, thus keeping said channels free of obstruction.

In the pen illustrated in longitudinal section in Fig. 2, air is admitted to the ink sac *b* through the channels *f*, *f*¹ and the central air tube *g*, *g*¹ of the feed bar *d*, whilst ink is fed to the writing point *e* through passage *c*¹ and the side channel *f*² in the feed bar *d*, along the transverse channel *f*³ and so to the writing point *e*. In the ink-filling process, air is expelled through the tube *g*, *g*¹ and the passages *f*, *f*¹ and through the passages *c*¹, *f*², *f*³ and ink enters by the same channels. The air tube *g* may be arranged to lie to one side of the centre line of the sac, and being of soft rubber this tube does not interfere with the action of the filling mechanism.

Said tube *g* is carried nearly to the upper extremity of the sac *b* so that when the latter is collapsed in the process of filling, or the pressure in same is increased, the air which has collected at the upper end of the sac is expelled through the tube *g*, and when the sac is allowed to expand, or the pressure in same

is diminished, ink is drawn in through the channels as before described. Repetition of the action of filling will—as is known—lead to more and more air being expelled and more and more ink being drawn in until the reservoir is full.

Figs. 3 to 5, inclusive, illustrate in longitudinal section fragments of pens which include various means for regulating the ink flow through siphonic action, by appropriate adjustment of the parts of which the ink flow may be regulated. The construction shown also prevents the flooding and blobbing often brought about through a jerk or sudden movement of the pen. In Fig. 3, h indicates the siphonic feed; in Fig. 4, h^1 indicates the siphonic feed; and in Fig. 5, h^2 indicates the siphonic feed.

Fig. 6 illustrates in longitudinal section a different and more general arrangement of air tube g which is carried to the upper end of the sac or reservoir b . Being composed of soft rubber, this tube offers no obstacle to the action of customary pen filling mechanism.

The feed bar d shown in Figs. 7 and 7^a, longitudinal and transverse sections, respectively, illustrates a method of controlling and regulating the flow of ink to the writing point e by means of channels j provided upon or in the substance of the feed bar d wherein what is, in effect, a reversed feed and a siphonic action is secured by the configuration of said channels j . Air is admitted through duct f .

The principle of the feed and reservoir in free communication with the atmosphere in association with a solid point is preserved by means of the channels shown.

The longitudinal section Fig. 8 and plan view Fig. 8^a shows a form of feed bar d in which cross slots k, k^1 are provided for the passage of ink to the writing point whilst air is admitted through the duct f . During the process of filling the pen, ink is induced through both of said channels k, k^1 .

Fig. 9 is an elevation and Fig. 9^a a plan view illustrating an arrangement in which two slots l, l^1 are worked in the feed bar d , one l from the base and the other from near the apex. These slots are at right angles to each other and overlap for a portion of their length, as shown. Flats d^2 which provide channels for the passage of ink and air may be provided upon the surface of the feed bar.

The construction illustrated in Figs. 10 and 10^a is substantially similar to that of Fig. 9 and 9^a, but in this case the feed bar is provided with one or several local

reservoirs or through passages m which are designed to receive surplus ink.

In Fig. 9 flats d^2 may be provided, these being large or small as required; alternatively, said flats d^2 may be replaced by or used with special air ducts. Again, the flat or flats referred to may be arranged to have different relations to the slot or slots l, l^1 , and each or any of the passages may be designed to act as a channel or channels for ink, for air, or for both.

In the modification illustrated in Figs. 11 and 12, elevation and plan view respectively, cross slots l, l^1 are provided in the feed bar d and overlap each other for a suitable length of the course: flats d^2 , (Fig. 12) may be formed upon the feed bar.

In Fig. 13 and 13^a, elevation and plan view respectively, the feed bar is provided with two flats d^2 arranged at an inclination to each other with appropriate crossing slots l, l^1 , also a local reservoir m^1 .

Figs. 14 and 14^a, are elevation and plan view respectively, showing a feed bar d provided with a flat d^2 upon which are formed two or more slots l, l^1 , which are carried right through near the apex of the bar, but which extend only part way through at their upper end, said slots l, l^1 being connected with the central bore at the lower part by cross slot l^2 . Fig. 14^b is a sectional plan view taken on the line A—A Fig. 14.

Fig. 15 is an enlarged sectional plan view illustrating an arrangement for preventing closure of the ink passage d^1 of the feed bar d by pressure of the point section caused by a tendency to collapse when the feed bar is not quite rigid. In this embodiment a plug n of ebonite or other suitable material is arranged in the lumen of the feed bore d^1 and is kept in place by a second plug n^1 . The passage for ink or air is provided by the semi-lunar spaces x bounded by the internal wall of the lumen y and the two plugs n, n^1 .

Figs. 16 and 16^a illustrate in longitudinal section and sectional plan view respectively, an arrangement in which ink fed into the central bore d^1 of the feed bar d passes by a lateral channel f^1 to a flat d^2 provided with numerous grooves d^3 and reaches the writing point e by way of a second lateral channel f^2 adapted to be partially occluded by a cross pin o which may be a solid unit, or made up out of a bundle of units: an air duct f is provided as usual. Thus a double regulation of the ink flow is provided, first by the formation of the flat d^2 with numerous shallow grooves d^3 upon its surface, and later in the ink current by the transverse channel f^2 and cross

piece *o*.

In the arrangement illustrated by sectional plan views in Figs. 17 and 17^a, feed slots *p* are formed in the feed bar *d* in such manner as to be shallow at the extremities and sufficiently deep at or near the centre to open into the central bore *d*¹ which contains the writing point *e*. One or more flats *d*² may be used with this construction.

As before stated, the ink may be led from the reservoir *b* directly to the central bore *d*¹ of the feed bar *d*, whilst the air tube *g* is situated at the side: constructions embodying this arrangement are illustrated in Figs. 18, 18^a. In the arrangement shown in Figs. 18, 18^a the air tube *g* is affixed to the side of the feed bar *d* whilst the ink is fed to the writing point *e* through the central bore *d*¹. The air tube *g* may extend nearly to the top of the sac or reservoir *b*, and may be of any suitable material, as ebonite, or the like, or soft rubber, or the like. Channels *d*⁴ for rapid filling are shown, but one not in communication with tube *g* may be omitted. In Figs. 19, 19^a the flow of ink to the writing point *e* is controlled and regulated by means of a cross bar *o* which partially occludes a transverse channel *f*. Said cross bar may be a single unit or formed by a plurality of components. Similar channels *d*⁴ may be provided to facilitate rapid filling.

In Fig. 20 the ink flow is controlled and regulated by means of an aggregate or bundle of units such as fine wires *p* inserted in the ink passage *d*¹, cross pin *o* in this arrangement serving to prevent point *e* from receding.

The feed bar illustrated in Fig. 21 is similar to that of Fig. 20, but in this case the fine wire regulator *p* is inserted from below. Air ducts *f*, *f*^a and ink channels *f*, *f*^a (as more particularly described in Fig. 2) are provided.

In the feed bar illustrated in Fig. 22, the regulator *p* is inserted from below.

In the feed bar illustrated in Fig. 23, a regulator *p* of multiple elements is arranged horizontally, and flow of ink to the writing point *e* is regulated by adjusting the position of the tube *g* surrounding the writing point, and by the presence of a bundle of fine wires *q*¹ in the ink passage *d*¹.

Fig. 24 illustrates an alternative method of controlling and regulating the flow of ink. Here the point member *e* is enclosed in a tube *r* the walls of which are perforated. This tube is either surrounded by a second tube *r*^a (see Fig. 24^a), the ink passing down the annular space between them, or is arranged inside the channel *d*¹ in the feed bar *d*, between the walls

and the perforated tube *r* an annular space exists.

The multiple writing point, as hereinbefore stated, may be prepared by a group of separate elements, or it may be provided by dividing into a number of parts longitudinally for a portion of its length a single element. The writing point elements may be of different configuration in different parts of their length.

Figs. 25 to 39, inclusive, are plan views illustrating various writing point arrangements; the composition of the several points being as follows:—

Fig. 25:—Two half-round elements.

Fig. 26:—Three similar cylindrical elements.

Fig. 27:—An arrangement similar to that of Fig. 26 with the addition of a smaller element.

Fig. 28:—An arrangement similar to that of Fig. 26 with the addition of several smaller elements.

Fig. 29:—Two large and a small cylindrical element.

Fig. 30:—Two large and two small cylindrical elements.

Fig. 31:—Three elements meeting at an angle of 120°.

Fig. 32:—Two pairs of dissimilar elements.

Fig. 33:—Four elements meeting at right angles.

Fig. 34:—Four square elements contained in a tube.

Fig. 35:—A single element with grooves formed in its periphery contained in a tube.

Fig. 36:—Three cylindrical elements surrounded by a tube which conforms to their contours.

Fig. 37:—Four square elements surrounded by a tube which conforms to their contours.

Fig. 38:—Two cylindrical elements.

Fig. 39:—Two cylindrical elements in a tube.

Fig. 40 shows a longitudinal section of writing point as above surrounded by a tube upon which one or several constrictions are formed, and

Fig. 41 shows a longitudinal section of writing point as above surrounded by a tube upon the inner surface of which projections are formed.

The implement may be sealed against leakage when carried in the pocket, either by a longitudinal movement of the feed bar to occlude the aperture leading from the sac or reservoir, or, alternatively, by arranging the ink passage from the reservoir partly as a hollow worked in the inner wall of the pen section surrounding the feed bar and partly as a hollow worked on the outer surface of the feed bar or

similar member. So long as these two channels are in alignment the whole passage is open, but on rotation either of the pen section in relation to the feed bar member, or of the feed bar member in relation to the pen section, the two portions of the channel being no longer in alignment, the passage is closed.

For example, Fig. 42 is a fragmentary sectional elevation of a pen illustrating a method of sealing same by longitudinal movement of the feed bar *d*. As shown, a cap *s* when placed in position, abuts against an annular shoulder *d*⁵ of bar *d* and forces the latter backwards against a spring *t* surrounding a reduced portion of bar *d* so that its conical end *d*⁶ closes the ink passage *c*¹ of point section *c*.

Fig. 43 is a similar view to Fig. 42 and illustrates a method of sealing the pen by relative rotation of feed bar *d* (i.e. rotation of feed bar *d* in relation to section *c*, or of section *c* in relation to feed bar *d*).

Figs. 44 to 47, inclusive, are sectional plan views taken as on lines A—A, B—B, and C—C, Fig. 43 respectively.

In the writing position, channels *d*⁷ provided on the internal surface of the point section *c* are in alignment with channels *d*⁸ provided on the outer surface of the feed bar *d* and in communication with the central passage *d*¹ of same, whilst in the sealed position said channels *d*⁷, *d*⁸ are out of alignment—see Fig. 47—and the passage *d*¹ closed.

It will be obvious that if the feed bar *d* in this construction is pressed backwards as illustrated in dotted lines Fig. 43, said channels *d*⁷ of the point section *c* will be occluded by feed bar *d* and the ink passage will be closed, thus providing an alternative method of sealing by longitudinal movement of feed bar *d* as compared with that described with reference to Fig. 42.

Suitable stops may be provided to ensure the correct longitudinal or rotary movement of feed bar *d* and/or point section *c*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A self-filling stylographic pen in which a solid writing point is associated with a feed bar and provision is made (a) for the admission and emission of air and of ink to and from the reservoir by way of a channel or channels formed in said feed bar or/and the surrounding point section of the pen, and (b) for the passage of ink by way of a channel or channels formed in or on the point and if necessary completed by the fitment of

said point to the feed bar.

2. A stylographic writing pen as claimed in Claim 1, in which the passage of ink to the writing point is controlled and regulated by means of slots with local reservoirs in association therewith.

3. A stylographic writing pen as claimed in Claim 1, in which the passage of ink to the writing point is controlled and regulated by vertical slots in the feed bar, said slots being arranged to overlap for a portion or the whole of their length.

4. A stylographic writing pen as claimed in Claim 1, in which the passage of ink to the writing point is controlled and regulated by means of slots provided in the feed bar, such slots communicating with a central bore of the feed bar by means of a transverse slot or slots in such feed bar.

5. A stylographic writing pen as claimed in Claim 1, in which the passage of ink to the writing point is controlled and regulated by means of a surface provided with fine longitudinal or transverse channels in association with a contiguous surface.

6. A stylographic writing pen as claimed in Claim 1, in which the passage of ink to the writing point is controlled and regulated by means of one or more channels occupied by a regulating member.

7. A stylographic writing pen as claimed in the preceding Claim 6, in which said regulating member is in the form of a solid rod.

8. A stylographic writing pen as claimed in any one of the preceding Claims, in which the passage of ink to the writing point is controlled and regulated by adjusting the position of a tube surrounding the writing point.

9. A stylographic writing pen as claimed in any one of the preceding Claims, in which local reservoirs are provided to take surplus ink.

10. A stylographic writing pen as claimed in any one of the preceding Claims, in which the flow of ink to the writing point is controlled and regulated by means of a bundle of wires or similar elements.

11. A stylographic writing pen as claimed in any one of the preceding Claims, in which the flow of ink to the writing point is controlled and regulated by means of a siphon connection between the ink reservoir and the point section and feed bar.

12. A stylographic writing pen as claimed in Claim 8, in which the flow of ink to the writing point is controlled and regulated by means of a perforated tube arranged in association with a second

tube.

13. A stylographic writing pen as claimed in Claim 1, in which ink may be fed directly or by means of lateral channels or a lateral channel to the bore of a feed bar.

14. A stylographic writing pen as claimed in any one of the preceding Claims, in which air may be led directly or by means of a lateral channel to the bore of a feed bar.

15. A stylographic writing pen as claimed in Claim 1, in which the writing point member is made up of wires or portions of metal of similar or different shapes sizes and configurations, such, for example, as those illustrated in Figs. 25 to 39 inclusive.

16. A stylographic writing pen as claimed in Claim 1, in which the flow of ink to the writing point is controlled and regulated by means of multiple longitudinal channels provided upon the surface of the feed bar surrounded for a portion of its length by a hollow cylinder or tube.

17. A stylographic writing point as claimed in Claim 1, in which the writing point is prevented from receding by means of a cross member consisting of a single rod or of a series of rods or wires.

18. A writing instrument as claimed in any one of the preceding claims, in which the writing point is composed of a plurality of wires or elongated portions of metal or other suitable material surrounded by a tube which is arranged to follow their external contour.

19. A writing instrument as claimed in any one of the preceding claims, in which the elongated portion of metal or writing point is composed of a plurality of wires or other suitable material surrounded by a tube upon which one or several constrictions are formed.

20. A writing instrument as claimed in

any one of the preceding Claims, in which the writing point is composed of a plurality of wires of metal or other suitable material surrounded by a tube upon the internal surface of which one or several projections are formed.

21. A stylographic writing pen as claimed in any one of the preceding Claims, in which the writing point element is held elastically within the feed bar so as to be capable of limited yielding motion in a longitudinal direction.

22. A stylographic writing pen as claimed in any one of the preceding Claims, in which the feed bar together with the writing point is arranged to abut against a spring suitably fixed and is capable of limited movement in a longitudinal direction.

23. A stylographic writing pen as claimed in any one of the preceding Claims, in which the instrument is sealed against leakage by means of a longitudinal movement of the feed bar member, the rear end of which is arranged to occlude the ink passage leading from the ink sac or reservoir.

24. A stylographic writing pen as claimed in any one of the preceding Claims, 1 to 20 inclusive in which the instrument is sealed against leakage by means of a rotational movement of the feed bar substantially as described.

25. A stylographic writing pen substantially as hereinbefore described and illustrated in the accompanying drawings.

26. A stylographic writing pen as claimed in any one of the preceding Claims, in which any of the usual methods of filling fountain pens is employed.

Dated this 23rd day of January, 1934.

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Jan. 28, 1969

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FOUNTAIN PEN

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Filed Feb. 9, 1965

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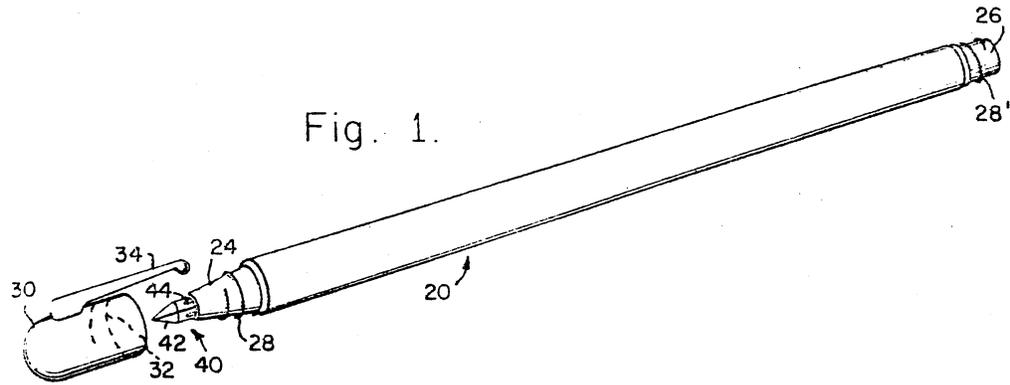


Fig. 1.

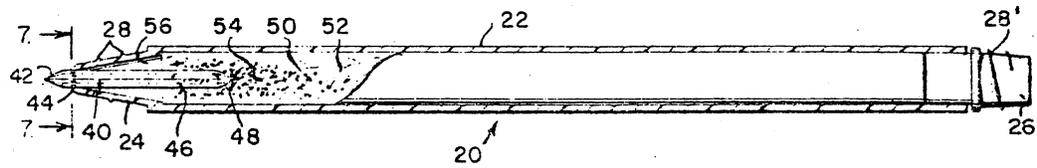


Fig. 2.

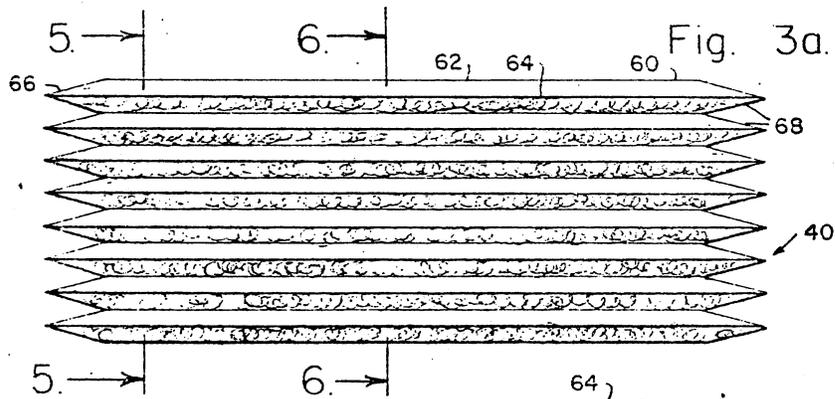


Fig. 3a.

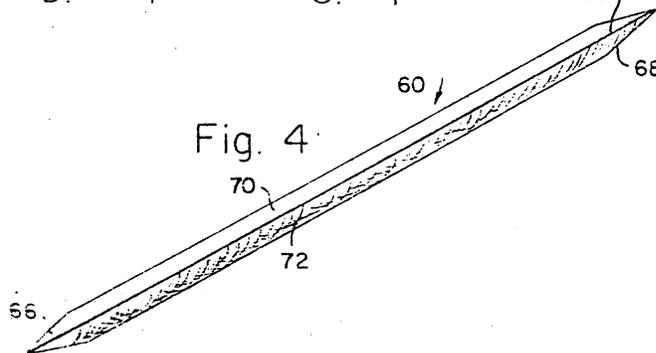


Fig. 4.

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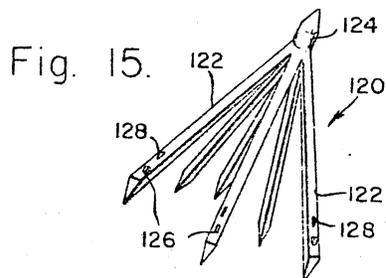
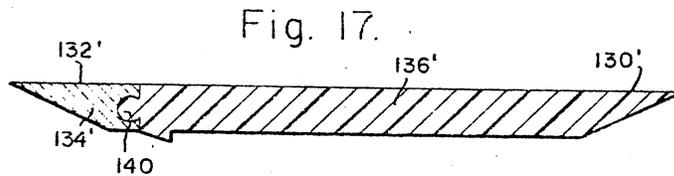
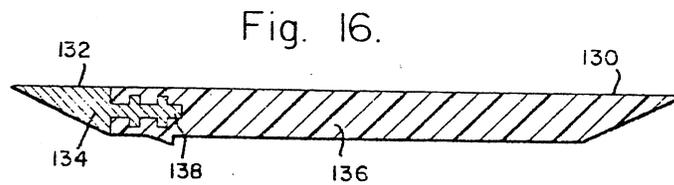
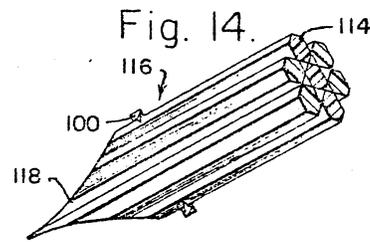
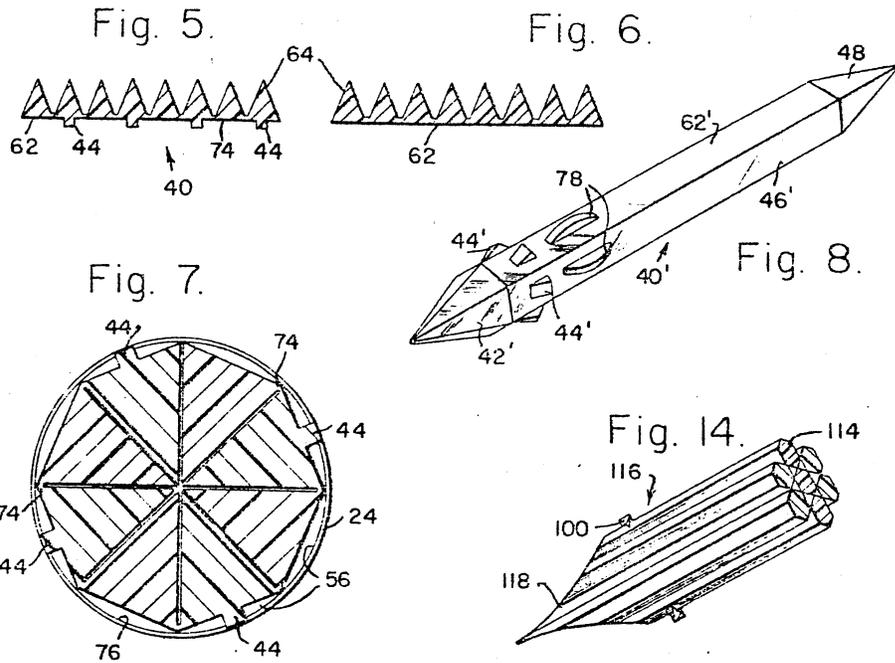
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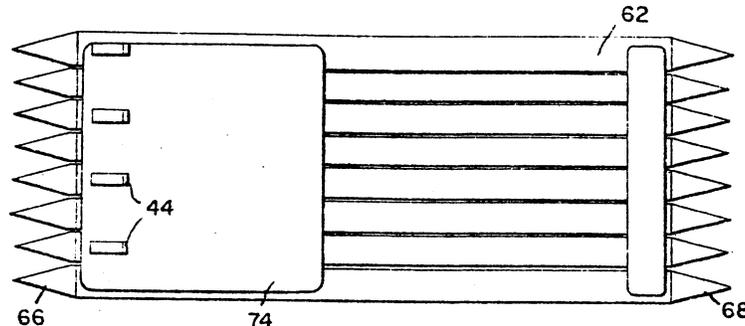


Fig. 3b.

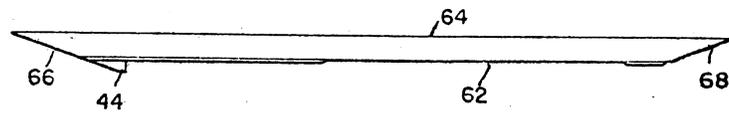


Fig. 3c.

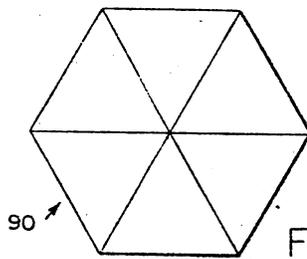


Fig. 9.

Fig 10

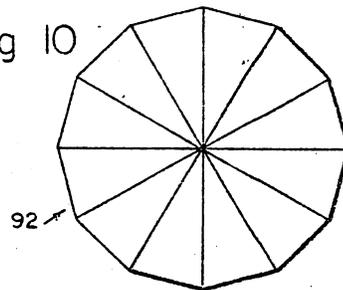


Fig. 11.

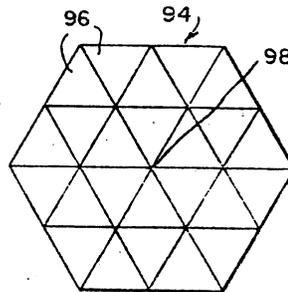


Fig. 13.

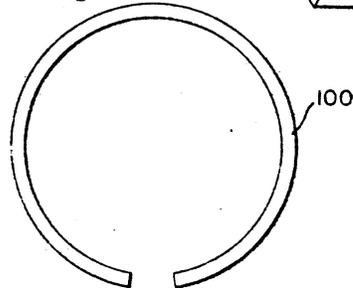
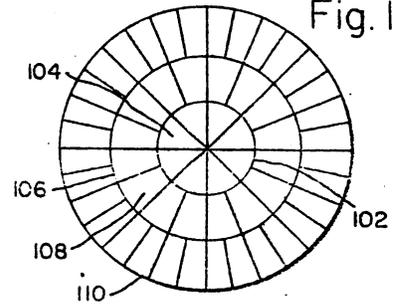


Fig. 12.



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FOUNTAIN PEN

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Filed Feb. 9, 1965, Ser. No. 431,377

U.S. Cl. 401-292

13 Claims 5

Int. Cl. A46b 11/00; B43k 1/02

ABSTRACT OF THE DISCLOSURE

A fountain pen is formed of a plurality of elongated elements in which adjacent surfaces have applied thereto different texture patterns to provide capillary ink passages. In a preferred embodiment, elongated elements are molded as one integral unit which is "rolled up" to form the writing assembly.

The present invention relates to writing instruments and more particularly to a novel fountain pen combining the ease of writing of fluent ink instruments with the smooth writing action of ball point writing instruments.

Fluid writing instruments have long been divided into three basic types. A first type employs a marking tip or nib through which a writing fluid flows or is conveyed to the writing surface. This type includes the earliest pens from the split nib quill pens to the modern, metal split nib pen; a second type usually referred to as a "marking" instrument, maintains a capillary wick in fluid communication with a supply of writing fluid. The third type is best characterized by the ball point pen, which utilizes a rotating ball to transport a more viscous writing fluid, from a supply to the writing surface.

The split nib pen has long been used because of its ability to produce a mark of consistent width and density for the life of the point so long as the supply of ink is adequate and the writing pressure uniform. Usually the pen is of metal and preferably includes a writing nib with a tapered writing tip, having a longitudinal slit extending from a pierce in the nib. Ink flows by capillary action through the slit to the tip during writing. The width of the slit varies as a result of the pressure of writing. Otherwise, ink is held and stored by capillary attraction.

The common split nib pen is "position sensitive" and requires that the instrument be carefully oriented in the writer's grasp to produce satisfactory results. Rotation of the pen point makes writing more difficult and there are "dead" positions from which the pen will not write.

Multiple nib lining and drawing pens have been devised and described for example, in the patents to Chinn, No. 82,598; Heath, No. 423,684; Wardin, No. 1,345,044; Aramian, No. 1,621,450; and Frank, No. 1,903,965. Each essentially relies on the capillary action of the split between adjacent nibs to provide an adequate flow of ink to the point.

The ball point pen which has been introduced in recent years, combines the advantages of a pencil (which transmits writing pressure through several thicknesses of paper to provide multiple copies and which is not particularly sensitive to the orientation of the instrument) with the desired end of producing an ink mark, usually more permanent and durable than a pencil mark.

Despite the wide acceptance and popularity of the ball point pen, many critics have objected to the application of substantial writing pressure, required of most ball point pens, to produce a satisfactory mark. Many find themselves fatigued after extended use of such a pen. Further, certain writing surfaces cause slippage of the ball and consequently a skip in the writing. Further, as the ball wears the socket in which it is mounted, the ink flow increases and ink builds up on the point which is left on the surface as a blot.

The marking instrument, long used for its broad mark-

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ing wick, has in recent years, been modified by attempts to find a wick-point which will provide a writing line comparable to that produced by either the nib pen or the ball point pen. Natural and synthetic fibers have been bundled into a small tip, through which ink flows by capillary action. Such instruments have not achieved sufficient rigidity at the writing point to prevent the collapse of the fibers at the very tip. As a result, an instrument providing a fine line initially quickly breaks down and soon produces a relatively broad mark, unsuitable for most normal writing purposes. More rigid fibers of comparable dimensions would result in a point that could easily scratch or tear the writing surface, which, in turn would result in an unduly broad or thick mark.

Still other attempts to modify a wick-type marking instrument for writing purposes have resulted in a narrowed writing point, but the resulting inadequate flow of the conventional inks used, precludes a satisfactory writing instrument. A more fluent ink, which might overcome the problem, creates yet additional problems, dealing with evaporation rates, permeability of the ink reservoir and pen barrel, and absorption by and drying on the writing surface.

A different approach to provide a wick-type marking instrument having a more rigid structure is exemplified by the patent to Roth, No. 2,396,058 in which a porous solid provides capillary paths for a writing fluid to a writing tip. Here, the choice of the materials and the size of the particles of the solid determines the size of the capillary channels, which are joined at random on a probabilistic basis. Such a method leaves the provision of a continuous capillary path between reservoir and writing tip, too much to chance, without any real control or adjustment being practical.

It is therefore desirable to have a writing instrument that can utilize conventional writing or marking inks, that affords the writing ease of a nib or wick, yet permits the wide range of writing attitudes possible with a ball point pen, and which does not require the fatiguing writing pressures normally experienced with a ball point pen. The instrument should be easily fabricated and permit a relatively inexpensive construction. Such an instrument can be expendable and therefore non-refillable, although if a more permanent unit is desired, the ink supply may be added to from time to time with various refilling modification. However, in an inexpensive, expendable pen, the ink supply can be entirely self contained without provision for refill.

The present invention provides such an instrument which utilizes a novel writing point. The point comprises a plurality of molded elongated elements hereinafter referred to as "strands" to form an elongated solid. It is understood that the conventional definition of "strand" contemplates a twisted or braided configuration, but for the present purposes that term has been adopted in preference to "filament" or other generic term which would encompass the elongated structure comprising an element of the present invention. The adjacent faces are spaced and/or textured to provide paths of capillary dimensions for ink from one end of the strands to the other and which is shaped into a writing tip. In a preferred embodiment, each strand is a segment of a regular polygon. It is to be understood that "polygon" is intended to include geometric shapes with as few as three sides. When the plurality of strands are bundled in interfitting alignment and inserted into a pen barrel, fluid communication is established with the ink supply and the adjacent faces of the individual strands provide capillary passages for the flow of ink.

If a cross section is taken of a bundle of strands, orthogonal to the axis, a central channel will be seen, with a plurality of channels radiating therefrom, all of capillary dimensions for the ink being used. The individual strands are textured to improve the capillary properties of the

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interfitting faces in the bundle. The strands are tapered so that the bundle provides a writing tip which is substantially symmetrical about the axis and which enables writing substantially independent of the attitude of the writing instrument.

In additional embodiments, shoulders are molded on the "bases" or outer-surfaces of selected strands, so that the extent of insertion into the pen barrel can be limited by the shoulders. Still other embodiments provide molded bosses or cam surfaces on the base of each strand, so that once a bundle is in place, the cam surfaces are frictionally engaged by the pen barrel to maintain the strands in a tight, compact bundle. At the same time, these cam surfaces provide a vent to the atmosphere from the ink supply through the barrel between adjacent cam surfaces.

In the preferred embodiment, the individual strands are molded with a triangular cross section. When assembled, a regular, polygonal prism is formed. As will be easily seen, a polygonal solid fitted into a circular orifice will provide a plurality of air passages external to the solid for communication with the interior of the pen.

The preferred method for producing the strands comprising a point involves a molding or casting process, in which the inner faces of the mold are textured, for example on one side with a series of circular striations or scratches and on the opposite or facing side, with linear or lateral striations or scratches. The "base" surfaces of the plurality of strands are provided with a connecting band or web so that the plurality of strands can be cast side-by-side in a single coherent unit which is later "rolled" to form the polygonal solid. An eight-sectioned point has proved to be eminently satisfactory and, accordingly, each strand has an apex angle of approximately 45°, so that an octagonal "solid" is formed by the bundling of eight, substantially identical, strands.

In an alternative embodiment, a plurality of strands are molded to radiate from a common, central rod. To provide a similar, eight-sectioned point, eight strands are formed, each of substantially triangular cross section and each with an apex angle of approximately 45°. When the individual strands are collapsed inward to be in parallel alignment with the axis, as by inserting the rod end into a circular orifice of a pen barrel, an octagonal body is again produced, co-axial with the stem rod.

Obviously, the number of strands used to make up a point, is determined by the fluidity of the ink, the capillary properties of the ink with the material used in the making of the strands, and the breadth of the mark to be written. To assure uniform writing properties, independent of the rotational position and attitude of the pen, six or more strands are deemed preferable. However, classical drafting pens would use two "strands," while the prior art has disclosed a pen using three metal points, in a conical taper. Experiments with four strands have produced instruments that were not insensitive to rotation of the pen, but it is suspected that even a four-strand pen would be satisfactory, if a suitably fluid ink were chosen.

In the preferred embodiment, a point is provided with a uniform, straight line taper, to the writing tip. It is believed, however, that depending upon the wearing properties of the point material employed, other, non-linear, tapers might be preferable, so that the width of the mark produced would be less dependent upon the wear of the tip in the axial direction.

Yet other embodiments employ either all-metal strands, or metal tips affixed to plastic strands, to provide a long wearing, highly polished writing tip that is not affected by abrasion with the writing surface and which will continually provide a smooth even contact between point and writing surface. In such embodiments, writing tips of suitable metals such as osmium or iridium can be integrally molded onto the ends of the individual strands. Alternatively, each strand could be made of a suitable metal, in a process similar to that employed for the plastics.

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Similarly, strands could be made of ceramic, or any other suitable material.

Plastics, such as the acetal copolymers, have obvious advantages of cost, ease of molding or casting and their extreme fidelity to the mold. Accordingly, a plastic strand is the first choice, especially for an expendable pen.

Accordingly, it is an object of the present invention to provide a fountain pen having a unique point structure suitable for use with conventional writing inks.

It is yet another object of the present invention to provide an improved fountain pen having an omnidirectional point.

It is still a separate object of the present invention to provide a fountain pen having a plastic writing point.

It is yet an additional object of the present invention to provide a fountain pen having a plastic writing point terminating in a metal writing tip.

It is a further object of the present invention to provide an improved fountain pen having an omnidirectional, all-metal writing point.

It is another object of the present invention to provide a writing point for a fountain pen, which is made up a plurality of elongated strands in a compact bundle.

It is a further object of the invention to provide an improved writing point for a fountain pen made up of a plurality of similar strands of plastic, which, in a bundle, provide contiguous capillary paths for ink for the entire length of the strands.

It is yet another object of the invention to provide an improved writing point for a fountain pen made up of a plurality of molded strands of plastic which can be rolled into a bundle and inserted into a pen barrel.

It is yet an additional object of the present invention to provide an improved writing point for a fountain pen made up of a plurality of strands radially cast from a central stem which when inserted into a pen barrel collapse to form a solid body having contiguous capillary ink paths extending the length of the point.

It is a further object of the invention to provide an improved writing point for a fountain pen made up of a plurality of individual strands which are cast or molded in a predetermined shape with a predetermined texture to the surfaces for providing capillary ink paths between adjacent strands.

It is yet an additional object of the invention to provide a polygonal point for a fountain pen which, when inserted in a circular orifice, provides a plurality of vent passages to the ink reservoir.

It is still an additional object of the present invention to provide an improved point for fountain pens made up of a plurality of individual strands bonded together by a web member, which enables the strands to be rolled into an elongated solid for insertion into a pen barrel.

It is still an additional object of the present invention to provide a multi-strand writing point assembly for a fountain pen which includes shoulders molded on the individual strand elements to limit the depth of insertion of the point assembly in the fountain pen barrel.

The novel features which are believed to be characteristic of the invention, both as to organization and method of operation, together with further objects and advantages thereof will be better understood from the following description considered in connection with the accompanying drawings in which several preferred embodiments of the invention are illustrated by way of example. It is to be expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the invention.

FIG. 1 is a perspective view of a fountain pen according to the present invention;

FIG. 2 is a side sectional view of the pen of FIG. 1; FIG. 3, including FIGS. 3a, 3b and 3c is a view of a preferred embodiment of a point assembly for use with the fountain pen with the present invention in which FIG.

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3a is a top view of a plurality of triangular strands showing the "interior" sides of the strands;

FIG. 3b is a bottom view of the strands of FIG. 3a showing the base or outside surfaces of the strands;

FIG. 3c is a side view of the strands of FIGS. 3a and 3b;

FIG. 4 is a perspective view of an individual strand of a point assembly showing, in greater detail the texturing of the interior surfaces thereof;

FIG. 5 is an end sectional view of the point assembly of FIG. 3a taken along the line 5—5 in the direction of the appended arrows;

FIG. 6 is an end sectional view of the point assembly of FIG. 3a taken along the line 6—6 in the direction of the appended arrows;

FIG. 7 is an enlarged front view of the point assembly of FIG. 2 taken along line 7—7 in the direction of the appended arrows;

FIG. 8 is a perspective view of an alternative point assembly according to the present invention;

FIG. 9 is a cross section view of a six stranded point assembly according to the present invention;

FIG. 10 is a cross section view of a twelve stranded point assembly according to the present invention;

FIG. 11 is a cross sectional view of a hexagonal point assembly according to the invention comprised of a plurality of equilateral triangular strands;

FIG. 12 is a cross section view of yet another point assembly comprised of strands forming segments of annular concentric cylinders to form a columnar point assembly;

FIG. 13 is a top view of a retaining ring adapted for use in the present invention;

FIG. 14 is yet another embodiment of a point assembly in which hexagonal strands are bundled together to form a point assembly;

FIG. 15 is a perspective view of yet another configuration of a plurality of strands radiating from a central stem;

FIG. 16 is a side sectional view of a strand having a metal point; and

FIG. 17 is a side sectional view of yet another strand having a metallic point.

Turning first to FIG. 1, there is shown a typical fountain pen 20 according to the present invention. The pen 20 includes a barrel 22, terminating at the forward end in an apertured nose piece 24, and, at the rearward end in a removable filling cap 26. The rearward end may be used to fill the pen with writing fluid. As shown, the nose piece 24 is also provided with a spiral thread 28, and the filling cap 26, has a similar spiral thread 28'.

A protective cap 30, has on the internal surface thereof, a matching thread 32, which is adapted to engage the thread 28 of the nose piece 24, as well as the thread 28' of the filling cap 26. A molded clip member 34 is provided on the cap 30 so that when the cap 30 is closed onto the nose piece 24, the clip 34 in cooperation with the barrel portion 22, provides a clip to be used with a garment pocket.

A point assembly 40 is fitted into the nose piece 24, and a writing tip 42, projects therefrom at a desired distance, determined by the placement of a plurality of shoulders or bosses 44. The shoulders 44 engage the nose piece 24, and limit the depth of insertion of the pen point assembly 40 into the pen barrel 22.

Turning next to FIG. 2, there is shown a side sectional view of the fountain pen 20 of FIG. 1. Within the pen barrel 22, there is a reservoir area 50 which, in the preferred embodiment is occupied by a cylinder 52 of a highly porous, fibrous material, capable of absorbing and holding, by capillary attraction, a substantial quantity of ink or writing fluid 54. Alternatively, the ink may be stored in the reservoir using a plastic or other sac or possibly a relatively thin disk of porous fibrous material between the point and the liquid ink supply to act as a

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"capillary valve" to prevent leakage around the point or through the air vent.

As shown in FIG. 2, an air passage 56 is necessary to communicate between the reservoir 50 and the atmosphere to maintain pressure equilibrium as ink is used. The air passage 56 through areas between the point assembly 40, and the interior surface of the nose piece 24 avoids the need to perforate the barrel 22 or the filling cap 26.

In a preferred embodiment, the pen 20 is assembled by first inserting the cylinder 52 of absorbent material into the reservoir area 50 of the pen barrel 22. Next, a precisely metered amount of ink or writing fluid 54 is added to the reservoir area 50 where it is absorbed and held by the cylinder 54. The filling cap 26 is then inserted in place. The filling cap 26 can be permanently fastened or can be provided with a frictional, but air tight fit. If the cylinder is not used, some other equivalent structure should be employed to keep the ink from leaking out around the point assembly 40.

Next, the point assembly 40 is inserted through the orifice of the nose piece 24, and forced into the interior of the pen barrel 22. Preferably the fit of the point assembly 40 in the nose piece 24 is a tight one. The piercing tip of the feed taper 48 enters the cylinder 52 of absorbent material and establishes contact with the writing fluid 54, stored therein. The point assembly 40 is forced into the pen barrel 22 until the shoulders 44 engage the nose piece 24.

Writing fluid 54 is conducted to the writing tip 42 through capillary action within the point assembly 40, to be explained in greater detail below. When the writing fluid has reached the tip, the pen is ready for writing. The protective cap 30 is placed on the nose piece 24. An air tight fit is formed after the mating threads 28, 32 have been fully engaged by rotation of the cap 30. With the cap in place, the air tight seal thus formed tends to prevent evaporation of the writing fluid. The clip portion 34 can be used to hold the pen 20 securely in a pocket. To write, the cap 30 is removed and placed for safekeeping on the filling cap 26, where it can be secured in place by the mating threads.

The pen may then be employed for writing in the well known manner. Only a light touch need be employed as the capillary flow of fluid to the point assures a plentiful supply at the writing tip.

Turning to FIGS. 3 through 7, there is shown a preferred embodiment of a point assembly 40 according to the present invention. In a preferred method of producing the point assembly 40, a plurality of strands are cast, in a "parallel" mold, each strand having a surface in a common plane. Satisfactory points have been produced from an acetel copolymer, commercially available under the trademarks Cellon or Delrin. Other assemblies have been made of linear polyethylene and even polypropylene has been used. The choice of a plastic material is, of course, closely related to the choice of writing fluid and the compatibility of one with the other.

In FIG. 3a, there is shown an eight-strand assembly, each strand 60 of triangular cross section. In this embodiment, each is provided with an apex angle roughly approximating 45° with a permissible variation of —30°. The exact amount by which the angle can be less than 45° depends upon surface texture and the properties of the writing fluid. The angle can be expressed as 44° 30' ±30'. It will be apparent that if the angle is much less than 45° with an octagonal assembly, the space between adjacent strands will exceed capillary dimension except for a very small area.

FIG. 3b shows the bases of the strands 60, with the base surface 62 in the common plane. As shown in FIGS. 3a, 3b and 3c, each strand 60 is provided with a leading taper 66 and a feed taper 68. The apex edge 64, however, is perfectly straight and, in this embodiment is aligned in parallel with those of the adjacent strands.

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The "inner" surfaces of the strands have differing cooperating textures 70, 72. A pair of webs 74, best seen in FIG. 3b molds the strands together into an integral unit. The webs 74 are easily produced by relieving areas on the cooperating opposite half of the mold so that corresponding areas of web are produced upon casting.

In FIG. 4, there is shown a single strand 60, in which the surface texturing is illustrated in somewhat greater detail. It has been found experimentally, that a satisfactory point assembly can be assembled from a plurality of strands in which one, inner face is textured by the plurality of parallel, longitudinal striations or scratches 70, which cooperate with the plurality of circular striations or scratches 72 on the adjacent, inner face.

When the plurality of strands 60 is formed into a finished point assembly 40, the strands 60 are arranged so that a surface having longitudinal or parallel scratches 70 is always next adjacent a surface having circular scratches 72. The texturing of the surfaces of the mold in which the strands are produced. It has been found, that the scratches normally caused by the milling out of the mold, produces adequate surface texturing on the finished strands 60.

FIGS. 5 and 6 are cross sections of the plurality of strands comprising a point assembly 40 in an unassembled configuration. FIG. 5 is a view taken through shoulders 44 while FIG. 6 is a cross section taken approximately through the center of the strands. While FIG. 6 shows each strand to be in fact an individual separate element, FIG. 5 shows the thickened web portion 74, which joins the adjacent strands in an integral unit.

To place a point assembly 40 in use, the plurality of strands 60 are rolled into a compact polygonal bundle, with the plurality of apices 64 coming together at a single central axial line. FIG. 7 is an enlarged end view of a point assembly 40, fully assembled and inserted into the opening or orifice 76 of the nose piece 24. As seen in FIG. 7, the bundling of the plurality of strands results in a regular, eight-sided polygon, which is circumscribed and frictionally held by the nose piece 24. Shoulders 44 cast on alternate strands, engage the nose piece 24 to limit the depth to which the point assembly 40 is inserted.

The point assembly is maintained in its polygonal shape by the pressure of the circumscribing orifice 76 which, in combination with the web 74, holds the strands 60 together. The space between the "flat" sides of the polygon and the circular orifice 74 functions as a breathing vent between the reservoir 50 and the outside environment. Such a structure easily provides adequate ventilation to the reservoir during the writing fluid withdrawal.

FIG. 8 is a perspective view of an alternative point assembly 40' in which a plurality of boss or cam surfaces 78 are provided on the base surfaces 62', immediately behind the shoulders 44'. These serve to reinforce the wedging action of the orifice 76 on the corners of the polygon and provide added support and frictional pressure to the midpoint of each of the strands 60.

The bundle of strands, when compacted, forms a major capillary surface between all adjacent inner faces, including a central capillary channel where the apices meet. The texturing of the individual surfaces of the strands provides minor capillary paths for writing fluid so that a substantial supply of writing fluid "travels" from the reservoir to the writing tip.

Still other alternative embodiments of point assemblies are shown in FIGS. 9 through 12, inclusive, which are cross section views of the other configurations that a point assembly might take. For example, FIG. 9 is a cross section of a regular hexagonal point assembly 90 comprised of six triangular strands bundled together.

FIG. 10 shows a similar structure, in this case a dodecagon or twelve-sided polygon 92, comprised of twelve, triangular strands bundled together. Similarly,

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sixteen triangular strands (not shown) could be utilized to form still another bundle having sixteen "sides." In all of these embodiments, there is the continuing requirement that the apex angle of each strand be no greater than $360^\circ/N$, where N is the number of strands. A certain nominal amount of leeway is permitted by which the angle might be less than $360^\circ/N$, depending on the capillary properties of the ink and the strand material. For example, the angle might be better expressed as

$$\left(\frac{360^\circ}{N} - 30'\right) \pm 30'$$

The difference is permitted so that if the adjacent surfaces are not adequately textured, the capillary surfaces are not completely closed off when the strands are compressed into the polygon.

Turning next to FIG. 11, there is shown a departure from what has heretofore been a single "layer" of strands, each of substantially triangular cross section and each having an apex angle no greater than $360^\circ/N$, where N is the number of strands in the bundle forming the regular polygon.

In FIG. 11, point assembly 94, is made up of a plurality of strands 96 of equilateral triangular cross section, which are arranged in a larger polygon of hexagonal shape with a central, axial line 98. As shown, some twenty-five identical strands 96, bundled together form the larger, hexagonal prism, point assembly 94, whose exterior faces are made up of two adjacent strand surfaces. The bundle can be held together by a split ring 100, as shown in FIG. 13, or by frictional engagement with the orifice of a nose piece, of suitable diameter.

If the individual strands 96 are drawn or extruded, then tapers must be ground or machined onto the finished bundle. If molded or cast, a plurality of flat, parallel type molds can be provided, or a "flower-type" configuration, explained below in connection with FIG. 15, can be employed.

FIG. 12 shows a similar approach, in which an inner core 102 is formed of strands 104 of a "pie" shape, which when bundled together produce a cylindrical column. A concentric annular cylinder 106 is made up of a plurality of strands 108 each having the cross section of a sector of the annular ring 106 and, as shown, a second annular cylinder 110 is provided, surrounding the first annular cylinder 106. Alternatively, the individual strands of the outer most annular cylinder 110 could be provided with plane exterior surfaces, so that the bundled strands would have the appearance of a polygon, rather than a cylinder.

A split ring 100, such as shown in FIG. 13 may be used both to hold the strands in a bundle and to limit the depth of insertion of the point assembly. The ring may have a sharpened inner periphery 112 so that the outer strands are slightly deformed by contact with the ring 100, thereby preventing sliding of the ring 100 in the axial direction.

In FIG. 14, yet another alternative embodiment of a point assembly is shown, in which a plurality of strands 114 of polygonal cross sections are bundled to form a point assembly 116 and held by a split ring 100. As shown the strands 114 are hexagonal and may be drawn or extruded and cut to proper length. When bundled, and held by the ring 100, a suitable taper 118 may be ground or otherwise formed, to produce a writing tip. The taper 118 can assume virtually any configuration from a "hollow ground," hyperboloid of revolution, (as shown), to a hemisphere (not shown). The "hollow ground" shapes permit substantial point wear without degradation of the width of the written mark. Other special shapes may be provided for any desired mark or line.

Turning next to FIG. 15, there is shown yet another configuration for an unassembled point structure 120, which is suitable for molding or casting. A plurality of

124. With a sufficiently flexible material, the individual strands 122 radiate from a central core member or stem strands 122 can be bundled together to assume the same point assembly configuration achieved by the casting of strands in parallel, such as illustrated in FIG. 3.

In the point structure 120 of FIG. 15, similar shoulders 126, and, where desired, cam surfaces 128, can be molded into the exterior sides of the strands. In substantially all aspects, the point structure 120 will be identical to the point assembly 40 of the preferred embodiment. However, the strands 60 of the preferred embodiment are joined by the webs 74 that form fairly wide lateral bands, yet in the instant embodiment, the strands 122 are joined only at one end.

The embodiments of FIGS. 11 and 12 might also be cast as a plurality of radiating strands from a central "stem." Such a mold is well within the skill of the plastics molding art, and accordingly will not be dealt with herein. It is sufficient to note that the finished point assembly will consist of a plurality of strands having interfitting adjacent surfaces to provide major capillary surfaces. The adjacent surfaces are so textured to provide minor capillary paths within each surface. The shapes of the individual strands and the methods of producing the strands are limited only by the ingenuity of the designer of the mold or die, without necessarily requiring the exercise of inventive skill.

Turning next to FIGS. 16 and 17, there are shown still other embodiments of strands 130 suitable for use in the present invention. If an all metal strand is considered undesirable, a composite strand may be utilized. A tapered point 132 forms the writing tip and is made of a hard, corrosion resistant metal 134, which is embedded or otherwise anchored to the plastic material 136, of the remainder of the strand 130.

As seen in FIG. 16, the metal point 132 has a post 138 extending therefrom about which the plastic material 136 is molded. FIG. 17 shows a similar metal point 132' which contains an opening 140 into which plastic material 136 has been injected for a firm connection.

The embodiments of FIGS. 16 and 17 are primarily intended for use in a permanent type fountain pen, in which the point is expected to undergo little or no wear through use. Accordingly, the pen is adapted to be refilled with ink. Where the added expense can be justified, the individual strands themselves can be entirely comprised of metal, although it is believed that plastic strand might provide better capillary surfaces and capillary paths.

Thus there has been described a new and improved fountain pen as well as a new writing point assembly for a fountain pen. The pen combines many of the advantages of the conventional fountain pen with other advantages peculiar to a ball point pen. Further, the present pen also embodies many features of the wick-type marking pen, but provides a smooth, long wearing point that does not degrade the quality of the line produced over a period of time.

What is claimed as new is:

1. A writing point for a fountain pen comprised of a plurality of similar, elongated elements, each element including:
 - a first inner surface having a first predetermined pattern formed thereon, and a second inner surface having a second predetermined pattern formed thereon, said first and second predetermined pattern being different whereby a first inner surface, in intimate contact with a second inner surface for substantially the length of their respective elements, provides a plurality of contiguous paths of capillary dimensions for writing fluid, extending the length of the elements.
2. An element adapted for use in a writing point assembly for a fountain pen in combination with other, similar, elements, comprising:
 - an elongated, non-absorbent solid having a first inner surface, a second inner surface and an outer surface;
 - a shoulder mounted on said outer surface adapted to

engage a pen barrel to limit the insertion of the point therein;

- a writing tip, having a uniform taper from said outer surface toward said inner surfaces; and
- inscribed texturing on said inner surfaces of predetermined depth and pattern, the pattern on one surface being different from the pattern on the next adjacent surface for providing, as between contacting inner surfaces of adjacent similar elements, paths of capillary dimensions for writing fluid extending the length of said element to said writing tip for transporting writing fluid thereto.

3. The combination with a fountain pen including a barrel portion, a reservoir portion within the barrel portion, and an orifice in one end of the barrel portion communicating with the reservoir portion of a writing point adapted to be inserted into the barrel portion orifice comprising:

- a plurality of elongated elements of non-absorbent material, said plurality of elements being adapted to be bundled into a substantially solid, elongated structure, adjacent surfaces of said elements having respectively different patterns inscribed and textured therein, for providing contiguous paths of capillary dimensions for writing fluids extending the length of said elements when said elements are bundled together and inserted into the pen barrel orifice.

4. The writing point of claim 3 above, wherein the pattern on one of a pair of adjacent surfaces is substantially curvilinear and the pattern on the other of a pair of adjacent surfaces is substantially rectilinear.

5. The writing point of claim 3 above, wherein each element has a tapered, writing tip of metal.

6. The writing point of claim 3 above, wherein each of said elements is made entirely of metal.

7. The writing point of claim 3 above, wherein each of said elements is made entirely of a plastic.

8. The combination with a fountain pen including a barrel having a writing fluid reservoir portion adapted to store writing fluid therein, and an orifice at one end adapted to receive a writing point in fluid communication with the reservoir portion of a writing point comprising:

- (a) a stem member adapted to engage the reservoir portion of the barrel;
- (b) a plurality of strands, each attached at one end to said stem member and extending radially therefrom, each of said strands adapted, respectively, to interfit with adjacent strands to form an elongated solid; and
- (c) writing fluid path means including predetermined inscribed textured patterns on adjacent interfitting strand surfaces, said patterns on a one surface being different from the pattern on the next adjacent surface, said interfitting strand surfaces cooperating to provide contiguous paths of capillary dimensions for writing fluid, extending substantially the length of said strands when said strands are bundled to form an elongated solid.

9. The writing point of claim 8 above, wherein each of said strands is an elongated triangular prism having an apex angle of substantially $360^\circ/N$, where the plurality of strands consists of N strands, to form an N-stranded writing point having a regular, geometric shape.

10. The writing point of claim 8 above, wherein at least one of said strands includes an outwardly projecting shoulder on an exterior surface thereof adapted to engage the barrel at the orifice thereof, to limit inward insertion of said writing point.

11. The combination with a fountain pen including a barrel having a writing fluid reservoir portion adapted to store writing fluid therein and an orifice at one end adapted to receive a writing point in fluid communication with the reservoir portion of a writing point comprising:

- (a) a plurality of N elongated strands, each having a base side and a pair of inner sides meeting at an acute angle approximately equal to but less than

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360°/N, each of said strands adapted, respectively, to interfit with adjacent strands to form an elongated, N-stranded solid; and

(b) writing fluid path means including predetermined inscribed textured patterns on adjacent interfitting strand inner surfaces said pattern on a one surface being different from the pattern on the adjacent interfitting surface, said surfaces cooperating to provide contiguous paths of capillary dimensions for writing fluid, extending the length of said strands when said strands are bundled to form an elongated solid, with all inner sides being held in close proximity, with each other.

12. The writing point of claim 11 further including intercoupling means connecting the base sides of all of said strands into an integral unit, said intercoupling means being operable to retain said strands in a rolled configuration when said strands are bundled.

13. The writing point of claim 11 further including shoulder means mounted on the base surface of some of

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12

said strands for limiting the inward travel of the writing point in the barrel orifice.

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ROBERT W. MICHELL, *Primary Examiner.*

U.S. CI. X.R.

15—447; 401—199, 258

118 A 3

特許庁
実用新案公報

実用新案出願公告
昭34-3714

公告 昭 34.3.16 出願 昭 31.6.16 実願 昭 31-30119

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(全1頁)

筆 記 具

図面の略解

第1図は本案の要部縦断正面図、第2図は先口の斜面図である。

実用新案の説明

本案はフェルト製細杆体をペン体とする筆記具の改良に係るもので、中心孔1を有する截頭円錐状の頭部2の底面中央部に筒部3を一体に連通突設した先口aを首座4の先端開口部から該頭部2の底面縁部によつて抑止せられるまで密挿し、該先口a中にはフェルト製細杆体よりなるペン体5を挿入してなるものである。なお、図中6は首座4に装着した管軸部、7は先口aの筒部3に適宜設けた割截部を示す。

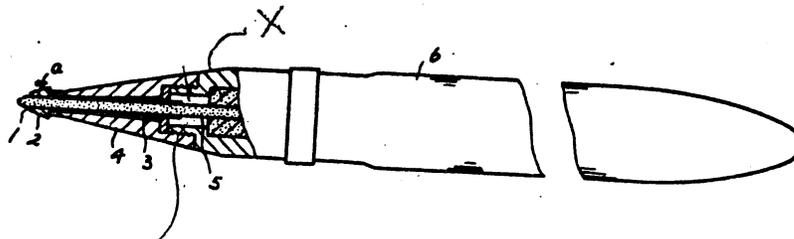
本案は前記のように、フェルト製細杆体よりなるペン体5を挿入した先口aが首座4中に密挿せられているため、該ペン体5は常に安定せられて、管軸部6中のインクをもつて浸潤せられたペン体5の先端部をもつて紙面等に文字を書く場合にもぐらつくようなこと全くなき、又該先口aの

頭部2はその底面縁部が首座4の先端部に密接せられているため、首座4の先端開口部から過剰のインクがペン体5を通じることなく漏出することを抑止するものであるが、該ペン体5が太書用である場合においてこれを細書用のものに交換する必要がある際には首座4の先端部より少許大径とした先口aの頭部2の縁部に爪先を懸けて牽引すれば、ペン体5は先口aと共に首座4から抜き出せるから、別に予備した細書用のペン体5を挿入した先口aと交換すれば、簡単に細書用のものとなる便利なものである。

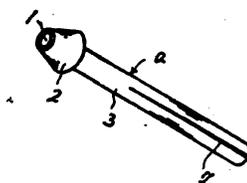
登録請求の範囲

図面に示すとおり、中心孔1を有する截頭円錐状の頭部2の底面中央部に筒部3を一体に連通突設した先口aを首座4の先端開口部から該頭部2の底面縁部によつて抑止せられるまで密挿し、該先口a中にはフェルト製細杆体よりなるペン体5を挿入してなる筆記具の構造。

第1図



第2図



Title of the Utility Model Registration

Writing Instrument

Name of the applicant

Takashi Funabashi

Scope of the Utility Model Registration

As shown in the attached drawing, a writing instrument provided with a nib holder (a) rigidly inserted into an opening of a tip portion of a casing (6), said nib holder (a) comprising a conical head (2) having a central aperture axially passing through thereof and a cylindrical member (3) coaxially connected to said head (2), a nib (5) supported by said nib holder (a), said nib (5) composed of a thin felt member, said head (2) defines ^{ing} a mounting position of said nib holder (a) to said casing (6).

_____ . _____ . _____ . _____ . _____

In the specification, it is clearly described the well-known construction of the writing instrument shown in the drawing, for example, the rear end of the nib 5 is inserted into an ink reservoir in the case 6. The ink reservoir does not represented by any numeral in the drawing, however, it is understood that X represent the ink reservoir. There is a space Y which is not particularly illustrated, but understood in the drawing.

Oct. 10, 1961

S. N. ROSENTHAL

3,003,181

MARKING DEVICE WITH SNAP-ON HEAD ASSEMBLY

Filed July 29, 1959

FIG. 1

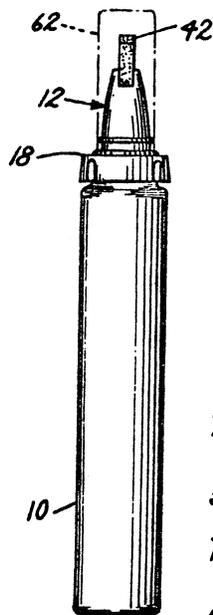


FIG. 2

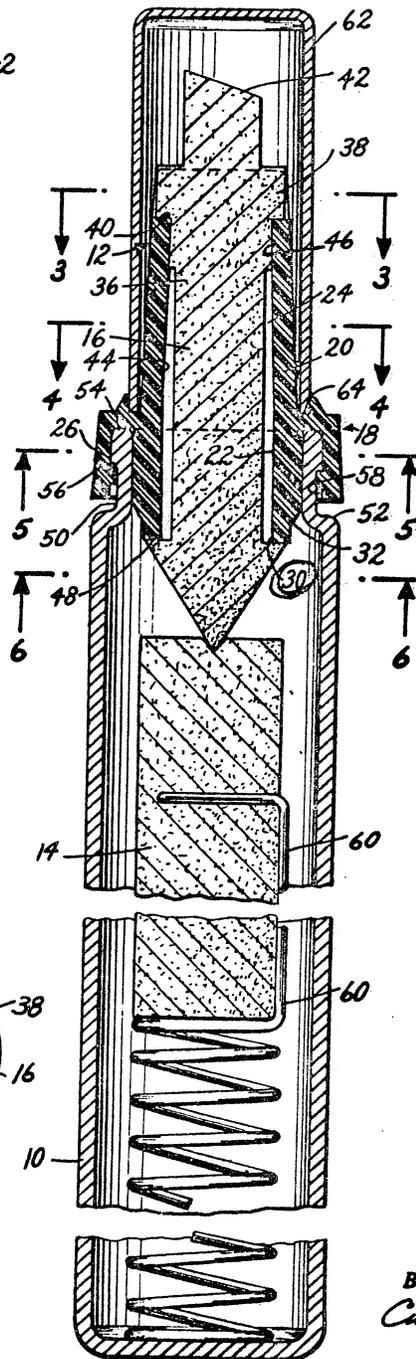


FIG. 4

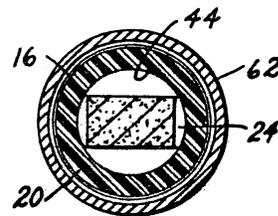


FIG. 5

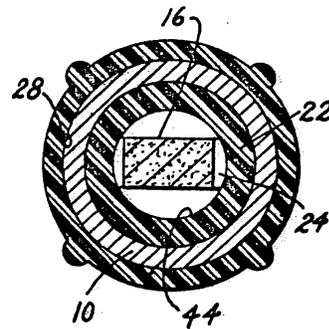


FIG. 6

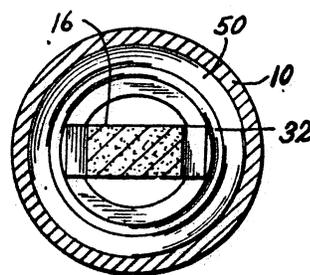
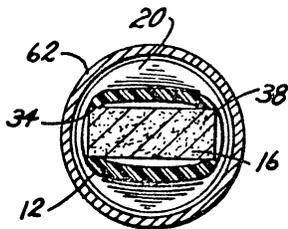


FIG. 3



844

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United States Patent Office

3,003,181

Patented Oct. 10, 1961

1

3,003,181

MARKING DEVICE WITH SNAP-ON HEAD ASSEMBLY

Sidney N. Rosenthal, Belle Harbor, N.Y., assignor to
Speedry Chemical Products, Inc., Richmond Hill, N.Y.
Filed July 29, 1959, Ser. No. 830,357
6 Claims. (Cl. 15—563)

This invention relates to a marking device with snap-on head assembly which is adapted for use with inks having different kinds of bases.

An object of the invention is to provide a marking device which essentially comprises a marking nib of felt or some similar material and wherein the ink is carried by an absorbent member from which the ink is fed to the nib by capillarity, which is substantially vapor tight when not in use, thus making it possible to use highly volatile bases or solvents for the ink, which may be recharged with ink by the user, quickly and easily, and which will be relatively simple and inexpensive to construct and assemble.

Other objects of the invention will appear as the description of the invention and of the embodiment illustrated in the drawing progresses.

In the drawing in which the presently preferred embodiment of the invention is illustrated,

FIGURE 1 is an enlarged elevation of the marking device;

FIGURE 2 is an enlarged vertical sectional view;

FIGURE 3 is a horizontal sectional view through FIGURE 1 on the plane of line 3—3 on FIGURE 2;

FIGURE 4 is a horizontal sectional view through FIGURE 1 on the plane of line 4—4 on FIGURE 2;

FIGURE 5 is a horizontal sectional view through FIGURE 1 on the plane of line 5—5 on FIGURE 2;

FIGURE 6 is a horizontal sectional view through FIGURE 1 on the plane of line 6—6 of FIGURE 2.

In the embodiment of the invention disclosed in the drawing the device comprises, fundamentally, a barrel or ink reservoir 10 which is of hollow cylindrical or other desirable form, which easily, comfortably and conveniently may be gripped in the hand of the user. A head assembly indicated generally by the reference numeral 12 is made, preferably, of polyethylene or of similar material, portions of which possess some degree of resiliency, and is removably carried by the open end of the reservoir 10. The reservoir 10 is provided with an ink carrier 14 made of felt or similar ink absorbent material. The head 12, which snaps on and off the reservoir, carries a nib 16 the outer end of which is used for marking and the inner end of which contacts the carrier 14 to supply ink to the marking end by capillarity. This nib 16 is preferably of felt or other similar material which is relatively harder than the carrier 14 and yet is capable of capillary action.

The elements of the head assembly are, preferably, integral with each other and comprise a cap portion 18, a nib holder 20 and a nipple 22.

A channel 24 extends axially as a continuous bore through the nib holder 20 and the nipple 22 and is open at both ends to permit the nib to extend into the ink reservoir and also beyond the end of the nib holder.

The flange 26 of the cap 18 is spaced from the nipple 22, thus creating an annular channel 28, FIGURE 5, for the reception of the neck portion of the reservoir, as later will be explained.

The free end of the nipple 22 is provided with an annular bearing surface or shoulder 30 for engagement with portions of the inner end of the nib and is also provided with a taper surface 32 to facilitate the emplacement of the head assembly on the reservoir, as later will be described.

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At the outer end of the nib holder 20 are located oppositely disposed notches 34.

The nib 16 which is of relatively hard felt or some similar capillary material, comprises a shank portion 36 which is located in the channel 24.

A pair of wings 38 is located adjacent the outer end of the shank portion and fit snugly within the notches 34 with a face-to-face engagement at 40, which engagement prevents the nib from being forced inwardly during use.

The nib is also provided with a marking point 42, of any desirable form, extending beyond the wings 38.

The shank 36 which is of less transverse dimensions than the channel 24, thus providing air passages 44, has shoulders 46 adjacent the wings 38 which tightly fit in the channel 24, thus cooperating with the wings 38 firmly to emplace the outer end of the nib. The cross section of the channel 24 may be of many configurations but, when it is circular as shown in the drawing, the outer end is preferably constructed into an elliptical form to more closely embrace the nib and yet leave an airway around the nib.

The inner end of the nib is provided with shoulders 48 which overlap and engage the annular face 30 on the nipple 22. The inner end of the nib is reduced to substantially pointed form for engagement with the ink carrier 14 in the barrel 10.

A reduced neck portion 50 is located at the upper end of the barrel or reservoir 10, thus creating a shoulder 52.

In order to insure a vapor-tight joint between the ink reservoir and the head assembly the outside diameter of the nipple 22 is slightly greater than the inside diameter of the neck of the reservoir into which it fits.

Preferably the thickness of the wall of this reservoir neck is slightly greater than the width of the annular space or channel 28 of the cap into which it extends and there is a forced face-to-face contact of the cap with the neck at the outer edge 54 of the neck 50 and at the shoulder 56 of inwardly extending flange 58 of the cap 18.

The reservoir 10 is sufficiently long to form a comfortable hand grip.

The ink carrier 14 is positioned in the reservoir 10 with its upper end in forced contact with the lower pointed end of the nib by means of a resilient member, as a coil spring 60, an end portion of which also serves the purpose of stiffening the ink carrier 14 without materially affecting its capillarity. The positioning of the ink carrier 14 by the nib and the resilient member 60 and as spaced from the enclosing wall surfaces of reservoir 10 insures the passage of air completely around the carrier which is necessary to the capillary action.

The assembly of the various elements of this marking device is simple and may be accomplished in a relatively short time by unskilled operators.

The inner end of the nib is inserted in and pushed inwardly through the channel 24, the protruding shoulder portions 48 being compressed until they pass beyond the lower end of the nipple 22 at which time their engagement of the shoulders with the annular face 30 will prevent the accidental outward movement of the nib. But the shoulders 48 may be flexed to permit deliberate withdrawal.

With the engagement at 40 between the wings 38 and the bottoms of the notches 34, the marking end of the nib will be held in proper position securely.

The nib having been emplaced in the head assembly, the resilient cap portion 18 of the latter may be snapped on the neck of the reservoir into the position shown in FIGURE 2. Thus there will be three vapor-sealing contacts between the head assembly and the ink reservoir to prevent volatilization of the ink base.

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In order to prevent escape of the volatile portions of the ink both from the reservoir and from the nib and to maintain the nib in marking condition, a cap 62 is removably mounted on the nib holder 20 and is sealed at its inner end by snug engagement of said inner end in annular channel 64 due to the resiliency of the plastic nib holder at this location.

While a specific embodiment of the invention has been illustrated and described many changes in the details of construction may be made within the scope of the claims.

What is claimed is:

1. In a marking device, a head assembly, an ink reservoir, snap-on means securing the head assembly and ink reservoir together, said head assembly having a channel extending therethrough to establish communication between the ink reservoir and the atmosphere, a capillary flexible nib removably mounted in said channel and having shoulders adjacent its ends engaging said head assembly to oppose longitudinal movements of said nib longitudinally of said channel.

2. Means according to claim 1 wherein the head assembly is an integral tube of circular cross-section whose channel is the interior of the tube; with the nib being of rectangular cross-section whose diagonals are equal to the internal diameter of the tube; the sides of the tube at its upper end being longitudinally notched, the upper end of the nib being transversely enlarged to provide wings fitting in said notches, the lower ends of such wings providing such shoulders.

3. Means according to claim 2 wherein said tube fits inside the ink reservoir and has a skirt embracing the ink reservoir; the tube and its skirt thus defining an annular groove receiving the end of the reservoir.

4. In a marking device, a head assembly comprising an integral resilient plastic structure, including a cap portion, a nib holder portion extending therefrom, a nipple portion within said cap portion in spaced relation to the inner wall thereof, said nib holder and nipple having a channel extending completely therethrough, a capillary flexible nib mounted in said channel with one end protruding from the outer end of said nib holder and its

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other end protruding from the inner end of said nipple, said nib having shoulders adjacent its ends in engagement with end shoulder portions of said nib holder and nipple to oppose the movement of said nib in either direction in said channel, said nib holder having at its outer end, oppositely disposed open notches, and said nib having lateral wings snugly retained in said notches against rotative and endwise movements in relation to the holder.

5. In a marking device, a reservoir having an open end and a closed end, a head assembly mounted on said reservoir and including a nib holder, a capillary nib mounted in said nib holder with one end extending outwardly therefrom and the other end extending inwardly into said reservoir, an absorbent capillary ink carrier within said reservoir and of less length than the same and resilient means between the carrier and the closed end of the reservoir for operatively positioning said carrier within said reservoir and forcing said carrier into ink transferring contact with the inner end of said nib.

6. In a marking device, a reservoir, a head assembly mounted on said reservoir and including a nib holder, a capillary nib mounted in said nib holder with one end extending outwardly therefrom and the other end extending inwardly therefrom, an absorbent capillary ink carrier within said reservoir and of less length than the same, resilient means positioning said carrier within said reservoir and forcing said carrier into contact with the inner end of said nib, said head assembly having a space therein surrounding said nib and with its outer end open to the atmosphere and with its inner end open to the interior of said reservoir, the effective area of said outer end opening being relatively restricted as compared to the effective area of said inner end opening.

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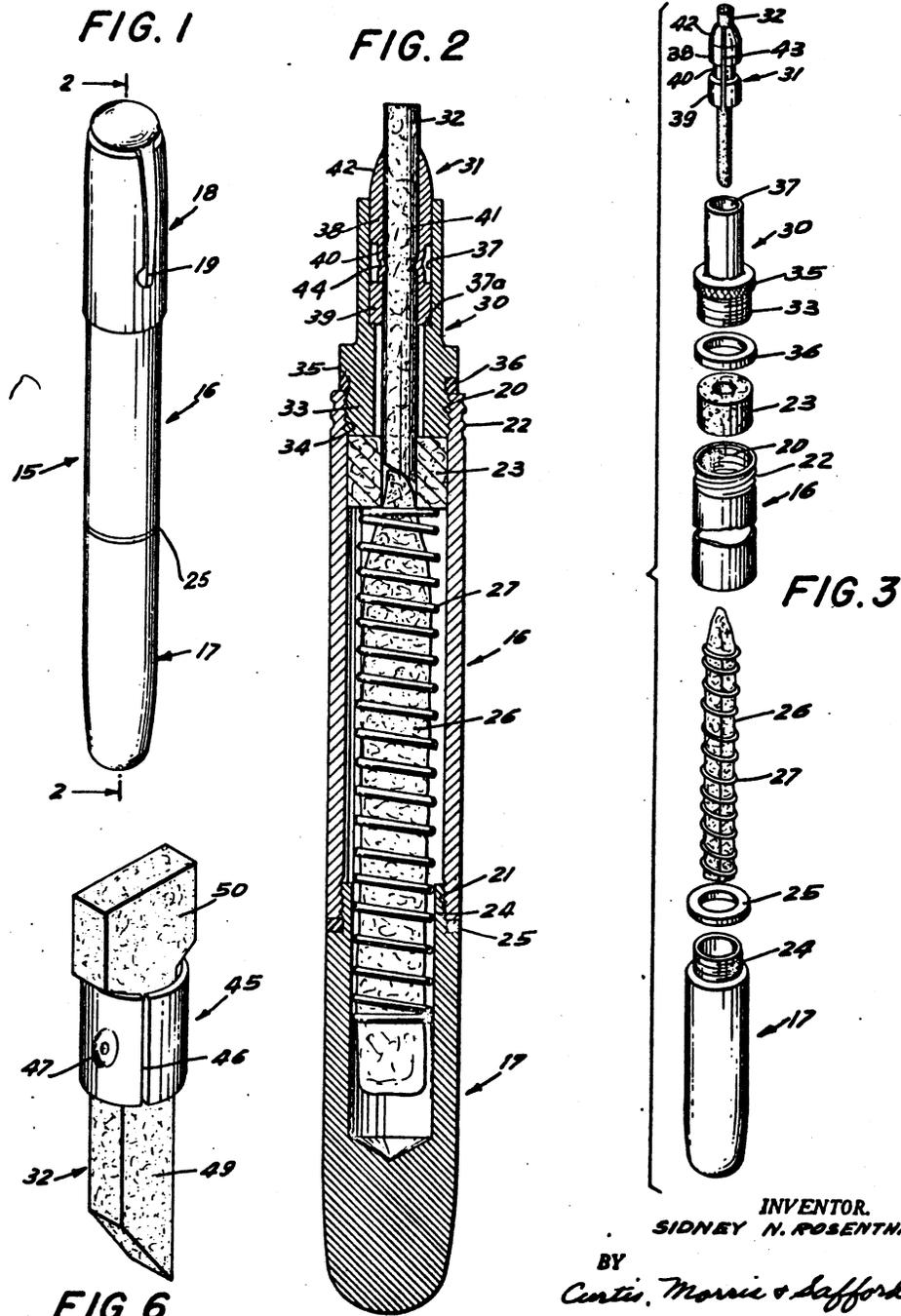
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Oct. 10, 1961

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FOUNTAIN PENS

3,003,182

Filed Aug. 13, 1960



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United States Patent Office

3,003,182

Patented Oct. 10, 1961

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3,003,182

FOUNTAIN PENS

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 Filed Aug. 13, 1959, Ser. No. 833,649
 1 Claim. (Cl. 15-563)

The present invention relates to improvements in pens for marking or writing indicia and more particularly to improvements in pens of the type described and claimed in my prior Patent 2,416,596, issued February 25, 1947, which utilizes a piece of felt or similar self-sustaining porous material as a nib.

Fountain pens of the type disclosed in my prior patent are in common use throughout the country. The piece of felt constituting the nib extends through and is retained by a nib holder forming the end portion of the pen which is gripped by the fingers. The nib holder is accurately formed and has a screw threaded connection with the interior of the barrel of the pen. The nib is directly carried by the nib holder with the result that the replacement of a nib is relatively expensive.

It is many times desirable to replace a nib by one having a different shape, such as a round end, square end, chisel-shaped end or pointed end. However, the cost of nib holders limits the extent to which the different shaped nibs are used.

One of the objects of the present invention is to provide a pen of the type indicated in which nibs of different shapes are carried by nib embracing adapters and which may be easily and quickly interchanged by merely sliding the nibs and thin adapters into and out of the nib holder.

This and other objects will become more apparent from the following description and drawing in which like reference characters denote like parts throughout the several views. It is to be expressly understood, however, that the drawing is for the purpose of illustration only and is not a definition of the limits of the invention, reference being had for this purpose to the appended claim.

In the drawing:

FIGURE 1 is a side elevational view of a fountain pen incorporating the novel features of the present invention;

FIGURE 2 is a sectional view taken on line 2-2 of FIGURE 1 and showing one form of nib holder for slidably receiving interchangeable nibs;

FIGURE 3 is an extended view of the parts of the pen and showing the split bushing constituting a nib adapter.

Referring first to FIGURES 1 to 3 of the drawing, a fountain pen 15 is illustrated which incorporates the novel features of the present invention. As shown in FIGURE 1 of the drawings, the pen 15 comprises an intermediate hollow cylindrical body 16 having a closure 17 at one end and a removable screw cap 18 at its opposite end. Cap 18 is provided with a clip 19 to adapt the pen to be carried in the pocket and clipped to the side thereof. When the pen is to be used, the cap 18 is removed to expose the nib at its end.

As illustrated in FIGURE 2, the intermediate body portion 16 comprises a sleeve having internal screw threads 20 and 21 at its opposite ends and external screw threads 22 adjacent one end. An annular plug 23 of absorbent material is positioned in the intermediate body portion 16 below the screw threads 20. Closure cap 17 has a reduced threaded end 24 for screw threaded engagement with the threads 21 at one end of the intermediate body portion 16 to attach the cap 17 to the body 16. A gasket 25 is provided between the closure cap 17 and end of the body portion to seal the joint therebetween. Mounted in and projecting from the cap 17 is an

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ink carrier 26 of absorbent material enclosed in a helical coiled spring 27 which fits snugly within the cap 17.

In prior constructions a nib of felt or other self-supporting absorbent material is mounted directly in a nib holder. Thus, the substitution of a nib of a different form requires the use of a plurality of expensively machined nib holders with the nibs of different forms assembled therein.

In accordance with the present invention, nib holder 30, see FIGURE 2, is provided at the end of the cylindrical body portion 16 which is adapted to slidably receive interchangeable adapters 31 for holding nibs 32 of different forms. It will be understood that the nib holder 30 of the present invention may be substituted for the nib holder used in prior constructions to slidably receive the interchangeable adapters of the present invention. Nib holder 30 has a reduced end 33 with screw threads 34 and an annular shoulder 35 overlying the upper end of the cylindrical body 16. Thus, when the nib holder 30 is screwed onto the internal screw threads 34, it clamps a gasket 36 between the annular shoulder 35 and end of the body 16 to seal the joint therebetween. The nib holder 30 has a stepped cylindrical bore 37 for receiving interchangeable adapters 31 and provide a shoulder 37a to limit the inward movement of adapter 31.

The adapter 31 is split so that it may be compressed for insertion into the nib holder and will resiliently expand to frictionally seat therein. The nib 32 is formed of felt or other self-supporting absorbent material and is clamped within the adapter bushing 31. Adapter 31 is of a construction which may be economically manufactured in automatic screw machines and easily and quickly assembled with a nib 32. As shown in FIGURES 2 and 3, the adapter has spaced cylindrical sections 38 and 39 with a reduced cylindrical section 40 therebetween. The adapter 31 has an axial bore 41 through which the nib 32 extends and the upper cylindrical section 38 is tapered from its outer periphery of the bore to provide a smooth continuous surface 42 from the end of the nib holder 30 to nib 32. Adapter 31 has a slot 43 along one side which splits the nib holder and extends throughout its length to adapt the holder to flex radially for frictionally engaging the sides of the bore 37 in the nib holder 30 in which it is slidably mounted. After a nib 32 has been assembled in an adapter 31, the reduced portion 40 is struck by suitable tools to form detents 44 for engaging and holding the nib therein without materially reducing the capillarity of the nib.

It will be obvious from the above description that a nib 32 of any desired shape may be easily and quickly mounted in a relatively inexpensive adapter 31, due to the slot 43 which permits the holder to flex. An assembly of adapter 31 and nib 32 mounted therein also may be easily and quickly mounted in or removed from the pen 15 by merely sliding it into or out of the nib holder 30. Thus, nibs 32 of different forms may be interchangeably mounted in the end of the pen 15 and held by the friction fit of the split bushing 31 with the side walls of the bore 37 in the nib holder 30.

When it is necessary to replenish the supply of ink, cap 17 with the ink carrier and its supporting spring is detached from the intermediate body portion 16 by unscrewing it therefrom. The end of ink carrier 26 is then dipped into a supply of ink which quickly saturates it. Ink carrier 26 is then inserted into body portion 16 and cap 17 screwed thereon. The longitudinal movement of the ink carrier 26 and cap 17 relative to the body 16 engages the end of the carrier with plug 23 of absorbent felt and with the nib 32 and such contact is insured by spring 27. Ink then flows from the ink carrier 26 to

3,003,182

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plug 23 and from the plug to the nib 32 and to its outer end by capillary action. Thus, the end of the nib 32 is continuously supplied with the ink to adapt it to be used to mark or write as desired. When the fountain pen is not in use the cap 18 is screwed onto the upper threaded end 22 of the body portion 16 to enclose the nib 32 and prevent the evaporation of the ink solvent.

It will now be observed that the present invention provides writing instruments in which the nibs may be interchangeably mounted by merely sliding the nibs and adapters into and out of the pen. It will also be observed that the present invention provides a nib holder for use with conventional pens to adapt it to receive interchangeable nibs. It will still further be observed that the present invention provides an adapter which is of simple and compact construction, adapted for economical manufacture and one which may be easily and quickly applied to and removed from a pen.

While one embodiment of the invention is herein illustrated and described it will be understood that further changes may be made in the construction and arrangement of elements without departing from the spirit or scope of the invention. Therefore, without limitation in this respect the invention is defined by the following claim.

I claim:

A fountain pen comprising a cylindrical barrel having an open end, a nib holder at one end of the barrel having a cylindrical bore for receiving interchangeable nibs, said barrel and holder being secured to each other by being mutually threaded; a nib of absorbent capillary material extending through the bore of the nib holder with one end projecting from the nib holder and an adapter surrounding the nib intermediate its ends and frictionally

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engaging the walls of the cylindrical bore of the holder to frictionally hold the nib in position in the nib holder; said adapter and nib being permanently secured to each other to form a sub-assembly adapter to be frictionally fitted as a sub-assembly into the holder; the holder being of considerably more rigid material than that of the adapter; the adapter being a thin longitudinally split resilient sleeve; the nib holder and adapter having mutually cooperating means for limiting the inward movement of the adapter and nib sub-assembly in the holder; the adapter being in the form of a collar enclosing the nib and having a slit extending longitudinally therethrough at one side to adapt the collar to yield radially as it is inserted into the cylindrical bore of the nib holder; the adapter being inwardly deformed to provide detents engaging the nib.

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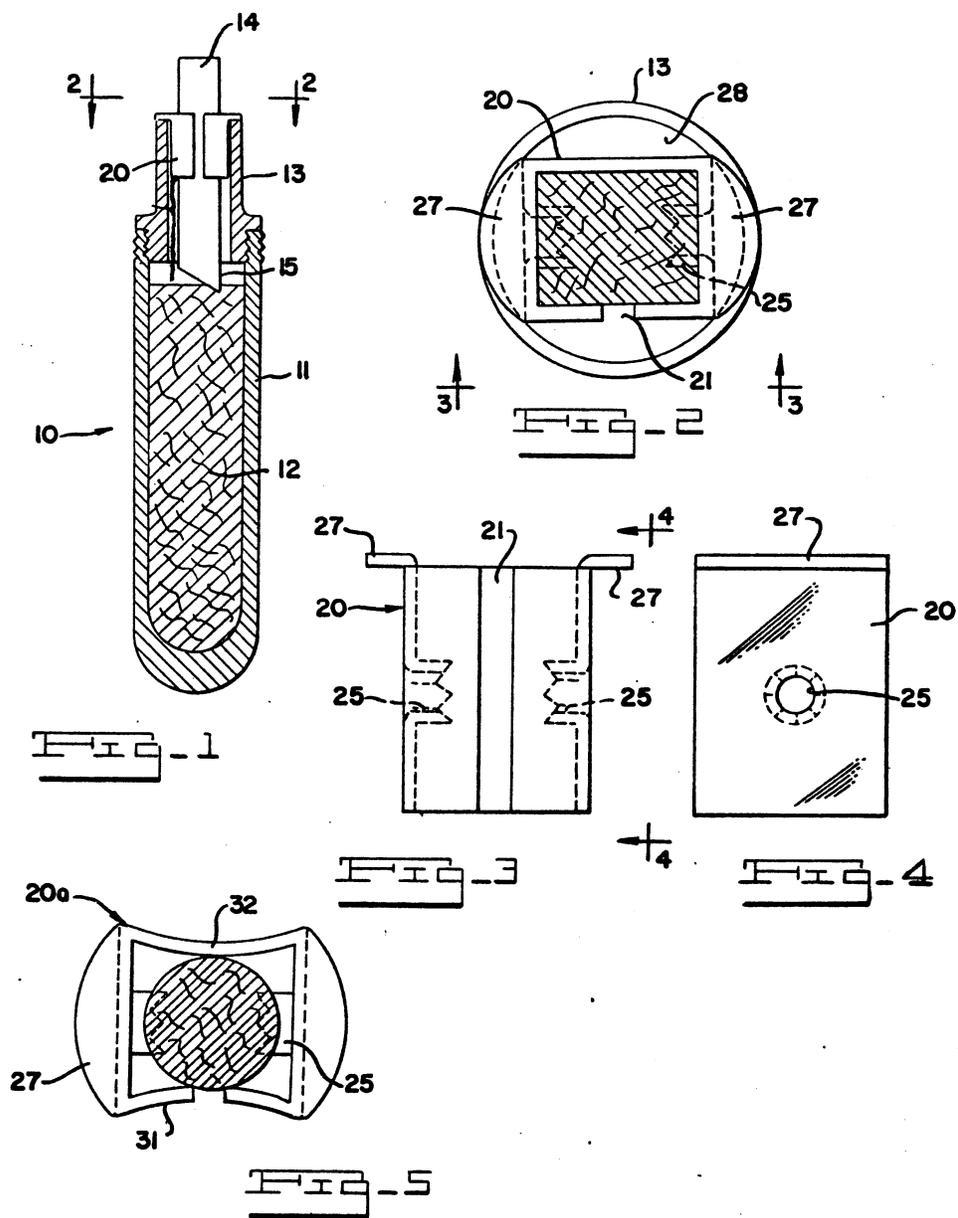
July 17, 1962

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3,044,101

NIB BUSHINGS

Filed Jan. 5, 1961



822

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United States Patent Office

3,044,101

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3,044,101

NIB BUSHINGS

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Filed Jan. 5, 1961, Ser. No. 80,799
1 Claim. (Cl. 15—563)

This invention relates to a nib bushing and particularly for a bushing for removably supporting a felt nib within the barrel of felt nib pens or similar writing implements.

Felt nib writing implements or pens, such as is disclosed in my prior Patent No. 2,416,596, issued February 25, 1947, usually are formed with a barrel containing an absorbent material soaked in ink and an open end having a felt nib secured therein. The bottom end of the nib contacts the absorbent material and the opposite end extends above the writing implement for applying the ink to a surface. The pen barrel is normally accurately formed and is relatively expensive and thus, is normally expected to have a long life. However, the nibs wear out in due course usually because they become dirty, and also quite frequently, it is desirable to use nibs of different sizes for different writing purposes. Since these devices are relatively expensive, it is not always feasible to have a number of them available, each with a different size nib.

Thus, it is an object of this invention to provide a nib bushing or adapter which clamps to a felt nib and supports that nib within the tubular open end of the writing implement, and which may be removed when desired and replaced with a different nib bushing having a different size or shape nib or a clean, new nib. Hence, the nib, which is inexpensive, can be easily replaced without necessity of discarding or altering the considerably more expensive pen.

A further object of this invention is to form a nib bushing suitable for clamping and securing a nib within the open tubular end of a writing implement but which, although positively clamping against the nib, does not compress the nib, since compression of the felt would alter the writing characteristics of the device by interfering with the flow of ink.

These and other objects and advantages of this invention will become apparent upon reading the following description, of which the attached drawings form a part: In these drawings:

FIG. 1 is an elevational view in cross-section of a felt nib writing implement or a pen.

FIG. 2 is a top view of the tubular end of the pen, taken in the direction of arrows 2—2 of FIG. 1 but greatly enlarged.

FIG. 3 is a front elevational view of the bushing, per se, taken in the direction of arrows 3—3 of FIG. 2, and

FIG. 4 is a side elevational view taken in the direction of arrows 4—4 of FIG. 3.

FIG. 5 is a top view of a modified bushing with a circular nib clamped therein.

With reference to FIG. 1, the writing implement herein, generally designated as 10, is formed of a barrel 11 stuffed with an absorbent packing 12 saturated with ink. At its upper end is threaded a tubular open end or nozzle 13 within which a nib 14 is secured. The open end is circular in cross-section and the nib may be either square, rectangular or circular in cross-section. The top of the nib extends above the top of the tubular end of the pen for transferring ink to a writing surface, and its bottom end 15 is in contact with the packing 12 so that ink may be transferred from the packing and through the felt nib by capillary action.

The specific improvement of this invention is the nib bushing 20 which is preferably formed out of a single flat sheet of thin gauge metal which is resilient and

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bendable and which is bent into a tubular shape that is square in cross-section. One wall is split at 21 with a relatively wide spacing between the edges defining the split. The two opposite side walls, which are connected to the split wall, are provided with inwardly struck, sharp spikes 25 which are normal to the walls upon which they are formed and extend inwardly of the tube a short distance. These same walls have flanges 27 formed at their top ends, the flanges being bent outwardly of the tube and also being normal to the walls upon which they are formed.

In operation, the nib bushing would be bent open so that the walls are spread apart, and particularly the walls upon which the spikes are formed are spread apart, and the elongated nib is inserted within the bushing. The nib is then clamped in the bushing by bending the walls back into their shape, as shown in FIG. 2. Here, the spikes cut or bite into the felt to positively grasp the felt nib bushing but without compressing the felt.

As shown in FIG. 2, the nib in the drawing is of the same size as the interior of the bushing and the spikes are located at approximately the center of their respective walls and are struck-in in a flower or star-like shape. The external dimensions of the bushing are approximately the size of the internal diameter of the pen tubular end 13 so that the bushing may be pushed into the tubular end 13 with its four corners in line contact with the interior wall of the tube and so that it is frictionally held therein by virtue of its tight fit and its resiliency. The bushing fits into the tube to the point where its flanges 27 rest upon the top open edge of the tube 13. These flanges act as stops to prevent the bushing from being pushed too far into the tube and also as a handle means for grasping the bushing and pulling it out when the bushing is to be replaced with a new nib. Also, the shape of the bushing is such, being square relative to the circular tube 13, that air spaces are formed along the sides, as at 28, for the free flow of air into the pen to thus vent the pen.

FIG. 5 illustrates a modification wherein the bushing 20a is substantially identical to that described before but wherein the split wall 31 and the wall 32 opposite to it are bowed inwardly a slight degree in order to hold a circular in cross-section nib which is of a diameter considerably smaller than the diameter of the writing implement tubular end 13. Otherwise, the construction is the same as that mentioned above.

This invention may be further developed within the scope of the following attached claim. Accordingly, it is desired that the foregoing description be read as being merely illustrative of an operative embodiment of this invention and not in a strictly limiting sense.

I now claim:

A felt nib and bushing unit removably supported within a circular in cross-section tubular shaped open end of a writing implement, comprising a square cross-section felt nib and a square in cross-section tube formed of a single flat sheet of metal bent into a tubular shape; the external diagonal dimensions of the bushing being the same as the diameter of the tubular end of the writing implement for snugly fitting the bushing-nib unit within said tubular end and with its four corners each in line contact with the interior wall of the tubular end for frictional securement within said tubular end; one wall of the bushing being split along its full length, with the wall edges defining the split being spaced apart a short distance; the two opposite walls which are connected to such split wall each having struck-in sharp spikes formed at their center portions and extending inwardly of the tube normal to their respective walls upon which they are formed; and a flange formed on one end of each of said opposite walls and extending normal to their respective

July 21, 1964

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3,141,187

MARKING INSTRUMENT

Filed Sept. 5, 1962

2 Sheets-Sheet 2

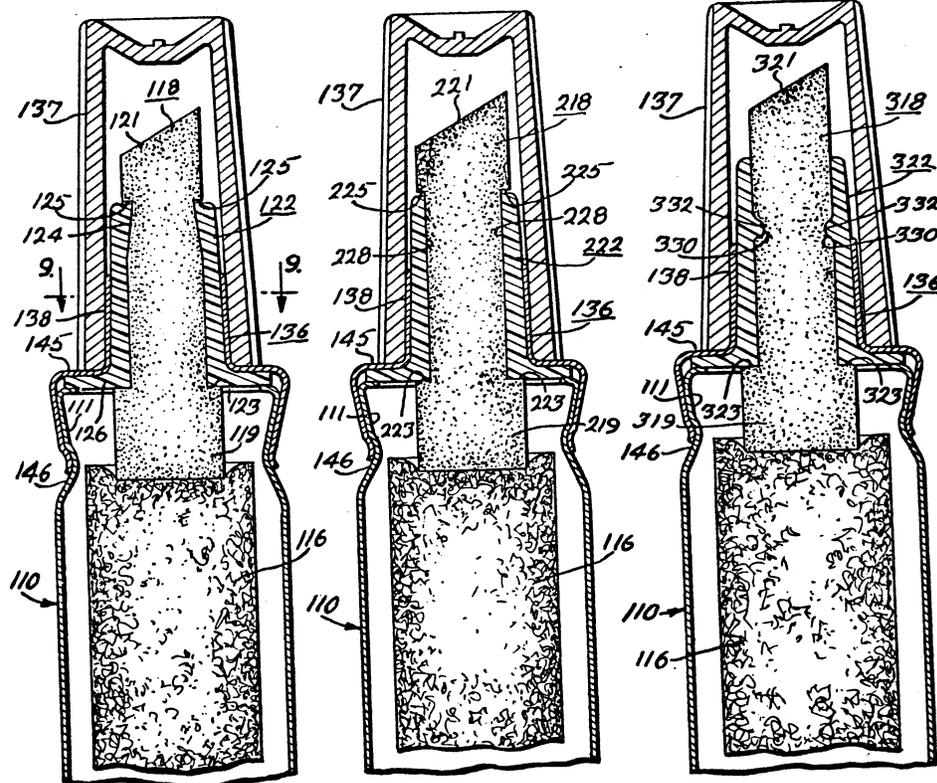


FIG. 6.

FIG. 7.

FIG. 8.

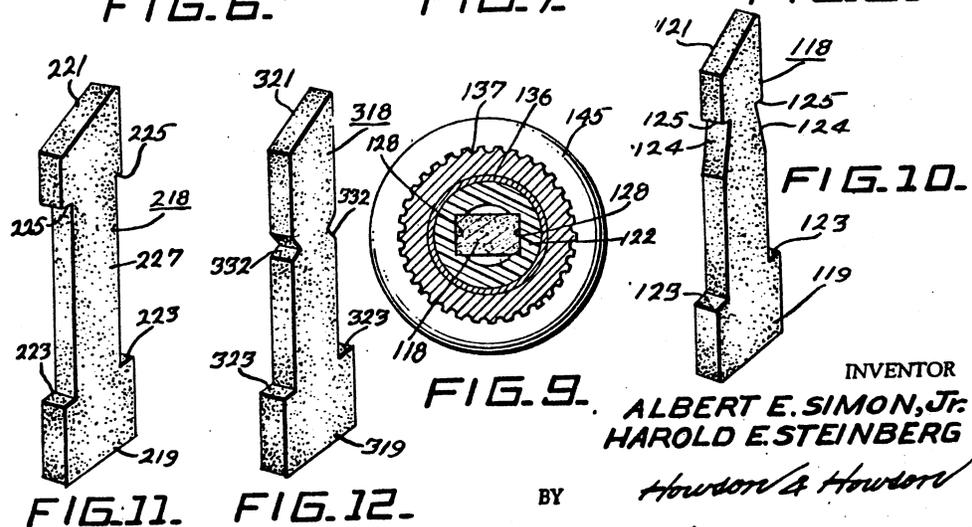


FIG. 11.

FIG. 12.

FIG. 9.

FIG. 10.

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United States Patent Office

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Patented July 21, 1964

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3,141,187

MARKING INSTRUMENT

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Philadelphia, Pa., assignors to Esterbrook Pen Com-
pany, Camden, N.J., a corporation of New Jersey
Filed Sept. 5, 1962, Ser. No. 221,608
5 Claims. (Cl. 15—563)

This invention relates to marking instruments of the type including an ink reservoir and a support member adapted to support a felt nib or applicator over the open end of the reservoir in position to receive ink by capillary action from an ink carrier housed in the reservoir.

An object of the present invention is to provide a marking instrument of the felt nib type which is characterized by a novel arrangement of parts providing a fluid-tight joint between the nib support and ink reservoir.

Another object of the present invention is to provide a marking instrument which is of comparatively simplified construction which may be manufactured economically and which is fully effective for the purposes intended.

These and other objects of the present invention and the features and details of a marking instrument made in accordance with the present invention are hereinafter more fully set forth with reference to the accompanying drawings, in which:

FIG. 1 is a side elevational view partly in section of a marking instrument in accordance with the present invention;

FIG. 2 is a longitudinal sectional view of the nib holder;

FIG. 3 is a top plan view of the nib holder shown in FIG. 2;

FIG. 4 is a perspective view of the nib;

FIG. 5 is a fragmentary perspective view of the nib holder;

FIGS. 6, 7 and 8 are enlarged fragmentary sectional views of other embodiments of marking instruments in accordance with the present invention;

FIG. 9 is a sectional view taken on line 9—9 of FIG. 6; and

FIGS. 10, 11 and 12 are perspective views of the felt nibs of the marking instruments shown in FIGS. 6, 7 and 8 respectively.

Referring now to the drawings and particularly to FIG. 1 thereof, the marking instrument comprises a generally cylindrical hollow ink reservoir 10 having a short radially inwardly projecting annular lip 12 at one axial end thereof defining a circular opening 14, an ink carrier or filler 16 housed in the reservoir 10 and an elongated felt nib 18 of generally rectangular cross sectional shape mounted in the opening 14 in the reservoir 10 by means of a support structure 20 secured thereto. The ink carrier 16 is conventionally made of felt or similar material capable of storing a large quantity of ink and the nib 18 is supported with its inner end 19 contacting the ink carrier 16 to supply ink by capillary action to the outer marking tip 21 of the nib 18.

In accordance with the present invention and with reference to the marking instrument illustrated in FIGS. 1-5 inclusive, the nib support structure 20 comprises a nib holder 22 and a tip section 36. The nib holder 22 is made of plastic and comprises an elongated neck 23, an axial bore 24 in the neck 23 extending from end to end and a radially outwardly projecting annular flange 26 adjacent the lower or inner axial end of the neck 23. A pair of confronting slots 28 extending lengthwise of the nib holder 22 are formed in the bore 24, the slots terminating short of the lower axial end of the holder 22 to define diametrically opposed projections 30 adapted to seat in notches 32 formed in opposite side edges of the nib 18 to support the nib 18 against axial displace-

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ment with respect to the nib holder 22. The side edges of the nib 18 below the notches 32 converge slightly toward the inner end 19 of the nib 18 to facilitate insertion of the nib 18 from the upper end of the nib holder 22.

The tip section 36 comprises an elongated tubular neck portion 38 which closely embraces the neck 23 of the nib holder 22, flange portion 42 projecting radially outwardly from the lower end of the neck portion 38 which overlies the flange 26 and a skirt 40 depending from the outer edge of the ring 42 which is crimped to provide an annular bead 44 which seats in an annular groove 46 in the side wall of the reservoir.

In assembling the marking instrument of the present invention for use, the ink carrier 16 is placed in the reservoir 10, and the nib holder 22 is then positioned over the opening 14 in the reservoir 10 with the flange 26 seated on the lip 12. The tip section 36 is placed over the nib holder 22 and pressed downwardly whereby the annular bead 44 snaps into the annular groove 46 to detachably secure the nib holder 22 and tip section 36 to the reservoir 10. It is noted that by this arrangement, the neck portion 38 of the tip section closely embraces the neck 23 of the nib holder 22 and the flange 26 of the nib holder 22 is seated firmly against the lip 12 by the flange portion 42 of the tip section thereby providing a fluid-tight joint. The nib 18 is then inserted into the bore of the nib holder 22 until the projections 30 engage in the notches 32 whereby the nib 18 is supported against axial displacement relative to the nib holder 22 to prevent the nib 18 from being pressed inwardly against the ink carrier 16 and compressing it during use. In this position the inner end 19 of the nib 18 is located in contact with the ink carrier 16 to draw ink by capillary action. Additionally, by this arrangement, the felt nib 18 is maintained out of contact with any metal parts of the instrument such as the tip section and ink reservoir thereby minimizing the chance of corroding metal parts due to contact of the marking fluid or ink therewith.

The various embodiments of marking instruments shown in FIGS. 6, 7 and 8 are basically the same in the arrangement of elements to that described above except for some changes in the structural details of the elements. Thus in each of the embodiments the nib holder has an outwardly projecting flange at one axial end thereof which is pressed against the lip of the reservoir by the tip section to provide a fluid-tight joint. However, in each of the embodiments illustrated in FIGS. 6, 7 and 8, the skirt 145 of the tip section 136 converges downwardly toward its free end and the ink reservoir 110 has a divergent wall section 111 between the annular groove 146 and its open end. Additionally each of the marking instruments illustrated in FIGS. 6, 7 and 8 includes a cap 137 which frictionally engages the outer periphery of the neck portion 138 of the tip section to cover the nib when the instrument is not being used and which is easily detached therefrom when desired. The cap may also be used with the marking instrument shown in FIG. 1.

With respect to the marking instrument shown in FIG. 6, the confronting walls of the diametrically opposed slots 128 in the nib holder 122 converge toward the upper axial end of the nib holder 122 and the nib 118 is generally "I" shaped being of larger transverse dimension adjacent its inner end 119 to provide transversely extending shoulders 123 which abut the lower face of the flange 126 of the nib holder 122. The nib 118 has gradually convergent side edge portions 124 between the marking tip 121 and shoulders 123 to provide abutments 125 adapted to engage the outer axial end face of the nib holder 122. By this arrangement, the nib 118 is supported against axial displacement in the nib holder 122 with the inner end 119 thereof contacting the ink carrier 116 to draw ink therefrom by capillary action.

In the marking instrument shown in FIG. 7, the distance between the confronting walls of the axially extending, diametrically opposed slots 228 in the nib holder 222 is uniform for the entire length of the nib holder and the nib is also of "I" shaped configuration, having a body portion 227 of a uniform transverse dimension substantially equal to the distance between the confronting walls of the opposed slots 228 and inner and outer end portions 219 and 221 respectively of greater transverse dimension to provide transversely extending shoulders 223 and 225. The shoulders 223 and 225 abut the inner and outer axial end faces respectively of the nib holder 222 to locate the inner end of the nib 218 in engagement with the ink carrier 216 and also to prevent axial displacement of the nib 218 relative to the nib holder 222.

The nib holder 322 of the marking instrument shown in FIG. 8 is similar to that shown in FIG. 2 except that the confronting projections 330 are disposed intermediate the axial ends of the nib holder 322. The nib 318 has notches 332 intermediate its inner and outer ends and is of enlarged transverse dimension adjacent its inner end to provide transversely extending shoulders 323. Accordingly when assembled, the projections 330 on the nib holder 322 seat in the notches 332 of the nib 318 and the shoulders 323 abut the lower axial end face of the nib holder 322. Thus the nib 318 is located in the desired position to engage the ink carrier and is restrained against axial movement relative to the nib holder 322.

In the assembly of each of the marking instruments shown in FIGS. 6-12, the ink carrier is placed in the ink reservoir and then a suitable amount of ink is deposited into the ink reservoir. Thereafter the nib is inserted into the nib holder from the lower end thereof. The nib holder is then positioned over the opening in the ink reservoir with its flange engaging the lip surrounding the opening in the ink reservoir. When the tip section is placed over the nib holder and secured to the ink reservoir, the neck portion of the tip section closely embraces the neck of the nib holder and the flange portion of the tip section presses the flange of the nib holder against the lip of the ink reservoir to provide a fluid-tight joint.

From the foregoing it is apparent that the present invention provides a marking instrument of the nib type which is comprised of relatively few parts which may be manufactured economically and assembled easily.

While various embodiments of marking instruments in accordance with the present invention have been illustrated and described herein, it is not intended to limit the invention and changes and modifications may be made herein within the scope of the following claims.

We claim:

1. A marking instrument comprising a generally cylindrical hollow ink reservoir having an opening at one end thereof, a nib support structure mounted end wise of said one end of the ink reservoir including a nib holder and tip section, said nib holder having an elongated neck provided with an axial bore therethrough and a resilient radial flange at its inner end disposed in outwardly overlying engagement with said one end of the reservoir, said tip section having an elongated neck snugly embracing the neck of the nib holder and having at its inner end a radially extending flange portion snugly engaged over the flange of the nib holder and terminating in a peripheral skirt outwardly overlying the adjacent side wall of the ink reservoir, interengaging locking means releasably mounting said flange portion of said tip section to said adjacent surface of the ink reservoir operable to permit said tip section to be detached from said reservoir by movement axially thereof, and an elongated nib mounted in the bore of the neck of the nib holder with the inner end of said nib extending interiorly of the ink reservoir and its outer end projecting beyond the outer end of the nib holder.

2. A marking instrument as claimed in claim 1 wherein said interengaging locking means comprises an annular circumferentially extending groove in the outer peripheral surface of the side wall of the ink reservoir adjacent said one end thereof and an annular inwardly projecting circumferentially extending bead formed in said skirt of said tip section which engages in said annular groove.

3. A marking instrument as claimed in claim 1 including means defining diametrically opposed axially extending slots in the bore of said nib holder, a pair of diametrically opposed projections projecting radially inwardly of the slots in said nib holder wherein said nib is of generally rectangular cross sectional shape having opposite side edges engageable in said slots and having notches in said opposed side edges to receive said projections whereby said nib is fixed against axial movement relative to said nib holder.

4. A marking instrument as claimed in claim 3 wherein said projections are adjacent the inner end of said nib holder.

5. A marking instrument as claimed in claim 3 wherein said projections are disposed between opposite axial ends of said nib holder.

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June 20, 1967

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WRITING INSTRUMENT

Filed Sept. 9, 1965

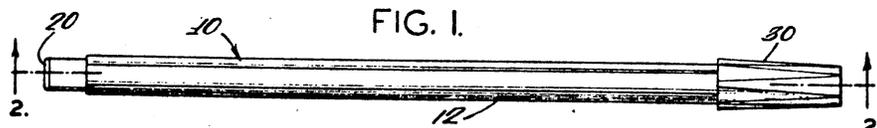
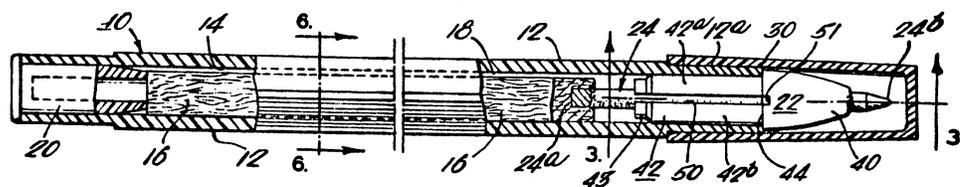


FIG. 2.



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FIG. 3.

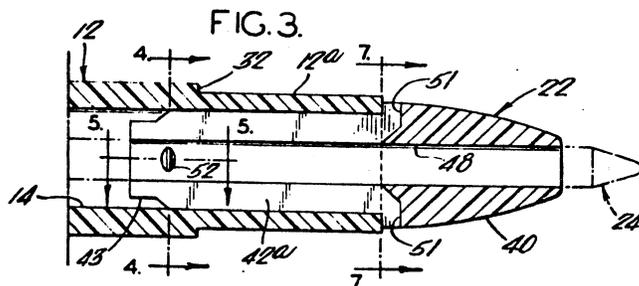


FIG. 4.

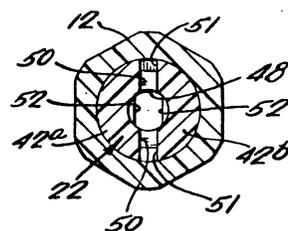


FIG. 5.

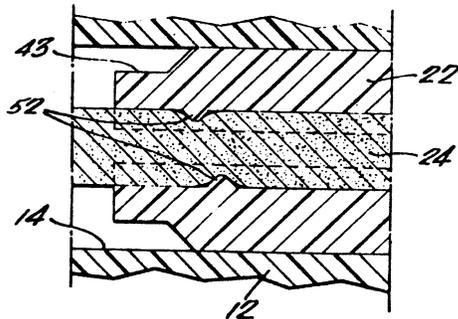


FIG. 6.

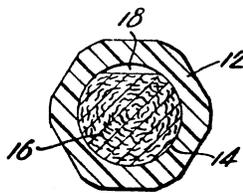


FIG. 7.

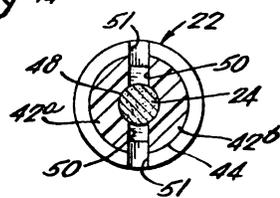
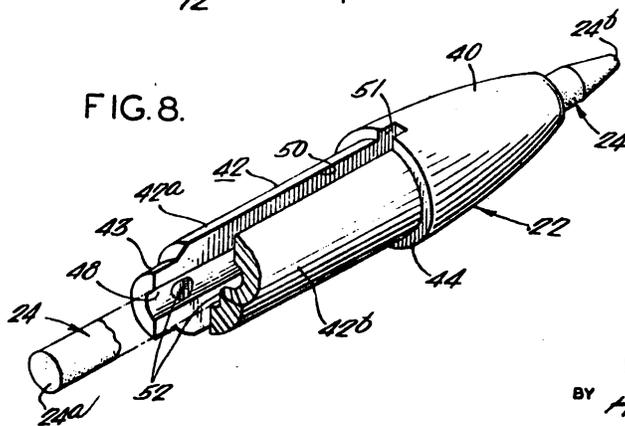


FIG. 8.



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WRITING INSTRUMENT

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5 Claims. (Cl. 15—563)

The present invention relates to writing instruments generally of the type including an ink reservoir and a nib holder adapted to support a writing nib over one end of the reservoir in position to receive ink by capillary action from an ink carrier housed in the reservoir. More particularly, the present invention relates to a new and improved type of nib holder for supporting the nib adjacent one end of the ink reservoir.

An object of the present invention is to provide a writing instrument which is characterized by a novel arrangement of parts including a nib holder adapted to accurately and firmly support the nib at one end of the writing instrument in a manner to resist inward displacement of the nib by normal writing pressure exerted on the nib or outward displacement due to swelling or expansion of the ink carrier.

Another object of the present invention is to provide a writing instrument of comparatively simplified construction which is extremely economical to manufacture and which is fully effective for the purposes intended.

A further object of the present invention is to provide a nib holder characterized by novel features of construction and arrangement which firmly supports the nib in the writing instrument and which is readily removable to permit replacement of a nib when necessary.

Still a further object of the present invention is to provide a nib holder which is of comparatively simplified construction which is easy to assemble and disassemble in the writing instrument and which in the assembled relation provides venting of the interior of the writing instrument.

These and other objects of the present invention and the various features and details of a writing instrument made in accordance with the present invention are hereinafter more fully set forth with reference to the accompanying drawings, in which:

FIG. 1 is a side elevational view of a writing instrument in accordance with the present invention;

FIG. 2 is an enlarged view partially in section showing the details of construction of the writing instrument of the present invention;

FIG. 3 is an enlarged sectional view taken along lines 3—3 of FIG. 2;

FIGS. 4 and 5 are enlarged sectional views taken along lines 4—4 and 5—5 of FIG. 3;

FIG. 6 is an enlarged sectional view taken along lines 6—6 of FIG. 2 taken through the ink reservoir;

FIG. 7 is an enlarged sectional view taken along lines 7—7 of FIG. 3 showing the cross-section of the front end of the nib holder; and

FIG. 8 is an enlarged perspective view with parts broken away of the nib holder of the present invention and a writing nib mounted therein.

Referring now to the drawings, there is shown in FIGS. 1 and 2 a writing instrument in accordance with the present invention generally designated by the numeral 10. The writing instrument 10 includes an elongated hollow barrel 12 open at both axial ends which forms an ink reservoir 14 an an elongated ink carrier or filler 16 housed in the reservoir 14 and which is preferably made of a material such as felt capable of storing a large quantity of ink. The ink carrier 16 is of generally circular cross section as shown in FIG. 6 and has a flattened side

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edge portion to provide a longitudinally extending air vent channel 18. The barrel is closed at one end by a tapered plug 20 and mounts at its other end a nib holder 22 which supports a writing nib 24 having its inner end 24a engaging in the ink carrier 16 as shown so that ink flows from the ink carrier through the nib 24 to the writing tip 24b by capillary action whereby the writing tip 24b of the nib is always wet with ink. The nib 24, which is of rod-like form, is fairly rigid, yet of a porous nature so that ink may flow therethrough by capillary action. A suitable material for the nib is bonded fibrous material or a compacted felt.

The writing instrument may include a cap 30 which frictionally engages over the reduced front end portion 12a of the barrel to cover the writing tip 24b when the instrument is not in use and which is easily detached from the barrel when it is desired to use the instrument. The cap 30, as illustrated, abuts a shoulder 32 on the barrel so that, when it is applied over the nib, the top of the cap is spaced from the writing tip and does not press against the writing tip 24b.

In accordance with the present invention, the nib holder is characterized by novel features of construction and arrangement whereby the nib may be accurately and firmly positioned so that its inner end contacts the ink carrier to supply ink by capillary action to the writing tip which projects beyond the nib holder and includes means preventing the nib being pressed into the reservoir by writing pressure or being displaced outwardly by expansion of the absorbent filler. The nib holder 22 is so constructed that it may be easily disassembled from the barrel to permit replacement of a nib when necessary or desired and includes means for venting air to the ink reservoir. To this end, the nib holder 22, which is preferably made of nylon or polypropylene, comprises a forward section 40 which is generally cone shaped and a generally cylindrical rear section 42 projecting from the rear end of the cone and which is of a smaller cross section than the largest cross-sectional dimension of the cone to define a shoulder 44 at the juncture of the front and rear sections. The nib holder 22 is provided with an opening 48 of circular cross section extending through the central portion thereof for the full length of the nib holder in which the nib 24 is mounted. The terminal end of the rear section 42 is of reduced cross section to provide a pilot portion 43 to permit easy insertion into the open front end of the barrel. The rear section 42 of the nib holder is provided with axially extending diametrically opposed slots 50 defining axial air passages communicating with the interior of the barrel, the slots 50 extending forwardly into a portion of the forward cone-shaped section 40 to define radial air passageways 51. By this slot arrangement the rear section 42 of the nib holder 22 is divided into a pair of opposed flexible wing segments 42a and 42b. Toward the rear of each of these wing sections there is provided a radially inwardly projecting locking rib 52, the ribs 52 on the wing sections being diametrically opposed and axially displaced relative to one another as shown in FIG. 5. By this arrangement, when the nib 24 is inserted in the nib holder 22, the wing segments are pressed radially inward whereby the locking ribs 52 press against the side of the nib and provide a clamping action in the assembled relation of the writing instrument which insures that the nib is not pressed against the ink reservoir by normal writing pressure. Further, the locking arrangement prevents the nib from being pressed outwardly by swelling or expansion of the ink carrier.

In assembling the writing instrument of the present invention, the ink carrier 16 is placed in the reservoir 14 of the barrel 12 from either axial end. Thereafter with the nib holder 22 removed, a nib 24 is slid into the central

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opening 48 so that the writing tip 24a of the nib projects beyond the forward portion of the nib holder and a portion of the nib projects beyond the rear section of the nib holder as illustrated in FIG. 8. Thereafter, the nib holder 22 is inserted in the forward end of the barrel simply by pressing it into the open axial end thereof, the rear section of the nib holder normally being of a slightly greater cross-section than the opening in the front end of the barrel to provide a press fit. By this arrangement, the wing segments 42a and 42b are pressed radially inwardly and the ribs 52 grip the nib and position it firmly in the holder. It is noted that since the ribs do not extend circumferentially of the opening 48 and since they are diametrically opposed and axially spaced apart, they serve to secure the nib in the holder and do not choke off or interfere with the desired flow of ink through the nib by capillary action. Thereafter, a supply of ink may be deposited through the opening in the rear axial end of the barrel and then the plug 20 may be pressed into the barrel. The plug then presses the ink carrier 16 against the rear portion of the nib to insure good contact between the nib and the carrier. It is noted that in the assembled relation, air is vented to the interior of the barrel through the radial and axial passages of the nib holder and up along the space between the carrier and the barrel. If it is desired to replace the nib, the nib holder which frictionally engages in the barrel may simply be removed from the forward end of the barrel and the nib is simply removed and a new nib inserted into the holder.

From the foregoing it is apparent that the present invention provides an improved writing instrument which is characterized by a novel arrangement of parts whereby the nib is positioned in the instrument in the manner resisting inward displacement by writing pressure. This protects the ink carrier filler from being compressed or crushed to a point whereby ink transfer would be effected and also prevents outward displacement of the nib due to expansion of the filler which might also be effected in transfer. The nib holder is simple and easy to insert and is held in the barrel by only a small frictional force so that it may be easily removed when it is desired to replace the nib. Further, the novel arrangement of parts provides a good air-venting arrangement for effective operation of the writing instrument.

While a particular embodiment of the present invention has been illustrated and described herein, it is not intended to limit the invention and changes and modifications may be made therein within the scope of the following claims.

I claim:

1. In a writing instrument including an elongated hollow casing defining an ink reservoir and a filler for ink in the reservoir, a nib holder for mounting a nib at one end of the casing, said nib holder including a rear section adapted to fit in the one end of the casing and a front section projecting beyond the end of the casing, means defining a bore extending through the front and rear sections for receiving the nib and being of a cross sectional

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shape conforming closely to the cross sectional shape of the nib, said rear section being provided with axially extending diametrically opposed slots dividing the rear section into opposed flexible wing segments, means defining a locking rib in each of the wing segments which project radially inwardly into the bore, said locking ribs being axially spaced relative to one another whereby the locking ribs press against the side of the nib and provide a clamping action when the wings are pressed inwardly upon insertion of the nib holder in the one end of the casing.

2. In a writing instrument as claimed in claim 1 wherein the rear section is of smaller cross section than the largest cross section of the front section to define a shoulder at the juncture of said front and rear sections adapted to abut the one axial end of the casing to properly position the nib holder in the casing.

3. In a writing instrument as claimed in claim 1 wherein the front section is generally cone shaped and the rear section is generally cylindrical and wherein the axial slots extend forwardly into the cone shaped front section to define radial and axial air passageways in the nib holder.

4. In a writing instrument as claimed in claim 1 wherein the nib holder is made of nylon.

5. A writing instrument comprising an elongated hollow casing defining an ink reservoir, a filler for ink mounted in said reservoir, a cap detachably secured over the open rear end of said casing to close one end of said ink reservoir and retain the filler therein, a nib holder for mounting a nib at the end of said casing opposite said rear end, said nib holder including a rear section adapted to fit in the one end of the casing and a front section projecting beyond the end of the casing, means defining a bore extending through the front and rear sections for receiving the nib and being of a cross sectional shape conforming closely to the cross sectional shape of the nib, said rear section being provided with axially extending diametrically opposed slots dividing the rear section into opposed flexible wing segments, means defining a locking rib in each of the wing segments which project radially inwardly into the bore, said locking ribs being axially spaced relative to one another whereby the locking ribs press against the side of the nib and provide a clamping action when the wings are pressed inwardly upon insertion of the nib holder in the one end of the casing.

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Appendix C
Statistical Table



Writing instruments other than pencils: U.S. manufacturers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1968-73

Item	1968		1969		1970		1971		1972		1973	
	Quantity 1,000 units	Value dollars										
U.S. manufacturers' shipments:												
Fountain pens	17,591	17,399	12,350	16,043	10,152	15,228	10,094	14,708	9,785	15,288	10,249	20,842
Ball point pens:												
Refillable	725,006	89,605	761,256	94,085	685,502	92,732	670,253	90,901	729,800	99,231	738,560	110,519
Non-refillable	623,635	53,399	696,270	58,738	700,308	59,157	720,402	61,390	760,259	61,590	821,079	69,177
Total	1,366,232	160,403	1,459,876	168,866	1,395,962	167,117	1,400,749	166,999	1,499,844	179,109	1,569,888	201,118
Imports:												
Writing instruments	123,471	26,831	116,767	26,820	107,091	25,425	102,238	24,987	120,334	29,486	209,393	33,696
Writing instruments 1/	253,404	41,876	304,084	50,251	334,492	58,898	344,526	60,665	475,925	80,866	504,485	85,675
Total	376,875	70,707	420,851	77,071	439,583	84,323	446,764	85,652	596,259	110,352	713,878	119,371
U.S. imports:												
Writing pens having a wicklike tip of felt or other material 2/	3/	5,927	3/	5,981	3/	5,160	3/	4,750	3/	5,523	3/	5,146
Other 4/	2,898	789	3,922	883	6,431	1,121	8,916	1,538	11,684	2,164	18,785	3,367
Total	3/	6,716	3/	6,864	3/	6,281	3/	6,288	3/	7,687	3/	8,513
Grand total, U.S. shipments and imports	3/	237,826	3/	252,801	3/	258,321	3/	258,939	3/	297,108	3/	329,002
U.S. exports:												
Fountain pens	3,024	6,897	2,584	6,883	4,170	7,618	3,112	7,082	4,072	8,937	5,405	14,683
Ball-point pens	27,207	6,095	27,942	7,026	32,342	8,185	29,425	9,060	36,609	11,619	67,419	20,555
Soft tipped markers	16,318	1,043	17,999	1,121	17,665	1,137	20,005	1,791	17,038	1,121	29,081	1,854
Total	46,549	14,035	48,525	15,030	54,177	16,940	52,542	17,933	57,719	21,677	101,905	37,092
U.S. consumption, total all types	3/	223,791	3/	237,771	3/	241,381	3/	241,006	3/	275,431	3/	291,910

1/ So-called fine-line markers which include the subject patented pens.
2/ Included imports of allegedly infringing pens to July 28, 1971; thereafter, such imports were included under the "other" classification shown immediately below.
3/ Not available.

4/ See footnote 2; includes fountain pens and ball-point pens, stylographic pens, ball-point pencils, and, effective July 28, 1971, allegedly infringing pens. The data are therefore not strictly comparable with U.S. manufacturers' shipments.

Source: U.S. manufacturers' shipments compiled from data supplied by the Writing Instrument Manufacturers Association, Inc.; U.S. imports and exports compiled from official statistics of the U.S. Department of Commerce.

