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**UNITED STATES TARIFF COMMISSION**

**ARTICLES COMPRISED OF PLASTIC  
SHEETS HAVING AN OPENWORK  
STRUCTURE**

**Report on Investigation No. 337-29  
Under the Provisions of Section 337 of Title III  
of the Tariff Act of 1930, as Amended**



**TC Publication 444  
Washington, D. C.  
December 1971**

**UNITED STATES TARIFF COMMISSION**

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UNITED STATES TARIFF COMMISSION  
Washington, D.C.

December 21, 1971

In the matter of an investigation )	Docket No. 29
with regard to the importation )	
and domestic sale of articles )	Section 337
comprised of plastic sheets )	
having an openwork structure )	Tariff Act of 1930, as amended

INTRODUCTION

On July 28, 1970, Ben Walters, Ben Walters, Inc., and Kage Co., Inc., hereinafter referred to as complainants, 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 or sale of certain articles comprised of plastic sheets having an openwork structure. Complainants alleged that a process embraced with the claims of U.S. Patent No. 2,761,177, owned by complainant Ben Walters, covers certain openwork plastic articles and that the importation or sale of such articles by Sterling Novelty Products, a division of Glovemakers, Inc., of Chicago, hereinafter referred to as Sterling, has the effect or tendency to destroy or substantially injure an efficiently and economically operated industry in the United States. Subsequent to the filing of the complaint, Yuletide Enterprises, Inc., of New York City, hereinafter referred to as Yuletide, and Harben Co., Aurora, Ill., were named as importers of the allegedly infringing articles.

Notice of receipt of the complaint and initiation of the preliminary inquiry was published in the Federal Register (35 F.R. 12683) on August 8, 1970. Interested parties were given until October 5, 1970, to file written views pertinent to the subject matter. Sterling's written request of September 11, 1970, for an extension of time within which to answer the complaint was denied by the Commission, and the complainants and Sterling were so notified by letters dated September 25, 1970.

On October 5, 1970, Sterling filed an answer which included various motions. Additional information was submitted on October 13, November 30, and December 10, 1970, and February 12, 1971, by Sterling. Pursuant to section 203.2(c) of the Commission's Rules of Practice and Procedure, the complainants on October 5, 1970, requested that the complaint be amended to rectify an inaccuracy recently discovered (i.e., complainant Ben Walters lost no royalty income from complainant Kage Co., Inc., because the license agreement provided for a lump-sum payment of royalties in advance), and on December 9, 1970, the complainant requested that the definition of the domestic industry in the complaint be amended to read "the manufacture and sale of plastic sheets formed of pre-stressed individual pellets and having an open-work structure and articles comprised of such sheets." Additional responses dated December 7 and December 22, 1970, and January 4, 1971, were also submitted by complainants.

Having conducted a preliminary inquiry with respect to the matters alleged in the said complaint in accordance with section 203.3 of the Commission's Rules of Practice and Procedure (19 CFR 203.3), the U.S. Tariff Commission, on March 18, 1971, ordered a full investigation and scheduled a hearing on the matter for May 18, 1971. No temporary exclusion order was recommended. Notice of the investigation and of the date of the hearing was given in the Federal Register (36 F.R. 5945) on March 31, 1971.

The scheduled hearing was held on May 18, 1971, and resumed and closed on June 28, 1971. Only the complainants made an appearance of record at these hearings. Notice of resumption of the hearing was published in the Federal Register (36 F.R. 9898) on May 29, 1971. Final briefs were submitted by attorneys for the complainants, Sterling, and Yuletide. Copies of the complaint, the notice of investigation and date of hearing, and the notice of resumption of hearing were served upon all known interested parties.

FINDINGS AND RECOMMENDATION OF THE COMMISSION 1/

The Commission finds violation of section 337(a) of the Tariff Act of 1930 by unfair methods of competition and unfair acts in the importation and sale of articles comprised of plastic sheets having an openwork structure manufactured in accordance with the process embraced within the claims of U.S. Patent No. 2,761,177 owned by complainant Ben Walters, the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States.

Accordingly, the Commission recommends that, in accordance with section 337(e) of the Tariff Act of 1930, the President direct the Secretary of the Treasury to instruct customs officers to exclude from entry into the United States articles comprised of plastic sheets having an openwork structure manufactured in accordance with the process embraced within the claims of U.S. Patent No. 2,761,177 through September 3, 1973, the date of expiration of complainant's patent.

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1/ Commissioners Leonard and Young dissent from the findings and recommendation of the majority. Vice Chairman Parker did not participate in the decision.



CONSIDERATIONS IN SUPPORT OF THE AFFIRMATIVE  
FINDINGS OF THE COMMISSION

On July 28, 1970, Ben Walters, Ben Walters, Inc., and Kage Co., Inc., filed a petition with the United States Tariff Commission under section 337 of the Tariff Act of 1930 asking that the Commission recommend to the President that certain articles comprised of plastic sheets having an openwork structure be permanently barred from entry into the United States. For the reasons set out below, we agree that a permanent exclusion order should be issued.

The relevant facts are as follows: In September 1956, Ben Walters obtained U.S. Patent No. 2,761,177 covering a process for the manufacture of plastic sheets having an openwork structure. In April 1968, Ben Walters licensed Kage Co., Inc. to use the patented process. In or about October 1969, Sterling Novelty Products, the respondent, began importing plastic decorative wall plaques from Hong Kong. The decorative wall plaques being imported from Hong Kong are in competition with decorative wall plaques being manufactured by Kage Co., Inc.

The domestic industry

The domestic industry is composed of the domestic facilities of the patentee and his licensee engaged in the manufacture, by the process disclosed in the patent, of plastic sheets having an openwork structure. The Commission's full investigation has disclosed that the industry is economically and efficiently operated.

Unfair act

The fundamental question presented in this case is whether the evidence shows that the imported decorative plaques are made in accordance with the claims of the Walters' patent. The patent covers a process for making plastic sheets with openwork structure. 1/

The complainants have alleged that the imported decorative plaques are made in accordance particularly with claim one of U.S. Patent No. 2,761,177. This claim is:

The process for the utilization of plastic memory so as to produce an extremely porous sheet of plastic material, including the steps of arranging pre-stressed pellets of polyethylene in a relatively thin layer, heating said layer at atmospheric pressure to a temperature not greatly above the softening point of said plastic, for a time sufficient to allow said pellets to at least partly reform under the influence of said plastic memory while remaining as individual particles, and cooling said pellets, whereby said pellets at least partly adhere to one another and are at least partly irregularly slanted upwardly at an angle to the plane of said layer, said time and said temperature being so chosen that the pellets do not melt and flow so as to lose their shape and identity.

The claimed process is comprised of three steps. The first step is the arrangement of pre-stressed polyethylene pellets in a thin layer. The second step is the heating of the already arranged pellets at

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1/ Section 337 of the Tariff Act of 1930, as amended, provides, the importation hereafter for use, sale, or exchange of a product made, produced, processed, or mined under or by means of a process covered by the claims of any unexpired valid United States letters patent, whether issued heretofore or hereafter, shall have the same status for the purposes of section 337 of the Tariff Act of 1930 as the importation of any product or article covered by the claims of any unexpired valid United States letters patent.

atmospheric pressure to a temperature not greatly above the softening point of the pellets. The pellets are heated for a time sufficient to allow the pellets to partly reform under the influence of the plastic memory, while remaining as individual pellets. The final step is the cooling of the pellets.

The parties agree that the basic consideration in viewing the use of the patented technology is the use of pre-stressed pellets with plastic memory.

Complainants' witness, a chemist whose qualifications as an expert in the field of plastics technology were firmly established, testified under oath during the public hearing as to the results of his analysis of an imported decorative plaque. The purpose of his analysis was to ascertain, insofar as practicable, the process used in making the imported plaques. He stated that pre-stressed articles with plastic memory revert to their original geometry to a degree dependent on the amount of initial stresses, temperature of exposure, and length of exposure. He presented results of relaxation tests run on the imported plaques which he found confirmed the use of pre-stressed pellets with plastic memory.

The respondent did not appear at public hearing, thus the Commission did not have a chance to cross examine its expert, a consulting chemist, whose written report had been submitted to the Commission. He stated in his written report that the process claimed in the patent necessarily includes the steps of using pre-stressed pellets of plastic, and utilizing their plastic memory whereby the

pellets when heated will at least partly reform under the influence of the plastic memory. He stated further that the final form of a sheet made in accord with the patent would show features resulting from changes in the form or dimensions of the pellets resulting from heating the pellets. He found that the imported plaques showed no dimensional or form changes due to the removal of plastic memory stresses, but rather showed the changes expected from a fluid flow process which is in the prior art.

The respondent concedes that it is importing plastic decorative plaques and that it has not obtained a license under the Walters' patent. The patent has never been declared invalid or unenforceable by any court. The respondent has answered the complaint denying that its method of manufacture infringes the Walters' patent because its plaques are made in accordance with a prior art process. Although the respondent alleged the existence of evidence, such as an English patent, regarding the use of a prior art process in the production of the imported plaques, no evidence was presented to substantiate the allegations.

Based upon all of the evidence presented including comparative tests, photos, analysis, and the submissions of all of the parties, along with the evidence presented at the public hearing, we find that the imported decorative plaques are made in accordance with the process revealed in claim one of the Walters' patent.

Effect or tendency to injure

Having found that the imported plaques are made in accordance with the patent, it is necessary under section 337 to consider whether the effect or tendency of the unfair methods of competition is to substantially injure or destroy an industry efficiently and economically operated in the United States or to prevent the establishment of such an industry, or to restrain or monopolize trade and commerce in the United States.

Decorative plastic sheet plaques have been imported in large quantities since 1969 and have been sold at prices lower than the prices at which the complainants sell their plaques. The imported plaques account for a substantial proportion of U.S. consumption of decorative wall plaques. These inroads into the U.S. market represent loss of potential sales to the complainants. The complainants have experienced decreasing profits since the appearance of the imports in the U.S. market and further they have found it necessary to reduce their prices to meet the lower prices of the imported plaques. Since there is considerable handwork involved in the manufacture of the plaques, the lower cost of labor abroad creates the threat of severe price cutting in future sales of the imported plaques.

It is clear from the evidence that the effect or tendency of the unfair methods of competition and unfair acts in the importation of the decorative plastic sheet plaques is to injure substantially an efficiently and economically operated domestic industry.

Conclusion

We recommend that the President direct the Secretary of the Treasury to exclude from entry into the United States, until expiration of the patent, articles comprised of plastic sheets having an openwork structure made by the process disclosed in U.S. Patent No. 2,761,177, except where the importation is made under license of the registered owner of said patent.

CONSIDERATIONS IN SUPPORT OF THE NEGATIVE FINDINGS OF  
COMMISSIONERS LEONARD AND YOUNG

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. In the instant investigation, we find section 337 not to apply.

To be considered first in an attempt to apply section 337 to a fact situation is whether there is the requisite unfair method of competition or unfair act. In the past, the Commission has consistently held (and has been upheld upon court review) that the unauthorized importation of articles or sale of such articles made in accordance with a valid U.S. patent is an unfair method of competition or unfair act within the meaning of section 337. 1/

In the present case, Ben Walters, Inc., the owner of a process patent, and its licensee, Kage, Inc., which together constitute the domestic industry, have alleged that certain imported decorative

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1/ See In re Von Clemm, 43 C.C.P.A. (Customs) 56, 229 F. 2d 441, 443 (1955); In re Orion Co., 22 C.C.P.A. (Customs) 149, 71 F. 2d 458, 465 (1934); and In re Northern Pigment Co., 22 C.C.P.A. (Customs) 166, 71 F. 2d 447, 455 (1934). See also Frischer & Co. v. Bakelite Corp., 17 C.C.P.A. (Customs) 494, 39 F. 2d 247, 260, cert. denied 282 U.S. 852 (1930).

plaques were made in accordance with the process claimed in their patent. At the Commission's hearing, a chemist appearing on behalf of the domestic industry testified that his analysis showed there were differences in the shape of the fused pellets in the plaques imported by one Sterling Novelty Products as opposed to those in the domestically manufactured plaques, which suggested differences in the specific technique used. He believed it to be reasonably clear, however, that prestressed pellets with plastic memory, the basic consideration in the patented technique, were used in the manufacture of the plaques imported by Sterling.

Sterling presented the report of another chemist who also purported to have analyzed both products. This report stated that, in the plaques imported by Sterling, no appreciable numbers of pellets showed a curling or bending which would have resulted had the fusion process included the use of prestressed pellets with plastic memory. The report concluded that the plaques imported by Sterling were produced by a process in the prior art rather than by the patented process.

No other evidence analyzing the imports in relation to the claims of the patent was obtained. After careful consideration of the evidence presented, it is not clear that the plaques imported by Sterling were made in accordance with the claims of the patent, but even assuming that they were, the second requirement of the statute—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--is not satisfied. 1/

The domestic industry's expert evidence regarding the process used in the manufacture of the imported plaques was based on an analysis of only those plaques imported by Sterling. In addition to the plaques imported by Sterling, other plaques were allegedly imported by Yuletide Enterprises, Inc. There was no expert evidence based on an analysis of the plaques entered by Yuletide. Therefore, in absence of expert analysis of its product or of any other evidence that Yuletide's plaques were made in accordance with the patent, the process used to produce the plaques imported by Yuletide cannot be considered. Accordingly, we are able to consider whether the effect or tendency of the importation of plaques only by Sterling is to destroy or substantially injure the domestic industry.

Sterling's imports never represented more than a relatively small percent of domestic consumption of the plaques. During the period when Sterling was importing its largest numbers of plaques, the domestic industry's sales of plaques and its employment increased greatly. During the period when there was a drop in sales and employment in the domestic industry, Sterling's importation of decorative plaques substantially decreased. Therefore, we do not find that the

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1/ The effect or tendency of unfair practices to prevent the establishment of an efficiently and economically operated domestic industry or to restrain or monopolize trade and commerce are not at issue here.

imports by Sterling were associated with the decline in sales and employment in the domestic industry.

The domestic industry was healthy, viable, and profitable during the period in which Sterling imported its largest numbers of decorative plaques. When the domestic industry showed a decline in sales and employment, Sterling's imports of plaques declined substantially. Thus, we find no relationship between Sterling's imports of plaques and injury to the domestic industry.

Therefore, we do not find that the effect or tendency of the alleged unfair methods of competition and unfair acts in the importation or sale in the United States of certain decorative plaques is to destroy or substantially injure an efficiently and economically operated domestic industry.

ALLEGED UNFAIR METHODS OF COMPETITION  
AND UNFAIR ACTS

Complainants allege that U.S. Patent No. 2,761,177, issued to complainant Ben Walters on September 4, 1956, covers a process for the manufacture of plastic sheets having an openwork structure and is being infringed by the importation into, and sale in, the United States of articles manufactured by the patented process. This is a process patent under 35 U.S.C. 101 which is limited to 17 years; it expires in September 1973. On August 21, 1968, the complainant brought suit against Innoplast Corp. in the U.S. District Court for the District of New Jersey, alleging infringement of his patent. On February 22, 1971, a consent judgment was entered by the court stating that Innoplast had infringed the Walters' patent. The court's decree enjoined and restrained Innoplast from further infringement of the patent. Complainants state that the patent is not presently involved in any litigation.

Complainant Ben Walters, Inc., is a Florida corporation, and complainant Kage Co., Inc., is a Connecticut corporation and a licensee of complainant Ben Walters under the said patent. A substantial part of the business of each complainant corporation comprises the manufacture and sale of articles produced in accordance with the said process patent. At present the decorative plaques formed of plastic sheets having an openwork structure imported from Hong Kong by the respondents are in competition with those manufactured

by only one of the complainants--Kage Co., Inc; Ben Walters, Inc., does not make plaques of the type being imported.

Sterling's answer states that it has imported decorative plastic wall plaques from Hong Kong since October 1969, but denies that the method of manufacture infringes the said patent. A report of William Colburn, Ph.D., of Colburn Laboratories, Inc., consulting chemists, was filed with the Commission by Sterling on October 16, 1970. At Sterling's direction, Dr. Colburn examined and compared a sample of the complainant's plaques and a sample of the respondent's plaques. It was his conclusion that the imported plaque was made according to the prior art process rather than the patent claims. This report conflicts with the conclusion reached by Richard S. DeBell of the Plastics Application Division of DeBell & Richardson, Inc., who also compared samples of the domestic and the imported plaques and concluded that "there is considerable evidence that Hong-Kong has adopted Walters' technology." Mr. DeBell's report was included as an exhibit with the complaint. Wesley Larson, a plastics technologist employed by DeBell & Richardson, also testified at the public hearing that the plaques imported by Sterling were made by the process claimed in the said patent and that he knew of no practical way the plaques of Sterling or Yuletide could be made other than through the process of the Walters' patent. The wall plaques which were displayed to the Commission by the complainants during the hearing for visual comparison with those of Kage were imported by Yuletide according to

the complainants. No other evidence relative to Yuletide's wall plaques was presented to the Commission.

Although Sterling's answer asserted that the imported plaques are made according to a process patented in Hong Kong, repeated requests to Sterling's attorney for a copy of the patent have yielded no results. 1/ A memorandum setting forth Sterling's position that the imported plaques are made according to a process which does not infringe the said patent was filed with the Commission February 12, 1971.

Counsel for Yuletide formally entered an appearance by a letter received by the Commission on June 4, 1971. Yuletide stated for its answer that it joined in those grounds and defenses raised by Sterling. In their final briefs Sterling and Yuletide allege that every patent issued should not constitute an "industry" within the meaning of section 337 and that the patent in question does not establish a protectable "industry". Neither respondent participated in the public hearings.

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1/ An application for a patent on the process used by Hong Kong Mercantile Industries was filed on Nov. 24, 1969, at the British Patent Office in London, but that office stated that the application could not be released for any purpose, while pending, without the applicant's approval.

## PATENT "INFRINGEMENT"

A threshold question in determining whether section 337 is being violated in the instant case is whether the accused imported products are made by the process claimed in the patent. Counsel for the complainants stated at the public hearing on May 18, 1971, that, although the patent contains seven claims, "We are only particularly concerned with claim one of the patent." This claim is as follows:

The process for the utilization of plastic memory so as to produce an extremely porous sheet of plastic material, including the steps of arranging pre-stressed pellets of polyethylene in a relatively thin layer, heating said layer at atmospheric pressure to a temperature not greatly above the softening point of said plastic, for a time sufficient to allow said pellets to at least partly reform under the influence of said plastic memory while remaining as individual particles, and cooling said pellets, whereby said pellets at least partly adhere to one another and are at least partly irregularly slanted upwardly at an angle to the plane of said layer, said time and said temperature being so chosen that the pellets do not melt and flow so as to lose their shape and identity.

Complainants allege in their final brief that the patented process comprises the following steps:

1. Arranging pre-stressed pellets of polyethylene in a relatively thin layer;
2. Heating said layer at atmospheric pressure to a temperature not greatly above the softening point of said plastic, for a time sufficient to allow said pellets to at least partly reform under the influence of said plastic memory while remaining as individual pellets; and
3. Cooling said pellets.

Hong Kong Mercantile Industries Ltd., Sterling's supplier, in a letter dated January 16, 1971, and filed as an exhibit with the Commission, outlined the steps of the process used in producing the imported plaques:

OPERATION 1:

- A: Heat during extrusion of resin 170 degrees centigrade or more.
- B: Cooling by water in water basin.
- C: At stage of granulating (grinding of rods) room temperature.

OPERATION 2:

- A: Cold pellets (small discs) put on engraved plates that show design.
- B: Heat inside tunnel 140 to 165 degrees centigrade. Time of process inside tunnel, approximately 20 minutes.
- C: Cooling by air fans above conveyor belt.

In the memorandum filed February 12, 1971, which included as an exhibit the Hong Kong Mercantile Industries' description of the process quoted above, counsel for Sterling stated:

The Complainant's process as set forth in Walters Patent No. 2,761,177 includes, as a primary step, the forced ejection of a fused plastic mass through a restricted orifice to provide an elongate rod. Since the rod hardens quite rapidly without any adequate opportunity for annealing, the final solid structure is inherently stressed and includes "strain." The presence of strains and the associated inherent tendency toward distortion has been referred to by the patentee of U.S. Patent No. 2,761,177 as "plastic memory." It is important to recognize that this plastic memory is present in substantially all extruded plastic products in which the strains developed are not removed by annealing or by some equivalent treatment. Ben Walters, the patentee of the patent in suit, is not the inventor or the person who has discovered "plastic memory." As definitively set forth in principal claim 1,

the patentee's claim to novelty is in a process "for the utilization of plastic memory." The quoted limitation is a material and substantive limitation of the claim and, accordingly, one who produces a product which does not utilize "plastic memory" does not practice the invention of the patent in suit. It is Respondent's position that it neither utilizes nor invokes any benefits of "plastic memory" and that, therefore, the method by which its products are produced does not come within the scope of the claims of the Walters Patent.

The memorandum continues:

It is Respondent's position that, with respect to the Walters Patent, the issue is not whether the pellets as originally produced for the fabrication of plaques had internal stresses or strains at the time they were produced, but whether use was made of such stresses in preparing the final products. It is respectfully submitted that the extended heating period of 20 minutes at a relatively elevated temperature of 140-165° Centigrade would have the effect of neutralizing or relieving any such stresses and causing gravitational collapse and deformation of the discs. Such a technique is within the teachings of the prior art and does not come within the claims of the patent in suit.

At the public hearing, Mr. Wesley Larson, a plastics technologist who had examined samples of the plaques manufactured by Kage and the plaques imported by Sterling, testified for the complainants:

The key thought that we wish to bring out is to the effect that the pellets as they lay in their flat condition must have a residual force, a stress, a strain that can be exerted to create and cause them to be upright. All of our examinations, all of our demonstrations show that this is the novel discovery that Walters has claimed. We concur that Mr. Walters did not discover memory but we do feel that he has utilized memory beneficially to the creation of the plaques. And, it is perhaps the only way this end result can be achieved.



Mr. Larson then commented upon the Sterling memorandum of February 12, 1971, and the Hong Kong Mercantile Industries' description of its process:

Now, the point that we are stressing, of course, is the manner in which the pellets have changed their shape and have visibly moved into an upright position and configured themselves in a manner that would be expected of a plastic memory. And in the doing of that have created the pleasant design as opposed to what would otherwise be an absolute flat downright melt. . . . The description which is given in Exhibit A and on page six [of the memorandum] is very much the description of the process used by the claimant and also as by the patent.

Yuletide, in its final brief, stated that Hong Kong Mercantile Industries was not the manufacturer of the plaques which it imports. No information was furnished about the process used by Yuletide's supplier, although the staff requested this information.

## U.S. IMPORTS

The plastic plaques at issue have been imported by Glovemakers, Inc., doing business as Sterling Novelty Products. Sterling designs, imports, and sells novelty items, principally through jobbers and distributors; its line includes some 300 items. Imports by Sterling of the plastic plaques at issue first began in the latter half of 1969 and have continued at least through the first quarter of 1971. During the first half of the period indicated above, Sterling's imports of the plaques at issue were substantially more than during the second half of the period.

In late 1970, a second firm, Yuletide Enterprises, Inc., began importing plastic wall plaques that the complainant alleges to be infringing. Imports by this firm were smaller than by Sterling.

The prices at which both firms sold their imported plaques at issue generally have been below those of Kage, Inc.

As indicated earlier, complainants stated that a third firm, Harben Co., and possibly others are now importing plaques infringing the Walters' patent. Data from the Harben Co. have not been obtained; the complainants believe Harben's imports to be small relative to those of Yuletide.

Imports of the allegedly infringing plaques enter under TSUS item 773.10, which provides for plaques and figurines of rubber or plastics. The rate of duty in 1969 was 13.5 percent ad valorem; the current (1971) rate of duty is 10 percent ad valorem. These rates are

the second and fourth stages, respectively, of a concession granted by the United States under the Kennedy Round. The final rate under this concession will be 8.5 percent ad valorem, effective January 1, 1972.

Total imports under TSUS item 773.10 in 1969 and 1970 were valued at \$1.9 million and \$2.4 million, respectively. The bulk of the imports under this classification are believed to be figurines.

## U.S. PRODUCERS

### Operations of Ben Walters, Inc.

#### Corporate structure, plant, and equipment

Ben Walters, Inc., of Hialeah, Fla., a family-owned firm, was incorporated in the State of Florida in 1964. The firm commenced production of articles under U.S. Patent No. 2,761,177 in 1956; it has not produced any wall plaques, but has manufactured a variety of other articles by the patented process. Such articles have comprised the great bulk of the firm's output. The production equipment is modern.

#### Sales

Ben Walters' sales of articles produced by the patented process increased substantially from the fiscal year ending in 1967 to the year ending in 1968, but then declined irregularly in the 1969-71 period. A company spokesman attributed the large increase in 1968 to sudden consumer acceptance of one of the firm's products, and the subsequent decline to gradual abatement of this acceptance. Sales of

other products also increased in 1968 and declined irregularly through 1971 as a result--according to the spokesman--of certain small-volume items coming into and going out of vogue.

#### Employment

Employment and the number of man-hours worked at Ben Walters, Inc., peaked in 1968, then declined.

#### Operations of Kage Co., Inc.

#### License agreements

An agreement drawn between Ben Walters of Ben Walters, Inc., and Kibbe Gerstein of Kage Co., Inc., dated April 30, 1968, licenses the latter to use the patented process to produce and sell decorative wall ornaments for the duration of the patent. Virtually all of the Kage's output consists of plaques produced under the Walters' patent.

#### Corporate structure, plant, and equipment

Kage Co., Inc., a family-owned firm incorporated in the State of Connecticut, designs, produces, and sells decorative plastic wall plaques, under license from Ben Walters, at a company-owned plant situated in Manchester, Conn. The production equipment is modern and standard for plastics processing.

Plastic wall plaques produced by Kage under the Walters' patent are made by partially fusing colored polyethylene pellets into semi-porous, decorative plastic sheets of various designs.

### Sales and prices

Kage's revenue from the sale of plastic plaques produced under the Walters' patent expanded sharply in the period 1966-70 but declined in 1971. The unit value of sales of plastic plaques, which represents Kage's price to the distributor after trade discounts and sales commissions remained constant during 1966-70 but declined thereafter. At the retail level, the price per plaque ranges between \$1.00 and \$1.25. Ultimate distribution is made through charitable fund-raising groups, gift and garden centers, and department stores.

### Production

Kage produces primarily to order; thus production closely paralleled the rising trend in sales during 1966-70. The company stated, however, that on October 15, 1970, production was cut back after a planned inventory buildup. In May 1971, approximately 40 percent of manufacturing capacity was being utilized in contrast to almost complete utilization in May 1970.

### Employment and productivity

Employment at Kage increased sharply during the period 1966-70 to approximately 180, paralleling the increase in production of plastic plaques, while output per man-hour remained relatively constant. However, the average number of employees producing plastic plaques and the man-hours worked by them in May 1971, was less than half than the corresponding month in 1970.

## PROFIT-AND-LOSS EXPERIENCE OF DOMESTIC PRODUCERS

## Ben Walters, Inc.

The value of net sales by Ben Walters, Inc., increased sharply from fiscal year 1966 to fiscal year 1967, then decreased in 1968. The net sales remained fairly level in 1969 and 1970.

A net operating loss was sustained in fiscal year 1966, while a net operating profit was reported for 1967. The net operating profit then declined from the 1967 level in 1968 and was at a lower level in both 1969 and 1970.

## Kage Co., Inc.

Net sales of Kage Co., Inc., increased considerably from fiscal year 1966 to fiscal year 1968, and then increased sharply in 1969 and 1970. Net operating profit decreased from fiscal year 1966 to fiscal year 1968, then rose considerably in 1969 and 1970.

Partial-year profit-and-loss data for the fiscal year ending August 31, 1971, are not available. Sales were lower in 8 of the 10 months of the current fiscal year than in the corresponding months of the previous fiscal year. For the most recent 6 months, sales were considerably below those in the first 6 months of the previous year.

A P P E N D I X

Copy of United States  
Patent No. 2,761,177





# United States Patent Office

2,761,177

Patented Sept. 4, 1956

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2,761,177

## MANUFACTURE OF ORNAMENTAL AND DISPLAY PLASTIC SHEETS

Ben Walters, New York, N. Y.

Application April 20, 1955, Serial No. 502,628

7 Claims. (Cl. 18—48)

The present invention relates to methods of manufacturing ornamental or display sheets formed of plastic materials, having an openwork structure and presenting a relatively great number of projections at an angle to the flat dimensions of the sheet proper.

This application is a continuation-in-part of my previous applications Serial Number 352,857, filed May 4, 1953, and Serial Number 474,160, filed December 9, 1954, now abandoned.

It has already been proposed to place granules of plastic material in contact with one another in a layer and then to apply heat until the portions of adjacent and contacting granules which become softened by the heat, completely or partially fuse together, so as to form respectively a solid sheet or a sheet displaying interstices, due to the fact that there exist spaces in some directions between adjacent granules.

In the case of the formation of solid sheets it is of course, always possible to make certain of a sufficient thickness of the layer of granules, and in this case the heating is usually carried to the point where the granules not only soften, but display some amount of fluid flow.

In the case of the porous type sheets it has been found necessary to arrange the layer of granules of plastic with great care. If the layer should be too thick at any point, the resultant sheet will display irregular bulges in thickness. If on the other hand the layer should be too thin at any point, there are apt to be relatively large and unwanted holes in the finished sheet.

The present invention discloses a process which enables the layer of plastic granules to be formed with great rapidity and without the need of great care as to obtaining a uniform thickness thereof before fusing the granules together. The resultant sheet will have an average thickness not subject to excessive variation and furthermore will display a relatively large number of granules which are oriented more or less upwardly from the plane of the sheet as a whole. This type of orientation yields an especially attractive appearance to the finished article.

The special phenomenon which is taken advantage of by the method of the instant invention is that termed plastic memory. Instead of depending upon manual skill in distributing the granules in a layer of uniform thickness prior to heating, what is accomplished is that during the actual heating of the layer, each individual granule will, per se, move or expand in the direction in which it is impelled by plastic memory, so that it encounters the minimum resistance to such motion. If the granule finds open space beside it, it may simply move or expand so as to tend to occupy such space. If it can slide up over a portion of an adjacent granule, it may do so. If on the other hand the direction in which it tends to move or expand is at an angle to the plane of the sheet, it may project upwardly therefrom. The reason that it would not tend to project downwardly is that the layer must of necessity rest upon something of a relatively unyielding nature, for example a metal sheet, pan or already formed solid plastic sheet.

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One object of this invention is to expedite the manufacture of plastic sheets of the nature just described by permitting granules before heating to be formed into a layer with the expenditure of much less time and effort than have hitherto been found needful.

A further object of the present invention is to take advantage of plastic memory so as to cause individual granules of unfused plastic to adjust themselves by movements in directions where the greatest tendency or least resistance is encountered, such movements taking place without the application of any external force, but being determined by the intra-molecular forces arising from strains and stresses frozen into the plastic at the time the granules are originally solidified and now being permitted to display themselves by the application of heat to the plastic.

Still another object of this invention is to provide a method whereby a finished sheet formed of plastic granules will present relatively great porosity throughout, but yet will have one surface substantially devoid of projecting particles, while the opposite side will display a large number of such projecting particles.

Yet a further object of this invention is to produce sheets of the form just described, wherein diverse colors of individual particles of plastic are used, which may be arranged in some definite design so that patterns in color will be exhibited by the finished sheet.

In the foregoing descriptions, when heat or fusing is mentioned, it is distinctly to be understood that the heat is never applied to such a high degree or for a length of time sufficient to cause the individual granules completely to lose their original shapes, although the sizes do alter. Thereby a selection of differing shaped original granules allows the manufacture of finished sheets which will have distinctive appearances, according to the particular shape of the granules employed in manufacturing the several sheets.

In order more easily to understand the present invention reference is now made to the drawings hereunto appended.

Figure 1 is a sectional elevation of an arrangement for preparing plastic pellets or granules so as to display plastic memory.

Figure 2 is a plan view of a tray of prepared pellets before heating.

Figure 3 is a cross-sectional elevation of a mass of pellets after heating and removal from the support.

Figure 4 is a plan view of a panel or sheet of completed plastic materials formed by this process.

Figure 5 is a cross-sectional elevation of the composite structure formed by heating the pellets on a sheet of solid plastic.

Figure 6 is a cross-sectional elevation of a similar structure formed on paper or cloth.

In Figure 1 a hollow cylinder, provided with a piston 2, is filled on one side of the piston with plastic 4, maintained in fluid or semi-fluid state by any one of the means familiar in the art of plastics, for example by supplying to the cylinder 1 a suitable degree of heat.

At the nearly closed end of cylinder 1, is provided a relatively small orifice 3, through which the fluid or semi-fluid plastic is expelled under stress, by reason of the pressure exerted by piston 2 upon the mass within the cylinder, as a rod 5.

As the plastic leaves orifice 3 it immediately hardens, due to the lower temperature encountered without the body of the cylinder. A suitable cutting device, for example the cutting wheel, mounted upon shaft 7 and driven from a suitable source of power (not shown) acts to sever the plastic rod being protruded into small pellets 10, the length of which can of course be determined by adjustment of the frequency with which the cutter is



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applied, relative to the speed of protrusion of the plastic rod.

The first step of the present invention produces individual pieces of plastic which, being severed from the parent rod without the use of heat, present within themselves the same stresses present in the rod, as extruded. Since the rod hardens just as it emerges through orifice 3, which often is tapered internally, it is given no chance to eliminate internal strains by slowly cooling. On the contrary, the extruded rod keeps such strong internal stresses that upon later application of heat thereto it will tend to eliminate the strains at this later time, by changing the dimensions thereof. In practice it has been found that this particular species of plastic memory usually causes the individual pellets or granules to expand particularly in a direction at right angles to the axis along which they were extruded and to shrink in the other direction. The preferred form of the pellets is some geometrical shape displaying at least one major axis, longer than at least one minor axis. However, equal axes can be used. Flattened discs or flat-faced three dimensional forms such as parallelepipeds are among the suitable shapes of the pellets but any other convenient shape can be used, such as stars, triangles, etc. However it is to be understood that this invention is not limited to any one form of pellet, since the essence lies in the use of almost any pellet which may be produced under conditions which will impart to it the above described plastic memory. Likewise holes or depressions may exist in the pellets without altering the method of this invention.

In Fig. 2 these pellets 10 are to be seen spread in a layer in a suitable tray 13, for example a tray of metal or other material, preferably one which will not warp or soften under heat. Heat is then applied to the tray of pellets by any convenient means. For example the tray may be placed within an oven and the heat applied either by conduction, convection or radiation. However the use of electrically powered radiant units suspended over the tray of plastic particles, has been found especially advantageous, although this invention is in no wise limited to this particular method of applying heat.

As to the amount of heat and the length of time for which it is applied, these two factors are influenced primarily by the particular type of plastic used. The size of the individual particles and the thickness of the layer naturally are additional determining factors. Lastly, to a limited extent there exists an inverse relation between the time and the temperature, but of course there are both lower and upper limits to each of these elements of the process. Purely by way of example, and without thereby limiting the scope of this invention, it has been found that a layer of particles of polyethylene having an average length in each dimension of about 3.2 millimeters, when spread in a layer not much thicker than the length of a single particle yields satisfactory results when heated for about five or six minutes at a temperature of about 177° C. to 204° C.

Upon removal of heat from the layer of plastic particles it will be seen that each particle 10 has expanded, chiefly in the direction at right angles to its axis of extrusion, and the finished sheet will present the appearance shown in Figures 3 and 4. Due to the mentioned expansion caused by plastic memory, the finished sheet will be more or less uniform, since such expansion will tend to fill up any large holes due to faulty formation of the layer of plastic granules before fusion thereof.

A mixture of differently colored plastic granules will yield particolored or variegated sheets.

In Fig. 5 is to be seen a solid sheet of plastic 11, on top of which the pellets 10 have been fused. This sheet 11 takes the place of the metal pan previously described and is usually preferably made of the same type of plastic

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virtually unchanged. The pellets, when softened, become fused or welded to the plastic sheet 11, which then constitutes the base supporting the pellets on one side, and affording a very smooth surface upon the other side.

In Fig. 6 the base is constituted by a sheet 12 of paper, cloth, or the like, to the upper surface of which has been permanently and firmly caused to adhere a relatively thin layer of plastic 11', preferably similar to that of which the pellets 10 are formed. The composite paper-plastic sheet supports the pellets in the heating oven and the pellets become fused or welded to the plastic layer, which thus yield a three ply composite or sandwich.

While I have shown and described certain embodiments of my invention, it is to be understood that these are solely by way of example and not limitation, the scope of this invention being determined by the hereunto appended claims.

What is claimed is:

1. The process for the utilization of plastic memory so as to produce an extremely porous sheet of plastic material, including the steps of arranging pre-stressed pellets of polyethylene in a relatively thin layer, heating said layer at atmospheric pressure to a temperature not greatly above the softening point of said plastic, for a time sufficient to allow said pellets to at least partly reform under the influence of said plastic memory while remaining as individual particles, and cooling said pellets, whereby said pellets at least partly adhere to one another and are at least partly irregularly slanted upwardly at an angle to the plane of said layer, said time and said temperature being so chosen that the pellets do not melt and flow so as to lose their shape and identity.

2. The process for producing composite plastic sheets having a backing layer of solid plastic, which includes the steps according to claim 1, said layer of pellets being placed upon said solid plastic layer before heating.

3. The process for producing composite sheets having an intermediate layer of solid plastic and a backing layer of cloth, which includes the step of first preparing a firmly adherent layer of solid plastic upon a sheet of cloth and then performing the steps according to claim 1, said layer of pellets being placed upon said intermediate layer of solid plastic before heating.

4. The process for producing composite sheets having an intermediate layer of solid plastic and a backing layer of paper, which includes the step of first preparing a firmly adherent layer of solid plastic upon a sheet of paper and then performing the steps according to claim 1, said layer of pellets being placed upon said intermediate layer of solid plastic before heating.

5. The process of forming decorative sheets having a plurality of openings therethrough, including the steps of selecting granules of hardened thermoplastic polyethylene which has been formed under much greater stress in one axial dimension than in another, so as to be capable of exhibiting asymmetrical plastic memory effect, placing said granules upon a supporting flat surface of a material to which polyethylene is non-adherent when softened by heat, in a layer of which the average thickness is not greatly in excess of the average maximum linear dimension of the respective granules, heating to between 177° C. and 204° C. said layer of granules under pressure not in excess of atmospheric and while leaving the granules free to move, until said granules change their ratio of length to width under the impulse of plastic memory, and to soften where they are forced into contact with one another because of said change of relative dimensions, so as to adhere in part to one another while the granules remain visibly distinct from one another, and cooling the so-produced highly porous sheet until the granules are again hardened, but with substantially all the stress due to plastic memory removed therefrom, whereby the enlargement of some of the granules in a

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average thickness of the finished sheet is substantially in excess of the thickness of said layer before heating.

6. The process according to claim 5, in which the selected pellets before heating are longer in one dimension than in a dimension normal thereto in a predetermined ratio, and after heating the ratio of length in the respective dimensions is altered.

7. The process according to claim 1, wherein the layer of granules, is partly restrained from horizontal expansion, by being placed in a relatively rigid shallow pan, whereby some granules are restrained horizontally and therefore expand in at least a semi-vertical direction.

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References Cited in the file of this patent

# UNITED STATES PATENTS

2,234,994	Vernon et al. ....	Mar. 18, 1941
2,603,575	Schramm .....	July 15, 1952
2,649,618	Rhodes et al. ....	Aug. 25, 1953

# FOREIGN PATENTS

646,162	Great Britain .....	Nov. 15, 1950
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Sept. 4, 1956

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MANUFACTURE OF ORNAMENTAL AND DISPLAY PLASTIC SHEETS

Filed April 20, 1955

Fig. 1.

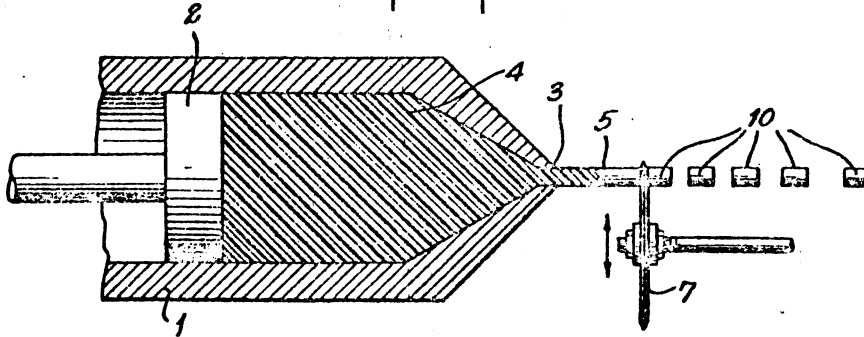


Fig. 2.

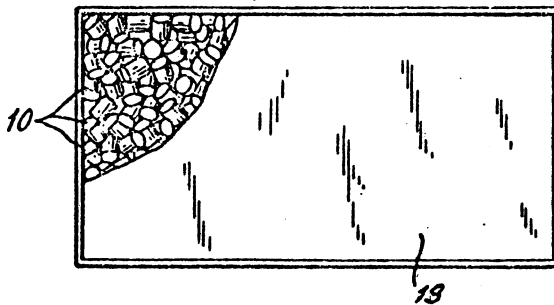


Fig. 4.

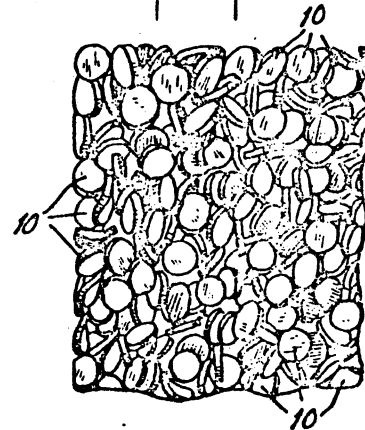


Fig. 3.



Fig. 5.



Fig. 6.



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