Nov. 1, 1960 H. W. LA BRANCHE 2,958,172

APPARATUS FOR PACKAGING ARTICLES IN A PRINTED PLASTIC SHEET

Filed March 1, 1957 2 Sheets-Sheet 1

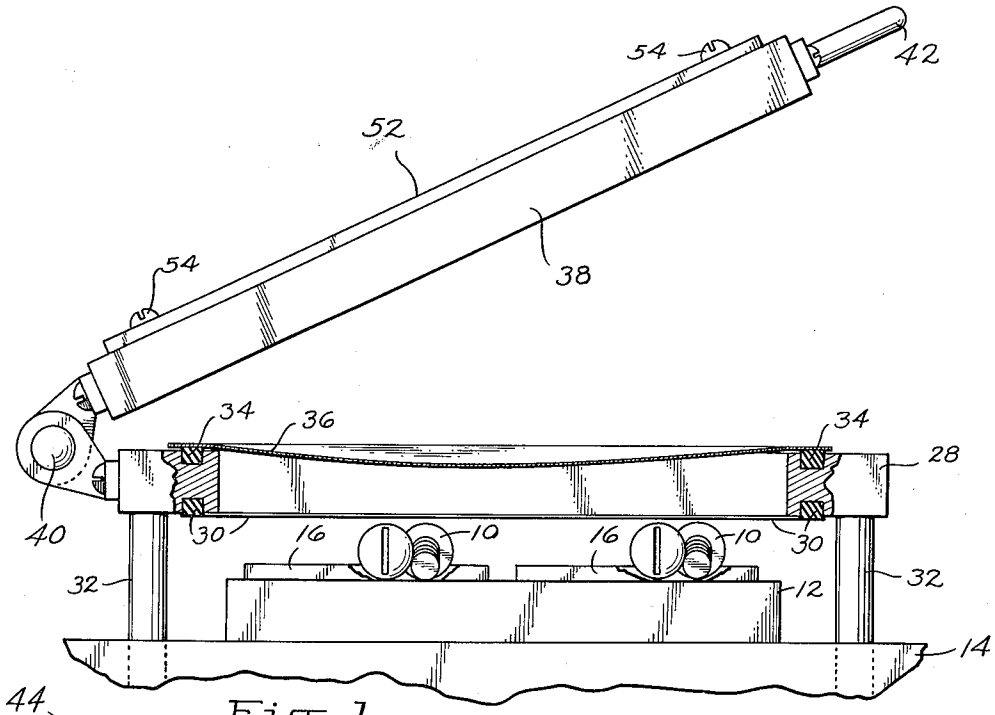


Fig. 1.

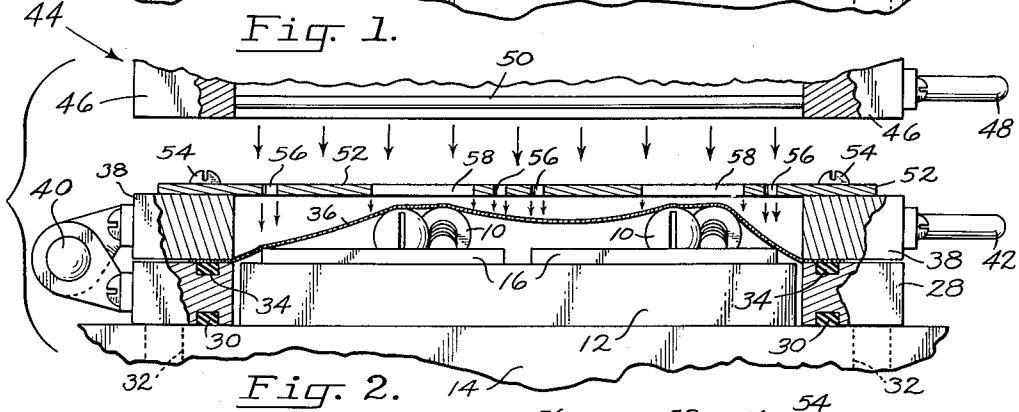


Fig. 2.

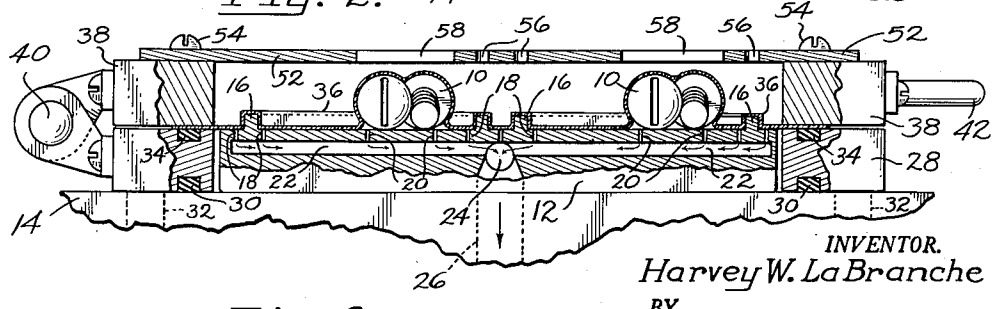


Fig. 3.

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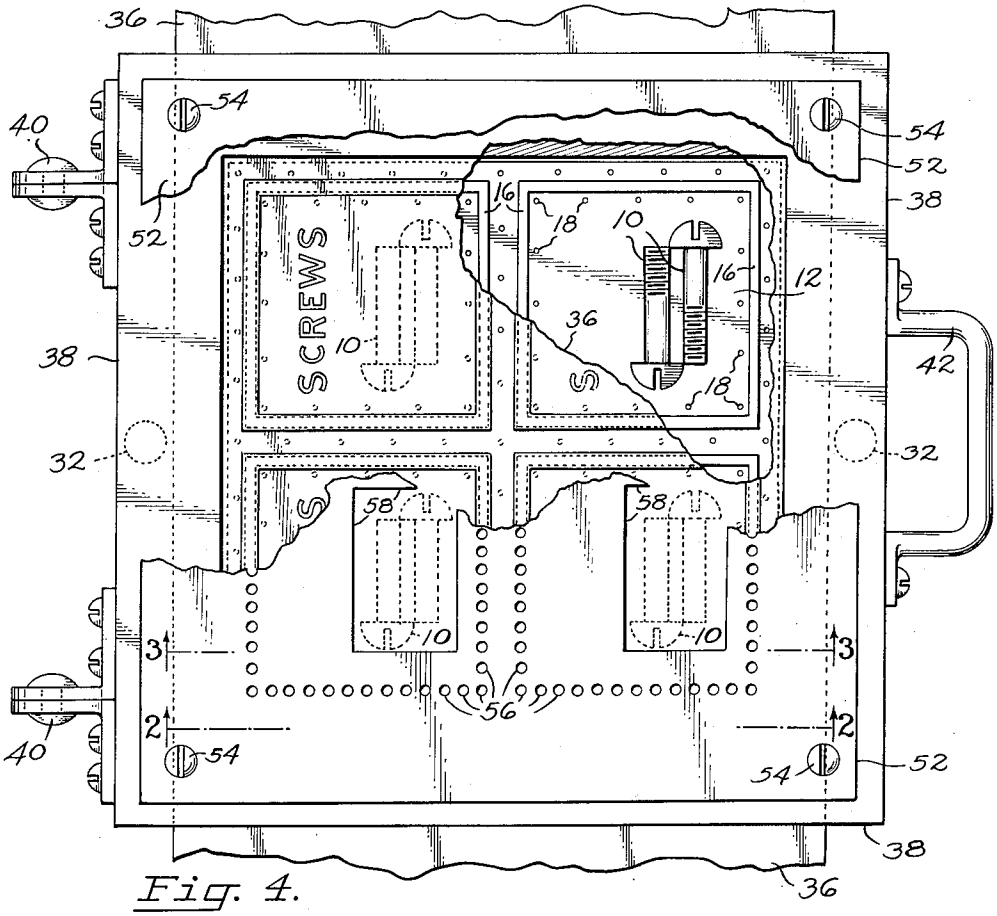


Fig. 4.

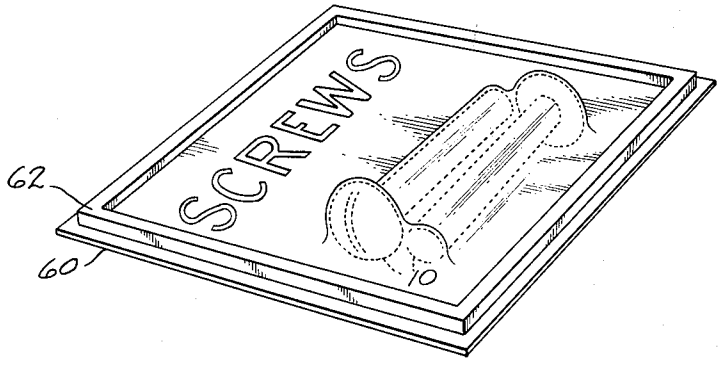


Fig. 5.

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2,958,172

# APPARATUS FOR PACKAGING ARTICLES IN A PRINTED PLASTIC SHEET

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1 Claim. (Cl. 53—141)

This invention relates to a method for packaging articles in a printed plastic sheet.

In the packaging art it frequently is desirable to package articles in sheets of clear plastic in order to protect the articles while still permitting inspection of them and display of their inherent beauty. This may be accomplished by heat softening a selected transparent thermoplastic material, wrapping it about the article while it is softened and then cooling it to harden it.

In this procedure it is desirable to apply to the package a printed message indicating, for example, the character of the goods, their source and price, and related information. However, application of such a printed message is difficult of accomplishment because of the distortion occurring in the plastic during the packaging operation.

Various procedures heretofore have been employed or suggested for achieving the desired result. In accordance with one method, the articles are packaged in clear plastic against a cardboard backing sheet upon which the message is imprinted. This procedure is subject to the disadvantage of increased cost attendant upon the use of the backing sheet, which costs nearly as much as the plastic itself and which requires special machinery and handling for its use. Also, the life of the backing sheet and the properties of the adhesive used for uniting the backing sheet and the plastic sheet are variable. Still further, the final product is subject to warping because of the unbalanced construction.

In another proposed procedure the plastic packaging sheet is preprinted with the message, allowance being made for the distortion occurring during packaging with the object in view of pulling the message into line during packaging. This is difficult of accomplishment, however, because of variable plastic properties, heater voltage, and atmospheric conditions. These and other factors make this procedure impractical and indeed preclude its application altogether where intricate work is involved.

Still further, it has been proposed to print the package after the packaging operation has been completed. However, this requires a special press. Also, each of the diverse items packaged would require its own special and costly printing platen designed to provide clearance for the packaged article when the sheet is printed.

Accordingly it is the general object of this invention to provide a method and apparatus for packaging articles in a printed plastic sheet without distortion of the printing to form a final package which is stable, inexpensive, and durable and which permits viewing of the packaged article while reading the printed message directly associated therewith.

The manner in which the foregoing and other objects of this invention are accomplished will be apparent from the accompanying specification and claim considered together with the drawings, wherein:

Fig. 1 is a view in side elevation of apparatus which may be employed for packaging articles in a printed plastic sheet in accordance with the herein described method, partly broken away to show the interior construction; the sheet being positioned for clamping and heating.



Fig. 2 is a sectional view taken along line 2—2 of Fig. 4 and illustrating the heat-softened, clamped sheet draped across the articles;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 4 and illustrating the sheet wrapped around the articles;

Fig. 4 is a plan view of the apparatus illustrated in Figs. 1–3; and

Fig. 5 is a perspective view of a package produced by the method of the present invention.

Generally stated, the herein described method of packaging articles comprises providing a thermoplastic sheet having a printed portion, which it is desired to preserve undistorted, and a packaging portion which is to be wrapped around the article. The sheet is placed across an article to be packaged with the packaging portion opposite the article. Heat is applied selectively to the packaging portion for softening the same, after which the article and the sheet are moved relatively to each other, wrapping the softened portion about the article. Thereafter the sheet is cooled for hardening it and forming the final package.

Contemporaneously with the foregoing sequence, the margins of the sheet may be softened selectively and pressed against a molding surface for forming a marginal bead about the package. This lends stiffness and rigidity to the package so that it may be handled more readily.

Considering the foregoing in greater detail and with particular reference to the drawings:

The presently described packaging method may be applied to the packaging of a diversity of miscellaneous items where it is desired to protect the item, but at the same time permit inspection of it. Illustrative of such items are fishing lures, cutlery, small tools, door and drawer knobs, hinges, clusters of screws and bolts, and the like. For purposes of illustration, it is described herein in connection with the packaging of a plurality of screws **10**.

To package the articles, they are placed in apparatus including a forming plate or platen **12** mounted on a table **14** having a smooth upper surface area surrounding the forming plate.

The upper surface of plate **12** is subdivided by a plurality of ridges **16** which define the plate areas to be employed for the production of each individual package. The interior of the plate is penetrated by a number of communicating passageways all of which are connected to a source of vacuum. As is evident from Fig. 3, these passageways include passageways **18** located on both sides of ridges **16**; passageways **20** located adjacent the articles to be packaged; and central passageways **22**, **24** communicating with each other and with a duct **26** leading to a source of vacuum, not illustrated.

Platen **12** is enclosed by a reciprocatable clamping frame assembly which also serves to define a vacuum forming box. In the illustrated form, the lower clamping frame **28** comprises a rectangular member dimensioned to enclose platen **12**. Its undersurface is provided with a sealing ring **30** which may be brought into sealing relationship with the smooth upper surface of table **14**. Piston rods **32** of fluid actuated cylinders not illustrated are connected to frame member **28** for reciprocating the frame assembly in a vertical direction.

A second sealing ring **34** is embedded in the upper surface of frame member **28**. This ring functions to form a seal with a sheet of thermoplastic material **36** which may be placed across the open top of lower frame member **28** and which is used for packaging the articles **10** lying on platen **12**. Accordingly, the packaging areas of the sheet which lie opposite the articles may or may not be left clear. However, the areas which do

not thus overlie the articles may be preprinted with an inscription such as is illustrated in Figs. 4 and 5.

The clamping frame assembly also includes upper clamping unit **38** hinged by means of hinges **40** to the companion clamping unit **28** with which it registers. An operating handle **42** is provided on frame unit **38** for opening and closing the frame assembly as required to insert and withdraw plastic sheet **36**.

Means also are provided for applying heat selectively to the packaging areas of the plastic sheet. Such means include a heating unit in combination with a shielding unit. The heating unit, indicated generally at **44** in Fig. 2, includes a substantially rectangular frame **46** dimensioned to register with clamping frames **28, 38**. An operating handle **48** is connected to the frame and an electric heating element **50** is supported thereby. The entire heating unit is mounted on a track or otherwise for movement toward and away from plastic sheet **36** clamped in the clamping frame.

The shielding unit of the selective heating assembly comprises a plate **52** fastened by means of screws **54**, or otherwise, to the top of upper clamping frame **38**. As is apparent from Figs. 2 and 3, shield **52** is formed with openings in predetermined locations. Thus openings **56**, which may assume the form of linearly disposed, round or elongated openings, register with ridges **16** on platen **12**. Openings **58**, which are of comparatively large size, overlie the unprinted areas of plastic sheet **36** and articles **10** on platen **12**. Since shield **52** is spaced from plastic sheet **36** by a distance equal to the thickness of upper clamping frame **38**, heat directed against the shield by heating unit **44** will be somewhat diffused, but will be directed against and soften those portions of the plastic sheet which are opposite articles **10** and ridges **16**.

*Operation*

The manner of operation of the above described apparatus is as follows:

Articles **10** to be packaged are placed on platen **12** opposite vacuum passageways **20** where they are held by gravity, magnetic attraction or otherwise. The clamping frame assembly is placed in the raised, open position of Fig. 1. A sheet **36** of suitable thermoplastic material is placed across the opening of lower clamping frame member **28** after which upper clamping frame member **38** is lowered into clamping engagement with the lower frame member.

Heat unit **50** then is energized or, if continuously energized, moved adjacent the apparatus. Heat thereupon is radiated against shield plate **52** which permits application of heat to the plastic sheet only in those areas directly below openings **56, 58**. The application of heat is continued until these areas of the plastic have been softened.

Next, piston rods **32** are retracted, which draws the clamping frame and the plastic sheet down over the platen and across the articles **10**. A vacuum mold box defined by the upper surface of table **14**, platen **12**, the side walls of clamping frame **28** and the plastic sheet itself accordingly is formed.

Vacuum is applied to the interior of the mold box via duct **26** communicating with passageways **18, 20, 22** and **24**. The softened areas of the plastic thus are sucked down; those opposite ridge **16** being formed in a continuous bead about the articles **10**, and those opposite the articles themselves being drawn about and tucked under the articles, encasing and packaging them.

After the heat source has been removed, the plastic sheet is permitted to cool and harden. The clamping frame then may be opened and the sheet with encased articles stripped from the platen **12**. Where, as illustrated, several package units are formed in one operation, these may be cut apart from each other.

The final package is illustrated in Fig. 5. It comprises a plastic sheet **60** having a marginal bead **62** conforming to the dimensions of ridge **16** on platen **12**. This stiffens the sheet and lends rigidity to it for better handling during merchandising operations. The articles **10** are encased in the clear area of the plastic. The preprinted message appears above the articles, undistorted and legible.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be made without departing from the spirit of my invention or the scope of the subjoined claim.

Having thus described my invention, I claim:

Apparatus for packaging an article in a thermoplastic sheet having printed and packaging areas, comprising support means for supporting an article to be packaged, peripheral bead-forming means on the support means, means for supporting a thermoplastic sheet across the bead-forming means with the packaging area thereof overlying the article, heating means adjacent the sheet supporting means on the side thereof opposite the article supporting means and operable to heat and soften a thermoplastic sheet, heat shielding means interposed between the heating means and the sheet supporting means and having openings therein disposed for registry with the bead-forming and packaging areas of a thermoplastic sheet, whereby to heat and soften the latter and to shield the printed area from such heat, means for lowering the sheet supporting means to lower the selectively heated areas of the sheet onto the bead-forming means and the article, and means for forcing the softened areas of the sheet about the bead-forming means and article and the printed unheated area of the sheet onto the article supporting means, whereby to maintain said printed area undistorted, the heated areas of the sheet thereafter being cooled to harden the same, whereby to produce a peripherally reinforced package sheet confining an article in the packaging area thereof and displaying an undistorted printing on the printed area.

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