June 10, 1969 R. L. HURTLE 3,448,558

PACKAGING MACHINE

Filed May 8, 1967 Sheet 1 of 5

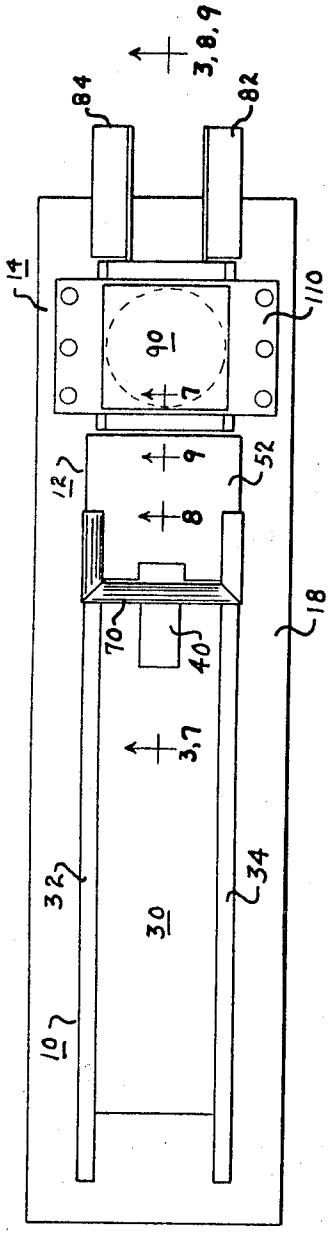


FIG. 2

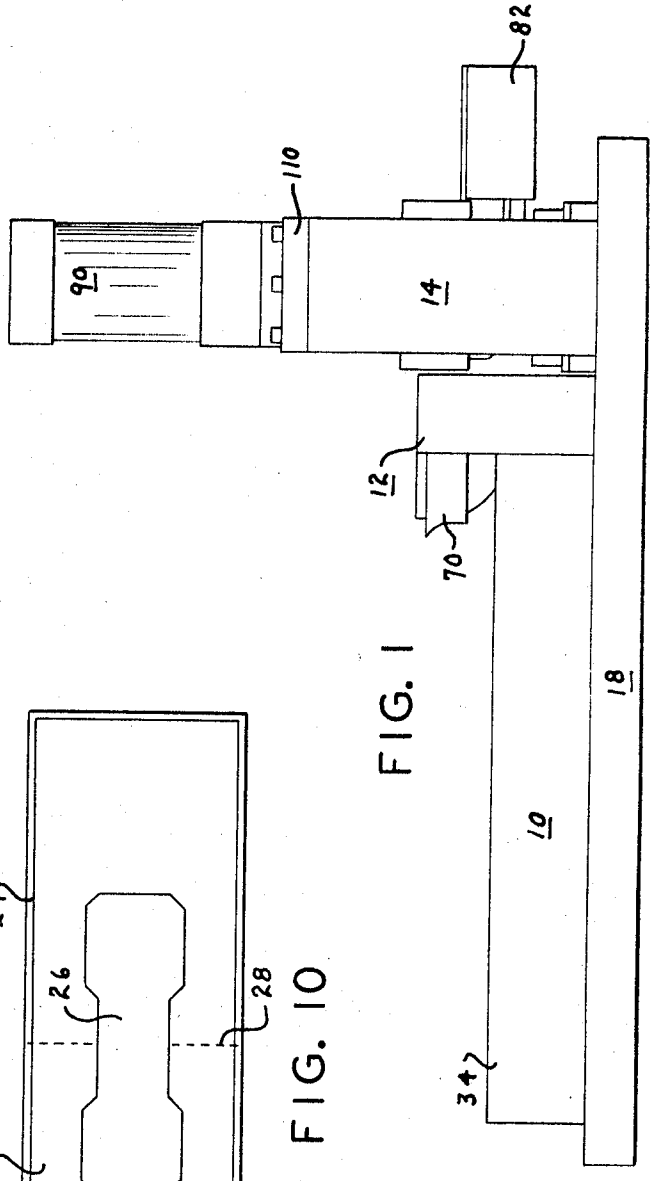


FIG. 1

FIG. 10

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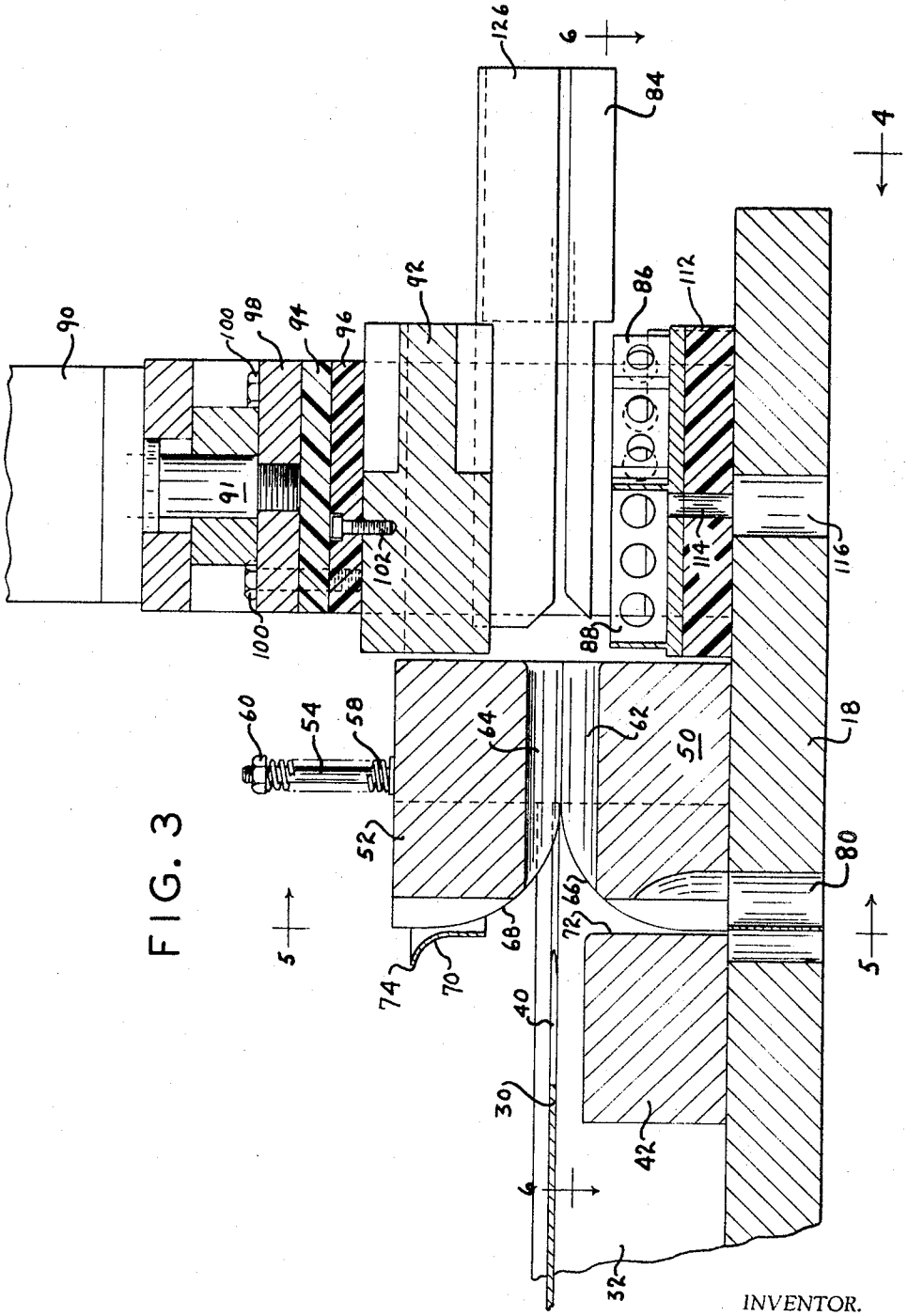


FIG. 3

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PACKAGING MACHINE

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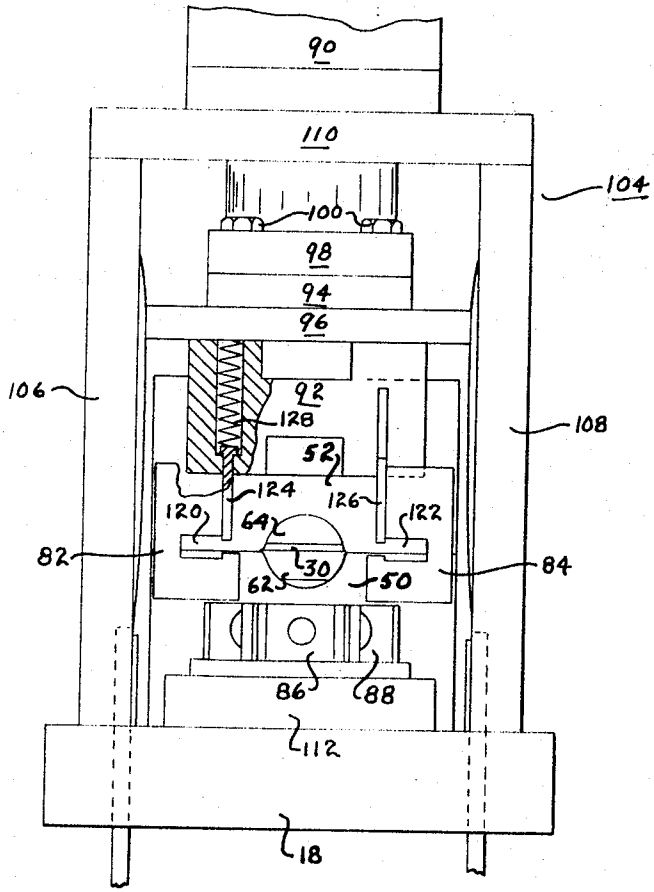


FIG. 4

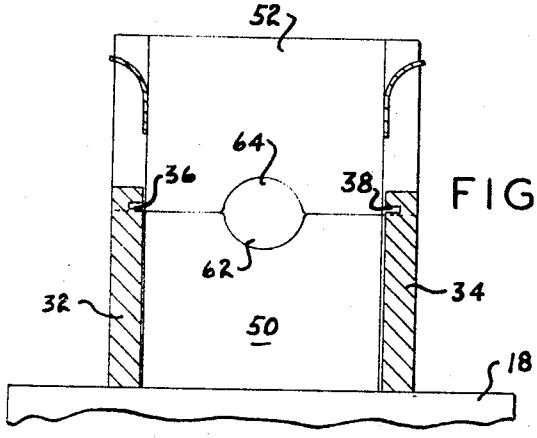


FIG. 5

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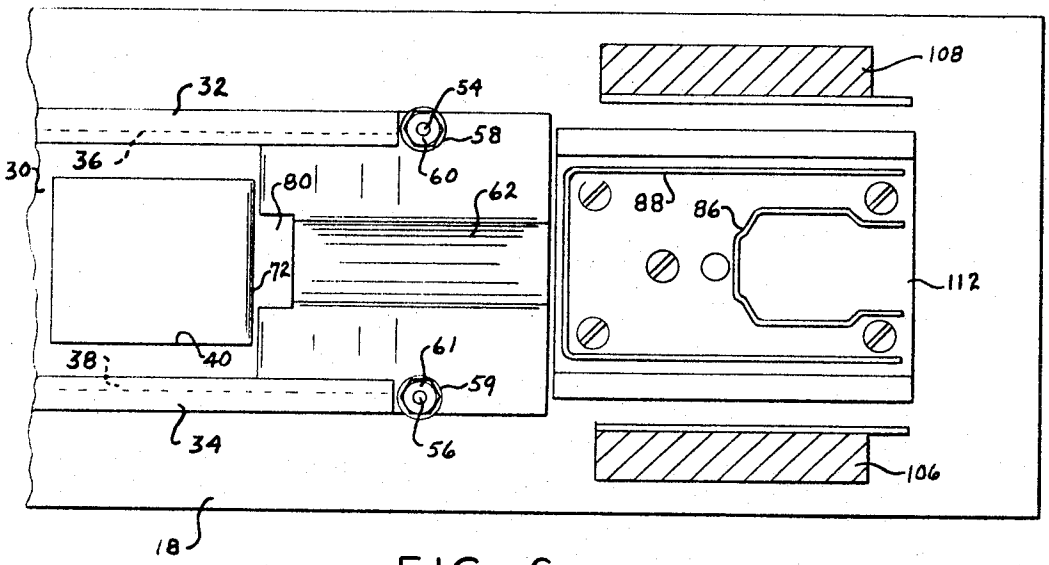


FIG. 6

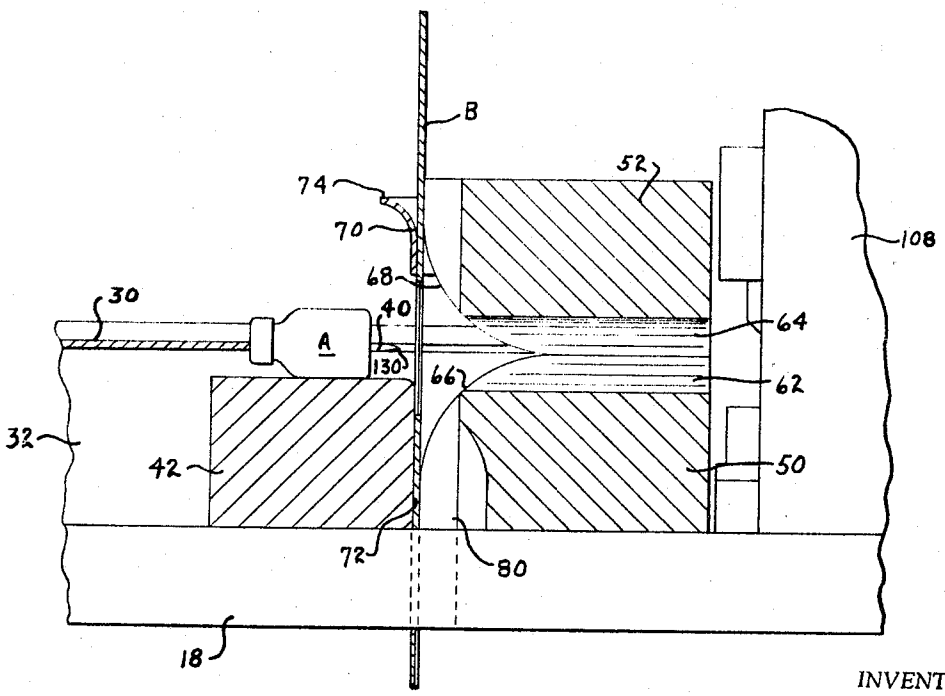


FIG. 7

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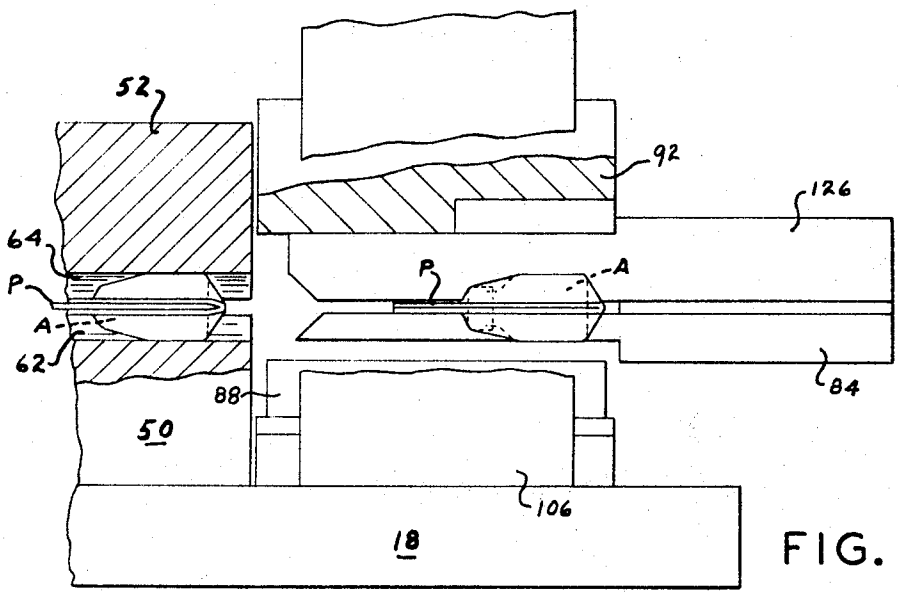


FIG. 8

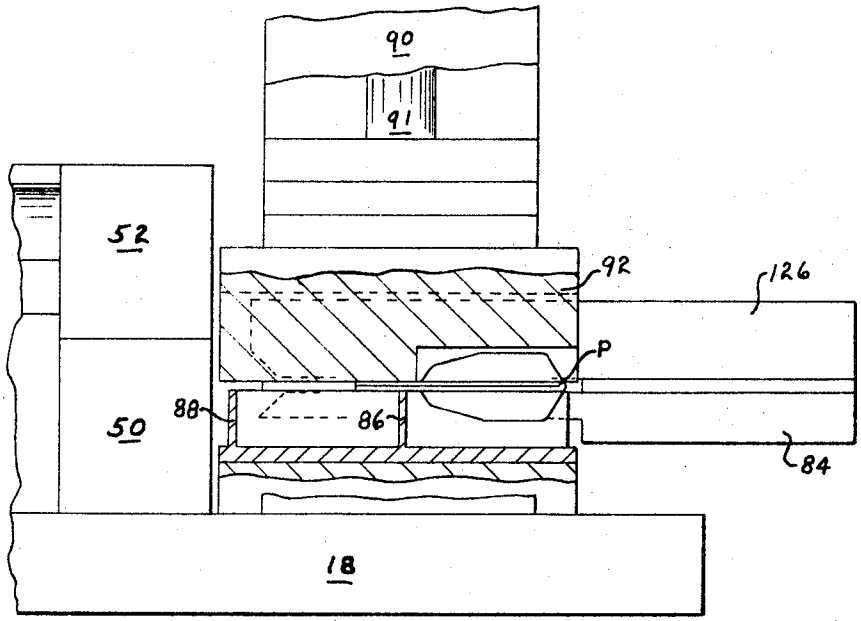


FIG. 9

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United States Patent Office 3,448,558 Patented June 10, 1969

3,448,558

PACKAGING MACHINE

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Filed May 8, 1967, Ser. No. 636,816
Int. Cl. B65b 47/02, 5/02
U.S. Cl. 53—141 11 Claims

ABSTRACT OF THE DISCLOSURE

A machine for packaging articles using a blank having a flat foldable card with a window at the center and a sheet of thermoplastic material on one side. The machine includes a mechanism for folding the card into two sections with the article to be wrapped disposed in the window of the card, and a heat sealing assembly for securing the two folded sections together with the thermoplastic material conformed generally to the configuration of the article. A stream of warm air or other heating means softens the plastic material prior to or during the folding operation.

In recent years a variety of small articles and products in bottles, ampulse or other containers have been enclosed in a package or wrapper consisting of a foldable cardboard sheet or frame, with a window of thin transparent thermoplastic sheet material. In enclosing the article or product in the package, the wrapper is folded over the article or product while the wrapper is being heated, thus permitting or causing the sheet material to form around and conform to the article or product and causing the inner sides of the margin or frame to adhere to each other and thereby form a firm seal around the article or product. This type of package permits the article or product to be easily seen while providing an effective frame for advertisement and promotional material, and a firm header for mounting the package on a rack or peg-board for displaying the articles or products. In the past the machine has been complicated and large and the operation performed on the machine rather difficult, involving several steps and a number of operators performing the various steps. Further, the packages produced by the prior machines and operations have often been poorly formed and not consistent from one package to another. It is therefore one of the principal objects of the present invention to provide a machine for packaging small articles, which is relatively simple in construction and operation and which will perform the complete operation with a single operator performing only one principal step.

Another object of the invention is to provide a machine for forming packages having a window of thermoplastic transparent material, in which the wrapper from which the package is formed is folded over the article or product and the package sealed in two successive steps as the operator inserts the articles or products successively into the machine.

Still another object is to provide a packaging machine of the aforesaid type which is compact and is constructed of few moving parts, and which can be operated with little skill or training to produce firmly sealed and consistently uniform packages having transparent windows conforming closely to the external configuration of the enclosed article or product.

A further object of the invention is to provide a machine for forming packages from flat blanks with center windows of thermoplastic material, which consists of several easily operated subassemblies having interchangeability with other sub-assemblies for repairing and servicing, and which can be readily adapted to small, short run packaging operations or to large, continuously operated assembly line installations.

Another object is to provide an easy and efficient method of sealing packages using wrappers of the aforementioned type.

Additional objects and advantages of the invention will become apparent from the following description and accompanying drawings, wherein:

FIGURE 1 is a side elevational view of the present packaging machine;

FIGURE 2 is a top plan view of the packaging machine shown in FIGURE 1;

FIGURE 3 is a vertical cross sectional view of the packaging machine shown in FIGURES 1 and 2, the section being taken on line 3—3 of FIGURE 2;

FIGURE 4 is an elevational view of the right hand end of the machine as seen in FIGURES 1 and 2;

FIGURE 5, is a vertical cross-sectional view taken on line 5—5 of FIGURE 3;

FIGURE 6 is a horizontal cross-sectional view taken on line 6—6 of FIGURE 3;

FIGURE 7 is a fragmentary vertical cross-sectional view of the machine, the section being taken on line 7—7 of FIGURE 2;

FIGURE 8 is a fragmentary vertical cross-sectional view of the machine, the section being taken on line 8—8 of FIGURE 2;

FIGURE 9 is a fragmentary vertical cross-sectional view of the machine, the section being taken on line 9—9 of FIGURE 2; and

FIGURE 10 is a plan view of one side of a package blank.

Referring more specifically to the drawings, and to FIGURES 1 and 2 in particular, showing generally the present packaging machine, numeral **10** designates an injector assembly, **12** a guide assembly for a partially formed blank and article, and **14** a heat-sealing assembly, the three assemblies being positioned in alignment with one another to permit the article and blank to be formed and sealed in one substantially continuous operation. The three assemblies are mounted on and secured to a base **18**. The type of blank used in the present machine is illustrated in FIGURE 10 and consists of a heavy paper or cardboard frame **22** and a thin sheet of thermoplastic, transparent material **24** covering a window **26**, one half of the window being substantially the same shape as the article, such as a bottle containing a medicinal preparation or the like. The cardboard frame is scored at numeral **28** to permit the frame to fold easily at its center with the plastic material over the window engaging opposite sides of the article. The thermoplastic material is bonded to one side of the cardboard material, and when it is heated after the cardboard frame has been folded, the contacting sides adhere to one another, forming an effective seal around the article. The thermoplastic material, when heated, readily conforms to the general configuration of the article so that the final package consists of a double cardboard frame with bulging windows of thermoplastic material. Various shaped blanks may be used to form packages for a variety of different articles and products, the shape of the window usually being changed to accommodate the various products. However, the basic construction of the blank, consisting of the cardboard frame with a window and the thermoplastic sheet material secured thereto, remains the same from one package to another.

The injector assembly as shown on the drawings consists of a reciprocable plate **30**, preferably of metal, supported on opposite edges by side members **32** and **34**, having grooves **36** and **38** on the inner sides thereof for receiving the margins of the plate. The forward end of

plate 30 contains a generally rectangular slot 40 for receiving the article preparatory to advancing the article into the guide assembly, the article being supported in the slot by a platform 42 mounted beneath the slot on base 18. Plate 30 is reciprocated to and from the guide assembly by any suitable mechanism such as a hydraulic cylinder.

The guide assembly consists of a stationary block 50 and a movable block 52 mounted on stationary block 50 and held in position thereon by two studs 54 and 56. The stationary block is mounted rigidly on base 18 and the movable block is urged into face-to-face contact with the stationary block by springs 58 and 59 reacting between the upper surface of block 52 and nuts 60 and 61 threadedly received on the upper end of each of the two studs 54 and 56, the studs being rigidly connected to block 50 and forming guides for block 52 as it moves upwardly and downwardly above block 50. Block 50 contains in its upper surface a slot 62 extending substantially the full length thereof, and block 52 contains a slot 64 in its lower surface directly above slot 62 and extending substantially the full length of the block. The two slots together form a cavity of approximately the same size as the article being packaged. The left hand ends of blocks 50 and 52, as shown in FIGURE 7, are provided with arcuate surfaces 66 and 68, respectively, to facilitate the folding of the blank inwardly and around the article, as will be more fully explained hereafter. The blank is guided inwardly along the two arcuate surfaces by guide member 70 on block 52 and by the forward face 72 of platform 42. The guide member 70 is provided with an outwardly turned arcuate lip 74 to facilitate inserting the blank in the guide assembly in the position illustrated in FIGURE 7. As plate 30 of the injector moves forwardly carrying the article, the blank is folded inwardly at its center toward the contacting surfaces of blocks 50 and 52, thus folding the blank downward over the article in the manner illustrated in FIGURE 8. As plate 30 further advances, it pushes the blank and article inwardly between the blocks which are yieldably held together by springs 58 and 59 on the two studs 54 and 56, thus pressing the blank firmly around the article. In order to soften the thermoplastic sheet material on the blank, a heated stream of air is injected from a suitable blower through passage 80 or other heated source of air. The heated air softens the plastic sufficiently to permit it to readily conform to the general contour of the article. The thermoplastic material readily becomes soft and yieldable from the heated air injected through passage 80, so that no delay in the operation is required to accomplish the heating before the blank is pressed inwardly between blocks 50 and 52.

The packages formed by the guide assembly are advanced into the heat sealing assembly 14 and are guided by laterally spaced guide members 82 and 84 into position over electrodes 86 and 88, having the general configuration of one-half of the window of the blank, but larger than the window so that the blank will be sealed around the article and in close proximity to the edge of the window. The contacting surfaces of the thermoplastic material adhere to one another as the heating operation is performed. This requires pressure which is provided by cylinder 90 acting through rod 91 connected at its upper end to a piston in the hydraulic cylinder and at its lower end to a plunger 92, the plunger being insulated from the cylinder by insulation layers 94 and 96 secured to plate 98 on the lower end of rod 91 by a plurality of bolts 100 and 102. The cylinder is supported by a frame 104 consisting of two side members 106 and 108 and a cross member 110 to which the cylinder 90 is firmly secured, the two side members being mounted on and rigidly secured to base 18. The electrodes 86 and 88 are preferably constructed of brass or copper and are mounted on insulating member 112 which in turn is secured to base 18. The lines for electrodes 86 and 88 extend downwardly through openings 114 and 116 in insulation member 112 and base 18,

and are connected to a transformer and other electrical equipment for providing the required current to heat the electrode. This electrical equipment is well-known and readily available on the market and hence will not be described herein. The guides 82 and 84 include slots 120 and 122 for receiving the edges of the folded blank, and these edges are pressed downwardly and the package guided through the heat sealing assembly by retractable guide members 124 and 126. These two guide members are urged downwardly into contact with the folded package by a plurality of springs 128 in plunger 92, reacting against the upper edge of each of the guide members, only one of said springs being shown in the drawings; however, a plurality is required for firmly holding the guide means against the folded blank. The guide means extends beyond the right hand end of the machine for carrying the sealed packages outwardly, where the completed packages can be readily removed from the machine.

In the operation of the present packaging apparatus, the article, for example a medicine bottle, is fed into slot 40 and a package blank is inserted in front of blocks 50 and 52 with the center of the blank on a line with plate 30 and on a plane with the upper surface of block 50. The thermoplastic sheet material of the blank faces the article when the blank is in the position illustrated in FIGURE 7. With the blank and article in the foregoing position, plate 30 is advanced, causing the rear edge defining the slot to engage the article and advance it forwardly along with the plate. As the plate advances the forward edge 130 of the plate engages the center of the blank on the scored line across the frame portion thereof, and, as the plate 30 and article advance, the blank is bowed inwardly along arcuate surfaces 66 and 68 of blocks 50 and 52, respectively, causing the blank to fold inwardly over and under the article. The windows in the blank are positioned to fold around the article and the thermoplastic sheet material, having been rendered soft and pliable by the heated air from passage 80, conforms generally to the contour of the article on both the lower and upper sides thereof. As the plate advances further inwardly between the two blocks, carrying therewith the article and the folding blank, the package is formed into its final configuration and is then advanced further, carrying with it the folded blank containing the article, to the heat sealing assembly, where it positions the package on electrodes 86 and 88 beneath plunger 92, the package being guided into proper position by guide members 82 and 84. When the package, folded in the foregoing manner containing the article, is positioned on the electrodes, plate 30 is retracted to its original position. After the plate has been retracted, the plunger is operated to press the formed package firmly against the electrodes 86 and 88, thereby permitting the hot electrodes to seal the contacting surfaces of the thermoplastic material together along the margins around the window, thus producing a completely sealed package with the windows therein exposing the merchandise on both sides thereof. As the operation is repeated, the next package advances through the guide assembly in the same manner as previously described and is advanced into the heat sealing assembly, where it contacts the preceding package and moves it along the guide tracks to the extended portion thereof at the right hand end of the machine, as viewed in the drawings. This operation is continually repeated, first inserting the blank at the forward end of the two blocks 50 and 52 and feeding an article to be packaged into slot 40. As each successive package is advanced through the guide and heat sealing assemblies, a completed package is ejected from the machine at the right hand end thereof.

It is contemplated that the present machine be operated automatically to perform the steps in sequence. A hydraulic cylinder or other suitable power mechanism reciprocates plate 30 in timed relation with the operation of hydraulic cylinder 90 performing the heat sealing operation. Suitable feed mechanisms may be adapted to insert

the package blanks at the forward end of blocks **50** and **52** and to feed an article to be packaged into slot **40**. However, the machine is capable of being manually operated, each step being performed in the same manner as described herein.

While only one embodiment of the packaging machine has been described in detail herein, various changes and modifications may be made to satisfy requirements without departing from the scope of the invention.

I claim:

1. A machine for packaging articles using a blank having a flat foldable frame with a window therein and a sheet or thermoplastic material secured to one side of the frame and spanning said window; said machine comprising an injector assembly for receiving and advancing an article to be packaged, a guide assembly having two relatively movable blocks with longitudinal slots in their facing surfaces, a station at the forward end of said blocks for receiving a blank with the thermoplastic side facing the article in the injector assembly, a means in the injector assembly for advancing the article into the guide assembly and for engaging the blank near the center thereof and folding the blank into two sections on opposite sides of the article and with the thermoplastic material of the folded section of the blank facing one another, and a heat sealing assembly for receiving the folded blanks containing the articles and for sealing said sections together.

2. A machine for packaging articles as defined in claim **1**, in which the blocks in said guide assembly have arcuate forward ends curving inwardly to the respective facing surfaces of the blocks.

3. A machine for packaging articles as defined in claim **1**, in which an abutment means is spaced forwardly from each of said blocks for guiding the package blank into the space between said blocks.

4. A machine for packaging articles as defined in claim **2**, in which an abutment means is spaced forwardly from each of said blocks for guiding the package blank into the space between said blocks.

5. A machine for packaging articles as defined in claim **1**, in which one of said blocks is fixed and the other of said blocks is moxable toward and away from said fixed block, and a spring means urges said movable block into engagement with said fixed block.

6. A machine for packaging articles as defined in claim **4**, in which one of said blocks is fixed and the other of said blocks is movable toward and away from said fixed block, and a spring means urges said movable block into engagement with said fixed block.

7. A machine for packaging articles as defined in claim **1**, in which said heat sealing assembly includes an electrode, a means for guiding a formed package blank onto the electrode, and a plunger for pressing said package firmly against said electrode to heat seal the folded sections of the package together.

8. A machine for packaging articles as defined in claim **4**, in which said heat sealing assembly includes an electrode, a means for guiding a formed package blank onto the electrode, and a plunger for pressing said package firmly against said electrode to heat seal the folded sections of the package together.

9. A machine for packaging articles as defined in claim **1**, in which the means for advancing the articles into the guide assembly is a plate-like member having a slot therein for receiving articles, and having an extension at the forward end thereof for advancing a folded package blank with the article therebetween into the guide assembly.

10. A machine for packaging articles as defined in claim **1**, in which a heated passage is disposed adjacent the station for said blanks for directing a stream of heated air onto said blanks prior to and during the folding operation.

11. A machine for packaging articles as defined in claim **9**, in which a heated passage is disposed adjacent the station for said blanks for directing a stream of heated air onto said blanks prior to and during the folding operation.

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U.S. Cl. X.R.

53—184, 229, 373