Jan. 16, 1962 R. W. HOMPE ETAL 3,016,672

PACKAGING APPARATUS

Filed April 18, 1960 6 Sheets-Sheet 1

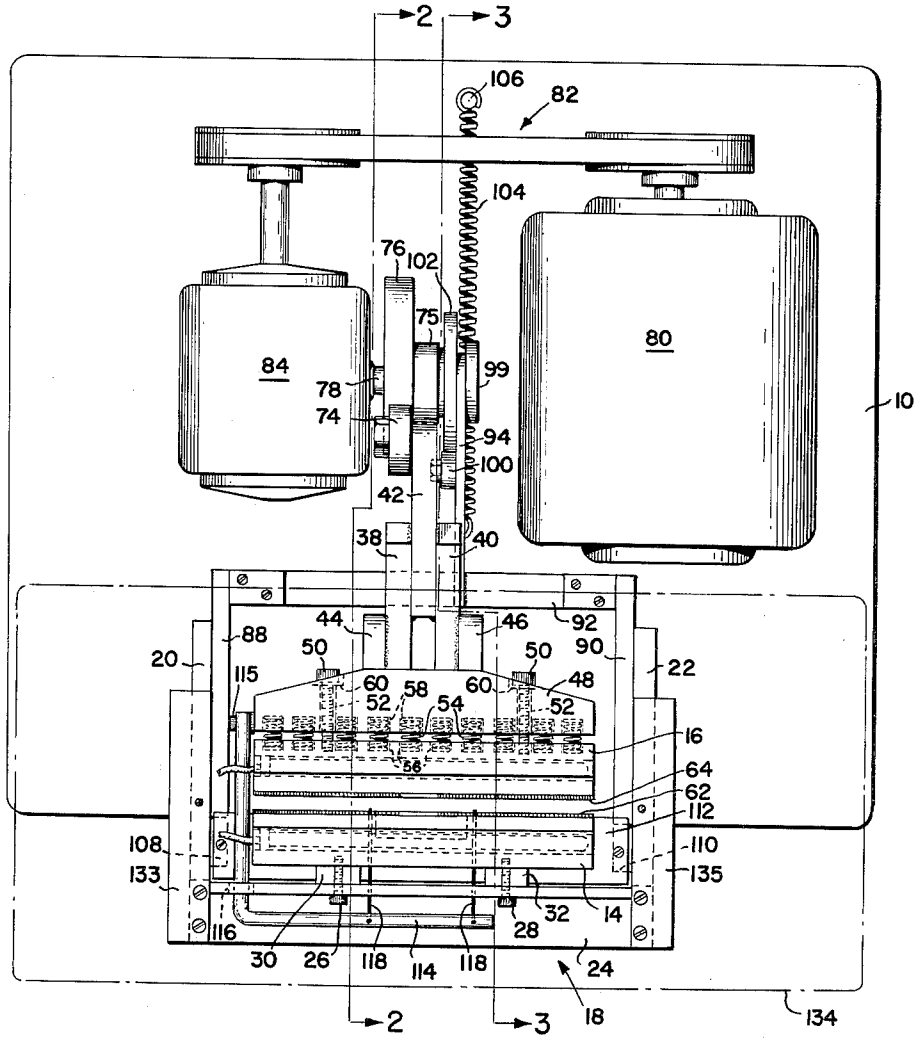


FIG. 1.

INVENTORS
ROBERT W. HOMPE
CHARLES TREZONA &
ALTEN E. WHITECAR
BY

ATTORNEYS

Jan. 16, 1962 R. W. HOMPE ETAL 3,016,672

PACKAGING APPARATUS

Filed April 18, 1960 6 Sheets-Sheet 2

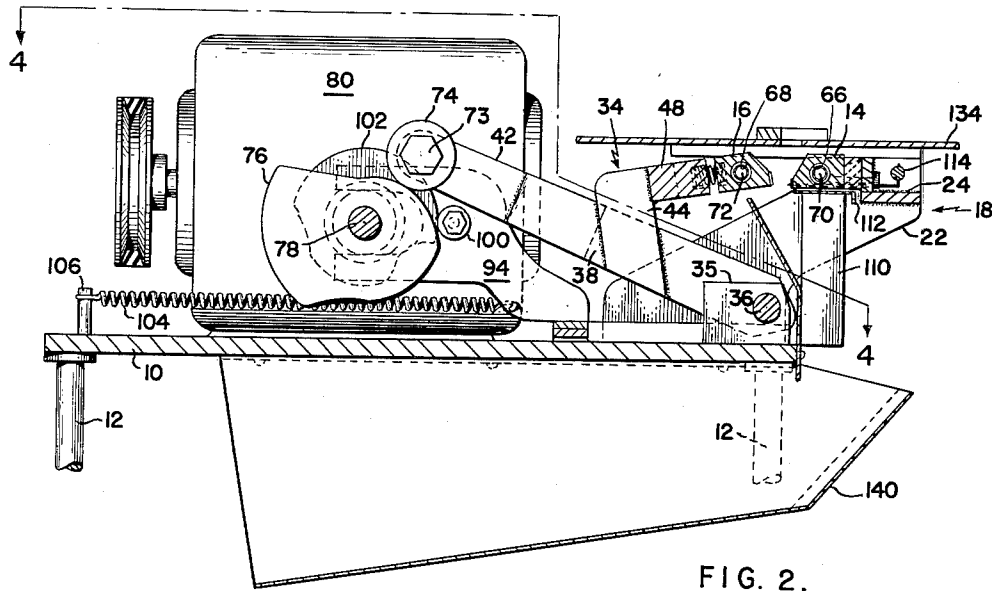


FIG. 2.

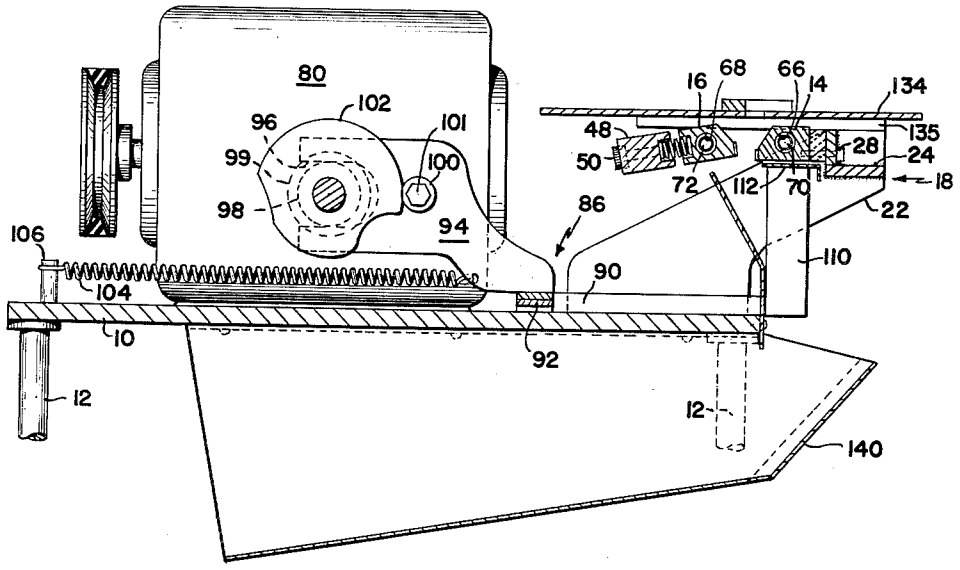


FIG. 3.

INVENTORS
ROBERT W. HOMPE
CHARLES TREZONA &
ALTEN E. WHITECAR
BY Dyson Smith & Hall
ATTORNEYS

Jan. 16, 1962 R. W. HOMPE ETAL 3,016,672

PACKAGING APPARATUS

Filed April 18, 1960 6 Sheets-Sheet 3

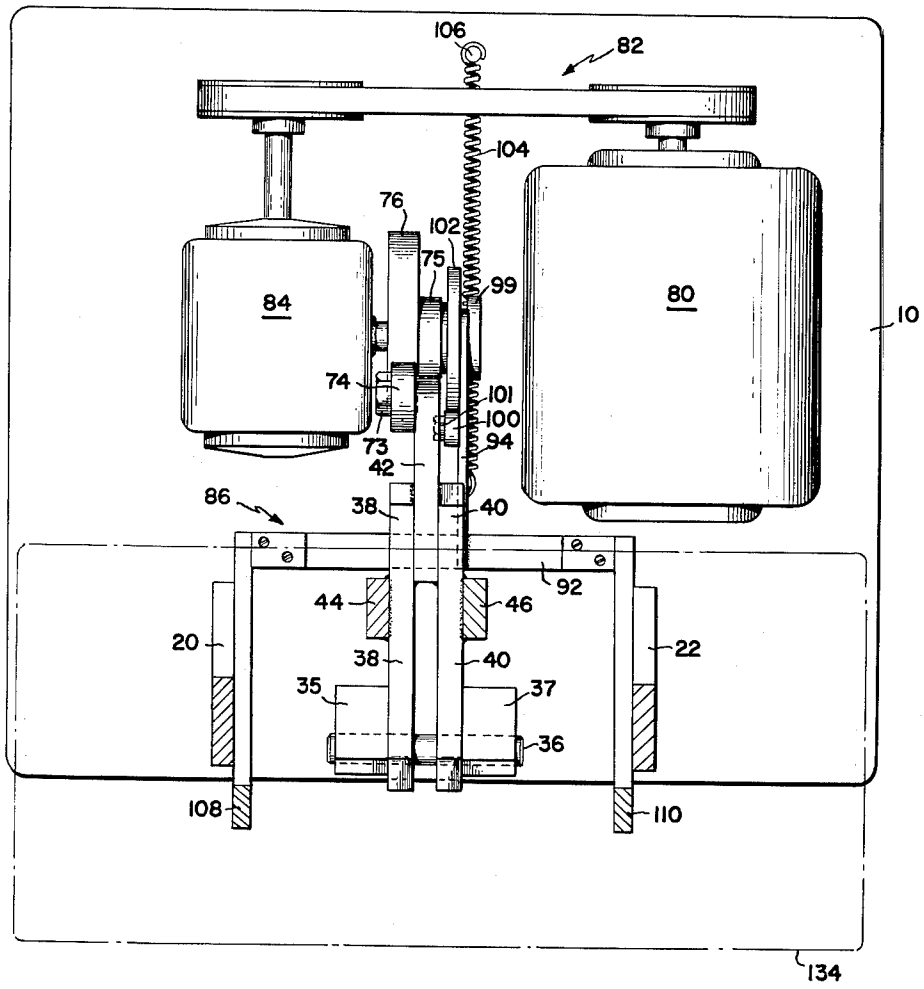


FIG. 4.

INVENTORS
ROBERT W. HOMPE
CHARLES TREZONA &
ALTEN E. WHITECAR
BY Dean Smith Hall
ATTORNEYS

Jan. 16, 1962 R. W. HOMPE ETAL 3,016,672

PACKAGING APPARATUS

Filed April 18, 1960

6 Sheets-Sheet 4

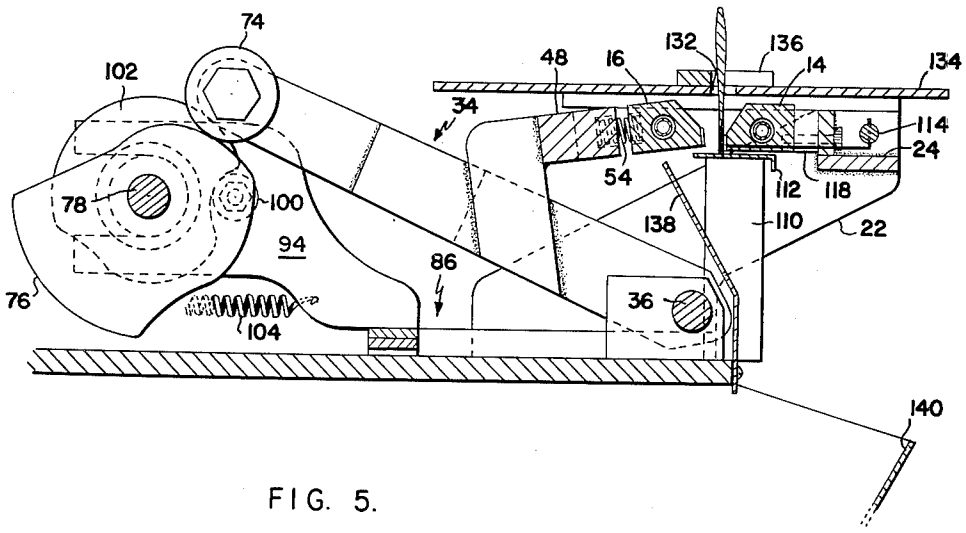


FIG. 5.

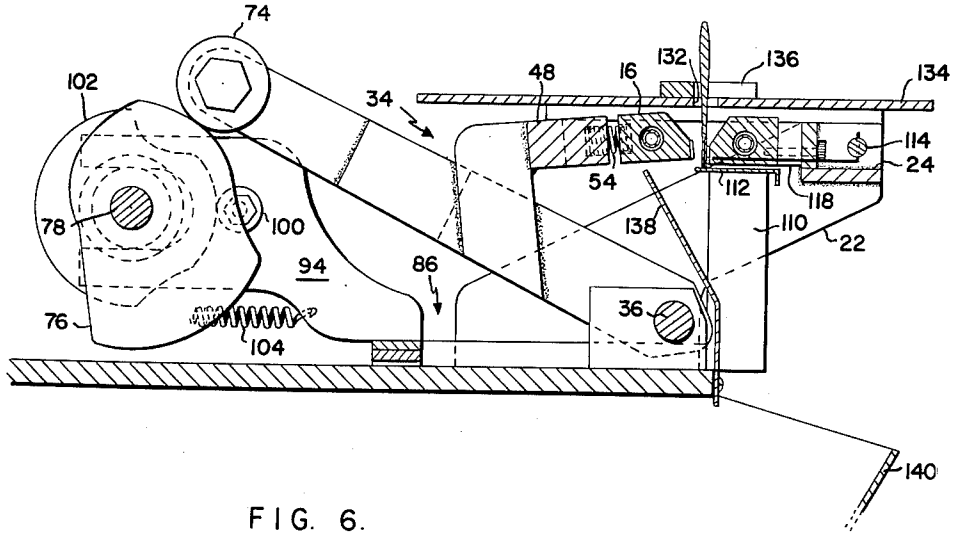


FIG. 6.

INVENTORS
ROBERT W. HOMPE
CHARLES TREZONA &
ALTEN E. WHITECAR
BY

ATTORNEYS

Jan. 16, 1962 R. W. HOMPE ETAL 3,016,672

PACKAGING APPARATUS

Filed April 18, 1960 6 Sheets-Sheet 5

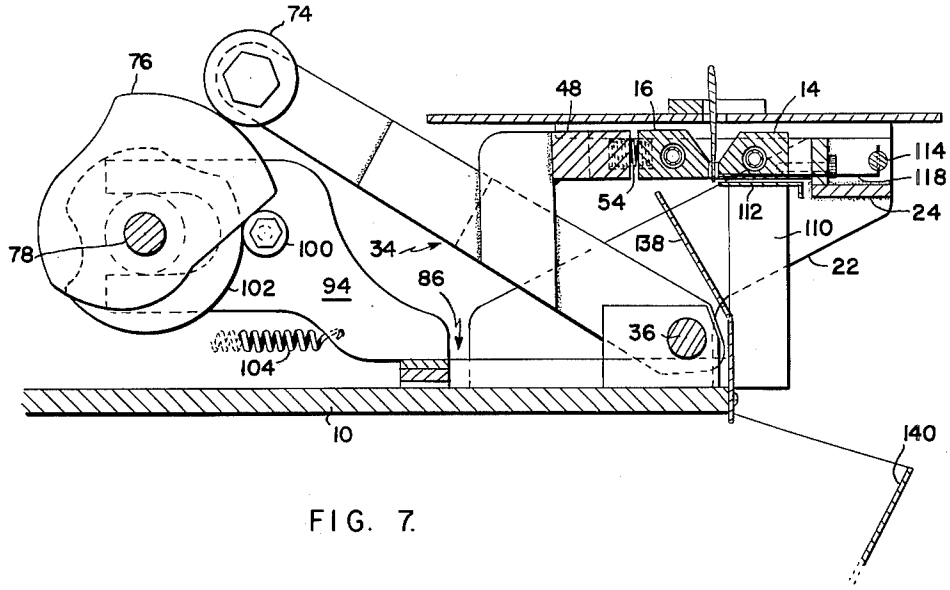


FIG. 7.

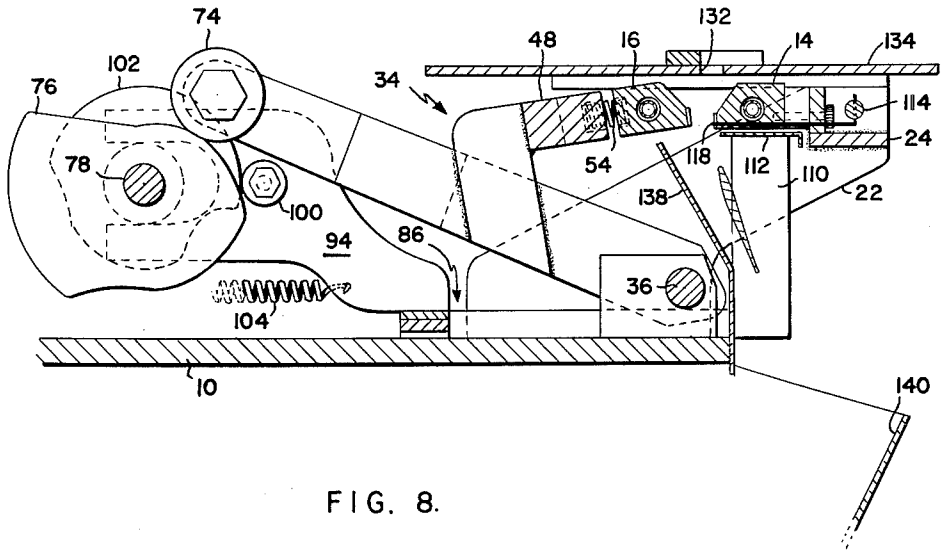


FIG. 8.

INVENTORS
ROBERT W. HOMPE
CHARLES TREZONA &
ALTEN E. WHITECAR
BY

ATTORNEYS

Jan. 16, 1962 R. W. HOMPE ETAL 3,016,672

PACKAGING APPARATUS

Filed April 18, 1960 6 Sheets-Sheet 6

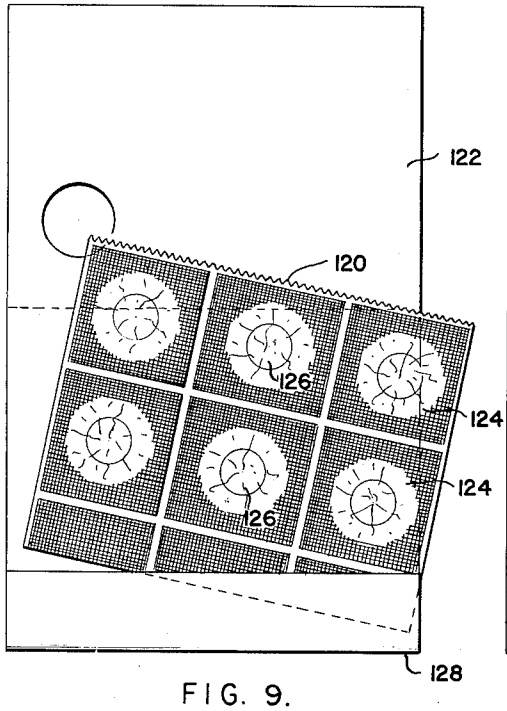


FIG. 9.

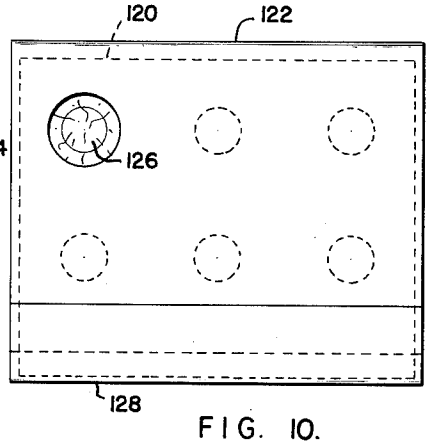


FIG. 10.

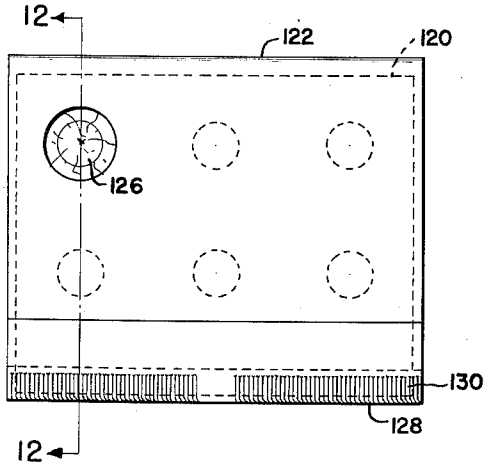


FIG. 11.

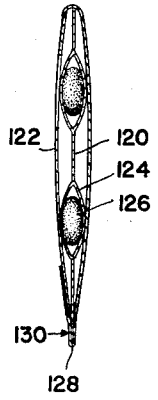


FIG. 12.

INVENTORS
ROBERT W. HOMPE
CHARLES TREZONA &
ALTEN E. WHITECAR
BY

ATTORNEYS

United States Patent Office 3,016,672
Patented Jan. 16, 1962

3,016,672
PACKAGING APPARATUS

Robert W. Hompe, Ithan, and Charles Trezona, Roslyn, Pa., and Alten E. Whitecar, Westville, N.J., assignors to Smith, Kline & French Laboratories, Philadelphia, Pa., a corporation of Pennsylvania

Filed Apr. 18, 1960, Ser. No. 22,843
9 Claims. (Cl. 53—373)

This invention relates to packaging apparatus and, more particularly, to apparatus for joining an envelope, which may contain small articles such as tablets or capsules, with a cover or folder to form a package wherein the envelope is held within and enclosed by the folder.

The packaging apparatus of this invention is particularly advantageous in that it provides for both rapid and uniform joining of the envelope and the folder and is constructed with a minimum number of parts.

Other advantages and objects of this invention will become apparent on reading the following description in conjunction with the drawings, in which:

FIGURE 1 is a plan view of the packaging apparatus in accordance with this invention;

FIGURE 2 is a section taken on the plane indicated by line 2—2 in FIGURE 1;

FIGURE 3 is a section taken on the plane indicated by the line 3—3 in FIGURE 1;

FIGURE 4 is a section taken on the plane indicated by the line 4—4 in FIGURE 2;

FIGURE 5 is a side elevation of a portion of the apparatus showing the insertion of a package into the apparatus;

FIGURE 6 is a view similar to FIGURE 5 showing a subsequent stage in the operation of the apparatus;

FIGURE 7 is a view similar to FIGURE 5 showing the joining stage in the operation of the apparatus;

FIGURE 8 is a view similar to FIGURE 5 showing the ejection of the package from the apparatus;

FIGURE 9 is an elevation of one type of package which may be formed by the apparatus of the present invention showing the separated position of the package components;

FIGURE 10 is an elevation of the package shown in FIGURE 9 showing it in a position for insertion into the packaging apparatus;

FIGURE 11 is an elevation of the package shown in FIGURE 9 in the completed condition with the envelope joined with the folder; and

FIGURE 12 is a section taken on the plane indicated by line 12—12 in FIGURE 11.

The packaging apparatus in accordance with this invention comprises a supporting frame including a table 10 and supporting legs 12. A pair of heat sealing and crimping jaws 14 and 16 are mounted on the table 10. The jaw 14 is mounted in a stationary, horizontal position by a frame 18 comprising a pair of spaced arms 20 and 22 joined by a horizontally extending transverse beam 24. The jaw 14 is secured to beam 24 by a pair of bolts 26 and 28 threadedly engaging the jaw 14 which is spaced from the beam 24 by a pair of spacers 30 and 32 mounted on bolts 26 and 28, respectively and constructed of a heat insulating material such as asbestos.

The jaw 16 is mounted for movement into and out of engagement with a package positioned between the jaws 14 and 16 by a frame 34 (FIGURE 2) pivoted on a pin 36 mounted in bearing members 35 and 37 supported on table 10. Frame 34 comprises a pair of arms 38 and 40 pivoted at one end on the pin 36 and secured, as by welding, at the other end to an arm 42 whereby arms 38, 40 and 42 move conjointly. Arms 38 and 40 carry arms 44 and 46, respectively, which support a beam 48 welded thereto and extending toward jaw 14. A pair of bolts 50 extend through bores 52 in the beam 48 to threadedly engage and support jaw 16 on the beam 48. A plurality of coil springs 54 are positioned in compression within longitudinally spaced recesses 56 and 58 in jaw 16 and beam 48, respectively, to bias jaw 16 outwardly of beam 48. The extended position of jaw 16 is limited by engagement of the heads of bolts 50 with shoulders 60 on beam 48. Jaw 16 is normally spaced from beam 48 under the bias of springs 54 and the bolts 50 are slidable within bores 52 to permit relative movement between jaw 16 and beam 48.

The opposing faces of jaws 14 and 16 are tapered to provide sealing edges 62 and 64, respectively, which, during the to and fro movement of jaw 16, either contact each other or a package positioned therebetween. Edges 62 and 64 may be corrugated or serrated, as shown in the drawings, for crimping or corrugating and pressing together layers of a package positioned therebetween. Alternatively, edges 62 and 64 may have a smooth surface and the apparatus may operate without any crimping action, the smooth edges serving to apply the necessary sealing pressure to a package positioned between the jaws 14 and 16. The jaws 14 and 16 have longitudinally extending bores 66 and 68, respectively, adapted to receive a pair of resistance heating elements 70 and 72, respectively. Heating elements 70 and 72 are energized to heat the jaws 14 and 16 which apply heat to the package along with the pressure applied thereto.

The means for operating frame 34 to move jaw 16 between an open position spaced from jaw 14 and a position in which jaws 14 and 16 are in heat sealing relation comprises a cam follower 74 mounted on the end of arm 42 by a bolt 73 and riding on a rotating cam 76. Cam 76 is secured to a shaft 78 driven by a motor 80 through a belt drive 82 and a transmission 84 geared to drive the shaft 78 at the desired speed. Rotation of cam 76 causes oscillation of frame 34 about pin 36.

A frame indicated generally at 86 (FIGURE 3) is slidably supported on table 10 and comprises a pair of slide members 88 and 90 joined by a cross member 92. An arm 94 is secured to cross member 92, as by welding, and has a groove 96 cooperating with a collar 98 on shaft 78 to guide the arm 94 for linear movement. A collar 99 formed on the end of shaft 78 axially retains arm 94. A cam follower 100 is mounted on arm 94 by a bolt 101 and is biased into engagement with a cam 102 mounted on shaft 78 by a spring 104 connected in tension between arm 94 and a stud 106 mounted on table 10. The cam 102 is spaced from the cam 76 by a collar 75 mounted on shaft 78. A pair of vertically extending arms 108 and 110 are mounted on side arms 88 and 90, respectively, and support at their upper ends a horizontally extending plate member 112.

As shown in FIGURE 1, an L-shaped arm 114 is mounted at one end on beam 48 by a screw 115 and extends through an opening 116 in beam 24 to extend parallel to beam 24. A pair of pins 118 are mounted on the part of arm 114 extending parallel to beam 24 and project through beam 24 and jaw 14. Pins 118 serve to strip a package from the jaw 14 as will hereinafter be described.

One form of package which may be sealed and joined by the apparatus in accordance with the invention is shown in FIGURES 9 to 12. This package is comprised of an envelope 120 and a cover or folder 122. Envelope 120 is preferably formed of sheet material, such as cellophane, or other material which is thermoplastic and can be softened by heat or has a fusible coating so that layers of the material can be fused or caused to adhere by the application of heat and pressure to form a seal.

The envelope 120 is sealed to form a plurality of pockets 124 containing tablets 126.

The cover 122 is folded around the envelope 120 to enclose and protect the same, as shown in FIGURE 10, before the package is inserted into the packaging apparatus. The cover 122 is preferably formed of a single strip of material, such as paper, stiffer than the envelope material and is folded at 128 around one end of the envelope 120. At this fold 128 the packaging apparatus secures the envelope 120 to the cover 122 by sealing and crimping as is indicated at 130 in FIGURES 11 and 12. It will be apparent that if smooth edges 62 and 64 are used, there will be no crimping action.

The operation of the packaging apparatus is best described by reference to FIGURES 5 to 8 which illustrate successive positions of the parts of the apparatus.

In FIGURE 5, the packaging apparatus is positioned to receive a package which is inserted through a slot 132 in a table 134 which is supported above the jaws 14 and 16 on members 133 and 135 secured to arms 20 and 22, respectively. The member 133 is shown in FIGURE 1. Slot 132 is positioned to guide a package between the jaws 14 and 16. A guide member 136 on table 134 longitudinally positions the package with respect to the jaws 14 and 16. The jaws 14 and 16 are in an open position by reason of the cam follower 74 riding on a low portion of cam 76. The plate 112 is positioned beneath the space between jaws 14 and 16 by reason of the cam follower 100 contacting a low portion of cam 102 which positions the frame 86 toward the left as viewed in FIGURE 5 under the action of spring 104. The plate 112 serves to properly position a package inserted between the jaws 14 and 16 and to prevent a package from passing between the jaws 14 and 16 without being sealed.

As shaft 78 rotates in a counterclockwise direction to the position shown in FIGURE 6, the frame 34 is moved to the right by cam 76 whereby jaw 16 is closer to jaw 14 but is still spaced therefrom. Cam 102 has also moved frame 86 to the right to a position in which the plate 112 just about intersects the vertical path between jaws 14 and 16 to support the package in the sealing position. The plate 112 will intersect the path between jaws 14 and 16 any time the jaws are spaced so that a package cannot be improperly inserted into the packaging apparatus.

FIGURE 7 illustrates the heat sealing and joining position of the packaging apparatus. In this position, the cam follower 74 rides on the high position of cam 76 to cause contact of the jaws 14 and 16 with a package. The cam 76 maintains the jaws 14 and 16 in this position for a time necessary to cause heat sealing of the package. The cam 76 is constructed to move the frame 34 to cause overriding movement of jaw 16 and compression of the springs 54 after the jaw 16 contacts the package to apply pressure to the package and the stationary jaw 14. It will thus be apparent that the springs 54 will determine the amount of pressure which is applied to the package during the heat sealing operation. During the overriding movement of the frame 34, the jaw 16 will slide on bolts 50 thereby compressing springs 54.

By this construction the same pressure will be applied to each of the packages and since the springs 54 are positioned along the length of jaw 16, a uniform pressure will be applied throughout the heat sealing area. Also, in the position of the packaging apparatus shown in FIGURE 7, cam follower 100 rides on the high portion of cam 102 whereby the frame 86 is moved to the extreme right position with the plate 112 clearing the vertical path between the jaws 14 and 16.

When the shaft 78 has rotated to the position shown in FIGURE 8, the plate 112 is maintained in the extreme right position and the cam follower 74 is dropped sharply to the low position of cam 76 whereby the frame 34 is moved to its extreme left position. This movement of frame 34 opens the jaws 14 and 16 to permit the package to drop downwardly from the jaws 14 and 16 against a baffle 138 which guides the package into a receiving chute 140. As frame 34 moves to the left from the heat sealing position, pins 118 project from jaw 14 to strip the package from the jaw 14. It will be noted that if the package tends to adhere to the moving jaw 16, it will contact the slotted portion of table 134 as the jaw 16 moves to the left and be stripped therefrom.

Since shaft 78 is rotated continuously by the motor 80, the jaw 16 will be continuously oscillated toward and away from the stationary jaw 14. Thus, one of the advantages of the apparatus is that a workman will not lose time holding the package in position while actuating a driving mechanism each time the package is inserted into the packaging apparatus. Instead, the workman need only insert an assembled package into the packaging apparatus and may immediately turn to the assembly of another package.

It is to be understood that although only one embodiment of this invention has been shown and described for purposes of illustration, the invention can be variously embodied and changes can be made in the construction and arrangement of parts without departing from the scope of the invention as defined by the appended claims.

What is claimed is:

1. A packaging apparatus comprising a pair of heat sealing jaws, means fixedly mounting one of said jaws, means moving the other of said jaws between an open position in which said moving jaw is spaced from said fixed jaw and a closed position in which said jaws are in heat sealing contact with a package positioned therebetween, said jaws being mounted substantially horizontally and having a vertical path extending therebetween when in said open position thereof, means mounting said moving jaw on said moving means including a resilient means biasing said moving jaw toward heat sealing relation with said fixed jaw when said moving jaw is in said closed position, and means for positioning a package between said jaws including a plate positioned horizontally beneath said jaws and means moving said plate between a position intersecting said vertical path for positioning a package and a position clearing said vertical path whereby a package may drop through said spaced jaws.

2. Apparatus as claimed in claim 1 comprising means for stripping an adhering package from said jaws after a sealing operation, said stripping means including a plurality of pins moving through said fixed jaw to project therefrom subsequent to a heat sealing operation.

3. Apparatus as claimed in claim 1 wherein said jaws have cooperating serrated faces and including means for heating said jaws.

4. A packaging apparatus comprising a pair of heat sealing jaws, means fixedly mounting one of said jaws, means moving the other of said jaws between an open position in which said moving jaw is spaced from said fixed jaw and a closed position in which said jaws are in heat sealing contact with a package positioned therebetween, means mounting said moving jaw on said moving means therefor including a resilient means applying a bias to said moving jaw and means for slidably supporting said moving jaw, said moving jaw being slidable on said support means against the bias of said resilient means upon said heat sealing contact of said jaws, said jaws being mounted substantially horizontally and having a vertical path extending therebetween when in said open position thereof, means for positioning a package between said jaws including a plate positioned horizontally beneath said jaws and means moving said plate between a position intersecting the vertical path between said jaws to thereby position a package and a position clearing

said vertical path whereby a package may drop through said spaced jaws after a sealing operation, and means for stripping a package which may adhere to said jaws after a sealing operation.

5. Apparatus as claimed in claim 4 including guide means comprising a plate having a slot therein positioned above said jaws in alignment with the space between said open jaws to guide a package into said space, said last-named plate stripping packages from said moving jaw upon movement thereof away from said closed position.

6. A packaging apparatus comprising a pair of heat sealing jaws, means fixedly mounting one of said jaws in a substantially horizontal position, a rotating cam, a movable frame having a cam follower riding on said cam, means supporting the other of said jaws on said movable frame, said cam actuating said cam follower to move said frame substantially horizontally between an open position in which said moving jaw is spaced from said fixed jaw and a closed position in which said jaws are in heat sealing contact with a package positioned therebetween, said supporting means including a resilient means applying a bias to said moving jaw and means for slidably supporting said moving jaw for movement relative to said frame, said moving jaw being slidable on said support means against the bias of said resilient means upon movement of said jaws to said closed position, a second movable frame, a plate carried by said second movable frame for positioning a package between said jaws, and means for reciprocating said second frame between a position in which said plate extends horizontally beneath said jaws to intersect the vertical path therebetween for positioning a package for sealing and a position clearing said vertical path whereby a sealed package may drop through said spaced jaws.

7. Apparatus as claimed in claim 6 wherein said means for reciprocating said second frame includes a rotating cam, and comprising a cam follower carried by said reciprocating frame and biased into contact with said last-named rotating cam.

8. Apparatus as claimed in claim 6 including means for stripping a package adhering to said fixed jaw, said stripping means being mounted on said movable frame supporting said moving jaw.

9. A packaging apparatus comprising a pair of heat sealing jaws, means moving said jaws between an open position in which said jaws are spaced from each other and a closed position in which said jaws are in heat sealing contact with a package positioned therebetween, said jaws being mounted to extend horizontally and having a vertical path extending therebetween when in said open position thereof, means mounting one of said jaws on said moving means including a resilient means biasing said one jaw toward heat sealing relation with the other of said jaws when said jaws are in said closed position, and means for positioning a package between said jaws including a plate positioned horizontally beneath said jaws and means moving said plate between a position intersecting said vertical path for positioning a package and a position clearing said vertical path whereby a package may drop through said spaced jaws.

References Cited in the file of this patent

UNITED STATES PATENTS

2,339,304	Von Haase	Jan. 18, 1944
2,591,935	Heigl	Apr. 8, 1952
2,613,489	Terry	Oct. 14, 1952
2,659,520	Reitzes	Nov. 17, 1953