

July 3, 1951

F. J. PANCRATZ

2,559,368

BAG FORMING AND SEALING MACHINE

Filed May 12, 1947

3 Sheets-Sheet 1

FIG. 1

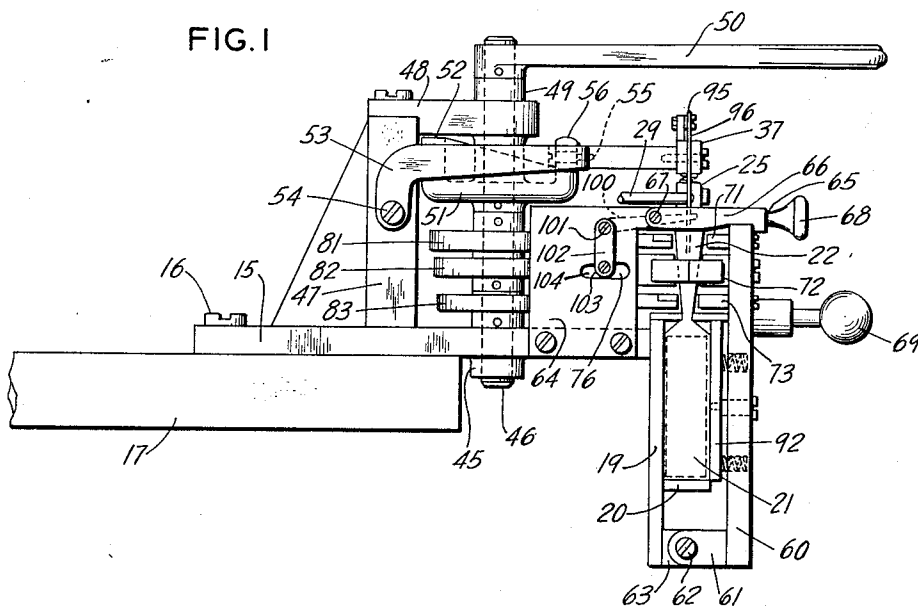
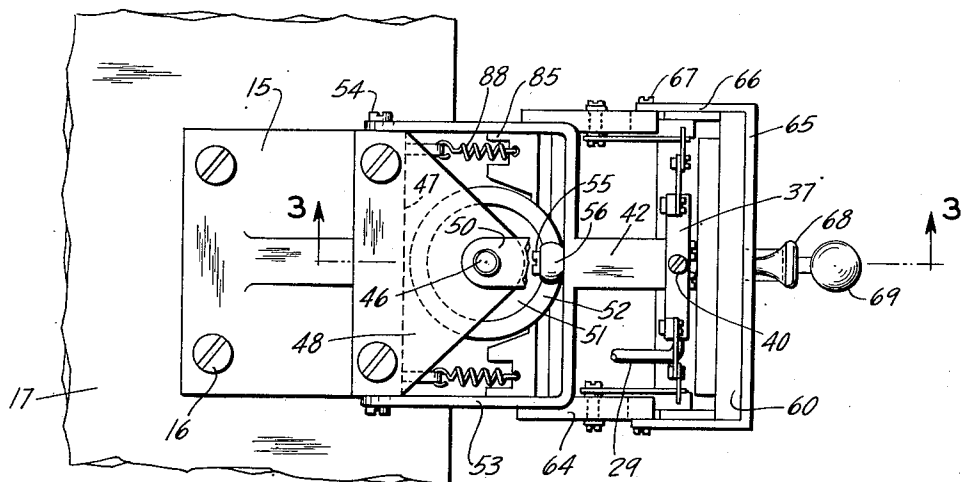


FIG. 2



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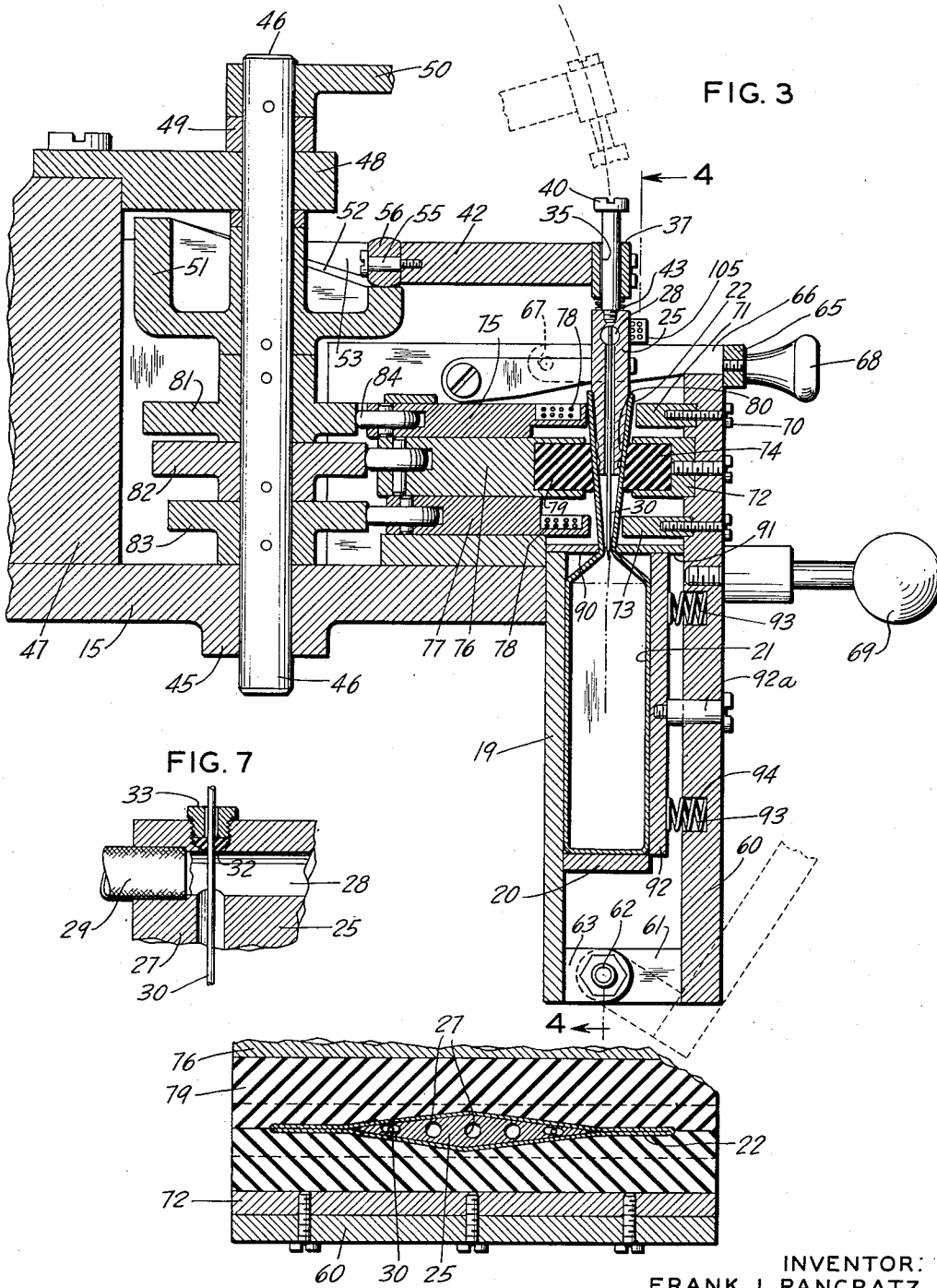
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3 Sheets-Sheet 3

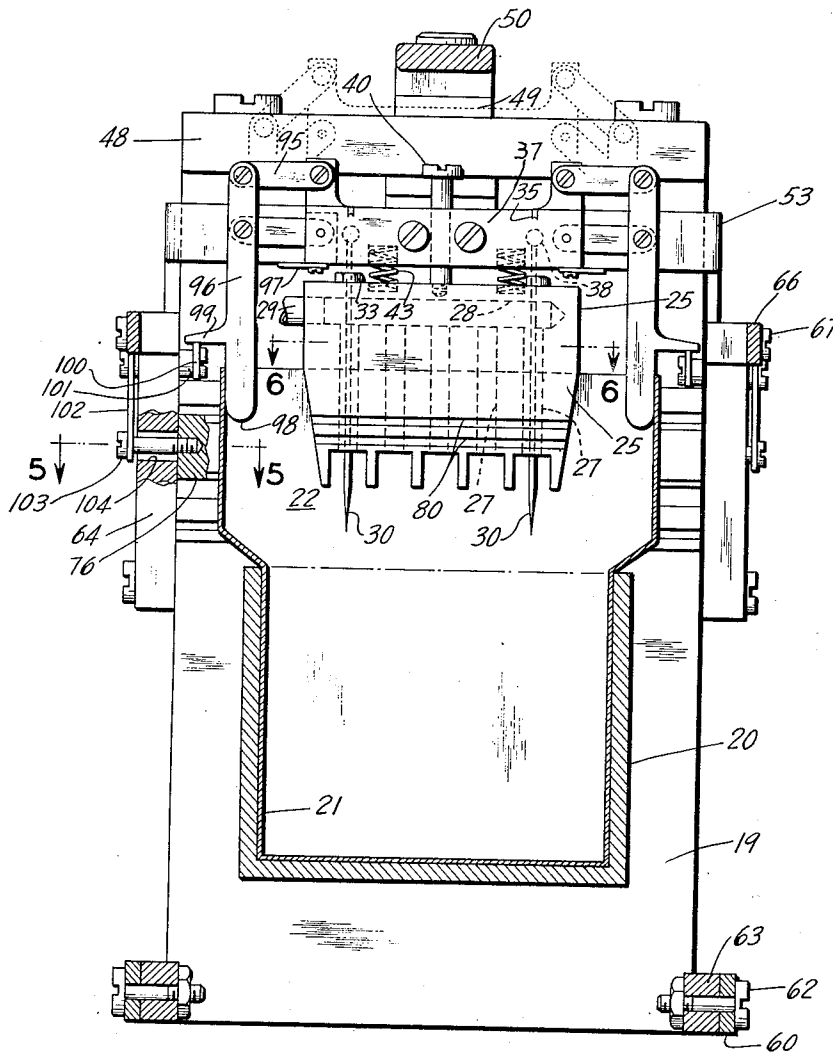


FIG. 4

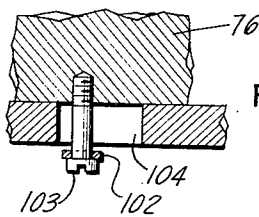


FIG. 5

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UNITED STATES PATENT OFFICE

2,559,368

BAG FORMING AND SEALING MACHINE

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Application May 12, 1947, Serial No. 747,459

12 Claims. (Cl. 226—56)

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My invention relates to bags in which groceries such as coffee, peas, raisins, etc. are packed, and more particularly to means for procuring a vacuum closure for such bags in order to preserve the contents thereof. Machines have been devised which accomplish this purpose, but such machines as have come to my attention are large and intricate and therefore expensive to build and maintain. It is therefore one object of the present invention to provide a machine which is compact and operable by hand or power means.

A further object is to design the novel machine with a minimum number of parts consistent with proper operation.

Another object is to include operative means in the novel machine which follow well established mechanical principles.

An important object is to provide a machine of the above character which is easy of access and simple to operate.

With the above objects in view, and any others which may suggest themselves from the description to follow, a better understanding of the invention may be had by reference to the accompanying drawings, in which—

Fig. 1 is a side elevation of the machine as designed for manual operation;

Fig. 2 is a top plan view;

Fig. 3 is an enlarged section on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged section on the line 6—6 of Fig. 4; and

Fig. 7 is an enlarged section of a detail which occurs in the upper left and right hand portions of Fig. 4.

In accordance with the foregoing, specific reference to the drawings indicates the base of the novel machine at 15. Figs. 1 and 2 show that the base can be secured by bolts 16 or other suitable means to a table 17 in a manner to project the greater portion of the machine into a space where the bags are handled. It is intended that such space accommodate the bags after they are filled, so that they may be taken one by one and inserted into the present machine for the vacuum closing operations.

Accordingly, the forward portion of the base 15 carries a pendent frame 19 on the forward side of which is mounted a rectangular forming box 20. As indicated in Fig. 4, this box is suitable for receiving the lower portion of a paper bag 21. This type of bag is made of heavy or double-ply wax paper; or, it may be made laminated of metal

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foil and treated paper. The form of the bag is standard, but for the present treatment its upper portion or mouth 22 is flattened so as to become considerably wider, as suggested in Fig. 4.

The mouth of the bag 22 is designed to receive a plunger 25 of wedge form, the plunger being of diamond shape in horizontal section, as indicated in Fig. 6, and thinned out to sharp edges at the sides, whereby to fit hermetically in the mouth of the bag when the latter is pressed to the flat form shown. The plunger is vertically bored with a series of passages 27, these communicating at their upper ends with a cross-duct 28 which opens at one end of the plunger. Here the duct may receive a hose 29 leading to a suitable vacuum unit (not shown). Thus, with the vacuum unit in operation, the air and vapor over and in the goods in the bag 21 may be drawn upwardly through the plunger 25, producing a partial vacuum in the bag.

Fig. 3 shows that the mouth of the bag converges in a downward direction, making it possible for the bag to close at its neck or narrowest portion while the evacuating operation is on. To counteract this tendency, a pair of separator rods 30 are disposed in the terminal passages 27, such rods passing through the upper portion of the plunger. Fig. 7 shows that each rod 30 passes through a rubber packing 32 over the duct 28, with a nut 33 threaded into the top of the plunger to tighten the packing around the rod. Each rod rises into a bore 35 of a cross-head 37 which is positioned above the plunger 25, set screws 38 from the front serving to secure the rods in the cross-head. As indicated in Figs. 3 and 4, the lower ends of the rods are pointed; and the rods are designed to become lowered into the mouth of the bag concurrently with the plunger, and crowded through the neck of the bag to insure the slight separation of its walls.

Dotted lines in Fig. 3 show the plunger 25 at the uppermost position of its travel. The plunger is carried by a vertical bolt 40 which rises freely through the cross-head 37. The latter is supported by an arm 42; and a pair of springs 43 are interposed between the cross-head and the plunger. The base 15 has a bearing 45 for the bottom portion of a vertical shaft 46; and a standard 47 is erected on the base 15 for the purpose of projecting a bearing 48 for the upper portion of the shaft 46. The latter receives a washer 49 over the bearing 48 and a crank handle 50 over the washer, so that the shaft is manually rotatable by means of the crank handle. The shaft 46 carries a cup-type cam 51 below the

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bearing 48, the edge 52 of the cam being oblique, as clearly indicated in Fig. 3. The arm 42 is extended outwardly with rearward branches 53 which terminate alongside the standard 47 to be pivoted to it as indicated at 54. The rear end of the arm 42 receives a screw 55 on which a roller 56 is freely journaled, the position of the roller being over the edge 52 of the cam 51 at the front. It is now apparent that the rotation of the shaft 46 through a half-turn will lower the assembly of the cross-head 37 and plunger 25 from the dotted line position in Fig. 3 to the full line position in the same figure.

A frontal closure is provided for the frame 19 in the form of a wall 60. The latter is extended back at the bottom with lugs 61 forming pivotal connections 62 with a pair of similar lugs 63 extending from the frame 19. Thus, the closure 60 may be opened by swinging the same from the full line position in Fig. 3 to the dotted line position in the same figure. The base 15 carries a pair of side walls 64. A latch-bar 65 is located in front of the closure 60 at the top, terminal arms 66 of the latch-bar extending rearwardly alongside the walls 64 to attach with pivotal connections 67 thereto. The latch-bar 65 is extended forwardly with a knob 68. When the forward portions of the arms 66 rest on the closure 60 as indicated in Fig. 3, the latch-bar 65 overhangs the closure in front, preventing the same from being opened. However, when the knob 68 is raised, the closure becomes released, and a handle 69 projecting from the front of the closure 60 may be used to draw the same open as previously explained.

The closure 60 has secured to it by means of screws 70 a vertical series of anvil bars 71, 72 and 73. The bars 71 and 73 are plain, but the bar 72 is fitted with a projecting rubber pad 74. The bars 71, 73 and the pad 74 are directed toward the frontal side of the bag mouth 22; and a set of companion bars 75, 76, and 77 are directed toward the bag from the rear, these serving as pressure bars. Thus, the bars 75 and 77 are plain, but fitted with electric heating units 78; while the bar 76 is fitted with a rubber pad 79 similar to the pad 74. It is noted that the contiguous faces of these pads are inclined similarly to the walls of the bag mouth. Also, the plunger 25 is formed with a series of horizontal grooves 80 substantially opposite the pads 74 and 79.

It is intended that the pad 79 advance toward the pad 74 when the plunger 25 is lodged in the mouth of the bag as shown in Fig. 3, whereby to firmly press such mouth into engagement with the plunger, the grooves 80 serving to corrugate the bag material under pressure and render the fit of the plunger tight. In such event, the vacuum draw from the bag will be more efficient. When this has been done, the crank handle is rotated to raise the cross-head 37 and the separator rods 30 out of the neck portion of the bag. Now the pressure bar 77 will advance in the direction of the anvil bar 73 and compress the mouth of the bag in the region above its neck, heating the bag material to the extent where it will become sealed. After this operation, the crank handle 50 is rotated to raise the plunger 25 out of the bag. Now the pressure bar 75 is designed to advance in the direction of the pressure bar 77 and tightly seal the mouth of the bag by pressure under heat.

Fig. 3 shows that the movement of the pressure bars 75, 76 and 77 is controlled by a series

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of cams 81, 82 and 83 fixedly mounted on the control shaft 46. The cams act through follower rollers 84 carried by the pressure bars; and Fig. 2 shows that these are slotted at 85 to allow clearance for springs 88 normally drawing the pressure bars toward the standard 47 in order to keep the follower rollers 84 in engagement with the cams 81, 82 and 83. It is understood that the arrangement of these cams will be such as to induce the operations of the pressure bars in properly timed relation to the raising and lowering of the separator rods 30 and the plunger 25.

It is understood that the deposit of the bag 21 into the machine occurs while the plunger 25 is in the fully raised position. Thus, the out-swung of the frontal closure 60 carries the anvil bars 71, 72 and 73 to a remote position, leaving ample room for the deposit of the bag into the forming box 20. The top of the same has a flange 90 directed toward the neck of the bag from the rear; and the closure 60 also carries a flange 91 companion to the flange 90 by being directed toward the neck of the bag from the front. The closure 60 also carries a pressure plate 92 by means of a slidable screw 92a, the plate being pressed in rearward direction by upper and lower springs 93 partly encased in cavities 94 made in the back side of the closure 60. Thus, on the application of the latter, the pressure plate 92 serves to hold the bag in place and press it into even shape.

It is desirable that the mouth of the bag be drawn flat between its side edges in order that it may closely line the plunger after the latter descends into the mouth of the bag. Ordinarily, the upper position of the plunger is such that its bottom end is slightly lower than the height of the bag. Therefore, when the bag is inserted into the machine, its mouth is trained with an upward turn to receive the bottom of the plunger before the bag is set down on the bottom of the forming box 20. Finely dotted lines in Fig. 3 show the upper position of the cross-head 37 and the plunger 25. Fig. 4 shows more clearly that a pair of outwardly directed links 95 extend from each side of the cross-head, each pair of links connecting with a vertical arm 96. Finely dotted lines in the same figure indicate that when the cross-head 37 is up, the links 95 are inclined and the arms 96 gathered until the lower links rest on brackets 97 extended from the bottom of the cross-head. The lower ends of the arms 96 are rounded, as indicated at 98, and leave ample clearance for the insertion of the bag. The arms 96 have outward fingers 99 resting on the inner arms 100 of bell cranks 101 journaled in the walls 64. Now, in the event that the plunger 25 is lowered, the stationary position of the fingers 99 on the arms 100 will force the arms 96 to separate to the positions shown by full lines in Fig. 4, causing the mouth of the bag to become stretched.

Since it is essential that the mouth of the bag be cleared when the pressure plate 75 and the anvil plate 71 act to seal the mouth of the bag, the arms 96 must be raised out of the bag to permit the action referred to. A simple mechanism for this purpose involves an outward extension 102 of each bell crank lever 101, such extension receiving a screw 103 through its lower end. The screw passes through an opening 104 in the wall 64 to thread into the pressure plate 76 as shown in Figs. 4 and 5. Thus, when the pressure plate advances, the bell crank lever 101

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is caused to rock in a counter-clockwise direction when viewed in Fig. 1, so that its arm 100 will raise the arm 96 clear of the bag. The plunger also carries a heating unit 105.

It will now be apparent that the novel machine procures the sequence of exhausting, pressing and sealing operations in respect to the mouth of the bag by means of a series of simple instrumentalities. These are all operated from a basic control shaft with a timing factor designed to harmonize the operations automatically as the crank handle 50 is turned. Thus, the bag is treated by machine methods which are easily controllable by hand. Further, the devices entering into the treatment of the bag are separable for quick access to any of them in case of adjustment or repair, and for open access to insert the bag. The frontal closure carries parts of the mechanism directly applicable to the bag, applying such parts and flattening pressure to the bag by the simple return of the closure to its normal position. All the factors entering in the mechanism are compactly grouped to render the machine small enough to be mounted as a unit or attachment on any table or support in the vicinity of the bag filling area. Finally, the machine accomplishes an efficient operation by means of relatively few and simple parts.

While I have described the invention along specific lines, various minor changes or refinements may be made therein without departing from its principle, and I reserve the right to employ all such changes and refinements as may come within the scope and spirit of the appended claims.

I claim:

1. Means for closing a paper bag whose mouth is formed with closely spaced walls joined by side folds, comprising a substantially flat plunger adapted to be lowered between said walls and spaced from said side folds, the plunger tapering to sharp edges at the sides, and means outside of said walls to press them against the plunger and against each other beyond said edges, whereby to constitute the plunger a hermetical closure for said mouth, wherein said walls converge in downward direction to form a neck for the bag, the plunger being tapered in downward direction to conform with the gather of said walls, a vertically-reciprocable support, and a series of rods depending from the latter and adapted to be lowered into said neck to separate the walls thereof on the downstroke of the support, said rods passing through the plunger.

2. Means for closing a paper bag whose mouth is formed with closely spaced walls joined by side folds, comprising a substantially flat plunger adapted to be lowered between said walls and spaced from said side folds, the plunger tapering to sharp edges at the sides, and means outside of said walls to press them against the plunger and against each other beyond said edges, whereby to constitute the plunger a hermetical closure for said mouth, wherein said walls converge in downward direction to form a neck for the bag, the plunger being tapered in downward direction to conform with the gather of said walls, a vertically-reciprocable support, the plunger being suspended from the support with allowance for lost upward motion, and a series of rods depending from the support and adapted to be lowered into said neck to separate the walls thereof on the downstroke of the support, said rods passing through the plunger, and the latter remaining in said mouth by virtue of said lost motion

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on the upstroke of said support, whereby to raise the rods out of said neck before the plunger is raised out of said mouth.

3. Means for closing a paper bag whose mouth is formed with closely spaced walls joined by side folds, comprising a substantially flat plunger adapted to be lowered between said walls and spaced from said side folds, the plunger tapering to sharp edges at the sides, and means outside of said walls to press them against the plunger and against each other beyond said edges, whereby to constitute the plunger a hermetical closure for said mouth, wherein said walls converge in downward direction to form a neck for the bag, the plunger being tapered in downward direction to conform with the gather of said walls, a vertically-reciprocable support, the plunger being suspended from the support with allowance for lost upward motion, a series of rods depending from the support and adapted to be lowered into said neck to separate the walls thereof on the downstroke of the support, said rods passing through the plunger, the latter remaining in said mouth by virtue of said lost motion on the upstroke of said support, whereby to raise the rods out of said neck before the plunger is raised out of said mouth, and yieldable means interposed between the support and the plunger.

4. Means for closing a paper bag whose mouth is formed with closely spaced walls joined by side folds, comprising a substantially flat plunger adapted to be lowered between said walls and spaced from said side folds, the plunger tapering to sharp edges at the sides, thin arms entering the mouth of the bag between the plunger and said folds, means separating said arms to fit in said folds and draw the mouth of the bag to maximum width, and means outside of said walls to press them against the plunger and against each other beyond said edges, whereby to constitute the plunger a hermetical closure for said mouth.

5. Means for closing a paper bag whose mouth is formed with closely spaced walls joined by side folds, comprising a substantially flat plunger adapted to be lowered between said walls and spaced from said side folds, the plunger tapering to sharp edges at the sides, thin arms entering the mouth of the bag between the plunger and said folds, means separating said arms to fit in said folds and draw the mouth of the bag to maximum width, means outside of said walls to press them against the plunger and against each other beyond said edges, whereby to constitute the plunger a hermetical closure for said mouth, and a connection between said plunger pressing means and said arm separating means to apply the latter before the plunger pressing means.

6. Means for drawing the mouth of a flexible bag having side folds to maximum width comprising a medial overhead support, auxiliary side supports, a pair of vertical arms near opposite sides of the medial support and depending into the mouth of the bag, said arms having outward branches resting on said side supports, inclined parallel links extending from the overhead support to the related arms, and means to lower said support and swing said links to horizontal positions, whereby to separate said arms with their branches sliding on the related side supports and cause the arms to engage said folds with pressure.

7. Means for exhausting and sealing a bag

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whose mouth has a fusible property and is formed with closely spaced walls, comprising a plunger designed to be partly advanced into said mouth to fit between said walls, the plunger having means to establish communication between the bag and an exhausting medium, first means for pressing the medial portions of said walls against the plunger to form a hermetical closure between the same and said portions preparatory to the exhausting action, heat-pressure means applicable to the inner portions of said walls after said action to seal such inner portions together, second means for releasing said first means, means for withdrawing the plunger from said mouth in such event, said pressing and heat-pressure means having grouped lateral extensions, a support for the latter, a rotatable shaft carried by the support crosswise of the extensions, and a series of cams carried by the shaft opposite the extensions and designed to operate the same as followers to apply said pressing and heat-pressure means as stated.

8. Mean for exhausting and sealing a bag whose mouth has a fusible property and is formed with closely spaced walls, comprising a plunger designed to be partly advanced into said mouth to fit between said walls, the plunger having means to establish communication between the bag and an exhausting medium, first means for pressing the medial portions of said walls against the plunger to form a hermetical closure between the same and said portions preparatory to the exhausting action, heat-pressure means applicable to the inner portions of said walls after said action to seal such inner portions together, second means for releasing said first means, means for withdrawing the plunger from said mouth in such event, wherein the bag is in upstanding position and the path of the plunger vertical, said means for withdrawing the plunger comprising a support, a vertical shaft rotatable in the same, a carrier for the plunger formed as a follower, and a cam carried by the shaft and effective on the partial rotation of the shaft to withdraw the plunger by raising said follower and carrier.

9. Means for exhausting and sealing a bag whose mouth has a fusible property and is formed with closely spaced walls, comprising a plunger designed to be partly advanced into said mouth to fit between said walls, the plunger having means to establish communication between the bag and an exhausting medium, first means for pressing the medial portions of said walls against the plunger to form a hermetical closure between the same and said portions preparatory to the exhausting action, heat-pressure means applica-

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ble to the inner portions of said walls after said action to seal such inner portions together, second means for releasing said first means, means for withdrawing the plunger from said mouth in such event, wherein the bag is in upstanding position and the path of the plunger vertical, said means for withdrawing the plunger comprising a support, a vertical shaft rotatable in the same, a carrier for the plunger formed as a follower, and a cam carried by the shaft and effective on the partial rotation of the shaft to withdraw the plunger by raising said follower and carrier, said cam being a ring-shaped member with its top end in an oblique plane, and said follower riding on said top end.

10. Means for exhausting and sealing a bag whose mouth has a fusible property and is formed with closely spaced walls, including a plunger adapted to be advanced into said mouth to fit between said walls, two series of cooperative elements applied from the exterior of said walls to press them against the plunger and seal the walls together in a prescribed order, a stationary support for the bag and the series of elements on one side of the bag, and a carrier for the series of elements on the other side thereof, said carrier being movable relative to the support to leave a clearance for the mounting of the bag on and the removal of the same from said support.

11. The structure of claim 10, said carrier being pivoted to the support at a point opposite the bottom of the bag to swing toward and from the related side of the bag.

12. The structure of claim 10, said carrier being pivoted to the support at a point opposite the bottom of the bag to swing toward and from the related side of the bag, the support having a flat backing for the opposite side of the bag, and yieldable pressure means mounted on the inner side of said carrier for pressing said related side of the bag flat to render the bag and its contents compact.

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