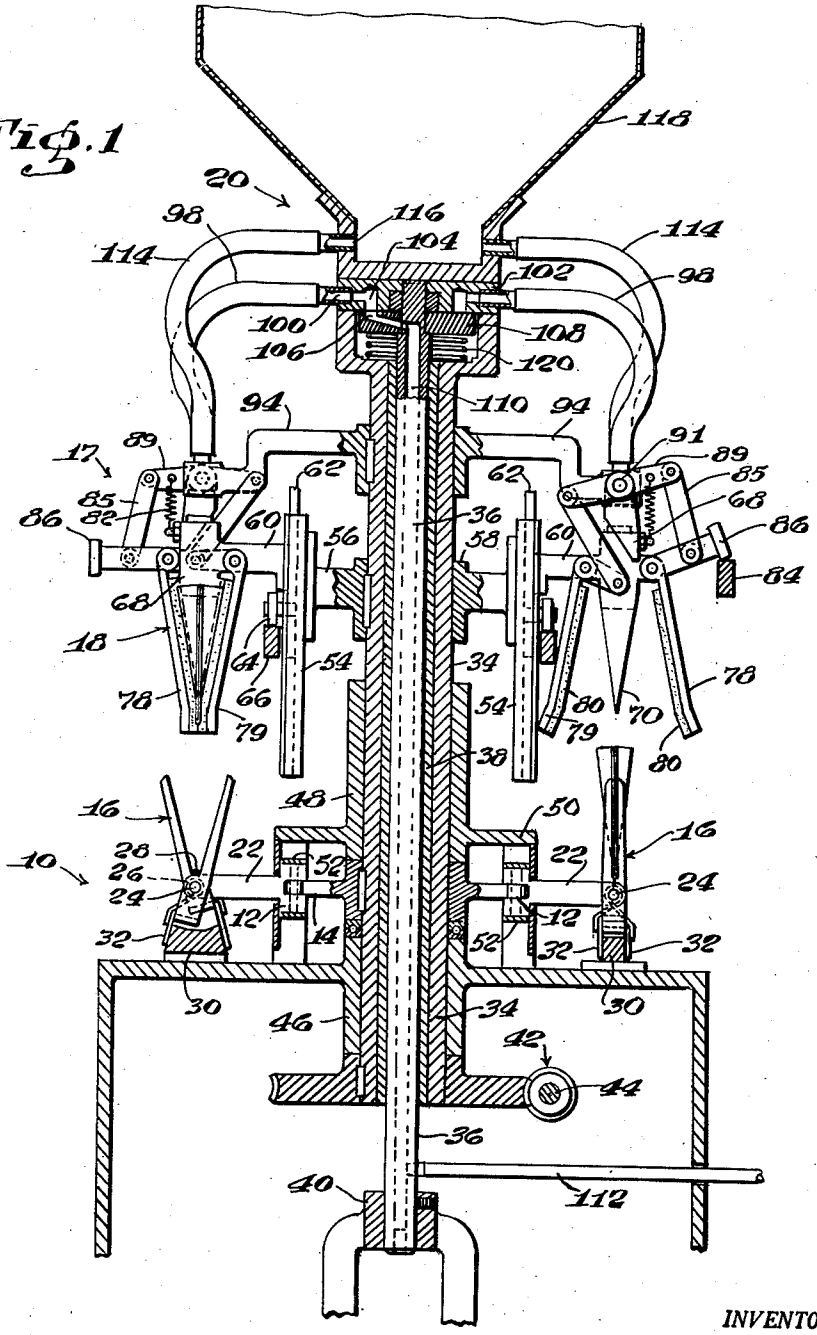
Oct. 30, 1956 A. L. BERGERON 2,768,655

VACUUM FILLING MACHINE

Filed Feb. 19, 1954 2 Sheets-Sheet 1

Fig. 1



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Filed Feb. 19, 1954 2 Sheets-Sheet 2

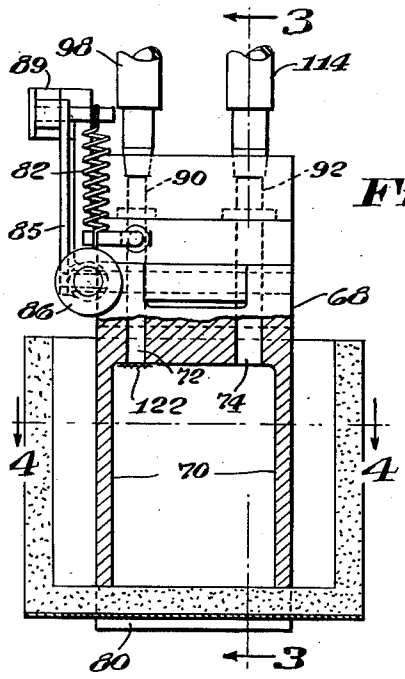


Fig. 2

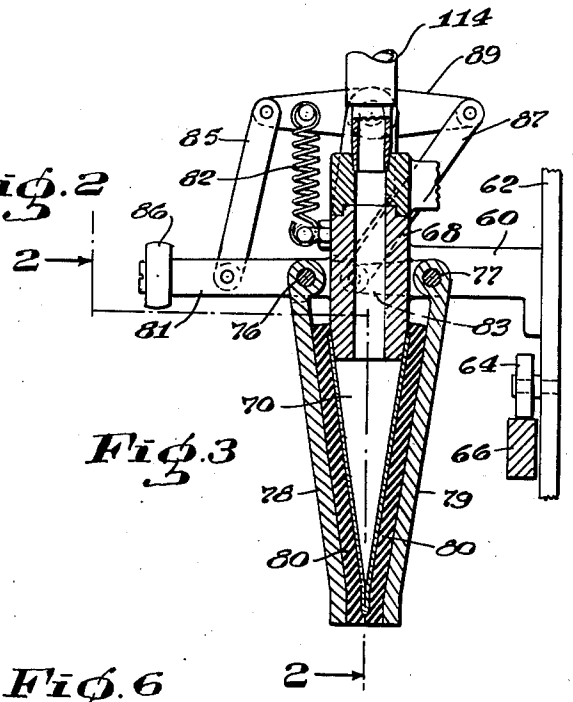


Fig. 3

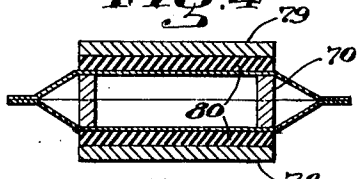


Fig. 4



Fig. 6

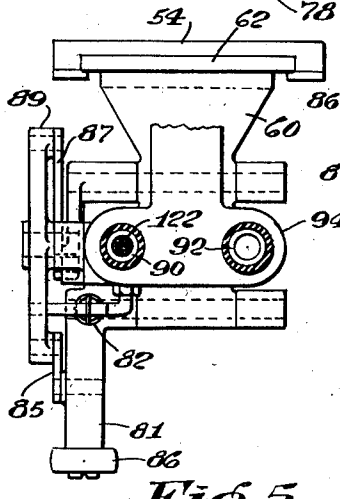
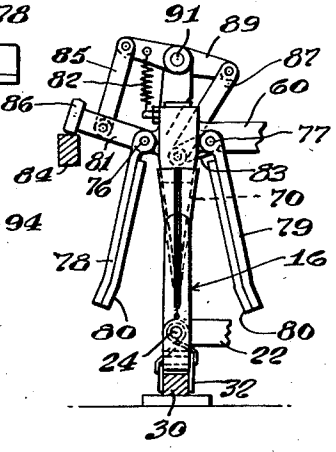


Fig. 5



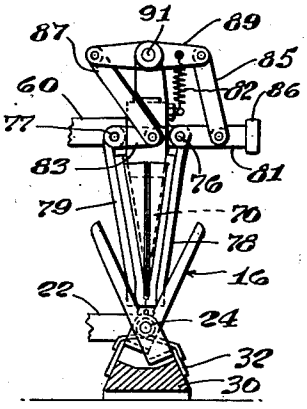


Fig. 7

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2,768,655

VACUUM FILLING MACHINE

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Application February 19, 1954, Serial No. 411,515

8 Claims. (Cl. 141—65)

This invention relates to a packaging machine and more particularly to a vacuum filling machine.

One object of the invention is to provide a novel and improved vacuum filling machine which is particularly adapted to fill flexible containers, such as cartons, bags or the like, with finely comminuted solid materials in a rapid, practical and efficient manner.

Another object of the invention is to provide a vacuum filling machine having novel and improved means for supporting a flat, flexible container in operative relation to vacuum filling mechanism in a simple and practical manner such as to avoid any stress on the flexible material during the vacuum filling operation.

With these general objects in view and such others as may hereinafter appear, the present invention consists in the filling machine and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiments of the present invention:

Fig. 1 is a vertical sectional view of a vacuum filling machine embodying the present invention;

Fig. 2 is a front elevation partly in cross section of a bag holding pocket as seen from the line 2—2 of Fig. 3;

Fig. 3 is a cross-sectional view of the pocket taken on the line 3—3 of Fig. 2;

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a plan view of the present bag holding pocket;

Fig. 6 is a side elevation showing the pocket in its open position in engagement with a bag supported by grippers; and

Fig. 7 is a similar view showing the pocket closed on the bag and the grippers opened.

In general the invention comprises a novel and improved filling machine which is particularly adapted to rapidly and efficiently fill successive relatively flat, flexible containers with a quantity of comminuted flowable solid material, such as flour, powdered gelatin or the like. In its preferred form the present invention contemplates apparatus having a filling head provided with a suction opening connected to a source of vacuum and a material inlet opening connected to a supply hopper filled with finely comminuted material to withdraw the same from the hopper and fill said container after the latter is evacuated. In the illustrated embodiment of the invention an endless chain gripper conveyer is provided for conveying to the filling mechanism successive formed containers which are open at the top. In the operation of the machine provision is made for removing successive containers from the conveyer and elevating them to a filling position in communication with the filling head. The filled containers may then be lowered by the elevating means onto the carrier and advanced to top sealing mechanism to complete the production of the filled and sealed bags.

In accordance with the present invention novel provision is made for supporting a relatively fragile flexible

container, such as a flat bag open at the top, in operative relation to the vacuum filling mechanism in a manner such as to avoid collapse of the bag during evacuation and filling thereof. In the illustrated embodiment of the invention the container supporting means comprises a holder or pocket having a relatively stationary central hollow wedge shaped portion provided at its upper end with a suction opening and a material supply opening, two sides of the central hollow portion being open. Two hinged backing members provided with resilient facings are arranged to cooperate with the open sides of the hollow portion to form an airtight seal. In practice the two side walls of the flat bag are clamped in airtight relation between the open sides of the central hollow portion and the hinged backing members to form in effect a pocket. Thus, in operation when the suction and filling openings of the holder are connected to the vacuum filling means a predetermined charge of the commodity is formed in the pocket defined by the central hollow portion and the two side walls of the flat bag clamped thereagainst so that when the hinged portions are subsequently rocked to open the pocket, the holder may be withdrawn from the bag to leave the charge confined between the two side walls of the bag.

In practice the bags may be preformed and placed over the hollow portion of the holder to be clamped thereto, or preferably the bags may be formed directly on the hollow portion of the holder in a bag forming and filling machine of the type illustrated and described in the United States patents to V. G. Williams, Nos. 2,351,382 and 2,556,382. As illustrated in such patents, the machine is provided with an upper carrier for conveying the hollow material supply members and a lower carrier provided with bag supporting grippers. In the operation of such prior machines a web of bag forming material is drawn from a roll thereof through the open grippers and folded longitudinally in the form of a V to receive the material supply members lowered therebetween and which also serve as bag formers. The grippers are closed on the bag forming material about the forming members, and the web may then be sealed at transverse intervals between successive grippers whereupon the web may be severed transversely through the sealed portions to form individual flat bags open at the top and carried by the grippers. In the illustrated embodiment of the present invention the forming members may comprise the hollow portions of the charge forming pockets, and after formation of the bags the pockets may be closed upon both side walls of the bag as described. The grippers may then be opened and the bags elevated out of the grippers and presented to the vacuum filling mechanism. Thereafter the pockets may again be lowered to present the bags to the grippers to be conveyed to top sealing mechanism and discharged from the machine.

Referring now to the drawings and particularly to Fig. 1, the invention is herein illustrated as embodied in a bag forming and filling machine wherein 10 represents a lower carrier comprising an endless chain conveyer 12 arranged to run over a sprocket 14 and which is provided with a plurality of spaced grippers 16 arranged to support and convey the formed bags, and 17 represents an upper carrier provided with bag holders or charge forming pockets 18 to which the bags may be transferred or about which the bags may be formed. The bag holders 18 are mounted to be elevated to remove the formed bags from the grippers 16 and to present them in operative relation to the vacuum filling mechanism, indicated generally at 20, to receive a charge of the commodity being packaged whereupon the holder is lowered to gain present the bag between the jaws of a gripper being moved along in alignment with the holder.

Projecting from the chain 12 are a plurality of arms 22 on which the grippers are pivotally mounted, each gripper unit 16 comprising U-shaped fingers mounted on a pivot pin 24 which extends through the end of arm 22 and which are adapted to swing on the pivot pin so as to bring the opposed fingers together and clamp the bag between them. A coil spring 26 passes around pivot pin 24 and engages cross pieces formed at the lower ends of the fingers tending to force them together. A pin 28 mounted on arm 22 extends axially of the pin 24 between the fingers and acts as a stop to hold them in vertical position when closed. The grippers 16 are arranged to slide on a bar on track 30 which cooperates with lugs 32 extending downwardly from the cross pieces of the U-shaped fingers. The track 30 is widened at selected points to urge the lugs outwardly and effect opening of the grippers, and the track is narrowed at other points to permit the gripper fingers to close under the influence of the spring 26 to grip the bag along the marginal side edges thereof.

As herein shown, the sprocket 14 may be keyed to a hollow shaft 34 rotatably mounted on a central stationary shaft 36 and provided with a sleeve bushing 38. The shaft 36 is supported at its lower end in a hub member 40 forming a part of the machine frame, and the hollow shaft 34 may be rotated through a worm gear drive 42 from the main drive shaft 44 of the bag forming and filling machine. The hollow shaft 34 may be rotatably supported at its lower end in a hub member 46 forming a part of the machine frame and is further supported in an upstanding hub 48 formed in a bracket 50 attached to the machine frame. The bracket 50 is also arranged to support guide rails 52 in which the carrier chain 12 is guided.

The bag holders or charge forming pockets 18 are supported for vertical reciprocation in a slide bracket 54 attached to arms 56 of a spider 58 keyed to and rotatable with the hollow shaft 34. Each pocket 18 is connected by an arm 60 to a slide member 62 slidingly mounted in the bracket 54, and each slide member is provided with a roller 64 which cooperates with a stationary cam rail 66 to effect reciprocation of the bag holders during the continuous movement thereof from a lowered position in operative relation to the grippers 16 to an elevated position in operative engagement with the vacuum filling mechanism 20.

As herein illustrated, each bag holding unit 18 comprises a relatively stationary central member 68 having a head portion provided with a suction opening 72 and a material inlet opening 74, the lower portion of the central member comprising a wedge or V-shaped hollow portion 70 open on two sides. In other words, the hollow portion is entirely open between two V-shaped end walls depending from the underside of the head portion. The central member 68 is formed integrally with the arm 60, and two hinged backing members 78, 79 provided with rubber or like resilient facings 80 are arranged to cooperate with the open sides of the hollow portion 70 to form an airtight seal therewith. The hinged backing members may be pivotally mounted on pins 76, 77 carried by the arm 60. In operation both walls of the flat bag are clamped between the central hollow portion 70 and the resiliently faced backing members 78, 79, as shown, to support the bag in airtight relation to said hollow portion. The hinged portions 78, 79 are arranged to be rocked into and out of airtight engagement with the central portion through parallel linkage including arms 81, 83 fast on pins 76, 77 respectively and connected by links 85, 87 to the outer ends of a two-armed lever 89 pivotally mounted at 91 in the stationary portion of the holder. A spring 82 connected between one arm of the lever 89 and the stationary portion serves to urge the hinged backing members into sealing engagement with the hollow portion, and the hinged members are arranged to be opened by a cam rail 84 cooperating with a roller 86 carried by the arm 81 extended from the hinged member 78.

The suction material inlet openings 72, 74 are arranged to be elevated into airtight relation with corresponding openings 90, 92 formed in arms 94 of a bracket 96 keyed to and rotatable with the hollow shaft 34. The suction opening 90 is connected by a flexible hose 98 to a port 100 formed in a suction head 102 mounted for rotation with the hollow shaft 34. Each port 100 communicates with an opening 104 which is arranged to communicate with an elongated port 106 formed in a stationary valve member 108 fast on the upper end of the central supporting shaft 36, the port 106 being in communication with a central pasageway 110 formed in the shaft 36 which may be connected to a source of suction by a pipe 112. The material opening 92 formed in each arm 94 is connected by a flexible hose 114 to one of a plurality of outlets 116 formed in the lower end of a material supply hopper 118 containing a supply of the commodity being packaged.

As illustrated in Fig. 1, the suction head 102 is mounted on the upper end of an enlarged diameter portion of the hollow shaft 34, and the stationary valve member 108 is maintained in airtight relation with the underside of the suction head 102 by a coil spring 120.

From the description thus far it will be seen that in the operation of the machine the bags carried by the grippers 16 and formed on or otherwise placed on the hollow portion 70 of the pockets may be clamped in the pocket by closing of the hinged members against the open sides of the central hollow portion of the pocket, and upon opening of the gripper fingers the pocket may be elevated with the bag into operative relation to the filling mechanism, the suction and material inlet openings 72, 74 engaging the openings 90, 92 in airtight relation. Thereafter, as successive ports 100 come into alignment with the stationary port 106 the bag is evacuated, and the material is withdrawn from the supply hopper to form a charge in the pocket defined by the hollow portion 70 and the two side walls of the bag clamped thereagainst. In practice a fine mesh filter screen 122 may be provided for the suction opening 72 to prevent the material from being drawn from the pocket into the suction lines. After the charge is formed, the suction is cut off as the port 100 leaves the elongated port 106, and the pocket may then be again lowered to present the bag between the fingers of the open grippers 16, as shown in Fig. 7, whereupon the gripper fingers may be closed on the marginal side edges of the bag. The hinged backing members of the pocket may then be rocked to an open position and the pocket elevated out of the bag, leaving the charge of material deposited between the side walls thereof. The bag may then be conveyed to top sealing mechanism for sealing the open top of the bag whereupon the bags are discharged from the machine.

From the above description it will be seen that the present invention provides novel and improved apparatus for rapidly and efficiently filling successive flexible, flat and relatively fragile containers by vacuum filling wherein novel provision is made for supporting such containers in airtight relation to the vacuum filling mechanism and in a manner such as to avoid collapse of the container when subjected to vacuum to evacuate the same and to form a charge of the commodity within the container.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a container filling machine for vacuum filling flat, flexible bags, in combination, vacuum filling means, and means for supporting a flat bag in operative relation to said filling means comprising a holder including a hollow member open on two sides and arranged to support a bag thereabout with the side walls of the bag extend-

ing across and enclosing said open sides, and means cooperating with said open sides for clamping the two side walls of the bag in airtight relation to said hollow portion to permit evacuation and filling thereof, the material being deposited between the side walls of the bag upon release of said side walls and removal of the holder from the bag.

2. In a container filling machine for vacuum filling flat, flexible bags, in combination, vacuum filling means, and means for supporting a flat bag in operative relation to said filling means comprising a holder including a hollow member open on two sides and arranged to support a bag thereabout with the side walls of the bag extending across and enclosing said open sides, and means cooperating with said open sides for clamping the two side walls of the bag in airtight relation to said hollow portion to permit evacuation and filling thereof, the material being deposited between the side walls of the bag upon release of said side walls and removal of the holder from the bag, said hollow member being wedge shaped and having a head portion provided with a suction opening and a material inlet opening for cooperation with said vacuum filling means.

3. In a machine of the character described, in combination, vacuum filling means, and means for supporting a flat, flexible bag in operative relation to said filling means comprising a holder including a hollow charge forming member open on two sides and adapted to be inserted within the side walls of a bag to be filled with the side walls of the bag extending across and enclosing said open sides, and a pair of hinged backing members cooperating with said open sides arranged to clamp the side walls of the flat bag in airtight relation to said hollow portion to permit operation of said filling means to form a charge of material in the pocket defined by said hollow portion and the two side walls of the bag, the charge being deposited between the side walls of the bag upon release of the same and withdrawal of the hollow portion from the bag.

4. In a machine of the character described, in combination, vacuum filling means having a suction opening adapted for connection to a source of suction and a material inlet opening adapted for connection to a supply of the material, and means for supporting a flat, flexible bag in operative relation to said filling means comprising a holder having corresponding suction and material openings for cooperation with said first-named openings and including a hollow charge forming member open on two sides and adapted to be inserted between the side walls of a bag to be filled with the side walls of the bag extending across and enclosing said open sides, and a pair of hinged backing members having resilient facings cooperating with said open sides and arranged to clamp the two side walls of the bag in airtight relation to said hollow portion to permit operation of said filling means to form a charge of material in the pocket defined by said hollow portion and said two side walls of the bag, the charge being deposited between the side walls of the bag upon release of the same and withdrawal of the hollow portion from the bag.

5. In a machine of the character described, in combination, vacuum filling means having a suction opening adapted for connection to a source of suction and a material inlet opening adapted for connection to a supply of the material, and vertically reciprocable means for supporting a flat, flexible bag in operative relation to said filling means comprising a relatively stationary folder having a head portion provided with corresponding suction and material openings for cooperation with said first-named openings and including a hollow charge forming member open on two sides and adapted to be inserted between the side walls of a bag to be filled with the side walls of the bag extending across and enclosing said open sides, a pair of hinged backing members having resilient facings, means for rocking said backing members into engagement with said hollow portion to clamp the side walls of the bag in airtight relation to the open sides of said hollow portion to permit operation of said filling means to form a charge of material in the pocket defined by said hollow portion and said two side walls of the bag, the charge being deposited between the side walls of the bag upon release of the same and withdrawal of the holder from the bag, and means for reciprocating said holder into and out of operative engagement with said filling means.

6. In a machine of the character described, in combination, vacuum filling means, a conveyer for supporting flat, flexible bags, and a vertically reciprocable bag holder for elevating a flat bag from the conveyor and into operative relation to said filling means, said holder comprising a central relatively stationary hollow portion open on two sides and arranged to support a bag thereabout with the side walls of the bag extending across and enclosing said open sides, and a pair of hinged and resiliently faced backing members, means for rocking the hinged backing members into engagement with said hollow portion to clamp the side walls of the bag into airtight relation with said open sides of the hollow portion to permit evacuation and filling thereof by said filling means, said reciprocable holder being subsequently lowered to return the bag to the conveyer and to deposit the material between the side walls of the bag upon rocking of the hinged members to release the bag and elevation of the holder to withdraw the same from the bag.

7. A vacuum filling machine as defined in claim 6 wherein the vacuum filling means and the vertically reciprocable bag holders are continuously rotated and the conveyer is continuously moved in timed relation thereto, said conveyer being provided with a plurality of bag supporting grippers, and means for opening and closing the grippers to release a bag to be filled and to grip a filled bag presented thereto by said holder.

8. In a vacuum filling machine of the character described, in combination, vacuum filling means, and means for supporting a flat, flexible bag in operative relation to said filling means comprising a relatively stationary hollow member having a suction opening and a material inlet at its upper end for cooperation with the filling means, the lower end thereof being defined by wedge shaped end walls and open on two sides and adapted to be inserted between the side walls of a flat bag to be filled with the side walls of the bag extending across and enclosing said open sides, and a pair of pivotally mounted and resiliently faced backing members cooperating with said hollow member to clamp the side walls of the bag in airtight relation to the open sides of said holder to permit evacuation and filling thereof by said vacuum filling means.

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