

June 17, 1952

H. C. HOPP

2,601,020

APPARATUS FOR PACKAGING MATERIALS

Filed Jan. 27, 1949

3 Sheets-Sheet 1

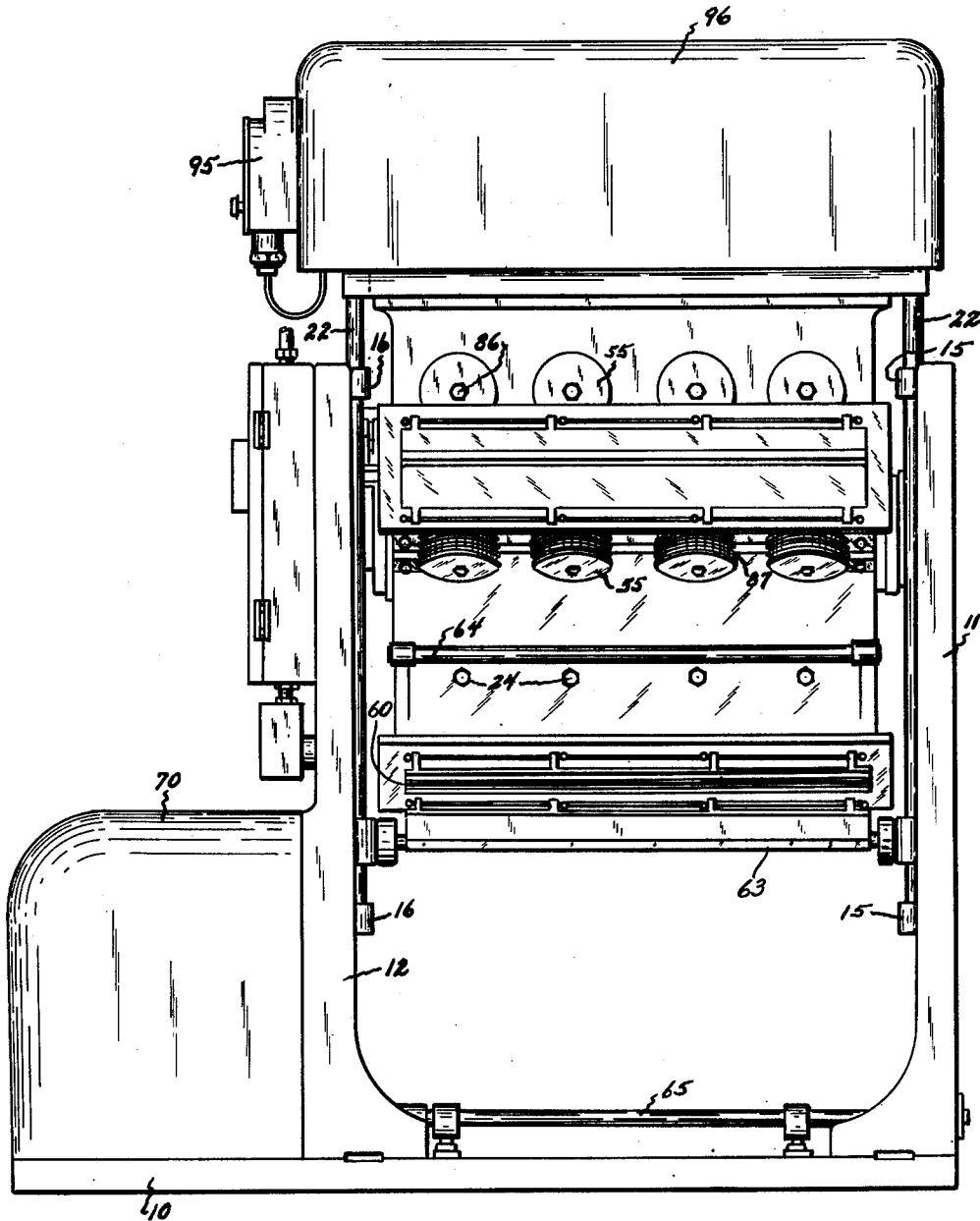


Fig. 1.

INVENTOR.
HAROLD C. HOPP.
BY
Joseph B. Lindecker.
ATT'Y.

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3 Sheets-Sheet 2

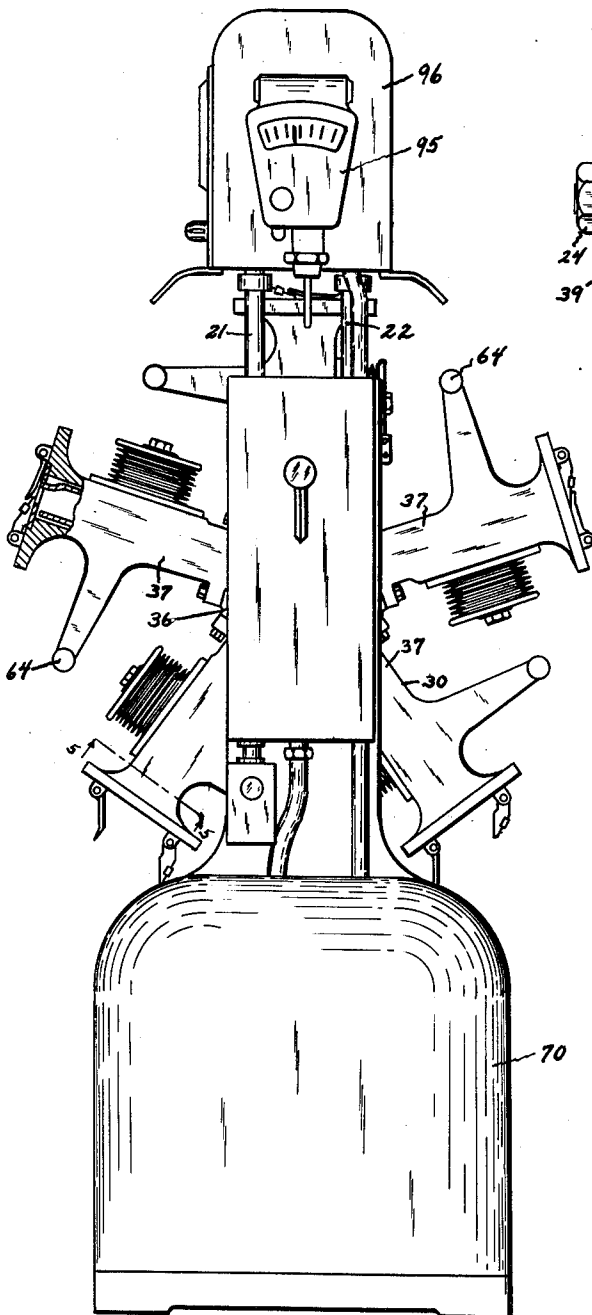


Fig. 2.

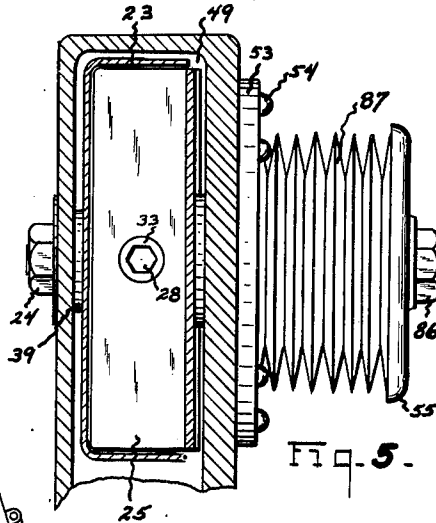


Fig. 5.

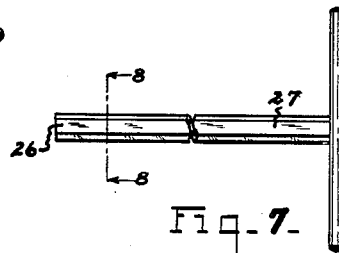


Fig. 7.

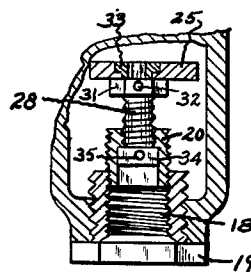


Fig. 6.

Fig. 8.



INVENTOR.
HAROLD C. HOPP.
BY
Joseph B. Lindecker.
ATTY.

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H. C. HOPP

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3 Sheets-Sheet 3

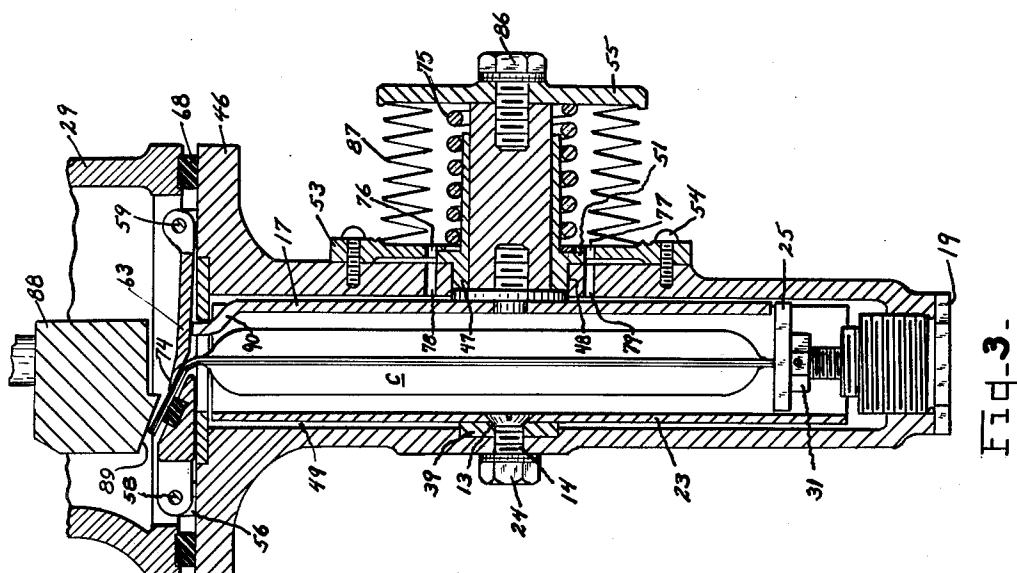


Fig. 3 -

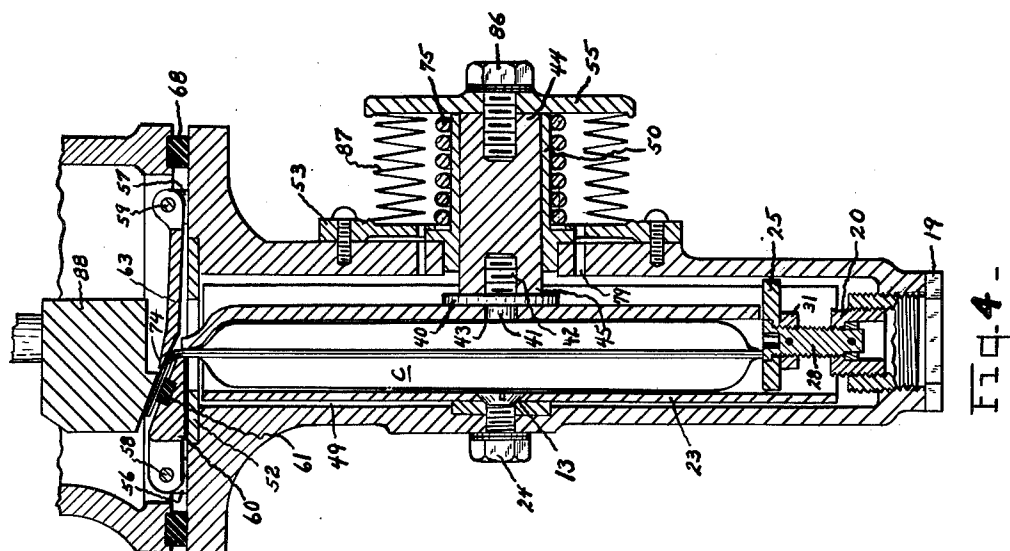


Fig. 4 -

INVENTOR.
HAROLD C. HOPP.
BY
Joseph B. Lindecker.
ATT'Y.

UNITED STATES PATENT OFFICE

2,601,020

APPARATUS FOR PACKAGING MATERIALS

Harold C. Hopp, Des Plaines, Ill., assignor to
Standard Cap and Seal Corporation, Chicago,
Ill., a corporation of Virginia

Application January 27, 1949, Serial No. 73,127

15 Claims. (Cl. 226—56)

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This invention relates to apparatus for packaging materials and more especially to a means for packaging food stuffs and the like whereby the same are incased in hermetically sealed envelopes or containers.

The invention embraces a means for inclosing food stuffs or similar materials in an envelope or container and subjecting the filled container internally to a source of subatmospheric pressure, and externally to a source of pressure, and subsequently sealing the envelope or container to maintain a subatmospheric pressure therein.

The present invention is an improvement over the mechanism for impressing subatmospheric pressure upon filled containers of flexible material and thereafter sealing the same, the latter being fully disclosed in copending application, Serial No. 750,417, filed May 26, 1947, now Patent No. 2,515,833 of July 18, 1950; therefore for the purpose of describing the present invention, only its essential and new parts are illustrated and described.

More specifically stated, the present invention relates to the adaptation of a machine for impressing subatmospheric pressure internally and positive pressure externally upon filled containers of flexible material and thereafter sealing the same, the containers being carried in chambers formed in a relatively movable magazine having several sections, and in which the arrangement is provided with mechanism brought into operation by movement of the magazine to bring a section into operative sealing position for automatically initiating the operation of a container vacuumizing and sealing cycle, and further residing in the added provision of means for contacting the filled containers carried in the chambers to apply pressure to said container to expel substantially all the air therein as the subatmospheric is applied to said chambers.

Another object of the invention resides in the provision of means that is rendered effective by the vacuum applied to a chamber to prevent the container therein from expanding and causing the formation of wrinkles in the sealing area of said container.

Still another object of the invention is the provision of a magazine section for a container vacuumizing and sealing machine provided with chambers, each chamber adapted to accommodate a stationary side wall, a movable side wall, and a movable bottom plate in order to adapt the mechanism for operation upon filled containers of various sizes and shapes, said movable wall being connected to a collapsible bellows

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arranged outside the chamber, said bellows assembled to contract when a vacuum is drawn within the chamber and within the bellows itself.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawing of a form of the invention, which may be preferred, in which:

Figure 1 is a vertical longitudinal elevational view of the apparatus for vacuumizing and sealing filled containers;

Figure 2 is an end elevational view of the machine shown in Figure 1 with a portion of one chamber shown in section;

Figure 3 is a vertical sectional view of a container sealing compartment, with a filled container therein and with bellows extended, a portion of the vacuum head and the sealing bar shown in cooperative position;

Figure 4 is a vertical sectional view similar to Figure 3 with the bellows in contracted position, and the sealing bar in sealing position;

Figure 5 is a horizontal detail sectional view taken substantially on line 5—5 of Figure 2;

Figure 6 is a vertical detail sectional view showing means for raising and lowering of the movable bottom plate in a chamber;

Figure 7 is a fragmentary view of a hexagonal type socket wrench for use in raising and lowering the movable bottom plate in each compartment;

Figure 8 is a sectional view taken substantially on line 8—8 of Figure 7.

While I have illustrated the apparatus of my invention as utilized for vacuumizing and sealing flexible containers adapted to contain food stuffs and the like, it is to be understood that I contemplate the use of the method and apparatus of my invention wherever the same may be found to have utility.

Referring to the drawings in detail and particularly with respect to Figures 1 and 2, the apparatus is inclusive of a base plate 10 upon which is mounted upright frame members 11 and 12, the uprights being secured to the base plate 10 by means of bolts. The frame member 11 is formed with pairs of laterally spaced bosses 15, and the frame 12 is similarly formed with pairs of laterally spaced bosses 16. The

pairs of bosses 15 and 16 are formed with vertical bores adapted to slidably receive pairs of vertical rods or shafts 21 and 22. The upper extremities of the rods 21 and 22 are secured to a bridge member extending between the pairs of rods. Slidably mounted upon the rods 21 and 22 is a head structure 29 which contains a hollow chamber adapted to be connected with vacuum producing means, said chamber also containing a thermo-sealing means 88 provided with a surface 89 which is angularly disposed with respect to the horizontal.

The arrangement of my invention is inclusive of a means or magazine 30 adapted to contain a plurality of filled containers upon which vacuumizing and sealing operations are to be performed. In the embodiment illustrated, the magazine 30 is inclusive of a plurality of sections 37 which are arranged for successive movement into container vacuumizing and sealing position. Said sections 37 are mounted upon two hub members 36 of polygonal shape and having facets equal to the number of magazine sections 37. In the embodiment illustrated there are five magazine sections so that the hub members 36 are each formed with five sections supporting facets; said members 36 being mounted upon a single horizontal shaft mounted in bearing members provided in the frame members 11 and 12.

Each magazine section is formed at its upper portion with a laterally extending flange 46 which is adapted to be engaged by a rubber gasket 68 carried by the head 29 in a manner and for a purpose to be hereinafter explained; and explained in said depending application. Each magazine section 37 is formed with a plurality of chambers 49 which are adapted to individually receive a channel member forming stationary side and end walls, a plate forming a movable side wall, and a plate to form a movable bottom member. In the embodiment illustrated there is a U-shaped channel member 23 provided with an opening 13, through which a flat head screw 14 is inserted. Said screw 14 is arranged to extend through an opening in the rear side wall of the chamber 49, whereby a lock nut 24 will hold said U-shaped member 23 rigidly in place. Said member 23 is held at any desired distance from the inside wall of chamber 49 by use of a plate spacer 39. The movable bottom plate 25 is raised and lowered by inserting the bottom end 26 of a wrench 27 into the opening of a female type adjusting screw 29. Said screw 28 has a collar 31 fixedly secured thereto by pin 32 to hold said plate 25 against the upset end portion 33 of said screw 28. The lower end of said screw 28 has a collar 34 secured thereto by pin 35 to limit the vertical travel of screw 28 within a screw-bushing member 20. The bushing member 20 can be raised or lowered within the plug-screw 19, if so desired, to give additional movement to the screw 28 and plate 25, since the bore 18 in plug 19 is provided with female threads to match the male threads upon the bushing member 20.

The movable wall 17, clearly shown in Figures 3 and 4, is secured to a stud-screw 40 by welding the enlarged portion of the stud-screw to said wall 17. One end of said screw 40 is formed with a guide pin 41 to fit within a bore 43 formed in the wall 17; the opposite end of said screw 40 is provided with threads 42. The threaded end of screw 40 is secured to the shaft 44 so that the enlarged portion of said screw 40 will contact one end 45 of said cylindrical shaft 44. Shaft 44 slides horizontally within a bearing 50, said bear-

ing being formed with a vertical shoulder 51, which contacts the outer side wall of chamber 49. The inner end 47 of said bearing is assembled to extend within a bore 48 provided within the side wall of chamber 49. Said bearing 50 is pressed into tight engagement with the outer wall of said chamber 49 by a bellows bracket 53 which is itself secured to the outer wall of said chamber 49 by cap screws 54. Upon the opposite ends of shaft 44 is secured a bellows top flange 55 by means of bellows cap screw 86. A metal bellows 87 is placed between said bracket 53 and flange 55 and secured into air tight engagement by soldering one end of the bellows 87 to bracket 53 and the opposite end of said bellows 87 to the flange 55. Surrounding said bearing 50 is assembled a steel spring 75, one end thereof being in contact with the vertical shoulder 51 and the opposite end thereof being in contact with the bellows top flange 55. A plurality of openings 76 and 77 are drilled thru the bellows bracket 53, said openings being in line with openings 78 and 79 provided in the wall of chamber 49. Openings 76, 77, 78 and 79 form a direct air passage from the vacuum chamber 49 to the interior of the bellows 87. By this means the machine may be used for vacuumizing and sealing containers of different sizes and shapes. The position of the bottom plate 25 can easily be adjusted. Each chamber 49, in a section 37, is formed at its mouth portion to receive a plate 52 which is held in place by suitable means. Said plate 52 serves to form a cover over the top end of the U-shaped member 23, and a cover over the top edge portion of the chamber adjacent to the movable plate 17.

As shown in Figures 3 and 4 the upper portion of each magazine section is formed with two series of projecting bosses 56 and 57 which are bored to receive rods 58 and 59. The rod 58 forms a pintle for hingedly supporting the flap 60 which extends substantially the length of a magazine section. Said flap 60 is provided with a longitudinal extending platen or pad 61 preferably formed of rubber or other suitable or yieldable material, the same forming a backing pad therein for supporting portions of the packaging container during the sealing operations in a manner to be hereinafter explained. The shaft 59 forms a pintle for hingedly supporting an elongated flap or member 63 which extends substantially the length of a section 37 as shown in Figure 1. The outer longitudinal edge of the flap 63, is formed with an offset portion 74 which lightly engages the upper ends of the containers and further overlaps the terminus portion of the flap 60 as shown in Figures 3 and 4.

In utilizing the apparatus of my invention, an envelope, wrapper or container enclosing a commodity and which is to be vacuumized and sealed is preferably fabricated of flexible material which may be readily and quickly sealed to provide an hermetically closed package. I have found that an envelope or container formed of material having thermo-plastic or thermo-sealable properties is satisfactory for the purpose. There are several materials available which are thermo-sealable, as for example compounds of wax and rubber, materials fabricated of vinyl resins and a material known as "Pliofilm." A container or wrapper C of the character having heat sealable properties and of a strength to withstand comparatively high atmospheric pressures when the interior of the container is impressed with a subatmospheric pressure is illustrated in Figure 4. The filled container C is disposed in a position in which the

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plies or laminae of material at the mouth of the container pass through the space between the flaps 60 and 63 and overlie the resilient pad 61, the container being in this position immediately prior to the movement of the head 29 into engagement with the magazine section and prior to the initiation of the sealing operation.

In carrying out the vacuumizing process, I have provided means for impressing a subatmospheric, or differential pressure within the chambers in the magazine section in contact with the head member thereof. Said low pressure, or substantial vacuum will be effective upon the interior of the filled containers in said chambers. In this connection the head member 29 is formed with a hollow interior arranged to be connected to a source of subatmospheric pressure. The lower face of the member 29 is provided with a recess or channel of rectangular configuration within which is adapted to be disposed a resilient gasket or sealing element 68. When the head 29 is moved downwardly, the gasket 68 seats upon the upper surface of the flange 46 so as to form a hermetic joint for the interior of the magazine section 37 in alignment with the head 29. Thus when reduced pressure is effective within the interior of head 29, such reduced pressure is impressed upon the contents of the containers in the magazine section 37 which is in engagement with the gasket 68 of head 29. Said vacuum producing means has been fully disclosed in my previously mentioned Patent No. 2,515,838 of July 18, 1950.

The apparatus is inclusive of a thermo means for heat sealing the laminae of the containers after a predetermined degree of reduced pressure or vacuum is existent in the containers. To accomplish this purpose there is movably disposed within the interior chamber of head 29 an elongated sealing bar 88 which is arranged to be heated by suitable means. As shown in Figures 3 and 4 the sealing bar 88 is provided with a surface portion 89 which is angularly disposed into parallelism with the upper surface of the resilient backing members 61 so as to provide a full area of contact, or close engagement for the open end portions of the container to effect a thermo-seal between said end portions.

The sealing bar 88 is of hollow configuration and is arranged to receive and accommodate electric heating units shown in my Patent No. 2,515,838, said units are connected to a suitable source of electrical energy. As shown in Figure 2, an indicator 95 is provided on the end of a hood member 96 to indicate the temperature of the sealing bar 88.

The movable mechanism of the apparatus is driven by a motor, not shown, the pedestal portion of said motor being mounted upon and secured to the base plate 10 within the housing 70.

The apparatus is inclusive of means for actuating or moving the head 29 vertically to bring the latter into engagement with a magazine section and for moving the sealing bar 88 into engagement with the open end portions of the containers to carry on the heat sealing operations.

The series of operations and the sequence thereof in vacuumizing and sealing a set of filled containers in one magazine section is as follows: The containers of heat sealable flexible material which have been previously filled with food stuffs or other commodities to be sealed therein are delivered to a position adjacent the machines. The operator swings the flaps 60 and 63 about their hinges to open position exposing the mouths of

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the chambers 49. The operator then inserts a filled container into each chamber of the section that extends angularly upwardly and to the left as viewed in Figure 2.

The operator swings the hinged flap 60 into position as shown in Figure 3, and arranges the projecting end portions of the container so that they overlie the resilient pad 61 on member 60. If the projecting end portions of the containers do not extend over the pad 61 and become arranged beneath the seal bar 88, the operator raises or lowers the bottom plate 25 within the chamber by inserting key 27 into the screw 28 and turning the same as desired. After the end portions of the containers are in proper position, the operator swings the hinged flap 63 to substantially a position parallel with flap 60 as shown in Figure 3, causing the laminations of each container to lie in parallelism with pads 61 as shown in Figures 3 and 4. The operator then grasps the hand rail 64 arranged on the lower side of each section 37 as shown in Figure 2, and then depresses a foot lever or treadle. This movement of the treadle rotates shaft 65 shown in Figure 1 which operates levers and releases a locking mechanism designed to retain the magazine section in proper position to accommodate the head 29. After this release has been effected, the operator manually rotates the magazine in a clockwise direction as viewed in Figure 2 to bring the section provided with filled containers into registration beneath the sealing head 29. As the filled section moves into registration beneath the head 29, the operator having released the foot pressure on the treadle, a switch which is automatically operated closes a motor circuit and in turn causes rods 21 and 22 to move downwardly. The downward movement of the rods causes downward movement of the head 29 with gasket 68, thereby contacting the flange 46 so as to effect an hermetic seal between the magazine section 37 and the head 29. As soon as the head 29 is in its lowered position, the gasket 68 in engagement with flange 46 of the magazine section 37, the vacuum which is effective from a continuously operating pump and connected to the hollow interior of the head structure 29, acts upon all the chambers in the entire section 37.

As shown and described in the copending application, the vacuum or reduced pressure is set up in the head 29, the chambers 49, and each container C held within the entire section 37 which is in contact with the head 29. The flaps 61 and 63 hold the end portions of the bags C in substantially closed position and as a result the air is withdrawn from each chamber, and around the outside of each container in the chamber, at a greater rate than from the interior of said containers. This usually causes a difference in air pressure between the inside and the outside of said container and causes the container to swell or expand; this expansion of the container causes wrinkles to be formed in the sealing area located in the end portions of the container.

In applicant's machine described above, as the vacuum or reduced pressure is set up in the head 29, and later set up in the chamber 49, the air within said chambers is gradually withdrawn producing a subatmospheric pressure therein. As the air is withdrawn from the chambers, the air is more slowly withdrawn from the interior of the containers in the chambers since the top

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portions of the containers are substantially closed. At the same time the air is being slowly withdrawn from the interior of the bellows due to the restriction caused by the reduced size of the holes 76, 77, 78 and 79. Prior to the evacuation of the bellows 87 the movable wall or panel 17 is positioned adjacent the inner wall of chamber 49 as shown in Figure 3. In this position the upper edge portion of panel 17 is in contact with the bottom surface of flap 63 to prevent said flap from exerting too great a pressure upon the upper end portions of the containers, too great a pressure upon said end portions would tend to close the container and prevent the evacuation of said container as desired. After a portion of the air contained in the chamber, and in the container, and in the bellows is extracted, the bellows starts to contract forcing the movable plate 17 to the left as shown in Figure 4. The face of said panel 17 is hereby caused to contact with the exterior of the filled container preventing expansion of the container. The container tends to expand since the air pressure within said container is greater than the ambient pressure in the chamber. As the panel 17 moves to contact said container the upper end portion thereof moves away from said flap 63 allowing said flap to assume the lower position as shown in Figure 4.

Said upper portion 90 of the panel 17 has a configuration which conforms to the configuration of the neck portion of a closed filled container. The upper portion 90 of said panel 17 also contacts the end portions of the container adjacent the sealing area overlapping said rubber member 61, said action presses the container end portions against the edge portion of the flap 61 to prevent the formation of wrinkles adjacent said sealing area.

The above movement of the panel 17 is caused by the evacuation of the chamber 49, and the reduced pressure is communicated to the interior of the bellows 87 through openings 76, 77, 78 and 79. The reduced pressure causing the bellows to contract, compressing the spring 75, forcing the shaft 44 with the movable plate thereon to the left as viewed in Figure 4. Said pressure of the panel 17 against the container is great enough to prevent the expansion of said container due to the differential of pressure within and without said container. Said pressure of the panel 17 also provides a very important function since the pressure thereof assists in the evacuation of said container. Should a container be placed within a chamber and said chamber evacuated, it would cause an incomplete or partial evacuation of said container should said container be sealed before a complete evacuation is obtained due to lack of time or failure of the vacuum pump to draw a complete vacuum. By applying external pressure to a container at the same time said subatmospheric pressure is applied internally thereto, a more complete evacuation of the container is obtained.

The impression of vacuum or reduced pressure continues, however, until the desired degree of subpressure is secured. When this condition is attained, the bridge member supporting the sealing bar 88 is moved further downwardly as explained in the copending application. The sealing bar 88 is thus moved downwardly bringing the pressure surface 89 thereof into contact with the laminations of the filled containers overlying the resilient pad 61. As the heating bar 88 and pressure surface 89 are heated under the influence of an electric heating unit, the adjacent

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laminations of the container are fused and sealed together with a subatmospheric pressure existent within the filled containers, and said sealed portions are free of wrinkles.

At the termination of the container sealing operation, a valve is operated automatically and the vacuum condition is interrupted, the head 29 is vented to the atmosphere so as to equalize the pressure within and outside the magazine section. The rods 21 and 22 move upwardly thereby moving the sealing bar 88 and head 29 to their uppermost or initial positions.

During the period in which the foregoing sequence of operations is carried on by the apparatus of my invention, the operator is engaged in depositing filled containers in the next succeeding magazine section. At the completion of a cycle of operations of the apparatus as above described, the operator again depresses the foot lever. This action again frees the container carrying magazine section so that the operator may manually rotate the section through $\frac{1}{2}$ of a revolution in order to bring the next succeeding section 37 into alignment or registration with the vacuumizing and sealing head 29. The cycle of operations previously described is again repeated. After the magazine section has been moved to a position wherein the sealed containers therein are inclined downwardly, the hinged members 60 and 63 are opened by gravity and the vacuumized and sealed containers fall from the magazine sections to be subsequently conveyed to a packing station.

It is apparent that, within the scope of the invention modifications and different arrangements may be made other than is herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

I claim:

1. In a container vacuum sealing apparatus; a vacuum chamber; means for subjecting a flexible, filled container to a vacuum while in said vacuum chamber; means for subjecting said flexible container to external pressure while said chamber and said container are being subjected to subatmospheric pressure; said second named means consisting of a member within said chamber directly connected with a flexible bellows outside said chamber, said member and said bellows operable incident to the vacuumizing of said chamber to cause said member to subject said container to external pressure to expel substantially all the air within said container thereby preventing expansion of said container and the formation of wrinkles in the sealing zone of said container; and means for sealing said container in said chamber while said container and chamber are under the influence of subatmospheric pressure.

2. In a container sealing machine, a vacuum chamber structure into which an open, flexible, filled container is placed to be sealed under vacuum, the opening of the container being sealed by having the inner abutting faces of the container opening sealed together; sealing means acting to cause said abutting faces to cohere under vacuum; a movable member within said chamber to contact said container while under vacuum, rigid means connecting said movable member with a bellows outside said chamber, said bellows to move said movable member into and out of contact with said container, said bellows controlled means being sensitive to a differential pressure varying in response to vari-

ations in the difference of the chamber pressure over ambient atmospheric pressure and operable incident to the vacuumizing of the chamber to cause said member to be moved into contact with the container to hold it against expansion during evacuation of the chamber and said container, thereby expelling substantially all the air within the container and preventing the formation of wrinkles in said abutting faces to be sealed.

3. In a container sealing machine, a vacuum chamber structure into which a flexible filled container is placed to be sealed under vacuum, the mouth of the container being sealed by forming a straight seam entirely across the top of the container with the inner abutting faces sealed together, sealing means acting along said abutting seam to cause the abutting faces to cohere under vacuum, a movable panel within said chamber structure to contact one side of said package while under vacuum, a bellows means outside said chamber structure, a rigid member connected between said movable panel and said bellows to move said panel into and out of contact with said container, said bellows controlled means being sensitive to a differential pressure varying in response to variations in the difference of the chamber pressure over ambient atmospheric pressure and operable incident to the vacuumizing of the chamber to cause said panel to be moved into contact with the container to hold it against expansion during evacuation of the chamber and said container, thereby expelling substantially all the air within said container and preventing the formation of wrinkles in said abutting faces to be sealed.

4. An apparatus for closing containers including a frame; a magazine having a plurality of sections arranged in fixed relationship and supported upon said frame for movement about an axis; each of said magazine sections being formed with a chamber adapted to receive and accommodate a container to be closed and sealed; a head movably mounted upon said frame; means for moving said head into engagement with a magazine section in alignment therewith; means for establishing a differential pressure in said head and effective in said chamber and container disposed therein; means controlled by vacuum in the chamber for applying pressure to the contents of the container to prevent expansion thereof and further to expel substantially all the remaining air in the container thereby preventing the formation of wrinkles in the container sealing area, a container closing shoe associated with said head; means operable upon said shoe for moving the latter into engagement with a container while said differential pressure is effective upon the container; said head adapted to be disengaged from a magazine section after completion of a container closing operation, and means for releasing the magazine whereby the latter may be moved to bring another section thereof into registration with said head.

5. An apparatus for sealing flexible containers including a frame; a magazine formed with a plurality of radially disposed sections journaled upon said frame for movement about a single axis; each of said magazine sections being formed with a chamber adapted to receive and accommodate a flexible container; a head movably mounted upon said frame; means for moving said head into engagement with a magazine section in alignment therewith; means for establishing a differential pressure in said head and effective in said chamber and container disposed therein; a

movable panel having a face arranged to be pressed against the side of the container while it is confined in the chamber; a flexible bellows associated with the chamber acted upon by the vacuum therein to move the panel against the container to prevent the expansion thereof; a sealing shoe associated with said head; means operable upon said shoe for moving the latter into sealing engagement with a container while said differential pressure is effective upon said container; said head adapted to be disengaged from a magazine section after completion of a container sealing operation, and means for releasing the magazine whereby another section thereof may be successively moved into registration with said head.

6. An apparatus for extracting air from and closing containers including, in combination, a frame; means mounted upon said frame adapted to support a plurality of containers; said container supporting means being revoluble about an axis; means including a head arranged for periodic movement into engagement with said container supporting means; means for establishing a hermetically tight connection between said container supporting means and said head; means acting through said head for establishing a subatmospheric pressure upon containers carried by said container supporting means, a movable panel having a face arranged to be pressed against the side of the container while in a chamber with subatmospheric pressure, a flexible bellows associated with the chamber acted upon by vacuum therein to move a member connected with said panel and cause said panel to move against the container in said chamber and prevent the expansion thereof; and means rendered effective during the existence of subatmospheric pressure in said containers and actuated into operation by a predetermined degree of subatmospheric pressure for hermetically closing the containers to maintain a subatmospheric pressure therein.

7. An apparatus for performing sealing operations upon containers comprising a frame; a chamber adapted for receiving and supporting a container, said chamber mounted upon said frame; means periodically movable into engagement with the chamber and adapted to establish a hermetically tight connection with said chamber; means for impressing differential pressure in the container disposed in said chamber; a movable panel having a face arranged to be pressed against the side of the container; a flexible bellows associated with the chamber and mounted on the exterior thereof, said bellows directly connected with said panel, said panel and bellows operable incident to the vacuumizing of said chamber to cause said panel to be moved into contact with the container confined in the chamber, thereby expelling substantially all the air in the container and preventing expansion of said container and the formation of wrinkles in the lamination when the container is sealed; and means for sealing the containers in said chamber while said container is under the influence of differential pressure.

8. Apparatus for hermetically sealing and packaging commodities in a container including a supporting frame; said apparatus having a section, the section being formed with a chamber adapted to receive a container; a movable head mounted upon said frame; said apparatus arranged whereby the section thereof may be consecutively brought into registration with said head; means for periodically causing inter-en-

gagement between said head and the section to provide a hermetically tight joint; means acting through said head and effective in the chamber of the section in alignment with the head for establishing a subatmospheric pressure in said chamber; means within the chamber arranged to press against the side of the container confined in the chamber with subatmospheric pressure, a flexible bellows attached to the outside of said chamber, the interior of said chamber and the interior of said bellows connected to the interior of said chamber by an air passage, said bellows sensitive to the differential pressure varying in response to variations in the difference of chamber pressure over ambient atmospheric pressure and operatively associated with said means within the chamber to cause it to move towards or away from said container; means rendered effective while said chamber is subjected to subatmospheric pressure for sealing a container in said chamber whereby a subatmospheric pressure is maintained in the container, and means for equalizing the pressure in said chamber after the completion of a container sealing operation.

9. In combination, a frame; a magazine revolvably mounted on said frame; said magazine being formed with a plurality of radially arranged chambers; each of said chambers provided with a panel member therein, said panel being connected to a bellows sensitive to the differential pressure varying in response to the variations in the difference of chamber pressure over ambient atmospheric pressure; said magazine being mounted whereby the same is arranged for movement to bring the chambers successively to a vacuumizing station; means to produce a vacuum in said chamber; means including a head arranged for movement into and out of engagement with said magazine; means for actuating said head, and electrically operated means for driving and controlling the movement of said means.

10. Apparatus for vacuumizing and sealing flexible containers comprising in combination a frame; a magazine mounted upon said frame and arranged for relative movement; means which can be contacted by the operator for moving said magazine to several positions; means for locking the magazine in each such position; means for releasing said locking means whereby the magazine may be consecutively moved to several positions; said magazine having a plurality of chambers; means including a head reciprocable upon said frame and arranged for periodic engagement with said magazine; means acting through said head for impressing a subatmospheric pressure in the chambers in said magazine in registration with said head; a heated container-sealing element associated with said head and adapted to be moved into engagement with a container in a magazine chamber for hermetically sealing said container while the latter is under the influence of subatmospheric pressure, and yieldable means within the chambers connected with vacuum operated means outside the chambers for preventing expansion of a container in the chamber when said atmospheric pressure is applied to said chamber, said means in the chamber moved by said vacuum operated means outside the chamber to apply pressure and prevent movement of the container within the chamber thereby expelling substantially all the air in said container and further preventing the formation of wrinkles when said container is vacuumized and sealed.

11. In combination, a frame, a plurality of rods reciprocably mounted on said frame; a head member mounted upon said rods and arranged for limited relative movement with respect thereto and to be actuated thereby; a container sealing member associated with said rods arranged to be moved thereby; a container carrying magazine section having a plurality of chambers formed therein arranged to accommodate containers to be sealed; said magazine section being arranged for relative movement whereby said chambers may be successively moved into registration with said head member; means for establishing a subatmospheric pressure through said head member effective in the chamber in registration with said head; means for indexing said magazine in its several positions; a yieldably movable pressure member in each chamber; a flexible bellows associated with each chamber acted upon by vacuum therein to move the pressure member against the container therein to expel substantially all of the air in the container; and means for effecting a release of said indexing means after the containers in a magazine chamber have been sealed by said container sealing member.

12. In combination, a frame having a pair of spaced upright portions; a rod reciprocably mounted on each of said upright portions; a head member mounted upon said rods and arranged for limited relative movement with respect thereto and to be actuated thereby; a container sealing bar associated with said rods arranged to be moved thereby; a container carrying magazine section having a plurality of chambers formed therein arranged to accommodate containers to be sealed; means for establishing a subatmospheric pressure through said head member effective in the chamber in registration with said head; said magazine being arranged for relative movement whereby said chambers may be successively moved into registration with said head member; cam actuated means for reciprocating said rods to move both said head member and said sealing bar; a yieldingly movable pressure member in each chamber, vacuum operated means outside the chamber operable incident to the vacuumizing of the chamber to cause said movable pressure member to be moved into contact with one side of the partially filled container placed in said chamber to eject substantially all the air remaining in the container not already removed by said action of subatmospheric pressure; means for indexing said magazine in its several positions; electrically-actuated means for operating said cam means; and means under control of the operator for effecting a release of said indexing means whereby said magazine may be moved to a succeeding position.

13. An apparatus for sealing containers while under the influence of a substantial vacuum comprising, in combination, a frame; pairs of spaced rods reciprocably mounted upon said frame; a head member mounted upon said rods and arranged to be actuated thereby and to have limited relative movement with respect thereto; a sealing bar carried by said rods; means for heating said bar; a magazine section formed with chambers adapted to receive containers movably supported upon said frame; said magazine section being arranged to be moved into successive positions to bring the chambers of the magazine into registration with said head member; means for actuating said rods to move

said head member into registration with the magazine; means for establishing a substantial vacuum in the chamber in registration with said head and effective upon the containers therein; a yieldable panel type means within the chamber connected with vacuum operated means outside said chamber for contacting the side of the container therein for ejecting substantially all of the air remaining in the container through the open end of the container when establishing said vacuum to the chamber; said rod-actuating means being arranged to move said sealing bar into engagement with said containers for sealing the latter while said containers are under the influence of substantial vacuum, means for indexing the magazine in its several positions whereby said chambers therein are successively brought into registration with said head member, and means for releasing said indexing means for subsequent movement of said magazine.

14. An apparatus for sealing containers while under the influence of a substantial vacuum comprising, in combination, a frame; pairs of spaced rods reciprocally mounted upon said frame; a head member mounted upon said rods and arranged to be actuated thereby and to have limited relative movement with respect thereto; a sealing bar within said head member carried by said rods; means for heating said bar; a magazine section formed with sections having chambers adapted to receive containers movably supported upon said frame; said magazine being arranged to be moved into position to bring the chambers of one magazine into successive registration with said head member; means for actuating said rods to move said head member into registration with the magazine section; means for establishing a substantial vacuum in the chambers of a section in registration with said head and effective upon the containers therein; a yieldable vertical panel

within each chamber for contacting the side wall of the container contained therein and clamping same against movement when establishing said vacuum to the chamber, said means further to expel substantially all the air remaining in the container when sub-atmospheric pressure is applied to each chamber; means being arranged to move said sealing bar into engagement with a plurality of containers of a section for sealing said containers while said containers are under the influence of substantial vacuum; and means under control of the operator for subsequent movement of said magazine.

15. In a container vacuum sealing apparatus; a vacuum chamber which can be opened and closed; means for subjecting a flexible, filled container while within said chamber to a vacuum; means for subjecting the exterior of said flexible container to external pressure while said chamber and the interior of said container are subjected to subatmospheric pressure; said second named means consisting of a member within said chamber directly connected by a rigid member to a flexible bellows outside said chamber, said member and said bellows operable incident to the vacuumizing of said chamber when closed and causing the external pressure on the exterior of said flexible container to expel substantially all the air within said container; and means to seal said container in the chamber while the interior of said container is under the influence of subatmospheric pressure.

HAROLD C. HOPP.

REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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