

Nov. 23, 1948.

D. RAY

2,454,477

APPARATUS FOR COMPACTING AND PACKAGING MATERIALS

Original Filed July 14, 1941

7 Sheets-Sheet 1

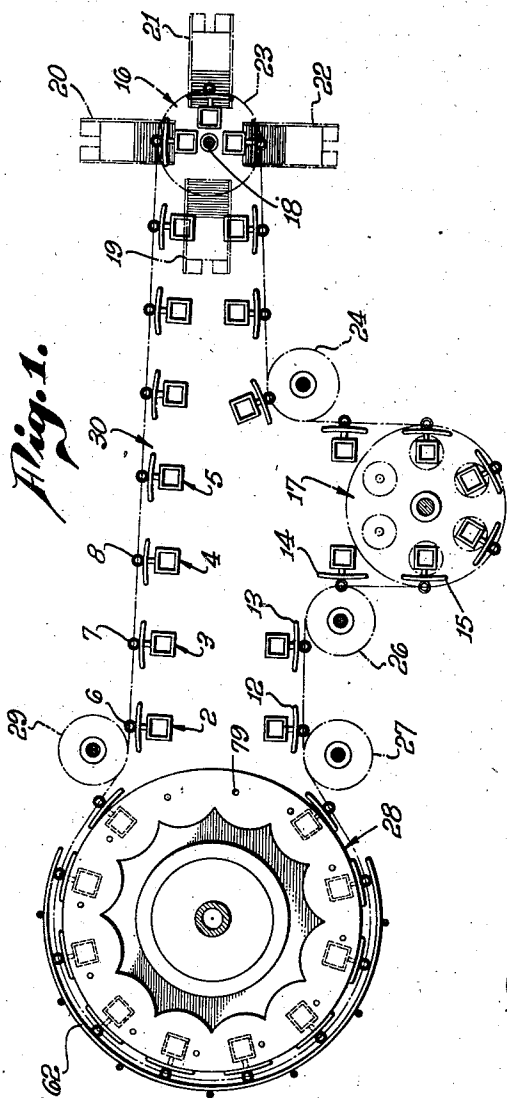
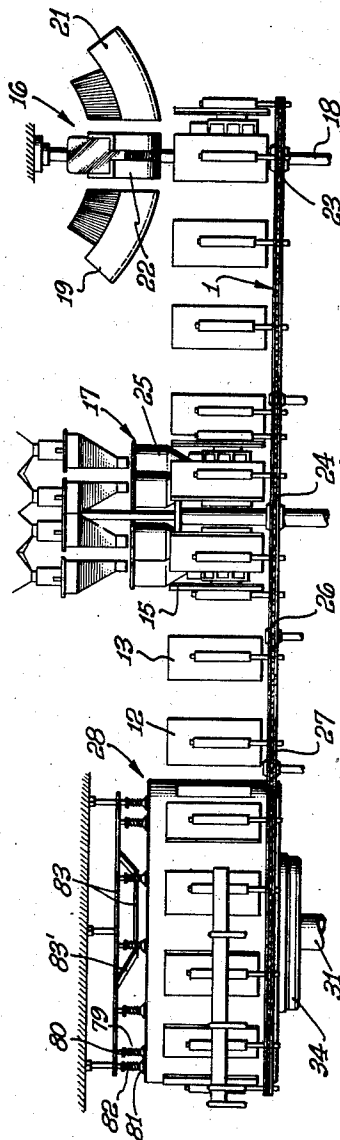


Fig. 2.



DON RAY
INVENTOR.

BY

C. C. Kiehl

ATTORNEY.

Nov. 23, 1948.

D. RAY

2,454,477

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7 Sheets-Sheet 2

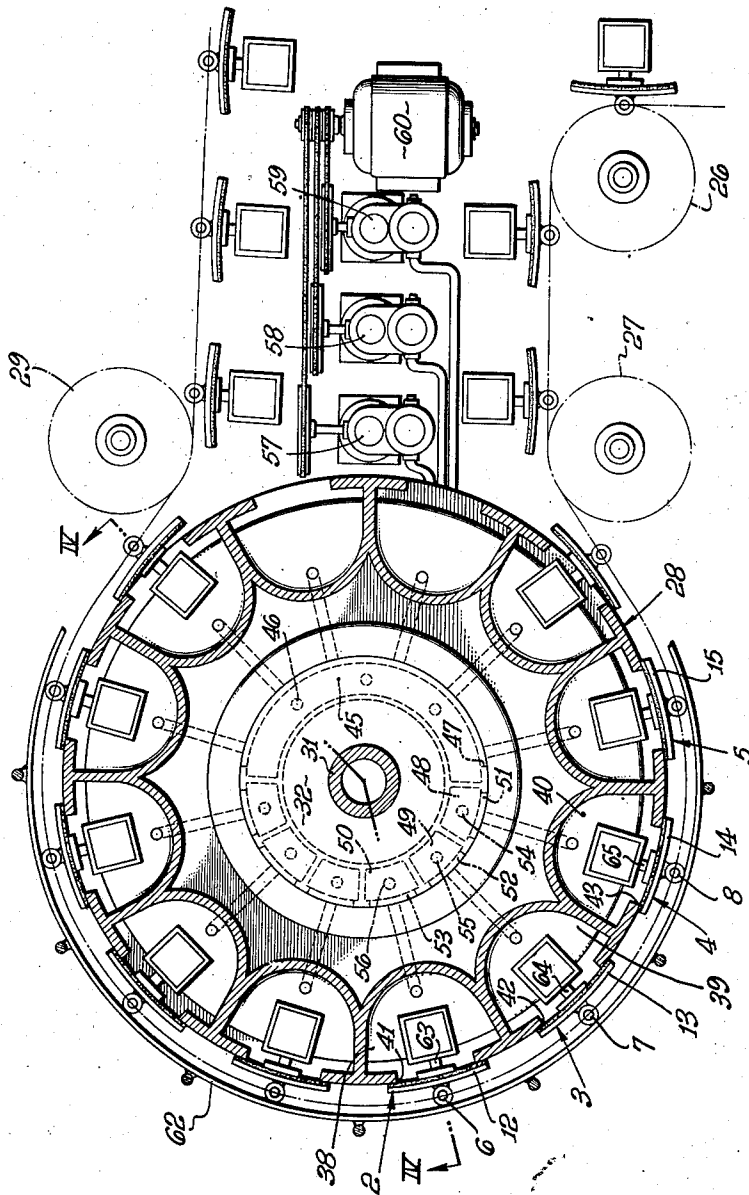


Fig. 3.

DON RAY
INVENTOR.

BY

C. E. MacRae

ATTORNEY.

Nov. 23, 1948.

D. RAY

2,454,477

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7 Sheets-Sheet 3

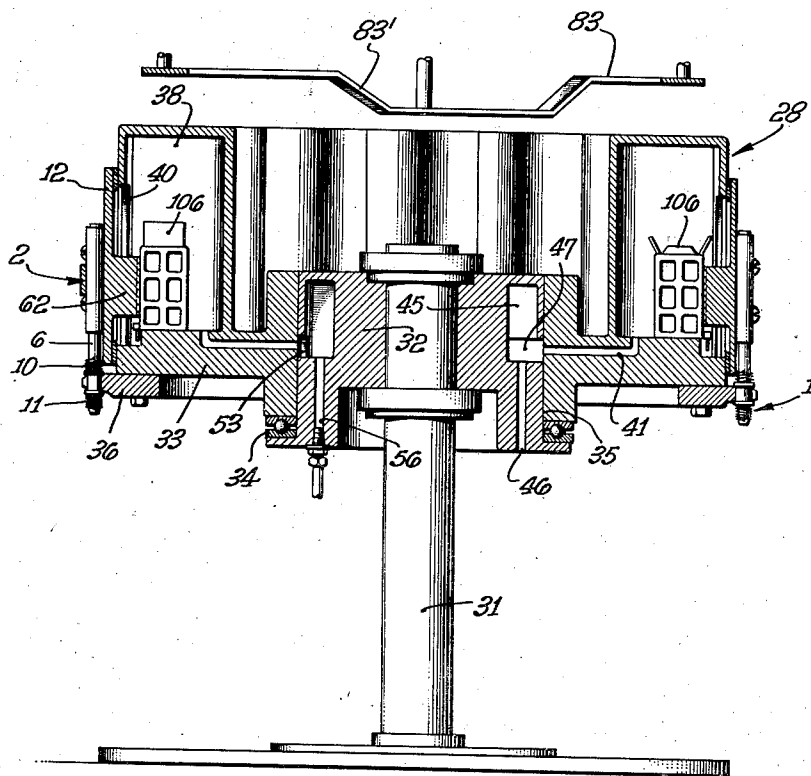


Fig. 4.

DON RAY
INVENTOR.

BY

C. E. McArthur

ATTORNEY.

Nov. 23, 1948.

D. RAY

2,454,477

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7 Sheets-Sheet 4

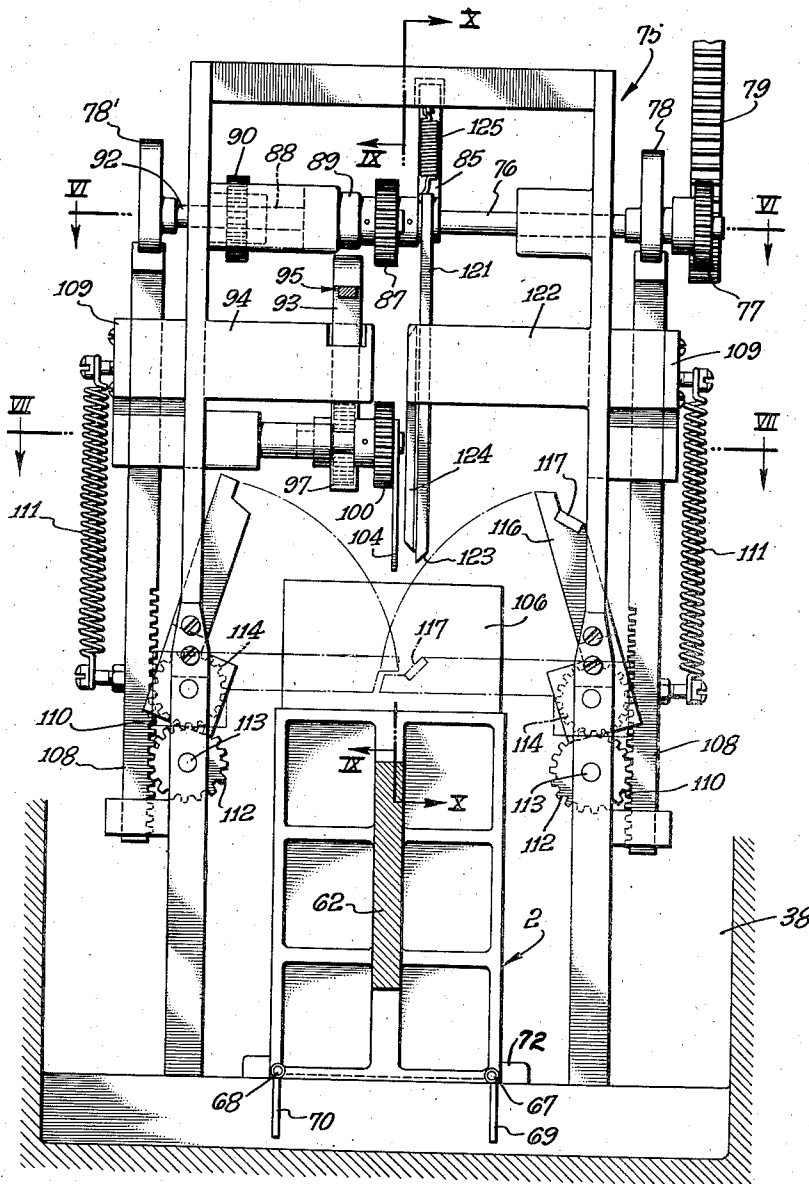


Fig. 5.

DON RAY
INVENTOR.

BY

C. C. H. H. H.
ATTORNEY.

Nov. 23, 1948.

D. RAY

2,454,477

APPARATUS FOR COMPACTING AND PACKAGING MATERIALS

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7 Sheets-Sheet 5

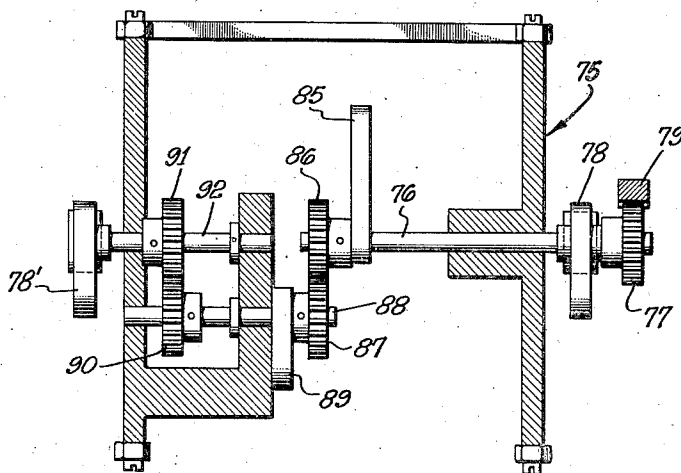


Fig. 6.

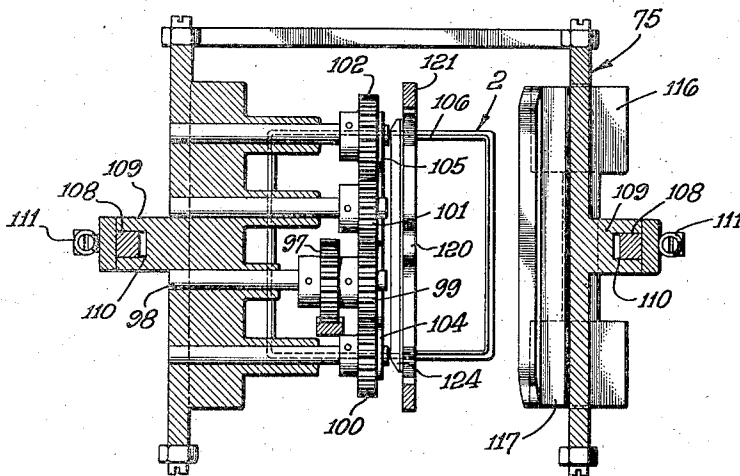


Fig. 7.

DON RAY
INVENTOR.

BY

C. E. Weickert

ATTORNEY.

Nov. 23, 1948.

D. RAY

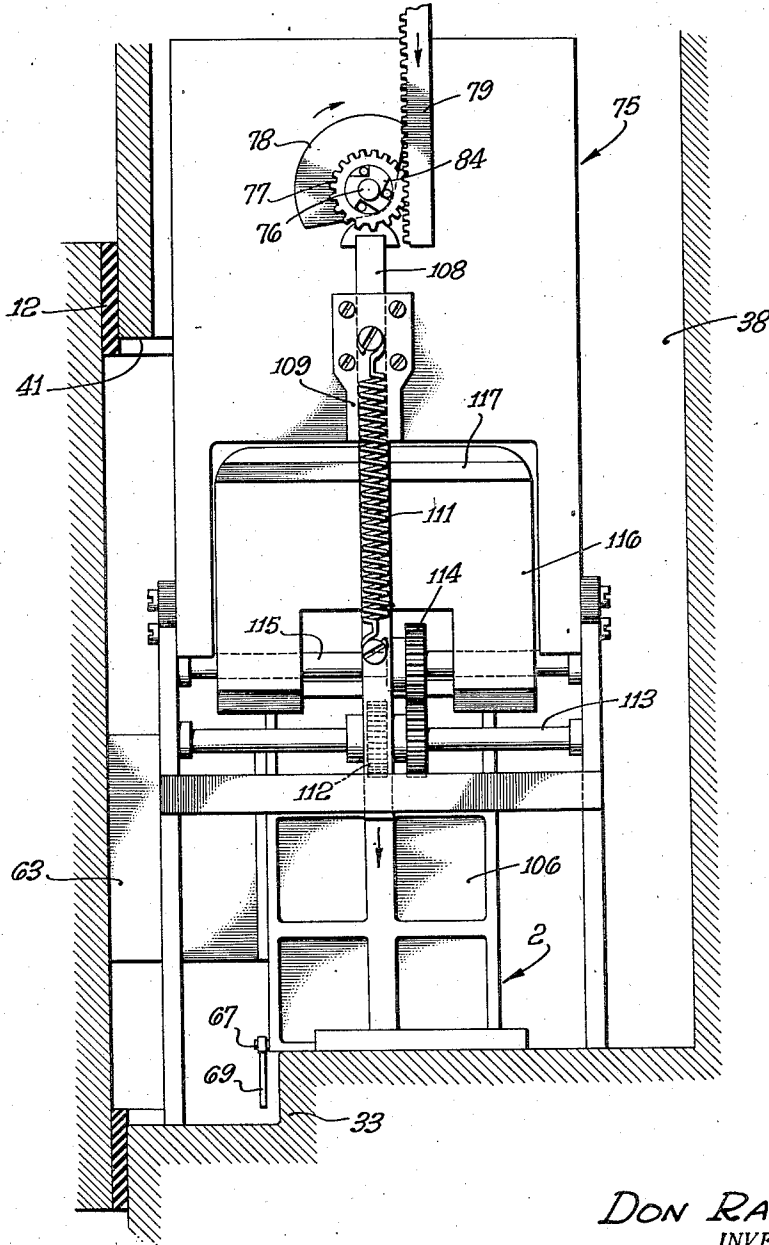
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Fig. 8.



DON RAY.
INVENTOR.

BY

C. P. Kelly

ATTORNEY.

Nov. 23, 1948.

D. RAY

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APPARATUS FOR COMPACTING AND PACKAGING MATERIALS

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7 Sheets-Sheet 7

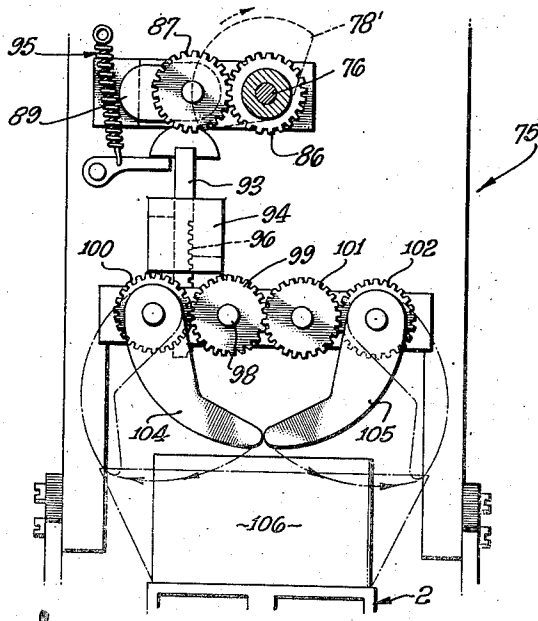


Fig. 9.

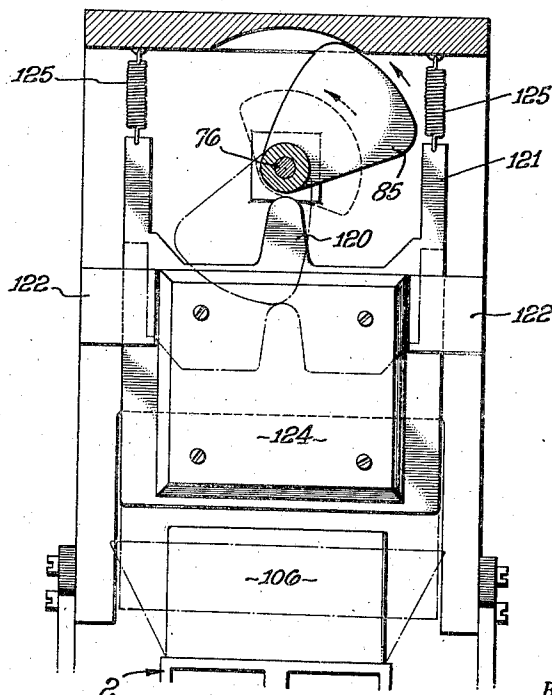


Fig. 10.

DON RAY
INVENTOR.

BY

C. C. [Signature]

ATTORNEY.

UNITED STATES PATENT OFFICE

2,454,477

APPARATUS FOR COMPACTING AND
PACKAGING MATERIALS

Don Ray, Beverly Hills, Calif.

Original application July 14, 1941, Serial No.
402,392. Divided and this application June 20,
1945, Serial No. 600,526

5 Claims. (Cl. 226—56)

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This invention pertains to apparatus for use in compacting materials, particularly mobile materials, and in maintaining them in compacted condition during shipment, storage, and the like. The invention also pertains to an apparatus whereby the operations may be carried out in a continuous, efficient, facile and economical manner.

Many materials sold or distributed in packaged form are bulky. Many mobile materials are subject to deterioration upon storage. The present invention is directed to means whereby mobile materials of the character stated may be compacted and maintained in a fresh, staple condition for prolonged periods of time. The method is described in detail in a copending application Serial #402,392, issued as Patent No. 2,380,903, of which this application is a division.

The means of this invention are adapted for use with various materials which may be granular, liquid, finely divided, grated, plastic, shredded or flaky. Pharmaceutical preparations, crystalline materials, chopped nuts and ground products such as coffee, may be cited as examples of granular or finely divided materials. Oatmeal, prepared flours, processed cheese, cream cheese, powdered milk, rice, dried fruits and grated cheese may be cited as examples of flaky, free-flowing and finely divided materials capable of being processed in accordance with the method of this invention. Milk and other liquids constitute other mobile materials.

In many instances the product to be compacted and packaged is either hygroscopic or capable of deterioration upon storage. Many of the products must be maintained out of contact with air in order to prevent oxidation and deterioration. Some products, such as coffee, are capable of giving off gases when stored and many deleterious changes ordinarily occur in such products upon storage under the present known conditions. All of these materials may be treated in accordance with the method of the present invention with improved results.

Generally stated, the apparatus of this invention in its continuous form comprises means for continuously advancing a series of containers, filling said containers, placing the containers into movable evacuation and sealing chambers, progressively decreasing pressure below atmospheric upon the containers and their contents while in said movable chambers, hermetically sealing the containers while in said chambers and while at a subatmospheric pressure, and then exposing substantially the entire outer surface of each con-

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tainer simultaneously to atmospheric pressure. The containers employed should be pliant, flexible and capable of readily conforming to irregularities of the mobile material being treated under the influence of atmospheric pressure. Moreover, the containers are preferably provided with pressure or heat-bonding means for the purpose of assuring the formation of a substantially gas-tight seal or joint therein.

An object of the present invention, therefore, is to provide an efficient continuous machine whereby flexible containers may be filled, subjected to vacuum and sealed.

A further object is to provide a continuous machine in which simple carrier elements bearing open bags of mobile material may be brought into a chamber in which the bag and its contents are subjected to a progressively decreasing pressure, applied both internally and externally, and the bag sealed.

Another object is to disclose and provide means whereby a continuous conveyor, including a carrier element, and a sealing means are brought into cooperative relation with a turret, the sealing means cooperating with the turret to form a closed chamber.

Other objects of the invention will become apparent from the description given hereinafter of exemplary forms of devices. In order to facilitate understanding, reference will be had to the appended drawings, in which:

Fig. 1 is a plan view, partly diagrammatic, of a continuous machine embodying the inventions.

Fig. 2 is a side elevation of the machine.

Fig. 3 is an enlarged horizontal section of a continuous compacting and sealing unit, certain details being eliminated for purposes of simplicity.

Fig. 4 is a vertical section taken along the plane IV—IV of Fig. 3.

Fig. 5 is a front elevation of mechanism within a chamber of the contacting and sealing portion of the device.

Fig. 6 is a horizontal section taken along the plane VI—VI of Fig. 5.

Fig. 7 is a horizontal section taken along the plane VII—VII of Fig. 5.

Fig. 8 is a side elevation of the mechanism shown in Fig. 5.

Fig. 9 is a vertical section taken along the plane IX—IX of Fig. 5.

Fig. 10 is a vertical section taken along the plane X—X of Fig. 5.

By referring to Figs. 1, 2, 3 and 4, the general arrangement and operation of the machine will become evident. A continuous conveyor 1 is pro-

vided, said conveyor being provided with a plurality of spaced carrier elements 2, 3, 4, 5, and the like, which are pivotally attached to the continuous conveyor 1 by means of vertical pins 6, 7, 8. As best shown in Fig. 4, springs 10 and 11, wound in opposite directions, each having one end attached to a pin and the other attached to a link of the conveyor 1, may be provided, these springs permitting the carrier element and pin to pivot upon the chain while the springs tend to return the pin to its original position. Each carrier element may be associated with a curved door element, such as the elements indicated at 12, 13, 14 and 15. The lower portions of the pins 6, 7, 8 and the like may be carried on another chain or may extend into a guideway for the purpose of maintaining the pins in a proper vertical position. This continuous conveyor 1 cooperates with means for supplying preformed containers to the carrier elements, such means being generally indicated at 16, and with a filling head, generally indicated at 17. The container supply device may be mounted for rotation about a vertical shaft 18 on which are mounted the feeding devices 19, 20, 21 and 22. The shaft 18 may also carry a sprocket, generally indicated at 23, so that the carrier elements rotate in unison with the feeding devices. Suitable containers, such as, for example, preformed but flattened bags, (such as those shown in Patent 2,370,419 for example) may be supplied to the feeding devices 19 to 22 inclusive and by suitable means (not illustrated but known in the art) such bags may be deposited into the carrier elements and expanded therein so that each of the carrier elements leaving the container supply 16 is provided with a container in open or expanded position therein. The conveyor may then pass over the sprocket 24 to the filling device 17.

The construction of the filling device may vary, depending upon the material which is to be placed in each of the containers carried by the carrier elements. In most instances, however, the filling device will include a rotatable turret 25 provided with suitable measuring or weighing devices for the purpose of placing a predetermined and desired amount of the material within each of the bags carried by a carrier element. The continuous conveyor may then move the carrier elements past sprockets 26 and 27 into operative engagement with the compacting and sealing mechanism generally indicated at 28. After encircling the compacting and sealing mechanism 28, the continuous conveyor may pass over sprocket 29 and past a discharge zone, generally indicated at 30, before returning to the container supply 16 in cyclic and continuous operation of the method.

The compacting and sealing mechanism 28 may comprise a stationary, vertically extending supporting column 31 carrying a vacuum chamber distributing manifold 32 which is also stationary. Rotatably mounted around the vacuum distributing manifold 32 is a rotatable body portion 33 which may be supported upon the bearings 34. The contacting cylindrical surface 35 between the manifold 32 and the body 33 should be smoothly machined and may include suitable gaskets to prevent loss of vacuum. The body 33 may be provided with a large sprocket 36 adapted to engage the continuous conveyor 1. The body 33 also carries a plurality of chambers 38, 39, 40 and the like, provided with outwardly directed openings 41, 42, 43 and the like.

The vacuum distributing manifold 32, as best shown in Fig. 3, includes an annular passageway

45 connected to the atmosphere by conduit 46. The annular passageway 45 is provided with a port 47 in communication with the surface 35. The body 32 also includes a plurality of smaller chambers 48, 49, 50 and the like, each of said chambers being provided with a port such as ports 51, 52 and 53 in communication with the surface 35. The various chambers 48, 49 and 50 are connected by conduits 54, 55, 56 and the like, to a source of suction or vacuum. For purposes of example, three vacuum pumps 57, 58 and 59 are shown, these vacuum pumps being driven by motor 60. It is to be understood that the vacuum pumps are of different capacities and are adapted to maintain different degrees of vacuum within the corresponding chambers. In Fig. 3, six small chambers are shown and adjoining pairs of chambers may be attached to the vacuum pumps 57, 58 and 59.

Each of the large chambers 38, 39 and 40 carried by the rotatable body 33 is provided with a conduit in communication with the surface 35 at such elevation as to communicate with port 47 or the ports 51, 52 and 53, depending on the relative position of the rotatable body 33 with respect to the stationary manifold 32.

It will thus be seen that the various chambers 38, 39 and 40 may either communicate with the annular passageway 45 supplied with air at atmospheric pressure, or they may progressively be connected with the chambers 48, 49 and 50 connected with vacuum pumps 57, 58 and 59.

Attention has been called to the ports 51, 52 and 53 leading into the chambers of the rotatable body 33. These ports are adapted to be closed by the door elements 12, 13, 14 and 15 carried by the pins 6, 7 and 8. The door elements may be curved and may be provided with a gasketing material on their inner surfaces so as to positively seal the openings 41, 42 and 43 when such doors are brought in contact with the outer surface of the chambers 38, 39 and 40. In order to assure positive closure, a curved rail 62 may be provided around a portion of the periphery of the mechanism 28, this rail guiding and pressing the pins carried by the conveyor 1 (and the door elements associated therewith) into seating engagement around the openings leading to the chambers 38, 39, 40 and the like.

Attention may be called at this time to the fact that the carrier elements 2, 3, 4, 5 and the like are carried by arms 63, 64, 65 and the like, connected to the doors 12, 13, 14, 15 and the like, the arms being of sufficient length so as to place the carrier elements well within the chambers 38 to 40 in a predetermined position. Moreover, the carrier elements are preferably light weight and foraminous in character, constituting in effect a light, open frame member through which the container may be readily visible, the contained bag having most of its surface exposed to action of ambient atmosphere.

The foraminous nature of the carriers subjects substantially the entire surface of the container to whatever pressure exists within the chambers 38, 39, 40 and the like. It may also be noted that each of the carriers is provided with a trap bottom which may be in two sections hinged at the sides as indicated at 67 and 68. Each hinge pin may be provided with a downwardly extending arm such as the arms 69 and 70. The bottom trap doors are spring-mounted so that normally the bottom is in closed position.

Each of the chambers 38 to 40 contains means for compacting material within the containers

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carried by the carriers and for sealing such containers. In order to eliminate confusion, such means are not shown in Figs. 3 and 4 but Figs. 5 to 10 inclusive show the details of the mechanism contained in each of the chambers.

As shown in the last-mentioned figures, each of the chambers 38 to 40 of the mechanism 28 includes a framework 75 carrying a transverse shaft 76 journaled therein, this shaft being provided with a spur gear 77 and a cam 78. The spur gear 77 is in engagement with a rack gear 79 provided with an upper cylindrical portion 80 extending through a suitable gasket 81 carried by the top of each chamber. Normally, the rack gear and its cylindrical portion are urged upwardly by means of a spring 82 against a stationary cam 83 suitably positioned above the mechanism 28 (see Figs. 2 and 4). As the mechanism 28 revolves, the upper ends of the cylindrical portions 80 come in contact with the step 83' of the cam 83 so as to move the rack gear 79 downwardly and thereby impart rotation to the spur gear 77.

The spur gear 77 is ratchet-mounted upon the shaft 76 (see Fig. 8) as indicated at 84, so that rotation is imparted to the pinion 77 when the rack gear 79 moves downwardly, but no rotation is imparted to the shaft 76 when the rack 79 moves upwardly.

A seal-actuating cam 85 is also mounted on the shaft 76 as well as a pinion 86 in engagement with pinion 87 mounted upon a stud shaft 88 carrying an expander cam 89. The stud shaft 88 also carries a pinion 90 in engagement with pinion 91 mounted upon stud shaft 92 which is provided with another cam 78'.

The expander cam 89 cooperates with push rod 93 slidable in bearing block 94. Means, generally indicated at 95, are provided for normally maintaining the end of the push rod 93 in contact with the expander cam 89.

As best shown in Fig. 7, the lower end of the push rod 93 is provided with a rack gear 96 in engagement with pinion 97 mounted upon stud shaft 98 which also carries pinion 99. Pinion 99 is one of a series of gears 100, 101 and 102 suitably journaled or mounted upon rotatable stud shafts. The four gears 99, 100, 101 and 102 constitute a gear train for the operation of expander arms 104 and 105 directly actuated by the end gears 100 and 102 of the train.

A container open at the top and resembling a bag in open position is indicated at 106, the upper portion of this container extending above the top of the carrier 2. The expander arms 104 and 105 are curved as shown, and are adapted to move outwardly and downwardly so as to engage the sides of the bag 106 and place them into the position indicated in dotted lines in Fig. 9, leaving but a narrow slit separating the lips of the bag. As shown in Figs. 5, 9 and 10 the walls of the open-ended bag 106 are vertical and virtually plane until the lips of the bag are brought in close proximity by the fingers 104 and 105, the upper portion of the bag then attaining a wedge shape.

Cams 78 and 78' (carried by shafts 76 and 92 respectively) cooperate with push rods 108 slidably mounted in bearing lugs 109. The lower portions of the push rods 108 are provided with rack gears 110. The rounded heads of the push rods 108 are normally maintained in contact with cams 78 and 78' by means of springs 111. Each of the rack gears 110 engages a pinion 112

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mounted upon longitudinal shaft 113. Each of the pinions 112 engages a spur gear 114 mounted upon shaft 115. These shafts carry folding arms 116 and 116'. Folding arm 116 preferably moves slightly in advance of arm 116' into the dotted positions indicated in Fig. 5, thereby folding the previously expanded upper end of the container or bag 106 into position for sealing. Arm 116 may be provided with a heat-resisting or heat-insulating facing 117.

The seal-actuating cam 85 cooperates with a cam follower 120 carried by a vertically reciprocable member 121 slidably mounted in a guiding bracket 122, the lower end of member 121 being provided with an inclined face 123. Adjacent said face is a heating element 124 supplied with electrical energy for the purpose of heating the lower end of the member 121, and particularly the inclined face 123 thereof. After the folding arms 116 and 116' have folded the bag, the seal-actuating cam is energized and forces the member 121, and particularly the face 123 thereof, into pressure contact against the overlapping lip portions of the bag and against the inclined face 117, so as to positively seal the bag. The member 121 is normally held in raised position under the influence of springs 125.

It will be evident, therefore, that under the influence of the push rod 80 and rack gear 79 (actuated by the stationary cam 83 and step 83' thereof), all of the mechanism within the chamber is caused to operate in precise timed relation.

After leaving the compacting and sealing mechanism 28, the arms 69 and 70 are engaged by a trip, thereby opening the hinged bottom of the carrier and permitting the treated container or bag to be ejected therefrom. These operations may take place in the zone 30 indicated in Fig. 1.

The method of operation may now be described and will be readily understood. Containers are placed within carriers by the container supply 16. The containers are supplied with material to be compacted at the filling station 17. The continuous conveyor 1 then carries the carriers, together with their filled containers, to the mechanism 28, inserts each of the carriers into a separate chamber, and closes the chamber by placing the door element over the opening leading to the chamber. By referring to Figs. 5 and 8, it will be noted that the bottom of each chamber is provided with side rails or guides 72 for the purpose of properly centering the carrier within the chamber. As the conveyor moves with mechanism 28, such chamber is serially connected with ports 51, 52 and 53 of the manifold chambers 48, 49 and 50 so that the pressure of the atmosphere ambient the container within the chamber is progressively decreased in steps to a desired low subatmospheric pressure.

After the container has been progressively subjected to a decreasing pressure within the chamber, the push rod 80 contacts the stepped portion of cam 83, whereupon the expander arms 104 and 105 expand the upper portion of the container so as to bring the lip portions of the bag into contiguous relation. The folding arms 116 and 116' fold the upper part of the bag and place it in position for sealing, and the heating element 124 and member 121 are brought down to positively hermetically seal the container while such container is still at the minimum subatmospheric pressure within the chamber. The folding arms 116 and 116', the expander arms 104 and 105 and the heating element then return to their original position and the chamber is brought into such

position that it is placed in communication with the annular passageway 45 of the member 32. The sealed container is still within its foraminous carrier within the chamber and when atmospheric pressure is admitted to this chamber, such atmospheric pressure can act upon substantially all of the surfaces of the container simultaneously so as to contact the material within the bag. The degree of compacting is determined by the inches of vacuum within the chamber at the time the container has been sealed. If, therefore, atmospheric pressure is 14.7 pounds per square inch and the pressure within the chamber at the time the container was sealed was only 0.2 pound per square inch, then the container is compacted by a force of 14.5 pounds per square inch acting upon each square inch of surface of the container.

The admission of atmospheric pressure into the chamber permits the ready separation of the door element from the opening leading to the chamber and therefore does not interfere with the progress of the conveyor in its cyclic movement past the discharge zone 30, the bag supply, and filling stations.

The conveyor 1 may be driven in any suitable manner. For example, driving impulses may be supplied to the conveyor 1 by sprockets 27 and 29. The speed of movement of the conveyor should be such as to assure that a container in each of the carriers is subjected to progressively decreasing subatmospheric pressure for a sufficient length of time within the chambers of the mechanism 28. Although this time element is somewhat variable due to the character of the material being compacted and the size of the container being treated, it may be stated that for packages of 8 to 18 cubic inch capacity, the total time during which the container is subjected to the decreasing subatmospheric pressure may range from about 4 seconds to 20 seconds and preferably such time should be on the order of from 10 to 16 seconds, thereby assuring a gradual and progressive decrease in pressure without disturbing the contents of the container and without impairing the effectiveness of the sealing operation. In the event three stages of subatmospheric pressure are employed, the first stage may be on the order of 10 inches of mercury, the second stage on the order of 20 inches of mercury, and the last stage on the order of 28 inches of mercury.

Numerous materials may be employed in making the containers for use in a method of the character described herein. It has been found that bendable, fibrous materials such as paper coated with a thermoplastic substance (as, for example, some of the vinyl resins or the like) are well adapted for use in the method. Thermoplastic coatings can also be applied to sheets of Cellophane or other cellulose derivative and containers made therefrom are substantially transparent and thereby permit the purchaser to observe the contents of the package without opening the same.

Containers may also be made of stock made by placing two sheets of thermoplastic material in face-to-face contact and heat-bonding the two to form a single inseparable sheet, such sheet having a greater strength than the sum of the two original sheets; such combined stock is impervious to gas and vapor even though the original sheets were somewhat porous.

In some instances the carrier elements 2, 3, 4, etc., may be in the form of supporting plates upon which partially wrapped materials are placed for movement into the processing and sealing cham-

bers. Preformed blocks of dried fruit, cheese, etc. may be thus treated in accordance with this invention. The machine is continuous in operation, the carriers are free from complex mechanisms (all sealing devices are in the turret), the carriers are positively guided into the chambers, and all operations take place in timed sequence. This application is a division of co-pending application Serial No. 402,392, filed July 14, 1941 (issued as Patent No. 2,380,903).

I claim:

1. In an apparatus of the character described: a rotatable compacting and sealing mechanism including a rotatable body provided with a multiplicity of circumferentially arranged chambers, each of the chambers being provided with an outwardly directed port; means for connecting such chambers progressively with sources of decreasing subatmospheric pressure during predetermined portions of rotation of said body and with atmospheric pressure at other portions of rotation of said body; means positioned within each of said chambers for folding and sealing a container; means for energizing such folding and sealing means at a predetermined portion of rotation of said body and while said chambers are in communication with a source of subatmospheric pressure, said means including a push rod operably connected to each of said folding and sealing means and extending from each chamber, and a stationary cam in operative engagement with said push rods; and a continuous conveyor peripherally engaging said rotatable body and movable therewith, said conveyor being provided with a multiplicity of longitudinally arranged, pivotally mounted door elements adapted to operably close ports to said chambers, and a foraminous carrier removably attachable to each of said doors and adapted to extend into a chamber in operative position with respect to the folding and sealing means in such chamber; and centering means within each chamber for cooperation with the carriers and doors for guiding the carriers into operative position.

2. In an apparatus of the character described: a rotatable compacting and sealing mechanism including a rotatable body provided with a multiplicity of circumferentially arranged chambers, each of the chambers being provided with an outwardly directed port; means for connecting said chambers progressively with sources of decreasing subatmospheric pressure during predetermined portions of rotation of said body and with atmospheric pressure at other portions of rotation of said body; means positioned within each of said chambers for folding and sealing a container; means for energizing such folding and sealing means at a predetermined portion of rotation of said body and while said chambers are in communication with a source of subatmospheric pressure, said means including a push rod operably connected to each of said folding and sealing means and extending from each chamber, and a stationary cam in operative engagement with said push rods; a continuous conveyor peripherally engaging said rotatable body and movable therewith, said conveyor being provided with a multiplicity of longitudinally arranged, pivotally mounted door elements adapted to operably close ports to said chambers, and a foraminous carrier removably attached to each of said doors and adapted to extend into a chamber in operative position with respect to the folding and sealing means in such chamber; means provided with a driving connection with said conveyor for placing

containers provided with a thermoplastic sealing surface in said carriers at one point of travel of the conveyor; filling means provided with a driving connection with the conveyor for filling containers while in said carriers; means provided with a driving connection with the conveyor for discharging filled and sealed containers from said carriers; and means for continuously driving said conveyor to actuate said container placing, filling and discharging means and into engagement with said rotatable body.

3. In an apparatus of the character described: a stationary supporting column carrying a cylindrical vacuum manifold; an annular body portion rotatably supported by and surrounding the cylindrical manifold and having a sliding internal surface contact with said manifold; a multiplicity of circumferentially arranged chambers in said body portion, each of said chambers being provided with a large, outwardly directed port; a semicircular passageway in the manifold, said passageway being in communication with the atmosphere and with a port formed in the sliding surface of the manifold; circumferentially arranged chambers formed in the manifold, each of said manifold chambers being provided with a port in the sliding surface of the manifold; a plurality of radially extending channels in the annular body portion, each of the channels extending to the inner surface of the body portion and arranged for sequential communication with the ports formed in the sliding surface of the manifold; means connecting the manifold chambers with sources of subatmospheric pressure; a continuous conveyor peripherally engaging the rotatable body and movable therewith, said conveyor being provided with a multiplicity of longitudinally spaced, pivotally mounted, door elements arranged to close the outwardly directed ports of the body portion chambers; a foraminous carrier on each of said doors arranged to extend into the chamber when the door is in chamber-closing position; and centering means within each body chamber arranged to guide and position said carriers.

4. In an apparatus of the character described: a stationary supporting column carrying a cylindrical vacuum manifold; an annular body portion rotatably supported by and surrounding the cylindrical manifold and having a sliding internal surface contact with said manifold; a multiplicity of circumferentially arranged chambers in said body portion, each of said chambers being provided with a large, outwardly directed port; a semicircular passageway in the manifold, said passageway being in communication with the atmosphere and with a port formed in the sliding surface of the manifold; circumferentially arranged chambers formed in the manifold, each of said manifold chambers being provided with a port in the sliding surface of the manifold; a plurality of radially extending channels in the annular body portion, each of the channels extending to the inner surface of the body portion and arranged for sequential communication with the ports formed in the sliding surface of the manifold; means connecting the manifold chambers with sources of subatmospheric pressure; means within each body chamber for folding and sealing a container; actuating means for each folding and sealing means, said actuating means being spring biased to normally hold the latter in inactive position, said actuating means including a push rod extending

from the body chamber; a stationary energizing cam positioned externally of the rotatable body and in operative engagement with the push rods to move the latter and actuate the folding and sealing means at a predetermined point in the travel of the body portion; and a continuous conveyor peripherally engaging the rotatable body and movable therewith, said conveyor being provided with a multiplicity of longitudinally spaced, pivotally mounted, door elements arranged to close the outwardly directed ports of the body portion chambers.

5. In an apparatus of the character described: a stationary supporting column carrying a cylindrical vacuum manifold; an annular body portion rotatably supported by and surrounding the cylindrical manifold and having a sliding internal surface contact with said manifold; a multiplicity of circumferentially arranged chambers in said body portion, each of said chambers being provided with a large, outwardly directed port; a semicircular passageway in the manifold, said passageway being in communication with the atmosphere and with a port formed in the sliding surface of the manifold; circumferentially arranged chambers formed in the manifold, each of said manifold chambers being provided with a port in the sliding surface of the manifold; a plurality of radially extending channels in the annular body portion, each of the channels extending to the inner surface of the body portion and arranged for sequential communication with the ports formed in the sliding surface of the manifold; means connecting the manifold chambers with sources of subatmospheric pressure; means within each body chamber for folding and sealing a container; actuating means for each folding and sealing means, said actuating means being spring biased to normally hold the latter in inactive position, said actuating means including a push rod extending from the body chamber; a stationary energizing cam positioned externally of the rotatable body and in operative engagement with the push rods to move the latter and actuate the folding and sealing means at a predetermined point in the travel of the body portion; a continuous conveyor peripherally engaging the rotatable body and movable therewith, said conveyor being provided with a multiplicity of longitudinally spaced, pivotally mounted, door elements arranged to close the outwardly directed ports of the body portion chambers; a foraminous carrier on each of said doors arranged to extend into the chamber when the door is in chamber-closing position; and centering means within each body chamber arranged to guide and position said carriers.

DON RAY.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,403,879	Taliaferro	Jan. 17, 1922
1,978,522	Darling	Oct. 30, 1934
2,088,012	Rector	July 27, 1937
2,241,943	Berch	May 13, 1941

FOREIGN PATENTS

Number	Country	Date
356,024	Germany	July 11, 1922