

Jan. 31, 1961

H. CAREW ET AL

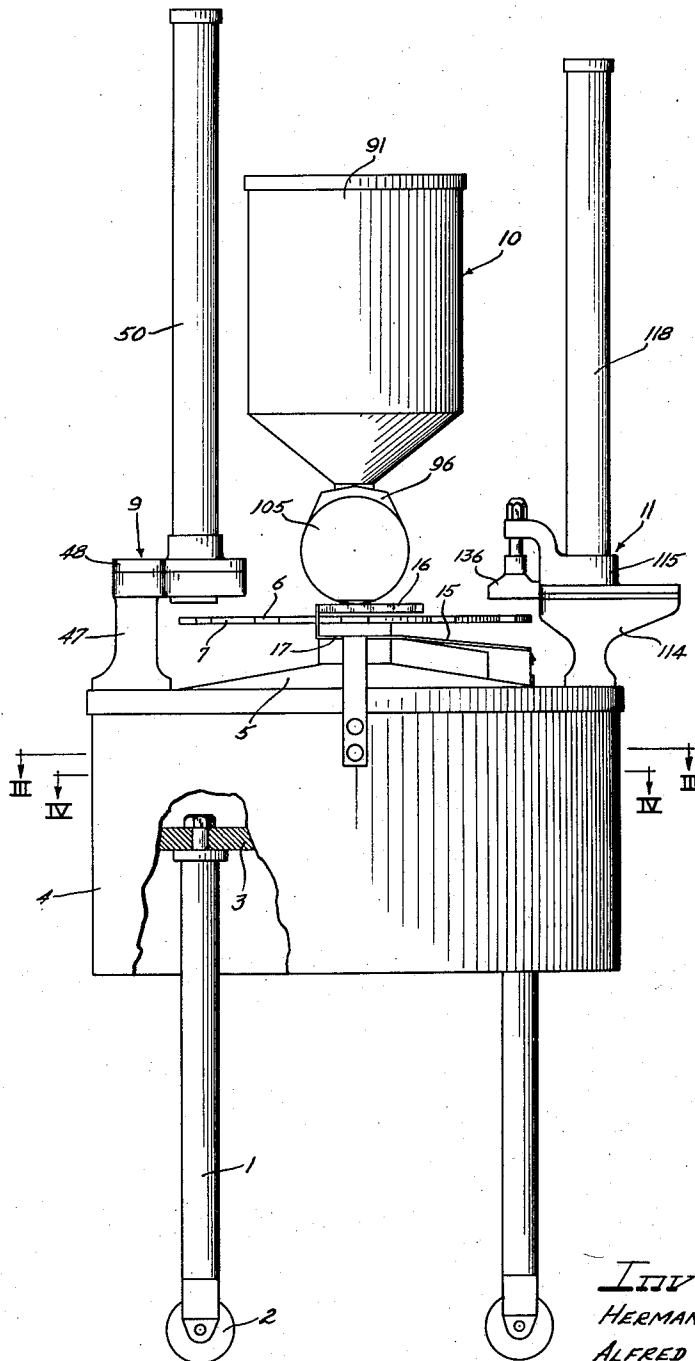
2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 1

Fig. 1



Inventors
HERMAN CAREW
ALFRED W. KINNEY

By W. H. Sullivan, Morris, Chase & Kinney Attys.

Jan. 31, 1961

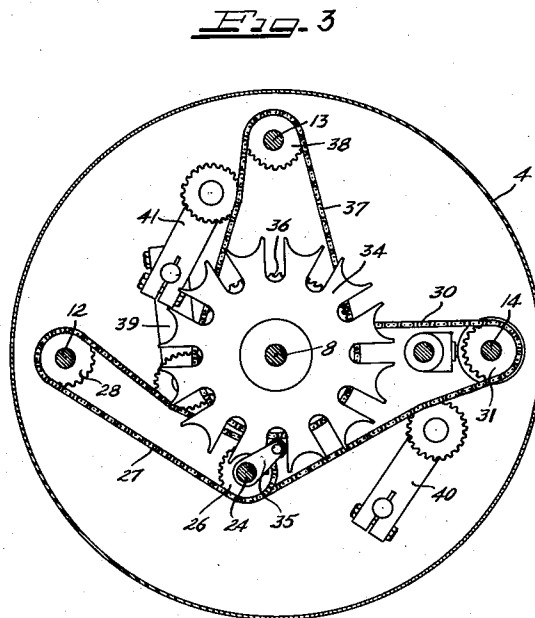
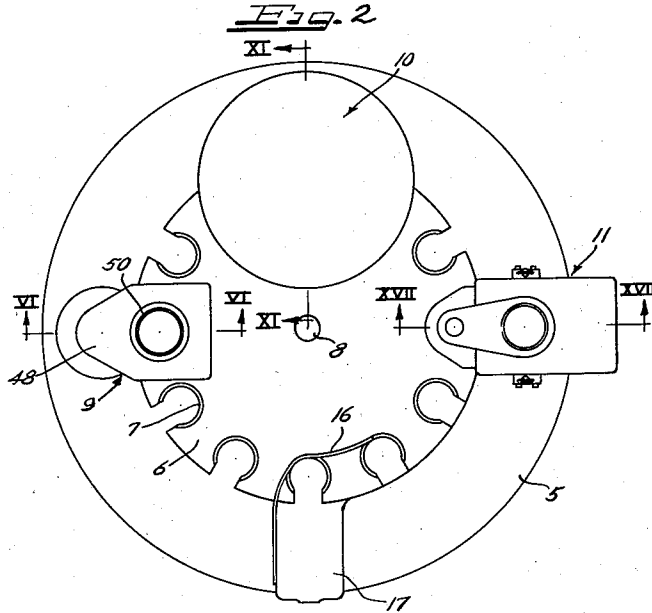
H. CAREW ET AL

2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 2



INVENTORS
HERMAN CAREW
ALFRED W. KINNEY

Att. Sherman, Morris, Green & Kinney Attys.

Jan. 31, 1961

H. CAREW ET AL

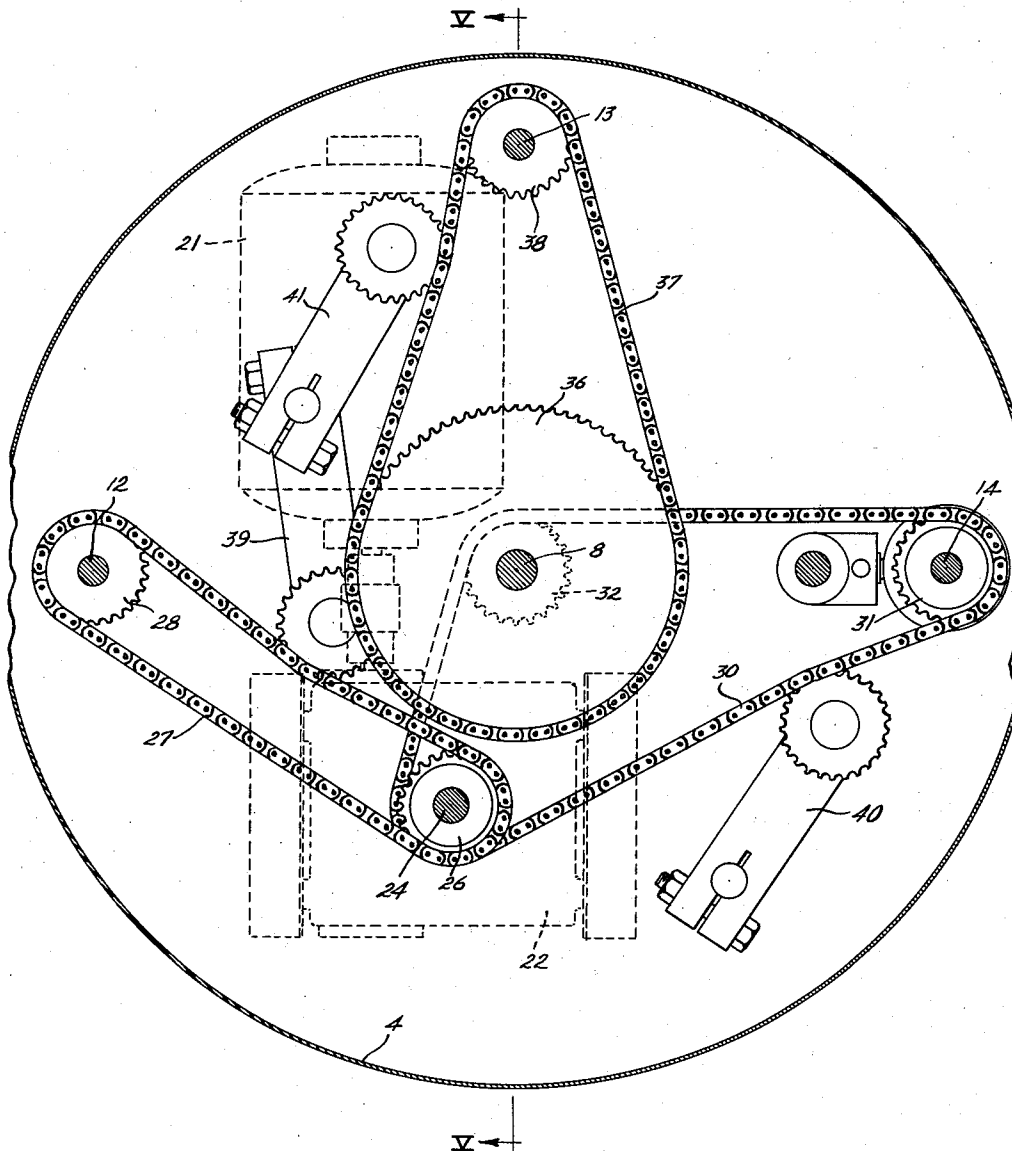
2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 3

Fig. 4



Inventors

HERMAN CAREW

ALFRED W. KINNEY

W. H. Herman, Merwin, Chas. Singer
EL Attys.

Jan. 31, 1961

H. CAREW ET AL

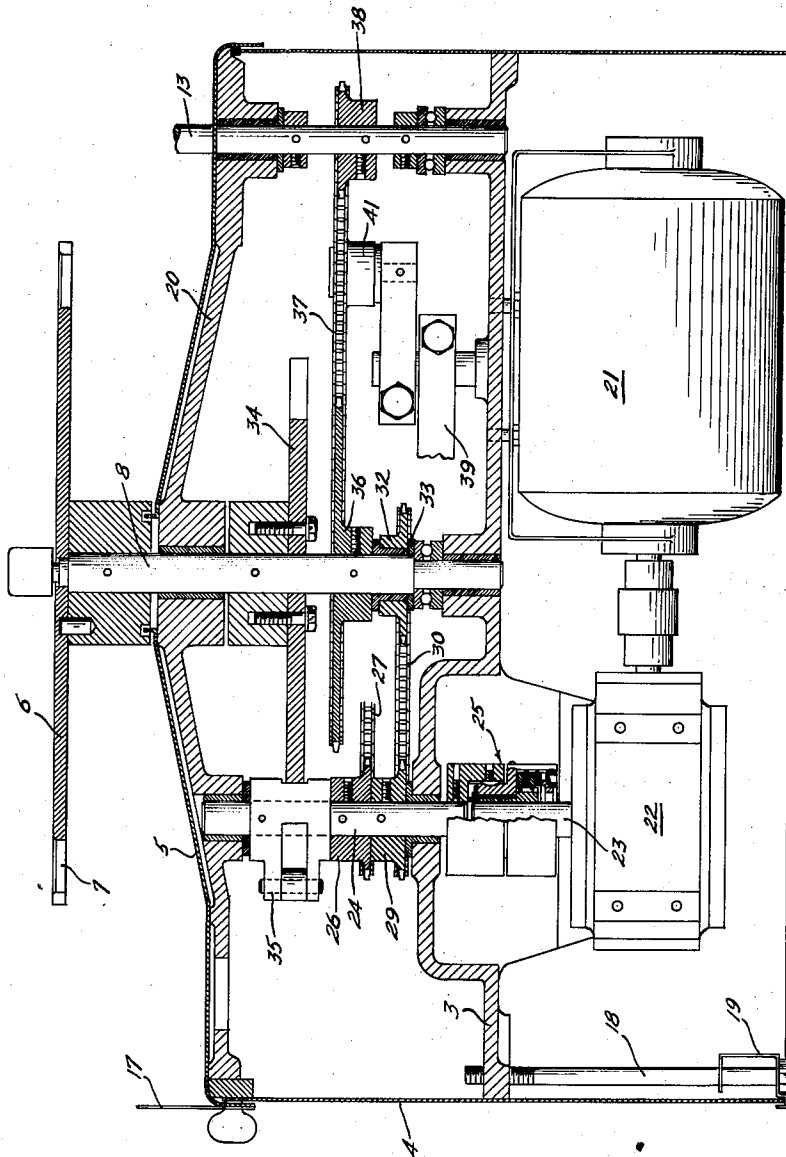
2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 4

Fig. 5



Inventors

HERMAN CAREW

ALFRED W. KINNEY

Niel, Sherman, Means, Chas. Singer Attys.

Jan. 31, 1961

H. CAREW ET AL

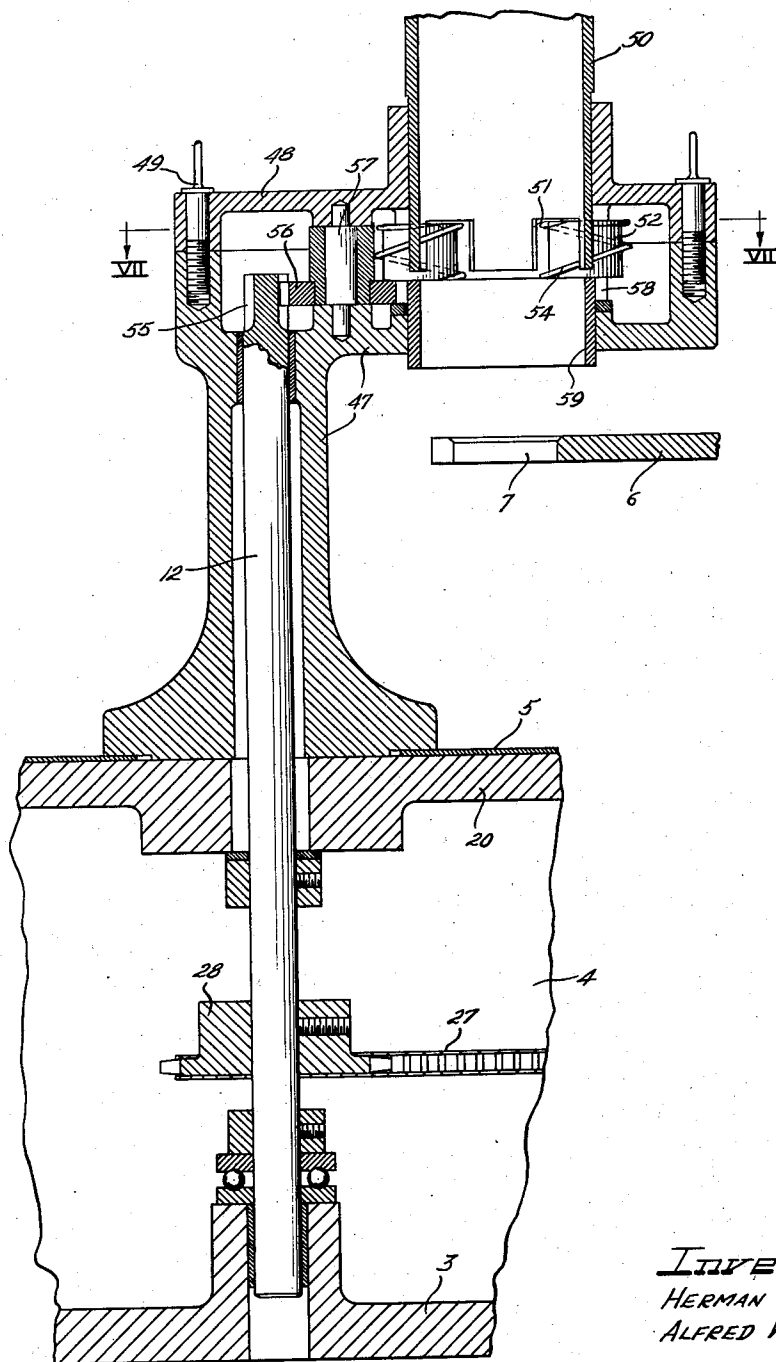
2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 5

Fig. 6



Inventors
HERMAN CAREW
ALFRED W. KINNEY

By *Niel, Sherman, Meloni, Chad & Simpson* Attys.

Jan. 31, 1961

H. CAREW ET AL

2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 6

Fig. 10

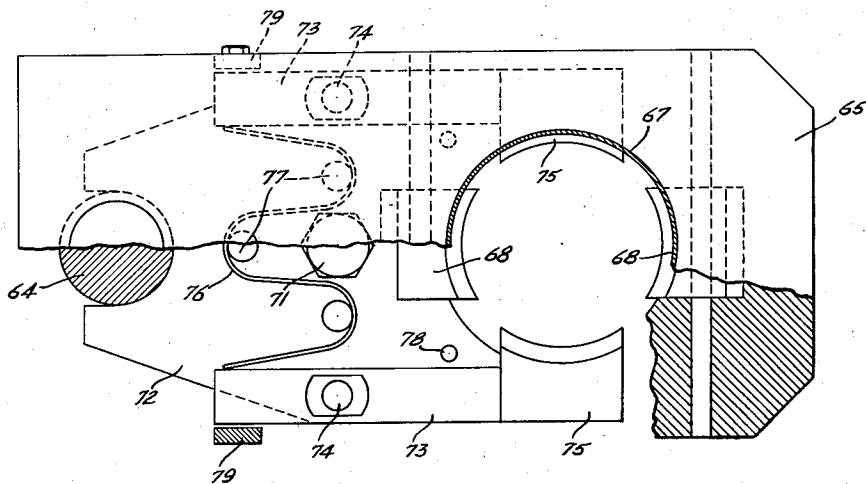
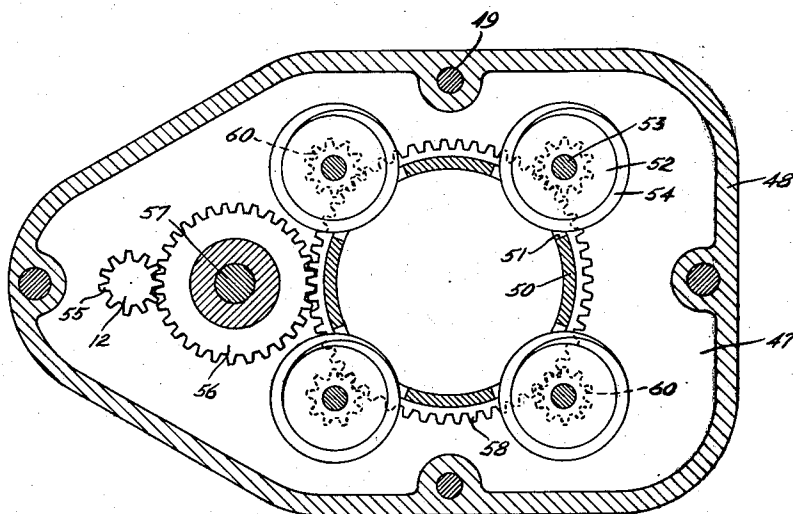


Fig. 7



Inventors

HERMAN CAREW

ALFRED W. KINNEY

Will, Herman, Merri, Chad & Simpson Attys.

Jan. 31, 1961

H. CAREW ET AL

2,969,632

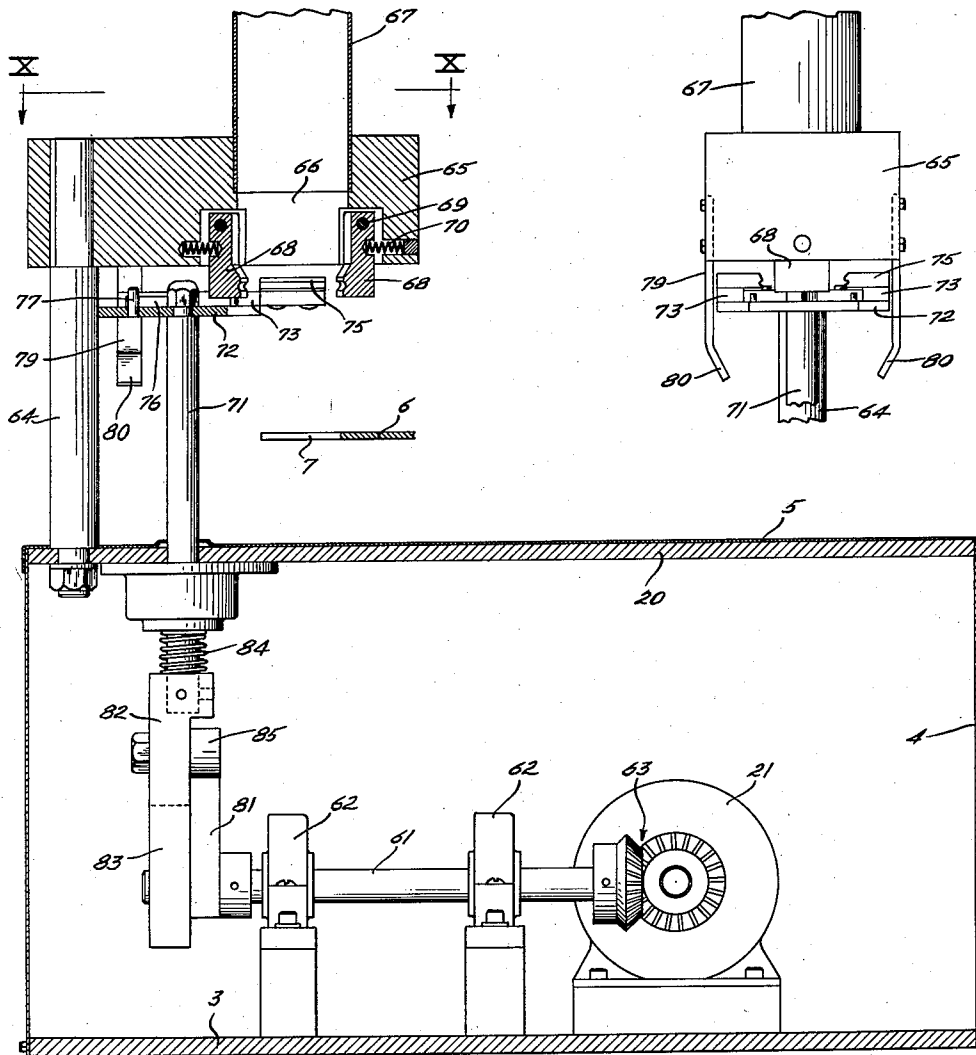
AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 7

Fig. 8

Fig. 9



Inventors

HERMAN CAREW

ALFRED W. KINNEY

Nel Sherman, Merwin Gass & Singer

Attys.

Jan. 31, 1961

H. CAREW ET AL

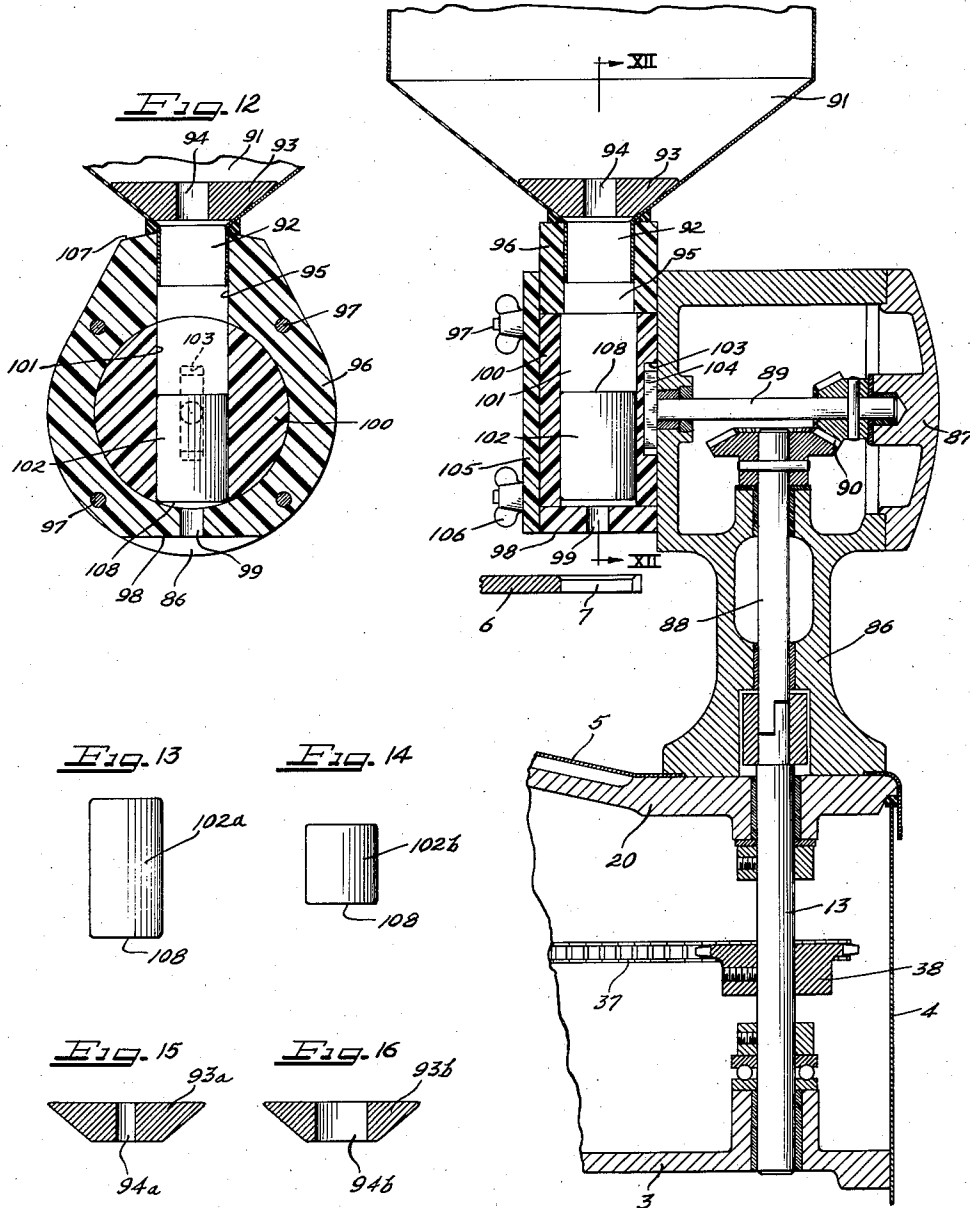
2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 8

Fig. 11



Inventors
HERMAN CAREW
ALFRED W. KINNEY

Attys.
Hill, Sherman, Merri, Cook & Simpson

Jan. 31, 1961

H. CAREW ET AL

2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 9

Fig. 17

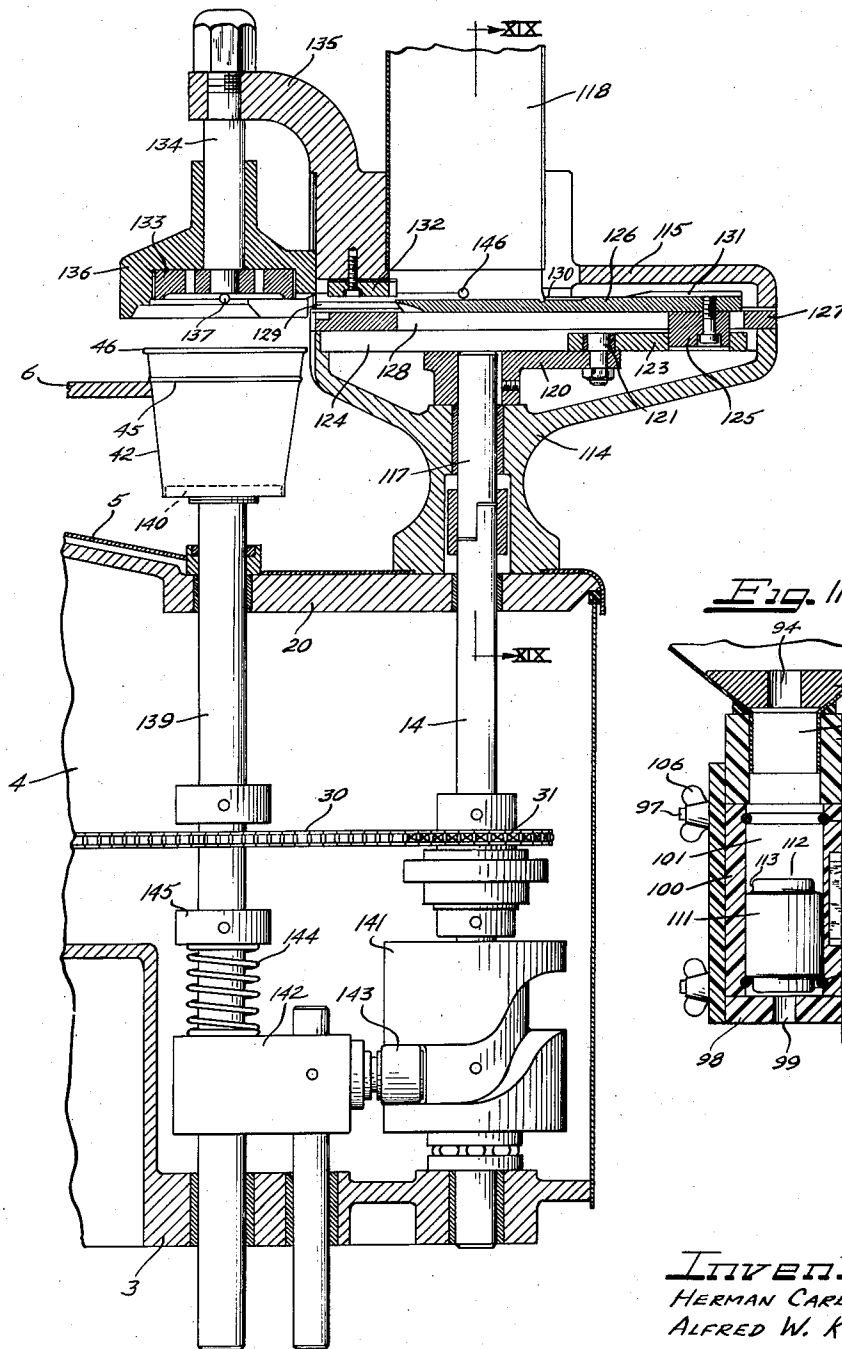
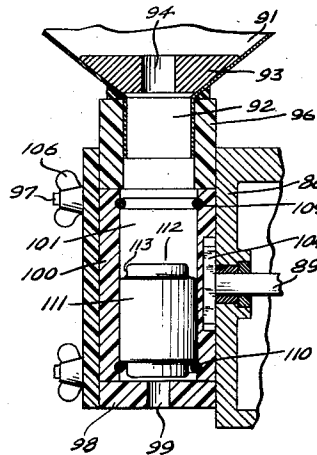


Fig. 11a



Inventors
HERMAN CAREW
ALFRED W. KINNEY

By *Kille, Loomer, Mason, and Singer* Attys.

Jan. 31, 1961

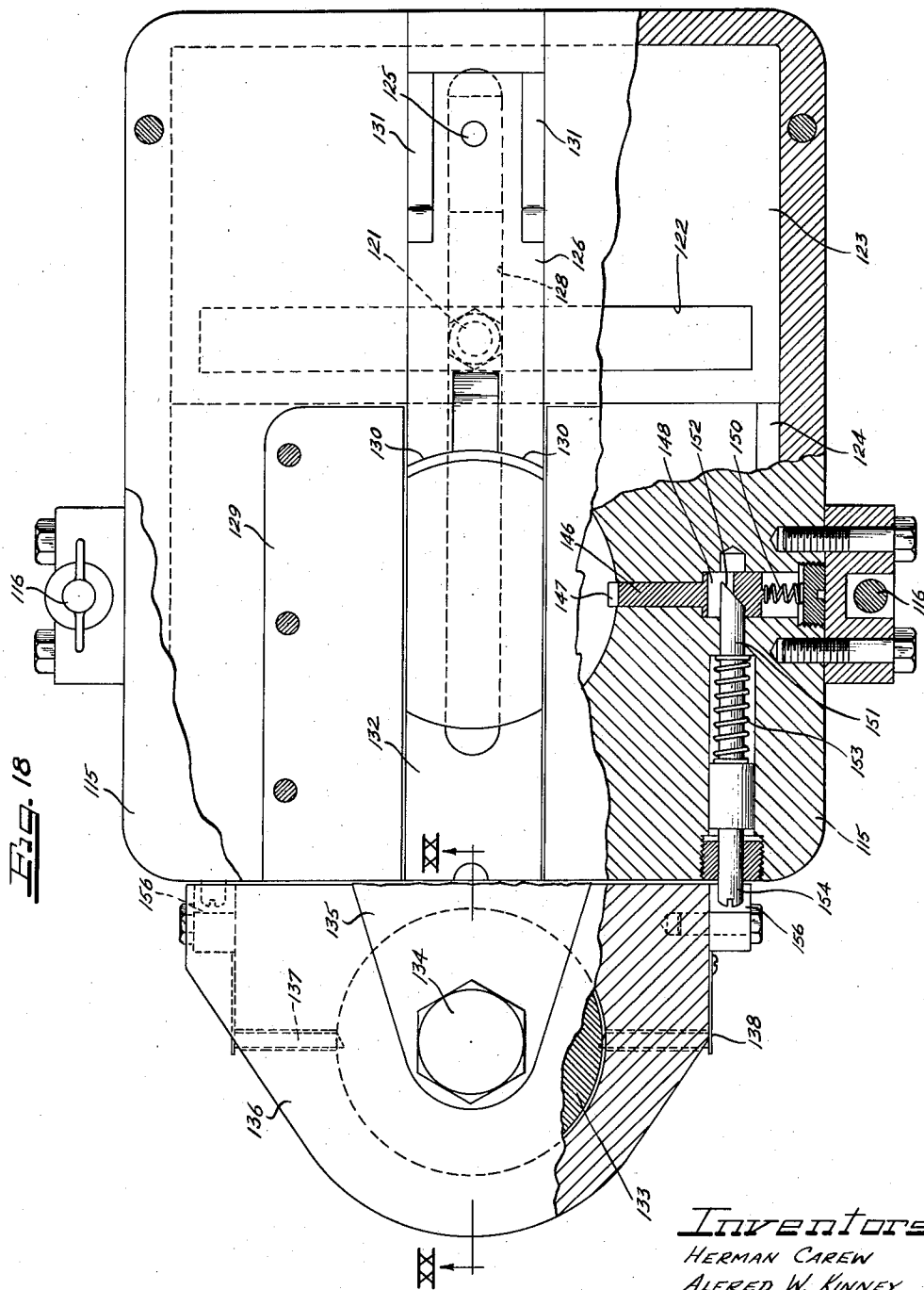
H. CAREW ET AL

2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 10



Hill, Sherman, Morris, Chase & Singer Attys.

Jan. 31, 1961

H. CAREW ET AL

2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Filed Feb. 21, 1956

11 Sheets-Sheet 11

Fig. 19

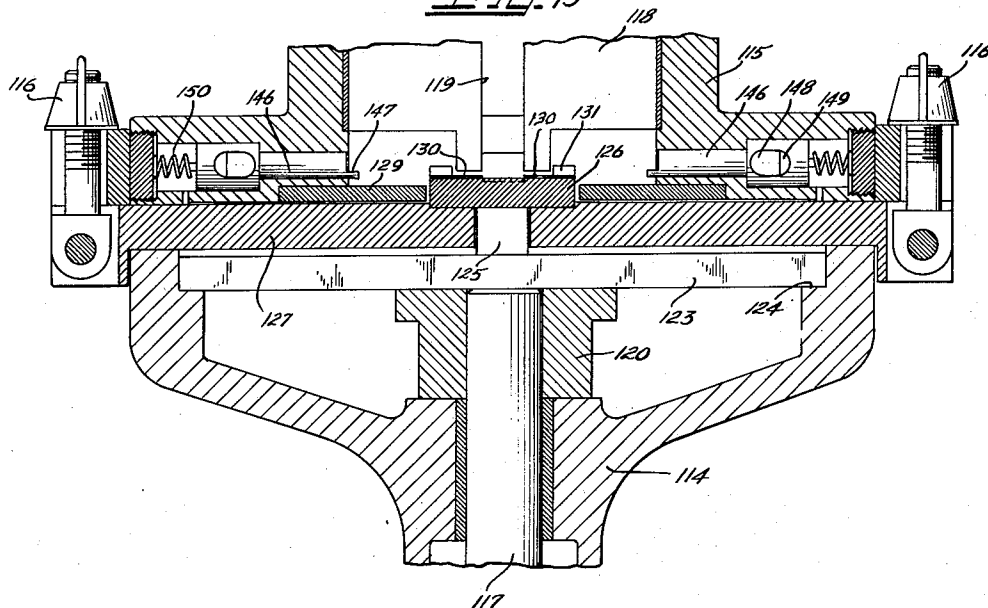


Fig. 20

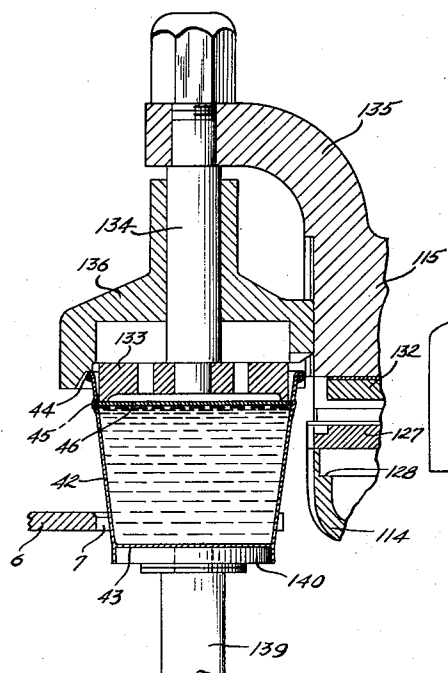
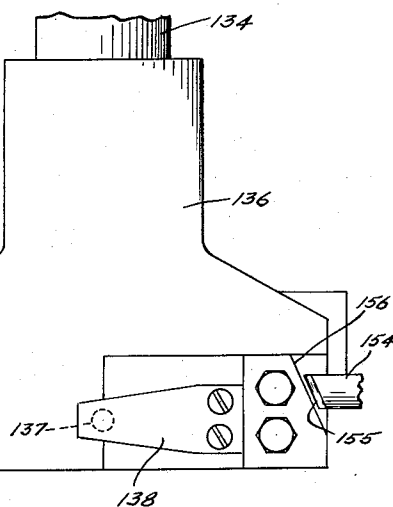


Fig. 21



Inventors

HERMAN CAREW

ALFRED W. KINNEY

Attorney
Hill, Sherman, Merwin, Conner & Co., Inc.

1

2,969,632

AUTOMATIC CONTAINER DISPENSING, FILLING AND CAPPING MACHINE

Herman Carew, Easton, Pa., and Alfred W. Kinney, Washington, N.J., assignors, by mesne assignments, to American Can Company, New York, N.Y., a corporation of New Jersey

Filed Feb. 21, 1956, Ser. No. 567,017

9 Claims. (Cl. 53—283)

This invention relates to improvements in an automatic container dispensing, filling and capping machine, and more particularly to a machine for dispensing containers one after the other, moving the containers successively to a filling station, filling the containers with a commodity, then moving the containers successively to a capping station, and automatically dispensing and placing a cap in each filled container. The invention is highly desirable for use in the filling and capping of paper containers of the single usage type, and of a character in which various commodities are packaged for sale to the ultimate consumer, or various commodities are served to a consumer for table usage, such as paper ramekins for example, although the invention will have other uses and purposes as is apparent to one skilled in the art.

In the past, many and various types of machines have been designed for the purpose of filling and capping or closing various types of containers. These machines were in most cases exceedingly bulky, occupied an objectionable amount of floor space, were highly expensive to manufacture and use, and in every instance of which we are aware, the machines were capable of filling a container of some kind with one particular commodity but could not be easily and readily adjusted to fill containers with any desired one of numerous commodities varying in fluidity and viscosity. Machines of this character heretofore known were also objectionably difficult to dismantle for cleansing purposes and to again reassemble, particularly in the event they were designed to handle a food product and subject to sanitary regulations regarding thorough cleansing. In addition, these formerly known machines were frequently subject to leakage, in that the commodity being utilized dripped from the filling orifice between successive containers, causing wastage of commodity and adding to the difficulty of properly cleansing the machine after operation had been suspended for a period of time. It might also be added that machines heretofore known of the type handling paper containers, and wherein paper caps were used for insertion in the mouths of such containers, were frequently subject to jamming and consequent destruction of both containers and caps, to say nothing of the aggravation of shutting down the machine temporarily in an effort to clear the jam.

With the foregoing in mind, it is an important object of the instant invention to provide an automatic container dispensing, filling and capping machine which is substantially continuous in operation, and which overcomes the deficiencies of machines of this character heretofore known.

Another object of the invention is the provision of an automatic machine for dispensing, filling and capping containers, which machine is suitable upon simple adjustments or a simple substitution of parts provided with the machine, for handling numerous types of commodities such as milk, cream, maple syrup, various flavored syrups, salad dressings, mayonnaise, tartar sauce, cottage cheese, mustard, jelly, practically anything served in a ramekin, or packaged in a paper container, the machine being also

2

useful for the supply of ground or powdered materials, and also various industrial materials where a predetermined amount of powder, grease of a certain character, and the like, may be desired.

One of the prime objects of the instant invention is in the provision of a machine for dispensing, filling and capping containers with various commodities as above explained, the machine being so designed that where the same size container is utilized, each commodity exits at the same velocity, in the same volume, and in the same length of time as any other commodity.

A further feature of the instant invention resides in the provision of a machine of the character described herein embodying a more efficient and continuously operating dispensing mechanism.

It is also a feature of the invention to provide a machine of the type described herein which includes filling mechanism capable by a simple adjustment of handling many and various types of commodities varying in fluidity and viscosity, the mechanism being adaptable for fluid, semi-fluid, viscous, and powdery material.

Still a further feature of the invention resides in the provision of a machine of the character described herein equipped with a filling mechanism utilizing a plunger movable within a cylinder bore as the means of expelling the commodity, and the filling means are correlated with respect to size of orifice admitting the commodity, clearance between the piston and cylinder bore, and the weight of the plunger, that substantially all commodities regardless of character will be delivered in the same quantity, at the same velocity, and in the same time as any other commodity.

Another object of the invention resides in the provision of a machine of the character set forth herein including container filling valve mechanism of a new and novel character, which is extremely easily dismantled for cleansing purposes, and equally as easily preassembled.

A further object of the invention resides in the provision of a machine of the character described herein embodying a novel filling valve mechanism so constructed as to offset any possible error on the part of the operator, in that the mechanism cannot be put together in reverse order so that some parts may bind during operation.

It is also a desideratum of the instant invention to provide a machine of the character described herein, embodying a novel container filling mechanism including a selection of differently sized orifice rings for disposition at the outlet end of the supply tank, and a series of different sizes and different weights of plungers to expel the commodity from the cylinder bore, so that the machine may readily be changed over in a very few minutes and with little effort to operate in the same manner upon a different commodity of different fluidity or viscosity than the commodity acted upon previously thereto.

It is a further feature of the invention to provide a machine of the character set forth herein equipped with filling mechanism so constructed as to automatically eliminate the likelihood of some of the commodity dripping from the discharge opening of the filling means between successive containers being filled.

Still a further object of the instant invention resides in the provision of a machine of the character set forth herein, embodying a new and novel continuously operating capping mechanism for containers.

Also an object of the invention is the provision of a machine of the character set forth herein embodying a capping mechanism so constructed that should there be no container in position to receive a cap, there will be no cap delivered.

Also a feature of the invention resides in the provision of an automatic container dispensing, filling, and capping machine designed for substantially continuous operation,

and wherein the dispensing mechanism operates continuously, the filling mechanism operates intermittently in timed relationship with the arrival of each successive container, and the capping machine operates continuously but is so arranged that should no container arrive at the capping station, no cap will be supplied by the capping mechanism.

It is also an object of this invention to provide a novel container dispensing, filling and capping machine, extremely simple in construction, economical to manufacture and operate, and which occupies a minimum of floor space.

While some of the more salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which—

Figure 1 is a side elevational view of the machine embodying principles of the instant invention, a part of the structure being broken away to illustrate parts therebeneath in section;

Figure 2 is a top plan view of the structure of Fig. 1;

Figure 3 is a plan sectional view taken substantially as indicated by the line III—III of Fig. 1, looking in the direction of the arrows, and illustrating a part of the drive mechanism for the machine;

Figure 4 is an enlarged fragmentary plan sectional view taken substantially as indicated by the line IV—IV of Fig. 1, also illustrating the drive mechanism for the machine;

Figure 5 is an enlarged fragmentary vertical sectional view, with parts shown in elevation, taken substantially as indicated by the line V—V of Fig. 4 and also illustrating the drive mechanism;

Figure 6 is an enlarged fragmentary vertical sectional view, with parts shown in elevation, taken substantially as indicated by the line VI—VI of Fig. 2, and illustrating the dispensing mechanism;

Figure 7 is an enlarged plan sectional view through the dispensing mechanism, taken substantially as indicated by the line VII—VII of Fig. 6;

Figure 8 is a fragmentary vertical sectional view, with parts shown in elevation, illustrating a dispensing mechanism of somewhat different construction than that shown in Figs. 1, 6 and 7;

Figure 9 is a fragmentary elevational view taken from the right-hand side of the upper portion of Fig. 8;

Figure 10 is a plan sectional view, with parts broken away to show structure therebeneath, and enlarged, taken substantially as indicated by the line X—X of Fig. 8;

Figure 11 is a fragmentary enlarged vertical sectional view, with parts shown in elevation, taken substantially as indicated by the line XI—XI of Fig. 2, and illustrating the filling mechanism;

Figure 11a is a fragmentary vertical sectional view, with parts shown in elevation, corresponding in character to the upper left-hand portion of Fig. 11, but illustrating a filling valve mechanism of slightly different construction, embodying a shock absorbing feature;

Figure 12 is a fragmentary transverse vertical sectional view particularly illustrating the valve structure of the filling mechanism and taken substantially as indicated by the line XII—XII of Fig. 11;

Figure 13 is an elevational view of an additional plunger for use in the valve mechanism of Figs. 11 and 12;

Figure 14 is an elevational view of a similar plunger of still different size;

Figure 15 is a vertical sectional view through an orifice ring of the character shown in the upper portion of Figs. 11 and 12, but of a different size;

Figure 16 is a similar sectional view through an orifice ring of still different size for use in the structures of Figs. 11 and 12;

Figure 17 is an enlarged fragmentary vertical sectional view, with parts in elevation, taken substantially as illus-

trated by the line XVII—XVII of Fig. 2, and illustrating the capping mechanism;

Figure 18 is a fragmentary plan view of the capping mechanism of Fig. 17, with parts removed including the cap stack, and parts broken away to illustrate other parts in section therebeneath;

Figure 19 is a fragmentary transverse vertical sectional view through the capping mechanism, with parts in elevation, and taken substantially as indicated by the line XIX—XIX of Fig. 17;

Figure 20 is a fragmentary vertical sectional view through a portion of the capping mechanism, with parts shown in elevation, and taken substantially as indicated by the line XX—XX of Fig. 18; and

Figure 21 is a fragmentary and greatly enlarged side elevational view of the central portion of the structure of Fig. 20, particularly illustrating the capping bell with cam controlling means thereon.

As shown on the drawings:

For convenience, and by way of example and not by way of limitation, the instant invention has been illustrated herein and described as a machine designed for the dispensing, filling and capping of small flat bottom paper containers of the type commonly utilized as ramekins, or the type commonly utilized for the service of coffee cream and the like. It is well known that paper containers of this type are utilized for distribution to restaurants and similar locations filled with many and various commodities for service to the dining customer, and in many cases they are also utilized for take home service in connection with various liquids, dressings, and sauces. It will, of course, be understood that the instant invention may be manufactured with at least parts thereof in larger sizes to accommodate larger sized containers such as those in which cottage cheese, ice cream, gelatin, salads, frozen foods, and the like, may be packed for home commodity items, and at the same time industrial uses cover an important field for filled containers of this general character.

The machine in general

With reference now to Fig. 1, it will be seen that the illustrated embodiment of the instant machine is in the form of a portable or easily movable device that can readily be moved from one location to another as desired, and which is not of the type that must be permanently installed as a fixture in the building. The machine may be supported by a plurality of legs 1, each of which terminates in a roller or caster 2, the upper ends of the legs being connected in any suitable manner to a base platform 3 inside an enclosing shell or casing 4 provided with a suitable cover 5 over the top thereof.

Now with reference to Figs. 2 and 3 as well as Fig. 1, it will be seen that above the cover 5 of the casing 4 there is disposed a turntable 6 provided with a series of circumferential notches 7, each of which is to hold a container. This turntable is carried on the top of a shaft 8 and rotates intermittently to successively bring the notches under a container dispensing mechanism generally indicated by numeral 9, and then carry the containers successively under a filling mechanism generally indicated by numeral 10, and from there to a capping mechanism generally indicated by numeral 11. These respective mechanisms are disposed substantially 90° apart as seen in Fig. 2 and represent the dispensing, filling, and capping stations of the machine. Looking at Fig. 3, it will be seen that the dispensing mechanism is driven by a vertical shaft 12, and the filling and capping mechanisms are driven by vertical shafts 13 and 14, respectively.

As will more fully appear later herein, the drive for the dispensing mechanism 9 is continuous, the filling mechanism is intermittently driven, and the capping mechanism 11 while continuously driven is so arranged that no cap will be delivered in the event no cup or container is located in the respective notch of the turntable 6.

5

The fourth station of the machine is the discharge station wherein filled and capped containers are delivered from the machine. As seen in Figs. 1 and 2, there is an upwardly inclined platform or ramp 15 fixedly mounted below the turntable 6. The bottoms of the filled containers contact the ramp, and the containers are thus elevated with respect to the turntable 6 sufficiently that the containers may move sideways through the narrow neck openings of the notches 7, it being understood that the containers have a tapering side wall. At the discharge station, a guide arm 16 extends inwardly over the turntable 6 for contact by the side walls of filled containers to turn those containers out of the respective notches onto a delivery platform 17 from whence they may be picked up by any suitable apparatus for packaging or delivery.

Thus, it will be seen that as the turntable continues its intermittent rotary movement, a notch 7 arrives under the dispensing mechanism 9 and a paper container or cup is dropped into that notch. The table then carries that container in its turn beneath the filling mechanism 10 and the container is filled to a desired extent with a predetermined commodity. From there the table carries the container in its turn beneath the capping mechanism 11, where a cap is applied to the top of the container to protect its contents, and thereafter as the turntable continues its movement, the filled container is eventually elevated by the ramp 15, and discharged onto the receiving platform 17 by the guide rail 16. The operation of the entire machine is therefore continuous and filled and capped containers are continuously discharged in successive order on the delivery platform 17.

With reference now to Fig. 5, it will be seen that the outer shell 4 is maintained in position by a plurality of bolts 18 threadedly engaged in the frame plate 3, and at the bottom of each of these bolts is a stirrup holder 19 which, when the bolts are tightened forces the casing 4 upwardly and holds it in tight association with a top frame plate 20. Thus when servicing is needed, it is a simple expedient to release the bolts 18, and drop the shell 4 toward the floor, whereby access is readily had to all the interior working mechanism, and particularly the drive mechanism which will now be described.

The main driving mechanism

The driving mechanism for the entire machine is best seen in Figs. 3, 4 and 5. With reference particularly to Fig. 5, it will be seen that a prime mover such as an electric motor 21 may be suspended from the frame plate 3, and this motor through a reduction gear box 22 actuates a vertical shaft 23 which in turn drives a vertical stub shaft 24 through a slip clutch assembly 25 which protects the machine against damage in the event one of the mechanisms becomes jammed. All of the drives for the various mechanisms, including the dispensing mechanism, filling mechanism and capping mechanism, are taken directly from the stub shaft 24, or somewhat indirectly from the center shaft 8.

For example, the dispensing mechanism is continuously driven by way of a sprocket 26 keyed to the stub shaft 24, a chain 27, and a sprocket 28 secured to the shaft 12.

The shaft 14 of the capping mechanism is also continuously driven from a sprocket 29 (Fig. 5) keyed to the stub shaft 24, a chain 30, and a sprocket 31 keyed to the shaft 14. From the showing in Figs. 4 and 5, it will be noted that the chain 30 passes around a sprocket 32 which rides freely on a bearing 33 around the center shaft 8, so that the sprocket 32 turns relatively to the center shaft and effects no drive whatever on the shaft 8.

This center shaft 8 which carries the aforesaid turntable 6 on its upper end is driven intermittently by way of a Geneva gear 34 keyed to the shaft. A Geneva actuator 35 (Figs. 3 and 5) is keyed to the aforesaid stub shaft 24 and intermittently operates the Geneva gear in a known manner. A relatively large sprocket 36 is keyed

6

to the center shaft 8, and through a chain 37 drives a sprocket 38 keyed to the shaft 13. Since the center shaft 8 is intermittently driven by the Geneva gear, the shaft 13 for the filling mechanism is likewise intermittently driven.

In order to insure a smooth and positive action at all times of the various mechanisms, and maintain synchronism, suitable chain tightening devices of known construction and designated 39, 40, and 41, are associated with the chains 27, 30 and 37, respectively.

It will be understood that suitable supporting bosses, bearings, and the like, will be supplied wherever necessary for the adequate operation of the various shafts, such being of known construction and which need not be described herein.

The container dispensing mechanism, first modification

For illustrative purposes, the instant dispensing, filling, and capping mechanisms will be described as acting upon a container in the form of a flat bottomed paper cup, one of these containers being shown in section in Fig. 20. Referring to that figure, it will be seen that the container includes a frusto-conical side wall 42 and a flat bottom 43 recessed inwardly somewhat from the lower circumferential edge of the side wall. At the top thereof, the side wall is provided with an outwardly rolled rim bead 44 around the mouth of the container, and below the rim bead a reasonable extent is an inwardly opening annular groove formation 45 for the reception of a disk-like cap or cover 46. Obviously this is not the only type or construction of container that the instant machine will handle, but by simple variations in the actual container contacting elements, the machine may readily be adjusted to handle various types and configurations of containers.

The first illustrated form of container dispensing mechanism is shown in Figs. 6 and 7. As previously mentioned, this dispensing mechanism is operated by way of the vertical shaft 12, which extends through an aperture in the upper frame plate 20 above the cover 5 of the machine and is disposed and journaled within an up-standing and laterally inwardly extending housing or casing 47 provided with a cover 48 held in position by a plurality of thumb bolts 49, or the equivalent.

Carried by and extending well above the casing cover 48 is a magazine 50 for holding a supply stack of nested containers, which stack gravitates down the magazine 50 as containers are successively moved from the bottom end of the stack. The lower end of the stack 50, inside the cover 48, is notched as indicated at 51, each notch providing an opening for the extension therethrough of a portion of a dispensing worm 52 carried on a shaft 53, there being four such dispensing worms shown in the illustrated instance, but obviously various numbers may be utilized depending somewhat upon the size of the containers being handled. Each dispensing worm 52 has a spiral outwardly extending flange or worm 54 thereon so arranged as to enter between the rim beads of the two lowermost cups in the stack, and by engagement with the rim bead on the lower cup carry that cup down and out of the apparatus in a single revolution of the worm, all of the dispensing worms operating in unison.

The dispensing worms are driven by a suitable gear arrangement from the shaft 12. As seen in Figs. 6 and 7, the upper end of the shaft 12 is preferably toothed as indicated at 55 in the manner of a drive pinion and meshes with a gear 56 mounted on a stub shaft 57. This gear 56, in turn, meshes with a ring gear 58 carrying a cylindrical portion 59 extending therebelow and through which each successive container is discharged to fall in one of the recesses 7 in the turntable 6. As seen best in Fig. 7, the ring gear 58 also meshes with a pinion 60 on the underside of each dispensing worm 52 so that all these worms are driven together by the ring gear 58.

As stated above, the operation of the dispensing mechanism is preferably continuous, and as each of the dis-

7

dispensing worms makes a revolution the then bottom cup of the stack is discharged through the ring gear, the drive of the turntable through the Geneva gear being synchronized so that as each cup drops from the stack, an empty recess in the turntable 6 is ready to receive that container.

The container dispensing mechanism, second modification

The second illustrated form of the container dispensing mechanism is shown in Figs. 8, 9 and 10. In this second illustrated form of dispensing mechanism, the individual containers do not drop into the recesses 7 in the turntable 6, but are actually seated in the recesses by the dispensing mechanism before being released. In other words, each container actually enters the respective recess in the turntable before the dispensing mechanism frees the container, so that the container actually gravitates only a very short distance in order to fully seat itself and there is little or no likelihood of a container becoming misaligned.

Since the dispensing mechanism in this instance requires a reciprocating movement of the actuating shaft, rather than a rotary movement, certain rearrangements in the general assembly may be necessary in order to accommodate this particular dispensing mechanism. To this end, in Fig. 8, the drive motor 21 is shown as mounted on top of the lower frame plate 3 and drives the dispensing mechanism by way of a horizontal shaft 61 provided with suitable bearing means as indicated at 62—62, through a set of bevel gears 63. Otherwise, the general drive system for the entire machine may be arranged as above described.

This form of dispensing mechanism embodies an upright support 64 secured to the upper frame plate 20, and to the top of which is keyed a block-like housing 65 having an opening 66 therethrough for the passage of containers from a magazine 67 which extends partially within said opening 66 and extends well above the housing 65.

As seen best in Fig. 8, the containers gravitate down the magazine 67, into the opening 66, and the bottom container comes to rest with the rim bead thereof engaged by a pair of opposed jaws 68—68 each of which is pivoted as at 69, and urged inwardly toward the stack of containers by a relatively lightweight spring 70. These springs 70 are of sufficient strength to support a stack of nested containers, and still light enough to permit the lowermost container to be stripped from the jaws by a straight downward movement.

Mounted on the top of a reciprocating supporting rod 71 is a frame plate 72. On each side of this plate 72 an arm 73 is pivoted as at 74 to a vertical pivot post. The outer end of each arm carries thereon a cup or container stripping jaw 75, grooved at its inner end to receive the rim bead of a container. As seen best in Fig. 10, it will be seen that the stripping jaws 75—75 are diametrically opposed to the retaining jaws 68—68. It will be noted that the pivot points 74—74 are intermediate the ends of the arms 73—73 so that these arms extend well beyond the pivot points on the side opposite the jaws 75. A sinuous leaf spring 76 engaged around a series of posts 77 urges the free ends of the arms 73—73 outwardly away from the median line of the plate 72, thus bringing the jaws 75 inwardly into container engaging position. This inward movement may be limited by a suitable stop pin 78, if the same is deemed necessary.

Depending from each side of the housing 65 in alignment with the free ends of the arms 73 are fixed bars 79, the lower end of each of which is bent inwardly at an angle as indicated at 80 and seen best in Fig. 9. These bars cause a spreading of the jaws 75—75 when a container is to be released, as will be more fully explained later.

The reciprocating rod 71 is moved upwardly and down-

8

wardly carrying the frame plate 72 along therewith by means of a cam 81 (Fig. 8) carried on the actuating shaft 61. Keyed to the lower end of the rod 71 is a yoke member 82, bifurcated at its lower end 83 to straddle the shaft 61. This yoke member and consequently the rod 71 is normally urged downwardly by means of a coiled spring 84 so that a cam rider 85 carried on the yoke member stays in contact with the cam or eccentric 81. This element 81 is preferably merely circular in shape, but as seen in the drawings is secured to the shaft 61 in an off center location.

As the structure is seen in Figs. 8 and 9, the pivotal stripper jaws 75—75 are in container engaging position along with the pivotal jaws 68—68. All four of these jaws may then be presumed to be engaging the rim bead of the lowermost container of the stack in the magazine 67. Now as the shaft 61 and the eccentric 81 revolve, the spring 84 moves the rod 71 downwardly carrying therewith the stripper jaws 75—75 and also the lowermost container of the stack which is stripped through the jaws 68—68 by the jaws 75. Near the end of the descent of the rod 71, the free ends of the jaws carrying arms 73—73 engage the inwardly turned portions 80 of the bars 79, causing a pivoting movement of these arms against the action of the spring 76, and an opening or spreading of the jaws 75—75 to release the carried container. By that time, the lower portion of the container has already entered the recess or notch 7 in the turntable 6 so that when it is freed the container need only drop into seating engagement in the recess a very small distance. When the rod 71 again rises, the jaws 75—75 snap over the rim bead of the lowermost container. The angle on the upper edge of each jaw 75 is such that the jaws open easily when contacting the container rim bead and the bead is not injured. The contour of each jaw 68 is such as to prevent the lowermost cup from rising when contacted by jaws 75—75.

It will be noted that the action of this dispensing mechanism is particularly positive, the container is never freed from engagement by the mechanism until just prior to actually seating in the turntable, and the timing of mechanism of this character and the synchronization of it with other mechanisms in the same machine is relatively simple.

The container filling mechanism

The mechanism by which each container is filled with the desired commodity is best seen in Figs. 11 to 16 inclusive. As previously stated, this mechanism is driven by the vertical shaft 13, and as seen in Fig. 11, the mechanism is supported by way of a housing 86 mounted on top of the upper frame plate 20, which housing is provided with a suitable end cap 37 over the open end thereof. Of course, the housing carries bearings at locations where needed for the respective shafts. Inside the housing the shaft section 88 is interlocked with the upper end of the shaft 13 to be driven thereby. This is a matter of convenience in providing a quick way of removing the mechanism when desired.

The shaft 88 drives a cross shaft 89 by means of a suitable bevel gear arrangement 90. This shaft 89 drives the dispensing means proper.

Commodity to be dispensed is initially placed by any suitable means in a hopper or reservoir 91 having a sloping bottom end terminating in an open neck 92 through which the commodity gravitates. In most cases, an orifice block will be utilized in the bottom of the reservoir, this block being indicated by numeral 93 and which has a discharge orifice 94 therethrough of predetermined size depending upon the commodity being dispensed.

The commodity gravitates from the reservoir 91 into an opening 95 in a valve housing 96 secured to the end of the housing 86 in any suitable manner such as by bolts 97, which bolts are preferably elongated with their inner

ends fixed to the housing 86. The valve housing is preferably provided with a flat bottom portion as indicated at 98, and through the lower portion of the valve housing is a discharge orifice 99 through which the commodity exists into a container carried by the turntable 6, as best seen in Fig. 11.

Inside the housing 96 rotary valve means are mounted which include a rotor 100 having a diametral passage 101 therethrough of the same diameter as the passage 95 in the housing, this passage 101 functioning as a cylinder for a piston or plunger 102 of sufficient weight to move by gravity in the cylinder opening 101. The rear wall only of the rotor is provided with a rectangular or other polygonal form of notch or recess 103 which receives a similarly shaped head 104 on the drive shaft 89 by means of which the rotor is revolved. A cover plate 105 maintains the rotor within the housing 96, and this cover plate is held in position by the aforesaid bolts 97, wing nuts 106 being provided to facilitate quick dismantling and reassembly of the entire valve housing and parts contained therein for cleansing purposes, or for interchangement of plungers and possibly rotors when different commodities are being dispensed.

Preferably the housing 96, rotor 100, cover plate 105, and in some instances the plunger 102 itself, are made of a transparent thermosetting plastic material so that the actual dispensing of the commodity during operation of the machine is visible to the operator. When a thermosetting plastic material is utilized, the valve housing 96 preferably has the construction illustrated particularly in Fig. 12, wherein it will be noted that the housing is thickened in the side portions and at the top thereof, which prevents any adverse expansion or contraction resulting from ambient temperature changes. Accordingly, the bottom of the housing cannot contract and pinch the rotor or vary the size of the discharge opening 99. The top of the housing is upwardly inclined as indicated at 107 giving in effect a pitched roof arrangement so that any condensation will run off laterally around the housing and not get into the commodity being dispensed.

It will be noted that the space in the rotor passage not occupied by the piston or plunger 102 determines the volume of commodity dispensed into the container. The shaft 89 intermittently rotates a half-revolution at a time, and for each half-revolution there is a filling of the space in the rotor above the plunger with the particular commodity being dispensed. Then after 180° of rotation, the plunger falls by gravity and pushes out the commodity beneath it, while at the same time commodity again enters above the plunger. Thus, there are two discharges of commodity for each rotation of the rotor. It is to be noted that the ends of the plunger are preferably flat as indicated at 108 to provide an action akin to suction and draw back the extra drop of commodity remaining in the discharge orifice 99, so that that drop does not fall between the filled container and the next oncoming container.

It will be noted that the instant commodity dispensing filling mechanism is extremely simple in character and operation. Nevertheless, in order to insure the proper dispensing of numerous commodities which may be fluid, semi-fluid, viscous, and in some cases even powdery in character, certain factors in the dispensing mechanism should bear a correlation with other factors so as to insure the attainment of the prime object which is to have all substances exit at the same velocity, in the same volume, and in the same time, assuming that each container is to receive the same quantity. The main factors to be correlated are clearance between the plunger and rotor, the plunger weight, and the size of the opening in the orifice block 93 in the reservoir. If any one of these factors is not in proper correlation with the other factors, the result may not be satisfactory.

For example, milk is thin with practically no viscosity, and if there is any material clearance between the

plunger and the opening 101, leakage would result in the dispensing of milk. Yet, the clearance must be sufficient as not to slow the fall of the plunger, because if the plunger is retarded in its descent, the rotor may turn by the indexing process before all of the commodity is discharged from below the plunger, in which event there would be insufficient filling of the containers. On the other hand, with a commodity such as cream, more clearance between the plunger and inner rotor wall is necessary because of the heavier quality of the product being dispensed, over milk, and further to avoid the churning of butter particles which would retard the action of the plunger and slow its descent. In short, the clearance between the plunger and the inside rotor wall must increase as the viscosity of the commodity increases.

As to the size of the opening through the orifice plate 93, here again the opening size must increase as the viscosity of the commodity increases. For example, the orifice size must be small for milk to take off the head pressure of the balance of the milk in the reservoir, or even if the clearance is correct leakage might result and the milk might exit so fast that it will splash out of the container on the turntable. A small orifice maintains the head pressure in the reservoir substantially constant.

For cream heavy in butter fat, a larger orifice is needed to insure the prompt descent of the adequate quantity into the rotor. A variance of $\frac{1}{16}$ inch in the diameter of the orifice makes a tremendous difference between the various commodities. For heavy and thick condiments, tartar sauce, ketchup, and the like, the orifice might better be wide open. That may mean the elimination of the orifice plate 93 entirely for a particular commodity, leaving the neck 92 of the reservoir as the actual orifice at this point.

In regard to the weight of the plunger, here again that weight must increase as the viscosity of the commodity increases. In proportioning the weight of the plunger to the viscosity of the commodity, then correlating that weight with the orifice size and clearance, insurance is had that the plunger will descend promptly and expel all of the commodity at the proper velocity as each container arrives beneath the discharge opening 99.

To this end, the machine is preferably provided with a series of plungers of different heights and different weights, such as the long plunger 102a shown in Fig. 13, and a short plunger 102b seen in Fig. 14. Of course, a change in plunger length varies the volume of commodity dispensed. It is therefore intended to equip each machine with a series of plungers of different lengths to provide for different quantities of commodity, such as $\frac{3}{8}$ fluid oz., $\frac{3}{4}$ oz., $\frac{7}{8}$ oz., and 1 oz. for small containers. At the same time it is necessary to provide further variances in length between the $\frac{3}{4}$ and $\frac{7}{8}$ oz. for example, to meet local avoirdupois requirements which a fluid ounce volume will not give. In addition, it is intended to provide the machine with plungers of equal length but varying in weights, and to that end, some of the plungers may be of thermosetting plastic material and others of stainless steel, or a combination of both, since weight may be varied readily by drilling a plunger and plugging it with a lighter or heavier material.

It is also intended to provide each machine with a set of orifice blocks or plates 93. In Fig. 15 we have illustrated a substitute orifice block 93a having a smaller orifice 94a than the ones shown in Figs. 11 and 12, whereas in Fig. 16 an orifice block 93b is illustrated having a larger orifice 94b. Another variation, as mentioned above, may be attained by removing the orifice block entirely and leaving the discharge neck 92 wide open.

The structure of the dispensing means makes it extremely simple for an operator to change orifice plates or plungers. The plunger is changed merely by removing

the cover plate 105, withdrawing the housing and rotor, removing the rotor, and substituting a different plunger. The orifice blocks may be changed by simply lifting the one in the reservoir out and dropping in a new one.

A set of directions may be provided as to the particular plunger and orifice blocks to be utilized for various commodities, so that the operator will have no difficulty whatever in obtaining the proper correlation between clearance, plunger weight and orifice size for any particular commodity. With such arrangement, various and sundry forms of commodities may be dispensed into containers, including commodities in the food service and distribution field of endeavor, as well as commodities for industrial usage inside manufacturing plants.

Of course, the filling mechanism is timed relatively to the movement of the turntable 6 so that contemporaneously with the arrival of a container in filling position, the Geneva wheel causes a half rotation of the shaft 89 insuring one dispensing operation, and that shaft rotates one half revolution upon each movement of the Geneva gear.

The modified filling valve means

In Fig. 11a we have illustrated a modified form of dispensing valve mechanism. In this instance means are provided to absorb or take up the shock of the dropping plunger, and this form of construction may be desirable where heavy plungers for the dispensing of thicker materials are utilized most frequently.

In this instance, the general structure is the same as just above described. However, inside the inner wall 101 of the rotor 100, O-rings 109 and 110 of resilient material such as synthetic rubber or the equivalent are provided adjacent each end of the wall. Suitable grooves are provided in the wall to accommodate substantially half portions of the O-rings, leaving the remainder project into the cylindrical passage.

A plunger 111 is utilized having a reduced portion 112 at each end thereof to provide an annular shoulder 113 around the actual end of the plunger. When the plunger drops, such shoulder comes in contact with the respective O-ring, and the end of the plunger does not create an impact against the bottom of the housing 98 around the discharge opening 99. Should there be any slight bounce to the plunger by virtue of the resiliency of the O-ring, such bounce would actually be helpful in creating a slight suction action and retracting the last drop of commodity within the opening 99 so that that drop did not fall on the turntable 6 between successive containers.

The container capping mechanism

The container capping mechanism is illustrated more completely in Figs. 17 to 21 inclusive of the drawings.

As stated above, the capping mechanism is driven by way of the vertical shaft 14 which extends through the frame plate 20 as seen in Fig. 17 and upwardly into a capping housing comprising a base portion 114 seated on top of the frame plate 20 and a top or cover portion 115 which may be secured to the base portion in any suitable manner, such as by swing bolts 116—116, seen best in Figs. 18 and 19. The drive shaft 14 is keyed at its upper end to an actuating stub shaft 117 in alignment therewith which actually moves the parts of the capping mechanism.

The top part 115 of the housing is apertured to receive therein a tubular magazine 118 for a stack of container caps. This magazine 118 is preferably provided with a slot 119 (Fig. 19) so that the supply of caps is visible to the operator.

Keyed to the upper end of the actuating shaft 117 is an eccentric 120 having on its outer end a shoe or roller 121 upstanding to enter into a slot 122 in a slide plate 123 movable backward and forward by the action of the eccentric on a track formed by a shoulder formation 124 in the base portion 114 of the housing. This slide plate 123 is connected by means of a shuttle key 125 to a lid

ejector or shuttle 126 reciprocable on a shuttle guide plate 127 between the base portion and cover of the housing, this guide plate being slotted as indicated at 128 to accommodate the shuttle key 125. The ejector or shuttle 126, as clearly seen in Figs. 18 and 19, is considerably narrower than the slide plate 123 and moves backward and forward between a pair of oppositely disposed lip plates 129, and beneath the lid magazine 118.

As seen clearly in Fig. 17, the shuttle, when in its farthest position of withdrawal, nevertheless extends under the magazine 118, and is provided adjacent the circumference of the magazine with a pair of spaced elevations 130—130 which actually engage a lid to move it from beneath the stack in the ejecting operation. Rearward of the ejecting shoulders 130—130 the shuttle is provided with a pair of integral elevated track-like formations 131—131 substantially in alignment with the ejecting shoulders and having sloping forward faces as seen best in Figs. 17 and 18. These elevations move under the stack of lids and support the entire stack at the time the lowermost lid is ejected. As the shuttle moves to the left as seen in Figs. 17 and 18 to eject the lowermost lid in a leftward direction, a suitable stripper block 132 prevents the movement of more than the lowermost lid.

When a lid is ejected, it passes beneath a capper head 133 fixed to the lower end of a stationary supporting rod 134 depending from an arm 135 integral with the cover portion 115 of the housing. Overlying the capper head 133 is a bell 136 slidable on the rod 134. This bell-like element 136 is of sufficient weight to fall by gravity to the position seen in Fig. 17. A pair of oppositely disposed lid retaining pins are carried by the bell. Each such pin 137 is urged inwardly by a leaf spring 138 mounted on the side of the bell, and as seen clearly in Fig. 18 the inner ends of the pins 137 are preferably skived to provide a sharp engaging edge. When a lid is delivered by the shuttle 126 to the capping head 133, the lid is retained in position by the pins 137—137 frictionally engaging the marginal edge of the lid. Such engagement is released at the time of capping a container by movement of the bell.

When a container carried by the turntable 6 reaches capping position, it is elevated by means of a ram 139 having a head 140 thereon for engaging the bottom of the container. The ram is reciprocated by means of a cam 141 keyed to the drive shaft 14 as seen in Fig. 17, the ram carrying a block 142 with a cam rider in the form of a roller 143 extending therefrom into the cam groove of the element 141. A coiled spring 144 disposed about the ram between the block 142 and a collar 145 takes up any shock that might occur during the operation.

At this point it should be pointed out that the cam 141 is shown opposite to its correct position in Fig. 17, for purposes of clarity. It will be noted in this figure that the ejection shuttle 126 is in fully retracted position, and at that time the cam 141 is rotated 180° from the showing in Fig. 17 so that the ram 139 is in elevated position, or the position seen in Fig. 20. However, the cam has purposely been illustrated 180° out of its normal position and with the ram in its lower position so as to eliminate possible confusion and better portray the parts in this figure of the drawings.

With the instant construction, means are provided to eliminate the possibility of a lid being ejected by the shuttle in the event there is no container to receive the just previously ejected lid. In other words, should the turntable have an empty space therein, and there is no container to receive the lid on the capping head 133, a second lid will not be ejected by the shuttle until that first ejected lid is removed and placed in a container.

To this end, a pair of opposed stack supporting pins 146 shouldered as at 147 are mounted in the top portion 115 of the housing as seen best in Figs. 18 and 19. Each of these pins is provided with a transverse opening 148

13

having a sloping wall 149 on one side thereof. Each pin is urged inwardly to a point where the shoulder 147 will project under the stack of caps or lids by means of a spring 150. In the event these pins remain in the position seen in Figs. 18 and 19, and are not retracted, they will support the entire stack of lids above the ejecting shuttle so that no lid will be ejected, the lids having been raised above the shoulders on the pins 146 by means of the track-like elevations 131—131 on the ejecting shuttle.

It is necessary, therefore, to retract the pins 146—146 each time a filled container receives a lid, and this is accomplished by way of a pair of retraction pins, there being one retraction pin assembly for each of the pins 146. These retraction pin assemblies are mounted on opposite sides of the cover part 115 of the housing as seen in Figs. 18 and 19. Each retraction pin assembly embodies a pin 151 having a slanting forward end 152 to engage the aforesaid sloping wall 149 in the slot of the stack supporting pin. This retraction pin 151 is normally urged outwardly by a spring 153 into disengaged position, or the position seen in Fig. 18. The projecting end 154 of the pin is also cut off obliquely as indicated at 155 in Fig. 21 for engagement by the sloping surface of a cam 156 carried by the aforesaid bell 136. At the time the filled container is capped, the bell is elevated by contact with the container, and the cam 156 forces the pin 151 inwardly against the action of spring 153 so that the end 152 of the pin forces the stack supporting pin 146 outwardly to permit the stack of lids to drop down upon the forward portion of the ejecting shuttle. But, if there is no cup to receive the lid on the head 133 and elevate the bell, the pins 146—146 will not be retracted but will remain in lid stack supporting position, and the next movement of the ejector shuttle will not contact a lid but pass freely under the stack.

In operation, the capping mechanism is extremely simple and positive. Assuming now that a lid has been deposited on the capping head 133 where it is held by the pins 137 carried by the bell, and the shuttle has moved to fully retracted position seen in the upper portion of Fig. 17. It will be recalled that the cam 141 on the drive shaft 14 should be 180° opposite to its present position, and therefore when the shuttle is in the fully retracted position, this cam will elevate the ram 139 which will engage with the bottom of a cup on the turntable, elevate that cup or container until the rim 44 thereof contacts the bell as seen in Fig. 20, and the upward push in order to seat the cap or lid 46 in the groove 45 of the container results in elevating the bell along the rod 134. The upward movement of the bell of course releases the lid by moving the pins 137 out of contact with the lid. As the bell is elevated, the cam 156 on each side thereof contacts the respective retracting pin 154 and causes a retraction of the stack supporting pins 146—146, permitting the stack of lids or covers to drop down upon the forward portion of the ejecting shuttle. After the lids have dropped on the forward portion of the shuttle, and the bell has descended, contact with the lower lids prevents inward movement of the supporting pins 146—146.

Immediately upon the completion of this operation, the ejector shuttle again moves outwardly and forces the lowermost lid into position on the capper head 133, at the same time elevating the stack of lids by means of the track-like members 131 so that the stack supporting pins 146—146 may again move in position under the stack. If the ejected lid is taken by a container, the operation is repeated. If there does not happen to be a container to receive the ejected lid, the bell 136 will not be raised, the stack supporting pins 146 will not be retracted, and upon the next outward movement of the ejector shuttle no lid will be ejected since the shuttle will pass beneath the stack of lids held up by the pins 146. Consequently, while operation of the ejecting mechanism may be continuous, a second lid cannot be ejected until

14

the first lid has been taken away on a container. Consequently, there can be no jamming of lids in the capper bell or under the stripper block or elsewhere along the course of travel of a lid and the mechanism operates efficiently and accurately as long as there is an adequate supply of lids available.

This capping mechanism per se is more fully set forth, described and claimed in a divisional application.

The operation of the machine in general

It is believed that the operation of the various mechanisms embodied in the instant machine are sufficiently apparent from the foregoing as to require only a brief general description of the working of the machine.

It will be recalled that the drive shafts 12 and 14 of the dispensing mechanism and the capping mechanism are both driven continuously, while the turntable 6 and the drive shaft 13 of the filling mechanism are driven intermittently by virtue of the Geneva gear 34. Consequently, it is advisable at the start of the operation to place containers in the sockets 7 of the turntable between the dispensing mechanism and the filling mechanism, so there will be containers beneath the filling mechanism in the early part of the operation. Thereafter, containers will be automatically dispensed into the remaining sockets on the turntable, and as outlined above, no cap will be fed from the stack of caps or lids until the first fed cap is picked up by a container.

The operation is thereafter substantially continuous. The timing of the machine is such that as the turntable indexes bringing a new recess 7 beneath the dispensing mechanism, a container drops into that recess from the first modification of dispensing mechanism and is placed in the recess if the second modification of dispensing mechanism is utilized. The turntable advances these empty containers into successive positions beneath the filling mechanism, and at each half revolution of the filling mechanism the container is provided with a predetermined amount of the desired commodity. As the turntable continues its movement it successively brings the filled containers beneath the capping mechanism, each container is automatically elevated to receive its respective lid or cap and then the filled and capped container is progressively moved by the turntable along the ramp 15 into elevated position to be free of its slot recess 7, and is ultimately delivered onto the platform 17 from whence it can be removed by any suitable mechanism.

It will be noted that little attention is needed from the operator of the machine, and in fact one operator is capable of handling a number of machines simultaneously. It is only essential that the operator keep the container and lid magazines 50 and 118 adequately supplied, and also be sure there is a quantity of commodity in the filling hopper or reservoir 91.

From the foregoing it is apparent that we have provided a novel container dispensing, filling and capping machine that is entirely automatic in operation, exceedingly rapid, and positive and accurate in dispensing filling and capping. It will also be noted that the machine is capable by a very minor interchanging of parts in the filling mechanism of handling substantially any desired commodity which may be liquid, semi-liquid, viscous, or even powdery, and a simple set of directions will suffice for the operator to utilize the proper orifice, the proper plunger, and so attain the proper correlation of orifice size, clearance, and plunger weight in the filling mechanism. Clearly, the machine is economical to construct, economical to operate, and exceedingly long lived. Further, the machine is pleasing in appearance, easily cleansed and need not be built in as a permanent fixture.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

This application is an improvement on and continuation-in-part of the invention set forth in our copending

application entitled Filling Machines, filed October 14, 1953, Serial No. 385,962, now abandoned.

We claim as our invention:

1. In a container dispensing, filling, and capping machine, a turntable having circumferential recesses to receive and carry containers, dispensing means to deliver containers successively into the recesses of said turntable, filling means to successively fill containers on said turntable with a commodity, capping means to successively cap the filled containers, said filling means being adjustable to accommodate different commodities varying in viscosity whereby each commodity may be dispensed at the same velocity, in the same amount and in the same time as the other commodities, and drive means connected to continuously actuate said dispensing and capping means while intermittently rotating said turntable and intermittently operating said filling means.

2. In a container dispensing, filling, and capping machine, a turntable having circumferential recesses to receive and carry containers, drive means to rotate said turntable, dispensing means to deliver containers successively into the recesses of said turntable, filling means to successively fill containers on said turntable with a commodity, capping means to successively feed caps and apply them to the filled containers, said capping means being arranged to withhold a cap if no container is positioned to receive a cap, said filling means including a reservoir, an orifice member at the bottom of said reservoir, a rotor having a bore therethrough beneath said orifice member, a plunger in said bore of less length than the bore and movable by gravity each half revolution of the rotor to discharge the commodity that entered above the plunger, and a set of various sized orifice members and plungers for said filling means to readily adapt it for commodities of different viscosities.

3. In a container filling machine, a housing having a passage therethrough, a commodity reservoir above said housing to discharge into said passage, a rotor in said housing having a diametral passage therethrough which will be in alignment with the housing passage at every half revolution, a gravity movable piston having a substantially flat bottom surface to lift fluid after the dispersing operation within and of less length than said rotor passage, drive means to intermittently actuate said rotor a half revolution to cause said piston to force out the commodity content of the rotor passage, and shock absorbing means in the rotor to cushion the fall of said piston.

4. In a container filling machine, a housing having a passage therethrough, a commodity reservoir above said housing to discharge into said passage, a rotor in said housing having a diametral passage therethrough which will be in alignment with the housing passage at every half revolution, a gravity movable piston within and of less length than said rotor passage, drive means to intermittently actuate said rotor a half revolution to cause said piston to force out the commodity content of the rotor passage, and shock absorbing means in the rotor to cushion the fall of said piston, said shock absorbing means being in the form of a resilient member extending partially into the rotor passage adjacent each end thereof.

5. In a container filling machine, filling mechanism comprising a housing having a vertical passage therethrough with a reduced opening at the bottom, a commodity reservoir over said housing to discharge into said passage, valve means in said housing comprising a diametrically bored rotor with a gravity actuated piston in the rotor bore and of less length than the bore, drive means to intermittently turn said rotor a half revolution at a time, said rotor being removable from said housing, and a series of one-piece cylindrical pistons of different weights and lengths for selective insertion in the rotor bore to adjust said valve means for different volumes and kinds of commodities.

6. In a container filling machine, filling mechanism comprising a housing having a vertical passage therethrough with a reduced opening at the bottom, a commodity reservoir over said housing to discharge into said passage, valve means in said housing comprising a diametrically bored rotor with a gravity actuated piston in the rotor bore and of less length than the bore, said housing and said rotor being plastic material, and said housing being thickened at the sides and top to eliminate effects of expansion and contraction.

7. In a container filling machine, filling mechanism comprising a housing having a vertical passage therethrough with a reduced opening at the bottom, a commodity reservoir over said housing to discharge into said passage, valve means in said housing comprising a diametrically bored rotor with a gravity actuated piston in the rotor bore and of less length than the bore, an orifice block having an opening of predetermined size at the outlet of said reservoir, drive means to intermittently rotate said rotor a half revolution at a time, and said piston having ends other than convex to provide an action akin to suction and eliminate dripping from said reduced opening between filling discharges.

8. The method of successively filling containers from a reservoir fed housing having a bored rotor and plunger valve assembly therein, consisting of the steps of varying the size of the orifice from the reservoir and the weight of the plunger and clearance between the plunger and rotor bore in keeping with the viscosity of the commodity being dispensed, intermittently rotating the rotor at least a partial revolution at a time, and successively disposing containers to be filled under the outlet from the housing.

9. In a container dispensing, filling, and capping machine, a turntable having circumferential recesses to receive and carry containers, dispensing means to deliver containers successively into the recesses of said turntable, filling means to successively fill containers on said turntable with a commodity, capping means to successively cap the filled containers, said capping means being arranged to automatically feed and apply caps to the containers but withhold a cap if a container is not in position to receive the cap, said filling means being adjustable to accommodate different commodities varying in viscosity whereby each commodity may be dispensed at the same velocity, in the same amount and in the same time as the other commodities, and drive means connected to continuously actuate said dispensing and capping means while intermittently rotating said turntable and intermittently operating said filling means.

References Cited in the file of this patent

UNITED STATES PATENTS

503,029	Baker	Aug. 8, 1893
1,049,478	Hedgcock	Jan. 7, 1913
1,507,516	Richardson	Sept. 2, 1924
1,601,565	Dudler	Sept. 28, 1926
1,609,581	Smith	Dec. 7, 1926
1,632,165	Bergmann et al.	June 14, 1927
1,640,528	Bruhn	Aug. 30, 1927
1,676,377	Bergmann	July 10, 1928
1,861,734	Bergmann	June 7, 1932
1,867,998	Benson	July 19, 1932
1,872,103	Bergmann	Aug. 16, 1932
1,913,743	Borchert	June 13, 1933
1,931,246	Barbieri	Oct. 17, 1933
2,325,164	Goodwin	July 27, 1943
2,468,675	Leonard	Apr. 26, 1949
2,568,526	Waring	Sept. 18, 1951
2,661,134	McGihon	Dec. 1, 1953
2,668,203	Martin	Feb. 2, 1954
2,712,893	Charland	July 12, 1955
2,755,008	Beltz et al.	July 17, 1956
2,768,491	Gatheridge	Oct. 30, 1956
2,788,027	Ullman et al.	Apr. 9, 1957