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F. HUNTAR ET AL
CONTAINER CLOSING MECHANISM

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2 Sheets-Sheet 1

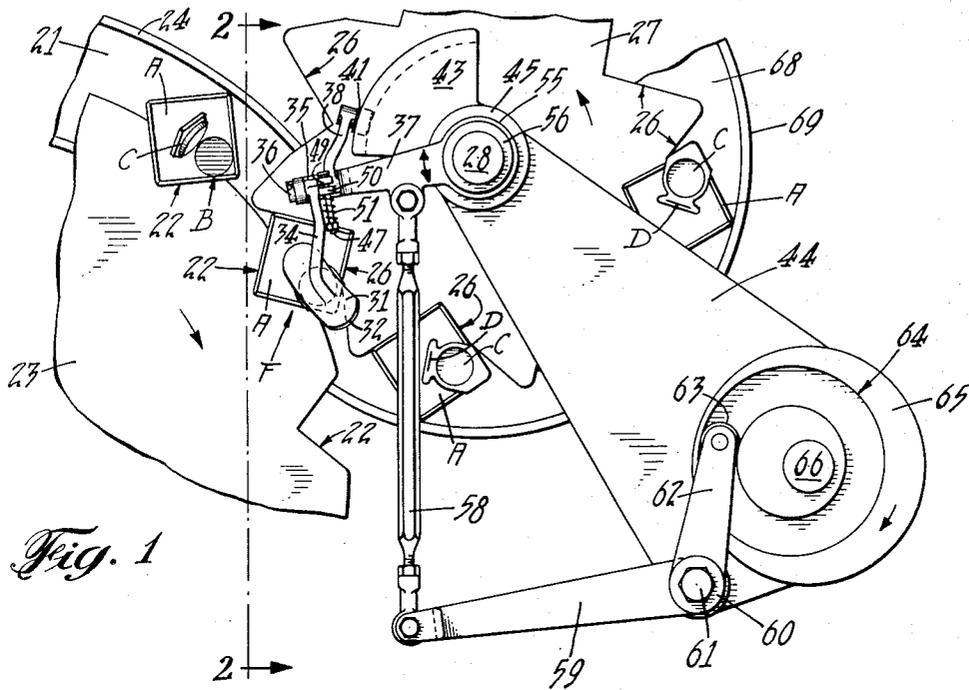


Fig. 1

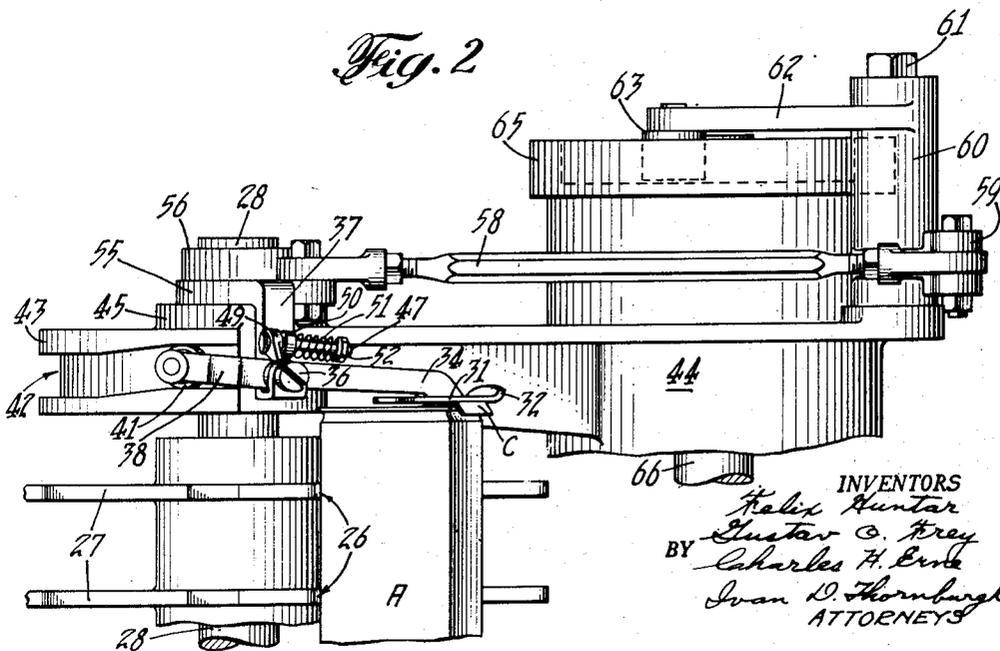


Fig. 2

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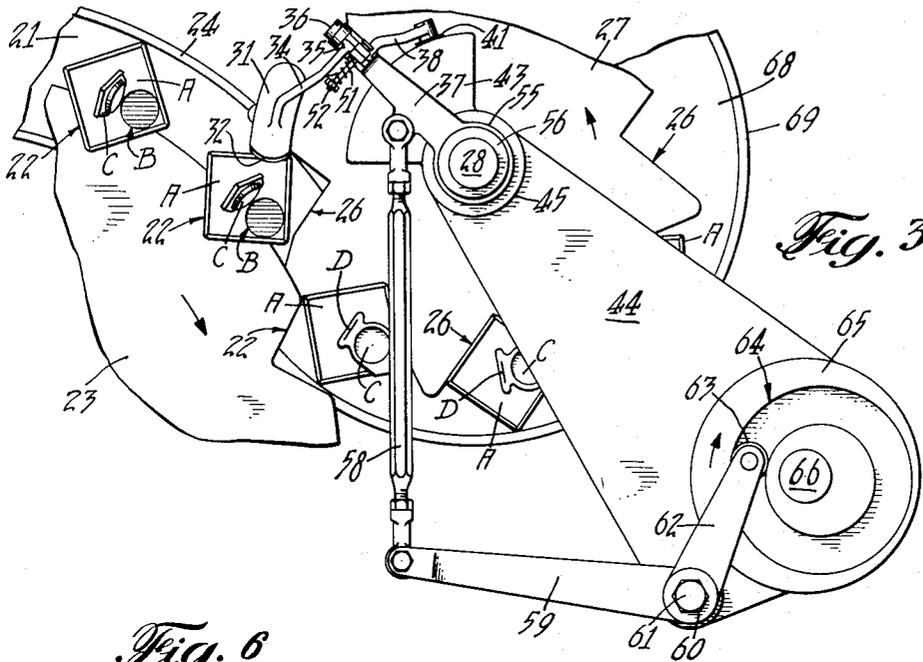


Fig. 3

Fig. 6

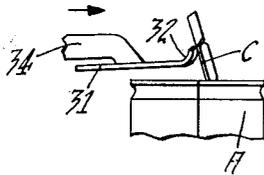


Fig. 7

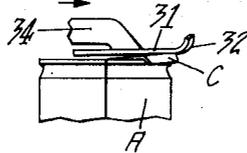


Fig. 8

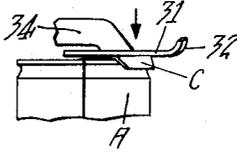


Fig. 4

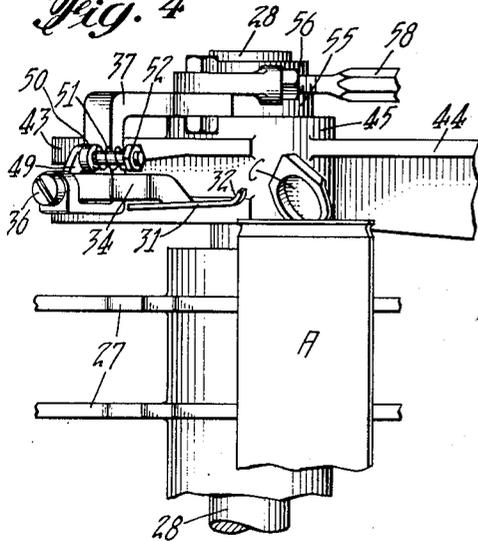
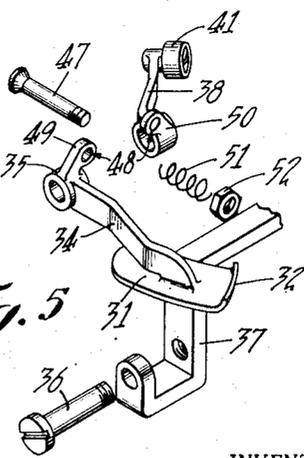


Fig. 5



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CONTAINER CLOSING MECHANISM

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4 Claims. (Cl. 226—81)

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The present invention relates to a mechanism for closing containers and the like and has particular reference to devices for closing hinged closure members attached to containers and for pressing them down tight into fully closed position.

An object of the instant invention is the provision of a container closing mechanism of simple and novel construction which may be utilized as a part of a more elaborate machine and which efficiently and rapidly hinges an attached closure member into closing position and simultaneously presses it toward the container to which it is attached for locking the closure element in fully closed position.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a plan view of a container closing mechanism embodying the instant invention, with parts broken away and with containers in place in the mechanism;

Fig. 2 is an enlarged elevational view taken substantially along a plane indicated by the line 2—2 in Fig. 1, with parts broken away and with parts omitted;

Fig. 3 is a view similar to Fig. 1 showing certain of the movable parts in a different position;

Fig. 4 is a view similar to Fig. 2 showing a fragmentary portion of the mechanism with certain of the movable parts in a different position;

Fig. 5 is an exploded perspective view showing in detail certain of the parts of the mechanism illustrated in Fig. 4; and

Figs. 6, 7 and 8 are schematic views of a portion of the closing mechanism and the upper end of a container having a hingeable closure member and illustrating how the closure member is hinged into closing position to fully close the container.

As a preferred and exemplary embodiment of the instant invention the drawings illustrate a mechanism for closing fibre containers A such as the milk container disclosed in United States Patent 2 085,979 issued July 6, 1937, to John M. Hothersall, although the invention is equally well adapted to closing a great variety of other containers and articles. The exemplary container A is provided in its top wall with a filling and dispensing opening B (Figs. 1 and 3) which is

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sealed by a friction plug closure element or member C (see also Fig. 4) hingedly connected by a staple D to the container top wall.

During a container filling operation, the closure member C is in raised or open position as shown in Figs. 1, 3, 4 and 6 to expose the opening B. When it is desired to close the opening B, the friction plug closure member C is hinged into position into the opening and is pushed down tight to fully close and seal the container. In some cases, this closing of the member C may be effected before filling the container, for example during the sterilizing step in the manufacture of the container to maintain its interior in a sterile condition during shipment and storage or for other reasons.

By way of example, the drawings illustrate the containers A immediately following a filling operation, the containers being in an upright position and supported on a curved runway 21 (Figs. 1 and 3) of a conventional filling machine. In this position, the filled containers, with their closure members C open and in raised position, are advanced along the runway 21 in a substantially continuous procession, preferably in an intermittent or step-by-step manner, in spaced and timed order, the containers being disposed in spaced pockets 22 formed in the outer periphery of a feed turret 23 carried on and rotated by a vertical shaft (not shown). The shaft may be rotated in any suitable manner in time with the other moving parts of the mechanism. A guide rail 24 disposed adjacent the periphery of the turret 23 retains the containers in their pockets 22 during advancement of the containers along the support.

During advancement of a container A along the runway 21, it is moved into a closing station F (Fig. 1) for the closing operation. At this station the advanced container is also engaged in a pair of vertically spaced pockets 26 formed in the outer periphery of a discharge turret 27 (see Fig. 2) carried on and rotated by a vertical shaft 28. This shaft is rotated in any suitable manner in time with the shaft of the feed turret 23 so that the peripheral speeds of the feed turret and the discharge turret 27 are substantially equal.

While the container A is thus disposed in the pockets 22, 26 of the feed turret 23 and the discharge turret 27 respectively, at the closing station F, the open and upright closure member C of the container is hinged down into closed position as explained above. This operation is effected preferably while the container is sta-

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tionary at the closing station between partial rotations of the turrets. However it may be readily effected without stopping the container if this is desired.

The closing operation is brought about by a closing shoe 31 which is movable into and out of closing position immediately above the path of travel of the container disposed at or moving through the closing station F. This shoe 31 preferably is a flat horizontally disposed plate having an upturned curved nose 32 formed on its leading end (see Figs. 2 and 5). The shoe is formed on the outer end of a lever 34 which at its inner end is formed with a bearing 35 mounted on a pivot pin 36 secured in the outer end of a movable actuating arm 37.

Adjacent the shoe lever bearing 35, the pivot pin 36 carries a cam lever 38 which extends in a direction opposite to that of the shoe lever 34 and which at its outer end carries a cam roller 41. The cam roller 41 operates in a groove 42 of a stationary segmental barrel cam 43 carried on a stationary support bracket 44 having a bearing 45 for the upper end of the discharge turret shaft 28 (see Fig. 2). The inner ends of the shoe lever 34 and the cam lever 38 are loosely mounted on the pivot pin 36 but are yieldably tied together by a spring connection which includes a bolt 47 (Fig. 5). The bolt 47 extends through clearance holes 48 formed in a pair of lugs 49, 50 which project up from the shoe lever and the cam lever respectively. Beyond the lugs 49, 50 the bolt 47 carries a compression spring 51 which is held in place by a nut 52 threadedly connected to the outer end of the bolt. Through this spring connection the shoe lever 34 is yieldable relative to the cam lever 38.

The actuating arm 37 which carries the shoe lever 34 and the cam lever 38, is formed at its inner end, with a bearing 55 (Figs. 1 and 2) which rests on the bearing 45 of the shaft 28 and which surrounds the upper end of the shaft, thereby providing a pivotal mounting for the arm. A collar 56 secured to the shaft above the arm bearing 55 holds the arm in place on the shaft.

The arm 37 is oscillated on the shaft 28 by cam action, through a forward or closing stroke toward the container disposed at the closing station F, and thence through a return stroke to clear the container, this action being effected in time with the movement of the container into the closing station. For this purpose, the arm 37 intermediate its ends, is pivotally connected to one end of a link 58 (Figs. 1 and 2). The opposite end of the link is pivotally connected to a long leg 59 of a bell crank lever 60 carried on a pivot pin 61 secured in the stationary bracket 44. A short leg 62 of the bell crank lever carries a cam roller 63 which operates in a cam groove 64 of a face cam 65 mounted on a rotatable shaft 66 journaled in the bracket 44. The shaft 66 is rotated in any suitable manner in time with the other moving parts of the mechanism so as to effect one revolution of the cam 65 for every container A positioned at or moved through the closing station F. The cam normally holds the closing shoe 31 out of the path of travel of the containers and in a plane just above the tops of the containers as best shown in Figs. 3 and 4.

Hence every time a container A is positioned at or is moved through the closing station F, the cam 65, through the bell crank lever 60 and

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link 58, swings the actuating arm 37 starting with the position shown in Fig. 3, through a closing stroke toward the container and in a plane immediately above the container. During this closing stroke of the arm 37, the closing shoe 31 carried thereon, moves into position behind the upright open closing element C of the container as shown in Fig. 6 and engages and forces the closure element with a hinging action down into closing position into the opening B of the container, the shoe 31 riding over the top of the closing element into the position shown in Figs. 1 and 7.

While the closing shoe 31 thus moves forward, the cam roller 41 on the cam lever 38 traverses its cam groove 42. The cam groove is shaped, see Fig. 2, so that when the shoe 31 reaches the place in its forward travel where it is fully over and covering the closed closure element C as shown in Figs. 1 and 7, the cam roller 41 is lifted so as to rock the cam lever 38 upwardly. This cam action, rocks the shoe lever 34 downwardly and thus presses the shoe 31 down against the closure element C and forces it tightly into its fully closed position in the opening B of the container. The compression spring 51 of the spring connection between the cam lever 38 and the shoe lever 34 permits of sufficient overthrow of the cam 43 to insure full compressing action of the shoe 31 while at the same time providing a yielding action which allows the shoe 31 to stop when the closure element C is fully closed. Through this yieldable or spring connection crushing of the top of the container is prevented.

After such a closing operation, the cam 65, through the bell crank lever 60, and link 58, returns the actuating arm 37 to its original position as shown in Fig. 3. During this return stroke the shoe 31 is lifted from the top of the container, by the cam 43, and is withdrawn from the path of travel of the containers where it is clear of the upright open closure element of the next container in the line as it enters or passes through the closing station.

In this manner, as each container A enters or passes through the closing station, its open closure element C is closed and firmly pressed down into frictional engagement with the container top wall surrounding the filling and dispensing opening B, thus sealing the container. The sealed container is immediately removed from the closing station F by the discharge turret 27 and is advanced along a container support 68 (Figs. 1 and 3) to any suitable place of deposit. This support preferably is a continuation of the container support 21 along which the containers travel as they enter the closing station. A guide rail 69 disposed adjacent the periphery of the discharge turret 27 holds the containers in the pockets 26 of the turret during their advancement along the support 68.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

We claim:

1. A mechanism for sealing a container by frictionally engaging sealing parts of a hinge closure member with a container wall surrounding its dispensing opening, comprising a support for the

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container to be sealed, means for advancing said container along said support in a predetermined path with its closure member projecting upwardly in open position, a vertically movable closing shoe also adapted for substantially horizontal swinging movement in a path substantially tangent to the path of said upwardly projecting closure member, means for swinging said shoe into and following the path of the upwardly projecting closure member of said container to hinge the closure member and bring its frictional sealing parts adjacent said dispensing opening, and means for moving said swinging shoe vertically downwardly against said hinged closure member to press and frictionally seat the closure member in the dispensing opening of the container.

2. A mechanism for sealing a container by hinging a closure member on a connecting hinge part to close the dispensing opening of the container, comprising a support for the container to be sealed, means for advancing said container in upright position along said support in a predetermined path with its dispensing opening in advance of its connecting hinge part, and with its closure member projecting upwardly from said hinge part in open position, a closing shoe adapted also for substantially horizontal swinging movement in a path substantially tangent to the path of the container closure member at one side of the container path adjacent the upper end of the advancing container, means for swinging said shoe in back of said projecting closure member to engage and rotate the member forward and down on its hinge connection and bring the closing part of said member adjacent said dispensing opening, and means for pressing said swinging shoe against said container closure member to fully seat the closure member and seal the container.

3. A mechanism for sealing a container by hinging a closure member on a connected hinge part to close the dispensing opening of the container, comprising a support for the container to be sealed, means for advancing said container in an upright position along said support with its dispensing opening in advance of its connecting hinge part and with its closure member projecting upwardly in open position, an oscillating arm disposed in the horizontal plane above the upright closure member of said advancing container and mounted on a vertical axis disposed at one side of the container path, a closing shoe depending from and carried by said oscillating arm, means for oscillating said arm first

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to swing said shoe out of the path of an advancing container and then to move the shoe in back of said container projecting closure member, said shoe engaging and moving the closure member on its hinge connection thereby bringing said closure member adjacent the dispensing opening, and means for pivoting the closing shoe on said oscillating arm to press said shoe against the container to seat the closure member and seal the container.

4. A mechanism for sealing a container by moving a hinge closure member into closing position to seal its dispensing opening, comprising a support for the container to be sealed, means for advancing said container in upright position along said support with its closure member projecting upwardly in open position and with the connecting hinge to the rear of its dispensing opening, an oscillating arm mounted on a vertical axis disposed at one side of the container path, said arm being movable in the horizontal plane extending above said advancing container, a closing shoe depending from and pivotally carried by said oscillating arm, means for oscillating said arm first to swing said shoe out of the path of an advancing container and then to move the shoe in back of said container projecting closure member, said shoe engaging and moving the closure member on its hinge connection and thereby bringing the closure member adjacent the dispensing opening, and means for pivoting said closing shoe during oscillation of said arm, said pivot means lifting said shoe during swinging of said arm out of the container path and lowering the shoe during its engagement with and hinging of said container closure member to simultaneously seat the closure member and seal the container during said arm oscillation.

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