March 23, 1954 R. L. TROTTER 2,673,018

MACHINE FOR SECURING CAPS TO GLASS JARS

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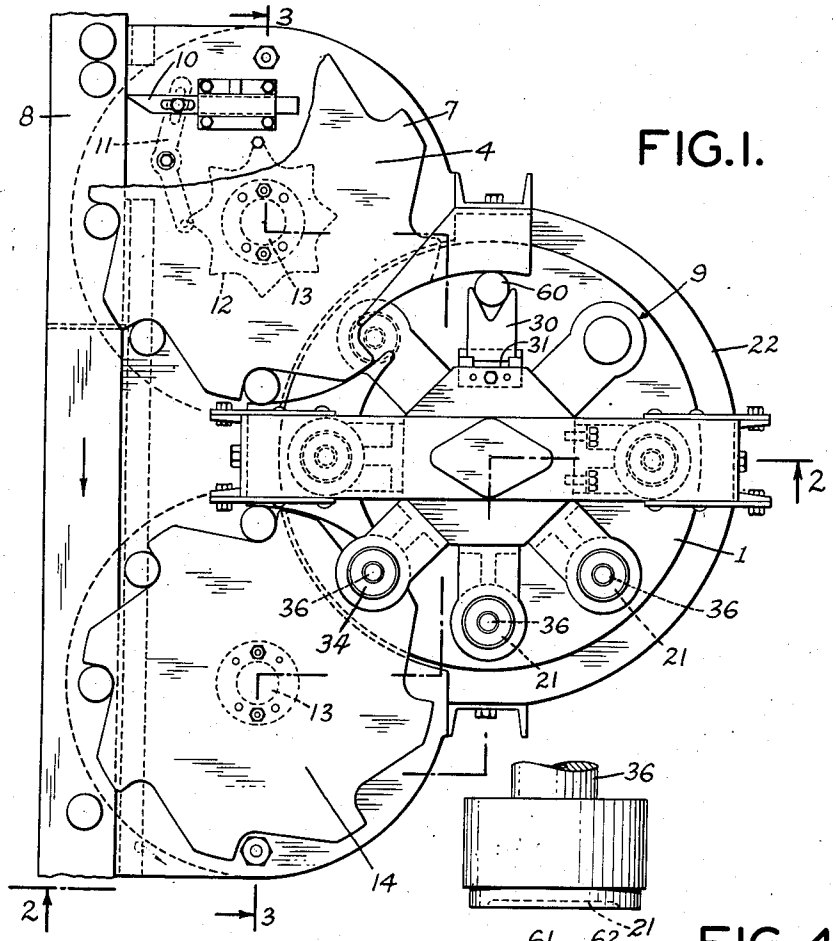


FIG. 1.

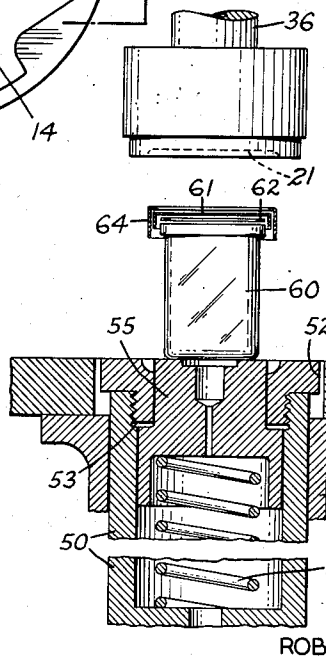


FIG. 4.

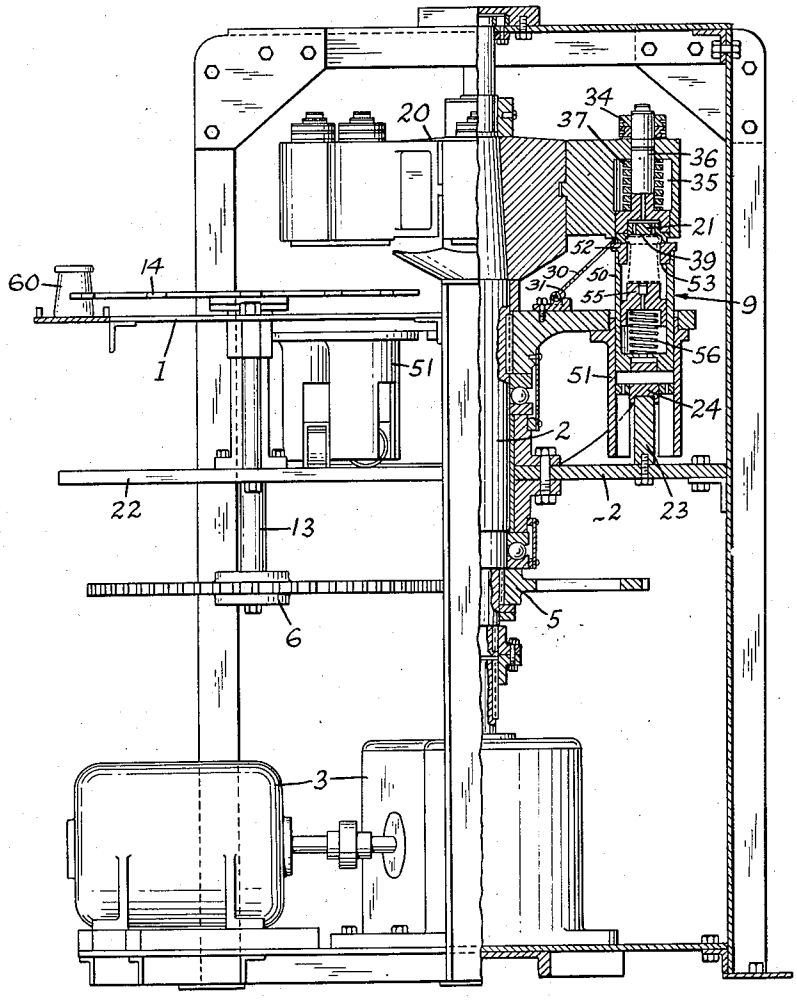
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MACHINE FOR SECURING CAPS TO GLASS JARS

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FIG. 2.



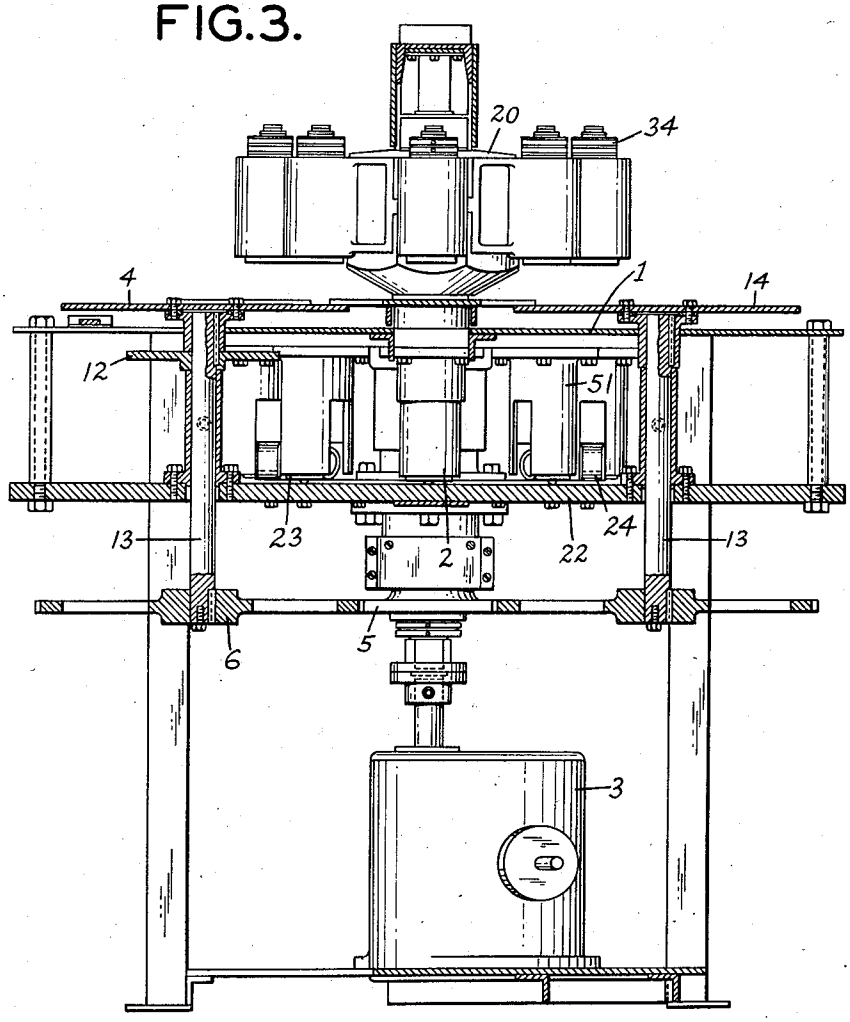
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MACHINE FOR SECURING CAPS TO GLASS JARS

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FIG.3.



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MACHINE FOR SECURING CAPS TO GLASS JARS

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FIG. 5.

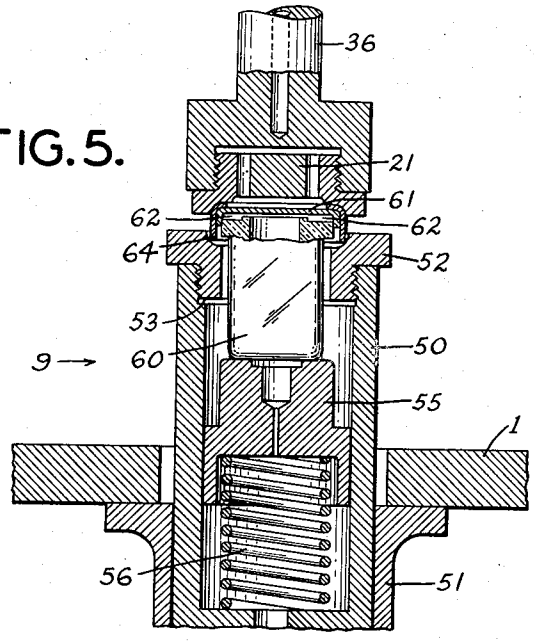
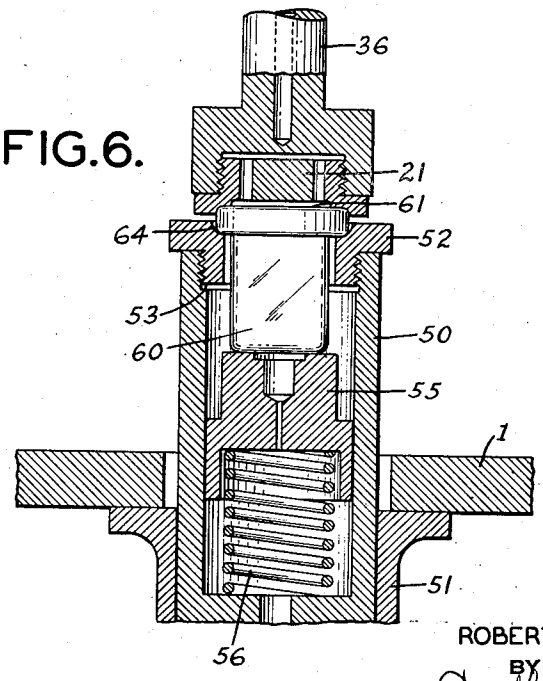


FIG. 6.



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2,673,018

MACHINE FOR SECURING CAPS TO GLASS JARS

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Application June 11, 1949, Serial No. 98,467

Claims priority, application Great Britain June 11, 1948

3 Claims. (Cl. 226—84)

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The invention relates to a machine for securing to glass jars (for example, jars containing fish or meat paste) caps of the kind known as "Phoenix" caps having a cover for the mouth of the jar, which cover is normally flanged to fit around the mouth, a resilient sealing ring to fit between the cover and the mouth of the jar and a metal securing ring of channel-section of which one web engaged over the cover and the other web (hereinafter referred to as the second web) underneath a rim around the jar mouth, the rim being received within the channel. Usually, the securing ring is divided in its circumference and the two ends are secured by means which are releasable to enable the ring to be removed from the jar and which may comprise a tongue on one end passing through an eye on the other and bent over to form a hook holding the eye but releasable by bending of the tongue. One form of "Phoenix" cap suitable for use in the present invention is described in our pending United States patent application Serial No. 62,314, now abandoned.

In caps of the above kind as made initially (that is, ready for fixing to the container) the securing ring is of angle section providing only the upper web of the eventual channel to fit over the cover, and to secure the cap after fitting to the jar the second web, which is constituted by the edge portion of one of the webs of the angle section, is pressed over against the underneath of the glass rim of the jar. The present procedure is to press the second web by means of blades or rollers rotated around the jar and arranged to exert radial inward pressure on the ring. This procedure has the disadvantage that there is a rubbing action on the material of the ring tending to remove the lacquer coating, usually applied to the ring, which may lead to corrosion of the ring and deterioration of the contents of the jar.

According to the present invention the second web is pressed over by a plunger die movable in the axial direction of the jar and ring and acting in combination with means for holding the cover against the jar during the pressing operation and backing-up means for supporting the ring.

Preferably, the backing-up means are resilient to accommodate variations in the thickness of the rims of the jars. Alternatively, or in addition, a resilient link may be included in the operating means for the plunger die.

It is usually necessary, in order to avoid spilling the contents of the jars, to apply the covers in an upright position of the jars and in one construction of the machine according to the invention the arrangement is that the holding means comprise a resilient supporting plunger which engages the bottom of the jar to be capped and moves upwardly to press the jar upwardly to hold the cover on the jar against backing-up means comprising a plunger, acting through the upper flange of the ring, and the plunger die is of tubular form arranged to move upwardly to surround the jar and to engage the ring and press the lower portion thereof inwardly and upwardly against the under-side of the jar rim while the upper flange of the ring is resiliently supported by the backing-up plunger. Preferably, the upper surfaces of the supporting plunger and the plunger die initially lie in the plane of a feed table for the jars and fit together and with the table to constitute in effect part of the surface thereof to facilitate sliding of the jars over the table to the supporting plunger.

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The invention includes the method of securing a cap of the above kind to a glass jar which comprises the steps of holding the cover on the jar by pressure applied to the bottom of the jar against a backing-up member engaging the cover or the upper flange of the ring and pressing over the second web of the ring by a plunger die movable in the axial direction of the ring and the jar while supporting the upper web of the ring by a backing-up member, either the plunger die or the backing-up member for the ring being resilient.

A specific embodiment of a capping machine according to the invention will now be described by way of example and with reference to the accompanying drawings, in which:

Figure 1 is a plan view of the machine with parts omitted and broken away for clarity.

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a detail showing a jar in position over a plunger;

Figure 5 is a detail showing the parts ready to press over the web of the cap ring, and

Figure 6 is a view similar to Figure 5 showing the parts after completion of the pressing operation.

The machine forming the subject of this example is suitable for capping glass jars which have been filled with meat or fish paste; for example, by the machine described in our co-pending United States application No. 98,466, filed June 11, 1949, in which a continuous stream of

jars are filled by first evacuating the jars and then admitting the paste under pressure and in which the filled jars leave the machine as a stream on a conveyor. The present machine comprises a table 1 carried by a vertical shaft 2 driven by an electric motor and suitable gearing 3 for rotation about a vertical axis. A feed disc 4 is driven through gearing 5, 6 from the shaft 2 and rotates above the table, the disc having teeth 7 like a ratchet wheel which are arranged to carry the filled jars one-by-one from the conveyor 8 and to deliver them on to the table 1 in registration with plungers 9 carried by the table and normally flush with the surface thereof. A feed gate consisting of a finger 10 reciprocated by means of a lever 11 from a star-wheel 12 on the shaft 13 carrying the feed disc 4 controls the admission of the jars to the disc. A similar disc 14 is provided to remove the capped jars from the table and to deliver them to a discharge conveyor formed by a continuation of the feed conveyor 8.

Mounted above the table 1 and carried for rotation by the same shaft there is a head 20 which carries backing-up means comprising eight resiliently supported backing-up plungers 21 evenly spaced around the circumference of a circle concentric with the driving shaft. These plungers are in vertical alignment with the plungers 9 in the table, of which there are also eight. As a preferred means for operating the plungers 9, below the table there is a fixed plate 22 carrying an annular cam ring 23 which is engaged by divided follower rollers 24 on the lower ends of the plungers 9 in the table.

The table has on its upper face eight adjustable guide forks 30 appropriated to the several plungers respectively and arranged to locate the jars in position on the plungers. In Fig. 1 part of the backing-up head has been omitted to show a guide fork 30 and a plunger 9. The guide forks are pivoted to the table at 31 so that the forked ends are free to move upwardly with the plungers 9 as the latter rise in the manner later described.

The backing-up plungers 21 are received within vertical guideways 35 in the backing-up head and are formed with stems 36 surrounded by stiff compression springs or resilient link means 37 urging the plungers downwardly. The downward movement of the plungers is limited by lock-nuts 34 on the end of the stem above the upper surface of the head. The lower face 39 of each plunger is shaped to support the upper flange of the cap ring and thereby to hold the ring and the cap within it, against upward movement.

The plungers 9 in the table are of two-part construction including a plunger die 52 within which is received a support plunger 55 (Fig. 4) for relative axial movement. The support plungers 55, in conjunction with the backing-up plungers 21, comprise holding means whereby the covers and securing rings are held against the jars during the pressing operations. The outer part 50 of each plunger is of tubular form and slides in a tubular guideway 51 depending from the table. This part is forked at its lower end and carries within the fork a follower roller 24 for engagement with the cam ring. The upper end of this part is provided with an annular die 52 shaped to engage the depending flange on the cap ring and on upward movement of the die to press the ring inwardly under the rim of the jar. The die ring also provides a shoulder 53 on the inner surface of the part limiting the upward movement of the support plunger or inner part 55 (that is, as shown in Figure 4) when the ring is in its lowermost position and thereby holding the upper face of the part 55 level with the table 1. The inner part constitutes the supporting plunger to engage the bottom of the jar and is spring-pressed upwardly in relation to the outer part by a compression spring 56 received within the outer part between the lower surface of the supporting plunger and a closed end provided at the bottom of the outer part.

The operation of the machine is as follows:

The jars 60 which already have the caps 61 and resilient rings 62 (assembled as described in pending United States application Serial No. 62,314, now abandoned) placed in position are fed by conveyor 8 and feed disc 4 one-by-one on to the rotating table 1 and each jar is centred over a supporting plunger 9, the jar being located partly by the feed disc and partly by the guide forks 30. As each plunger leaves the feeding station in the rotation of the table it is raised by the cam ring 23 and moves upwardly as a unit until the upper surface of the cap ring comes into contact with the backing-up plunger 21. The upward movement of the outer part 50 of the plunger carrying the die 52 is then continued around the outside of the jar while the supporting plunger or holding means 55 remains stationary but applies pressure to the jar derived from the spring between the two plunger parts. At the limit of its upward movement the outer part effects the pressing over of the cap ring second web 64, any excess upward movement of the die being accommodated by resilient upward movement of the backing-up plunger, this by virtue of the resilient link means or spring 37. The die plunger and the supporting plunger are then lowered to the initial position in which they are flush with the surface of the table and the jar is removed by the discharge disc.

During the upward movement of the die plunger the forked guides 30 are lifted by the top of the plunger and ride thereon.

It is to be appreciated that the machine forming the subject of the above example is suitable for use only with jars of a shape such that the rim is of greater diameter than the body of the jar, otherwise the tubular die plunger would not pass over the body of the jar to engage under the rim.

I claim:

1. A machine for securing to glass jars of the kind having a circular mouth surrounded by a laterally protruding glass rim, cap assemblies of the kind comprising a cover to fit over the mouth and a metal securing ring for surrounding the mouth of the jar and having a web adapted to be pressed beneath the glass rim, the web being formed from a depending portion of the ring after the cap assembly has ben placed on the jar, which machine comprises in combination a frame, a table on the frame for supporting a jar and having an opening formed therein, a tubular die disposed in the opening and having its axis disposed normal to the plane of the table, said tubular die being shaped to surround the jar during the sealing operation and including a web-forming surface to press the web under the glass rim, a support-plunger mounted for axial movement within the tubular die for supporting the jar coaxially therewith, first resilient means for supporting the support-plunger normally in the plane of the table and yieldable downwardly to permit the support-plunger and jar to be displaced axially with respect to the tubular die to

bring the die into engagement with the web, a head mounted on the frame above the table, a backing-up plunger mounted in the head for movement axially of the jar and adapted to bear downwardly on the cap assembly, second resilient means to urge the backing-up plunger toward the jar on the support-plunger, and operating means to move the backing-up plunger and the tubular die toward each other axially of the jar, first to bring the backing-up plunger and support-plunger, respectively, into engagement with the cap assembly and bottom of the jar to cause the cap assembly to be held in sealing relationship on the jar under the pressure of the opposing first and second resilient means, to cause the support-plunger to yield, through the agency of the first resilient means, relatively to the tubular die to bring the die into engagement with the web, and ultimately to cause the die to press the web tightly beneath the glass rim by means of upward pressure opposed by the second resilient means through the backing-up plunger.

2. Apparatus as set forth in claim 1, including means to rotate the table and head about a vertical axis, infeed conveyor means to pass the unsealed jars on to the table and outfeed conveyor means to pass the sealed jars from the table, said means to bring the backing-up plunger and support-plunger toward each other, comprising a cam track disposed beneath the table and a cam follower carried by said plunger die for engaging the cam track.

3. Apparatus as set forth in claim 1, said tubular die being movable axially with respect to the table and said support-plunger being mounted within said tubular member with the first resilient means reacting between the support-plunger and the tubular die to urge the support-plunger upwardly, and means to move said tubular die upwardly from the plane of the table toward the backing-up plunger.

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