Jan. 31, 1956 E. N. DE BASTOS ET AL 2,732,991

CONTAINER CAPPING MACHINE

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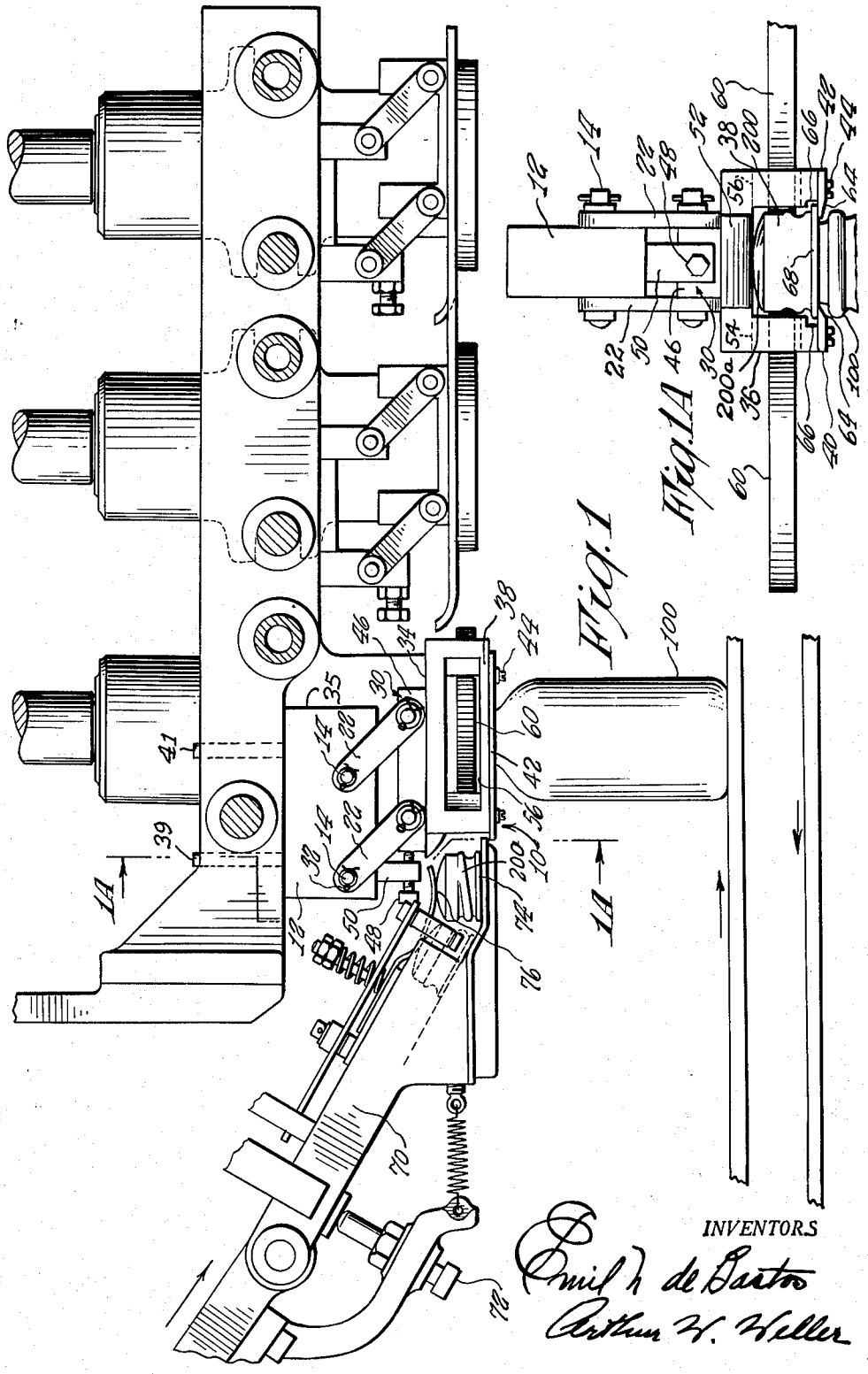


Fig. 1

Fig. 1A

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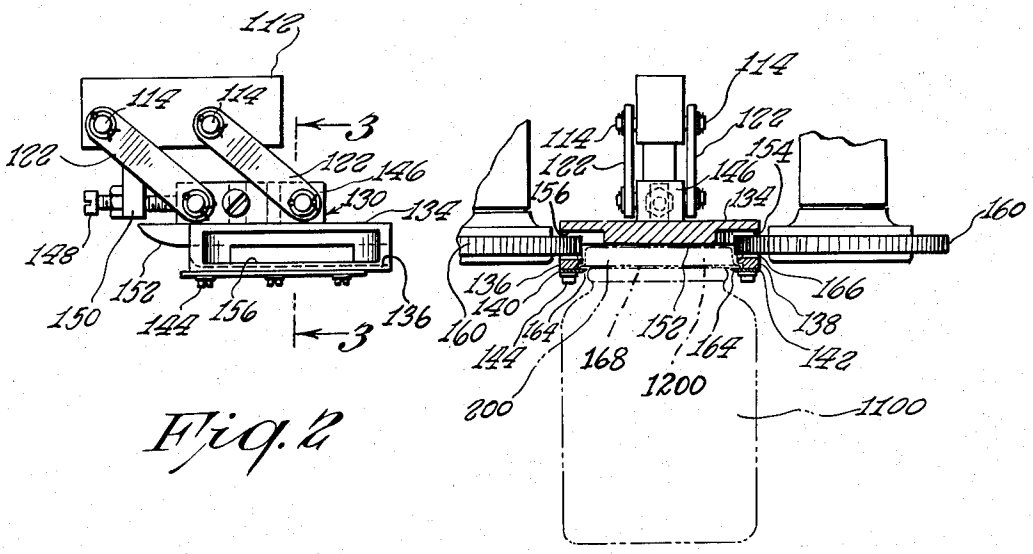


Fig. 2

Fig. 3

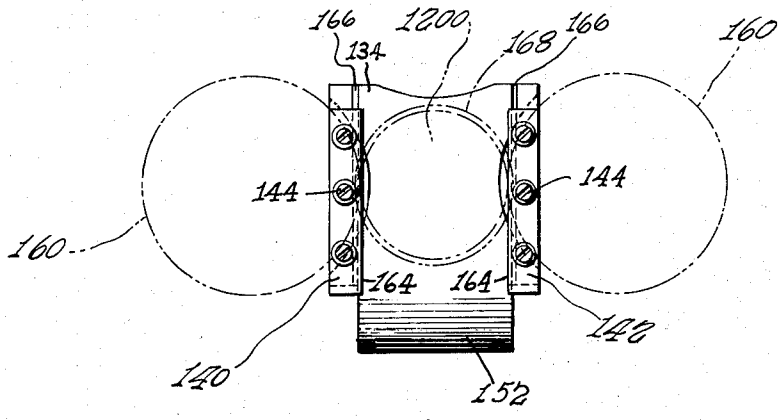


Fig. 4

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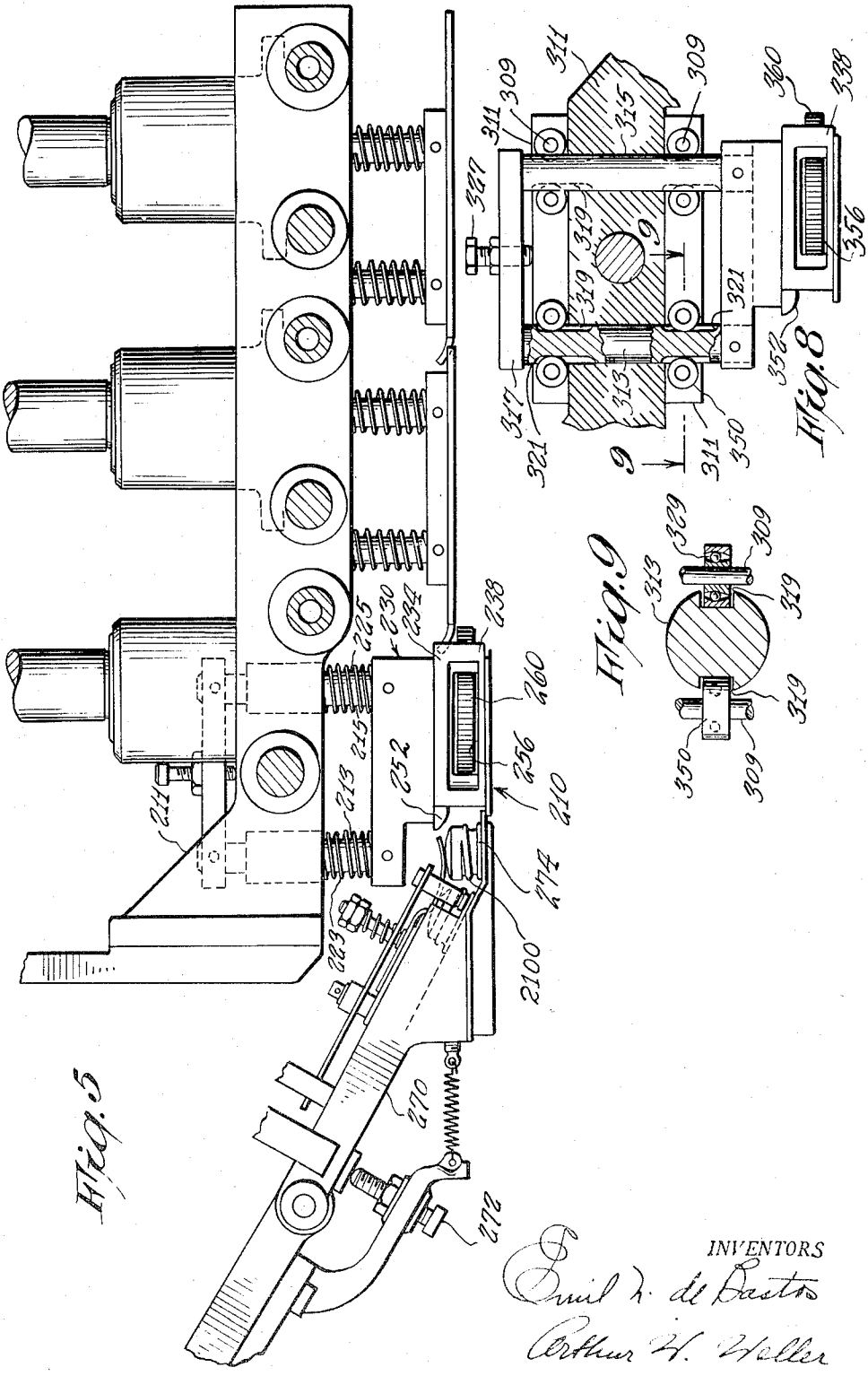
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Fig. 6

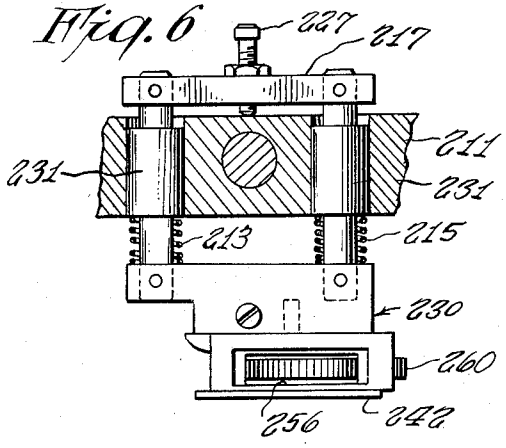


Fig. 7

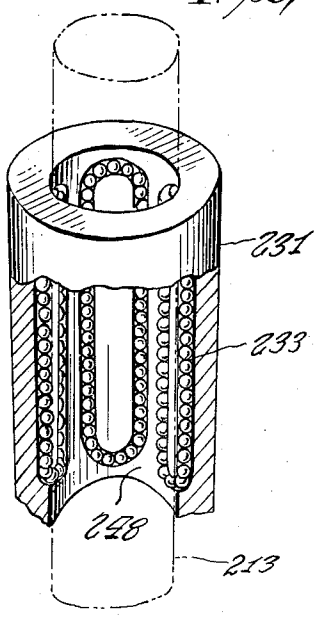


Fig. 10

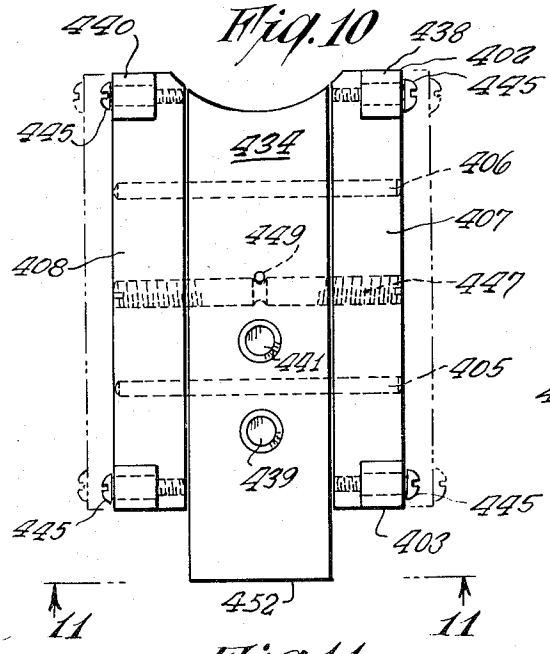


Fig. 13

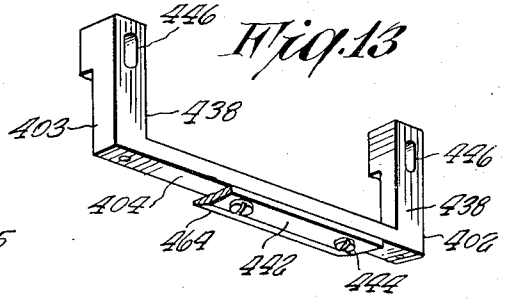


Fig. 11

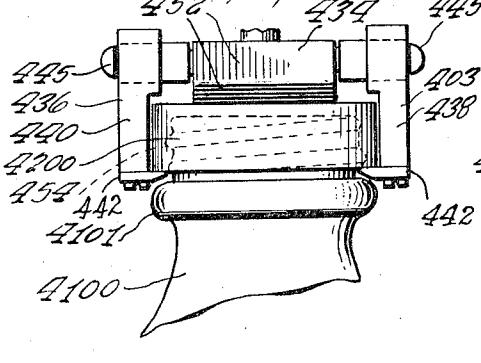
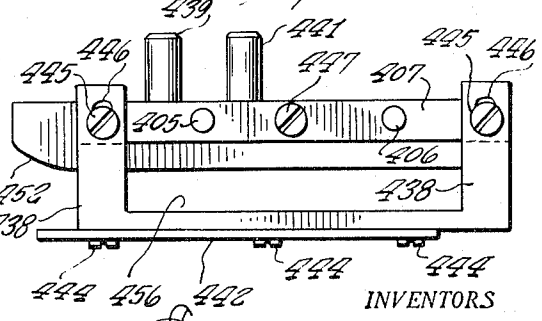


Fig. 12



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2,732,991

CONTAINER CAPPING MACHINE

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Application October 31, 1950, Serial No. 193,255

6 Claims. (Cl. 226—88)

This invention relates generally to the field of container capping machines, and more particularly to means for leveling caps disposed immediately above containers, prior to the seating of said caps upon the same. The present invention has specific application to the container capping machine structure set forth in a pending application by M. Norman Schweitzer, filed February 12, 1949, and which bears Serial No. 76,105, now Patent Number 2,658,654, dated November 10, 1953.

With machines of this type, wherein the containers and caps therefor travel at relatively high rates of speed, there is occasionally a tendency for the caps to be seated on the openings of the containers in such a manner that the engageable threads of the cap and the opening are not properly aligned. Since, as has been mentioned the containers and the caps are moving at such speeds, this improper positioning cannot be corrected manually before the improperly capped container is ejected from the machine. It has been found that this difficulty occurs both in the threaded or screw-type cap and the bayonet or lug type-cap.

It is therefore among the principal objects of the present invention to provide structure by means of which substantially all possibility of the caps being positioned improperly has been removed.

Another object of the present invention herein lies in the provision of structure which will maintain each successive cap in a horizontal plane until the threads or lugs thereof have been sufficiently engaged with corresponding parts of the container to assure proper positioning thereof as the same is tightened.

Still another object of the present invention lies in the provision of structure of the class described in which there is provided means for maintaining the cap in a horizontal plane regardless of any vertical displacement of the cap during the tightening process. A feature of the invention lies in the fact that the device may be adjusted for various types of caps ranging from those having a relatively flat shape, as exemplified by the cap for mustard jars and the like, as well as the relatively tall configuration exemplified by caps used in conjunction with catsup bottles and the like.

These objects and features, as well as other incidental objects and advantages will become more clearly apparent during the course of the following disclosure, and be pointed out in the appended claims.

On the drawings to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

Figure 1 is a fragmentary side elevational view of a first embodiment of the invention, showing the device in position on a capping machine.

Figure 1*a* is a fragmentary enlarged elevational view as seen from the plane 1*a*—1*a* on Figure 1.

Figure 2 is a side elevational view of a second embodiment of the invention.

Figure 3 is a fragmentary vertical transverse sectional view as seen from the plane 3—3 on Figure 2.

Figure 4 is a bottom plan view of Figure 3.

Figure 5 is a fragmentary side elevational view of a third embodiment of the invention, showing the device in position upon a capping machine.

Figure 6 is a fragmentary side elevational view of the third embodiment of the device.

Figure 7 is a fragmentary enlarged perspective view, partly in section, of a portion of the structure in Figure 6.

Figure 8 is a fragmentary sectional view, partly in elevation, showing a fourth embodiment.

Figure 9 is a fragmentary enlarged horizontal sectional view as seen from the plane 9—9 on Figure 8.

Figure 10 is a plan view of a fifth embodiment of the invention, detached from the capping machine.

Figure 11 is a fragmentary elevational view as seen from the plane 11—11 on Figure 10.

Figure 12 is a side elevational view as seen from the right hand portion of Figure 10.

Figure 13 is a view in perspective of a portion of the adjustable means which engages the container caps while the caps are being applied to the container.

In accordance with the invention, in the first embodiment the device, generally indicated by reference character 10, includes broadly a mounting block 12 to which are pivotally secured by means of pins 14, four link members 22. Pivotally secured to the lower ends of the link members 22 is a leveling element 30, through which the successive caps 200 may pass. When the device is installed on already existing machines, the leveling element 30 may be secured to link members already present, and the leveling element 30 merely replaces the forward leveling member (reference character 188 shown on Figure 4 of the drawing in the above mentioned application). This may be readily accomplished by removing the cotter keys after which the link members may be freed.

The leveling element 30 comprises an upper guide member 34, side guide members 36 and 38, and detachably associated lower guide members 40 and 42; said last mentioned members preferably being secured to said guide members 36 and 38, respectively, by means of screws 44.

The upper guide member includes a link connecting member 46, which is generally rectangular in configuration. Since the link members 22 between bearings are of equal length, it necessarily follows that the connecting member 46 can execute motion only in planes parallel to the horizontal. The lowermost limit of this motion is regulated by means of an adjusting screw 48, the supporting member 50 of which is secured to the mounting block 12. This limit will be fixed, depending upon the particular type of cap and container employed, by considerations of height of the given containers and caps therefor.

The upper guide member 34 and side guide members 36 and 38 are preferably formed integral in the form of a single casting. The upper guide member is generally of planar configuration, and is provided with a cap-engaging camming surface 52 which provides force to the moving cap 200 to result in leveling the same.

The side guide members 36 and 38 are disposed at substantially right angles with respect to the upper guide member 34 and are provided with elongated slots 54 and 56 through which the annular members 60 which serve to drive the caps 200 may project. The lower guide members 40 and 42 are preferably in the form of elongated strips, and as may be seen on Figures 1 and 2 inclusive they are detachably connected to the side guide members by means of screws 44. The lower guide members 40 and 42 are preferably substantially planar in configuration. A lip portion 64 on each lower guide member projects inwardly of the side guide members 36 and 38, and in conjunction with the rabbet portions 66 on

each of the side guide members **36** and **38**, form a channel in which the radial edge **68** of a cap **200** may move.

It will, of course, be understood that since the device **10** is essentially an attachment, it may be readily removed for substitution and/or replacement, the exact configuration of the cap carrying or engaging portions of the device depending upon the size and configuration of the cap employed.

Turning to the second embodiment in Figures 2 to 4, for example, in the case of a relatively tall screw-type cap, such as that used to close catsup bottles, a device having relatively high side guide members is necessary (see Figure 1), while in the case of a relatively low flat cap, for example those employed in the closing of mayonnaise or mustard jars, a device having relatively low side guide members and relatively wide upper guide members is desirable. This is shown in Figures 2 to 4 inclusive. Since the differences between the first and second embodiments are principally differences in relative cap sizes and shapes, for the purpose of avoiding needless repetition certain of the parts are given the same reference characters with the addition of the prefix "1."

Operation

In use, the operation of the capping machine is generally similar to that occurring when the device **10** is not employed. The cap chute **70** is adjusted to proper height by means of the set screw **72** and the device **10** is adjusted as to its lower limit of motion by means of the adjusting screw **48**. Containers **100** travel in a direction to the right as seen on Figure 1, and as they pass beneath the terminal portion **74** of the cap chute, each successive container **100** engages a cap **200**, subsequent travel disengaging the cap **200** from contact with the guiding spring **76**. Further travel to the right engages the cap **200** with the device **10**, whereby the former may be leveled with respect to the container. If the cap **200** is properly aligned at the time of entrance into the device **10** the same will assume a position similar to that shown on Figure 1A, wherein the cap may be rotated by the annular members. As the cap is engaged upon the container, the same will normally travel in a downward direction, and this is permitted by the link members **22** under gravity. However, such motion may be made only in a manner in which the cap maintains its horizontal disposition, that is to say, displacement is purely transitional since this is fixed by the inner configuration of the device. Should the cap enter the device at an angle other than the proper angle, the upper portion of the cap **200** will strike the camming surface **52**, prior to becoming fully engaged with the side and lower guide members **36** to **42**, inclusive, which surface serves to straighten or correct the angle, after which the cycle of operation is precisely the same as heretofore described. Subsequent travel to the right of the device (as seen on Figure 1) serves to eject the capped container for transit from the capping machine. It is to be understood that the capping operation need not be fully completed by the time the container and cap leave the confines of the device **10**. Subsequent completion may be accomplished by the annular members disposed to the rear of the capping machine.

In the operation of the present invention, as seen in Figures 1A and 3, it will be noted that the rims **68** and **168** are disposed in the longitudinal grooves formed by the lips **64** and **164** and the rabbets **66** and **166** respectively. These grooves prevent tipping of the caps and are especially effective where the top of the cap is rounded as for example as shown at **200***a* in Figure 1A. As shown in Figures 1A and 3 the clearances, between the caps **200** and **1200** and the grooves within which they they ride, are exaggerated for clarity and it is desirable that the clearances be sufficient to permit the caps to slide and rotate freely but not to tip sufficiently to permit incorrect threading or jamming.

Thus, since the neck of the container is partially disposed within the cap, it moves the cap along with it as it is moved by the conveyor for the container. The weight of the parts below the pins **14**, and the cap, is carried by the container neck, but the structure moves the cap only axially with respect to the axis of the threads on the neck of the container, where by the movement of the cap is positively guided until sufficient of the threads on the cap and neck are interengaged. Not until that stage of closure does the container and cap leave the structure **10**. Sufficient clearance is provided in the slots **54**, and **56**, to provide contact with the cap by the annular members **60** while the leveling element is moved through its range.

Turning now to the third embodiment of the invention, as illustrated in Figures 5, 6 and 7, to avoid needless repetition, certain of the parts corresponding to those of the first embodiment have been designated by similar reference characters with the additional prefix "2." The third embodiment differs from the first embodiment principally in the elimination of the link members **22** together with associated structure. Instead of the curved translational movement obtained by this structure, the third embodiment provides vertical rectilinear displacement.

Referring to Figure 5 on the drawings, it may be seen that the device **210** is resiliently and slidably mounted directly upon the main frame element **211** of the capping machine. This is accomplished by means of a forward slide shaft **213** and a rearward slide shaft **215** which are joined at the upper ends thereof by a horizontally disposed cross bar **217**. The shafts **213** and **215** are slidably disposed for vertical reciprocation in the ball bushings **231**. The bushings **231** are of generally hollow cylindrical configuration, of such internal diameter as to enable them to surround the shafts **213** and **215**. One of the bushings **231** is shown in detail in Figure 7 where there is disposed in the inner surface **248** a plurality of oval-shaped circuits **233** in which there is disposed a plurality of small ball bearings. These balls are adapted to operate as friction reducers to permit vertical reciprocation, and also, because of the length of the circuits provided there is accurate alignment for the shafts.

By virtue of the fact that the ball bushings have a very low coefficient of friction the leveling element **230** and the parts it carries may shift rapidly in vertical directions to accommodate high speed travel of caps **2100** therethrough. Gravity and the coil springs **223** and **225** urge the leveling element to its lower position.

As seen in Figure 6 the cross bar **217** carries adjusting means **227** (shown as a bolt threaded in said bar and maintained in position by a lock nut) which may contact the upper surface of the frame **211** to limit downward movement of the block **230** and the parts on it.

The fourth embodiment of the invention is illustrated in Figures 8 and 9. Here again certain of the parts corresponding to prior described embodiments are given the same reference characters with the addition of the prefix "3."

The shafts **313** and **315** are provided with rectilinear channels **319** which extend centrally from opposite surfaces (see Figure 9). A smooth sliding motion between the shafts **313** and **315** and the frame **311** is obtained by the engagement of a plurality of ball bearings **329**, the outer races **350** of which extend into the channels **319**. The inner races of said bearings are mounted on transverse spindles **309**. The uppermost and lowermost limits of the path of travel are of course determined by the arresting portions **321** which terminate each channel **319**, but more accurate determination is made by means of the means **327** shown in the form of an adjusting screw. As shown, the lower end of the screw **327** is normally urged into contact with the frame **311** by gravity but coil springs like **223** and **225** may be disposed concentrically about the shafts **313** and **315** below the frame **311**.

The fifth embodiment is seen by referring to Figures 10 to 13, inclusive. Here again certain parts carry the reference characters of prior described embodiments with addition of prefix "4."

The upper guide member **434** is formed to include means for adjusting the width between the side guide members **436** and **438**. This is accomplished by means of slidably mounted blocks **407** and **408** which are maintained in parallel position by means of pins **405** and **406**. A double threaded adjusting screw **447** simultaneously moves both blocks inwardly or outwardly as required, the adjustment being easily made by means of a screw driver which may engage the slotted ends thereof. The members **436** and **438** are secured to the blocks **407** and **408** by means of screws **445** which engage elongated slots **446** in said members **436** and **438**. This mounting affords vertical adjustments which may be required when employing any particular type of cap **4200**. The upper guide member **434** is positioned upon the mounting block like the block **35** by means of pins **439** and **441**, the suitable means (not shown) may be used to secure the guide member **434** in place upon said block.

The embodiment shown in Figures 10 to 13, inclusive provides the greatest flexibility for the accommodation of caps and containers of different sizes and shapes. Note for example in Figures 11 and 13 that the side guide members **436** and **438** have lower substantially horizontal members **404** and upright arms **403** and **402** which carry the slots **446** previously mentioned. This construction effects an automatic change in height of the slots **454** and **456** to accommodate changes in height of the caps **4200**.

The lower guide members **442** as well as the lip portions **464** thereof through manipulation of the screws **444** may be changed to accommodate to the neck rim **4101** of the containers **4100**.

It may thus be seen that we have provided novel and useful improvements in container capping in which there is provided a simple device which assures the proper alignment of caps with respect to containers prior to the securing of the caps upon the containers. By virtue of the relatively low mass of the moving parts and the low coefficient of friction under which they are movably mounted, the moving parts may quickly shift to accommodate changes in position of the caps and these may therefore pass through at relatively high speeds. Since container capping machines are frequently used with different runs using changed sizes of containers and caps, the disclosed constructions afford ease of adjustment to accommodate not only for the height and diameter of the cap but also for caps having internal and external threads and for containers having neck rims of different dimensions. Depending upon the speed of operation the device may incorporate springs which urge it into proper position to align the caps with respect to the containers for quick and accurate engagement. Even though the cap is adequately supported and aligned there is sufficient clear opening for access by the wheels which engage the caps to either start screwing them or to complete the tightening thereof. Thus, the caps have their threads axially aligned with the threads of the container just prior to and also during a sufficient period of time until an ample portion of the threads are interengaged to prevent tilting or jamming and assure high speed operation.

We wish it to be understood that we do not consider the invention limited to the exact details of the structure set forth in this specification, for obvious modifications will occur to those skilled in the art to which the present invention pertains.

We claim:

1. For use with a container capping machine having means to feed a succession of caps and a succession of containers which meet at a capping location and means for rotating said caps to threadedly engage the same upon said container; a device for aligning the caps with respect to the containers as the caps are threadedly engaged with said containers, said device comprising: a support means fixedly arranged with respect to said capping machine; a leveling element; means movably interconnecting said leveling element with said support means; said leveling element being movable through a plurality of substantially parallel planes, and including an upper guide member and a pair of spaced side guide members between which said caps may pass; at least one of said guide members having an opening therein through which said cap rotating means on said capping machine may project to engage successive caps passing between said side guide members; whereby said caps may be maintained in level position as the same are rotated to be threadedly engaged with said containers.

2. For use with a container capping machine having means to feed a succession of caps and a succession of containers which meet at a capping location, means for rotating said caps to threadedly engage the same upon said containers, a device for aligning the caps with respect to the containers as the caps are threadedly engaged with said containers, said device comprising: a support means fixedly arranged with respect to said capping machine; a leveling element; means movably interconnecting said leveling element with said support means; said leveling element being movable through a plurality of substantially parallel planes, and including an upper guide member, a pair of spaced side guide members and a pair of lower guide members; said lower guide members being associated with said side guide members; said side guide members having openings therein through which said cap rotating means on said capping machine may project to engage successive caps passing between said side guide members; whereby said caps may be maintained in level position as the same are rotated to be threadedly engaged with said containers.

3. A device as claimed in claim 1, in which the openings in said side guide members are in the form of elongated rectangular slots.

4. For use with a container capping machine having means to feed a succession of caps and a succession of containers which meet at a capping location and means for rotating said caps to threadedly engage the same upon said container; a device for aligning the caps with respect to the containers as the caps are threadedly engaged with said containers, said device comprising: a support means fixedly arranged with respect to said capping machine; a leveling element; means movably interconnecting said leveling element with said support means; said leveling element being movable in a substantially vertical direction with respect to said support means, and including an upper guide member and a pair of spaced side guide members between which said caps may pass; at least one of said guide members having an opening therein through which said cap rotating means on said capping machine may project to engage successive caps passing between said side guide members; whereby said caps may be maintained in level position as the same are rotated to be threadedly engaged with said containers.

5. For use with a container capping machine having means to feed a succession of caps and a succession of containers which meet at a capping location, means for rotating said caps to threadedly engage the same upon said containers, a device for aligning the caps with respect to the containers as the caps are threadedly engaged with said containers, said device comprising: a support means fixedly arranged with respect to said capping machine; a leveling element; means movably interconnecting said leveling element with said support means; said leveling element being movable in a substantially vertical direction with respect to said support means; and including an upper guide member, a pair of spaced side guide members, and a pair of lower guide members; said lower guide members being associated with side guide members; said side guide members having openings there-

in through which said cap rotating means on said capping machine may project to engage successive caps passing between said side guide members; whereby said caps may be maintained in a level position as the same are rotated to be threadedly engaged with said containers.

6. A device as claimed in claim 5, in which the openings in said side guide members are in the form of elongated rectangular slots.

References Cited in the file of this patent

UNITED STATES PATENTS

2,435,127	Cameron	Jan. 27, 1948
2,658,654	Schweitzer	Nov. 10, 1953