

G. M. S. TAIT.
MEANS FOR CAPPING OR CLOSING BOTTLES AND OTHER CONTAINERS.
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1,363,824.

Patented Dec. 28, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

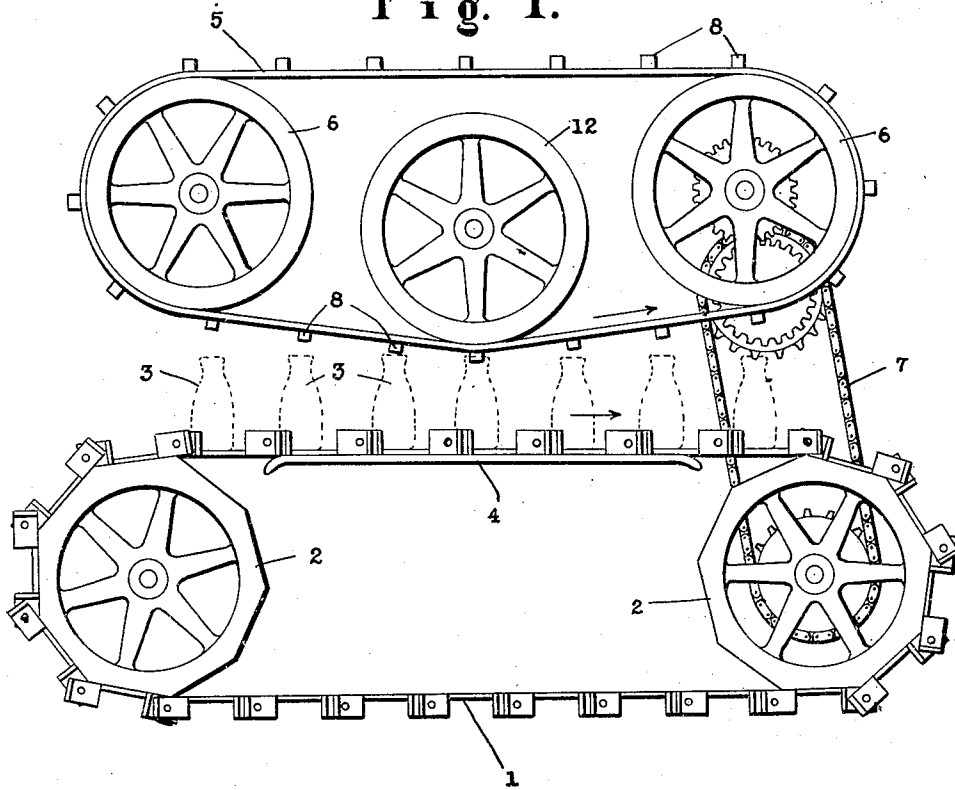


Fig. 2.

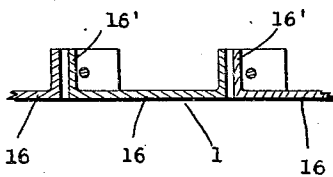
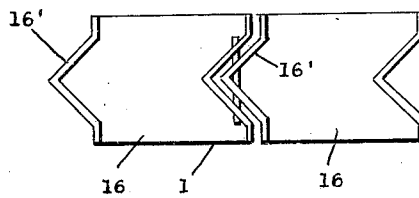


Fig. 3.



WITNESS

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2 SHEETS—SHEET 2.

Fig. 4.

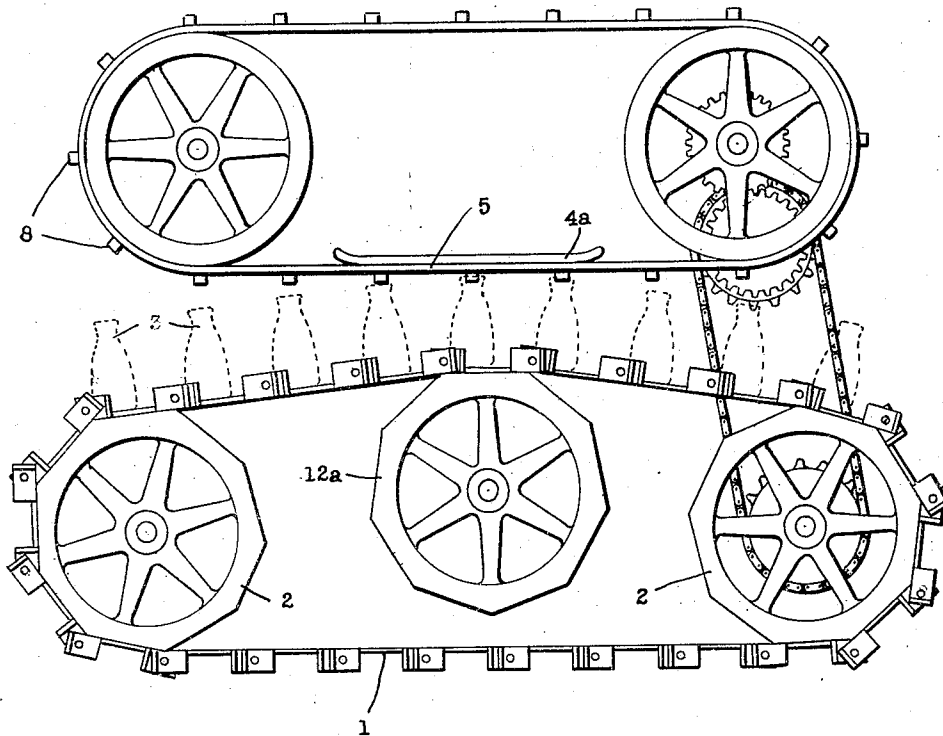
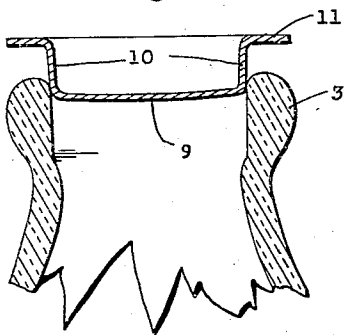


Fig. 5.



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Fig. 7.

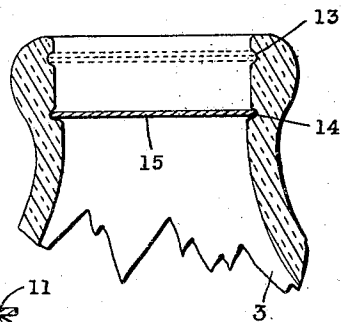
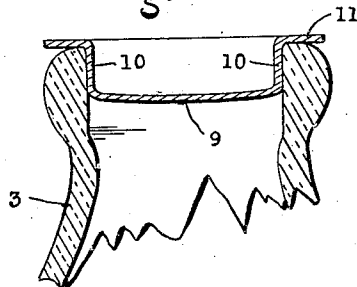


Fig. 6.



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GODFREY M. S. TAIT, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO
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MEANS FOR CAPPING OR CLOSING BOTTLES AND OTHER CONTAINERS.

1,363,824.

Specification of Letters Patent. Patented Dec. 28, 1920.

Application filed February 14, 1917. Serial No. 148,644.

To all whom it may concern:

Be it known that I, GODFREY M. S. TAIT, a citizen of the United States of America, and a resident of Washington, in the District of Columbia, have invented certain new and useful Means for Capping or Closing Bottles and other Containers, of which the following is a specification.

My invention relates to means for capping or closing bottles, jars and other containers which are filled with a liquid which has been heated or otherwise expanded and then has contracted as a result of cooling or otherwise, and is to be finally sealed. A specific example is, the capping or closing of milk bottles which have been filled with pasteurized milk, while the milk is still warm, or in which bottles the milk has been subjected to a pasteurization treatment, resulting in the expansion of the liquid. As the liquid cools to normal temperatures, it contracts quite noticeably, and it is desirable that the cap by which the bottle is to be closed shall be pressed down very close to the ultimate liquid level; both in order that the ultimate user may not think that the bottle has not been filled as full as it should have been, and in order that the contents of the bottle may not be stirred up by the agitation to which it is necessarily subjected in handling. If there be a considerable air space between the surface of the liquid and the cap or closure, handling of the bottle is apt to result in agitation of the liquid contents; and such agitation is injurious to many liquids; in the case of milk, rise of the contained cream is apt to be interfered with. But if the cap or closure be pressed down close to the surface of the liquid, after that liquid has cooled, subsequent handling of the bottle will result in little agitation of the liquid.

My invention comprises means whereby caps, applied initially to bottles or other containers while the contents are still in an expanded condition, may be forced down close to the ultimate liquid level after the liquid has contracted. More specifically, my invention comprises means whereby a bottle

or other container, to which a cap has been applied but not pressed home to final position, is caused to approach, or to be approached by, a suitable plunger which gradually forces the cap home; such forcing of the cap home being performed gradually, in order that ample opportunity may be given for escape of air or other gas present, or possibly present, between the liquid and the cap; otherwise such air or gas might be compressed to such pressure as to blow the cap out again. Other features of my invention will be pointed out hereafter.

The objects of my invention are, to provide effective, automatic, and simple apparatus for forcing closure caps home, under circumstances such as stated above.

I will now proceed to describe my invention with reference to the accompanying drawings, illustrating several typical embodiments of the invention, and will then point out the novel features in claims. In said drawings:—

Figure 1 shows, more or less diagrammatically, a side elevation of one form of apparatus embodying my invention, and comprising link-belt conveyers for the bottles or containers and for the said plungers. Fig. 2 shows a fragmentary longitudinal section of the bottle-carrying conveyer chain, and Fig. 3 a top view of two of the links of such chain, assembled.

Fig. 4 is a side elevation which shows, more or less diagrammatically, a machine of similar but somewhat alternative structure to that shown in Fig. 1. Fig. 5 is a fragmentary sectional elevation of the upper portion of a bottle and of one form of cap applied thereto in its initial position; Fig. 6 a view similar to Fig. 5, except that the cap has been pressed home; Fig. 7, a fragmentary sectional elevation of a bottle with upper and lower cap grooves, initial and final positions of the cap being indicated, the first in dotted lines, the second in full lines.

Referring first to Figs. 1, 2 and 3: 1 designates a conveyer chain, the links of which are adapted to carry the bottles or other con-

tainers to be capped, said chain passing over sprocket wheels 2, one of which is arranged to be driven in any suitable manner. 3 designates the containers on this chain, to which containers caps are supposed to have been applied initially, already. The upper run of this chain is supposed to be straight, and for that reason it is better that the right-hand sprocket wheel be the driving wheel; also I have shown, just beneath such upper run, a supporting platen 4.

5 designates another sprocket chain, passing over sprocket wheels 6, one of which is driven by a chain 7 in such manner that the two chains 1 and 5 move synchronously; in the particular construction shown, the drive of chain 5 is from the shaft of the driving sprocket 2. The links of chain 5 carry plungers 8 adapted to coast with the caps of the bottles or containers 3, and to press such caps down into the necks of such bottles or containers.

Figs. 5, 6 and 7 show two of the many types of cap and container which the machine shown in Figs. 1, 2 and 3 may operate upon. The form of cap shown in Figs. 5 and 6 is provided with a bottom part 9, substantially cylindrical sides 10, and a top flange 11; the distance between the bottom and the top flange representing, approximately, the shrinkage or contraction which the liquid in the bottle undergoes between the initial and final application of the cap. 3, as in Fig. 1, designates the bottle, the upper portion of the throat of which is approximately cylindrical; the sides of the cap being of such diameter as to fit very snugly into the neck of the bottle. The cap is applied initially, just after the bottle has been filled, so as to occupy the position shown in Fig. 5; that is to say, the cap is pressed home initially only just far enough to seal the bottle temporarily, and to insure that the cap shall remain in place while the contents of the bottle are cooling. If the cap fit the bottle fairly tightly at this time, the slight vacuum formed during the cooling of the liquid will help to hold the cap in place. The cap may be applied in the position shown in Fig. 5 by an ordinary capping machine.

After the contents of the bottle have cooled sufficiently, the bottle is placed on chain 1 of Fig. 1, and as the chain moves it is carried under one of the plungers 8 of chain 5. Chain 5 passes under a wheel 12, set somewhat lower than sprockets 6, so that the plungers 8 of chain 5 gradually approach the corresponding bottles on chain 1, engage the caps of those bottles, and force the caps down to the position shown in Fig. 6; after which the plungers retreat. The ordinary reciprocating-plunger capping machine is too sudden in action to be used to advantage in forcing the caps home from

the position shown in Fig. 5 to the position shown in Fig. 6; time should be allowed for the escape of air or other gas while the cap is being forced home. This time the machine shown provides.

In practice, the sprockets 2 will be set much farther apart, with respect to the sprockets 6, than indicated in Fig. 1, and to that extent Fig. 1 is diagrammatic. Such further setting apart of the sprockets 6 will provide for the ready placing of the bottles on the sprocket chain carrier. Also, in practice, automatic means will commonly be provided for the placing of the initially-capped bottles on the chain.

The bottle shown in Fig. 7 has in its neck two cap-grooves, 13 and 14, spaced apart by a distance representing approximately the shrinkage or contraction which the contents of the bottle undergo. The cap, 15, is an ordinary disk cap, first placed in groove 13 by an ordinary capping machine, and then, after the contents of the bottle have shrunk or contracted, forced into groove 14 by the plungers of the machine shown in Fig. 1, in the manner just described.

As shown in Figs. 2 and 3, the links, 16, of chain 1 are preferably V-shaped at one end, and at the other end have a V-shaped notch; and at the pointed end each link has a raised V-shaped portion 16' forming a pocket to hold the bottle.

It is to be understood that I do not limit myself to any particular form of chain-link or of bottle-holding pocket, or to any particular form of bottle-closure.

The machine shown in Fig. 4 is similar to that shown in Fig. 1, except that in Fig. 4 the lower run of chain 5 is straight, and to hold it so there is a platen 4^a; while the upper run of chain 1 passes over a wheel, 12^a, set somewhat above the sprockets 2, so that the bottles on chain 1 are carried up toward the plungers on chain 5. In other respects, the machine of Fig. 4 is substantially the same as that of Fig. 1.

What I claim is:—

1. Means for closing bottles and other containers comprising in combination two conveyers, one for containers to be capped, the other having plungers adapted to force home caps initially applied to such containers, and means for driving such conveyers synchronously, both of said conveyers being endless band conveyers, one of them having a guide wheel causing that conveyer to gradually approach to, and then recede from, the other conveyer.

2. Means for closing bottles and other containers comprising in combination two conveyers, one for containers to be capped, the other having plungers adapted to force home caps initially applied to such containers, and means for driving such conveyers synchronously, both of said conveyers being

endless band conveyers, one of them having a guide wheel causing that conveyer to gradually approach to, and then recede from, the other conveyer, such other conveyer having a platen constituting a support to resist thrust due to the action of the first mentioned conveyer.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GODFREY M. S. TAIT.

Witnesses:

T. H. YEAGER,
F. LYMAN PRATT.