

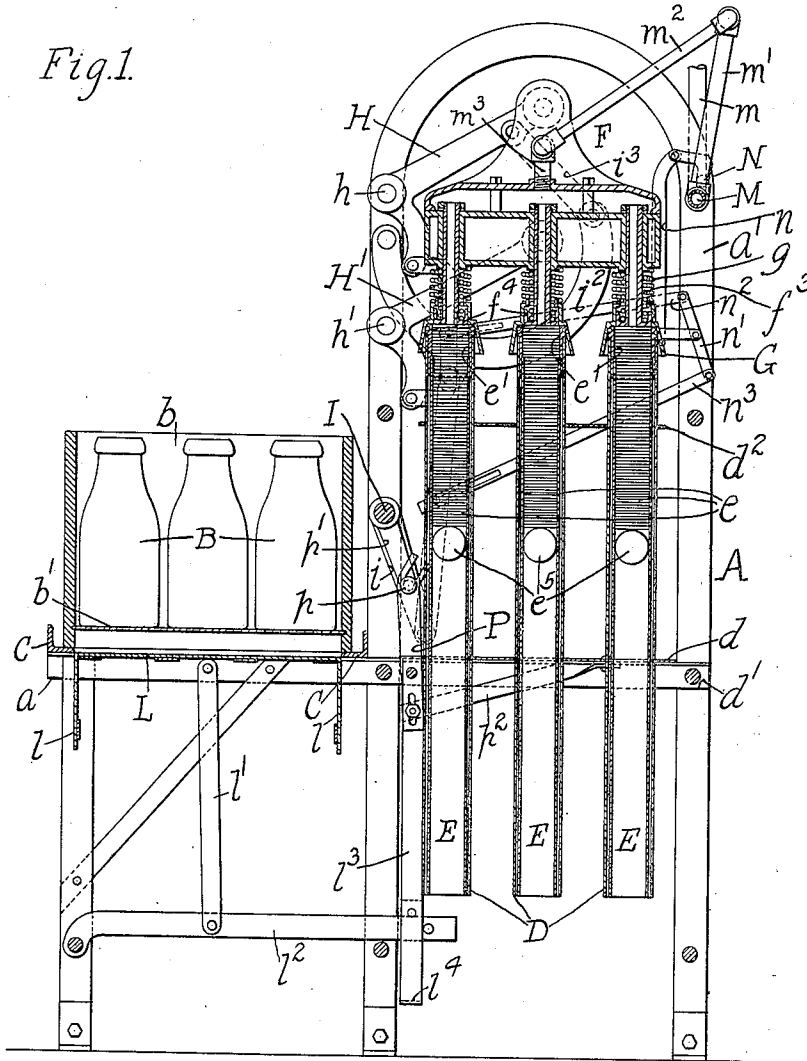
F. B. SCHUSTER.
BOTTLE CAPPING MACHINE.
APPLICATION FILED JUNE 16, 1911.

1,060,948.

Patented May 6, 1913.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.

C. C. Easterbrook.

A. B. Kuhnhausen

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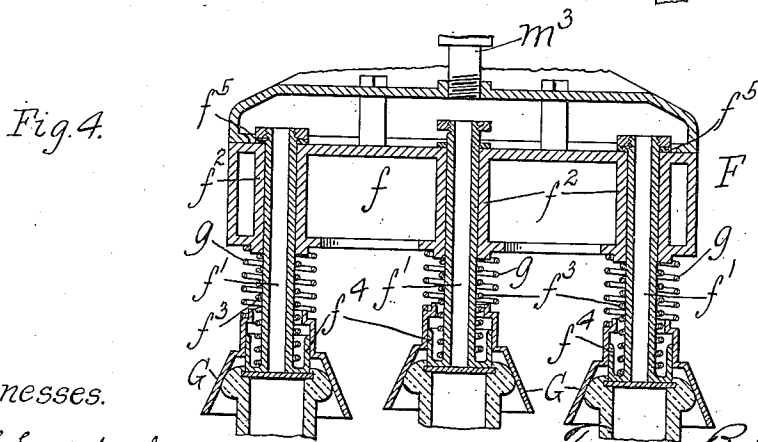
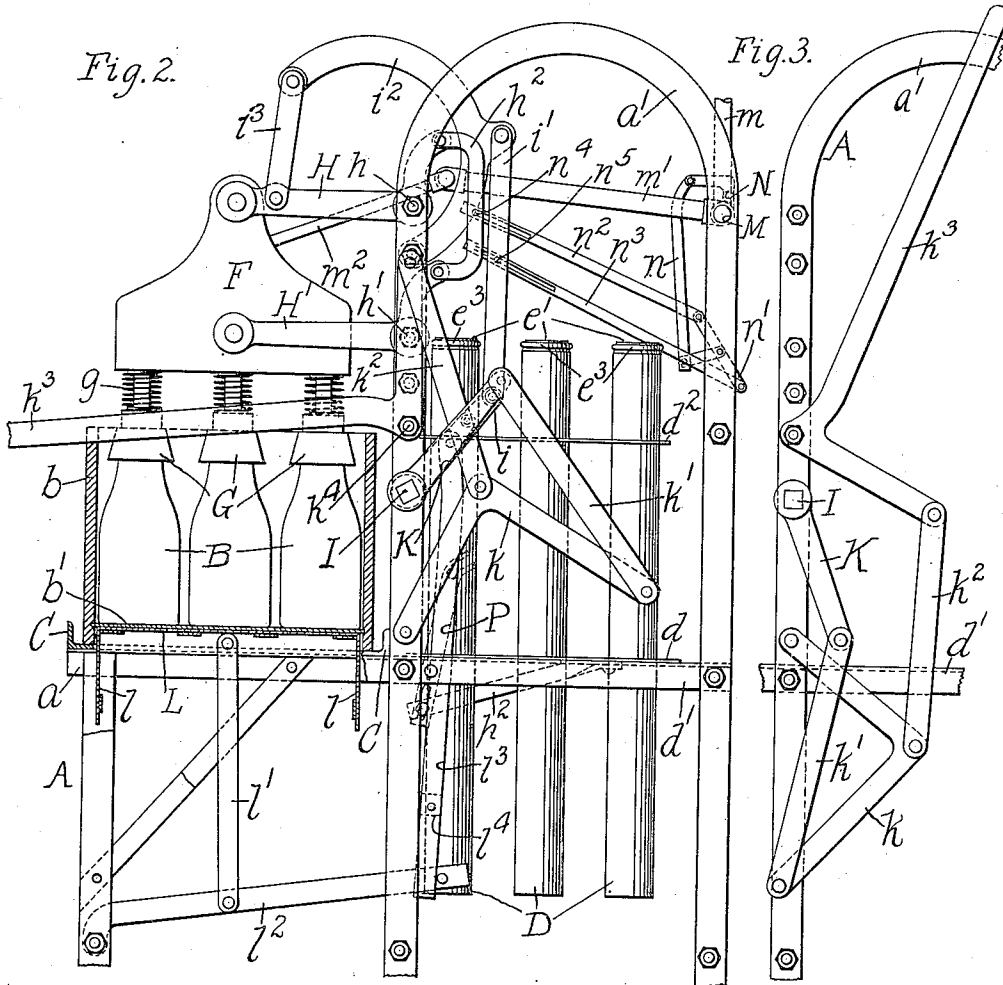
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3 SHEETS—SHEET 2.



Witnesses.

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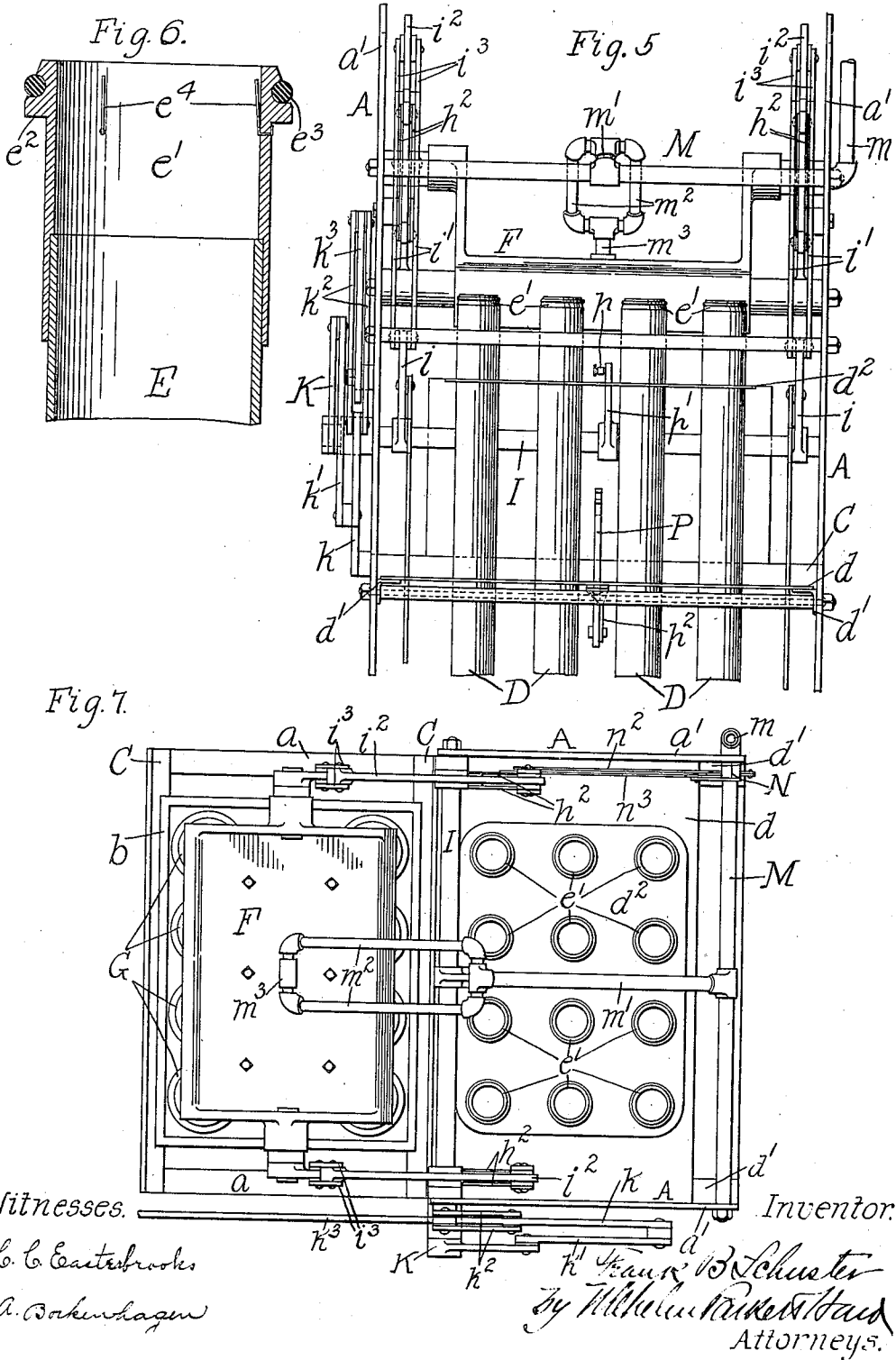
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3 SHEETS-SHEET 3.



UNITED STATES PATENT OFFICE.

FRANK B. SCHUSTER, OF BUFFALO, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO SANITARY DAIRY MACHINE COMPANY, INC., OF BUFFALO, NEW YORK, A COR-
PORATION OF NEW YORK.

BOTTLE-CAPPING MACHINE.

1,060,948.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed June 15, 1911. Serial No. 633,243.

To all whom it may concern:

Be it known that I, FRANK B. SCHUSTER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Bottle-Capping Machines, of which the following is a specification.

This invention relates to bottle capping machines which are employed for placing paper disks or caps in milk bottles.

One of the objects of the invention is to produce an efficient, practical machine which is of simple and inexpensive construction and which can be easily operated to rapidly cap the bottles and preferably to simultaneously cap a plurality of bottles.

Other objects of the invention are to construct the machine so that it can be operated to cap the bottles while they are contained in the ordinary carrying case or crate, and so that the capping devices will adjust themselves automatically to bottles of different heights and which may be located in slightly different positions in the cases; also to provide means for bracing or supporting the bottom of the case or crate while the caps are being forced into the mouths of the bottles; also to provide the machine with convenient and reliable means of simple construction for supplying the caps to the capping device which places them in the bottles; also to so construct and arrange the parts that the machine can be operated by a relatively short throw of the operating crank or lever; and also to improve bottle capping machines in the respects hereinafter described and set forth in the claims.

In the accompanying drawings, consisting of three sheets: Figure 1 is a side elevation, partly in section, of a bottle capping machine embodying the invention. Fig. 2 is a fragmentary sectional elevation thereof, showing the capping device in position to place the caps on the bottles. Fig. 3 is a fragmentary sectional elevation, showing the mechanism for actuating the capping device. Fig. 4 is a sectional elevation, on an enlarged scale, of the capping device. Fig. 5 is a fragmentary rear elevation of the machine. Fig. 6 is a fragmentary section of one of the cap containers. Fig. 7 is a plan view of the machine.

Like reference characters refer to like parts in the several figures.

The frame A of the machine may be of any suitable construction and is preferably provided with a front portion forming a support *a* on which the cases containing the milk bottles are placed, and with a rear upright portion *a'* which extends above the support for the cases.

B represents the milk bottles and *b* the case or crate therefor which is provided with the usual cross-wire bottom *b'*. The caps are placed in the bottles without removing them from the cases which are placed on suitable guide bars C secured on the front portion of the frame A between which bars the case is held in position while the bottles are being capped.

D represents the cap magazines or containers. One of these magazines is provided for each of the bottles and they are arranged in a group and are spaced apart from center to center substantially the same distance as the bottles in the cases. The magazines pass through holes in and are held by a support or plate *d* which rests on supporting bars *d'* secured to the frame A of the machine, and an additional spacing plate *d''* may be provided to hold the upper ends of the magazines in their proper positions relatively to each other. The magazine support *d* is preferably movably horizontally on the supporting bars *d'* toward and from the support for the cases of milk bottles for a purpose which will be explained. Any other means for holding the magazines may be employed if desired, and any number of magazines can be used, depending upon the number of bottles which it is desired to cap at one time. Twelve of these magazines are preferably employed, so that a case of a dozen bottles can be capped at one time. The cap magazines consist of upright open-ended cylindrical tubes of a suitable size to receive tubular cartons or containers E in which the bottle caps *e* are usually packed for shipment by the manufacturers. The magazines are open at both ends and a carton is inserted into each magazine and is held therein by a suitable sleeve or bushing *e'*. The lower portions of these sleeves are of suitable diameter to be slipped on and fit tightly on the ends of the cartons. The upper portion of the sleeve is provided with an outwardly extending shoulder or flange *e''* which rests

on the top edge of the cap magazine D when the sleeve is in place in the magazine. The upper face of the shoulder is made tapering and is provided with a rubber or other suitable gasket or washer e^3 which is retained in a seat in the tapered face. Spring clips or holders e^4 may be provided in the sleeve e' which offer a slight resistance to the removal of the caps from the cartons and thereby prevent the removal of more than one cap at a time in case the second cap from the top should adhere to the uppermost cap.

After one end of a carton has been inserted into the sleeve e' , the caps are pushed upwardly into the sleeve and a follower e^5 is inserted into the bottom of the carton so that the caps in the carton rest on the follower, which is movable lengthwise in the carton. This follower can be a hollow rubber ball, or it can be of any other shape and made of any light and compressible material adapting it to engage the walls of the carton with sufficient friction to support the stack of caps, or it can be otherwise movably supported in the carton. As the caps are removed from the magazine one after another, the follower is moved upwardly in the magazine, as hereinafter explained, so as to always keep the top cap of the stack at the top of the magazine.

The cap magazines are preferably made of the construction described, since the caps for the milk bottles are commonly packed in tubular paper cartons, and by using the cartons in the manner described, the cap magazines can be easily filled. The invention is not, however, limited to the use of this type of cap magazine. The magazines could, for example, consist simply of the tubes D, the caps being placed directly therein, in which case the follower e^5 would engage with the walls of the magazine tube D.

F represents a capping device which is movably mounted on the upright rear portion a' of the frame so as to swing from the position shown in Fig. 1, over the cap magazines, to a position shown in Fig. 2, and has provision for taking the caps from the magazines and carrying them to the bottles in the case. The capping device (see Fig. 4) preferably comprising a horizontal chambered suction head f from which depends a group of open-ended capping tubes f' corresponding in number and arrangement to the cap magazines D. The capping tubes are slidable vertically in guide bearings f^2 on the suction head and communicate at their upper ends with the suction chamber in the head. Springs f^3 , which surround the tubes between collars f^4 at their lower ends and the tube bearings, normally press downwardly and hold the flanged upper ends of the tubes against suitable packing rings f^5 surrounding the upper ends of

the tubes to prevent the leakage of air through the tube bearings. Each capping tube carries at its lower end a flaring bottle guide and holder G which is slidably mounted on the lower end of the tube and is normally pressed downwardly on the tube by a second spring g surrounding the tube between the suction head and the bottle guide or holder.

The suction head is preferably pivoted at each of its opposite ends to a pair of levers H H' which are fulcrumed between their ends respectively at h h' on the upright rear portion a of the frame of the machine. Each pair of these levers has arms extending at an angle to the arms to which the suction head is pivoted and which are joined by links h^2 to cause the levers to swing together and always hold the capping device upright. The means shown for moving the capping device back and forth from the cap magazines to the bottles comprises a series of levers and links which are actuated by a rock-shaft I journaled in the frame a' of the machine. Arms i are rigidly secured to the rock shaft I adjacent to the sides of the machine and their ends are pivotally connected by links i' to levers i^2 intermediate of the ends thereof. These levers i^2 may be of any suitable shape, those shown being curved. One end of each of the curved levers i^2 is pivoted on the frame of the machine and the other end is pivotally connected by a link i^3 to the lever H. Thus by oscillating the rock-shaft I, the levers i^2 shift the capping device from one of its positions to the other.

The turning or oscillating of the rock-shaft I is effected by the following mechanism: An arm K is rigidly secured at one end of the rock-shaft I and the end of this arm is pivotally connected to one end of a bent lever k by a link k' . The other end of the lever k is pivoted to the frame of the machine and a link k^2 is pivoted to this lever intermediate of the ends thereof and to the short arm of a hand lever k^3 . The hand lever is pivoted at k^4 to the frame of the machine and the long arm thereof is adapted to be drawn toward and from the front of the machine by the operator, whereby the rock-shaft I is turned through an angle sufficient to move the capping device from the magazines to the bottles.

The suction head of the capping device may be connected to a suction pump or device (not shown) for exhausting the air from the suction head and capping tubes, in any suitable manner which will permit the described motion of the capping device. A jointed folding pipe connection is shown for this purpose comprising a pipe M which is swiveled to a pipe m connected with the suction pump or device and a pipe m' ar-

5 ranged perpendicularly thereto and swiveled to pipes m^2 which in turn are swiveled to a connection m^3 on the suction head. By means of these connections, suction can be transmitted from the pipe m to the suction chamber of the capping device F, the pipes assuming positions shown in Figs. 1 and 2 when the capping device is in a position over the cap magazines and over the bottles, respectively.

10 The pipe m is provided with a valve N of any suitable sort, which may be operated to connect the suction head with the pump so that the suction tubes will take the caps from the magazines and carry them to the bottles, and for disconnecting the suction head from the pump to release the caps from the suction tubes when they are placed on the bottles. The valve N is connected by a link n to one arm of a lever n' , which is pivoted on the frame of the machine. The ends of two links n^2 n^3 are pivoted to the opposite arms of the lever n' and the other ends of these levers are provided with longitudinal slots in which pins or bolts n^4 n^5 , which are secured respectively to the links h^2 and i' , slidably engage. When the capping device is moved to the position over the magazines, shown in Fig. 1, the pin n^5 engages with the end of the slot in the link n^3 and shifts the lever n' to move the link n upwardly and open the valve N, and when the capping device is moved to the position over the bottles, shown in Fig. 2, the pin n^4 engages with the end of the slot in the link n^2 and the lever n' is thereby shifted to move the link n downwardly and close the valve N. The suction tubes then release the caps, which are pressed into the cap-retaining lips of the bottles. Any other suitable suction connections and controlling means therefor could be used.

In order to rigidly support the bottles when the caps are being forced therein and prevent the downward pressure of the capping device on the bottles from breaking or bending the bottom wires of the crate, a movable support, plunger or plate L is provided which is mounted in the frame of the machine between the bars C, which support the crates, and is adapted to be moved toward and from the bottom of the crates. The plunger is suitably guided in the frame of the machine, for instance, by depending guide strips l secured to the plunger. The plunger is connected by links l' to levers l^2 between the ends thereof. These levers are pivoted at one end to the frame of the machine and their other ends are adapted to be engaged by links l^3 which are pivoted to the arm i of the operating mechanism for the capping device. When the capping device is in the position over the bottles, the arm i and link l^3 are in their uppermost positions and thus the lever l^2 and the plun-

ger L will also be raised to support the bottom of the crate. The plunger is adapted to enter between the side walls of the crate and bear directly against the bottom wires and thereby straighten the bottom of the case and cause each of the bottles to assume a vertical position. The plunger is preferably arranged to raise the crate slightly above the supporting bars C, which, owing to the pivotal connection between the plunger and the links l' , enables the crate and plunger to be easily tilted to guide the mouths of the bottles into the flaring bottle guides G. By means of a slotted connection l^4 between the lever l^2 and the link l^3 , the arm i may have a limited upward movement before moving the plunger upwardly, for instance the upward movement of the plunger may be made to commence after the capping device begins to move downwardly, so that practically no effort on the part of the operator is required to raise the plunger. Any other suitable means for supporting the bottom of the crates could be used, if desired.

The operation of the machine is as follows: A case or crate with the milk bottles therein is placed on the guide bars C and the operator then turns the crank to move the capping device F over to the cap magazines with the capping tubes bearing on the top of the stacks of caps in the magazines, as shown in Fig. 1. The pin n^5 engages in the end of the slot in the link n^3 just before the capping tubes engage the caps in the magazines, and shifts the valve N so as to connect the suction head with the suction pump or device. The uppermost caps in the magazines are caused to cling to the ends of the capping tubes by the suction, and the operator then turns the crank to carry the capping device with the caps carried thereby, over the bottles. During the last portion of the movement of the capping device toward the bottles, the caps are forced into the mouths of the bottles by the capping tubes and the pin n^4 engages in the end of the slot n^2 , thereby shifting the valve N so as to disconnect the suction head from the pump and connect it with the atmosphere, thereby breaking the suction and releasing the caps from the capping tubes so that when the capping device is again moved away from the bottles, the caps will be held in place in the bottles by the cap-retaining lips of the bottles. The suction through the capping tubes, when the bottle guides G bear on the cap magazines, lifts the stacks of caps and the followers c^5 in the magazines until the uppermost caps engage the ends of the capping tubes, and when the capping device leaves the magazine, the followers are retained in the position to which they are lifted by the friction between the followers and the walls of the magazines.

Thus the stack of caps in each magazine is raised slightly each time a cap is withdrawn from the magazine, and the tops of the stacks are kept always at the tops of the magazines, and no feed mechanism is required for raising the stacks in the magazines as they are depleted.

If the bottles are located in the case so that they are not directly under the capping tubes as the latter approach the bottles, the flaring bottle guides or holders G, engaging the upper ends of the bottles, will shift the bottles in the case and center them exactly under the capping tubes. The capping tubes and bottle guides are both adapted to yield so that the correct operation of the machine will not be defeated by reason of a variation in the height of the bottles, which frequently occurs in bottles of different makes.

By providing a supporting plunger I, the bottoms of the crates are supported in such a manner as to prevent injury thereto if the operator should force the capping device down upon the bottles with excessive pressure. When the capping operation is completed, the plunger is withdrawn from the bottom of the crate to a position where it does not interfere with the removal of the crate and the placing of another crate on the machine.

Since the capping device is mounted to swing in an arc of a circle, the capping tubes have a slight lateral motion in approaching and receding from the cap magazines instead of moving in an exactly vertical direction, and means are therefore provided for shifting the cap magazines horizontally sufficiently to prevent any lateral movement between the capping tubes and the magazines, while the former are in proximity to the latter. The means shown for this purpose comprise a lever P which is fulcrumed on the frame of the machine and has its upper end arranged to be engaged by a pin p on a rock arm p' and its lower end connected by a link p^2 to the movable support or plate d for the cap magazines. The upper end of the lever P is slotted and the movement of the pin p in this slot swings the lever sufficiently to shift the cap magazines horizontally to the extent required, as the capping tubes approach and recede from the magazines. Any other suitable means could be employed for this purpose, and if the cap magazines were located so that the capping tubes would engage the tops of the magazines just as the arms of the supporting levers for the capping device reach the horizontal planes of the pivotal axes of the levers, there would then be no horizontal movement of the capping device at the time of the engagement of the capping tubes with the magazines. Such an arrangement would, however, necessitate a longer movement of the

capping device and a proportionally greater throw of the operating crank or lever. The construction described is therefore preferred.

In the machine illustrated in the drawings the several suction tubes f' communicate with a suction chamber in the capping device F, but while this construction is preferred, it is manifestly not essential, as separate suction connections for the several tubes would effect the same result. It will also be understood that a suction device for carrying the caps from the magazines to the bottles in the manner described could be differently mounted and operated, while, on the other hand, a capping device mounted and operated as described could be equipped with other means in place of the suction tubes for picking up the caps and carrying them to the bottles.

I claim as my invention:

1. In a bottle capping machine, the combination of a support for the bottles, magazines adapted to contain caps, a movable capping device having a plurality of suction tubes which are adapted to take the caps from the magazines and to place them in the bottles, means for moving the capping device from the cap magazines to the bottles, said suction tubes being independently movable on said capping device to accommodate bottles of different heights, and suction controlling means for causing said suction tubes to take the caps from the magazines, carry them to the bottles and release the caps, substantially as set forth.

2. In a bottle capping machine, the combination of a support for the bottle, a magazine adapted to contain caps, a movable suction capping device, a suction tube yieldingly mounted in said capping device which is adapted to take a cap from the magazine and which is shaped to enter the mouth of the bottle and to force the cap into the mouth of the bottle, means for moving the capping device from the magazine to the bottle, and suction controlling means for causing the capping device to take a cap from the magazine, carry it to the bottle and release the cap, substantially as set forth.

3. In a bottle capping machine, the combination of a support for the bottle, a magazine adapted to contain caps, a movable suction capping device having a suction tube which is adapted to take the cap from the magazine and to force the cap into the mouth of the bottle, a bottle guide which is adapted to engage the end of the bottle and center it with regard to said suction tube, said suction tube being movable with respect to said bottle guide, means for moving the capping device from the magazine to the bottle, and suction controlling means for causing the capping device to take a cap from the magazine, carry it to the bottle and release the cap, substantially as set forth.

4. In a bottle capping machine, the combination of a support for the bottle, a magazine adapted to contain caps, a suction capping device for taking the caps from the magazine, means for operating the capping device to place the caps in the bottles, and a follower which is moved vertically in the magazine by the suction of the capping device and supports the caps in the magazine by engagement with the magazine, substantially as set forth.

5. In a bottle capping machine, the combination of a support for the bottle, a magazine containing caps, a capping device, a suction connection for the capping device and means for controlling the suction for withdrawing the caps from the magazine and releasing them from the capping device, a follower which is moved vertically in the magazine by the suction of the capping device and supports the caps in the magazine by frictional engagement with the walls of the magazine, and means for moving the capping device to place the caps in the bottles, substantially as set forth.

6. In a bottle capping machine, the combination of a support for the bottle, a magazine adapted to contain caps, a swinging capping device for taking the caps from the magazine, means for swinging the capping device back and forth from the magazine to the bottle, said magazine being stationary during a considerable portion of the movement of the capping device toward the magazine, and means for shifting the magazine laterally as the capping device nears the end of its movement toward the magazine to compensate for the horizontal displacement of said capping device, due to its swinging movement, substantially as set forth.

7. In a bottle capping machine, the combination of a support for a case of bottles, a group of cap magazines corresponding in number to the number of bottles in the case, a capping device mounted to swing from a position over the cap magazines to a position over the bottles and having a yieldingly mounted suction tube for each magazine, said tubes being adapted to yield independently of each other, means for actuating the capping device, a suction connection for the capping device, a valve which controls the suction in the capping device, and means for actuating said valve to cause the suction tubes to take the caps from the magazines and release them when placed in the bottles, substantially as set forth.

8. In a bottle capping machine, the combination of a bottle support, a magazine adapted to contain caps, a capping device for taking the caps from the magazine and placing them in the bottles, supporting levers to which said capping device is pivoted

to swing back and forth from the magazine to the bottle, connecting links between said supporting levers whereby said levers are caused to swing together, and an oscillating operating lever connected to one of said supporting levers whereby said capping device can be swung back and forth, substantially as set forth.

9. In a bottle capping machine, a capping device for placing the caps in the bottles comprising a yielding suction tube, and a flaring bottle guide which is adapted to engage the end of the bottle and center it with relation to said suction tube, said bottle guide being also mounted to yield, substantially as set forth.

10. In a bottle capping machine, a capping device for placing the caps in the bottles comprising a suction tube for holding the caps and forcing them into the bottles, and a flaring bottle guide for engaging the end of the bottles, said suction tube and bottle guide being yieldably mounted to permit them to yield together and to allow the bottle guide to yield independently of the suction tube, substantially as set forth.

11. In a bottle capping machine, the combination of a support for the bottle, a magazine for caps comprising a stationary tube, a tubular container for the caps which is removably supported in said stationary tube, a suction capping device for taking the caps from the container, means for operating the capping device to place the caps in the bottle, and a follower which is moved vertically in said container by the suction of the capping device and supports the caps in the container by engagement with the walls of the container, substantially as set forth.

12. In a bottle capping machine, the combination of a support for the bottle, a magazine for caps comprising a stationary tube and a tubular carton containing caps which is adapted to be removably supported in said stationary tube, a capping device for taking the caps from said carton, means for operating the capping device to place the caps in the bottle, and means feeding the caps upwardly in said carton to maintain the top of the stack of caps substantially at the same height, substantially as set forth.

13. In a bottle capping machine, the combination of a support for the bottle, a magazine for caps comprising a stationary tube, a sleeve which is removably supported in the upper end of said tube, and a carton containing caps adapted to fit in and be supported by said sleeve, a suction capping device adapted to engage with said sleeve and to take caps from said carton, means for operating the capping device to place the caps in the bottle, and a follower which is movable vertically in said carton by the suction of the capping device and supports the caps

in the carton by engagement with the carton, substantially as set forth.

14. In a bottle capping machine, the combination of a bottle support, a magazine adapted to contain caps, a capping device for taking the caps from the magazine and placing them in the bottles, supporting levers to which said capping device is pivoted to swing back and forth from the magazine to the bottle, a rock-shaft operatively connected with said supporting levers, and an oscillating operating lever connected to turn said rock-shaft, whereby the capping device can be swung back and forth, substantially as set forth.

15. In a bottle capping machine, the combination of a support for a crate containing bottles and having a hollow bottom, a capping device for placing the caps in the bottles, and means which are movable into said hollow bottom for supporting the bottom of said crate and for raising and pivotally supporting said crate to enable the same to be properly positioned relatively to said capping device, substantially as set forth.

16. In a bottle capping machine, the combination of a support for a crate containing bottles, a capping device for placing caps in the bottles, a second support which is normally out of engagement with the bottom of said crate, and means for moving said second support into engagement with the bottom of said crate when said capping device is moved toward said bottles, for reinforcing the bottom of said crate, said means being adapted to pivotally hold said second support in a position to support the case above said first mentioned support to enable the crate to be properly positioned relatively to said capping device, substantially as set forth.

17. In a bottle capping machine, the combination of a support for a crate containing bottles, a capping device for placing caps

in the bottles, operating means for moving said capping device into engagement with said bottles, and a second support which is normally out of engagement with said crate and is connected with said operating means and is moved upwardly thereby into engagement with the bottom of said crate for reinforcing said bottom when said capping device is moved downwardly into engagement with said bottles, and which raises said crate and pivotally supports the same to enable the crate to be properly positioned relatively to the capping device, substantially as set forth.

18. In a bottle capping machine, the combination of a support for a crate containing bottles, a capping device for placing caps in the bottles, a second support which is adapted to engage said crate and raise the same, and operating means for said capping device and said second support which raise said second support when said capping device is lowered, whereby the weight of the capping device helps to raise said second support, substantially as set forth.

19. In a bottle capping machine, the combination of a bottle support, a magazine adapted to contain caps, a movable suction capping device which is adapted to take a cap from said magazine and to place the same into the mouth of the bottle, means for moving said capping device from said magazine to the bottle, and a jointed folding suction pipe connected to the capping device, whereby the air can be exhausted from said movable capping device, substantially as set forth.

Witness my hand, this 25th day of May, 1911.

FRANK B. SCHUSTER.

Witnesses:

C. W. PARKER,
A. L. MCGEE.