H. A. OLSSON.

MACHINE FOR CAPPING BOTTLES.

APPLICATION FILED DEC. 16, 1908.

968,791. Patented Aug. 30, 1910.

3 SHEETS—SHEET 1.

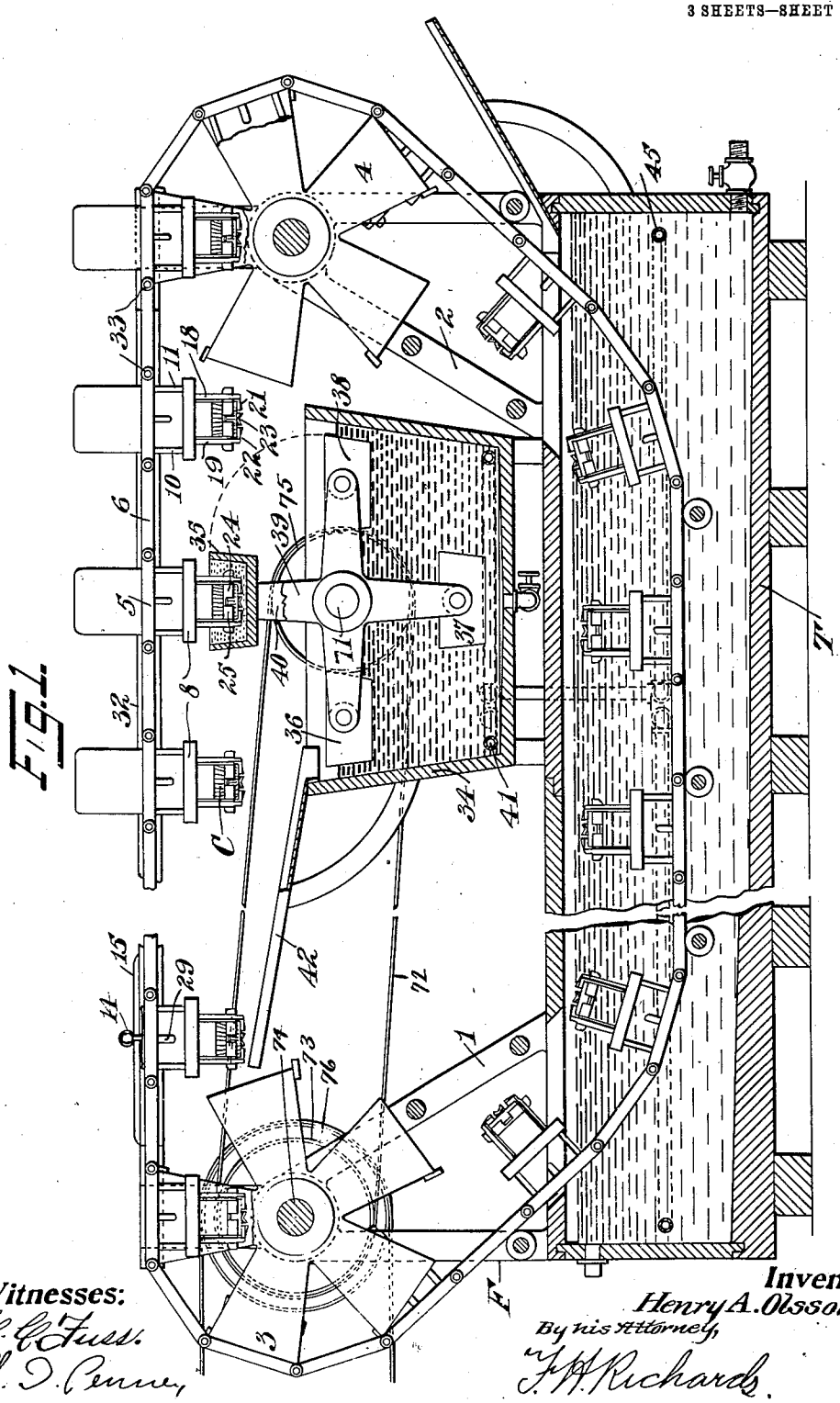

FIG. 1.

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Inventor:
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By his Attorney,
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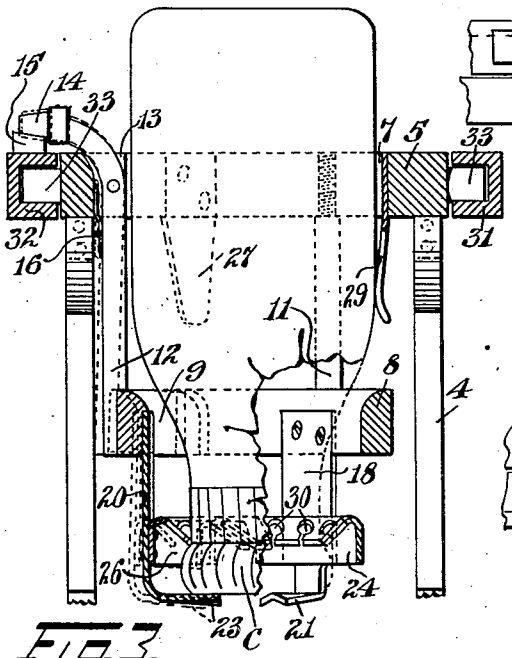

Fig. 3.

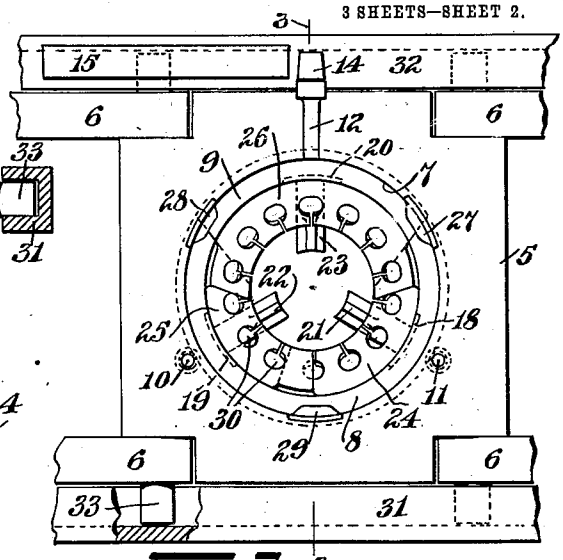

Fig. 2.

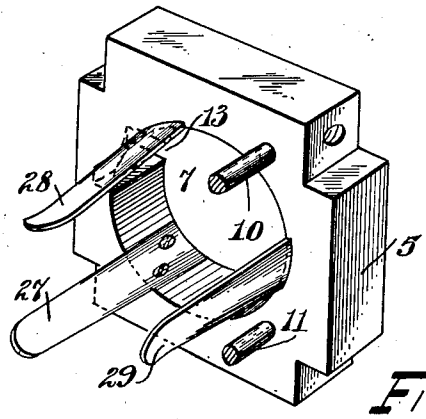

Fig. 4.

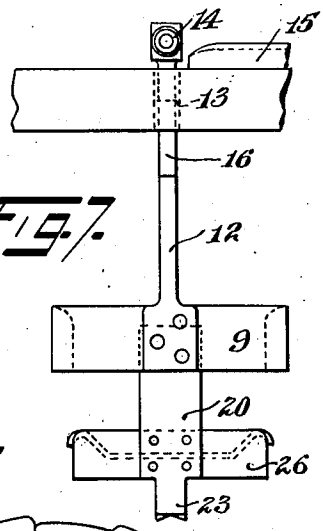

Fig. 7.

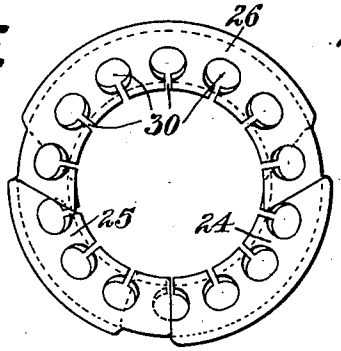

Fig. 6.

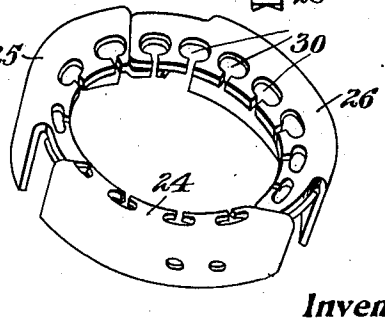

Fig. 5.

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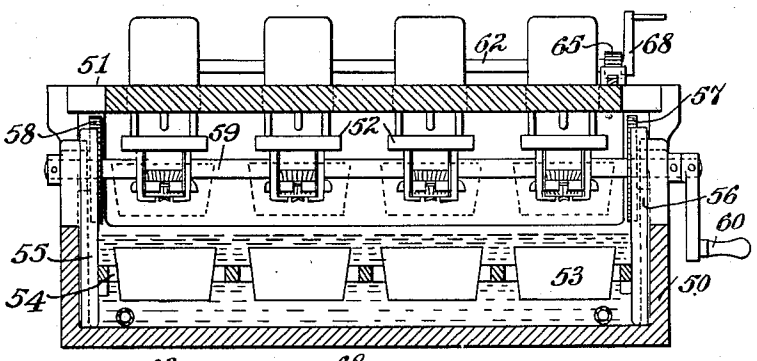


Fig. 9.

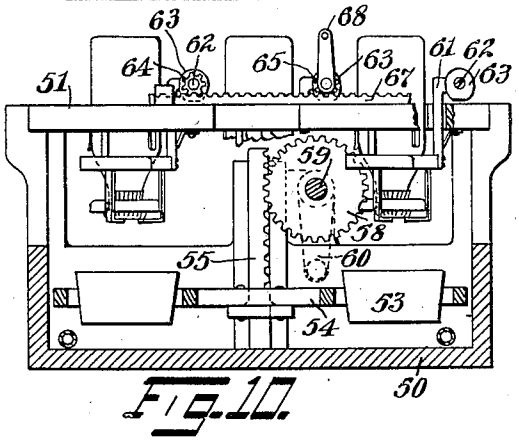
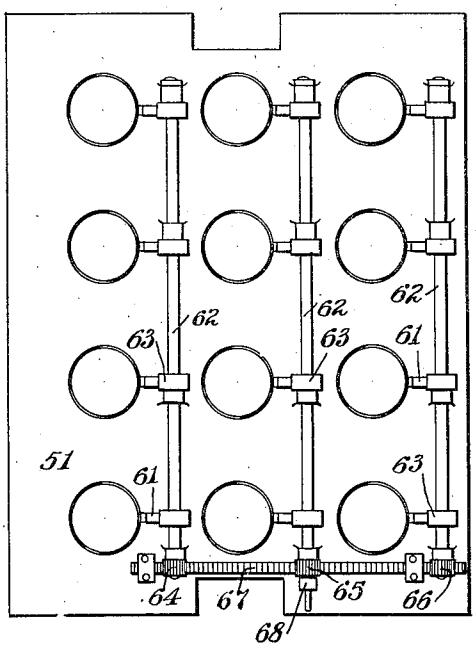


Fig. 10.

Fig. 8.



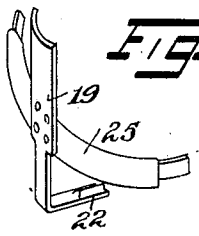


Fig. 11.

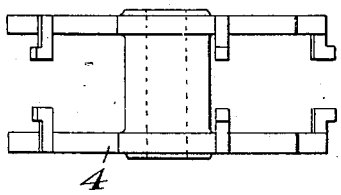


Fig. 12.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR CAPPING BOTTLES.

968,791. Specification of Letters Patent. Patented Aug. 30, 1910.

Application filed December 16, 1908. Serial No. 467,898.

To all whom it may concern:

Be it known that I, HENRY ALBERT OLSSON, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machines for Capping Bottles, of which the following is a specification.

This invention relates to mechanism for applying a coating of a sealing material in a liquid or semi-liquid form to the closure end of a bottle, jar or other vessel.

One of the objects of the invention is to provide means for supporting a bottle or jar, and to cause a relative movement between the bottle and a containing vessel having the sealing fluid therein, whereby the bottle is immersed therein at its closure end for a certain required distance.

A further object is to provide means whereby the immersing operation will be practically continuous, by merely inserting the bottles at one portion of the machine and removing them at another portion.

A further object of the invention is to provide supporting means for the closure end of an inverted bottle or jar, whereby a cap will be pressed against the end and side of the bottle mouth, and such cap will be immersed in the sealing fluid, to effect the securement of the cap to the bottle mouth upon removal of the same from the machine.

Another object of the invention is to provide means for causing a kind of wiping action of the cap onto the mouth of the bottle, and to press the cap around a bead on the outside of the bottle mouth, and retain it in such position during the dipping operation.

Another object of the invention is to provide for the automatic operation of the compressing means for the proper positioning of the cap on the bottle neck.

Another object is to provide means for the cleansing of the bottle holding means from the sealing fluid immediately after the dipping operation and previous to the subsequent use of the bottle supporting and engaging means.

In the accompanying drawing showing embodiments of my invention, Figure 1 is a vertical sectional view through the machine. Fig. 2 is a plan view of one of the bottle supporting members. Fig. 3 is a section on the line 3—3 of Fig. 2. Fig. 4 shows in perspective the supporting block. Fig. 5 shows in perspective and Fig. 6 in plan, the segmental compressing members. Fig. 7 is a fragmentary view showing the movable compression member and its supporting and operating means. Fig. 8 is a plan view of a modified form of the device. Fig. 9 is a longitudinal section of the same. Fig. 10 is a transverse section of the same. Fig. 11 shows in perspective one of the compressing segments, and Fig. 12 shows in plan one of the reels for supporting and operating the endless chain of bottle carriers.

This invention is especially designed to apply sealing fluid to a bottle cap of paper or the like in order to secure the cap to the bottle after the same has been filled and closed by suitable closure or stopper member, such as a disk of paper. The machine is especially adapted for use with milk bottles or jars having a bead or ring on the outside of the neck at the mouth. In the act of inserting the inverted bottle into the carrier with the cap previously dropped into the carrier, or else placed on the bottle mouth, the cap will be compressed around the bead and held in such position while the bottle mouth is immersed in a suitable vessel containing sealing fluid, for substantially the depth of the cap member. This is effected by causing a relative movement between the bottle carrier and the vessel.

In the machine illustrated in Fig. 1, there is an endless chain of the carriers by which the bottles can be successively brought to a certain predetermined position and there immersed. A series of receptacles are provided that are alternately immersed in a tank containing the sealing fluid and then shifted to the immersing position of the bottles; whereby the operation is practically continuous, the bottles being placed in the carriers at a certain position of the chain before reaching the said position of immersion, and then removed beyond this position. The device is shown as comprising a frame member F having standards 1 and 2 at the opposite ends, on which are journaled reels 3 and 4, shown separately in Fig. 12. On these reels is carried an endless chain member that is composed of frame or supporting blocks 5 (see Figs. 3 and 4) that are pivotally connected by links 6 on each

side. Each of these blocks forms part of a carrier for a bottle or jar, as shown in Fig. 2, the block having a central opening 7 large enough to permit insertion of the bottle. The block carries members for engaging the end of the inserted bottle whereby it is supported, and also lateral pressing members whereby a cap C, in the insertion of the bottle, will be pressed or wiped against the bead on the bottle end, and the cap will be compressed against the bottle neck at the end of the bead, as indicated in Fig. 3. These means are preferably automatic in in their action, so that when the bottle is pushed down, with a cap previously dropped in the support, the cap will be properly applied and pressed against the bottle neck. In the construction shown a split ring having two parts 8 and 9 is supported from the block 5, the part 8 being rigidly connected with the block by posts 10 and 11. The other portion 9 of the split ring is carried by an arm 12 pivoted to the block in a slot 13, and carrying a roller 14 at its upper extremity. At a certain part of the travel of the carrier this roller on the arm will strike a bar 15 and swing the portion 9 of the split ring away from its other member. When not engaged by this bar 15, the ring portion 9 is held in engagement with the other portion 8 by a spring 16 on the lever 12, that engages the block 5.

The split ring carries a series of depending strips, that are preferably resilient. The ring portion 8 carries two strips 18 and 19, while the ring portion 9 carries a similar strip 20. The lower ends of these strips have transverse arms 21, 22, and 23 extending inwardly a short distance, and which engage the end of the bottle mouth to support the weight of the bottle. The said depending strips carry a segmental pressing member in the form of a ring of three segments 24, 25 and 26, that are secured to the three strips respectively. This ring member has its outer portion substantially circular and secured to the strips, while the inner portion is substantially conical and inclined downward. The inner diameter of the conical portion is adapted to engage the cap on the bottle neck and press it against the neck just below the bead, as indicated in Fig. 3. These ring segments also preferably have their inner conical portions slightly overlapping. When the bottle with the cap is pushed down through the opening in the block, the end of the bottle will engage the conical portion of the segmental ring, and the bead will tend to force these members outwardly or expand the ring. This movement is permitted by reason of the three supporting strips being resilient, and this will cause a kind of wiping action on the bottle cap throughout the bead, the bottle passing down until its end reaches the three supporting arms that will limit its movement, as indicated in Fig. 3. In the expanding of the segmental ring, the overlapping portions will still engage and have a practically continuous engagement with the cap on the bead. After passing the maximum diameter of the bead, the segmental pressing member will contract again, until at the final position they will press the cap against the bottle at the bottom of the bead, as indicated. If desired spring fingers 27, 28 and 29 may be secured in the opening in the block to assist in keeping the bottle central in the carrier.

When the bottle is removed by drawing it upward, the segmental ring could expand in the same manner and release the bottle from the ring. But such action might tend to loosen the bottle cap, and therefore the swinging lever 12 is first swung, by engagement with the bar 15, that will shift the segmental ring portion 26 outward from the bottle. Then when the bottle is withdrawn, it will slide freely away from the other two segment portions of the ring. Preferably the ring segment 26 is larger than the other two and approximately forms a semicircle as indicated in Fig. 6; so that its opening movement will leave the bottle cap free from any wiping action of the other segments during its removal. It will be observed that the bottle cap is engaged by the supporting arms and the compressing ring over a comparatively small portion of its surface, whereby the immersion of the cap end of the bottle in a sealing fluid will permit practically free access of the fluid to the cap. The cap is engaged at its lower end by the three supporting arms that are comparatively slender, and it is further engaged by the inner edge only of the conical portion of the ring segments, that will practically compress it on a circle only. In order to prevent accumulation of the sealing fluid in the channel that would be formed by the conical portion of the ring and the opposite portion of the bottle cap, suitable openings 30 are formed in this conical portion, so that upon removal of the bottle from the sealing fluid, the fluid drains down through these openings.

As shown in Fig. 1, the endless chain of the carriers moves horizontally between the reels 4 and 3, and may be guided by channeled bars 31 and 32 into which project rollers 33 extending from the links 6. The sealing fluid is shown as contained in a tank 34, and a series of vessels are brought successively to engage the successive bottle ends, as the chain is advanced. Four vessels 35, 36, 37 and 38 are shown as pivotally carried by radial members 39 and 40 fast on a shaft 71, that is rotatable in the tank 34. As this shaft is rotated the vessels will be successively immersed in the fluid in the tank and consequently be filled; and as the vessels

rise from the tank they will be brought into the path of movement of one of the bottles in a carrier, so that in the uppermost position of the vessel, as shown in Fig. 1, the bottle mouth in the carrier will be immersed in the vessel for the proper distance. Now, as the bottles all travel in the same horizontal path, and as the vessels are successively brought to the same horizontal position, the vessels will become filled by their immersion in the tank, and each bottle will be immersed for the same distance upward from its lower end at each operation, this will be irrespective of the relative length of the bottle because it always rests on the three supporting arms, and the immersion is for the same distance above these arms. The shaft carrying the four vessels is continuously operated at a speed relative to that of the advancement of the endless chain of carriers whereby as each vessel is elevated from the tank, it will meet a bottle moving along, and cause immersion of the bottle at the uppermost position of the vessel, at which position they will have the same surface speed. That is, there is a complete revolution of the shaft carrying the four vessels, as four carriers are brought to the position for immersion. The means shown for effecting such relative movement comprises a belt 72 on a pulley 73 on the shaft 74 of the reel 3, which belt also passes around a pulley 75 on the shaft 71. Since the vessels are filled as they leave the tank, the immersion of the bottle end will cause the sealing fluid to overflow, but of course the vessel will remain full. After immersion the vessel will return to the tank, and being partly empty, it will receive a fresh supply as it passes into and through the tank. It has been found desirable to use a sealing fluid of very low melting point such as paraffin. This material is heated in the tank by suitable means such as steam pipes 41. The vessels become heated from immersion in the melted paraffin, and it will be still liquid when the bottle cap is immersed therein. As the bottles leave the vessels and advance along the carrier, this fluid will very quickly harden. And the subsequent immersion of the vessel will keep the paraffin in a fluid condition. If desired a shelf 42 may be provided beyond the tank to catch any paraffin that may drip off after the immersion. The bottles after immersion remain in the carrier and the central ring still compresses the cap around the bead, and will hold it there until the paraffin or other sealing fluid becomes set or hardened. Then the lever carrying the movable segment of the compressing ring is shifted by the bar 15, that will open the ring segment, yet the bottle will be still supported by the transverse arms engaging its lower end. The bottle can now be removed without being compressed by the segmental ring, that might tend to loosen the cap. After passing beyond the bar 15, the segmental ring will again close.

Since the lower portion of the carrier, that is, the supporting arms and the segmental rings are immersed in the paraffin in the vessels, when they cool a certain amount of this material will adhere thereto, and an undue amount might adhere to them by the successive immersions and coolings. Therefore a tank T is provided at the lower part of the apparatus, and the carriers pass through this tank on their return movement. The tank preferably contains water that may be heated by steam pipes 45. This will melt off the accumulated paraffin on the carriers, and will tend to keep the bottle engaging portion of the carriers in a warm condition, so that the paraffin will not be cooled thereby in the act of immersing the caps on the bottles.

In Figs. 8, 9 and 10 is shown a slight modification in which a number of bottles are placed in a stationary holder, and the same number of vessels are elevated from a tank to immerse the bottles at their capped ends, and then the vessels returned to the tank. The device is shown as comprising a suitable tank 50 having at its top 51 a plurality of carriers 52, that are substantially identical with the device shown in Fig. 2, and hence will not be further described in detail. A set of twelve of these carriers 52 is shown, that is similar to the usual arrangement of milk bottles in the boxes as used in dairies and on the milk wagons. A set of vessels 53, there being twelve corresponding in position to the carriers, are mounted on a frame 54. This frame has racks 55 and 56 at each side that engage gears 58 and 57 respectively, fast on a shaft 59. The latter is turned by a crank 60 that will serve to elevate the racks and frame by which the vessels 53 are elevated from immersion in the melted paraffin in the tank, to a position in which the capped ends of the inverted bottles are immersed the proper distance in the vessels respectively; as indicated in broken lines in Fig. 9. Thereupon the handle is turned back and the vessels are lowered again into the tank. Means are provided for swinging levers 61 on each of the carriers 52, which levers correspond to the levers 12 and shift the movable ring segment to release the bottle. A series of three identical shafts 62 are shown each of which carries four cams 63. Each of these cams engages one of the levers 61 when the shafts are rocked, and serves to open the ring segment to release the bottle as has been described. These three shafts carry gears 64, 65 and 66 that all mesh with the rack bar 67, and the latter is reciprocated by a lever

68. It will be seen that this modification operates similar to the device shown in Fig. 1, except that there is not a continuous operation of successive immersions, but that a dozen bottles are simultaneously immersed in the same number of vessels, and then the bottles are simultaneously released from the compression means.

Having thus described my invention, I claim:

1. The combination of a frame, a series of resilient strips on the frame, arms carried by the strips for supporting the mouth of a bottle in an inverted position, a segmental ring member having the segments carried by the respective strips and projecting inwardly in proximity to said supporting members to engage the bottle neck beyond the mouth and compress a cap thereon.

2. The combination of a frame, a series of relatively movable strips on the frame, arms carried by the strips for supporting the mouth of a bottle in an inverted position, a segmental ring member having the segments carried by the respective strips and projecting inwardly in proximity to said supporting members to engage the bottle neck beyond the mouth and compress a cap thereon, the segmental ring members having overlapping portions.

3. The combination of a frame, a series of strips on the frame, arms carried by the strips for supporting the mouth of a bottle in an inverted position, a segmental ring member having the segments carried by the respective arms and projecting inwardly in proximity to said supporting members to engage the bottle neck beyond the mouth and compress a cap thereon, said strips being relatively movable to permit radial movement of the segments.

4. The combination of a frame, a series of strips on the frame, arms carried by the strips for supporting the mouth of a bottle in an inverted position, a segmental ring member having the segments carried by the respective strips and projecting inwardly in proximity to said supporting members to engage the bottle neck beyond the mouth and compress a cap thereon, said strips being resilient to permit radial movement of the segments.

5. The combination of a frame, a series of relatively movable strips on the frame, arms carried by the strips for supporting the mouth of a bottle in an inverted position, a segmental ring member having the segments carried by the respective strips and projecting inwardly in proximity to said supporting members to engage the bottle neck beyond the mouth and compress a cap thereon, the segmental ring having its inner portion arranged conically tapering toward the supporting arms.

6. The combination of a frame, a series of resilient strips on the frame, arms carried by the strips for supporting the mouth of a bottle in an inverted position, a segmental ring member having the segments carried by the respective strips and projecting inwardly in proximity to said supporting members to engage the bottle neck beyond the mouth and compress a cap thereon, one of said strips having a pivoted support, and means for automatically swinging the support to shift the strip and connected segment away from the other segments to disengage the bottle.

7. The combination of a frame, a series of resilient strips on the frame, arms carried by the strips for supporting the mouth of a bottle in an inverted position, a segmental ring member having the segments carried by the respective strips and projecting inwardly in proximity to said supporting members to engage the bottle neck beyond the mouth and compress a cap thereon, a split ring to which said strips are secured, means for rigidly securing one of the segments to the frame, a lever pivoted on the frame secured to another of said segments, and means for shifting said lever whereby one of the supporting segments and a strip and compressing segment is shifted to and from the other segments.

8. A tank for containing a sealing fluid, means for supporting a bottle in an inverted position adjacent the tank, means on the supporting means for pressing a cap on the lower end of the inverted bottle, a vessel smaller than the tank, and supporting means for the vessel movable to shift the vessel from a position immersed in the fluid in the tank to a position in which a cap on the inverted bottle is immersed in the vessel.

9. A tank for containing sealing fluid, means for supporting a series of bottles in an inverted position, means on the supporting means for pressing a cap on the lower end of the inverted bottle, said supporting means being movable whereby the bottles are successively brought to a certain position adjacent the tank, a vessel smaller than the tank, and supporting means for the vessel movable to shift the vessel from a position immersed in the tank to a position in which a cap on the inverted bottle is immersed in the vessel when the bottle is in said certain position.

10. A tank for containing sealing fluid, means for supporting a series of bottles in an inverted position, means on the supporting means for pressing a cap on the lower end of the inverted bottle, said supporting means being movable whereby the bottles are successively brought to a certain position adjacent the tank, a vessel smaller than the tank, supporting means for the vessel movable to shift the vessel from a position im-

mersed in the tank to a position in which a cap on the inverted bottle is immersed in the vessel when the bottle is in said certain position, means for advancing the bottle-supporting means, means for operating the said vessel-supporting means to shift the vessel between said two positions, and means for operating the cap holding means.

11. A tank for containing sealing fluid, means for supporting a series of bottles in an inverted position, means on the supporting means for pressing a cap on the lower end of the inverted bottle, said supporting means being movable whereby the bottles are successively brought to a certain position adjacent the tank, a vessel smaller than the tank, supporting means for the vessel movable to shift the vessel from a position immersed in the tank to a position in which a cap on the inverted bottle is immersed in the vessel when the bottle is in said certain position, means for advancing the bottle-supporting means, means for operating the said vessel-supporting means to shift the vessel between said two positions, and means for operating the cap holding means automatically after immersion of the bottle end.

12. A tank for containing a sealing fluid, means for supporting a bottle in an inverted position adjacent the tank, means for automatically pressing a cap against the bottle neck upon insertion of a bottle, a vessel smaller than the tank, and supporting means for the vessel movable to shift the vessel from a position immersed in the fluid in the tank to a position in which a cap on the inverted bottle is immersed in the vessel.

13. The combination of a frame having a member for engaging the end of a bottle inserted therein, members arranged to engage the bottle neck a short distance beyond the mouth, one of the latter members being movable laterally to compress a cap against the neck of the bottle, and a vessel for sealing fluid, the vessel and the frame being supported to move relatively to cause immersion of the cap on the bottle end in the vessel, and means for effecting such movement.

14. The combination of a frame having a transverse member arranged to engage the end of a bottle inserted therein, members arranged to engage the bottle neck a short distance beyond the mouth, the latter members being relatively movable laterally to compress a cap against the neck of the bottle, means for automatically operating the said compression members by the act of inserting a bottle into the frame, a vessel for sealing fluid, the vessel and the frame being supported to move relatively to cause immersion of the cap on the bottle end in the vessel.

15. In a machine for capping bottles, the combination of means for applying sealing fluid to the sides of a cap on a bottle, means for pressing the cap on the sides of the bottle, and means operatively connected with the fluid-applying means for causing the release of said compressing means.

16. In a machine for capping bottles, the combination of means for applying sealing fluid to the sides of a cap on a bottle, means for pressing the cap on the side of a bottle, and means operatively connected with the fluid-applying means for causing the said compressing means to open and close.

17. In a machine for capping bottles, the combination of means for applying sealing fluid to the sides of a cap on a bottle, means for causing a cap to be pressed on the sides of the bottle, and means operatively connected with the fluid-applying means for effecting the release of the compressing means.

18. In a machine for capping bottles, the combination of means for applying sealing fluid to the sides of a cap on a bottle, means for causing a cap to be pressed on the sides of the bottle, and means operatively connected with the fluid-applying means for effecting the release of the compressing means after the application of the sealing fluid by said means.

19. In a machine for capping bottles, the combination of means for supporting a bottle, means for applying sealing fluid to the sides of a cap on the bottle in the supporting means, means for pressing the cap on the sides of the bottle, and means operatively connected with the fluid-applying means for causing the release of said compressing means.

20. In a machine for capping bottles, the combination of means for supporting a series of bottles, means for successively applying sealing fluid to the sides of caps on bottles in the supporting means, means for causing the caps to be compressed on the sides of the bottles in the supporting means, and means operatively connected with the fluid-applying means for effecting the release of the pressing means successively as the bottles have been treated by the fluid applying and compressing means.

21. In a machine for capping bottles, the combination of a tank for containing sealing fluid, means for supporting a bottle and cap in an inverted position near the tank, means on the supporting means for pressing a cap on the lower end of an inverted bottle in the supporting means, a plurality of vessels smaller than the tank, supporting means for such vessels movable to shift the vessels successively from a position immersed in the sealing fluid in the tank to a position in which a cap on the mouth of the inverted bottle on the supporting means is immersed in one of the vessels.

22. In a machine for capping bottles, the

combination of a tank for containing sealing fluid, means for supporting a bottle and cap in an inverted position near the tank, means on the supporting means for pressing a cap on the lower end of an inverted bottle in the supporting means, a plurality of vessels smaller than the tank, supporting means for such vessels movable to shift the vessels successively from a position immersed in the sealing fluid in the tank to a position in which a cap on the mouth of the inverted bottle on the supporting means is immersed in one of the vessels, said supporting means comprising a shaft having a series of arms upon which the vessels are pivotally mounted.

23. In a machine for capping bottles, the combination of a tank for containing sealing fluid, means for supporting a bottle and cap in an inverted position near the tank, means on the supporting means for pressing a cap on the lower end of an inverted bottle, a vessel smaller than the tank, supporting means for such vessel movable to shift the vessel from a position immersed in the sealing fluid in the tank to a position in which a cap on the mouth of the inverted bottle in the supporting means is immersed in the tank, and means for heating the fluid in the tank.

24. In a machine for capping bottles, the combination of a tank for containing a sealing fluid, means for supporting an endless chain, bottle-supporting means on the chain for supporting bottles in an inverted position to bring them successively to a certain place upon advancement of the chain, means on each supporting means for holding a cap on the lower end of the inverted bottle, a series of vessels smaller than the tank, supporting means for the vessels movable to successively and continuously shift the vessels from a position immersed in the fluid in the tank to said certain position to thereby cause the bottles and caps as advanced by the endless chain to be successively immersed in the vessels respectively as advanced by the supporting means.

25. In a machine for capping bottles, the combination of a tank for containing a sealing fluid, means for supporting an endless chain, bottle-supporting means on the chain for supporting bottles in an inverted position to bring them successively to a certain place upon advancement of the chain, means on each supporting means for holding a cap on the lower end of the inverted bottle, a series of vessels smaller than the tank, supporting means for the vessels movable to successively and continuously shift the vessels from a position immersed in the fluid in the tank to said certain position to thereby cause the bottles and caps as advanced by the endless chain to be successively immersed in the vessels respectively as advanced by the supporting means, and a tank into which the chain and bottle supporting means pass at one portion of their travel.

26. In a machine for capping bottles, the combination of means for applying sealing fluid to the sides of a cap on a bottle, means for pressing the cap on the sides of the bottle, means for causing operation of the compressing means, and means for heating the compressing means.

27. In a machine for capping bottles, the combination of a tank for containing a sealing fluid, means for supporting an endless chain, bottle-supporting means on the chain for supporting bottles in an inverted position to bring them successively to a certain place upon advancement of the chain, means on each supporting means for holding a cap on the lower end of the inverted bottle, a series of vessels smaller than the tank, supporting means for the vessels movable to successively and continuously shift the vessels from a position to thereby cause the bottles and caps as advanced by the endless chain to be successively immersed in the vessels respectively as advanced by the supporting means, and means for heating the said supporting means.

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Witnesses:
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