Nov. 24, 1925.

1,562,479

M. C. WHITAKER

APPARATUS FOR CAPPING BOTTLES

Filed Jan. 19, 1922

6 Sheets-Sheet 1

Fig. 3.

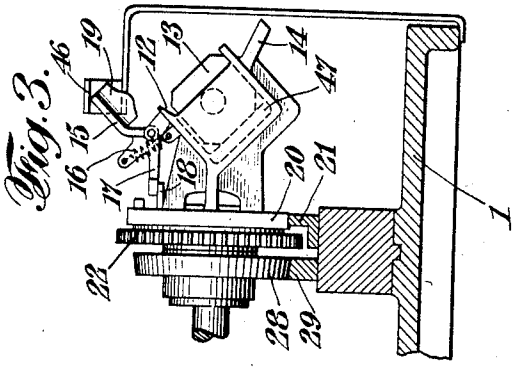
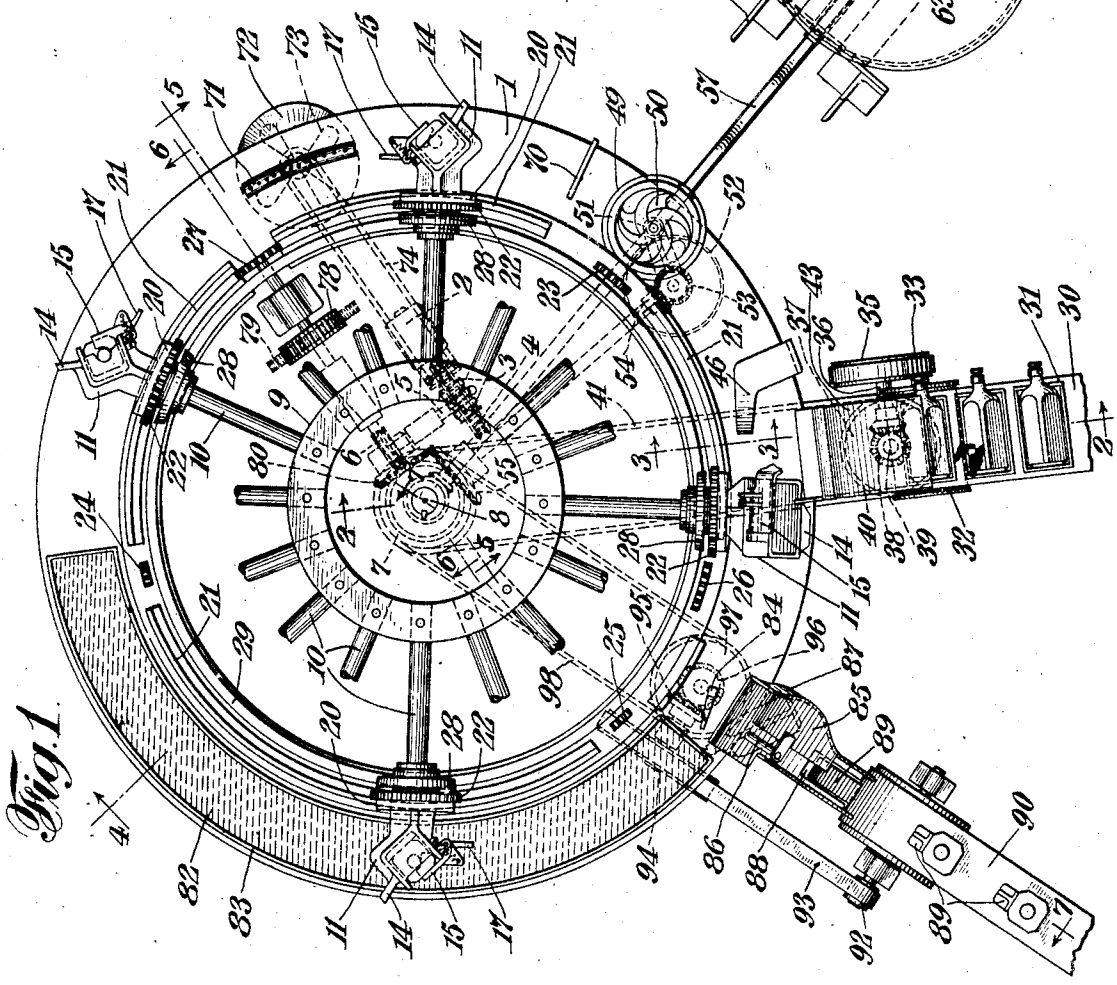


Fig. 1.



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Nov. 24, 1925. 1,562,479

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APPARATUS FOR CAPPING BOTTLES

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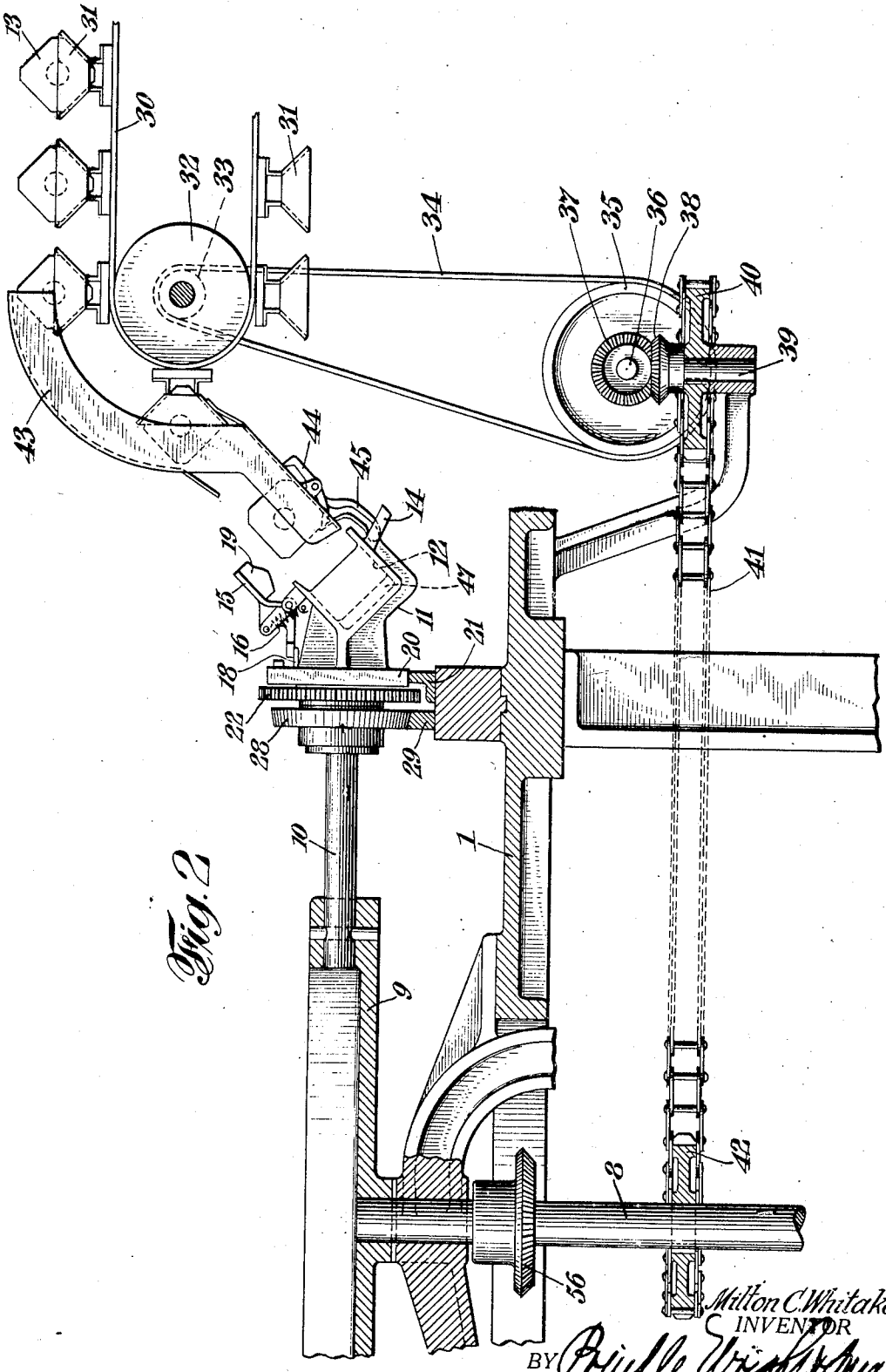

Fig. 2

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Filed Jan. 19, 1922

6 Sheets-Sheet 3

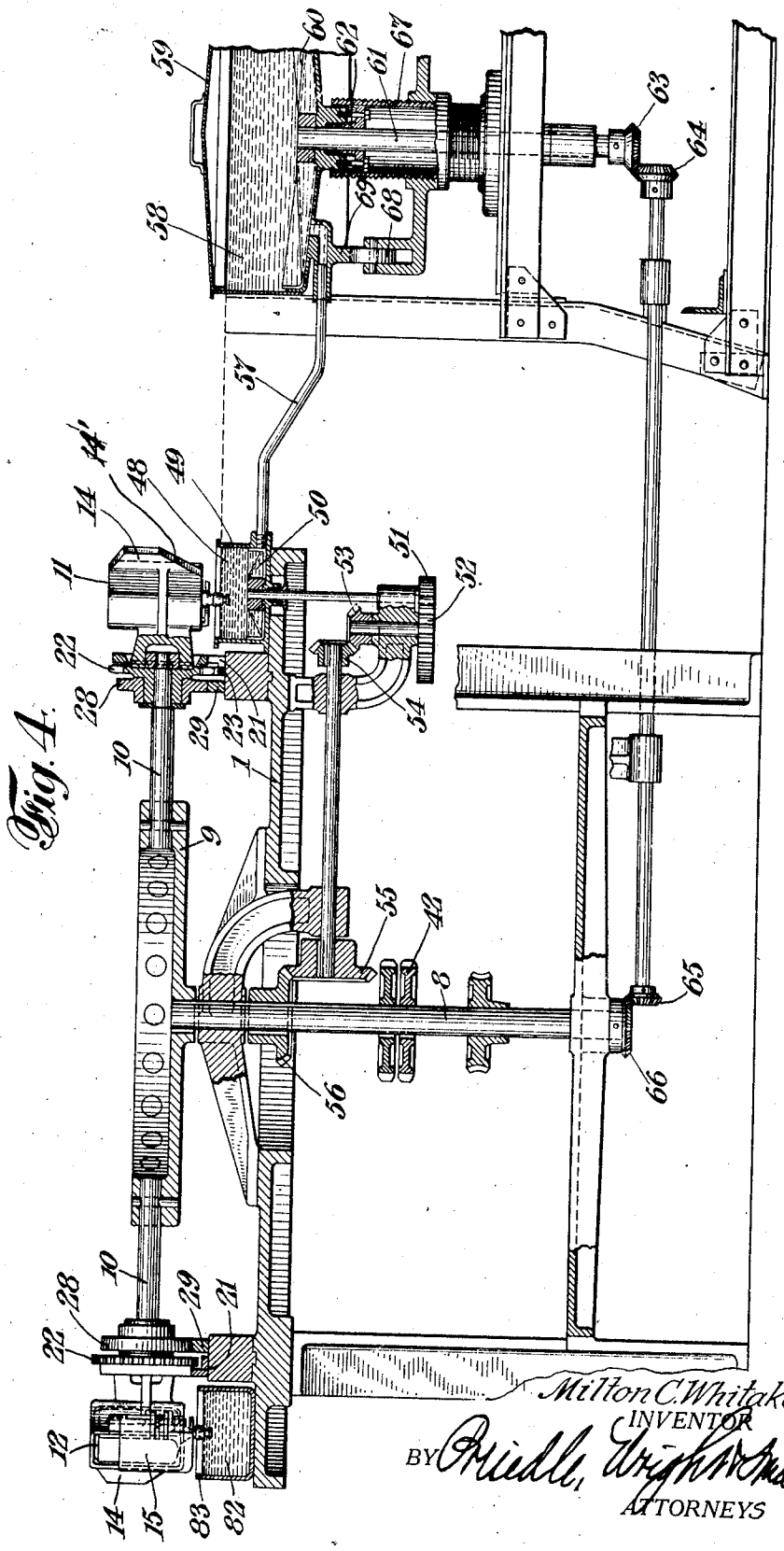

Fig. 4.

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APPARATUS FOR CAPPING BOTTLES

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Fig. 5.

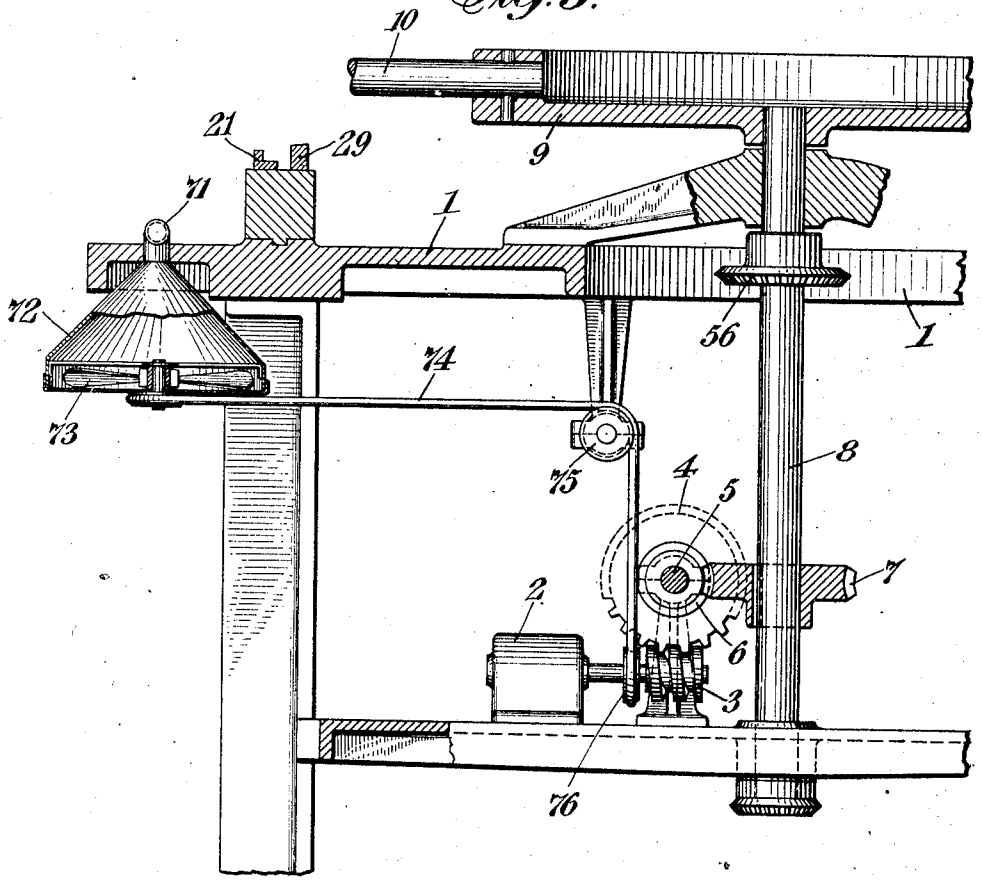
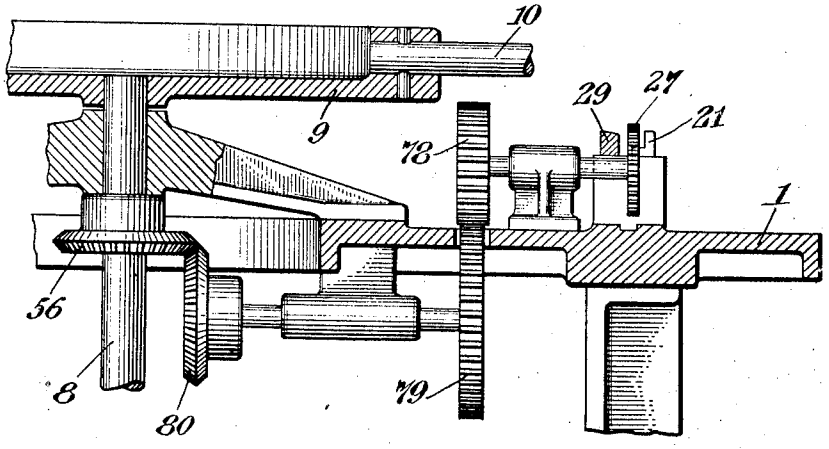


Fig. 6.



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APPARATUS FOR CAPPING BOTTLES

Filed Jan. 19, 1922

6 Sheets-Sheet 5

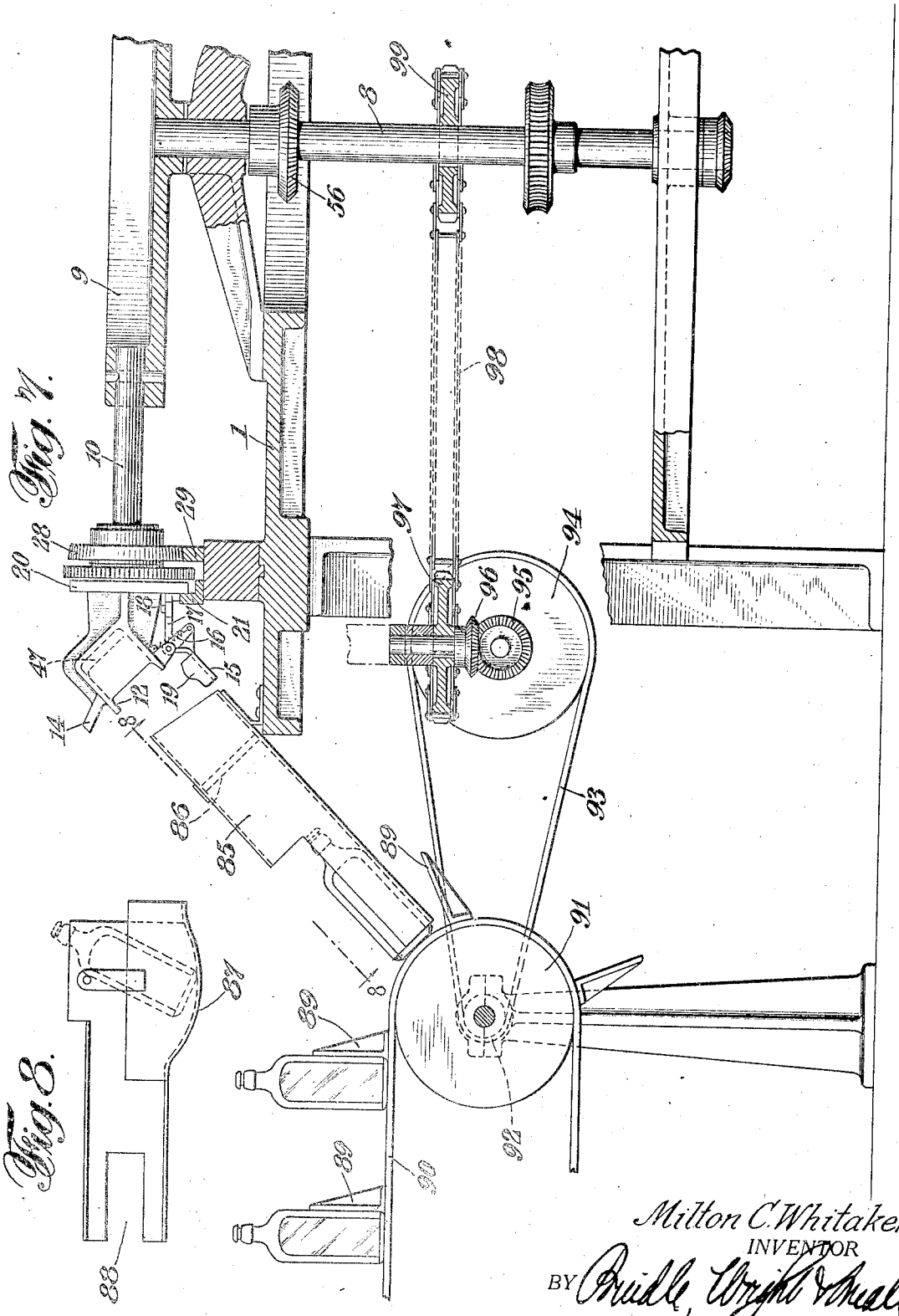

Fig. 7.

Fig. 8.

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Fig. 9.

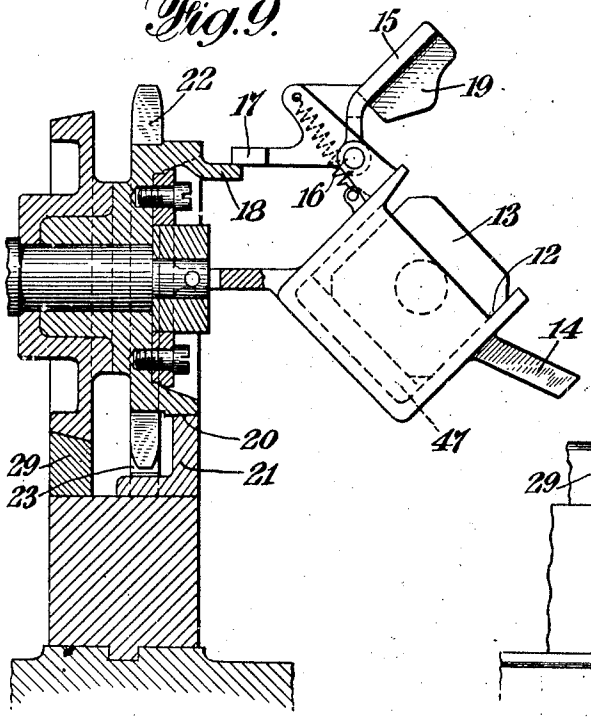


Fig. 10.

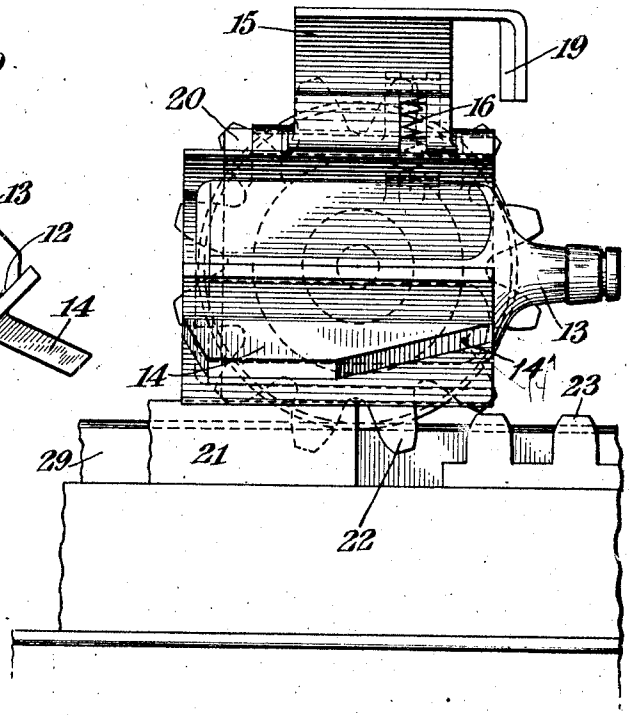
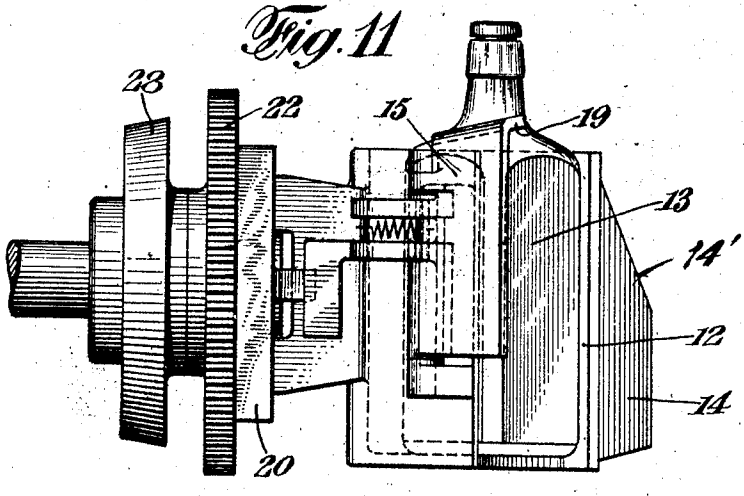


Fig. 11



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Patented Nov. 24, 1925. 1,562,479

UNITED STATES PATENT OFFICE.

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APPARATUS FOR CAPPING BOTTLES.

Application filed January 19, 1922. Serial No. 530,253.

To all whom it may concern:

Be it known that I, MILTON C. WHITAKER, a citizen of the United States, a resident of New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Apparatus for Capping Bottles, of which the following is a specification.

My invention relates to a method of and apparatus for capping bottles by the use of a coating material of such a character that therefrom a coherent layer of the coating material is formed which, when dried, effectively seals the bottles.

The object of my invention is to provide a method and apparatus by which such coating composition may be effectively applied to bottles and in such a manner that the bottles are continuously supplied to the apparatus for receiving therein a uniform coating which is dried and hardened before the bottles leave the machine. One of the objects of my invention is particularly to provide a cap of uniform thickness made from the coating composition. Again, a further object is to apply a coating material containing metallic particles, which when dried gives the appearance of a continuous sheet of metal, the apparatus being so arranged as to keep the composition uniform while being applied to the bottles. Further objects of my invention will be apparent from the detailed description thereof which follows:

Many different types of apparatus may be used for carrying out my process and as embodiments of my apparatus, but by way of example, I shall describe one such type of apparatus in the accompanying drawings, in which—

Figure 1 is a plan view of an apparatus embodying my invention;

Fig. 2 is a vertical section of the same taken on line 2—2 of Fig. 1;

Fig. 3 is a side elevation of one of the rotary bottle containers taken on line 3—3 of Fig. 1;

Fig. 4 is a vertical section of the apparatus shown in Fig. 1 taken on line 4—4;

Fig. 5 is a vertical section of the same taken on line 5—5;

Fig. 6 is another vertical section thereof taken on line 6—6;

Fig. 7 is a further vertical section taken on line 7—7 of Fig. 1;

Fig. 8 is a view of a portion of the apparatus shown in Fig. 7 looking from the direction of line 8—8 therein;

Fig. 9 is a side elevation of one of the bottle containers showing the gate in open position;

Fig. 10 is an end elevation of the same; and

Fig. 11 is a plan view of the container as shown in Fig. 9.

In the drawings, I have shown a table 1 having an electric motor 2 mounted thereon provided with a worm 3, which drives a worm-wheel 4 on a shaft 5 carrying another worm 6, which drives a worm-wheel 7 on a main vertical shaft 8. The main vertical shaft 8 is provided at its upper end with a spider 9 carrying a plurality of radiating arms 10 on the outer end of each of which there is rotatably mounted a bottle container 11. The bottle container 11 has a longitudinal recess 12, which is U-shaped in cross section, to receive a bottle 13, and at one side of the container 13 there is a bottle releasing projection 14 having a beveled edge 14′ to be hereinafter referred to. At the other side of the bottle container there is a pivoted gate 15 adapted to be maintained open in one position by a spring 16 while a releasing arm 17, to be hereinafter referred to, rests against a stop 18, and to be maintained closed by said spring when the gate is in closed position so as to hold a flange 19 thereon against the upper end of the bottle. On the inner end of the bottle container there is, furthermore, provided a square cam surface 20 which contacts with a plurality of track sections 21 located around the periphery of the table 1. Furthermore, secured to the inside of the cam surface 20 there is a gear 22 which is adapted to cooperate with a series of stationary gear sections 23, 24, 25 and 26 located within the track sections 21 on the table 1. Said gear 22, furthermore, cooperates with a rotating gear 27 to be hereinafter referred to. Furthermore, each of the arms 10 has a rotatable wheel 28 which is arranged to run upon a circular supporting track 29 carried by the table 1.

The bottles 13 are fed into each bottle container 11 while the gate 15 is in open position, as shown in Fig. 9, the bottles being fed in this manner by means of a conveyer belt 30 carrying a series of bottle-holding

brackets 31, and supported by a pulley 32, which is driven by a smaller pulley 33, which receives a belt 34 driven from a large pulley 35. The pulley 35 is carried by a shaft 36, having a bevelled gear 37 meshing with a beveled gear 38 on a shaft 39, which has a sprocket wheel 40 driven by a chain 41 from a sprocket wheel 42 on the main shaft 8. The belt 30 conveys the bottles to the interior of a chute 43, where they are retained in position by a spring-pressed pivoted gate 44, which has an arm 45 adapted to be operated by the bottle releasing projection 14, whose beveled side 14' causes arm 45 to move out and rotate gate 44 counterclockwise (Figure 2). As soon as a bottle has thus been fed into the bottle container 11 and has been withdrawn by the spider 9 from in front of the chute 43, the spring-pressed gate 44 returns to its original position, so as to bring a new bottle in position to be delivered to the next succeeding bottle container. Furthermore, as the bottle container 11 moves in this way, away from the chute 43, the flange 19 contacts with an inclined arm 46 so as to move the gate 15 into closed position, thus clamping the bottle in place in the container 11. Any danger of breakage to the bottle, by reason of these movements of the bottle relative to the container 11, are eliminated by providing a bed of rubber 47 in the bottom of the recess 12 in the container. The bottle container 11 is thus carried around the spider 9 in horizontal position by reason of the track-section 21, with which the cam surface 20 initially contacts, until the gear section 23 is reached, where the cam surface 20 is released, and the bottle is then rotated by the gear 22 in such a manner that the neck of the bottle, which has been previously provided with a stopper before being fed into the machine, is projected downwardly into a body of coating liquid 48 carried in a dipping tank 49.

The coating liquid 48 may be of any desired character but preferably it is comprised of a cellulose ester composition containing finely divided metallic particles, such, for example, as aluminum powder, as well as a dyestuff, to give the resulting cap a uniform metallic surface. One specific composition which may be used for this purpose is the coating composition described in detail in the application of John Wysocki upon sealing composition, No. 525,810, filed December 29, 1921, and the preferred composition given in which is the following:

100 grams nitrocellulose ester such as pyroxylin, 500 cc. ether, 500 cc. absolute alcohol, 50 cc. castor oil, 30 grams aluminum powder, and a quantity of a yellow aniline dye.

Furthermore, before the bottles are fed into the machine, preferably they will have been provided around the necks thereof with a thin coating of vaseline, or some other greasy material, so that when the bottles are to be opened the caps will not adhere to the surface of the glass.

In order to keep the metallic particles uniformly distributed throughout the coating liquid, the tank 49 has a rotary agitator 50 therein, driven by a gear 51 meshing with a gear 52 having a small bevelled gear 53 fixed thereto, which, in turn, meshes with a bevelled gear 54, having a large bevelled gear 55 secured to the same in such a manner as to be driven by a bevelled gear 56 located on the main shaft 8. In order to provide a continual supply of the coating liquid to the dipping tank 49, and maintain the same at the desired level, a tube 57 supplies the liquid from a main supply tank 58, having a cover 59 and provided with a rotary agitator 60. The agitator 60 is driven by a shaft 61, passing through a stuffing box 62, and is driven by means of a bevelled gear 63 in mesh with a bevelled gear 64 connected to a small bevelled gear 65 driven from a bevelled gear 66 on the main shaft 8. In order to prevent leakages around the shaft 61, there is a sleeve 67. Rollers 68 operating on a track 69 and carried by the underside of the main supply tank 58 permit of a vertical adjustment of the tank with reference to sleeve 67.

The neck of the bottle having been given, thus, a layer of the coating material in the dipping tank 49, is rotated by the gear segment 23 45° further to enable the neck of the bottle to clear the edge of the tank 49, whereupon the gear 22 passes beyond the gear segment 23, and the bottle container 11 is then rotated in the reverse direction by contacting with a stop 70 located above the axis of the bottle container 11 so as to bring the neck of the bottle again into a position in which it is directed downwardly, and so as to enable one face of the cam surface 20 to fit over the next portion of the sectional track 21. The cam surface 20 will now travel around the adjacent track section with the bottle neck directed downwardly so that any excess of the coating composition may drip from the end of the same. At the end of this track section the bottle is brought over a perforated pipe 71 from which jets of air issue so as to dry the film of coating material on the bottle to some extent. The current of air is provided from an inverted funnel 72 leading to the pipe 71, said funnel 72 having a fan 73 therein, driven by a belt 74 passing over an idler pulley 75 and driven from a pulley 76 on the shaft of the motor 2.

Upon leaving this portion of the track section 21 the gear 22 comes into contact with the increased speed gear 27, so as to

bring the bottle quickly into an upright position, in order to enable the quantity of the coating material on the neck of the bottle to flow uniformly in a downward direction, and thus provide an even coating thereof on the bottle while the cam surface 20 is in contact with the next succeeding track section 21. The gear 27 is driven from a larger gear 78 which meshes with a gear 79 driven by a bevelled gear 80 from a bevelled gear 56 on the main shaft 8.

The bottle is carried around the table in this manner until the cam surface 20 is released from this track section, whereupon the gear 22 comes into engagement with the gear segment 24 and the bottle is rotated thereby 180°, so as to bring the neck of the bottle into a body of water 82 carried in a water tank 83, the bottle being held in this position by the cam surface 20, while in engagement with the track section located opposite to the tank 83. The water hardens the bottle cap, and the bottle is then ready for discharge from the apparatus. The bottle is withdrawn from the body of water 82 as soon as the cam surface 20 passes beyond the corresponding track section 21 and after the bottle has been rotated 45° into a horizontal position by the succeeding gear segment 25, while the cam surface 20 is in engagement with the track section 21. At this point the arm 17 on the gate 15 comes into contact with a releasing arm 84 so as to move the gate into its open position, as shown in Fig. 7. Thereupon, the bottle falls out of the bottle container 11 into a chute 85, having at one side a rod 86 to engage with the end of the bottle carrying the cap and retard the same while the bottom portion of the bottle moves onwardly in a curved recess 87 provided in the chute 85 until the bottle passes beyond the rod 86 downwardly into the lower end of the chute 85. The lower end of the chute 85 has a slot 88, through which brackets 89, carried on a conveyer belt 90, continually ascend so as to remove the bottles from the chute 85. The belt 90 is supported upon a pulley 91 and is driven by a pulley 92 which receives a belt 93 from a larger pulley 94. The pulley 94 is driven by a bevelled gear 95 meshing with a bevelled gear 96, which is secured to a sprocket wheel 97, driven by a chain 98 from a sprocket wheel 99 on the main shaft 8. It will be noted that the bottles are conveyed away in vertical position so as to enable them to be more conveniently manipulated preparatory to shipping the same.

After the bottle has been discharged in this manner the cam surface 20 is released from this track section 21 and the gear 22, coming into contact with the gear segment 26, causes the bottle container 11 to rotate 180° so that the cam surface 20 is ready for engagement with the next track section 21, located in front of the feeding chute 43, from which another bottle to be capped is received in the manner previously described.

The bottles capped in this manner have the appearance of being provided with caps made of sheet metal and the caps may be removed therefrom in substantially the same manner as in removing a sheet metal cap.

It is to be understood that many changes may be made in my invention without departing from the spirit of the same and within the scope of the appended claims.

I claim:

1. A bottle capping machine which comprises a coating tank, a rotary arm carrying a bottle container rotatable around the arm axis, means for holding the container horizontal to receive a bottle, means for rotating it to dip the bottle into the coating tank, and for further rotating it to clear the tank, means for inverting it to allow the liquid to drip off, and means for righting it to permit the liquid to spread evenly.

2. A bottle capping machine which comprises a coating tank, a rotary arm carrying a bottle container rotatable around the arm axis, means for holding it horizontal to receive a bottle, means for rotating it to dip the bottle into the coating tank, and for further rotating it to clear the tank, means for inverting it in a reverse direction to allow the liquid to drip off, means for righting it to permit the liquid to spread evenly, a tank for containing a solution to harden the coating formed and means for inverting and dipping the bottle into the same.

3. A bottle capping machine which comprises a rotary arm carrying a bottle container rotatable around the arm axis, means for holding it horizontal to receive a bottle, means for rotating it to dip the bottle into a coating tank, and removing it, means for turning the container and the bottle to allow the liquid to drip off, and means for again righting it to permit the liquid to spread evenly and a coating tank into which the bottles are dipped.

4. A bottle capping machine, comprising a rotary arm carrying a bottle container rotatable with regard thereto, and means for holding said container in horizontal position to receive the bottle, inverting it to dip the same, rotating the container in one direction to discontinue the dipping, and then rotating the container in the reverse direction to restore the inverted position.

5. A bottle capping machine, comprising a rotary arm carrying a bottle container rotatable with regard thereto, and means for holding said container in horizontal position to receive the bottle, inverting it to dip the same, rotating the container in one direction to discontinue the dipping, then rotating the container in the reverse direction to restore the inverted position, an air blast

mechanism for drying the coating, and means for rotating the container into upright position and again into an inverted position and finally in a horizontal position to discharge the bottle.

6. In a bottle capping machine, a bottle holder for securely holding a bottle; means for inverting the holder to dip the neck of the bottle into a coating solution; a tank means for supplying an air current to said neck; means for thereupon reversing the holder to bring the bottle into an upright position; means for thereupon inverting the holder to dip said neck into a hardening bath; a tank for hardening liquid and means for thereupon righting the holder.

7. A bottle capping machine which comprises a coating tank, a rotary arm carrying a bottle container rotatable around the arm axis, means for holding the container to receive a bottle, means for moving the container to dip the bottle into the coating tank, means for inverting the container and bottle to allow the liquid to drop off and means for righting the container and bottle to permit the liquid to spread evenly.

8. A bottle capping machine which comprises a coating tank, a rotary arm carrying a bottle container rotatable around the arm axis, means for holding the container horizontal to receive a bottle, means for moving the container to dip the bottle into the coating tank, means for inverting the container and bottle to allow the liquid to drip off, and means for righting the container and bottle to permit the liquid to spread evenly.

9. A bottle capping machine which comprises a coating tank, a rotary arm carrying a bottle container rotatable around the arm axis, means for holding the container to receive a bottle, means for moving the container to dip the bottle into the coating tank and for moving the container to withdraw the bottle from the tank, means for inverting the container and bottle to allow the liquid to drip off, and means for righting the container and bottle to permit the liquid to spread evenly.

In testimony that I claim the foregoing, I have hereunto set my hand this 14th day of January, 1922.

MILTON C. WHITAKER.