

April 3, 1928.

1,664,514

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CAPPING MACHINE

Filed June 7, 1924

3 Sheets-Sheet 1

Fig. 1.

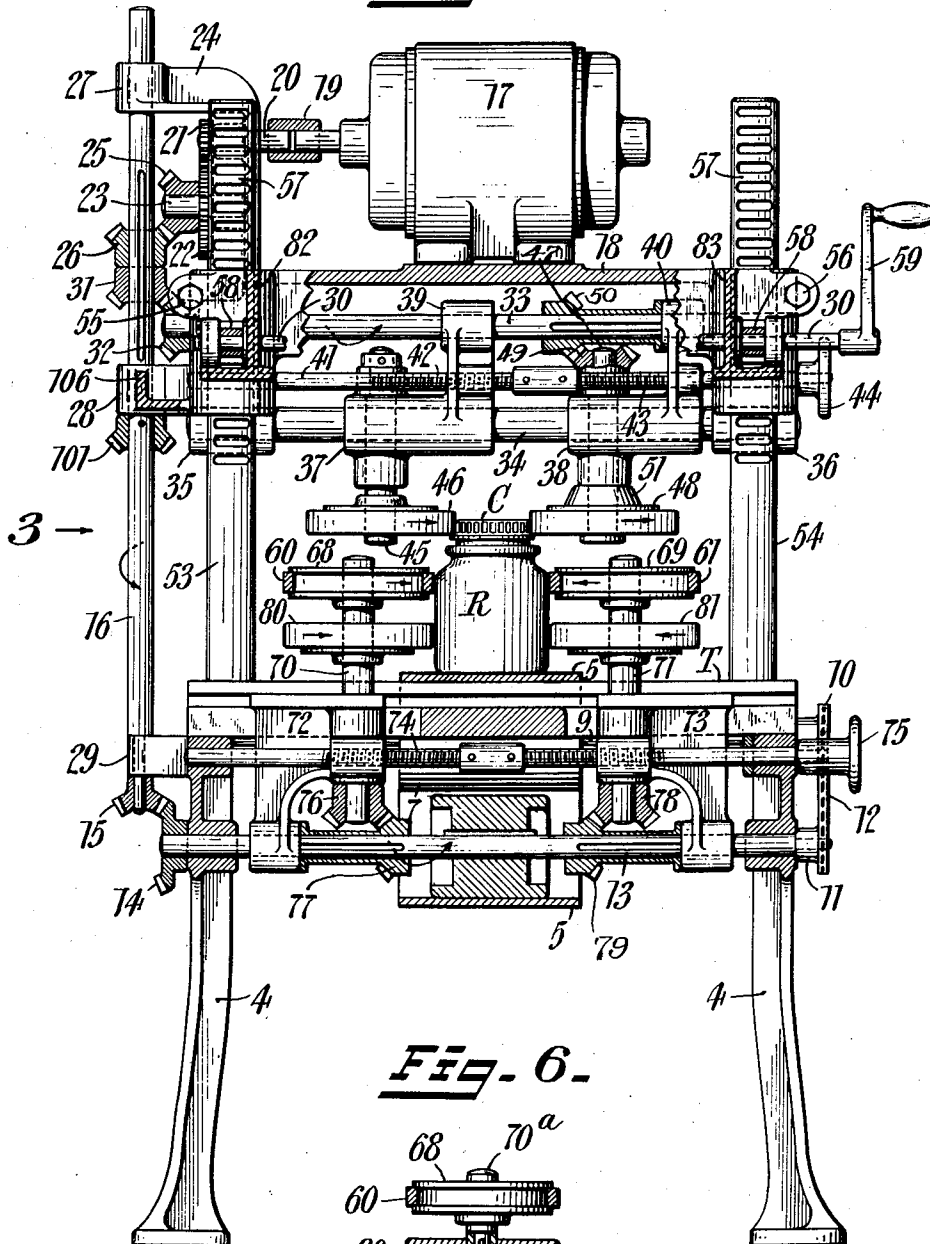


Fig. 6.

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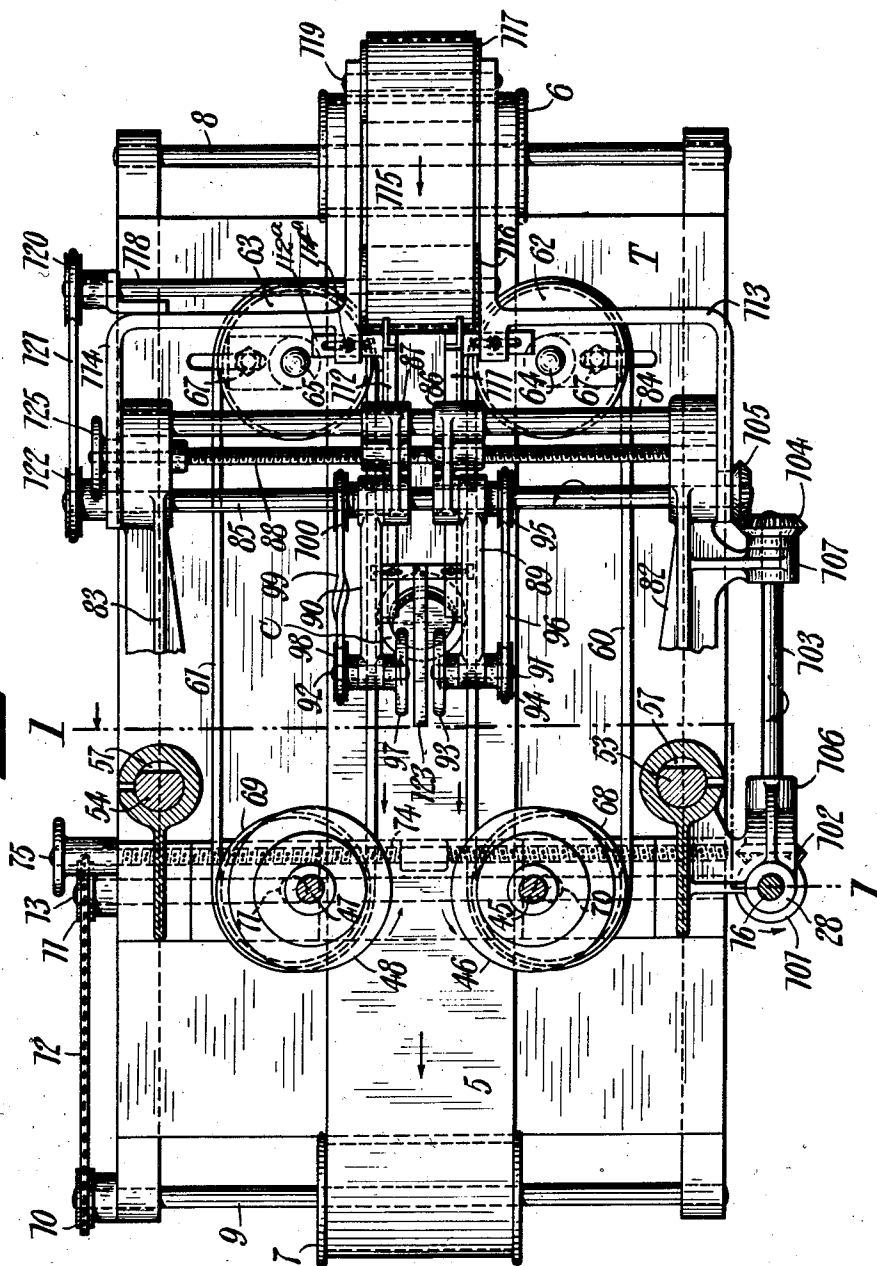
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FIG. 2-



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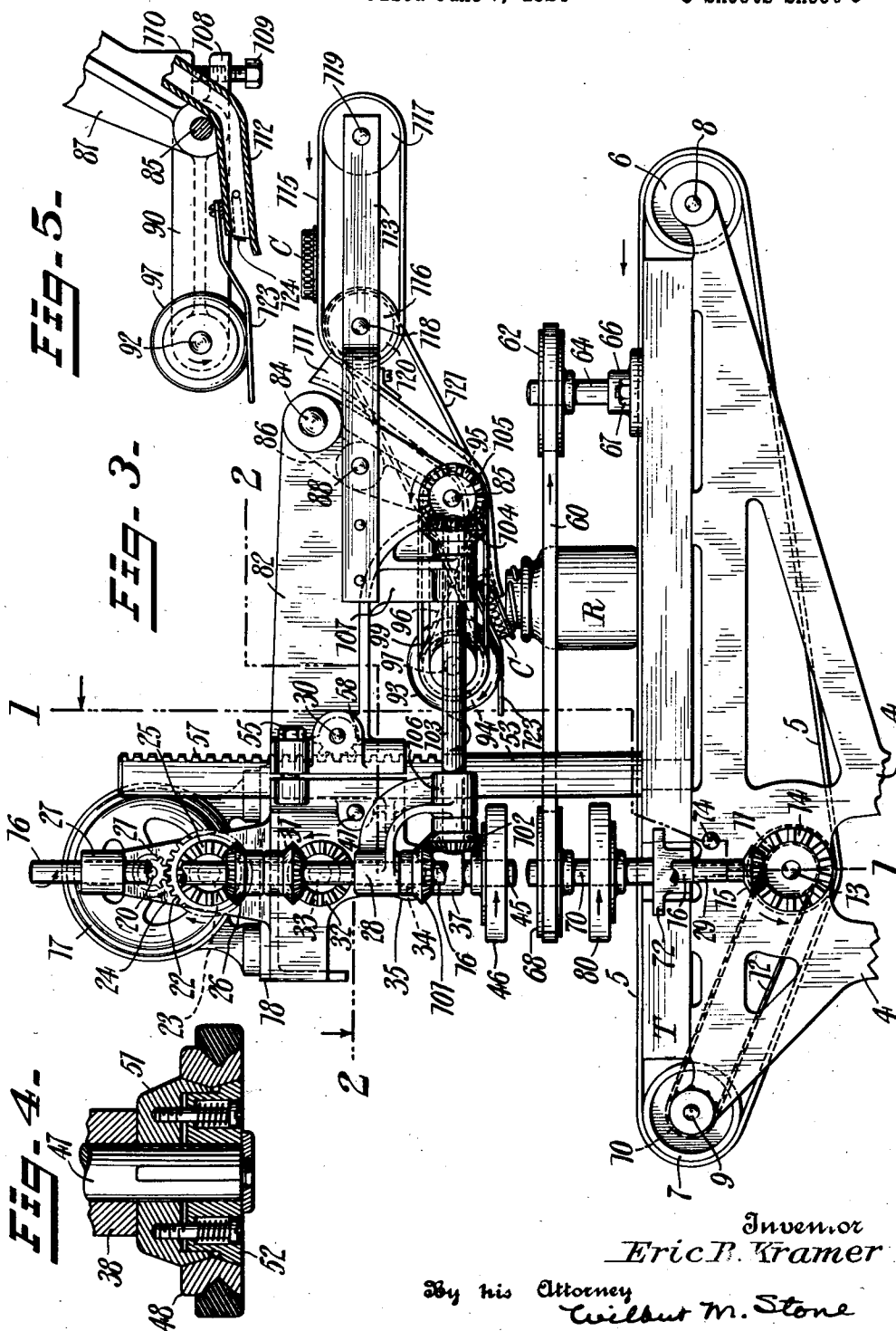
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UNITED STATES PATENT OFFICE.

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CAPPING MACHINE.

Application filed June 7, 1924. Serial No. 718,422.

This invention relates to capping machines and particularly to machines of the class specified which are provided for screwing caps having flanges internally threaded or provided with lugs, onto the open ends of receptacles having external means for engaging the threads or lugs of the caps.

The object of my improvements is to provide a machine readily adjustable to a wide variety of sizes of receptacles, and diameters and lengths of caps; to provide means for reducing the frictional strains of the machine to a minimum, and therefore the wear and tear on those parts contacting with the receptacles and caps, and to provide an automatic feed for the caps, from a suitable hopper to the tops of the receptacles. Other objects will appear later herein.

My improvements are illustrated in their preferred embodiment in the drawings accompanying this specification, wherein:—

Figure 1 is a front end elevation of a capping machine embodying my improvements, those portions of the machine in front of line 1, 1 of Fig. 2 being removed to show the construction of the machine more clearly. Fig. 2 is a plan view corresponding with Fig. 1, those parts above line 2, 2 in Fig. 3 being omitted. Fig. 3 is a side elevation particularly illustrating the cap feeding mechanism, and the view is taken looking in the direction of arrow 3, Fig. 1. Fig. 4 is a sectional elevation of a detail of the cap setting head. Fig. 5 is a sectional elevation of a portion of the cap feeding mechanism. Fig. 6 is a detail elevation of one of the guide belt pulleys. The scale of Figs. 1, 2, 3 and 6 is the same; the scale of Fig. 4 is about twice that of the major figures and the scale of Fig. 5 is about one third larger.

My improvements are illustrated as applied to that type of capping machine wherein a feed belt advances the receptacles one after another to between opposite guide belts, and thence to one or more linear traveling or rotating members, which screw the previously placed caps onto the receptacles.

Table T may be supported on suitable legs, as 4, 4, and over said table feed belt 5 is advanced from pulley 6 at the front end of the machine to pulley 7 at the rear end of the machine. Said pulleys are fixed to suitable shafts, 8, 9, respectively, having bearings in the side frames of the machine. Shaft 9 has sprocket 10 fixed thereto and

is driven from sprocket 11 by chain 12. Sprocket 11 is fixed to cross shaft 13 having bevel gear 14 fixed thereto, said gear meshing with bevel gear 15 on vertical shaft 16. 60

Driving motor 17 is fixed on upper cross frame 18 and through coupling 19 drives shaft 20, to which is fixed gear 21 meshing with a driving gear 22 fixed to shaft 23. Shafts 20 and 23 have bearings in bracket 24 upstanding from frame 18. Also fixed to shaft 23 is bevel gear 25 meshing with and driving bevel gear 26 slidably keyed to vertical shaft 16. Said shaft 16 has one bearing in ear 27 of bracket 24, another bearing in ear 28 of frame 18 and a lower bearing in ear 29 of adjacent leg 4. Shaft 16 is constrained against endwise movement in ear 29 but ears 27, 28 are adapted for movement vertically along said shaft as frame 18 is moved up or down, as will be presently explained. Below bevel gear 26, also slidably keyed to shaft 16, is bevel gear 31 meshing with and driving bevel gear 32 fixed to the left hand end of cross shaft 33, Fig. 1. Said shaft 33 has bearings at opposite sides of frame 18. Below shaft 33 and parallel therewith is shaft 34 rigidly held in opposite ears 35, 36 depending from frame 18, and slidably mounted on said shaft are brackets 37, 38. Said brackets have upreaching ears 39, 40, respectively, through suitable openings in which shaft 33 passes. Said brackets 37, 38 are slidable along shafts 33 and 34 and may be moved by means of screw shaft 41, having bearings in frame 18, by means of oppositely threaded portions 42, 43 of said shaft in engagement with suitable nut portions of said brackets. Said screw shaft 41 may be rotated by hand wheel 44 to cause brackets 37, 38 to approach or recede uniformly with respect to an imaginary vertical lengthwise plane through the machine. Bracket 37 has mounted for free rotation therein vertical shaft 45 having fixed to its lower end wheel 46 and which wheel preferably has a resilient face. Bracket 38 has vertical shaft 47 mounted for rotation therein and said shaft has frictionally mounted on its lower end wheel 48 similar to wheel 46. Shaft 47 has bevel gear 49 fixed to its upper end in mesh with and driven by bevel gear 50 slidably keyed to shaft 33. The character of the frictional drive of wheel 48 may be seen in Fig. 4, wherein hub member 51 is fixed to shaft 47 and hub member 52 is yieldably urged to- 110

ward hub member 51, and between the beveled edges of said hub members wheel 48 is frictionally carried.

Referring now to the means for supporting and for raising and lowering frame 18 relatively to table T, opposite vertical posts 53, 54, upstanding from said table, pass through suitable bearings in said frame and said bearings are provided with clamp screws 55, 56, respectively, for locking said frame in any chosen position within its vertical path of adjustment. For moving said frame vertically, said posts are provided with rack teeth, as 57, for engagement with pinions, as 58, fixed to cross shaft 30 having bearings in opposite sides of frame 18. Said shaft may be rotated as desired by handle 59.

For conducting the receptacles, as R, to capping position, feed belt 5 is assisted by opposite side belts 60, 61, carried by opposite pairs of pulleys on vertical shafts. At the entrance end of the machine, right hand in Fig. 3, loose pulleys 62, 63, carrying one end of said belts, turn freely on vertical shafts 64, 65, respectively. Said shafts are mounted in blocks, as 66 of shaft 64, adjustable transversely of the machine and secured in position by bolts, as 67. At the operative end of the machine, left hand in Fig. 3, said belts 60, 61 are carried and driven by pulleys 68, 69, respectively. Said pulleys are removably mounted on vertical shafts 70, 71 having bearings in transversely slidable brackets 72, 73, respectively. Said brackets may be moved toward and from each other, symmetrically relatively to an imaginary lengthwise vertical plane through the machine, to accommodate varying diameters of containers. Right and left hand threaded shaft 74 having bearings in the upper portions of legs 4, 4 engages suitable nut portions of said brackets 72, 73 and said shaft 74 may be rotated by hand wheel 75, Fig. 2. The lower end of shaft 70 has bevel gear 76 fixed thereto and said gear meshes with and is driven by bevel gear 77 slidably keyed to shaft 13. Shaft 71 is similarly provided with bevel gear 78 meshing with bevel gear 79 slidably keyed to said shaft 13. Referring to Fig. 6, shaft 70 is shown as having its upper portion 70^a, carrying pulley 68, removably keyed to lower portion 70^b. Shaft 71 is similarly separable. This provision is to permit the removal of belts 60, 61 and pulleys 68, 69, when the machine is used for very short containers, dependence being then had on opposite wheels 80, 81 fixed to the lower portions of shafts 70, 71, below pulleys 68, 69, respectively.

Directing attention now to the automatic feed for the caps, as C, vertically movable frame 18 has opposite forwardly reaching members 82, 83 in the forward ends of which is supported transverse fixed shaft 84, and

therebelow, rotatable shaft 85. Slidably mounted on said shafts are opposite brackets 86, 87, and said brackets may be moved toward and from each other symmetrically relatively to said imaginary lengthwise vertical plane to accommodate varying diameters of caps. Right and left hand threaded shaft 88, having bearings in frame members 82, 83, engages suitable nut portions of brackets 86, 87 and said shaft may be rotated by hand wheel 125. Projecting rearwardly to the left from shaft 85, Figs. 2 and 3, are arms 89, 90 having rotatably mounted in their rearward ends short horizontal shafts 91, 92, respectively. Shaft 91 has fixed to its inner end wheel 93 preferably having a yieldable periphery, such as of rubber, and to its outer end pulley 94. Said shaft, wheel and pulley are driven from pulley 95, fixed to shaft 85, in the same direction by belt 96. Shaft 92 is similarly equipped with wheel 97 and pulley 98 driven in the opposite direction by crossed belt 99 from pulley 100 on said shaft 85. Shaft 85 is driven from vertical shaft 16 through the following train: Bevel gear 101 fixed to shaft 16 drives bevel gear 102 fixed to the rearward end of horizontal shaft 103, and bevel gear 104 fixed to the forward end of said shaft 103 drives bevel gear 105 fixed to shaft 85. Shaft 103 has one bearing in arm 106 of frame 18 and one bearing in ear 107 of member 82. Arms 89, 90 may be swung about shaft 85 to raise and lower wheels 93, 97 with respect to containers passing thereunder. By reference to Fig. 5 it will be observed that arm 90 is provided with forwardly reaching toe 108 having adjusting screw 109 threaded therethrough for engagement with heel 110 of bracket 87. Arm 89 is similarly equipped with an adjusting screw, not shown.

Forwardly reaching to the right, from members 82, 83, Figs. 2 and 3, are arms 113, 114 between the forward ends of which is supported cap feed belt 115 on pulleys 116, 117 fixed to shafts 118, 119, respectively. Said shafts have bearings in said arms 113, 114 and shaft 118 projects over one side of the machine, Fig. 2, and has fixed thereto pulley 120, which by means of belt 121 is driven from pulley 122 fixed to shaft 85. Leading from the delivery end of said belt 115 and projecting downwardly and rearwardly is a cap chute comprising opposite channel members 111, 112. These are supported from arms 113, 114 and may be adjusted toward and from each other by known means, such as bolt 114^a of arm 114 adjustably engaging slotted arm 112^a of channel 112 and similar means for channel 111, to accommodate caps of different diameters. Adjustably carried by the delivery end of said chute and projecting rearwardly between wheels 93, 97 is cap seating blade 123. This blade is yieldable upwardly and is adapted

for holding the cap down onto the receptacle top, while that cap is being operated upon by wheels 93, 97. It will be observed that the cap feeding mechanism just described is carried by frame 18 and that as that frame is raised or lowered to accommodate any given height of receptacle, said cap feeding mechanism travels therewith so as to deliver caps at the proper height relatively to said container.

The operation of my improved machine is as follows: The machine being started in motion, the several shafts, wheels and belts are driven in the direction of their several arrows, respectively. A receptacle R is placed upon belt 5 near the right hand end of the machine, Figs. 2 and 3, and presently is advanced to between belts 60, 61 which centralize said receptacle and may assist in its advancement. In the meantime a cap C has been placed upon cap feed belt 115 and has been delivered into chute 111, 112 down which it descends by gravity until checked at the delivery end of said chute by opposite clips thereon, as 124, with its leading edge tipped downwardly by blade 123. Receptacle R now advances until the leading edge of its top engages under the downwardly tipped leading edge of said cap and drags said cap from the end of the chute, thereby bending blade 123 upwardly. While under the downward pressure of said blade, the cap passes into engagement with wheels 93, 97 and lifts those wheels slightly. Said wheels, rotating in opposite directions, thereupon frictionally engage said cap and rotate it in anti-clockwise direction, whereby the screw members of the cap are brought into engageable relation to the corresponding screw members of the receptacle. Passing out from under wheels 93, 97, said receptacle, with the cap thereon, passes between pulleys 68, 69 which hold belts 60, 61, respectively, snugly against the receptacle, wheels 80, 81 therebelow assisting in gripping the receptacle. At the same time cap C passes between idle wheel 46 and driven wheel 48. Said driven wheel 48 thereupon rotates cap C in clockwise direction, idle wheel 46 acting as a rotatable backing to take the thrust thereof. Cap C is thereby screwed down to its seat on receptacle R. When said cap has been seated by wheel 48, that wheel is frictionally stopped or retarded and its shaft 47 may turn independently thereof, thereby preventing abrasion of the cap by said wheel 48, or undue wear of said wheel against said cap. Said receptacle with the cap seated thereon then passes to the delivery end of belt 5 and may be removed therefrom.

I claim:

1. In a machine of the character described the combination of means for advancing a receptacle, means for screwing a cap in a

clockwise direction onto the receptacle, cap feeding means comprising a chute for receiving the cap, a pair of pivotally mounted arms, a cap rotating wheel mounted in the free end of each of said arms, means for rotating said wheels in opposite directions for rotating the cap in anti-clockwise direction, and means for releasably retaining the cap at the delivery end of said chute.

2. In a machine of the character described the combination of means for advancing a receptacle, means for screwing a cap in clockwise direction onto the receptacle, cap feeding means comprising means for advancing a cap, a chute for receiving the cap from the advancing means, a pair of pivotally mounted arms, a cap rotating wheel mounted in the free end of each of said arms, means for adjusting said arms for raising and lowering said wheels, means for rotating said wheels in opposite directions for rotating the cap in anti-clockwise direction, means for adjusting said chute for different sized caps, and means for releasably retaining the cap at the delivery end of said chute.

3. In a machine of the character described the combination of means for advancing a receptacle, means for screwing a cap in clockwise direction onto the receptacle, cap feeding means comprising a chute for receiving the cap, a pair of pivotally mounted arms, a cap rotating wheel mounted in the free end of each of said arms, means for rotating said wheels in opposite directions for rotating the cap in anti-clockwise direction, means for releasably retaining the cap at the delivery end of said chute, and means for vertically adjusting said cap feeding means.

4. In a machine of the character described the combination of means for advancing a receptacle, means for screwing a cap in clockwise direction onto the receptacle, cap feeding means comprising a chute for receiving the cap, a pair of pivotally mounted arms, a cap rotating wheel mounted in the free end of each of said arms, means for adjusting said arms for raising and lowering said wheels, means for rotating said wheels in opposite directions for rotating the cap in anti-clockwise direction, opposite clips for releasably retaining the cap at the delivery end of said chute, a yieldable blade above the delivery end of said chute for tipping the leading edge of the cap downwardly into the path of the receptacle, and means for vertically adjusting said cap feeding means.

5. In a machine of the character described the combination of a frame adjustably mounted for movement up or down to accommodate varying heights of receptacles and having mounted therein means for screwing a cap in clockwise direction onto the receptacle, cap feeding means carried by said

- frame and vertically adjustable therewith, said cap feeding means including a chute for receiving the cap, a pair of pivotally mounted arms, a cap rotating wheel mounted in the free end of each of said arms, means for rotating said wheels in opposite directions for rotating the cap in anti-clockwise direction, and means for releasably retaining the cap at the delivery end of said chute.
6. In a machine of the character described the combination of a frame adjustably mounted for movement up or down to accommodate varying heights of receptacles and having mounted therein means for screwing a cap in clockwise direction onto the receptacle, cap feeding means carried by said frame and vertically adjustable therewith, said cap feeding means including means for advancing a cap, a chute for receiving the cap from the advancing means, a pair of pivotally mounted arms, a cap rotating wheel mounted in the free end of each of said arms, means for adjusting said arms for raising and lowering said wheels, means for rotating said wheels in opposite directions for rotating the cap in anti-clockwise direction, means for adjusting said chute for different sized caps, opposite clips for releasably retaining the cap at the delivery end of said chute, and a yieldable blade above the delivery end of said chute for tipping the leading edge of the cap downwardly into the path of the receptacle.
- In witness whereof, I hereby affix my signature this 5th day of June, 1924.
- ERIC B. KRAMER.