J. B. FOOTE.

CAP PLACER.

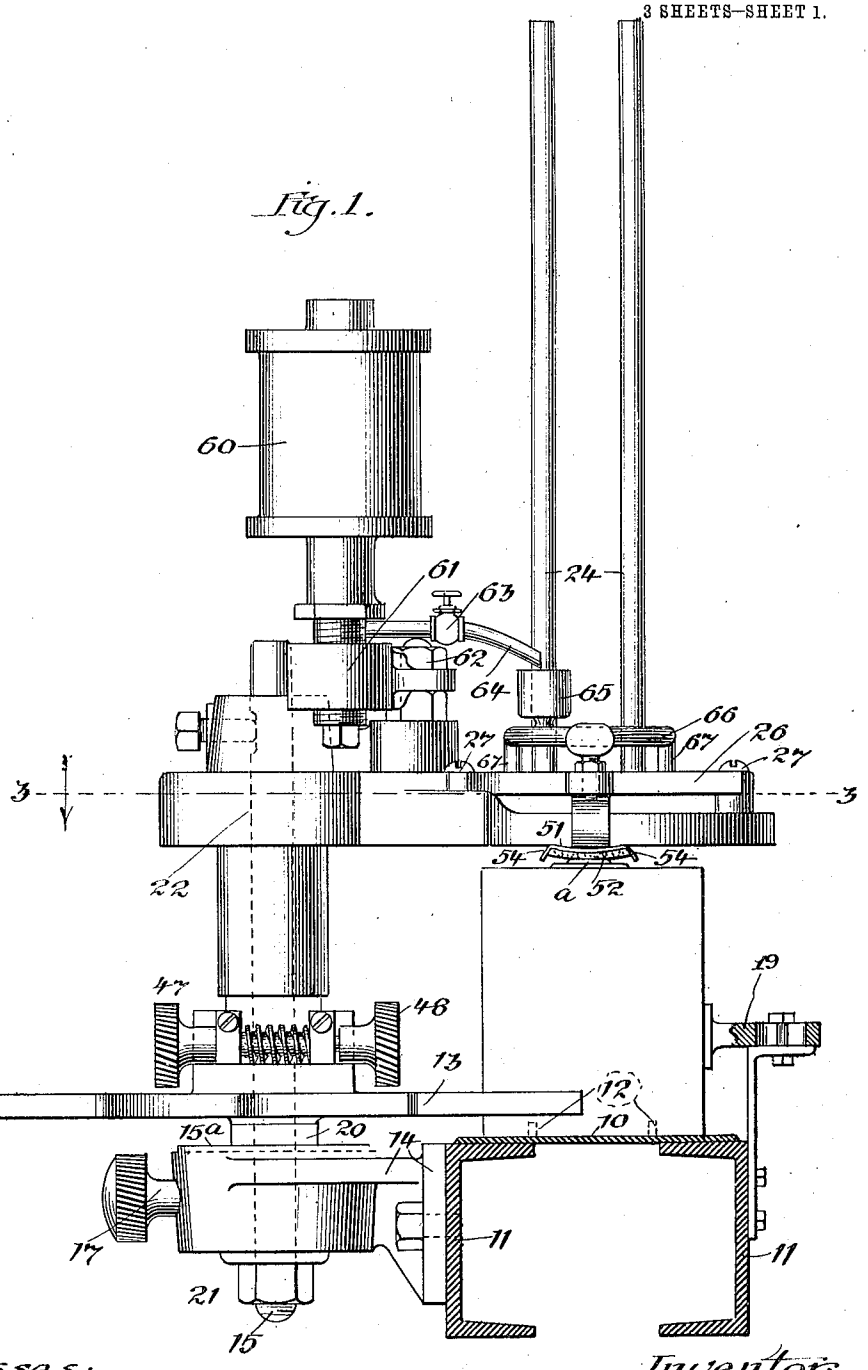
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1,128,435.

Patented Feb. 16, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

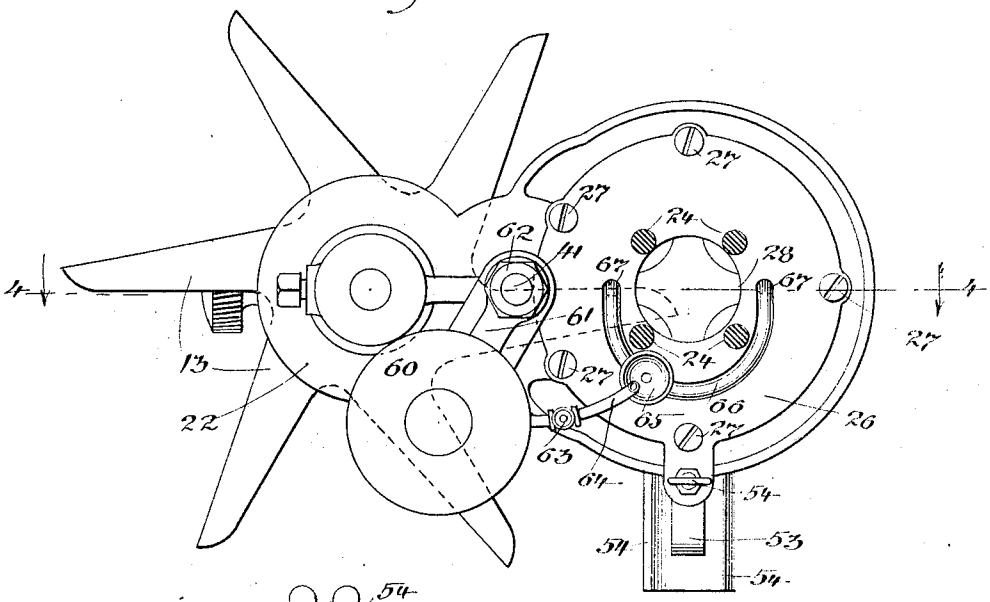


Fig. 2a.

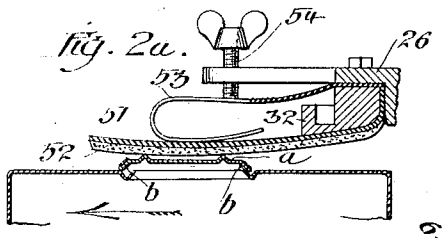
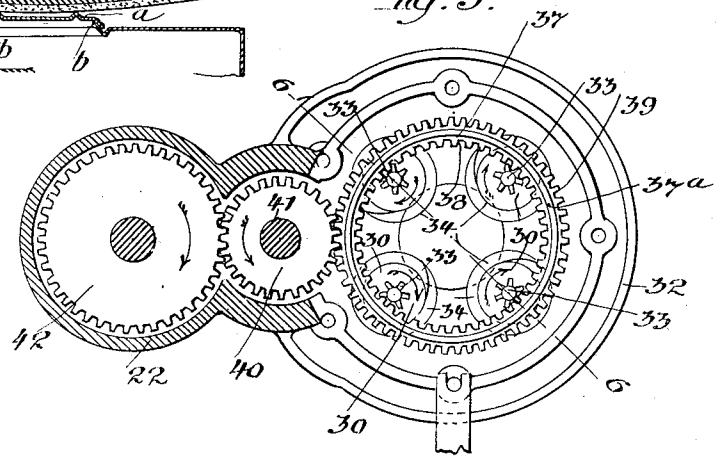


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

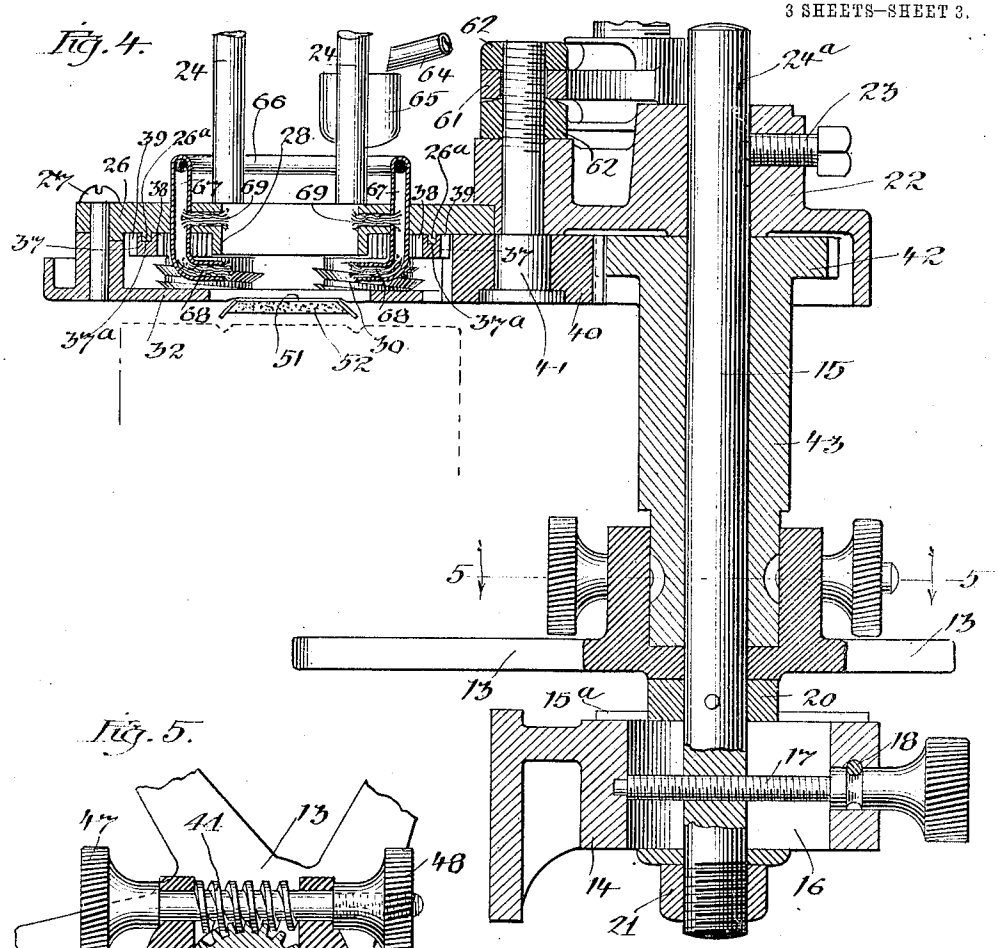


Fig. 5.

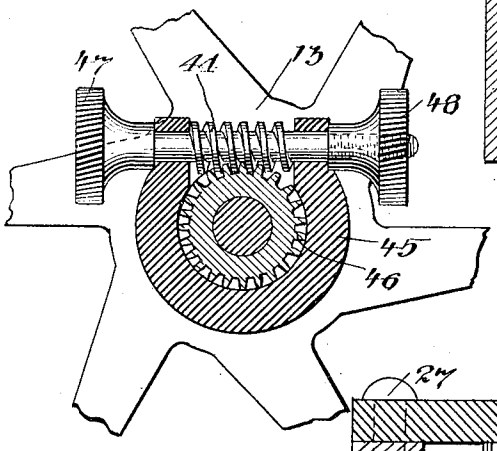
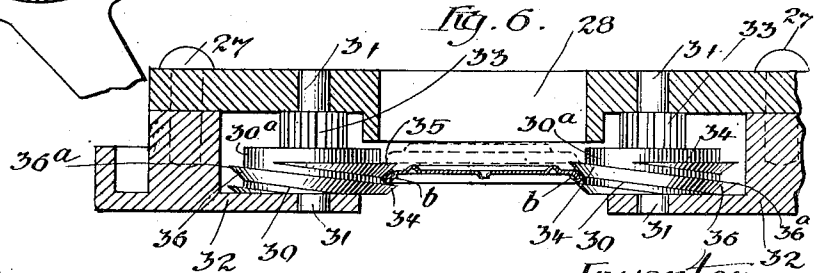


Fig. 6.



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UNITED STATES PATENT OFFICE.

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CAP-PLACER.

1,128,435. Specification of Letters Patent. Patented Feb. 16, 1915.

Application filed February 9, 1912. Serial No. 676,677.

To all whom it may concern:

Be it known that I, JOHN B. FOOTE, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cap-Placers, of which the following is a full, clear, and exact description.

The present invention relates to machines for feeding caps to cans preparatory to fixing the caps on the cans.

One object of the invention is to provide improved mechanism whereby caps will be delivered singly from a stack or magazine, and whereby single delivery of the caps will be insured despite irregularities in the caps or in the position of the caps in the stack.

Another object of the invention is to provide mechanism of the character described whereby the stack of caps will be rotated in operation of feeding them to the cans, which tends to cause the caps in the stack before they are gripped by the feeding devices, to assume a more true and regular relation in the passage for the caps and thus overcome the possibility of a plurality of caps sticking or being fed together to a can; to facilitate the application of acid to the soldered edges, as necessary in soldering caps on the tops of cans.

The invention further designs to provide an improved machine for the purpose set forth which is readily adjustable, so that it will be adapted to feed caps to moving cans of different sizes.

The invention further designs to provide an improved machine for feeding caps to cans and for applying acid to the caps.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings Figure 1 is a side elevation of a machine embodying the invention, the endless conveyer for moving cans into position to receive caps and its supporting rails being shown in section. Fig. 2 is a plan. Fig. 2ª is a detail of the presser for the caps after they have been delivered onto the cans. Fig. 3 is a horizontal section taken on line 3—3 of Fig. 1. Fig. 4 is a vertical section taken on line 4—4 of Fig. 2. Fig. 5 is a section taken on line 5—5 of Fig. 4. Fig. 6 is a section taken on line 6—6 of Fig. 3.

The machine is adapted to deliver caps to, and is operated by, the cans which are carried on an endless belt or conveyer 10 which is suitably supported upon rails 11 in a manner well understood in the art. The conveyer is usually equipped with lugs 12 for causing the cans to move with the belt, and the cans are adapted to drive a star-wheel 13 which operates the cap-feeding mechanism in synchronism with the movement of the cans beneath the feeding-mechanism.

The cap-feeding-mechanism is sustained by a bracket 14 which is secured to one side of the rails 11. A stationary post 15 is adjustably and non-rotatably mounted in said bracket. Said post extends through an elongated slot 16 in said bracket and a screw 17 journaled in the bracket and held against longitudinal movement therein by a pin 18, extends and is screw-threaded through said post 15. By turning screw 17 the post and the mechanism sustained thereby may be readily adjusted laterally to regulate the point of delivery of the caps so it will be in line with the axial center or longitudinal plane of the moving cans on belt 10. A bar 19 is slidably connected to the outer rail 11 to prevent the cans from moving outwardly on the belt during the period when they are operating star-wheel 13. A collar 20 is secured to post 15 and is held against rotation by ribs 15ª on bracket 14 and a nut 21 on the lower end of said post is adapted to securely clamp the post to the bracket when it has been adjusted to its desired position in the bracket.

A frame 22 is connected to and supported by the upper end of post 15 and the mechanism for feeding the caps and applying acid thereto is mounted in or sustained by said frame. This frame is adjustably connected to the post by screw 23 which has a terminal fitting into a vertical groove 24 in said post. The purpose of this connection is to permit the cap-feeding-mechanism to be raised or lowered so as to be brought into the desired relation above cans of different sizes and so that the caps will be delivered in close proximity to the tops of the cans, without permitting the frame to rotate relatively to post 15.

A series of vertical rods 24 are rigidly secured in a plate 26 which is removably secured to frame 22 by screws 27, and these rods form a magazine for a stack of caps to be delivered singly to the cans passing beneath the frame 22. This plate is provided

with a central opening 28 corresponding in diameter substantially to the diameter of the caps and through which the caps will pass to the feeding mechanism.

The improved cap-feeding mechanism comprises a series of four wheels 30 each of which is secured to a shaft 31 journaled in a lower wall 32 of frame 22 and in plate 26 and has secured thereto a pinion 33. Each of these wheels 30 has its periphery provided with a screw-like cam or helical rib 34, the upper face of which is substantially flat or horizontal as at 35, and the under side of which is beveled as at 36. The stack or superposed series of caps will normally rest on the top edges of these ribs and be prevented from falling through the guideway thereby, it being understood that these ribs are disposed to project into the vertical path of the caps at opposite and equidistant points around the periphery of the caps. When, however, these screw-ribs are conjointly rotated, the caps will pass into the grooves between these screw-ribs and a complete rotation of wheels 30 will cause the lowermost cap to be separated from the stack and fed downwardly so it will fall onto the can which is then rotating the machine. Each wheel 30 has an upper cylindrical portion 30^a which serves to guide the caps to the screws 34.

The mechanism for conjointly rotating the pinions 33 to operate screw-ribs, comprises a ring 37 which has a series of internal teeth 38 meshing with all of the pinions 33 and an outer series of teeth 39 which mesh with a gear 40. Ring 37 has a groove 37^a into which a rib 26^a on plate 26 fits, to guide the ring against lateral displacement. Gear 40 is journaled upon a stud 41 in frame 22 and meshes with a gear 42 which has a downwardly extending hub 43 to which the star-wheel 13 is adjustably connected. Resultantly, each operation of the star-wheel 13 one step by a can moved along by the conveyer 10, will cause the star-wheel to operate sleeve 43, gears 42, 40 ring 37, and pinions 33 sufficiently to impart one complete revolution of wheels 30 in the same direction.

In practice, the caps supplied to cans *a* usually have their edges supplied with a thin sheet or layer of solder *b*, and it frequently occurs that this solder is not uniformly applied or becomes loose at places or that the edge of the cap is rough or irregular. The caps usually have their outer edges beveled and when these caps are placed in a stack, being usually of thin material, such as tin, they sometimes assume a slightly irregular disposition in the stack, particularly when the edges of caps at one side are cramped into closer relation and correspondingly separated at the other side. Feeding devices such as heretofore employed, would sometimes cause two caps when cramped together to be delivered together. In the operation of these screw-wheels, the lowermost cap will normally rest on the ribs of wheels 30, and when the latter are rotated the edge of the lowermost cap will pass into the grooves of said wheels and fit snugly in the screw-grooves of wheels 30, the beveled side of the rib 34 fitting the bevel on the cap and the outer edge resting upon the straight surface 35 of the rib. Therefore, in the rotation of these wheels, each cap, as it passes into the bite thereof will be rotated and the stack resting on the upper surface of the top of rib 34 will also be rotated, the gravity of the stack being sufficient to cause a considerable number of the caps in the stack to rotate, and this rotation causes the caps in the lower portion of the stack to move the caps in relatively parallel relation, as a result of the rotation of the lowermost rotating cap on wheels 30 to frictionally rotate the superposed caps since the weight of the caps in the stack above the lowermost cap will cause the caps to frictionally engage one another so that when the lowermost cap is rotated by the wheels 30 this rotary movement will be imparted to the caps above it. Furthermore, the sharp cam-shaped edge 36^a of each screw-rib is adapted to wedge its way between the edges of superposed caps and avoid plural gripping of the caps. Furthermore, in its passage and rotation between wheels 30, the cap will be fed downwardly, and the cap-edge, by its rolling contact with the ribs 35, will be smoothened or reshaped so that the solder will be evenly pressed and distributed around the edge of the cap.

In order to synchronize the delivery of the caps with respect to the openings in the tops of the cans passing beneath the feeding-mechanism which is operated by the engagement of the cans with the star-wheel 13 so that the delivery of the caps may be varied relatively to period of engagement of the star-wheel by the cans, a screw 44 is mounted in one side of the hub 45 of star-wheel 13, and engages a series of teeth 46 on hub 43 of gear 42. Screw 44 is provided with a wheel 47 whereby it may be turned and a lock nut 48 whereby the screw may be clamped in its assigned position. By turning screw 44 the time of delivery of the caps relatively to the movement of the cans may be readily varied to a nicety. It has been found desirable to time the delivery of the caps onto the can tops so that they will be deposited at a point slightly in advance of their true position and to provide a yielding presser, which will engage the cap after it has been deposited on the can top and exert a slight retarding pressure or friction sufficient to place it in the seat in the top of the can. This device consists of a plate or strip 51 equipped on its lower side with a strip 52 of suitable material such as leather. Strip

51 is sustained by a spring 53 which has its terminal secured in frame 22 and a screw 54 is adapted to engage the spring to adjust the presser to vary its pressure upon caps as desired. Strip 51 has inclined side-edges 54' which are adapted to guide the caps laterally. By setting the strip in an angular relation to the line of travel of the cans, the caps may be guided laterally on the cans, if that is necessary.

The improved machine is adapted, as the caps are being fed to the cans, to apply acid to the solder on the caps preparatory to the soldering operation and so that when the caps are deposited on the can-tops, the soldered edges of the caps will have acid applied thereto. A container or reservoir 60 is mounted upon an arm 61 which is secured to stud 41 by nuts 62. A valve 63 is adapted to regulate the flow of acid through a discharge pipe 64 which delivers the acid in regulated quantity to a cup 65 on the top of a pipe 66 which has branches 67 leading to points adjacent the plane where caps are in the grasp of feed-wheels 30. A wick 68 is held in the terminals of each of these branches and as each cap is being fed and rotated, its edge will be brought into contact with the wicks 68 which will apply acid in regulated quantity to the solder on the caps. If desired, another pair of wicks 69 to which acid will also be supplied from branches 67, may be provided, to contact with the caps in the lower portion of the stack.

In operation, as a can on conveyer 10 is carried under the feed-mechanism, it will operate star-wheel 13 to rotate, through the gear-mechanism, the feed-wheels having screw-ribs thereon which will separate a single cap from the stack and will cause it to rotate in contact with the acid-applying wicks, and will rotate the caps in the stack and cause them to assume a more regular position as they pass successively to the feed-mechanism. All of the parts of the mechanism are readily adjustable for the purpose of maintaining synchronism in delivery of the caps and the passage of the cans under the feed-mechanism and to adapt the machine for the cans of different sizes.

The invention is not to be understood as restricted to the details set forth as these may be modified by the skilled mechanic without departing from the scope and spirit of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. A machine for feeding caps, comprising a plurality of rotatable screws having a substantially flat upper surface disposed at substantially right angles to the axis of rotation and on the threads of said screws and an inclined lower surface on the threads thereof, means for guiding the caps to said screws, and mechanism for conjointly rotating the screws to feed the caps.

2. In a machine for feeding caps to cans, the combination of a frame, a series of revoluble devices mounted in the frame, each provided with a screw rib having its upper side substantially flat and disposed at substantially right angles to the axis of rotation and having an inclined lower surface, said surfaces merging into a sharp edge, means for guiding the caps to said devices, and mechanism for conjointly rotating all of said devices in the same direction to feed the caps.

3. In a machine for feeding caps to cans, the combination of a frame having an opening therein for the caps, means for guiding the caps in the form of a stack to said opening, a series of revoluble cap-feeding devices disposed to engage the edges of a cap in said opening, and provided with means for separating the lowermost cap from the stack, rotating it, and feeding it downwardly, pinions on said devices, a gear-ring engaging said pinions, interfitting guiding means on the frame and pinion respectively, and mechanism for operating the gear-ring.

4. In a machine for feeding caps to cans, the combination of a frame having an opening therein for the caps, means for guiding the caps in the form of a stack to said opening, a series of revoluble cap-feeding devices disposed to engage the edge of a cap in said opening, and provided with means for separating the lowermost cap from the stack and feeding it downwardly, pinions on said devices, a gear-ring engaging said pinions, a guide rib on the frame, the ring having a groove into which said rib fits and mechanism operated by the cans to which the caps are being fed, for operating the gear-ring.

5. In a machine for feeding caps to cans, the combination of a frame having an opening therein for the caps, means for guiding the caps in the form of a stack to said opening, a series of revoluble cap-feeding devices disposed to engage the edge of a cap in said opening, and provided with means for separating the lowermost cap from the stack and feeding it downwardly, pinions on said devices, a ring having internal teeth engaging said pinions, and external teeth, and gear-mechanism comprising a wheel engaging said external teeth, for driving said ring to rotate said devices.

6. In a machine for feeding caps to cans, the combination of a frame, having an opening therein for the caps, means for guiding the caps in the form of a stack to said opening, a series of revoluble cap-feeding devices disposed to engage the edge of a cap in said opening, and provided with means for separating the lowermost cap from the stack and feeding it downwardly, pinions on said devices, a ring having internal teeth engag-

ing said pinions and external teeth, gear-mechanism comprising a wheel engaging said external teeth, for driving said ring to rotate said devices and means operated by the cans to which the caps are being fed, for operating said mechanism.

7. In a machine for delivering caps to cans, the combination of a bracket, a post non-rotatably held in said bracket, an adjusting screw between said post and said bracket for adjusting the post laterally therein, a frame sustained by said post, cap-feeding devices mounted on said frame and gear mechanism for operating said devices.

8. In a machine for delivering caps to cans, the combination of a bracket, a post non-rotatably held in said bracket, an adjusting screw between said post and said bracket for adjusting the post laterally therein, a frame sustained by said post, cap-feeding devices mounted on said frame, gear mechanism for operating said devices, and a wheel operated by the cans to which the caps are being fed, for operating said mechanism.

9. In a machine for feeding caps to cans, the combination of a bracket, a post sustained by said bracket, a frame connected to the upper end of said bracket, cap-feeding-mechanism sustained by said frame, mechanism for operating said feeding-mechanism comprising a wheel on said post, a star-wheel mounted to revolve around said post and a screw coöperating with said wheels, for rotatably adjusting the connection between them.

10. In a machine for feeding caps to cans, the combination of a bracket, a post sustained by said bracket, a frame connected to the upper end of said bracket, cap-feeding-mechanism sustained by said frame, gear-mechanism for operating said feeding-mechanism, comprising a wheel on said post, a star-wheel mounted to revolve around said post, and a connection between said wheels comprising a screw and teeth for rotatably adjusting the connection.

11. In a machine for feeding caps to cans, the combination of a frame, revoluble devices for feeding caps from a stack, and rotating them, mechanism for rotating said devices, and means for applying acid to the rotating caps.

12. In a machine for feeding caps to cans, the combination of a frame, revoluble devices for feeding caps from a stack, and rotating them, mechanism operated by the cans to which the caps are fed for rotating said devices, and means for applying acid to the rotating caps.

13. In a machine for feeding caps to cans, the combination of a frame, cap-feeding-mechanism sustained by said frame, mechanism for operating said feeding-mechanism, and a yielding presser for engaging the cap after it has been released from the feed-mechanism and fallen onto the cans to press the cap on the cans and having means for guiding the caps laterally.

14. In a machine for feeding caps to cans, the combination of a frame, cap-feeding mechanism sustained by said frame, mechanism for operating said feeding mechanism, a yielding presser comprising a strip or plate, and a spring engaging said plate to press said plate in contact with the cap after it has been released from the feed-mechanism and fallen onto the cans to press the cap on the cans, said plate having means thereon for guiding said caps laterally and means for adjusting the presser.

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