June 4, 1929. G. W. CHALMERS 1,715,352

CAPPING MACHINE

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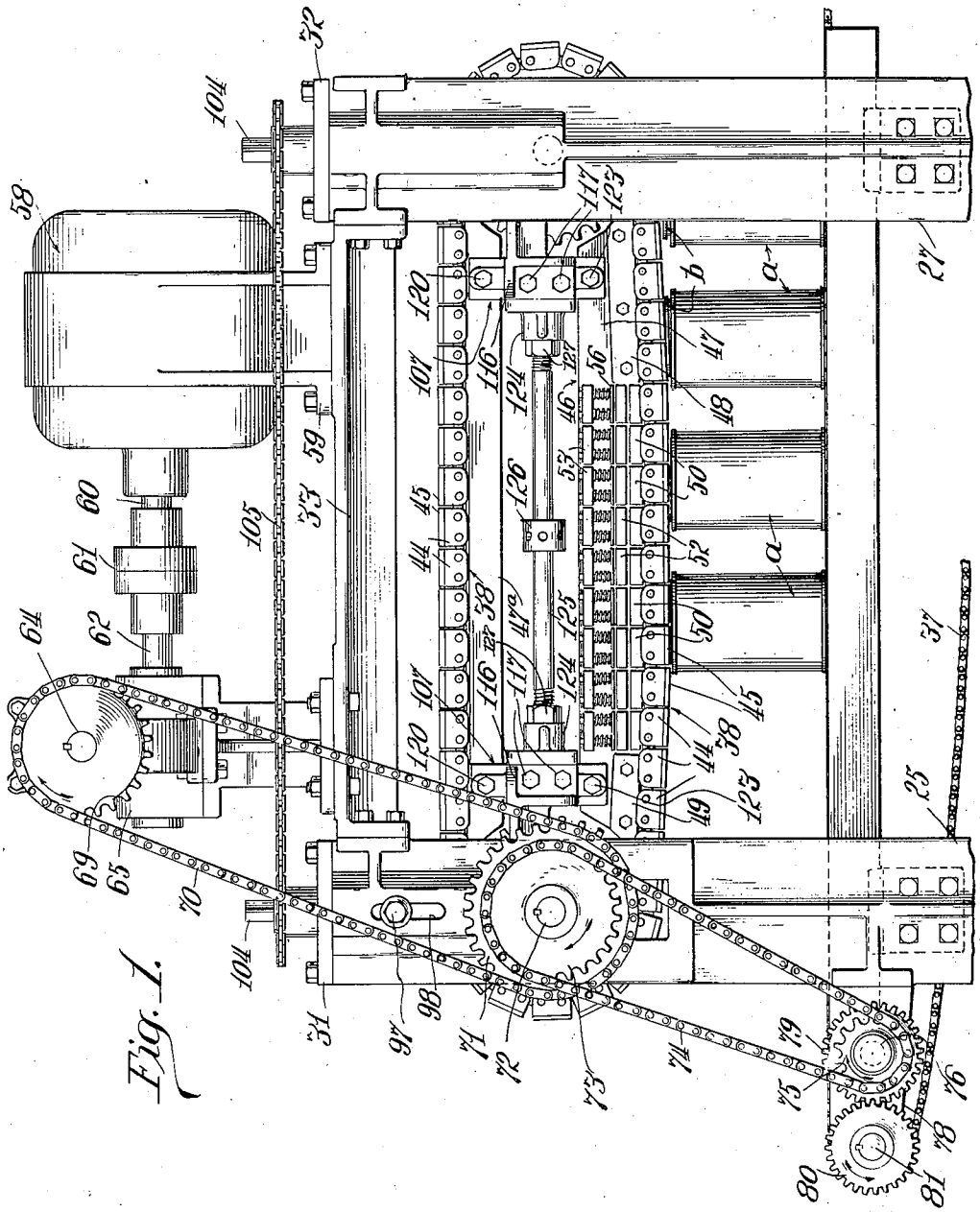


Fig. 1.

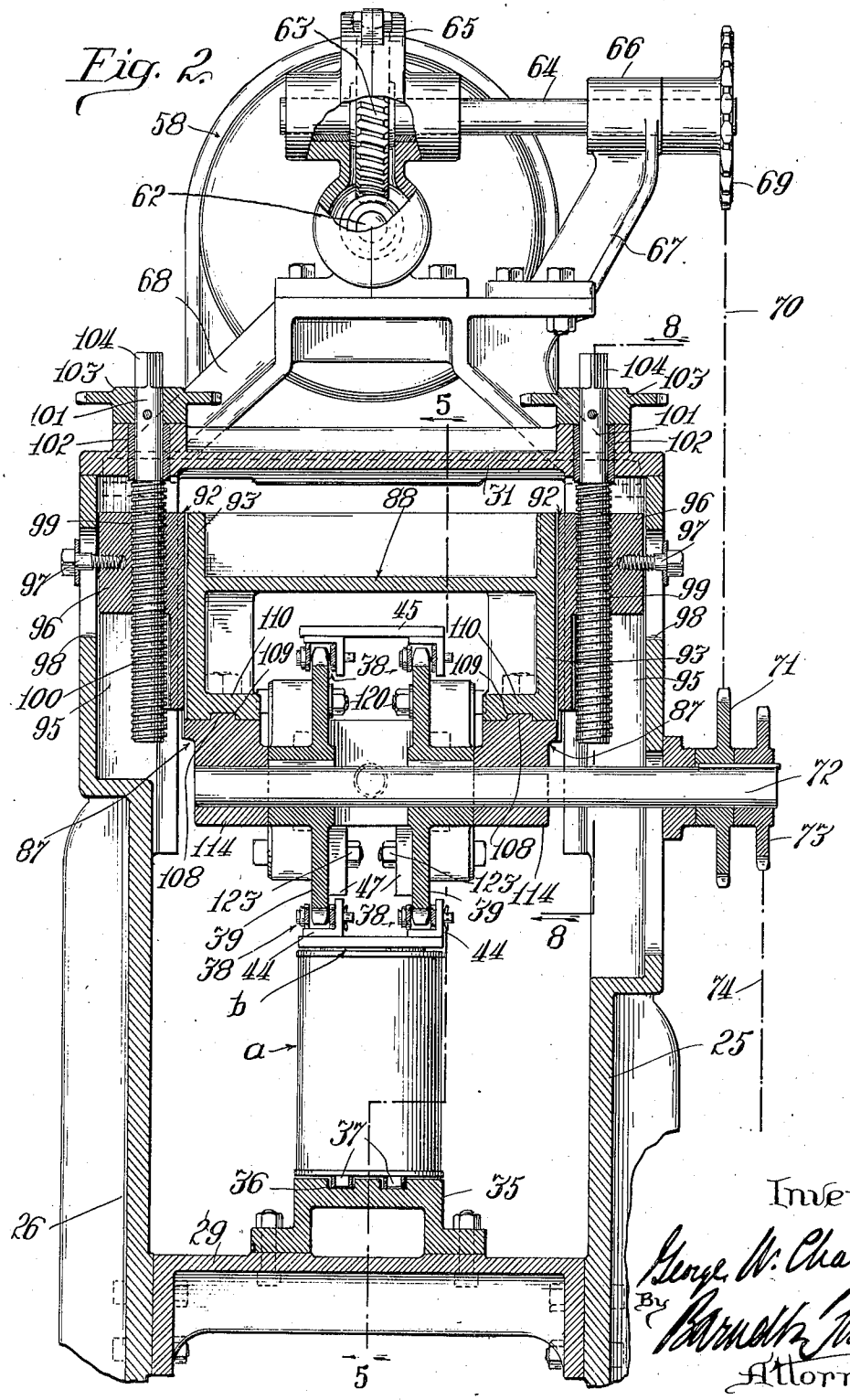
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Fig. 2.



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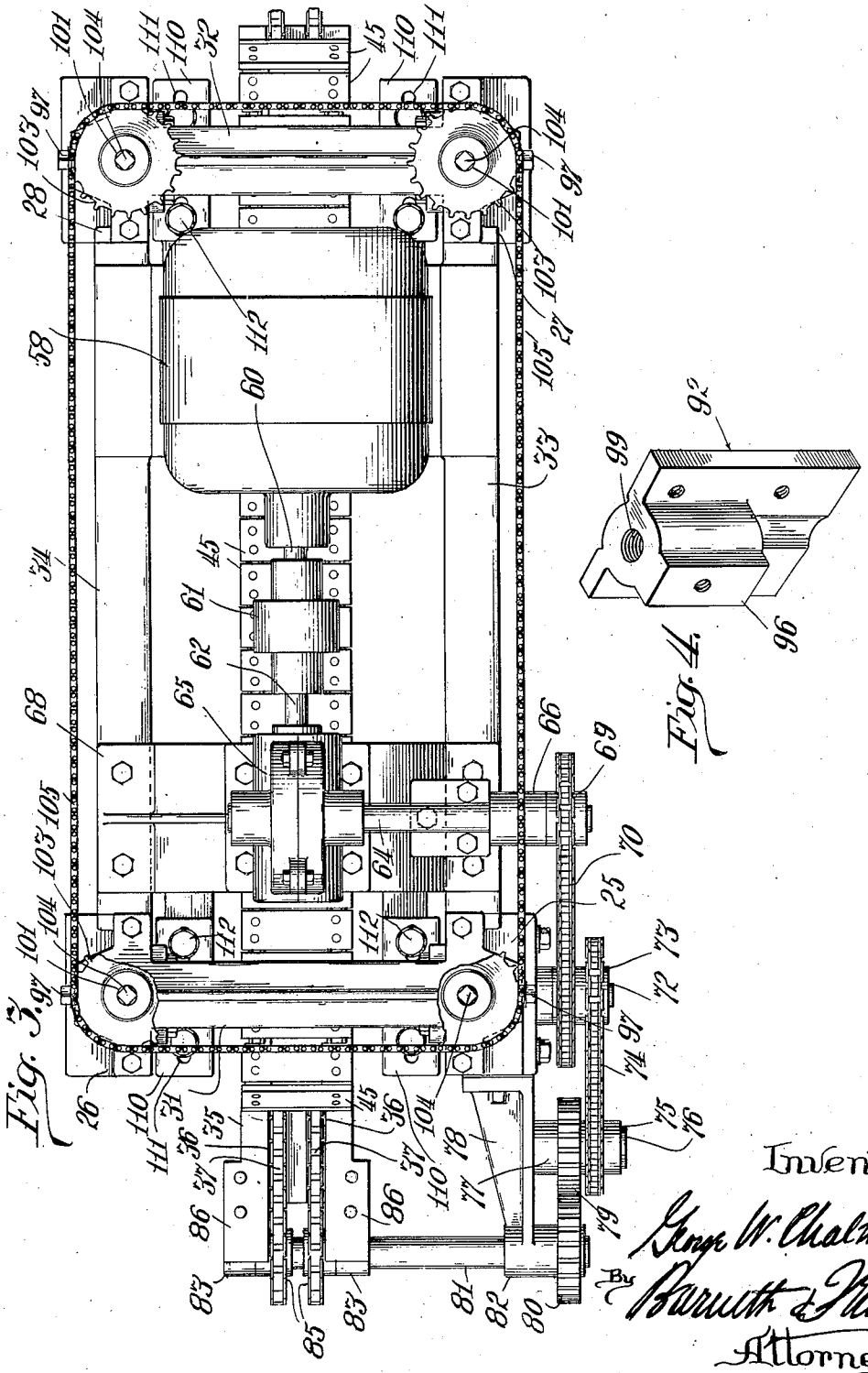


Fig. 3.

Fig. 4.

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CAPPING MACHINE

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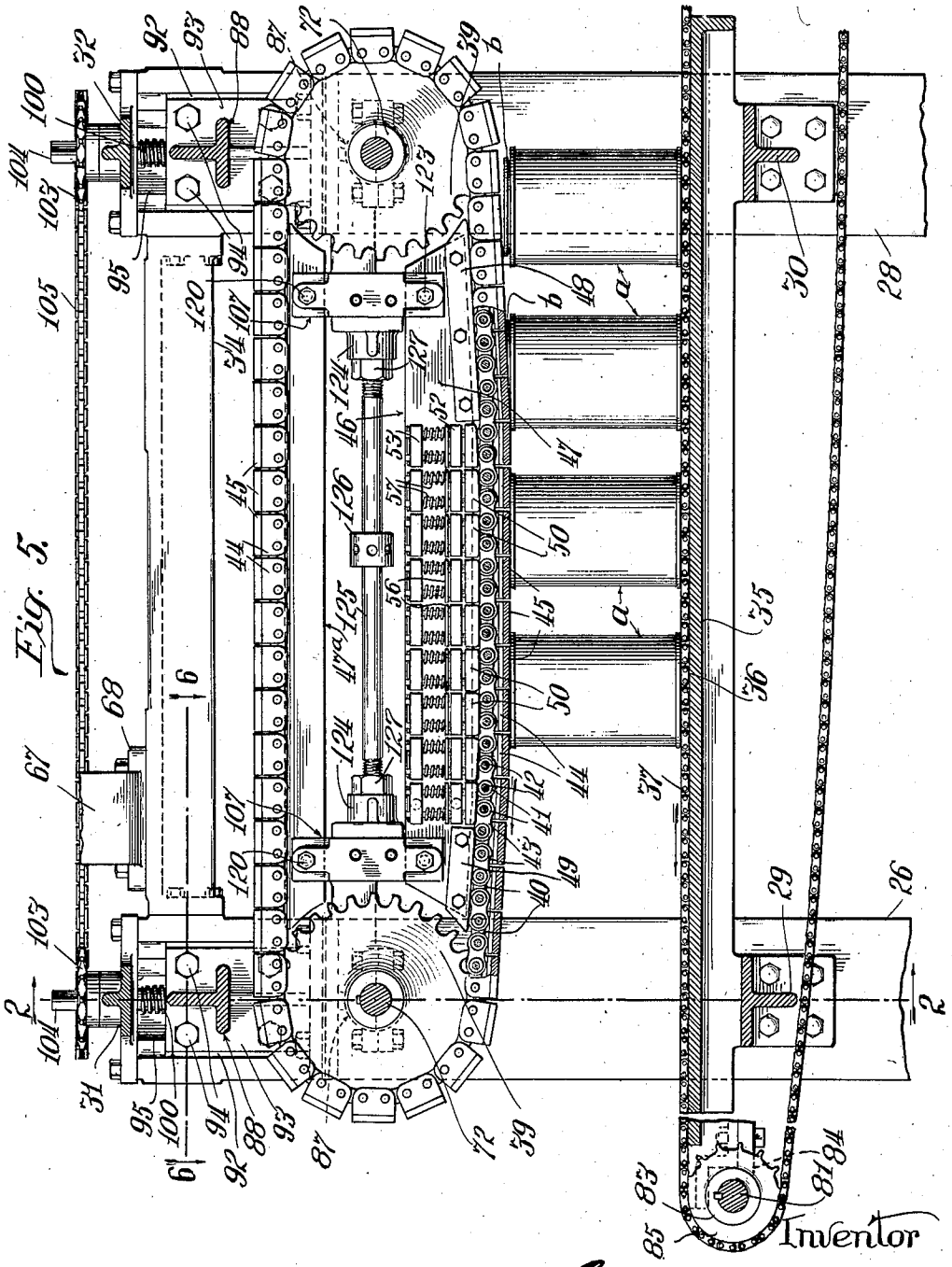


Fig. 5.

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Fig. 6.

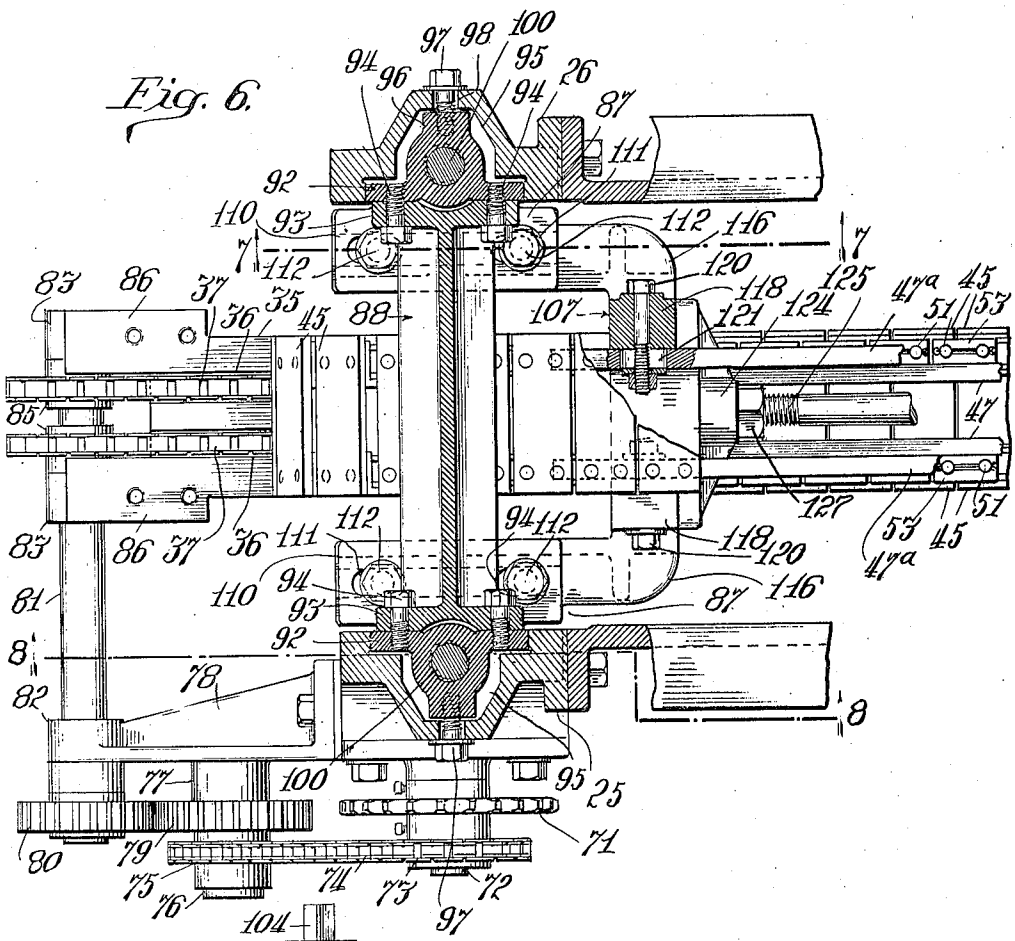
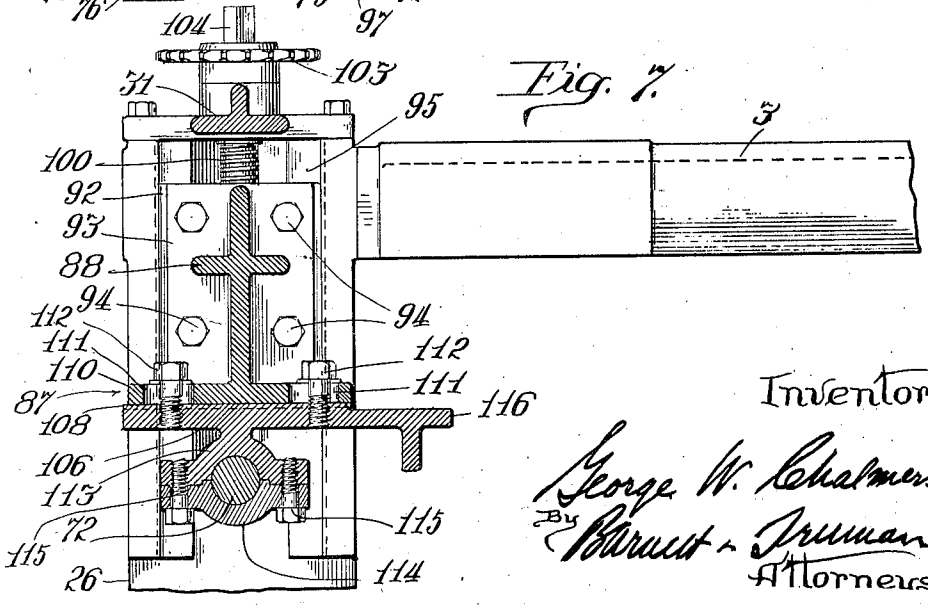


Fig. 7.



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Fig. 8.

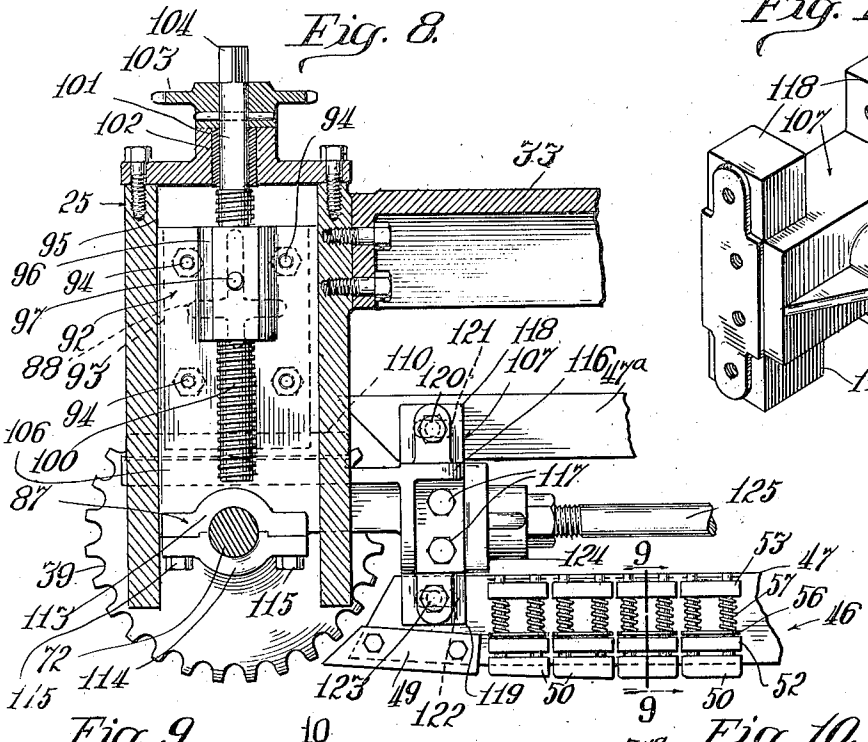


Fig. 11.

Fig. 9.

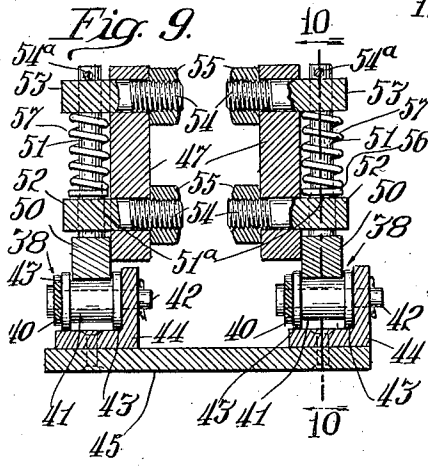


Fig. 10.

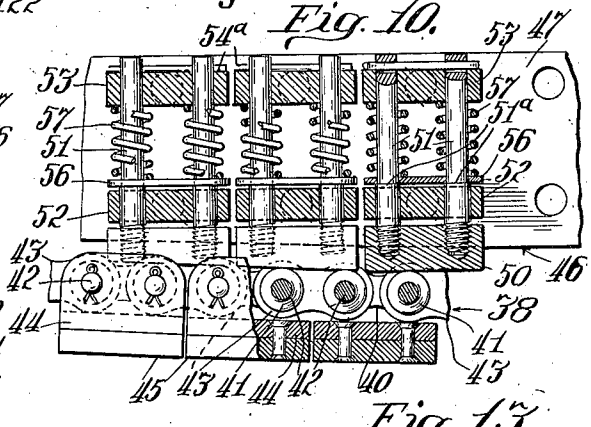


Fig. 12.

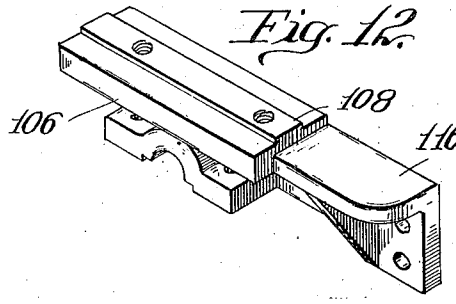
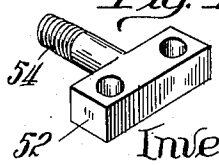


Fig. 13.



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Patented June 4, 1929. 1,715,352

UNITED STATES PATENT OFFICE.

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CAPPING MACHINE.

Application filed July 5, 1927. Serial No. 203,627.

My invention relates to automatic machinery for closing or "capping" friction top cans, that is, for forcing the friction tops of the cans into their seats; and the principal object of the invention is to provide a new and improved machine which will perform this operation more expeditiously, more certainly and positively and with less care and attention than is required with machines now used for this purpose.

A further object is to provide means whereby adjustment can be made to accommodate the machine for cans of different height and to take up the wear of certain parts of the machine. The invention is illustrated in a preferred embodiment in the accompanying drawing, wherein:

Fig. 1 is a side elevation of the machine.

Fig. 2 is a vertical cross sectional view on line 2—2 of Fig. 5.

Fig. 3 is a plan view.

Fig. 4 is a view in perspective of a part of one of the vertically adjustable carriages supporting the endless chain capping mechanism.

Fig. 5 is a vertical longitudinal sectional view on line 5—5 of Fig. 2.

Fig. 6 is a fragmentary plan section on line 6—6 of Fig. 5.

Fig. 7 is a fragmentary vertical longitudinal sectional view on line 7—7 of Fig. 6.

Fig. 8 is a longitudinal vertical sectional view on line 8—8 of Fig. 2.

Fig. 9 is a vertical cross sectional view on line 9—9 of Fig. 8.

Fig. 10 is a fragmentary longitudinal vertical sectional view on line 10—10 of Fig. 9.

Fig. 11 is a view in perspective of another part of one of the carriages above referred to.

Fig. 12 is a similar view of another part of the carriage; and

Fig. 13 is a similar view of a part of the structure for guiding the capping mechanism into contact with the can caps.

The operative parts of the machine are supported upon a frame comprising four spaced uprights 25, 26, 27 and 28, lower transverse members 29 and 30, upper transverse members 31 and 32 and longitudinal members 33 and 34.

Secured to the lower cross frame members 29, 30 is a table or runway 35 formed with longitudinal grooves 36, 36 for can conveying chains 37, 37, these chains projecting slightly above the upper surface of the table. The cans, indicated at *a* (Figs. 1, 2 and 5), are placed upon the right-hand end of the chains 37, having reference to Figs. 1 and 5, by hand or by any suitable feeding means, and are moved by the chains lengthwise of the table 35. Before reaching the table the caps or friction tops *b* of the cans are put in place, for example, by hand, in the openings in the can tops into which they are to be driven by operation of the machine.

The caps are pressed into place to close the cans while the cans are being moved along table 35 by means of an endless chain structure carrying a plurality of capping elements which, by deflection of the chain structure, are brought to bear against the caps to drive them into place, the chain carrier moving in the same direction and at the same speed as the conveyor chains 37.

The chain carrier or capping mechanism is preferably constructed as follows: A pair of spaced endless chains 38—38 are provided operating over sprocket wheels 39 at opposite ends of the machine. The sprocket wheels are mounted upon horizontally adjustable supports, for the purpose of adjustment of the tension of the chains, which supports are arranged on vertically adjustable carriers whereby the whole capping structure may be raised or lowered to accommodate the machine for cans of different heights. These supporting and adjusting devices will be described hereafter.

The chains 38 consist, in each case, of links 40, rollers 41, pintles 42 and washers 43 (Figs. 9 and 10) together with angle members 44 which take the places of alternate links on one side of the chain. Riveted to the horizontal legs of the respectively opposite angle members—one on one chain and one on the other—are capping plates 45 which are the elements adapted to be brought to bear against the can caps to drive them into place in the can.

In order to force the can caps into the open tops of the cans, the lower runs of the chains 38 are deflected downwardly as they leave the sprockets 39 at the end of the machine at which the cans enter. After the capping operation has been completed, the chains with their capping plates are raised from the cans so that the cans may be moved down and dis-

charged from the machine. The deflection of the lower runs of chains 38 is accomplished by a pair of guides, one for each chain, designated 46 and constructed as follows: 47 is a bar arranged above the chain, but slightly to one side of the same, to which is secured, at the end of the machine at which the cans enter, a fixed guide 48, having a downwardly sloping under surface, against which the rollers 41 of the chain bear. At the other end of bar 47 is a similar fixed guide 49 inclined in the opposite direction. Between these two guides are a plurality of upwardly yieldable guiding members consisting each of a block 50 provided with a pair of upstanding rods 51, 51, which extend through guide members 52, 53 (Figs. 9, 10 and 13) having threaded stems 54 secured by nut 55 to the bar 47. The rods 51 are held in place by cotter pins 54ª, and are shouldered at 51ª for a washer plate 56 between which and the upper guide 53 are arranged coiled springs 57. The initial pressure on the can cap is exerted by the fixed guide 48. The driving in of the caps is completed by the yieldable guide blocks 50 which because of their capacity to yield in an upward direction will give way against rather than crush a can if slightly greater in height than the other cans, or if the cap cannot be driven down as far as the caps of the other cans, or in case the adjustment of the capping mechanism for any reason is too close.

The driving mechanism for the can conveying chains and the capping mechanism is as follows: 58 is an electric motor, the base 59 of which is secured to the longitudinal frame members 33, 34. The armature shaft 60 of the motor is connected by a flexible connection 61, with a worm shaft 62, (Fig. 2) meshed with a worm wheel 63, on a shaft 64 journaled in the housing 65 of the worm wheel and in a bearing 66 on a bracket 67 on the bridging member 68 which carries the worm gear housing. Shaft 64 carries a sprocket wheel 69 for a drive chain 70, which extends over a sprocket wheel 71 fixed to a shaft 72, to which one pair of the sprockets of the capping mechanism are keyed. The mounting of the shaft 72 will be described in connection with the arrangement for adjusting the height of the capping mechanism. Shaft 72 also carries a sprocket 73 for a drive chain 74 which extends around a sprocket 75 on a stub shaft 76, turning in bearings 77 on a bracket 78 secured to the upright frame member 25. Shaft 76 has fixed thereto a spur gear 79 meshing with a spur gear 80, on a shaft 81 mounted in a bearing 82 on bracket 78 and in a bearing 83 carried by a bracket 84 secured to the forward end of the table 35. Shaft 81 has secured thereto, a pair of sprocket wheels 85, for the can conveying chains 37. The bracket 84 has secured thereto a pair of guide plates 86—86 at the level of the upper surface of the table. Gears 79, 80 are reversing gears so that the upper runs of chains 37, 37 are driven in the same direction as the lower runs of chains 38, 38 of the can capping mechanism. The elements of the gearing have ratios proportioned so that the two pairs of chains move at the same speed.

The arrangements whereby the capping mechanism may be raised and lowered and whereby the tension of its chains may be adjusted are as follows: The sprocket wheels of the can capping mechanism are fixed to shafts which are carried by longitudinally adjustable supports 87 (Figs. 2 and 7) on vertically adjustable carriages 88, the arrangements being the same at each end of the machine. The carriage 88 is provided at each side with a guide block 92 (Fig. 4) which is secured to the end webs 93 of the carriage by screws 94 (Figs. 6 and 7). The uprights 25, 26, 27, 28 are recessed at 95 for the guide blocks, the latter being provided with bosses 96 tapped for set screws 97 which extend through slots 98 in the uprights. Each guide block 92 is formed with a threaded perforation 99, for an adjusting screw 100 having a smooth portion 101 turning in a bushing 102 in the transverse frame member 31 or 32, as the case may be. Fixed to the upper end of the screw 100 is a sprocket wheel 103. The screw shaft 101 terminates in a squared portion 104, to which a wrench may be applied. A chain 105 extends around all four sprockets so that when a wrench is applied to one of the screw shafts, all four shafts are turned simultaneously at both ends of both of the carriages 88. Any substantial adjustment of the capping mechanism, as for example, for cans of different height, will involve of course, substituting chains of different lengths for the chains 70, 74.

The arrangements for adjusting the tension of the capping mechanism chains are as follows, these arrangements being duplicated at opposite ends of the machine: The support 87 for sprocket shaft 72 consists of two members 106 (Fig. 12) made right and left, and a connecting member 107 (Fig. 11). Each member 106 has a longitudinal rib 108 fitting into a correspondingly formed groove 109 in the lower webs 110 of the carriage 88, these webs being formed with slots 111 for adjusting set screws 112 that screw into the member 106. The member 106 is formed with a half bearing 113 (Fig. 7) for the shaft 72 which is retained in place by the removable half bearing 114 fastened to the other bearing member by screws 115. Each of the members 106 has a forwardly projecting bracket 116 and the transverse member 107 is secured between the brackets 116 by screws 117. The transverse member 107 is formed with an upper pair of lugs 118 and a lower pair of lugs 119. Guide bars 47ª are provided for

guiding the upper runs of the capping mechanism chains and these guide bars are secured to the lugs 118, on the inner sides of the lugs, by bolts 120, the guide bar being slotted at 121 (Fig. 8). It will be understood that the attachment of the guide bars at each end of the machine is the same. The guide bars 47 for the lower runs of the capping mechanism chains are slotted at their opposite ends, as indicated at 122, and secured by bolts 123 to the inner faces of the lower pair of lugs 119 of the transverse member 107. Each of the two members 107 at the opposite ends of the machine is formed with a threaded boss 124, the threads, however, being opposite threads and these threaded bosses are engaged by the correspondingly threaded ends of an adjusting rod 125 provided at a place intermediate its ends with heads 126 apertured for a crow bar or the like. The adjustment is maintained by lock nuts 127.

The operation of the apparatus as above described is as follows: The cans *a* with their caps *b* placed over openings in the tops of the cans are moved under the capping mechanism by the conveying chains 37. The capping plates 45 on the chains 38 of the capping mechanism are brought down upon the caps by the deflection of the chains produced by the fixed guides 48. The yieldable guides 50 complete the capping operation while yielding, when necessary, to prevent injury to the cans. The capping chains and their capping plates then move away from the cans as the chains ride up fixed guides 49.

To adjust the machine for cans of different heights, set screws 97 are loosened and the carriages 88 carrying the can capping mechanism are raised or lowered by application of a wrench to the squared end 104 of one of the adjusting screws 100, after which the set screws 97 are again tightened.

To adjust the tension of the carrier chains of the capping mechanism the set screws 112 are loosened and also the nuts on the bolts 120 and 123 which secure the upper and lower guide-bars for the can capping chains, and after loosening the lock nut 127 the adjusting rod 125 is turned to either bring the longitudinally adjustable supports 87 toward each other or separate them, as may be necessary. When this adjustment has been made, the set screws, bolts and lock nuts are tightened.

In comparison with capping machines of the rotary type, the machine of my present invention, which operates on the principle of moving the cans in a straight line, is more efficient and certain in its operation. It can be operated at a higher speed, that is so as to cap a larger number of cans per minute than the machines of the rotary type. The caps are less likely to be displaced before they are acted upon by the capping mechanism so that less supervision of the operation is required. The machine is readily adjustable for cans of different heights and can also be quickly and accurately adjusted to compensate for wear. The capping action is positive and at the same time there is no danger of injury to cans by crushing.

I claim:

1. In a can capping machine, the combination of means for moving the cans in a straight line and capping means positioned for movement above and substantially parallel to the path of travel of the cans, said capping means comprising a plurality of flexibly supported capping elements and means for holding these elements from yielding upwardly during the first part of the travel of the cans and for subsequently permitting the yielding movement thereof.

2. In a can capping machine, the combination of means for moving cans over a straight line path, an endless chain carrier arranged above and in line with the path of the cans, capping elements on said carrier, a stationary guide for the lower run of the carrier which forces the middle portion thereof downwardly against the can caps, said guide comprising a fixed downwardly sloping guiding member to depress the capping elements against the can caps and upwardly yielding guiding members against which the middle portion of the run of the carrier bears.

3. In a can capping machine, the combination of a longitudinally grooved table, an endless chain carrier for the cans movable in the grooved portion of the table, an endless chain carrier arranged above and in line with the path of the cans, capping elements on said carrier, and means for forcing the lower run of the carrier, with its capping elements down against the can caps.

4. In a can capping machine, the combination of a supporting frame comprising a pair of spaced uprights at each end of the machine, and endless chain conveyor for the cans supported on said frame, a vertically movable carriage between each pair of uprights, supports on the carriages movable longitudinally with respect to the machine, sprockets carried by said supports, an endless chain carrier operating over said sprockets, and provided with capping elements, means for adjusting the positions vertically of the carriages, and means for giving longitudinal adjustment to said supports on the carriage, comprising an adjusting screw having right and left threads engaging said sprocket supports at opposite ends of the machine.

5. In a can capping machine, the combination of means for moving the cans over a straight line path, and an endless chain capping mechanism arranged above and in line with the path of the cans comprising a pair of sprockets at each end of the machine, chains to operate over said sprockets, a plurality of angle members secured to said chains, and capping plates extending from chain to chain

attached to said angle members and spring means for independently urging the capping plates toward the cans.

6. In a can capping machine, the combination of means for moving the cans over a straight line path, and an endless chain capping mechanism arranged above and in line with the path of the cans comprising sprockets at opposite ends of the machine, a chain extending around said sprockets comprising rollers and connecting links, can capping elements on said chain, and a multipart yieldable guide to deflect the middle portion of the lower run of the chain downwardly, which guide is engaged by the rollers of said chain.

7. In a can capping machine, the combination of means for moving the cans over a straight line path, and an endless chain capping mechanism arranged above and in line with the path of the cans comprising sprockets at opposite ends of the machine, a chain extending around said sprockets comprising rollers and connecting links, can capping elements on said chain, and a guide to deflect the middle portion of the lower run of the chain downwardly, which guide is engaged by the rollers of said chain, said guide comprising a plurality of blocks and springs against which said blocks can yield upwardly.

8. In a can capping machine, the combination of means for moving the cans over a straight line path, and an endless chain capping mechanism arranged above and in line with the path of the cans comprising sprockets at opposite ends of the machine, a chain extending around said sprockets comprising rollers and connecting links, can capping elements on said chain, a longitudinally extending plate arranged above the lower run of the chain, a plurality of blocks against which the rollers of the chain bear, rods on said blocks, guides on the plate for said rods and coiled springs arranged so as to be compressed by the upward movement of the blocks.

9. In a can capping machine, the combination of means for moving the cans over a straight line path, and an endless chain capping mechanism arranged above and in line with the path of the cans comprising a pair of sprockets at each end of the machine, chains to operate over said sprockets comprising rollers and links, a plurality of angle members secured to said chains, capping plates extending from chain to chain and attached to said angle members, a longitudinally extending plate arranged above the lower run of the chain, a plurality of blocks against which the rollers of the chain bears, rods on said blocks, guides on the plates for said rods, and coiled springs arranged so as to be compressed by the upward movement of the blocks.

10. In a can capping machine, the combination of a conveyor for supporting and transporting a series of cans, a flexible traveling capping mechanism arranged to move with the conveyor above the path of travel of the cans, and means for independently yieldably urging adjacent portions of the capping mechanism toward the cans.

11. In a can capping machine, the combination of a conveyor for supporting and transporting a series of cans, a flexible traveling capping mechanism arranged to move with the conveyor above the path of travel of the cans, and means for simultaneously yieldingly urging separate portions of the capping mechanism toward each of a plurality of cans in the series.

12. In a can capping machine, the combination of a conveyor for supporting and transporting a series of cans, a flexible traveling capping mechanism arranged to travel with the conveyor above the path of travel of the cans, and relatively stationary guiding means inclined downwardly so as to progressively urge the capping mechanism toward the cans, a portion of the guiding means consisting of a series of independent sections, and means for yieldingly urging each section separately toward the cans.

13. In a can capping machine, a pair of endless flexible conveyors, means for driving the conveyors so that opposed runs of the two conveyors travel in the same direction, fixed guiding means for one of the conveyors whereby this conveyor may serve as a support for a series of cans, the cans being positioned between the opposed runs of the two conveyors, the other conveyor carrying a plurality of capping elements and guiding means for the second conveyor inclined so as to progressively force the capping elements toward the cans, a portion of the latter guiding means consisting of a plurality of independently movable sections, and means for yieldingly urging each section toward the cans.

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