J. A. McANULTY.

BOTTLE CAPPING MACHINE.

APPLICATION FILED MAY 25, 1909.

954,685.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.

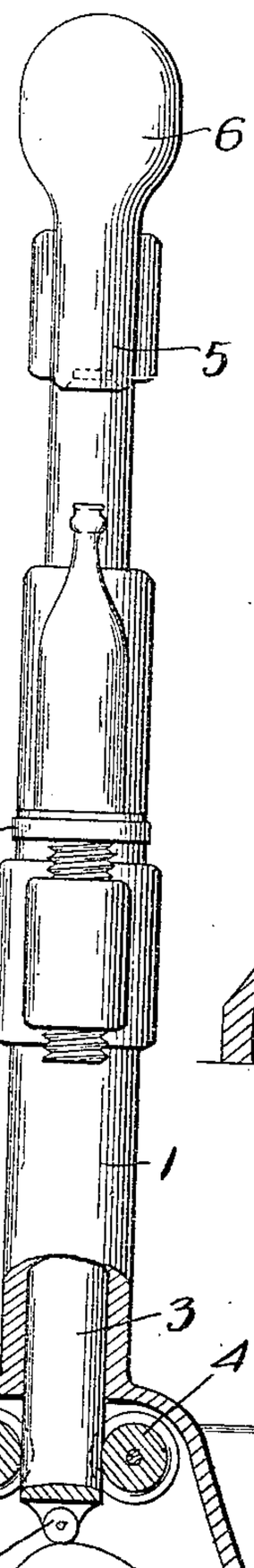


Fig. 1.

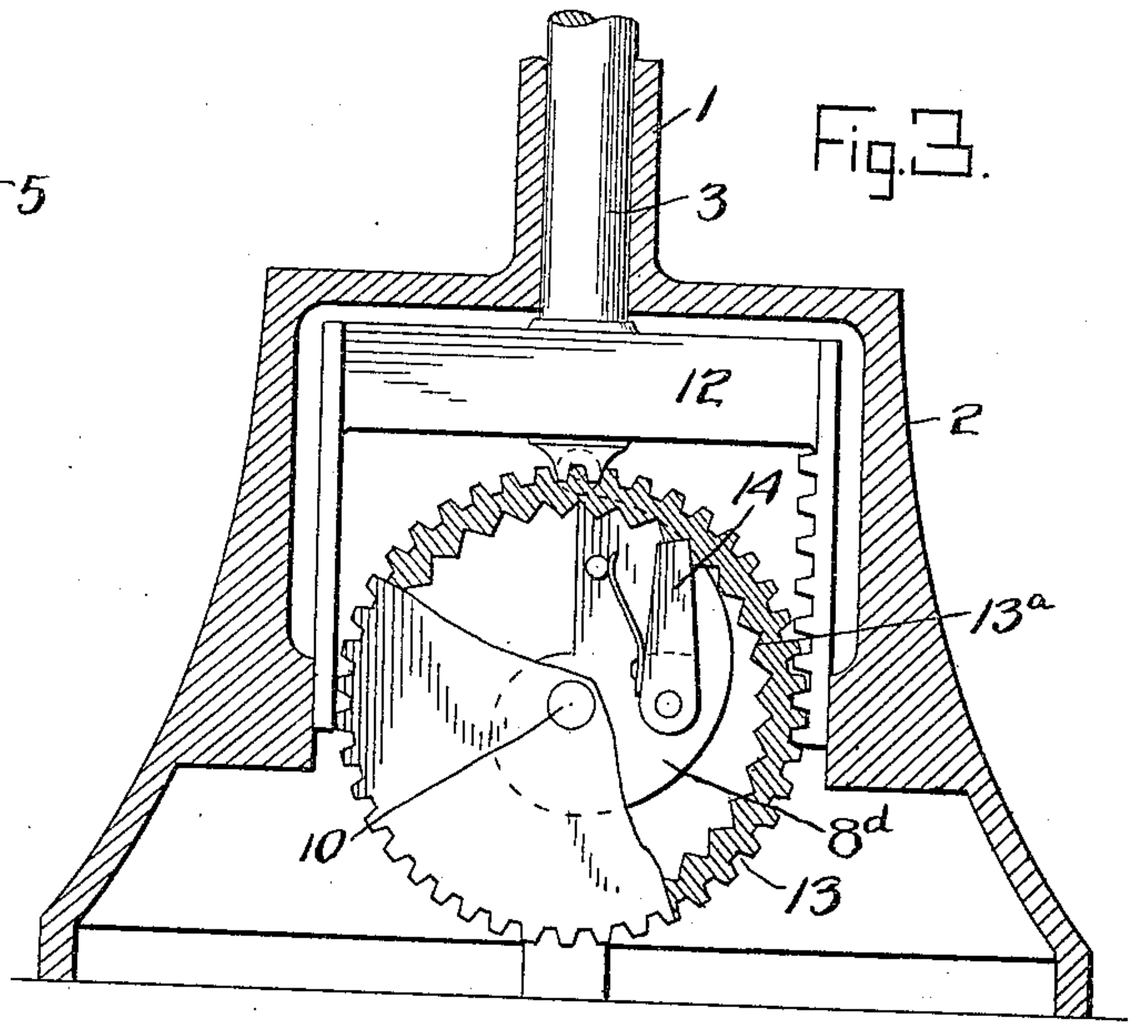


Fig. 3.

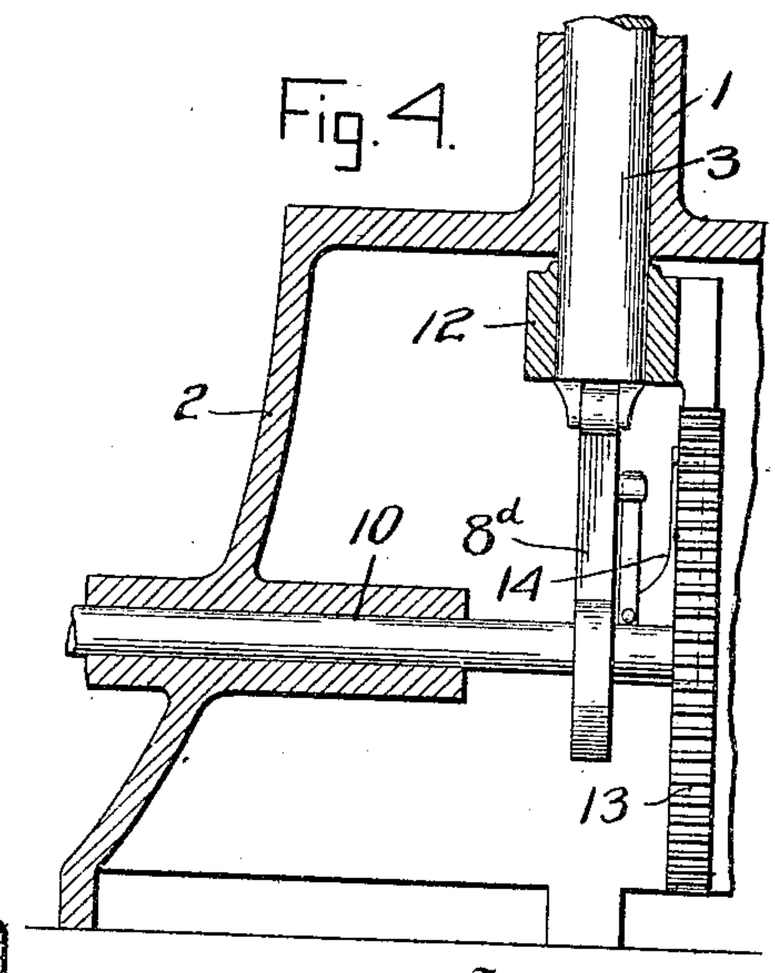


Fig. 4.

Witnesses

C. F. Reichenbach.

J. M. Wynkoop

Inventor.

John A. McAnulty,

By Knight Bros

Attorneys.

J. A. McANULTY.

BOTTLE CAPPING MACHINE.

APPLICATION FILED MAY 25, 1909.

954,685.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 2.

Fig. 2.

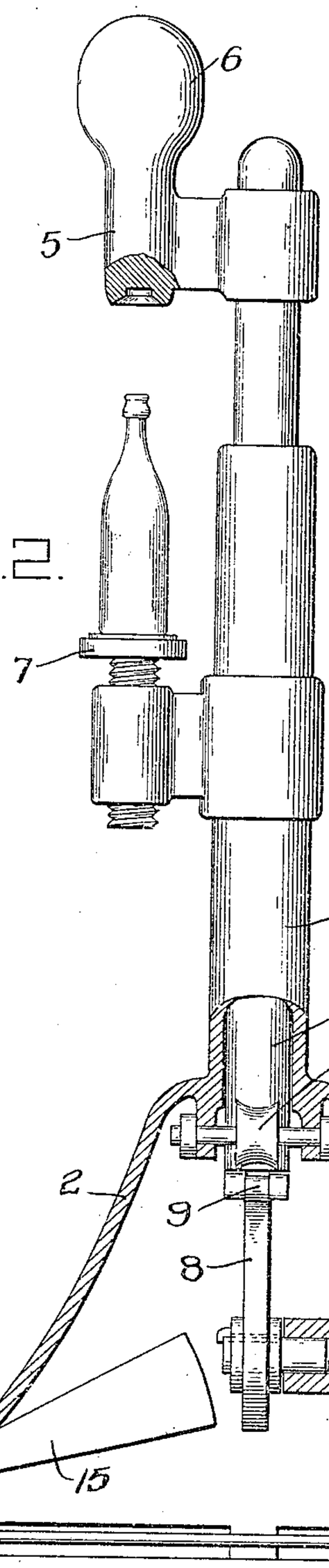
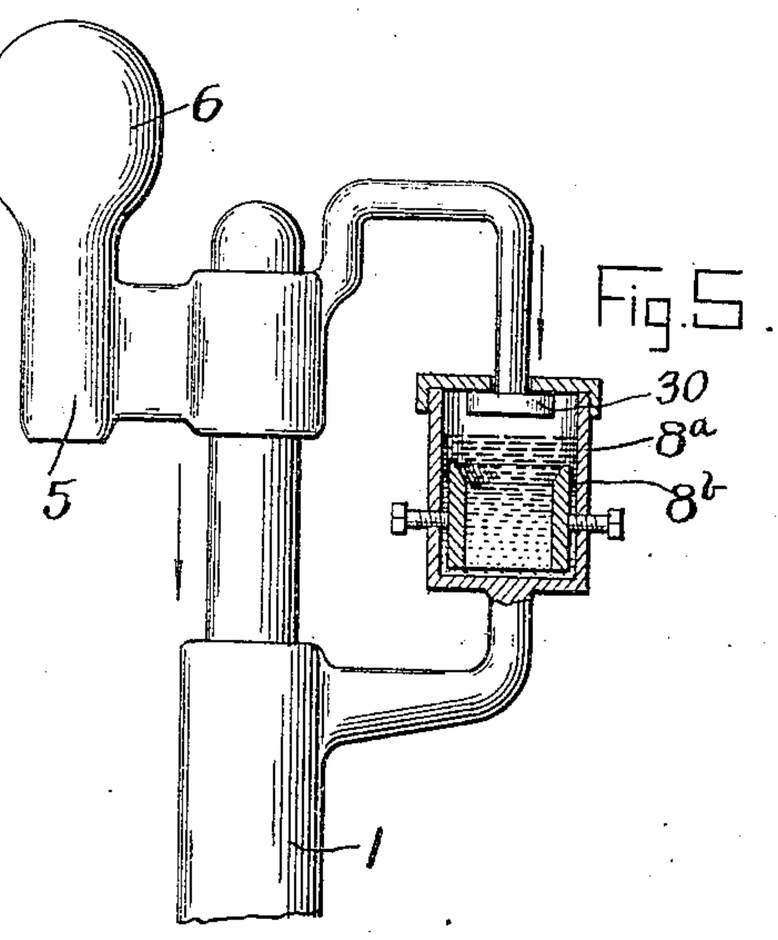
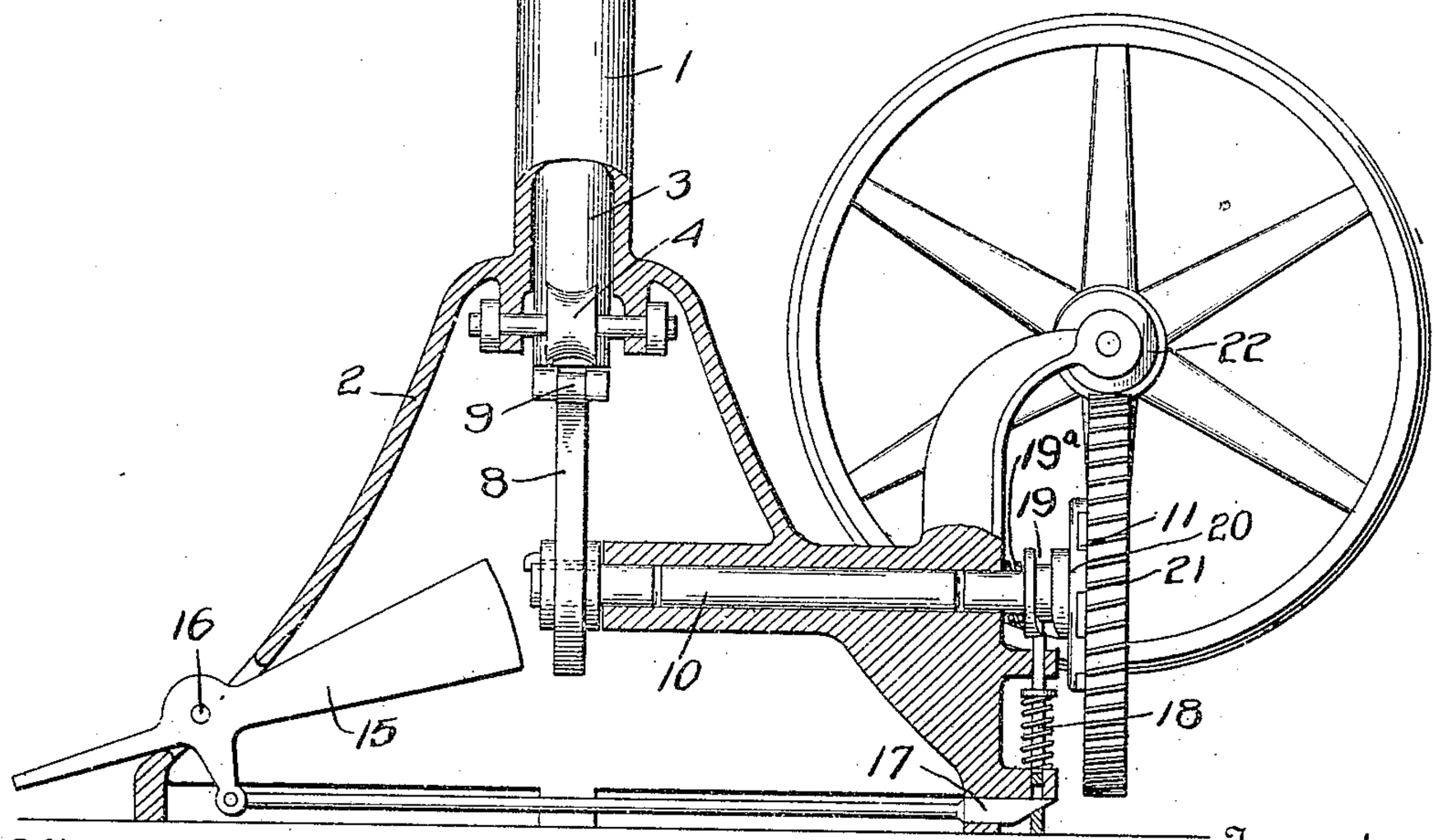


Fig. 5.





Witnesses

C. K. Reichenbach

J. M. Wynkoop,

Inventor

John A. McAnulty

By Knight Bros

Attorneys.

UNITED STATES PATENT OFFICE.

JOHN ARMSTRONG McANULTY, OF BALTIMORE, MARYLAND.

BOTTLE-CAPPING MACHINE.

954,685. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed May 25, 1909. Serial No. 498,277.

To all whom it may concern:

Be it known that I, JOHN ARMSTRONG McANULTY, a citizen of the United States, and resident of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Bottle-Capping Machines, of which the following is a specification.

The present invention relates to the means for developing the force employed for crimping a cap on a bottle, and has for its object to provide means that will develop the necessary force to accomplish this purpose under conditions which will produce uniform results, notwithstanding variations in the length of the bottle and the point in the stroke of the machine at which the capping operation is performed.

In carrying out my invention, I perform the work by means of a weight or dead load which is sufficient, when supported through the medium of a capping device, to compress the cap upon the neck of the bottle and establish the relations necessary to hermetically seal it. While the dead weight of the capping device performs the main part of the work, it must of necessity have some movement to bring it into contact with the cap to be crimped and to this extent inertia is a factor in the results produced, but this movement is comparatively slow and inertia is, therefore, a relatively small factor in the result. The descent of the capping device is so controlled that at whatever point it encounters the capping, it will perform the same work and as this is readily regulable at will by predetermining the weight, it follows that danger of breaking bottles as a consequence of inequalities in their length is entirely done away with.

Several embodiments of my invention are shown in the accompanying drawings by way of illustration, although I desire it understood that my invention is not limited to the specific means disclosed.

In said drawings, Figure 1 is a side elevation, partly in section, of a machine embodying one form of my present invention; Fig. 2 is a similar view in a plane at right angles to Fig. 1; Figs. 3 and 4 are vertical sectional views in planes at right angles to each other, showing a special means for timing the downward movement of the capping device; and Fig. 5 represents in vertical section another means for determining the speed at which the capping device moves.

In the standard 1 having a base 2, is mounted a vertically reciprocating plunger 3 suitably guided by anti-friction rolls 4. At some point in the length of this plunger, preferably at its lower end, it is brought under the influence of a governing device which times its downward movement, while at its upper end said plunger carries a suitable form of capping device 5. The capping device 5 embodies in its structure a weight 6 which is either originally given a dimension suitable for the work to be performed or else is made so that it can be added to or detracted from at will.

Mounted upon the standard 1 is a table 7 preferably made adjustable in the usual manner, upon which the bottles may be stood when receiving the caps.

According to Figs. 1 and 2, means for timing the motion of the plunger consists of a cam 8 upon which the plunger bears through the medium of an anti-friction roller 9, which cam is rotated by a shaft 10, to which revolutions are imparted intermittently through a clutch 11. Cam 8 is designed to impart a lift to the plunger and then to permit it to descend until the capping device reaches the cap upon the bottle. Obviously, if the plunger were allowed to descend with great speed, the energy developed by acceleration of the falling mass would crush the bottle; but if the cam is so designed that it permits only a slow descent of the plunger, it is obvious that the weight imposed upon the plunger may be made sufficient to crimp the cap, yet insufficient to break the bottle. If now the descent of the plunger previous to the time when even the longest bottles will be encountered in the capping operation is rendered uniform in speed in addition to being slowed down sufficiently to prevent breakage, it is immaterial whether the bottle be relatively long or short, for the same force will be imparted in the capping operation at whatever point in the stroke of the plunger, the capping operation takes place.

According to Figs. 3 and 4, the speed of rotation of the shaft 10 determines the rate at which the plunger descends, and not the construction of the cam. The cam 8^d lifts the plunger 3, but releases it entirely at the salient point of the cam, and in order to retard the descent of the plunger from that point on, the plunger has a yoke 12 in toothed engagement on one side with a pin-

ion 13 loosely mounted on shaft 10, so that the weight of the plunger 3 tends to rotate the pinion. A pawl 14 carried by the cam 8^d and pressed normally into engagement with internal ratchet teeth 13^a on the pinion 13, prevents the pinion from racing ahead of the pawl during the downward stroke, but when this is completed and the cam begins to raise the plunger 3 so that pinion 13 will be rotated by the yoke 12 in the opposite direction, the pawl 14 will slip and permit rotation of the pinion 13 in the direction opposite to that of the cam 8^d.

According to the form shown in Fig. 5, the end of a laterally disposed plunger 30 is fitted in a dash-pot 8^a having a lining 8^b supported therein in a manner to leave a space at the bottom and sides of the dash-pot to form a by-pass. The resistance to the movement of the piston in the dash-pot may be regulated by increasing or decreasing the space between the lining and the bottom of the dash-pot.

To render the operation of the machine intermittent so that bottles may be placed in position and removed, a counter-balanced treadle 15 pivoted at 16 is made to control a wedge 17 that in turn controls the spring pressed pin 18 coöperating with the cam groove 19 of the clutch 20. One member of clutch 20 is carried by the gear wheel 21 that is constantly driven by the worm 22. When treadle 15 is released, wedge 17 is withdrawn and the pin 18 enters the groove 19 and opens the clutch 20 upon encountering the cam portion of said groove. If, however, the treadle 15 is depressed, pin 18 is withdrawn and the clutch automatically closed by a spring 19^a as is usual in clutches of this type, and thus made to impart rotation to the shaft 10 and develop reciprocating movement in the plunger 3. As these parts are not of the essence of my invention, they may be changed at will.

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

1. In a machine for applying closures to bottles, a closure affixing device, a gravitating plunger adapted to develop in said affixing device a force sufficient to affix the closures to the bottles and means opposing the free gravitation of said plunger but receding in advance thereof sufficiently to permit the plunger to develop the aforesaid force without excessive acceleration.

2. In a machine for applying closures to bottles, a gravitating plunger adapted to develop force sufficient to affix the closure to the bottle, means releasing said plunger to the action of gravity and means arresting the gravitation of the plunger, yieldingly, and controlling its movement to prevent excessive acceleration.

3. In a machine for applying closures to bottles, a closure affixing head, a gravitating plunger actuating said affixing head and developing therein force sufficient to affix the closures to the bottles, and means operating on said plunger to yieldingly control its movement and prevent excessive acceleration of the plunger substantially as set forth.

4. In a machine for applying closures to bottles, a gravitating plunger adapted to develop force sufficient to affix the closures to the bottles, a closure affixing head gravitating with said plunger and through which the plunger acts, and means operating on said plunger to yieldingly control its movement and prevent excessive acceleration of the plunger and head.

5. In a machine for applying closures to bottles, a gravitating plunger, a closure affixing head in which said plunger is adapted to develop force sufficient to affix closures to the bottles, and means interposed in the path of the plunger, receding to permit gravitation of the plunger without excessive acceleration thereof.

6. In a machine for applying closures to bottles, a gravitating plunger, means for elevating the plunger constructed to release the plunger to the force of gravity, and means entering the path of the plunger to resist excessive acceleration of the plunger, but moving to permit gravitation thereof at a predetermined speed.

7. In a bottle closure machine, a gravitating plunger having a range of movement which adapts it to impose closure affixing pressure at different heights when bottles of different lengths are presented and a controlling means interposed in the path of a part moving with the plunger, resisting free gravitation of the plunger but receding in advance of the part engaged, at a predetermined rate and thereby preventing excessive acceleration of the plunger resulting from presentation of a short bottle to the capping device.

8. In a bottle closure machine having a closure affixing device, the length of affixing stroke of which is determined by the length of the bottle to be closed; a gravitating plunger carrying the affixing device and adapted to develop therein force sufficient to affix closures to the bottles, and a means for elevating the plunger, constructed to release the plunger to the force of gravity and to thereafter remain in the path of a part moving with the plunger but receding therefrom at a predetermined rate, which permits continued gravitation of the plunger without excessive acceleration thereof.

9. In a closure affixing machine having an affixing device which encounters caps at different elevations according to the length of the bottle presented for closure, a gravitating plunger, driving the affixing device and adapted to develop therein force sufficient to

affix the caps on the bottles, and a rotary member adapted to elevate the plunger and also receding in the path of the plunger to permit the latter to gravitate at a rate of speed which prevents excessive acceleration of the plunger.

10. In a bottle capping machine, the combination of a capping device, a gravitating energizer for said capping device, a cam for moving said energizer in opposition to gravitation, adapted to release it at the end of said movement and a pawl carried by the cam and adapted to resist gravitation of the energizer during the capping operation.

11. In a bottle capping machine, the combination of a capping device, a gravitating energizer for actuating said capping device, a cam for lifting said energizer, a rack connected with said energizer, a pinion engaging said rack, a pawl engaging said pinion in the direction to resist rotation of the pinion imposed by the weight of the energizer and a cam carrying said pawl and having connection through which it intermittently moves the energizer in opposition to gravitation.

The foregoing specification signed at Indianapolis Indiana this thirteenth day of May, 1909.

JOHN ARMSTRONG McANULTY.

In presence of—
MARY LA RUE,
LENA L. GOODSPEED.