

July 29, 1924.

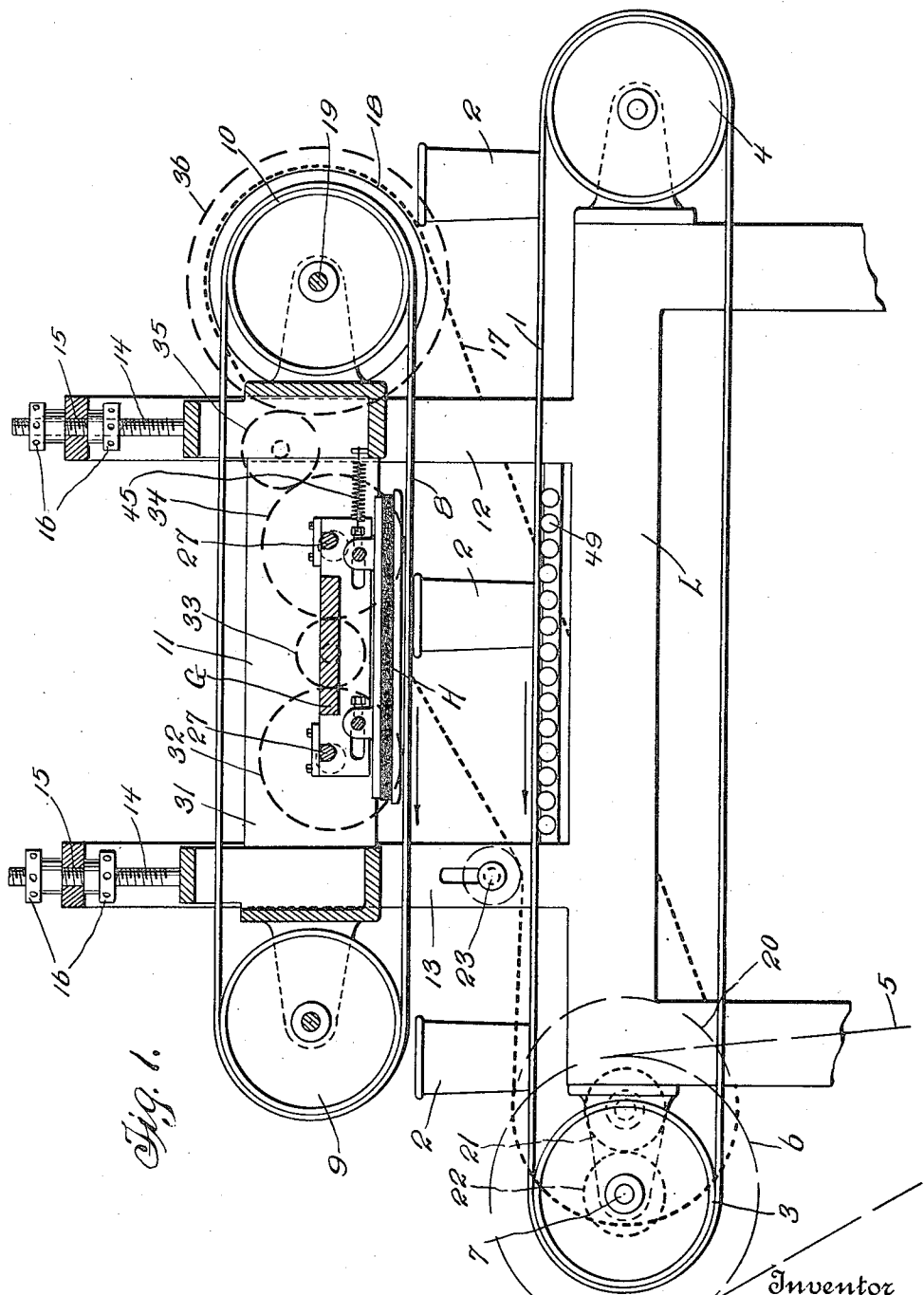
F. M. DALRYMPLE

1,503,034

CAPPING MACHINE

Filed Feb. 4, 1921

2 Sheets-Sheet 1



Inventor
Frank M. Dalrymple
By his Attorney
A. Sanford Hand

July 29, 1924.

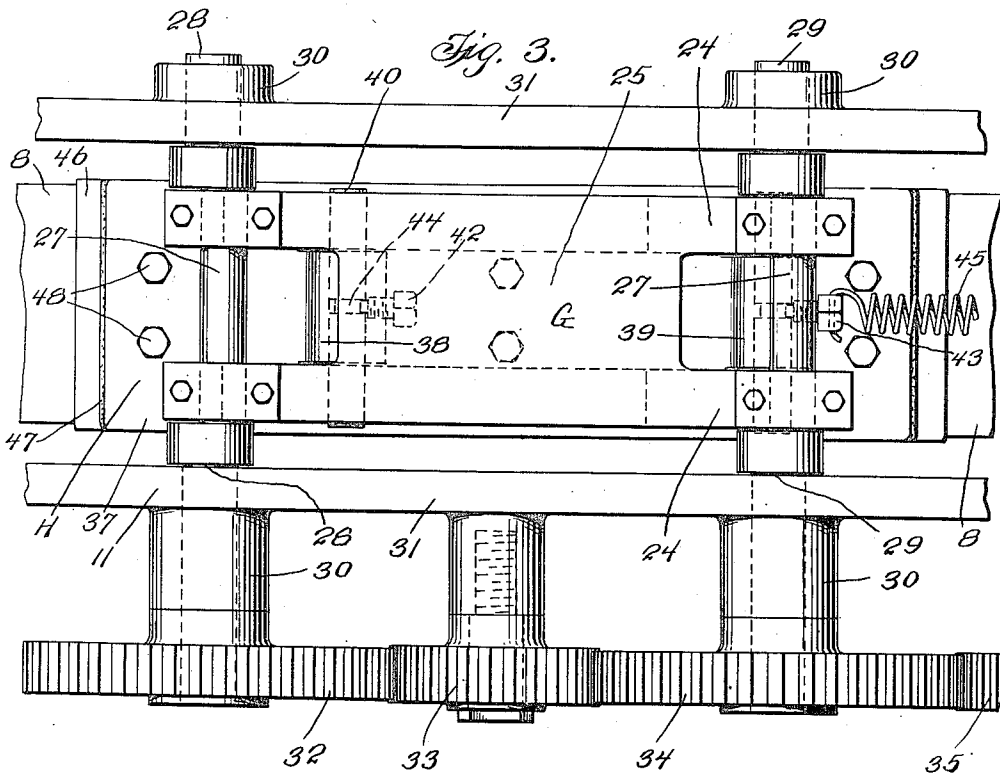
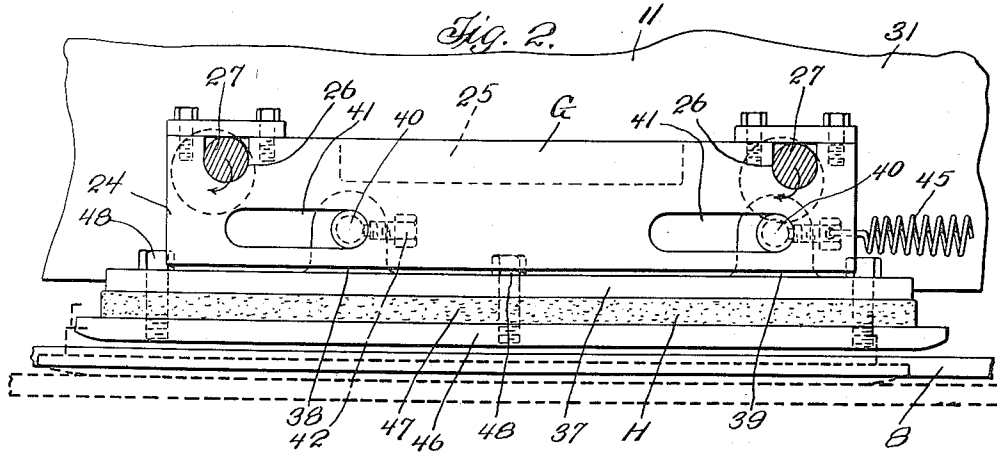
F. M. DALRYMPLE

1,503,034

CAPPING MACHINE

Filed Feb. 4, 1921

2 Sheets-Sheet 2



Inventor
F. M. Dalrymple
 By his Attorney
L. Sanford Hand

UNITED STATES PATENT OFFICE.

FRANK M. DALRYMPLE, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE CLOSURE SERVICE COMPANY, A CORPORATION OF OHIO.

CAPPING MACHINE.

Application filed February 4, 1921. Serial No. 442,392.

To all whom it may concern:

Be it known that I, FRANK M. DALRYMPLE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Capping Machines, of which the following is a specification.

This invention relates to a capping machine, and particularly to a machine designed for the application of closures to receptacles where a straight downward pressure of the closure over the open end of the receptacle is required to seal the receptacle.

Altho the mechanism here shown is capable of successfully applying closures of various different types, as will be readily apparent, yet it is principally designed for the successful application of such closures as appear in the pending applications of Leslie R. N. Carvalho, Serial No. 300,462, filed May 28, 1919; Serial No. 367,061, filed March 19, 1920; Serial No. 413,649, filed Sept. 29, 1920, and Serial No. 442,393, filed Oct. 21, 1921.

A further object of the invention is to provide a capping machine which will successfully press down the closures on to the receptacles while the receptacles continue to move laterally at a uniform speed, thus rendering the machine capable of rapidly applying closures without necessity for a step by step movement of the receptacles.

A further and more detailed object is to provide a conveyer device adapted for receiving and conveying the receptacles at a uniform speed, the closures having been previously laid in position upon the receptacles, and to provide a plunger device so arranged and connected as to move with the conveyer device while at the same time applying sealing pressure against the closures.

A further object is to arrange the parts of this device so that they will be capable of operating upon receptacles of varying sizes and proportions.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles, constituting the invention, and

the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown merely a preferred form of embodiment of the invention:—

Figure 1 is a vertical longitudinal sectional view thru a machine constructed in accordance with this invention, portions of the machine being shown diagrammatically for the sake of clearness.

Figure 2 is an enlarged side elevational detail view of the plunger device employed, and

Figure 3 is a top plan view of the structure seen in Fig. 2.

Referring to the drawings for describing in detail the structure which is illustrated therein, the reference character L indicates a main frame upon which is mounted a conveyer 1 for carrying the receptacles 2 to be sealed.

The conveyer may take any appropriate form but for illustration and convenience is shown to consist of an endless belt passing over spaced rollers 3 and 4, one of said rollers, as 3, being driven as by means of a drive belt, or the like, 5, engaging about a pulley 6 which is mounted upon the same shaft, as 7, which carries said roller 3.

The upper lead of the belt is adapted to receive the receptacles 2 upon its upper surface and to carry said receptacles along, in the direction of the arrow, from the roller 4 to the roller 3.

Any suitable, or desired, feed and delivery mechanism may be employed in connection with the conveyer 1 for feeding the receptacles thereonto adjacent the roller 4, and for receiving the receptacles therefrom at the roller 3.

Supported above the conveyer 1 is an auxiliary conveyer 8 adapted to engage the upper ends of the receptacles and to move in the same direction and at the same speed as the conveyer 1. This conveyer 8 preferably also takes the form of an endless belt and travels about a pair of spaced rollers, as 9 and 10.

The rollers 9 and 10 are mounted at opposite ends of a carrying frame 11 which is vertically adjustably supported upon a pair of standards 12 and 13 formed as parts of the main frame L.

The vertical adjustment of the frame 11 may be accomplished in any suitable manner, but, for convenience, is shown to consist of screw elements 14 connected with said frame and extending upwardly therefrom thru apertures 15 formed in the top portions of the standards 12 and 13, suitable adjusting nuts, as 16, being provided for holding the frame in any position of adjustment to which it may be moved.

The roller 10 is driven preferably from the shaft 7 by means of a flexible chain, or belt, 17, which engages, at one end, about a pulley 18 carried by the same shaft, as 19, which carries the roller 10, and which engages, at its opposite end, about a pulley 20 which is connected by gears 21 and 22 with the shaft 7, said gears 21 and 22 being provided for reversing the direction of movement of belt 17 so as thereby to move the conveyer element 8 in the same direction as the conveyer element 1, as will be readily understood.

A suitable tension device, as 23, may be provided for adjusting the tension of belt 17 after each vertical adjustment of the frame 11.

The plunger device, illustrated in detail in Figs. 2 and 3, is carried by, and bodily movable with, the frame 11. It consists of a main body element G and a pressure element H. The body element G consists of a pair of side members 24 spaced apart and connected together by a connecting plate 25, said parts being preferably cast integral.

At their opposite ends the side members 24 are formed with bearings 26 within which engage supporting and operating shafts 27, which shafts are eccentrically connected with drive shafts 28 and 29 respectively.

The shafts 28 and 29 are mounted in suitable bearings 30 formed in the side members 31 of the frame 11. These shafts are to be synchronously rotated and altho any suitable connections may be provided for accomplishing this result, the drawing herewith illustrates the shaft 28 to be fitted with a gear 32 which meshes with the teeth of a gear 33 which in turn meshes with the teeth of a gear 34 carried by shaft 29. The gear 34 meshes with the teeth of a gear 35 which, in turn, meshes with the gear 36 carried upon, and driven by, the shaft 19. The gears 33 and 35 serve as intermediaries simply for the purpose of completing the connections and providing proper direction of rotation for gears 32 and 34.

It will be apparent that by these means the body element G will be caused to move continually with a circular motion about the centers of shafts 28 and 29, as indicated by the arrows in Fig. 2, the motion being steady and uniform thruout the period of operation of the machine.

The pressure element H consists of a carrying plate 37 occupying a position just below the body element G. A pair of lugs 38 and 39 project upwardly therefrom in the space between the side members 24 of the body element, and these lugs carry cross shafts 40 which extend from opposite ends of the lugs into sliding engagement within slots 41 provided to receive them in the side members 24.

The shafts 40 are freely rotatable both within the lugs 38 and within the slots 41, but are held against longitudinal displacement by means of set screws, or the like, as 42 and 43, carried by said lugs and engaging within annular grooves 44 formed in the shafts.

A suitable tension spring, as 45, is provided for urging the plate 37 at all times to position with the shafts 40 in the right hand ends of slots 41, as indicated in Fig. 2. This spring 45 may be connected in any suitable manner, but preferably has one of its ends engaging within a suitable aperture formed thru the head of the screw 43, the opposite end of the spring being connected with a portion of the frame 11, as seen in Fig. 1.

A pressure plate 46 is arranged beneath the carrying plate 37 and between these two plates is positioned a cushion member 47. Suitable screws, or the like, as 48, may be provided for holding the plates and cushion member assembled, said screws being preferably rigidly connected with the plate 46 and being extended loosely thru apertures in the cushion member and plate 37.

The parts are arranged so that the plate 46 is adapted to stand at, or just above, the upper surface of the auxiliary conveyer 8, substantially as indicated in Figs. 1 and 2.

This pressure element H moves with the body member G at all times except when a closure is being applied to a receptacle, and the operation of the device is as follows:—

As the receptacles, with closure elements resting upon their upper ends, are received on to the conveyer 1 at the right hand end of Fig. 1, they are moved forwardly by said conveyer, at a steady and uniform rate of speed. Meanwhile, the plunger device is pressing down the conveyer element 8 at regular intervals. As the receptacle reaches a position beneath the plunger device the next succeeding downward movement of the plunger device presses the conveyer 8 downwardly against the closure element and operates to force the closure element downwardly to sealing position upon the receptacle.

Both of the conveyers 1 and 8 continue their uniform forward movement even during the time of pressure, and after the operation is completed they deliver the sealed receptacle at the left hand end of the machine.

It will be observed that during the time of pressure referred to the plunger device was moving forwardly in the same general direction as the travel of the conveyers. At the moment when the pressure began to be applied the plate 46 of the pressure element H, by its frictional engagement with the upper surface of the conveyer 8, began to move forwardly with said conveyer. The forward movement of the pressure element continued until such time as the eccentric shafts 27 had rotated to a point lifting the pressure element again away from the conveyer. The forward motion of the conveyer was slightly faster than the forward motion of the body element G, and this difference in speed was compensated for by movement of the shafts 40 of the pressure element along slots 41. The provision for relative movement as between the pressure element H and the body element G was devised to permit unobstructed uniform speed travel of the pressure element with the conveyer 8, notwithstanding the continually changing speed of forward movement of the body element G.

As soon as the shafts 27 had rotated to lift the pressure element sufficiently to release the frictional grip of the pressure element against the conveyer, then the spring 45 immediately operated to return the pressure element to the right hand ends of the slots 41 preparatory to being brought again into engagement with the conveyer with the next rotation of the shafts 27.

Any suitable means, as for instance the anti-friction roller platform device 49, may be provided beneath the conveyer 1 for enabling said conveyer to properly sustain the pressure of the plunger device while yet permitting unobstructed forward movement of the conveyer.

The purpose of the cushion member 47 is to enable the mechanism, by a single adjustment of the frame 11, to successfully operate upon receptacles of slightly varying heights, it being apparent that this cushion element, while capable of transmitting sufficient pressure to successfully drive the receptacle closure to sealing position, is, at the same time, capable of yielding to a desirable extent in the event that a given receptacle is a trifle taller than others passing thru the machine during the same adjustment of frame 11.

Here it may be pointed out that, if desired, the conveyers 1 and 8 may be of suitable resilient material, such as a rubber composition, or the like, so that they also may be depended upon as cushion elements serving the same purpose as the cushion 47.

While it is ordinarily sufficient to have the plunger device move downwardly to sealing position against a receptacle only a single time, yet it will be apparent that, if desired, either the speed of travel of the

conveyers or the length of the plunger device, may be so altered as to cause the plunger device to move to sealing position for any desired number of times against a single receptacle during passage of the receptacle thru the machine to thus more surely effect proper closure of the receptacle.

It will also be apparent that, if desired, more than one receptacle may be operated upon at each downward movement of the plunger device, and, in this connection, it is pointed out that the capacity of the machine is exceedingly elastic. Receptacles may be fed into the machine as close together as desired. Due to the uniform rate of travel of the conveyers, and the consequent lack of any step by step, or halting, movement of the receptacles at any time the receptacles may be placed as close together as possible and all will receive the same treatment without likelihood of any spilling, or slopping over, of the receptacles' contents.

As many changes could be made in this construction without departing from the scope of the invention as defined in the following claims, it is intended that all matter contained in the above description, or shown in the accompanying drawings, shall be interpreted as illustrative only and not in a limiting sense.

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

1. A receptacle capping machine comprising a conveyer adapted to transport receptacles at a uniform rate of travel, and a plunger device supported above said conveyer movable toward and away from the conveyer for forcing closure elements on to the passing receptacles, said plunger device comprising a body element movable toward and away from said conveyer and a pressure element slidably connected with the body element to move with the receptacle during the pressure period.

2. A receptacle capping machine comprising receptacle supporting means, a plunger, a pair of operating shafts for the plunger, said shafts being spaced apart horizontally and each having an eccentric portion, the plunger comprising a body part extending between and being connected to the eccentric portions of said shafts, means for rotating said shafts synchronously to thereby move said body part vertically into different parallel horizontal planes, and the plunger also comprising a pressure element connected with the body part to move horizontally thereof.

3. A receptacle capping machine comprising receptacle supporting means, a plunger, a pair of operating shafts for the plunger, said shafts being spaced apart horizontally and each having an eccentric portion, the plunger comprising a body part extending

between and being connected to the eccentric portions of the shafts, means for rotating said shafts synchronously to thereby move said body part vertically into different parallel horizontal planes, said body part having horizontally extending slots formed therein, and said plunger also comprising a pressure element having portions slidably engaging within said slots to thereby permit movement of the pressure element horizontally with respect to said body part.

4. A receptacle capping machine comprising a conveyer adapted to transport receptacles at a uniform rate of travel, and a plunger device supported above said conveyer movable toward and away from the conveyer for forcing closure elements on to the passing receptacles, said plunger device comprising a body element movable toward and away from said conveyer and a pressure element slidably connected with the body element to move with the receptacle during the pressure period, and said pressure element comprising as a part thereof a cushion member adapted to absorb a portion of the pressure and to thereby permit free movement of the body element irrespective of variations in the height of different receptacles.

5. A receptacle capping machine comprising a pair of conveying belts having adjacent leads spaced apart and adapted to travel in a common direction by and between which leads the receptacle moves, and a mechanically operating plunger device arranged to periodically press against one of said leads to thereby produce a squeezing action upon a receptacle held between said leads.

6. A receptacle capping machine comprising a pair of conveying belts having adjacent leads spaced apart and adapted to travel in a common direction by and between which leads the receptacle moves, and a mechanically operating plunger device arranged to periodically press against one of said leads to thereby produce a squeezing action upon a receptacle held between said

leads, together with means whereby the portion of said plunger device directly engaging the mentioned lead is adapted to travel therewith during the period of pressure.

7. A receptacle capping machine comprising a pair of conveying belts having adjacent leads spaced apart and adapted to travel in a common direction by and between which leads the receptacle moves, a mechanically operating plunger device arranged to periodically press against one of said leads to thereby produce a squeezing action upon a receptacle held between said leads, the plunger device comprising a member for engaging said mentioned lead adapted to travel with said lead during the period of pressure, and spring means to return said member to its normal position following the period of pressure.

8. In a receptacle capping machine, the combination with receptacle supporting means for supporting and transporting the receptacles during the capping operation, of a plunger adapted to apply pressure upon a receptacle supported and carried by said supporting means, means to move the plunger toward and away from the supporting means, said means being adapted also to move the plunger in the direction of movement of the receptacle during the period of pressure, and a pressure element slidably connected with the plunger to move laterally with the supporting means during the pressure period.

9. A receptacle capping machine comprising a pair of endless conveying belts having opposite leads spaced apart by and between which the receptacle moves, and independent supporting means for opposite end portions of one of said conveying belts whereby said end portions are independently vertically adjustable.

In testimony whereof I affix my signature in the presence of two witnesses.

FRANK M. DALRYMPLE.

Witnesses:

L. GESSFORD HANDY,
LESLIE R. N. CARVALHO.