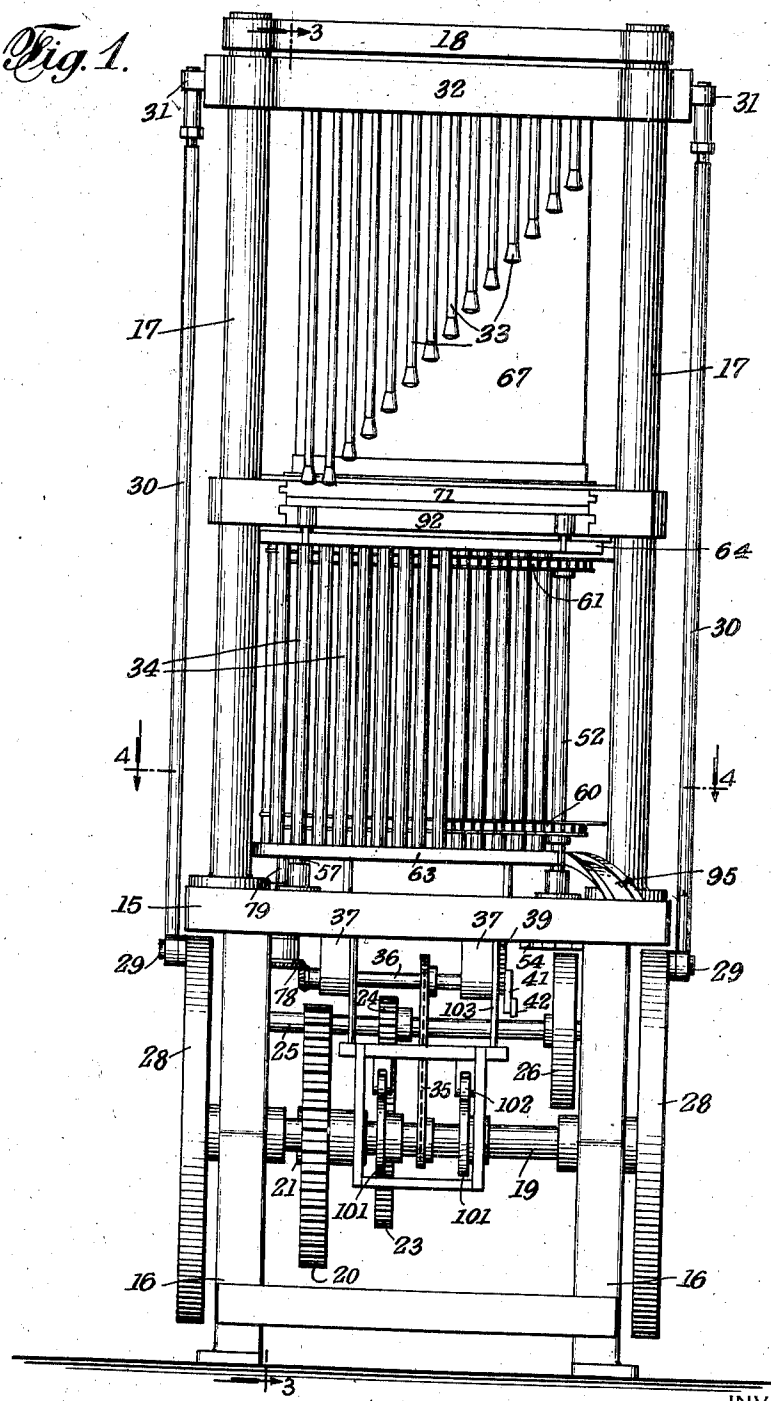
Feb. 20, 1940. J. M. BINDER 2,190,859

CORK ROD FORMING MACHINE AND THE LIKE

Filed Aug. 30, 1935 4 Sheets-Sheet 1

Fig. 1.



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Filed Aug. 30, 1935 4 Sheets-Sheet 2

Fig. 2.

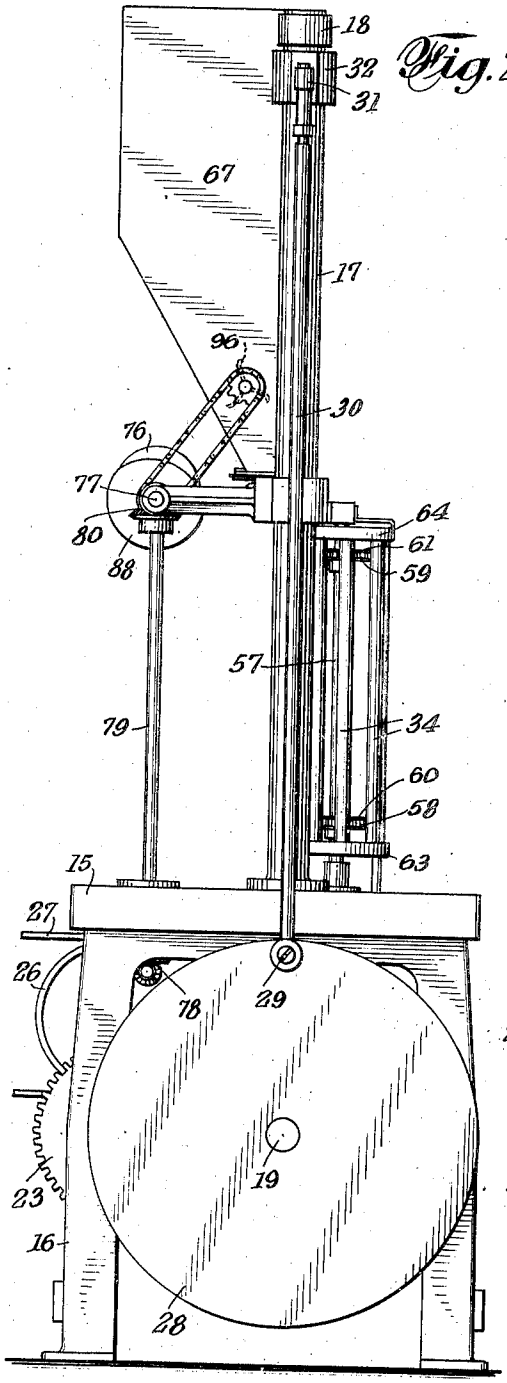
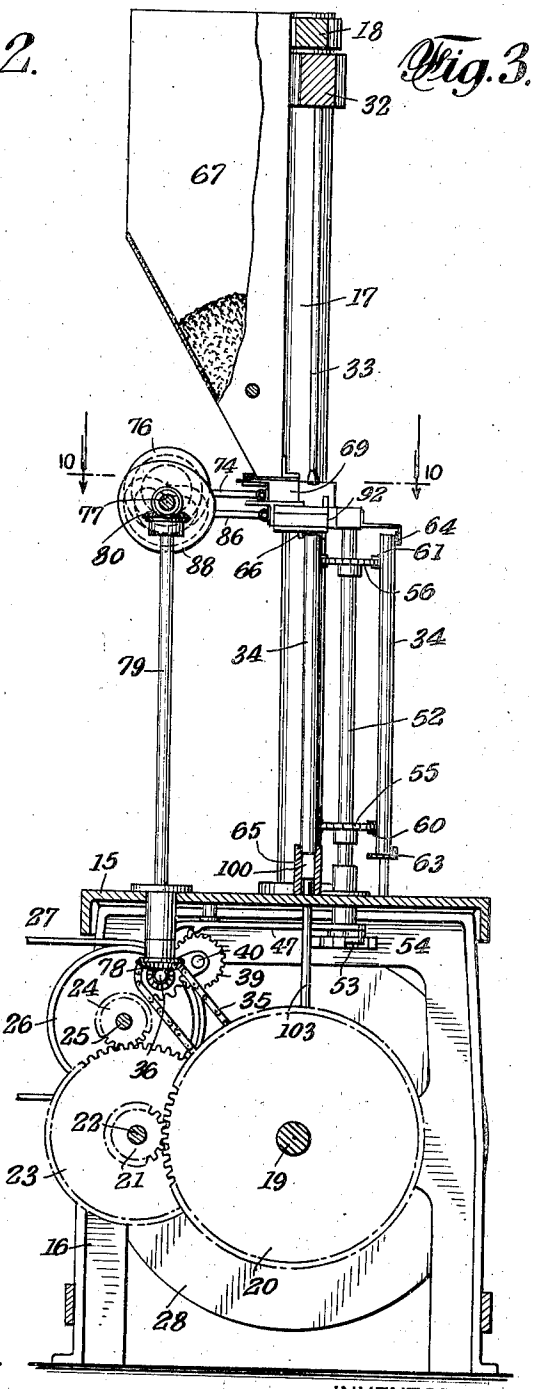


Fig. 3.



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Fig. 4.

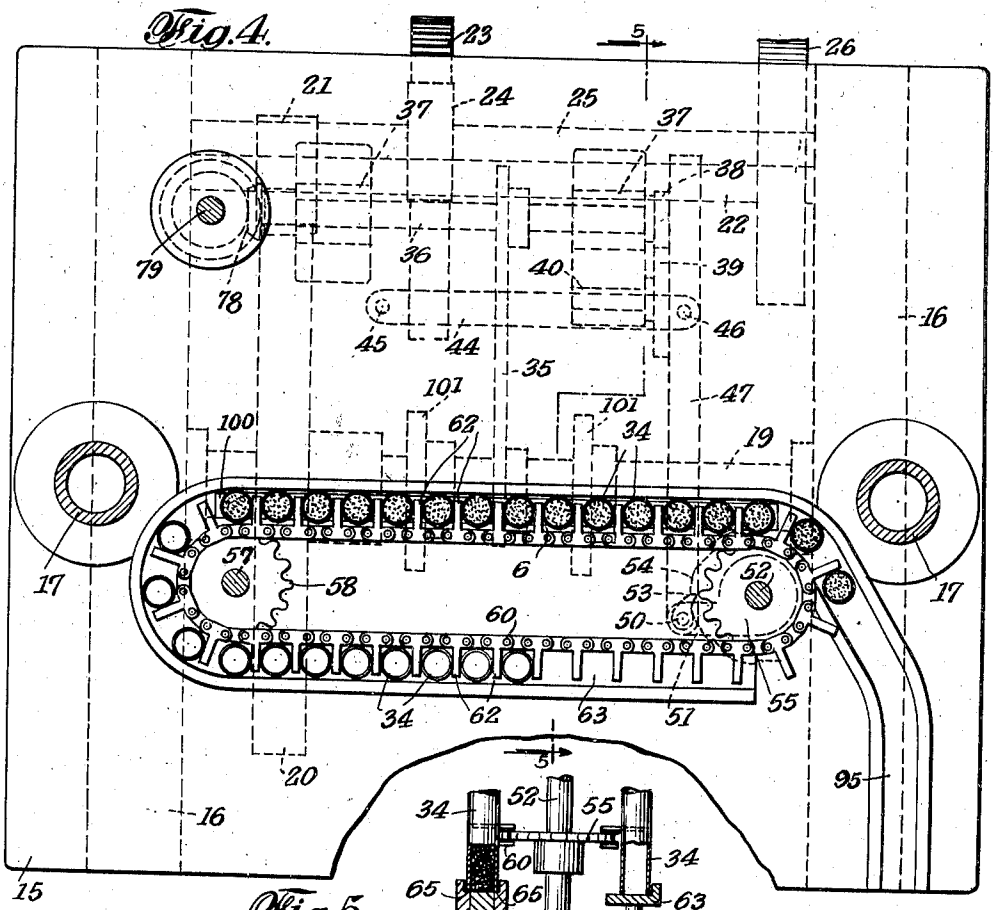
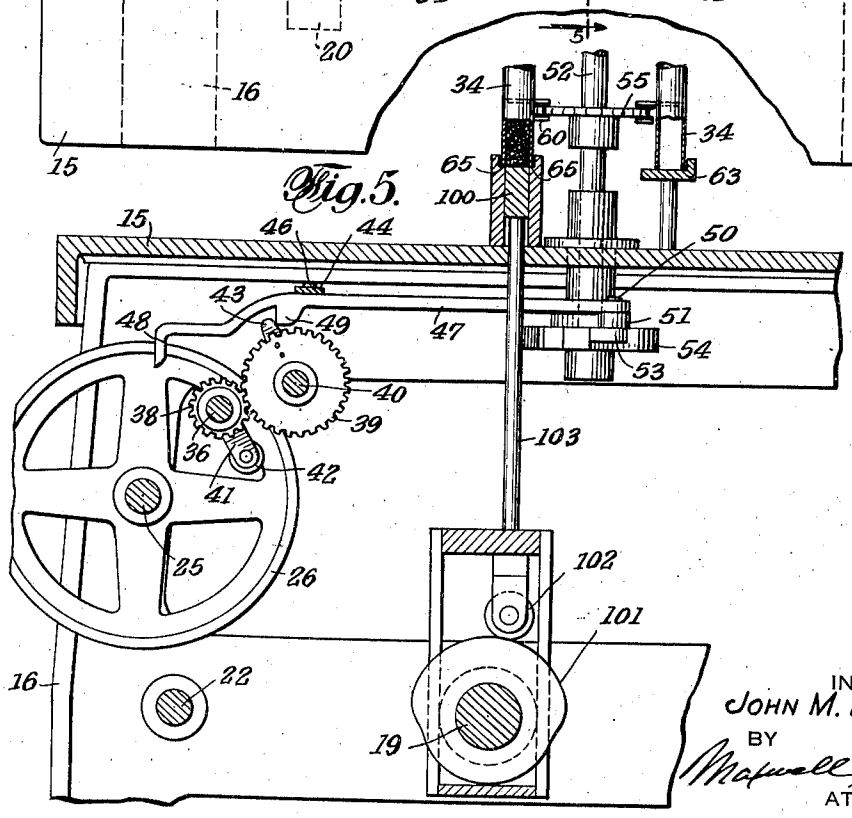


Fig. 5.



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Fig. 6.

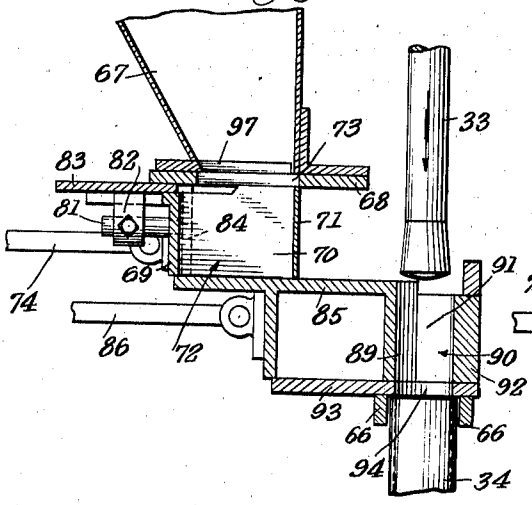


Fig. 8.

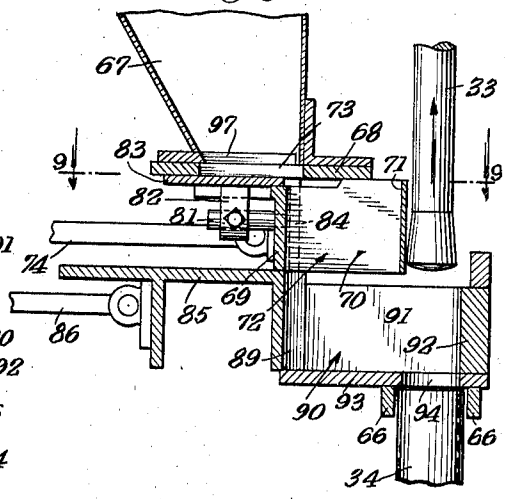


Fig. 7.

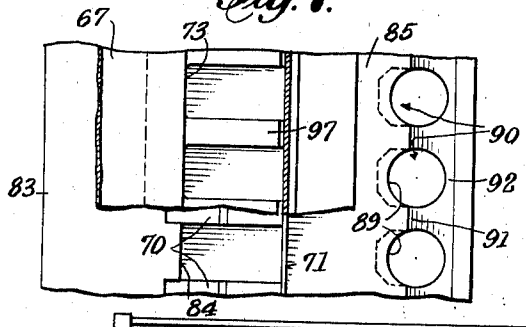


Fig. 9.

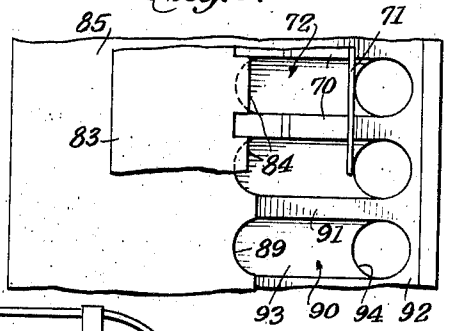
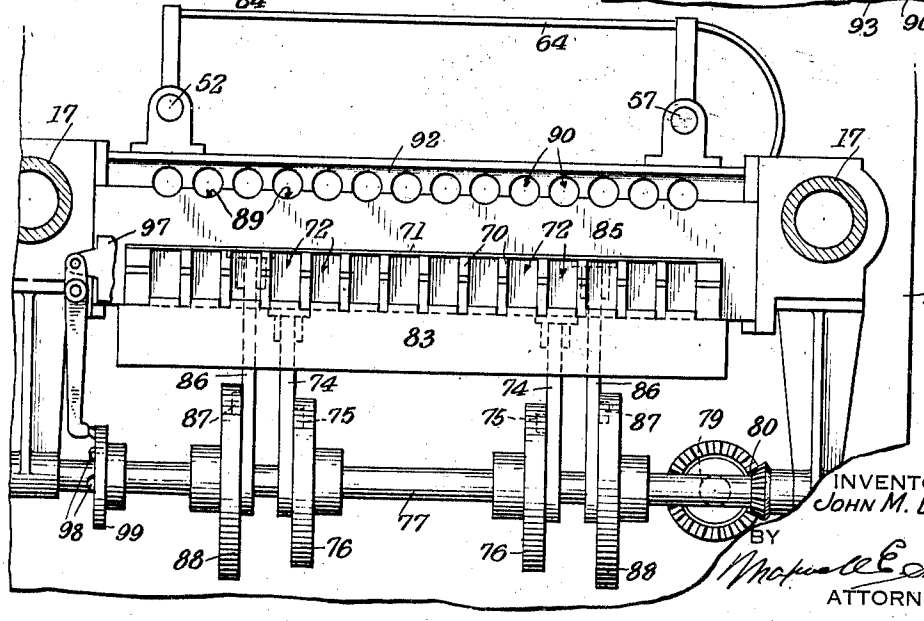


Fig. 10.



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UNITED STATES PATENT OFFICE

2,190,859

CORK ROD FORMING MACHINE AND THE LIKE

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Application August 30, 1935, Serial No. 38,540

10 Claims. (Cl. 18—5)

This invention relates to machines for forming rods of tightly packed granulated cork mixed with suitable binder, said rods being adapted to be sliced into discs for use as liners for bottle crown caps and for other purposes.

The invention contemplates the provision of a simple, rapid mechanism for compressing into tubes a mixture of granulated cork and binder, said tubes being moved intermittently in relation to charging plungers of progressively diminishing length and after at least two charging strokes of the plungers.

The invention further contemplates the provision of mechanism for forming a cylinder of cork of uniform compactness throughout its length and diameter.

The invention further contemplates the provision of improved means for moving granulated cork from the hopper to a position where the plungers act to charge and compress said cork into the tubes.

The invention also contemplates the provision of means for obviating the tendency of a filled tube, through expansion of the cork therein, binding in the mechanism and thereby impairing the efficiency and smooth operation of the machine.

The foregoing primary features and objects of the invention and other corollary features are realized in the preferred embodiment of the machine herein disclosed the same being set forth in the following detailed specification which is based on the accompanying drawings.

In the drawings:

Fig. 1 is a front elevational view of a machine incorporating the features of the invention.

Fig. 2 is a side view thereof.

Fig. 3 is a vertical sectional view as taken along the line 3—3 of Figure 1.

Fig. 4 is an enlarged plan sectional view as taken along the line 4—4 of Figure 1.

Fig. 5 is a broken vertical sectional view on the line 5—5 of Figure 4.

Figs. 6 and 7 are respectively vertical sectional detail and fragmentary plan views of the means for transferring granulated cork from the hopper to the charging position.

Figs. 8 and 9 are respectively similar views with the parts in another position, Figure 9 being a section on line 9—9 of Figure 8.

Fig. 10 is a broken enlarged plan sectional view on the line 10—10 of Figure 3.

The machine generally comprises a table 15 supported upon legs 16, and rigid upright posts 17 supported on the table and provided with a cross tie 18 between the upper ends thereof. In this manner there is provided a rigid frame for supporting the moving mechanism of the machine.

Beneath the table and journalled in the legs 16 there is preferably provided a main shaft 19 having a gear 20 in mesh with a pinion 21 on the shaft 22. The shaft 22 is provided with a gear 23 in mesh with a pinion 24 on the shaft 25, and on this shaft there is provided means such as the pulley 26 to which rotary motion may be imparted as by means of the belt 27. In this manner, and by employing proper gearing ratios among the mentioned gears, a uniform rotation at a desired speed is imparted to the shaft 19.

The shaft 19 is preferably extended beyond the legs 16 and these extensions serve to mount large discs 28. Adjacent the periphery of each of these discs there is connected, as at 29, one end of a pitman rod 30, the other end of which is pivotally connected, as at 31, to a cross-head 32 slidably engaged on the posts 17. The cross-head 32 serves to rigidly support a plurality of equally spaced cork charging plungers 33. These plungers are preferably of successively shorter length from left to right as viewed from the front of the machine. Since it is apparent that the discs 28 act as cranks, their rotation imparts a reciprocatory movement to the cross-head and hence to the plungers.

The tubes into which the granulated cork is to be packed are shown at 34 and move intermittently from right to left, then in an arc, and then from left to right in registering alignment with the plungers 33. These tubes are moved and guided by the following mechanism.

The shaft 19 is provided with a one to one drive connection, such as the chain 35, with a countershaft 36 journalled at 37 beneath the table 15. The shaft 36 is provided with a gear 38 meshing with a gear 39 of twice the size on the shaft 40 which is mounted in one of the journals 37. Fixed either to the shaft 36 or to the gear 38, there is preferably provided an arm 41 which may have a roller 42 on its end. The gear 39 or its shaft 40 may be similarly provided with an arm 43.

A link 44 may be pivoted at 45 to the under surface of the table and the free end of said link is preferably pivotally connected as at 46 to an intermediate portion of a lever 47 provided with a lug 48 for engagement by the roller 42 and a similar lug 49 for engagement by the arm 43. These lugs are preferably provided at or adjacent the pivot point 46.

The other end of the lever 47 is preferably piv-

otally connected at 50 to an arm 51 rotatably mounted on a vertical shaft 52. The end of the arm 51 supports a pawl 53 engaged with a ratchet wheel 54 fixed to the shaft 52.

The portion of the shaft 52 which projects above the table 15 is provided with a pair of spaced sprocket wheels respectively 55 and 56, and in spaced relation with the shaft 52 there is provided an idler shaft 57 having the respectively spaced sprockets 58 and 59. About the sprockets 55 and 58 is trained a chain 60 and in a similar manner a chain 61 is trained about the sprockets 56 and 59. Both chains 60 and 61 are provided with outstanding fingers 62. The adjacent fingers are spaced for the reception of the tubes 34, the front bank, i. e., those which move towards the left being supported in the ledge 63 and guided by the rail 64, and the rear bank, those moving towards the right, being supported on the ledges 65 and guided between the rails 66.

It will be remembered that each revolution of the shaft 19 causes one complete reciprocation of the cross-head 32 and hence of the plungers 33. The mechanism above described is designed to move the tubes 34 intermittently at each two complete reciprocations of the plungers 34 as follows:

The shafts 19 and 36 being of the same speed due to the chain connection 35, the arm 41 on the shaft 36 will make one revolution with each complete reciprocation of the plungers, and therefore, will move the lever 47 towards the left (Figure 5) when it engages the projection 48 on said lever. Since the shaft 40 rotates only one-half of a revolution during each full revolution of the shaft 36, due to the one to two gearing between these shafts, the arm 43 will engage to move the lever 47 towards the right only after two complete revolutions of the arm 41. It follows then that the ratchet wheel 54 will be advanced once for each two reciprocations of the plunger and hence the tubes 34 will be similarly moved.

Of course, if it is desired to move the tubes only after three or more reciprocations of the plungers, this may be readily accomplished by the provision of suitable gearing between the shafts 36 and 40. It should be understood, however, that the movement of the tubes occurs only when the plungers are raised and the mechanism is timed to accomplish this.

Granulated cork is supplied for charging the tubes as follows:

A hopper 67 is positioned in the upper part of the frame, its bottom terminating in a throat plate 68. Below this plate and slidable from front to back there is positioned a feed regulator 69 having a plurality of tines 70 spaced alternately with the plungers 33. The ends of the tines are closed by a plate 71 to form pockets 72. These pockets are movable from a position in register with the opening 73 in the throat plate (Figure 6) to a position out of register therewith (Figure 8).

The above movement is accomplished through the medium of connections 74 having rollers 75 engageable with suitable cams 76 on the shaft 77 which is driven from the shaft 36 by the gearing 78, vertical shaft 79, and gear 80, or by chain and sprocket means if desired.

The feed regulator 69 may be accurately adjusted in its positions by means of the pins 81 engaged in sockets 82 which are carried by a member 83 having portions 84 adjustably movable in the pockets 72.

Immediately beneath the feed regulator there is preferably positioned a carrier or pusher 85 which is moved in a manner similar to the feed regulator by connectors 86 having rollers 87 engaged with the cams 88 on the shaft 77. The front of the carrier or pusher is provided with spaced concave portions 89 movable in slots 90 formed between the tines 91 of a cork holder 92 rigidly supported between the posts 17. Slots 90 have arcuate walls of the same radius as the concavities of portions 89 so that when the pusher 85 is in the position shown in Figs. 6 and 7, slots 90 become cylindrical bores or chambers.

The bottom of the holder 92 is provided with a fixed plate 93 provided with openings 94 in register with the plungers 33 and the top ends of the rear bank of tubes 34.

From the above it can be seen that the cork which falls into the pockets 72 of feed regulator 69 from the hopper is first moved towards the right, the top plate 83 of the feed regulator during the latter's movement closing off the flow of cork from the hopper. Then as the carrier or pusher is moved towards the left, the cork in the pockets will fall into the holder. The feed regulator will then return for another charge of cork and the carrier will then move towards the right to push the cork in the holder slots towards the openings 94 so the cork may fall into the registering bank of tubes. It is then that the plungers move down to compress and pack the cork in said tubes.

The timed relation between feed regulator 69 having the pockets 72, and the slide or pusher 85 is such that when the feed regulator reaches its extreme advanced position the pusher simultaneously reaches its extreme retracted position as clearly indicated in Fig. 8. At this time the charge of granulated cork which has been fed from the hopper 67 to the pockets 72 will have been completely discharged into slots 90 of holder 92. As shown in Fig. 6 when feed regulator 69 is in its extreme retracted position pusher 85 is in its extreme advanced position. In this relative position a charge of material is being fed into each pocket 72 from hopper 67 and the complete charge of the material which has been discharged into holder 92 from pockets 72 has been carried or pushed by pusher 85 into the moulding or forming tubes 34, and during this act the cork has been partially compressed by the gradual shortening of the holder by the advancing pusher. Introducing feed regulator 69 between hopper 67 and holder 92 considerably facilitates the feeding of the material from the hopper to forming tubes, which is of utmost importance in a device of the character described herein. It affords a greater uniformity in distribution of the material during the formative stage as a complete, measured and predetermined charge is received first in each pocket 72 before passing on to be ultimately received in the molding tube to be compressed by the piston or plunger 33. The timing is so arranged that the pushers are simultaneously held in their extreme advanced positions (Fig. 6) until plungers 33 have made their respective maximum advance into molding tubes 34. As the plungers retract the pushers correspondingly retract and on the return the pushers reach their extreme advanced positions before the plungers 33 commence to enter the cylindrical chamber formed by the pushers or slides 89 and holders 92.

This cycle of operation is performed at least

twice and then the tubes are moved as previously described.

Since the plungers are of progressively shorter length in the direction of the movement of the tubes as they are filled, the leftmost tube will receive a small charge of cork which will be compressed by the leftmost plungers. As the leftmost tubes progress towards the right, they receive further charges of cork which are compressed by the shorter plungers until the tubes are finally filled with tightly packed granulated cork and the filled tubes leave the machine by way of the tracks 95. The machine attendant inserts empty tubes in the front bank as the machine continues its cycles of operation.

In order to insure proper flow of cork from the hopper, agitators such as 96 driven from the shaft 77 may be employed and in addition a shaker plate 97 may be joggled across the hopper throat as by means of the bumps 98 on the disc 99 carried by said shaft.

Although tightly packed in the tubes 34, the cork therein expands to a certain degree. This expansion can only manifest itself by a protrusion of the cork from the ends of the tube. This causes a filled tube to become wedged between the bottom of the plate 93 and its supporting rail. To obviate this undesirable fault, the tubes in the filling position are supported only on opposite edges on the ledges 95 and a bar 100 is positioned flush with the ledges when the plungers are compacting the cork and is moved down out of touch with the cork in the tubes when the tubes are being moved. This is accomplished as by cam means 101 on the shaft 19, acting on rollers 102 on extensions 103 connected to the bar 100.

As can be seen from the foregoing a machine has been provided which is considerably simpler than any mechanism heretofore constructed for the purpose, it is also apparent that various modifications may be made in the structure and arrangement in the herein-disclosed elements. The scope of the following claims, therefore, should rather be determined in view of the prior art and not on the present specific embodiment of the machine.

It is believed from the above description that those skilled in the art will have no difficulty in understanding the construction, the method of use and operation of the device herein disclosed and a detailed discussion thereof is unnecessary. The invention is of simple and practical construction and is adapted to accomplish among others all of the objects and advantages herein set forth.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features, that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

I claim:

1. In a machine of the class described, a plurality of vertically arranged plungers, a plurality of tubes in vertical alignment with said plungers, means for intermittently moving said tubes in relation to said plungers, means for supporting said tubes, means for causing said plungers to enter said tubes successively to compress material within the tubes, means for supporting the material at the lower ends of the tubes when the plungers are in the tubes, and means for removing said material supporting means during the mentioned movement of the tubes.

2. In a machine of the class described, a frame comprising a table having a pair of spaced rigid upright members, a cross-head movable on said members, crank means, means connecting said cross-head and crank means outside said upright members, a plurality of plungers on said cross-head, an intermittently moving tube adapted to be successively entered by said plungers for compressing material therein, and means for moving said tube once for at least two movements of a plunger in the tube.

3. In a machine of the class described, an intermittently moving tube adapted to be charged with compressed material, means to support said tube on opposite portions of the bottom thereof, a member adapted to contact the remainder of said tube bottom during the charging of the tube, and means for moving said member away from the bottom of the tube during the movement thereof.

4. In a machine of the class described, an intermittently moving tube adapted to be charged with compressed material, means to support said tube on opposite portions of the bottom thereof, a member adapted to contact the remainder of said tube bottom during the charging of the tube, and means comprising a cam operated reciprocatory frame for moving said member away from the bottom of the tube during the movement thereof.

5. In a machine of the class described, an intermittently moving tube adapted to be charged with compressed material, means to support said tube on opposite portions of the bottom thereof, a member adapted to contact the remainder of said tube bottom during the charging of the tube, and means for moving said member away from the bottom of the tube during the movement thereof, said means comprising a frame connected to said member, cam means for moving said frame whereby said member contacts the bottom of the tube during the charging thereof and is out of contact therewith during its movement.

6. In a machine of the class described, an intermittently moving tube adapted to be charged with compressed material, means to support said tube on a portion of the bottom thereof, a member adapted to contact another portion of the tube bottom during the changing of the tube, and means for moving said member away from the bottom of the tube during movement thereof.

7. In a machine of the class described the combination of a plurality of tubes, said tubes being chargeable with material; a plurality of reciprocating plungers mounted to cooperate with said tubes to compress the material therein; means for reciprocating said plungers including a rotatable member; and means connecting said plunger reciprocating means to said tubes to intermittently move said tubes simultaneously in timed relation to the reciprocation of the plungers, said last named means including a ratchet, a pawl, two interconnected rotatable members for reciprocating said pawl, one of said last mentioned members having a diameter twice that of the other of said members, and means connecting the smaller of said members to said rotatable member of the plunger reciprocating means for rotating the smaller of said members at the same speed as said rotatable member of the plunger

reciprocating means, whereby the plungers are reciprocated twice for each movement of said tubes.

8. In a machine of the class described the combination of a plurality of tubes, said tubes being chargeable with material; a plurality of reciprocating plungers mounted to cooperate with said tubes to compress the material therein; means for reciprocating said plungers including a rotatable member; and means connecting said plunger reciprocating means to said tubes to intermittently move said tubes simultaneously in timed relation to the reciprocation of the plungers, said last named means including a rotatable element, a reciprocatable element engageable with said rotatable element to impart rotation thereto, two interconnected rotatable members for reciprocating said reciprocatable element, one of said last mentioned members having a diameter at least twice that of the other of said members, and means connecting the said other of said members to said rotatable member of the plunger reciprocating means for rotating the said other of said members at the same speed as said rotatable member of the plunger reciprocating means, whereby the plungers are reciprocated at least twice for each movement of said tubes.

9. In a machine of the class described the combination of a plurality of tubes; said tubes being chargeable with material; a plurality of reciprocating plungers mounted to cooperate with said tubes to compress the material therein, means for reciprocating said plungers including a rotatable member; means connecting said plunger reciprocating means to said tubes to intermittently move said tubes simultaneously in time relation to the reciprocation of the plungers, said last named means including a rotatable element, a reciprocatable element engageable with said rotatable element to impart rotation thereto, two interconnected rotatable members for reciprocating said reciprocatable element, one of said last mentioned members having a diameter at least twice that of the other of said members, and means connecting the said other of said members to said rotatable member of the plunger reciprocating means for rotating the said other of said members at the same speed as said rotatable member of the plunger reciprocating means, whereby the plungers are reciprocated at least twice for each movement of said tubes; and means for feeding material to said tubes between successive compression actions of said plungers.

10. In a machine of the calss described the combination of a plurality of tubes, said tubes being chargeable with material; a plurality of reciprocating plungers mounted to cooperate with said tubes to compress the material therein; means for reciprocating said plungers including a rotatable member; means connecting said plunger reciprocating means to said tubes to intermittently move said tubes simultaneously in timed relation to the reciprocation of the plungers, said last named means including a rotatable element, a reciprocatable element engageable with said rotatable element to impart rotation thereto, two interconnected rotatable members for reciprocating said reciprocatable element, one of said last mentioned members having a diameter at least twice that of the other of said members, and means connecting the said other of said members to said rotatable member of the plunger reciprocating means for rotating the said other of said members at the same speed as said rotatable member of the plunger reciprocating means, whereby the plungers are reciprocated at least twice for each movement of said tubes; and means for feeding material to said tubes between successive compression actions of said plungers, said feeding means including a hopper in off-set relation with the tops of said tubes and means for moving material discharged from said hopper to a position immediately above said tubes.

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