J. BINDER.

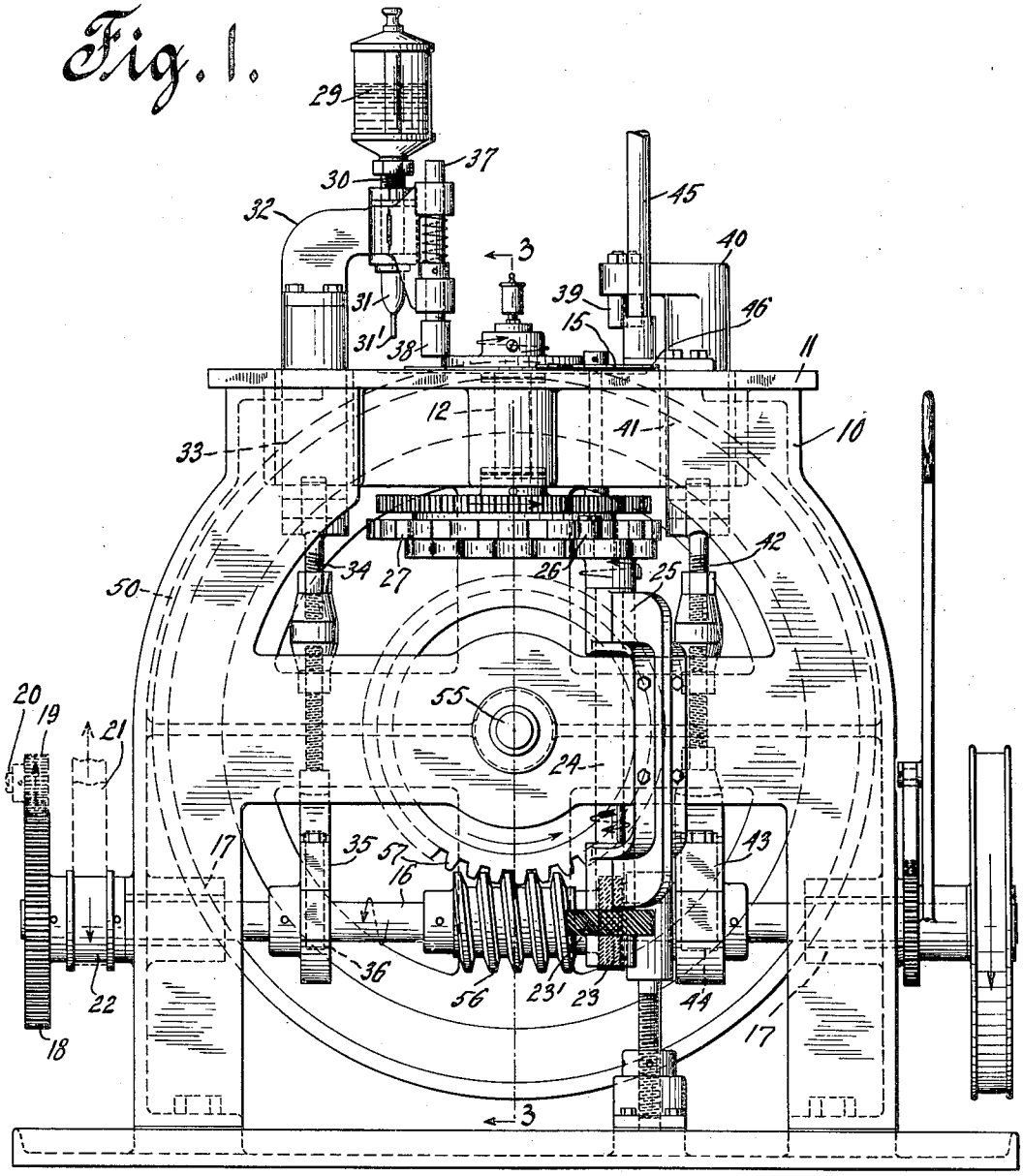
MACHINE FOR THE MANUFACTURE OF BOTTLE CLOSURES.

APPLICATION FILED DEC. 26, 1919.

1,381,055. Patented June 7, 1921.

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

Fig. 2.

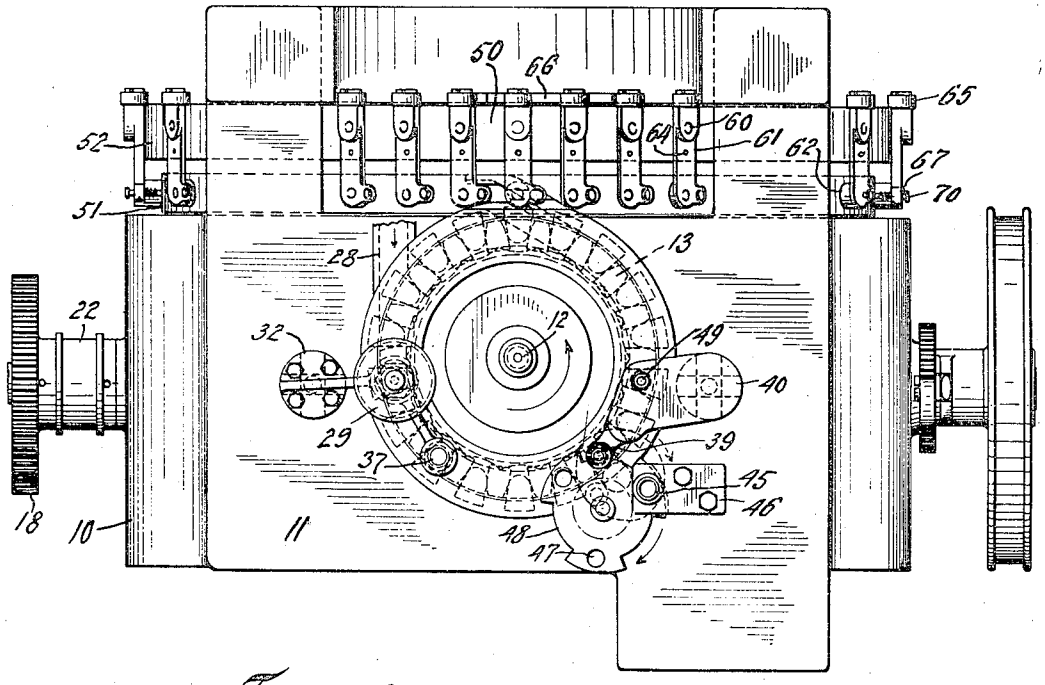
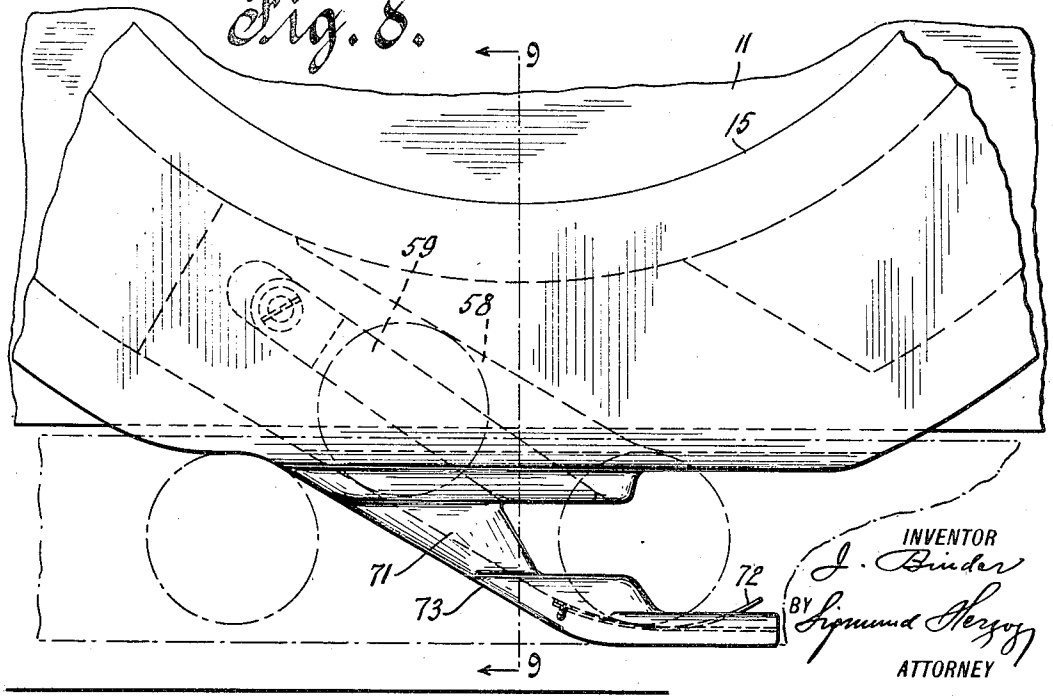


Fig. 8.



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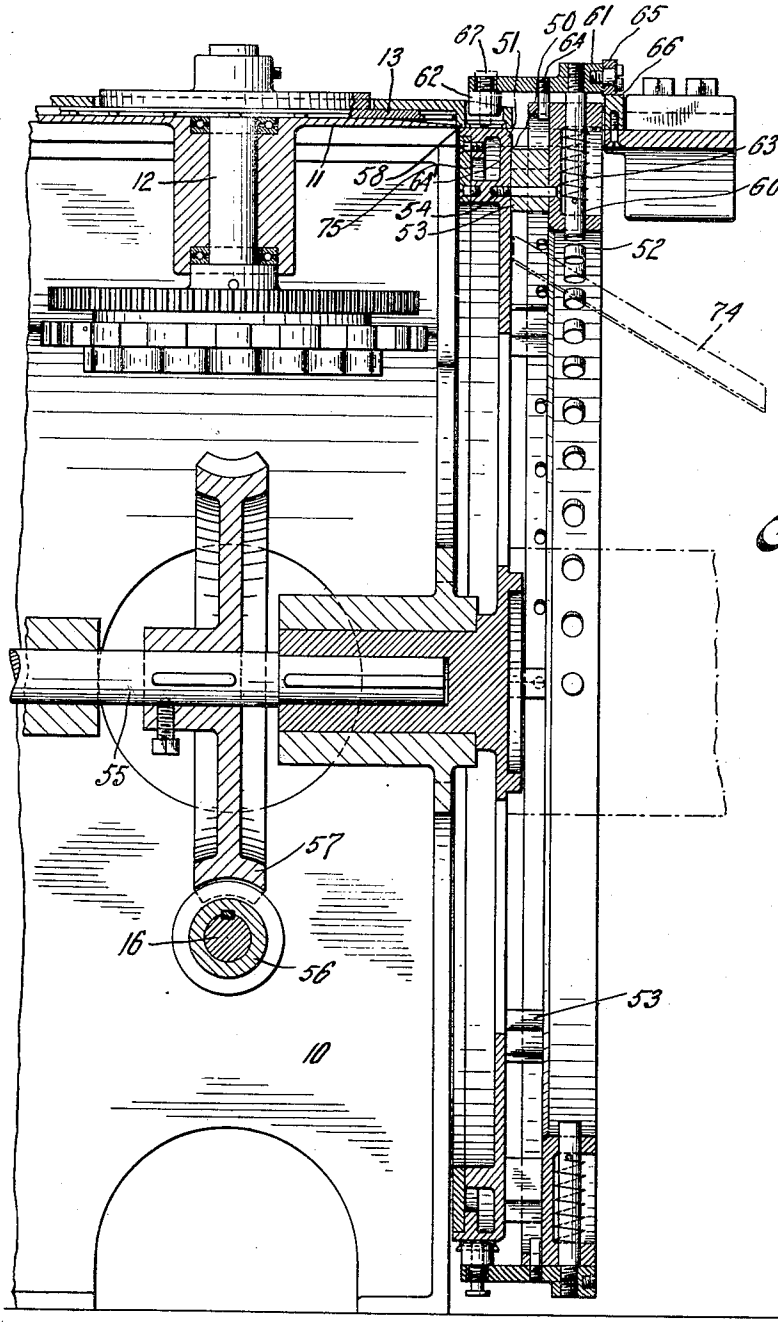


Fig. 3.

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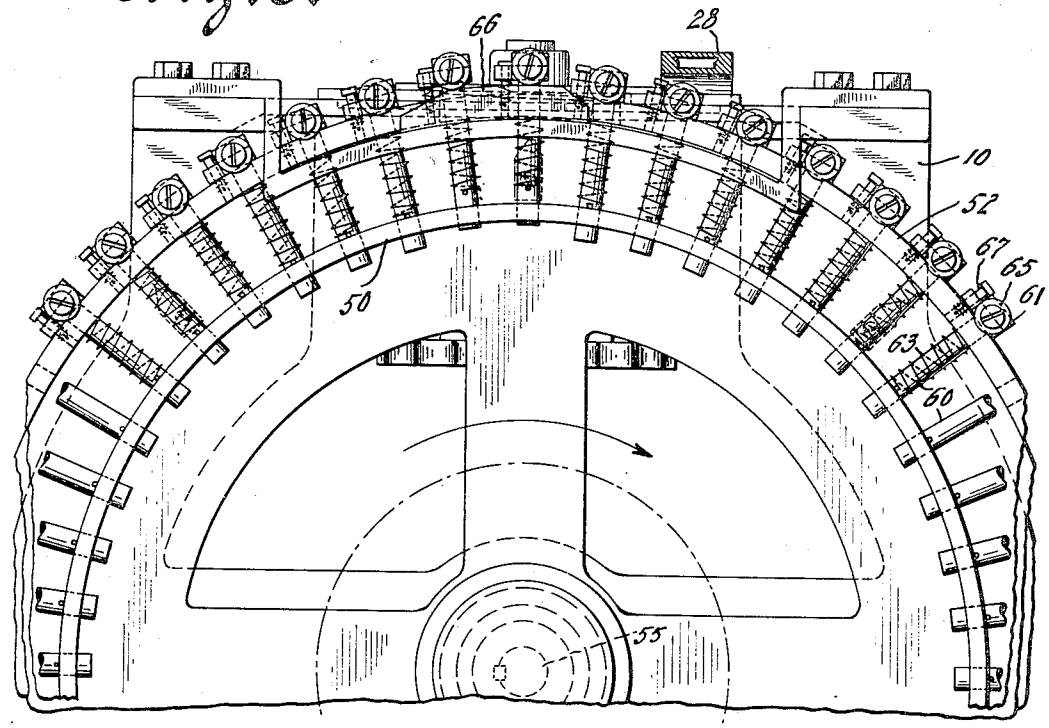
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5 SHEETS—SHEET 4.

Fig. 5.



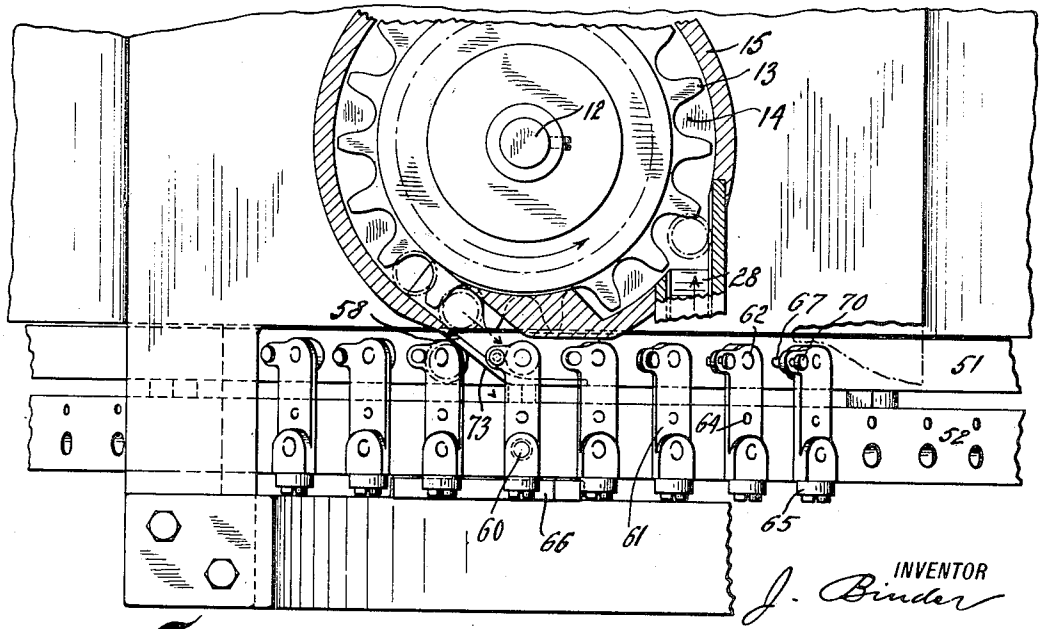


Fig. 4.

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5 SHEETS—SHEET 5.

Fig. 6.

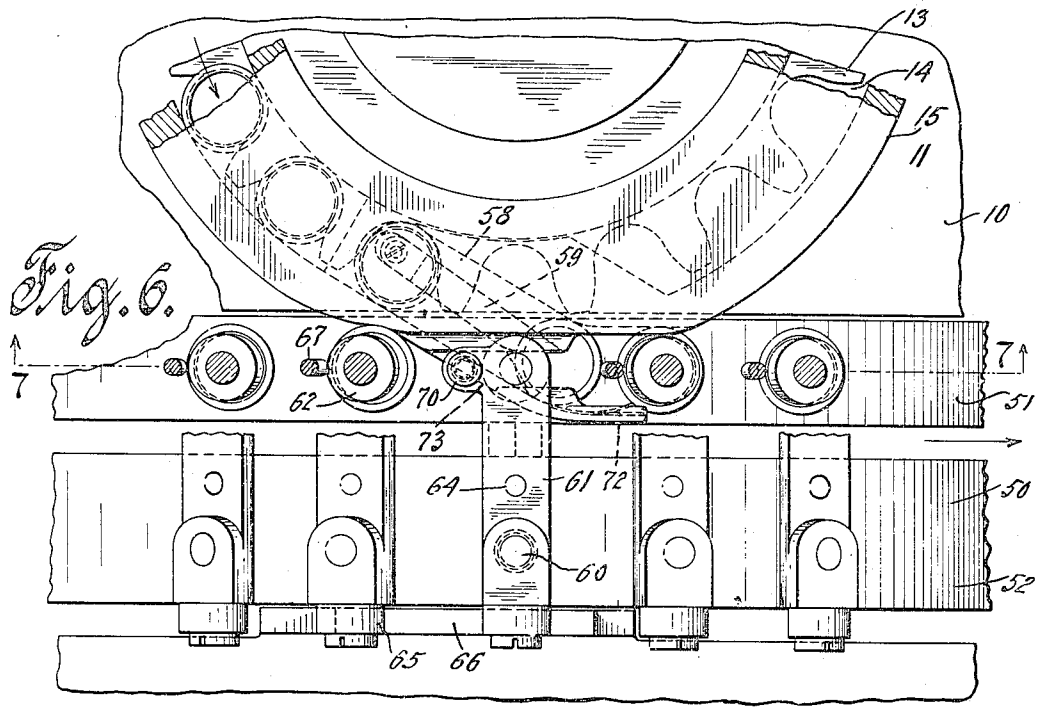


Fig. 7.

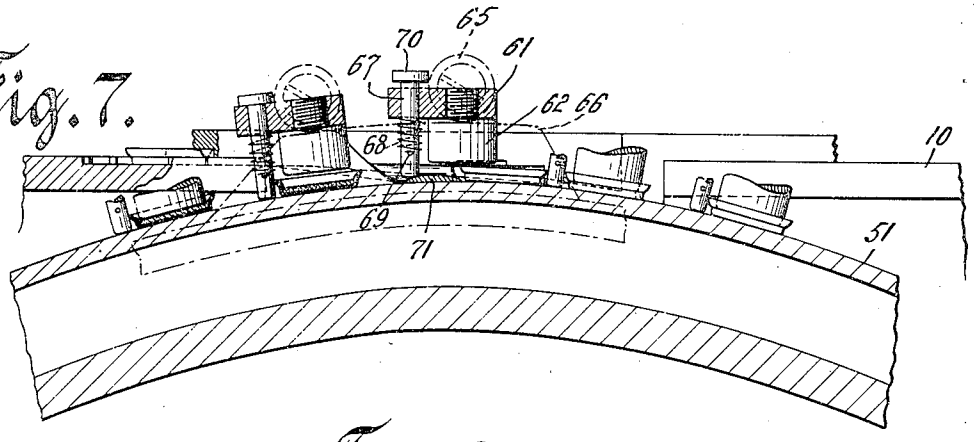
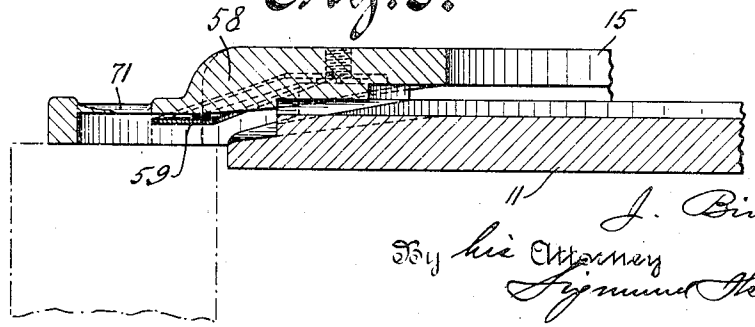


Fig. 9.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR THE MANUFACTURE OF BOTTLE-CLOSURES.

1,381,055. Specification of Letters Patent. Patented June 7, 1921.

Application filed December 26, 1919. Serial No. 347,479.

To all whom it may concern:

Be it known that I, JOHN BINDER, a citizen of the United States, and a resident of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machines for the Manufacture of Bottle-Closures, of which the following is a specification.

The present invention relates to a machine for the manufacture of closures for bottles or like receptacles, more particularly it relates to a machine for making closures of the cap variety, including those termed "crown corks". Closures of this type consist of a metallic cap or crown, to be locked to the exterior of the neck of the bottle, and of a sealing disk or packing of cork or the like, which is united by the aid of a suitable cementing medium with the cap or crown. There may be either used a fusible cementing medium, which is fused when in the cap or crown and left to cool and set, or the cap or crown is charged with a liquid or viscous cementing material, which is caused to set or coagulate, as the case may be.

Most of the machines, as heretofore used, for assembling and uniting the several parts of the closures, comprise a rotary drum or body, on which the assembled closures are held under pressure while the fused cementing medium is left to cool or the liquid or viscous cementing material is caused to set or coagulate. This rotary drum is either cooled or heated, according to the type of closures carried thereby. For holding the closures under pressure on the rotary drums, usually spring-pressed plungers are employed, which hold the assembled closures against the body of the drum, placing the parts under compression and holding them in this condition for a predetermined time, usually until the drum makes very nearly a complete revolution.

With the drums heretofore in use, one serious difficulty has been experienced. This difficulty consists in that it has been heretofore almost impossible to bring the closures into perfect alinement with the plungers, the result being that assembled caps are crushed, interfering with the proper operation of the machine, not speaking of the loss of material.

The main object of the present invention is to provide a drum for machines for the manufacture of bottle closures, which overcomes the defect above referred to in that it contains an automatic mechanism which brings the closures, one after the other, into proper alinement with the series of plungers thereon.

With these and other objects in view, which will more fully appear as the nature of the invention is better understood, the same consists in the combination, arrangement and construction of parts hereinafter described, pointed out in the appended claims and illustrated in the accompanying drawings, it being understood that many changes may be made in the size and proportion of the several parts and details of construction within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

One of the many possible embodiments of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a rear elevation of a machine for manufacturing bottle closures, containing the improved drum; Fig. 2 is a top plan view thereof; Fig. 3 is a section taken on line 3—3 of Fig. 1, on a larger scale; Fig. 4 is a top elevation, on a larger scale, of the drum, showing the same in operative relation to other elements of the machine; Fig. 5 is a front elevation of the detail shown in Fig. 4; Fig. 6 is a view similar to the one shown in Fig. 4, of a portion of the device, on a still larger scale; Fig. 7 is a section taken on line 7—7 of Fig. 6; Fig. 8 is a top elevation of a mechanism for guiding the assembled closures to the head, on a larger scale; and Fig. 9 is a section taken on line 9—9 of Fig. 8.

In the drawings, a machine has been illustrated for manufacturing bottle closures using a liquid or viscous cementing material, which is caused to coagulate by heat. The assembling elements of this machine have been shown for purposes of illustration only, the invention residing, as above stated, only in the drum, on which the assembled closures are held under pressure while the cementing medium is caused to coagulate. The machine comprises a frame 10, including a horizontal table 11. In this table is rotatably mounted a vertically extending shaft 12, to which is fixedly attached a transporting wheel 13, that is disposed above the table and is, preferably, made in the

form of a star wheel. The star wheel has recesses 14, to which the metallic caps of the closures are fed, in any suitable manner, in their inverted positions. A ring-shaped guide 15 overlies the recesses in the star wheel, it serving to keep the caps in position upon said wheel. The transporting wheel is intermittently rotated in the direction of the arrow shown in Figs. 2 and 4 of the drawings from a main driving shaft 16. This shaft is journaled in bearings 17, which are formed upon the frame 10, and has keyed or otherwise attached to it a gear 18, in mesh with a pinion 19 on the shaft 20 of a motor, or it may be driven by a belt 21, shown in dotted lines in Fig. 1 of the drawings, running over a pulley 22 on the said shaft, the belt being driven by any suitable source of power. The connection between the shafts 16 and 12 may be of any suitable type, for instance there may be fixed to the shaft 16 an oblique-toothed gear 23, in mesh with a similar gear 23′ on a shaft 24, the latter being journaled in bearings 25 and carrying an actuating mechanism 26, coacting with a mechanism 27, the latter being carried by the shaft 12. The mechanisms 26 and 27 are of a type that converts the continuous rotary motion of the shaft 24 into intermittent motion of the shaft 12. As these mechanisms do not form part of the present invention, a further description thereof seems to be unnecessary.

The caps may be passed to the recesses on the transporting wheel 13 either manually or automatically through a charging chute 28 (Figs. 2, 4 and 5), leading to the ring-shaped guide 15.

The caps received from the chute 28 are transported, step by step, by the transporting wheel in the direction of the arrow shown in Fig. 2 of the drawings, and are brought, one after the other, into registering position with the means which introduces into the same the cementing material. This means comprises a receptacle 29, communicating through a pipe 30 with a valve casing 31. The receptacle 29, pipe 30 and valve casing 31 are attached to a bracket 32, having a downwardly projecting vertical extension 33. This extension is slidably arranged on the frame 10 and connected to a rod 34, the other end of which is fixed in the usual manner to the strap 35 of an eccentric 36, the latter being keyed to the driving shaft 16. Within the valve casing 31 is disposed a valve, not shown, it being fully disclosed in U. S. Letters Patent No. 1,249,714. To this valve is attached a pin 31′, that projects below the valve casing and extends through a discharge opening in the latter. The eccentric 36 and the driving mechanisms 26 and 27 are so timed that, during the downward stroke of the bracket 32, the transporting wheel 13 is at rest and a closure cap held in registering position with the cementing medium charging-means. On the downward stroke of the bracket 32, the pin 31′ is caused to bear against the inner face of the cap, whereby the valve is lifted from its seat and the desired amount of liquid cementing medium is introduced into the cap. Upon the upward stroke of the bracket 32, the valve is seated, by means not shown.

The cementing material having been introduced into the cap, the latter is transported to means which spreads the cementing material over the entire inner face of the head of the cap. This means comprises, in the case illustrated in the drawings, a spring-pressed spindle 37, which is slidably mounted on the bracket 32. To the lower end of the spindle is attached a block 38, for instance of rubber. The reciprocating bracket 32, on its downward movement, brings the bracket 38 into contact with the inner face of the cap and spreads the liquid cementing material over the entire inner face of the head thereof. On the upward movement of the bracket, the block 38 leaves the cap. The spindle 37 is yieldingly mounted upon the bracket in order to prevent breakage.

After the cementing material has been spread, the cap is transported to an assembling plunger 39, that is attached to a bracket 40, having a downwardly projecting vertical extension 41, slidably mounted in the frame 10 and connected by a rod 42 with the strap 43 of an eccentric 44, the latter being fixed to the driving shaft 16. The sealing disks are stacked in a vertical tube 45, which is secured by means of a bracket 46 to a table 11. These disks are fed by gravity into the recesses 47 of a rotary plate member 48, that is geared to the shaft 12 above referred to. This plate member is disposed above the transporting wheel 13 and brings the disks, one after the other, into alinement with the assembling plunger 39, which, in its downward movement, forces a sealing disk into the metallic cap on top of the cementing material therein. Obviously, the eccentric 44 is so timed in relation to the driving mechanisms 26 and 27 that the plunger moves downward while the transporting wheel 13 is at rest and holds a cap in alinement with the said plunger. From this plunger the assembled closures are fed, one after the other, to a second plunger, denoted by the numeral 49, that is also carried by the bracket 40. This plunger serves as an additional means for forcing the sealing disks into proper contact with the inner faces of the caps.

The assembled crowns are brought, in a manner hereinafter to be described, onto a heating and uniting drum 50. This drum is made up of two members 51 and 52,

spaced apart by blocks 53 and united, for instance, by screws 54. The drum is disposed a slight distance below the transporting wheel 13, it being attached to a horizontally extending shaft 55, that is suitably journaled in bearings on the frame 10. This shaft is continuously driven from the main driving shaft, and for this purpose the latter is provided, for instance, with a worm 56, meshing with a worm gear 57, that is fixedly attached to the shaft 55. The member 51 of the drum is disposed as close as possible to the frame 10 and receives upon its cylindrical face the assembled closures. The closures pass from the transporting wheel 13 to the cylindrical face of the drum member 51 through a passaged member 58, which projects into the annular guide 15 and overhangs the drum member 51. Within the passage of the member 58 is disposed a spring 59, bearing against the corrugated flanges of the metallic caps and having a tendency to hold the same stationary in the passage of the member 58. A suitable number of spindles 60 are radially and slidably arranged in the drum member 52, each carrying outside of the drum an arm 61, that is rigidly attached to the spindle and projects in a direction parallel to the longitudinal axis of the drum over the member 51 thereof. To each arm 61 is fixed a downwardly projecting plunger 62, for holding the assembled crowns on the cylindrical face of the drum member 51. On each spindle 60 is coiled a spring 63, having a tendency to force the respective plunger toward and into contact with the drum. Each arm 61 carries a pin 64, extending through an opening 64′ in the drum member 52, the purpose of said pins being to prevent the arms 61 from shifting around the axes of their spindles 60. On each arm is furthermore mounted a roller 65, adapted to coact with a cam 66, that is attached to the frame 10. The drum rotates in the direction of the arrow shown in Fig. 5 of the drawings and the cam 66 is so disposed that the plungers are forced, against the action of their springs, outward before they arrive opposite the passaged member 58, the cam permitting the springs 63 to force their plungers toward the drum after they have passed the said passaged member.

Each arm 61 carries in rear of its plunger a lug 67, in the form of a spindle, that is slidably disposed in the said arm, it being arranged parallel to its respective plunger. On each lug is coiled a spring 68, bearing against the under face of its arms 61 and against a stop 69 upon the lug. On each lug is formed a head 70, that bears against the outer face of the respective arm 61. The spring 68 has a tendency to force the lug against the cylindrical face of the drum member 51, permitting the lug to rise as it rides over a bridge 71 on the passaged member 58 (Figs. 7 and 8). The lugs and plungers are arranged in the same vertical plane, as appears from the several figures of the drawings.

The assembled crowns are caused to move into the passage of the member 58, the latter removing the same from the recesses 14 in the transporting member 13. In this passage the crowns are moved by the following crowns, one after the other, into the forward end of the passage, where each crown is held stationary, above the drum member 51, by a spring 72. In the rotation of the drum, a plunger, ariving at the cam 66, is lifted, while its lug is kept in contact with the drum. This lug, after riding over the bridge 71, removes the crown, held by the spring 72, from the passaged member 58, sliding the same on the drum until it is in alinement with the respective plunger 62. By this time, the roller 65, coacting with the said plunger, is disengaged from the cam, whereby the respective spring 63 forces the plunger against the assembled crown cork, thereby placing the parts under compression and holding them in this condition until the closure makes very nearly a revolution around the shaft 55, when the plunger again arrives at the cam 66, whereby the plunger is disengaged from the crown cork, allowing the front edge 73 of the member 58, which is placed at an angle to the longitudinal axis of the drum, to remove the finished crown cork from the cylindrical face of the drum member 51, the closure dropping between the two members of the drum into a chute 74, the latter being attached to the frame 10 of the machine.

It is obvious that the distance between the longitudinal axes of a plunger and the lug coacting therewith must correspond exactly to the radius of the corrugated flange portion of a metallic cap and the radius of a lug. With this arrangement, obviously, the caps are brought, by the lugs, into registering positions with the plungers and centered, so that the said plungers, in descending, always engage the assembled crown corks properly, whereby a crushing, etc., of the crown corks is prevented.

While the closures are being carried by the drum and are held under pressure, their cementing material is coagulated or set by a suitable means. For this purpose a suitable fluid, for instance steam, is admitted into an annular channel 75, that is formed in the drum member 51. The temperature of the fluid is maintained at a point sufficient to coagulate or set the cementing material within the assembled closures. The coagulation results in a firm union between the parts of the closure.

It is to be observed that upon the machine herein described cementing media can be

used which are fed to the caps in their hot state. To the uniting drum 50 is led in such cases a cooling fluid.

It is obvious that, while herein specific assembling means have been disclosed, others may just as well be used in connection with the invention herein set forth, which pertains to the uniting drum and the passaged member 58 solely. The other elements of the machine have been disclosed for purposes of illustration only.

What I claim is:

1. In a machine for the manufacture of bottle closures of the cap variety, a rotary body adapted to receive assembled closures, spring-pressed plungers slidably arranged on said body for applying pressure to the closures, and means carried by said plungers for entering the closures in relation to said plungers before the latter are moved toward the closures.

2. In a machine for the manufacture of bottle closures of the cap variety, a rotary body adapted to receive assembled closures, spring-pressed plungers slidably arranged on said body for applying pressure to the closures, and a separate mechanism carried by each plunger for centering a closure in relation to said plunger before the latter is moved toward the closure.

3. In a machine for the manufacture of bottle closures of the cap variety, a rotary body adapted to receive assembled closures, means on said body for placing the parts of the closures under compression, and a mechanism carried by said pressure applying means for centering the closures in relation to said pressure applying means before the latter is being moved toward the closures.

4. In a machine for the manufacture of bottle closures of the cap variety, a rotary body adapted to receive assembled closures, means on said body for placing the parts of said closures under compression, and a separate mechanism carried by each pressure applying means for centering a closure in relation to said pressure applying means before the latter is being moved toward the closure.

5. In a machine for the manufacture of bottle closures of the cap variety, a drum rotating around a horizontal axis, means for feeding assembled closures to the cylindrical face thereof, spring-pressed plungers slidably arranged on said drum for applying pressure to the closures, and a mechanism coacting with each plunger for centering a closure in relation to its plunger before the latter is being moved toward the closure.

6. In a machine for the manufacture of bottle closures of the cap variety, a drum rotating around a horizontal axis, a passaged member overhanging said drum and adapted to hold assembled closures in operative position to the cylindrical face of said drum, spring-pressed plungers slidably arranged on said drum for applying pressure to the closures, and means carried by said drum for removing the closures one after the other from said passaged member and centering the same in relation to said plungers before the latter are moved toward the plungers.

7. In a machine for the manufacture of bottle closures of the cap variety, a drum rotating around a horizontal axis, a passaged member overhanging said drum and adapted to hold assembled closures in operative position to the cylindrical face of said drum, spring-pressed plungers slidably arranged on said drum for applying pressure to the closures, and means for removing the closures one after the other from said passaged member and centering the same in relation to said plungers before the latter are moved toward the plungers.

8. In a machine for the manufacture of bottle closures of the cap variety, a drum rotating around a horizontal axis, a passaged member overhanging said drum and adapted to hold assembled closures in operative position to the cylindrical face of said drum, spring-pressed plungers slidably arranged on said drum for applying pressure to the closures, and means coacting with each plunger for removing a closure from said passaged member and centering the same in relation to its plunger before the latter is being moved toward the closure.

Signed at New York in the county of Kings and State of New York, this 17th day of Oct. 1919.

JOHN BINDER.