A. BOGDÁNFFY.

PROCESS OF MANUFACTURING BOTTLE CLOSURES.

APPLICATION FILED MAY 31, 1913.

1,143,353.

Patented June 15, 1915.

3 SHEETS—SHEET 1.

Fig. 1.

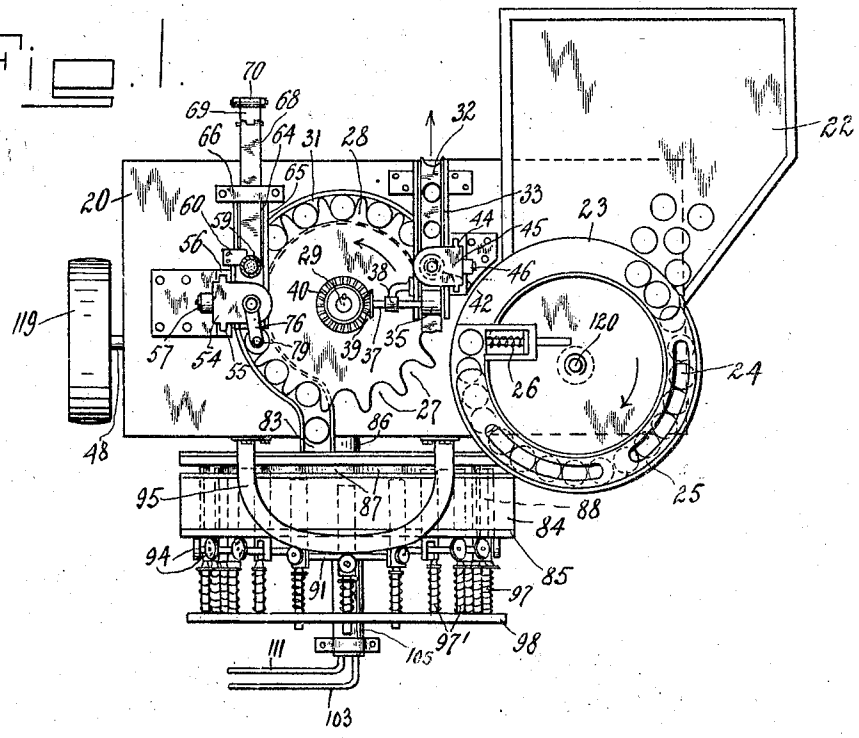
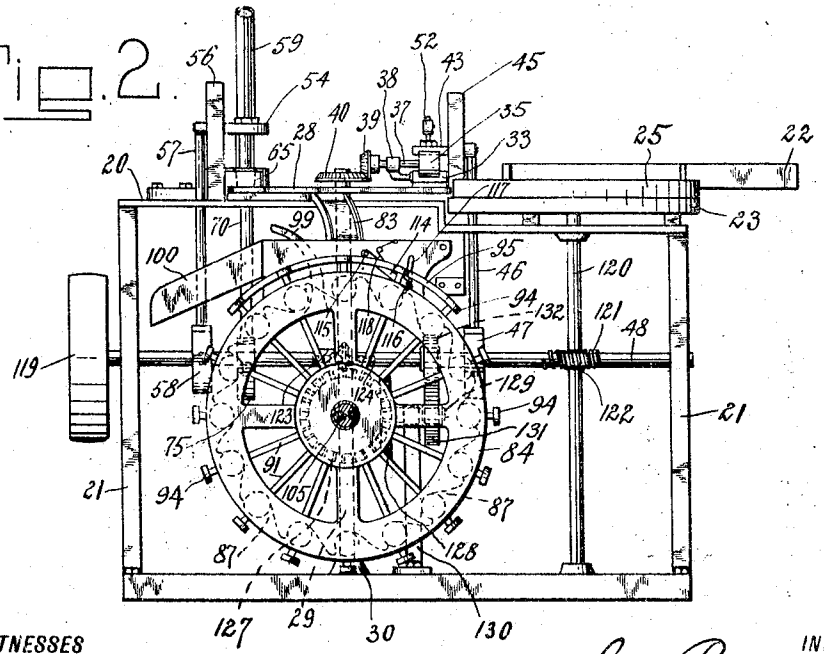


Fig. 2.



WITNESSES

Wm Klauk.

S. Birnbaum

INVENTOR

A. Bogdánffy

BY

Sigmund Herzog

his ATTORNEY

A. BOGDANFFY.

PROCESS OF MANUFACTURING BOTTLE CLOSURES.

APPLICATION FILED MAY 31, 1913.

1,143,353.

Patented June 15, 1915.

3 SHEETS—SHEET 2.

Fig. 8.

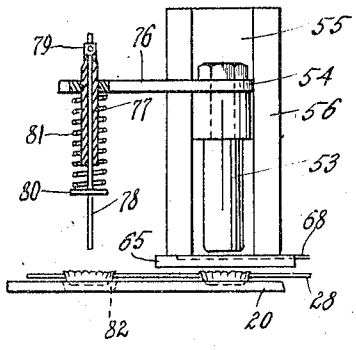


Fig. 3.

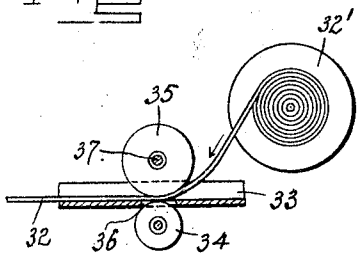


Fig. 6.

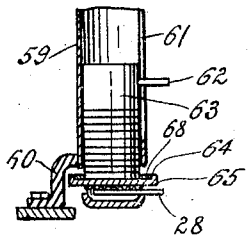


Fig. 4.

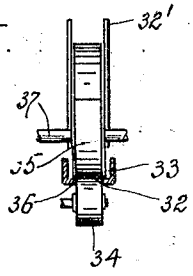


Fig. 9.

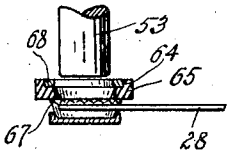


Fig. 10.

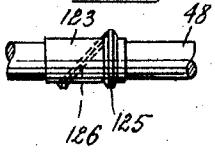


Fig. 5.

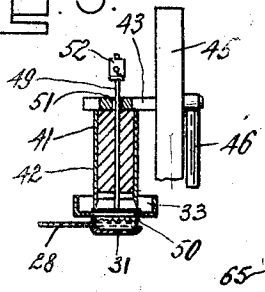
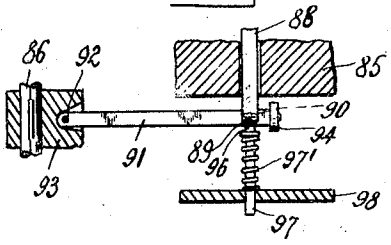


Fig. 13.



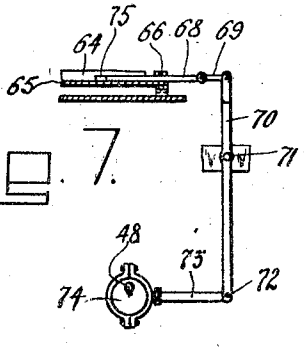


Fig. 7.

WITNESSES

Wm. Klein

S. Birnbaum

INVENTOR

A. Bogdanffy

BY

Sigmund Herzog

his ATTORNEY

A. BOGDANFFY.

PROCESS OF MANUFACTURING BOTTLE CLOSURES.

APPLICATION FILED MAY 31, 1913.

1,143,353.

Patented June 15, 1915.

3 SHEETS—SHEET 3.

Fig. 11.

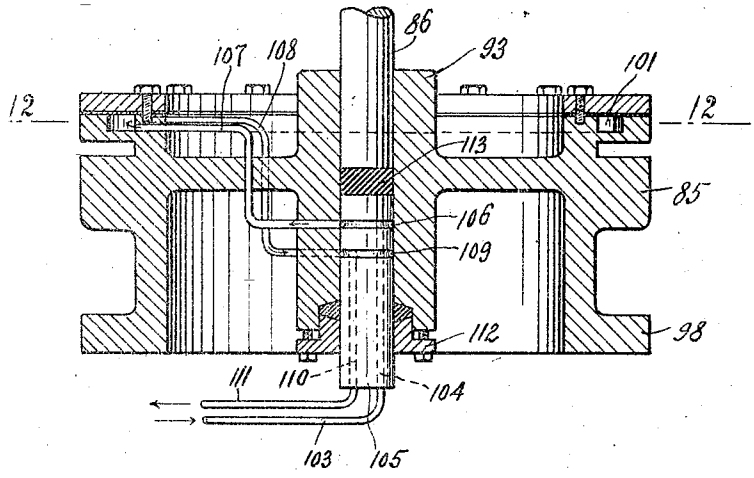
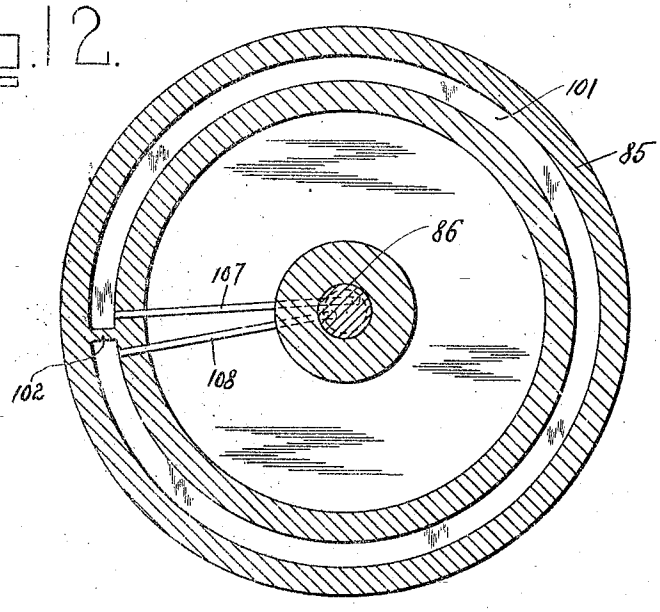


Fig. 12.



WITNESSES

Jm. Klenk.

S. Birnbaum

INVENTOR

A. Bogdanffy

BY

Spiegel & Herzog

his ATTORNEY

UNITED STATES PATENT OFFICE.

ALEXANDER BOGDÁNFFY, OF NEW YORK, N. Y., ASSIGNOR TO INTERNATIONAL CORK COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

PROCESS OF MANUFACTURING BOTTLE-CLOSURES.

1,143,353. Specification of Letters Patent. Patented June 15, 1915.

Application filed May 31, 1913. Serial No. 771,055.

To all whom it may concern:

Be it known that I, ALEXANDER BOGDÁNFFY, a subject of the King of Hungary, and resident of the city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Processes of Manufacturing Bottle-Closures, of which the following is a specification.

The present invention relates to a method or process for the manufacture of bottle closures of the class known as "crown cork sealing caps or closures". Closures of this type usually comprise three parts, that is a metallic cap or crown having a corrugated flange to be locked to the exterior of the bottle neck, a sealing disk or packing of cork or the like, and an impervious cementing material, for instance in the form of a disk, interposed between the metallic cap and the sealing disk.

In the earlier stage of the development of this branch of industry, the crown corks were manufactured in the following manner: The three parts of the closure were first assembled and then placed into a "baking oven", wherein they were exposed to heat to fuse the cementing or binding material, one of the purposes of which is to unite the sealing disks with the metallic caps. This "baking method", as it was called by its inventor, gave poor results which were clearly recognized at the time, its main defect being that "puffers" were produced, the term "puffer" designating a crown cork, the sealing disk or packing of which is caused to bulge or swell out at its center portion, whereby a proper union between the said sealing disk and the metallic cap is prevented. Moreover these "puffers" cannot be use as the liquid contents of the bottle or gas therein soon work their way through the packing, resulting in a corrosion of the metallic part of the closure, which, in turn, causes a contamination of the liquid contents of the bottle. As long as, however, the crown corks were applied to the bottles by manually operated means, the operator was in a position to attach the "semi-puffers" and to throw away the real "puffers". As soon as, however, automatic capping machines were put in use, the so-called "baking method" had to be abandoned entirely, for the reason that the closures are in these machines indiscriminately thrown into a hopper-like structure and subjected to a whirling action in order to present them to the closure applying means in their proper positions. Due to this whirling action, obviously those sealing disks, which were not properly united with their respective metallic caps, separated therefrom, thereby rendering the automatic machinery entirely useless. It is true that the "puffers", which formed a large percentage of the product, were first separated from the seemingly good crown corks, but there was no way of determining which were good crowns inasmuch as, even when the sealing disks assumed the shape of the heads of the caps, the operator could not be sure whether or not a proper union existed between the parts. In the next step of the development of this industry the assembled crown corks, or one or two elements thereof, that is either the metallic caps alone or the metallic caps with the fusible cementing medium therein, were heated, preferably by gas flames, or other means in direct contact with the outer faces of the caps, to fuse the cementing medium. Either during the heating operation or after the same pressure was applied to the assembled closures, the pressure being maintained while the cementing material set or hardened, or in other words the closures were left to cool under pressure. Sometimes even artificial cooling means were used. In practice it has been found that these methods had several serious defects, which will be presently described. The temperature of the gas flames, or of the other heating means in direct contact with the metallic caps, was maintained at such point as to cause the cementing medium to liquefy, and consequently to boil. Vapors and gases were thus naturally formed which to a large extent prevented a firm union between the sealing disks and the metallic caps, no matter to what pressure the closures were subjected during and after the heating. On the other hand, the cementing medium was, due to the liquefaction and boiling, caused to exude toward the working faces of the disks, if the proper amount of cementing medium was applied. If a lesser quantity was inserted into the cap, it burned or coked and thereby was rendered entirely useless. Furthermore, the high temperature affected the sealing disks so that they lost their toughness, that is to say they became

more or less brittle, whereby the sealing properties of the same were impaired to a great degree. This applied with even greater force to sealing disks of the composite type, the latter being rendered entirely useless if they contained a fusible binding material. Moreover, when decorated caps were manufactured the extent of the heat to properly fuse the cementing medium was always ruinous to the same, inasmuch as the paint used for decorating them was affected and the caps otherwise defaced. As has been mentioned above, the closures were, after heating, subjected to cooling action while the binding material was hardening. Aside from the question that the cooling means complicated the machinery, the cooling action considerably increased the time of manufacture.

The main object of the present invention is to provide a method or process for the manufacture of bottle closures which obviates the defects above mentioned and, on the other hand, greatly reduces the time of manufacture thereof.

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 process hereinafter described and pointed out in the appended claims.

In carrying out the process, forming the subject matter of the present application for Letters Patent, the closures are first assembled, then subjected to appropriate pressure, and while maintaining said pressure heated to a degree which softens the cementing medium to an extent sufficient to cause a union between the sealing disks and the caps, but not high enough to liquefy the said medium or to affect the decorations of the metallic caps or the material of the sealing disks. Cooling is entirely dispensed with inasmuch as vapors or gases are not formed during the heating action, and consequently no factor created which would tend to move the sealing disk out of contact with the metallic cap after the said two parts have been once caused to properly abut against each other.

One of the many possible apparatus for carrying out the process of this invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a plan view of the machine; Fig. 2 is a front elevation thereof; Fig. 3 is a sectional view of the means for feeding a strip of prepared paper from which the cementing disks are cut; Fig. 4 is a front elevation of the device shown in Fig. 3; Fig. 5 is a vertical section taken through the means for cutting the cementing disks from the strip of prepared paper; Fig. 6 is a vertical section taken through the sealing disk holding means; Fig. 7 is a vertical sectional view through the means for feeding the sealing disks to the metallic caps; Fig. 8 is a side elevation, partly in section, through the means for forcing the sealing disks into the metallic caps; Fig. 9 is a sectional view of the means for conveying the sealing disks to the metallic caps; Fig. 10 is a detail view of a worm for intermittently rotating the cap transporting means of the device; Fig. 11 is a central section taken through the pressure applying and heating means of the apparatus; Fig. 12 is a section taken on line 12—12 of Fig. 11; and Fig. 13 is a detail of construction of the pressure applying means of the machine.

In the drawings, the numeral 20 indicates a horizontal table supported by legs or standards 21. Above the plane of the table is arranged a substantially horizontal support 22, onto which the metallic caps are brought in their inverted positions, to be passed, for instance, manually to a continuously rotating carrying disk 23, which conveys the caps, one after the other, along a channel 24 in the direction of the arrow indicated in Fig. 1 of the drawings, said channel being formed between said carrying disk and a cover plate 25, the latter being attached to the table in any suitable manner. The carrying disk 23 transports the caps to a feeding device 26, for instance of the type described in Letters Patent No. 1,055,126, the said feeding device advancing the caps to the recesses or pockets 27 of a star-wheel 28, which is attached to a vertical shaft 29, the latter being journaled in the table and in a bearing 30. To this shaft intermittent rotary motion is imparted in the direction of the arrow by means which will be hereinafter described. The star-wheel engages the flange portions of the caps and conveys them along a groove 31 in the table to rest directly beneath the means which cuts the impervious cementing disks from a strip of suitably prepared paper, or other material, and places the said disks into the caps.

The cementing medium is prepared as follows: Paper or other material may be soaked in or carried through a molten mixture, which is composed, for instance, of copal gum, resin and a waxy substance, or of copal gum and some other suitable material or materials. The paper so treated is then dried and cut into strips.

The strip 32, from which the disks are cut, is wound upon a reel 32′, suitably journaled in the frame of the machine, and from which the strip is conducted into a guide 33, to pass between the feeding rollers 34 and 35. The feeding roller 34 is journaled in the frame of the machine and projects through a slot 36 in the guide above the lower plane of the same, while the spindle 37 of the roller 35 is journaled in a

bearing 38 and carries at its outer end a bevel gear 39, meshing with a similar gear 40, that is attached to the shaft 29 of the star-wheel. Obviously the feeding rollers 34 and 35 will thus rotate intermittently, and advance the strip 32 to the cutting means 41. The cutting means comprises a tubular knife 42, secured in any suitable manner to an arm 43, which is shiftably arranged in a vertical guideway 44 of a bracket 45, that is attached to the table 20. The arm 43 is pivotally engaged by a rod 46, which is fastened to the strap of an eccentric 47, the latter being mounted upon the main driving shaft 48 of the machine. The driving shaft is journaled in bearings which are secured to or made integral with the standards or legs 21. As the disk is cut from the strip, it is automatically forced, upon the upward movement of the knife 42, by a stem 49 through an aperture 50 in the guide 33 into the metallic cap. The stem 49 projects through an opening 51 in the arm 43 above the plane of said arm, and carries upon its upper end a weight 52. When, therefore, the knife 42 moves upward, the weight 52 will force the stem 49 downward, and thereby the paper disk into the cap. After this, upon the further upward movement of the arm 43, the latter engages the weight 52 and lifts thus the stem 49 out of the aperture 50. The disk having been deposited into the metal cap, the said cap and the disk are transported by the star-wheel step by step to an assembling plunger 53, attached to an arm 54, which is slidably arranged in a vertical guideway 55 of a bracket 56. The arm 54 is pivotally connected with a rod 57, which is fastened to the strap of an eccentric 58, the latter being keyed to the main driving shaft 48. The sealing disks or packing of cork or the like are placed into a substantially vertical tube 59, which is attached to the table by means of a bracket 60, or otherwise, and is provided with a longitudinal slot 61, through which a finger piece 62 of a weight 63 protrudes, said weight being placed on the sealing disks and serves to feed the same into a guide-way 64 of a plate member 65, which is attached to the table by a bracket 66 in a plane above that of the star-wheel 28. The plate member 65 is provided with an aperture 67 in alinement with the plunger 53. This aperture tapers toward the plane of the wheel 28, its upper diameter being larger than the diameter of a sealing disk, and the diameter at its lower end being somewhat smaller than that of a sealing disk. The purpose of this arrangement will be explained presently. The sealing disks are conveyed in the guideway 64 from below the tube 59 to the aperture 67 by a reciprocable conveyer 68, which is slidably arranged in the guideway 64 and pivotally connected by a link 69 with a lever 70, the latter being fulcrumed at 71 to the frame of the machine, and pivoted at 72 to the rod 73 of an eccentric 74, which is keyed to the main driving shaft 48. The conveyer 68 is provided with a recess 75, which engages the sealing disks in transferring the same to the aperture 67. Obviously the angular relation of the eccentrics 58 and 74 must be such that when the plunger 53 is lifted, the conveyer 68 will move inward, and thereby transfer a sealing disk within the reach of said plunger, which, in its downward movement, will force the sealing disk through the aperture 67 into the metallic cap. It should be noted that, since the diameter of the aperture 67 is smaller than that of a sealing disk, the latter will be compressed to some extent and, when forced into the cap, will expand and be held thus firmly in the cap.

As it happens sometimes that one or the other of the recesses in the star-wheel does not contain a metallic cap, it becomes necessary to eject the sealing disk from that recess after it has passed the plunger 53. For this purpose the plunger carries a bracket 76, to which a downwardly extending tubular member 77 is attached. In this tubular member is slidably arranged a spindle 78, provided upon its upper end with a stop 79 and near its lower end with a disk 80. Against this disk and the bracket 76 bears a spring 81, tending to force the spindle 78 downward into the recesses of the star wheel. The distance between the longitudinal axes of the plunger 53 and the spindle 78 is equal to the distance between two neighboring recesses in the star-wheel. When, therefore, the plunger 53 moves downward to force a sealing disk into the metallic cap beneath it, the spindle 78 will be forced into the neighboring recesses of the star-wheel. If an assembled crown is in this recess, the spring 81 will be compressed by the upward movement of the spindle 78. If, however, a sealing disk only is seated in the recess, the spindle will force the same through an opening 82 in the table into a receptacle below the same, for the reason that the tension of the spring 81 is greater than the resistance offered by the sealing disk in the recess.

The assembled crowns slide down an inclined passage 83 to a heating and uniting head 84. This head comprises a rotary drum 85, keyed to a shaft 86, which is continuously driven from the main driving shaft of the machine. The drum is provided with a plurality of peripheral recesses 87, which are adapted to receive, one after the other, assembled crowns from the passage 83. Plungers 88 are slidably arranged in the drum in alinement with the recesses, said plungers being located parallel to the

longitudinal axis of said drum, and provided at their outer forked ends each with a pin 89, which engages slots 90 in radial arms 91, the inner ends of which are pivoted at 92 to the hub 93 of the drum, while their outer free ends carry rollers 94, which are adapted to coact with a cam 95, attached to the frame of the machine. The arms 91 are engaged by the pointed ends 96 of spring pressed pins 97, which are slidably mounted in apertures of a ring 98, the latter being, preferably, made integral with the drum. The cam 95 is arranged in the path of the rollers 94, whereby, as the drum 85 rotates, the plungers 88 are forced against the action of the springs 97' upon the pins 97 out of the recesses 87 in the drum before they arrive opposite to the passage 83. When a recess arrives at this point, an assembled crown cork will slide into the same, and after the corresponding roller 94 is disengaged from the cam, the corresponding spring 97' will force the plunger against the assembled crown cork, placing thereby the parts of the closure under pressure, and holding them in this condition until the closure makes nearly a complete revolution around the shaft 86, when the roller of the plunger again arrives at the cam 95, whereby the plunger is disengaged from the closure, allowing the same to be guided by a projection 99 into a chute 100.

While the closure is carried by the drum and held under pressure, its cementing medium is softened by suitable heating means. This heating means comprises a suitable fluid, for instance hot liquid or steam, which is admitted into an annular channel 101, formed in the drum 85 in rear of the recesses 87. In the channel 101 is provided a radially extending partition 102, the heating fluid being admitted into the channel on one side of said partition, travels around the said channel, and leaves the same on the other side of said partition. The fluid flows to the channel 101 through a pipe 103, communicating with a bore 104 in a stationary cylindrical member 105, which is arranged within the hub 93. The bore 104 leads to a peripheral groove 106 in the said cylindrical member, said groove being connected with a pipe 107, which leads to the channel 101 on one side of the partition 102. The other side of the partition is connected by a pipe 108 with a peripheral groove 109 in the cylindrical member 105, this peripheral groove communicating with a bore 110 in said cylindrical member, the latter bore being connected with a pipe 111. A stuffing box 112 and a packing material 113 prevent a leakage of the fluid in the direction of the longitudinal axis of the shaft 86. The fluid, admitted through the pipe 103 and the passages communicating therewith into the channel 101, flows through the same, and leaves it through the pipe 108 and the passages communicating therewith. The temperature of the fluid is maintained at a point to soften the cementing medium within the assembled closure; it is, however, not high enough so as to liquefy the same or to cause a creation of vapors and gases.

A tongue 114 is pivoted at 115 to a stationary part of the frame, its free end being provided with a pin 116, engaging an arc-shaped slot 117 in the frame. A spring 118 forces the tongue into contact with the drum, so that closures, which are not properly seated in the recesses of said drum, will be forced into the same before a plunger engages them.

Motion is imparted to the entire mechanism through the intermediary of a pulley 119, which is keyed to the main driving shaft 48. The shaft 120 of the continuously rotating disk 23 is driven by a worm 121 upon the main driving shaft, in mesh with a worm gear 122 upon the shaft 120. The shaft 29 of the star-wheel 28 is driven by a worm 123 upon the main driving shaft 48, engaging a worm gear 124 upon the shaft 29. The worm 123 has a straight portion 125, and while this is engaging the worm gear 124, the latter is at rest. When the inclined portion 126 of the worm 123 coacts with a tooth of the worm gear, the latter will be rotated a given distance, whereby the star wheel transports the caps a corresponding distance. The shaft 86 of the rotary drum 85 is also actuated from the main driving shaft. For this purpose a bevel gear 127 is mounted upon the shaft 86 and meshes with a similar gear 128, keyed to a shaft 129, which is journaled in a bearing 130. Upon the shaft 129, is furthermore mounted a spur gear 131, meshing with a similar gear 132, the latter being fixedly attached to the shaft 48.

The operation of the machine can be clearly understood from the foregoing description. It is to be noted that the assembled closures, after being placed under compression and during the time the pressure is maintained, are subjected to baking action, the term "baking" meaning that the temperature is too low to cause the cementing medium to liquefy or boil and to produce vapors or gases.

The difference between the process herein described and the old "baking" method above mentioned consists in that the closures are subjected to pressure while the "baking" takes place. The formation of "puffers" is, therefore, effectively prevented. It has furthermore several advantages over the old "baking" method, for instance the heat is applied more uniformly to the closures, inasmuch as a perfect control of temperature and of time is obtainable, both of which were lacking in the above mentioned "baking" method. Since the temperature

is maintained substantially below that used in all processes heretofore practised, obviously, a close union is formed between the parts of the closure, there being no vapor or gas between the said parts to cause a bulging of the sealing disks after the closures are discharged from the machine. The closures need not be cooled, therefore, under pressure. The time of manufacture is thus reduced and the machine for producing same simplified. The sealing disks, whether of cork or the composite type, retain their original toughness, and the decorations of the caps keep their original colors, in fact bright colors can be employed which heretofore, by reason of the high temperatures, were never even attempted to be used.

In some instances the pressure need not be maintained during the entire time of heating, meaning thereby that the parts of the closure may be placed under compression after the heating has been commenced, or they may be released from pressure before the heating has been finished. This can be easily accomplished by lengthening the cam 95 in one or the other direction.

What I claim is:—

1. A process for the manufacture of bottle closures of the crown cork type, which consists in, first, interposing between the sealing disk and the coincident surfaces of the metal cap coöperating therewith a suitable cementing medium which becomes adhesive when softened, second, placing the closure under appropriate pressure, and, third, heating the closure to a degree which softens the cementing medium to an extent sufficient to cause a union between the sealing disk and the cap, but not high enough to liquefy the cementing medium or to create vapors and gases.

2. A process for the manufacture of bottle closures of the crown cork type, which consists in, first, interposing between the sealing disk and the coincident surfaces of the metal cap coöperating therewith a suitable cementing medium which becomes adhesive when softened, and, second, heating the closure to a degree which softens the cementing medium to an extent sufficient to cause a union between the sealing disk and cap, but not high enough to liquefy the cementing medium or to create vapors or gases and in the meantime placing the closure under appropriate pressure.

3. A process for the manufacture of bottle closures of the crown cork type, which consists in, first, interposing between the sealing disk and the coincident surfaces of the metal cap coöperating therewith a suitable cementing medium which becomes adhesive when softened, and, second, heating the closure under pressure to a degree which softens the cementing medium to an extent sufficient to cause a union between the sealing disk and cap, but not high enough to liquefy the cementing medium or to create vapors or gases.

4. A process for the manufacture of bottle closures of the crown cork type, which consists in, first, interposing between the sealing disk and the coincident surfaces of the metal cap coöperating therewith a suitable cementing medium which becomes adhesive when softened, second, heating the closure to a degree which softens the cementing medium to an extent sufficient to cause a union between the sealing disk and cap, but not high enough to liquefy the cementing medium or to create vapors or gases, and, third, subjecting the closure to an appropriate pressure at some period in the heating action.

Signed at New York, in the county of New York, and State of New York, this 27th day of May, A. D. 1913.

ALEXANDER BOGDÁNFFY.

Witnesses:

SIGMUND HERZOG,

JOHN ALBERTI.