H. M. BROWN.

BOTTLE STOPPERING MACHINE.

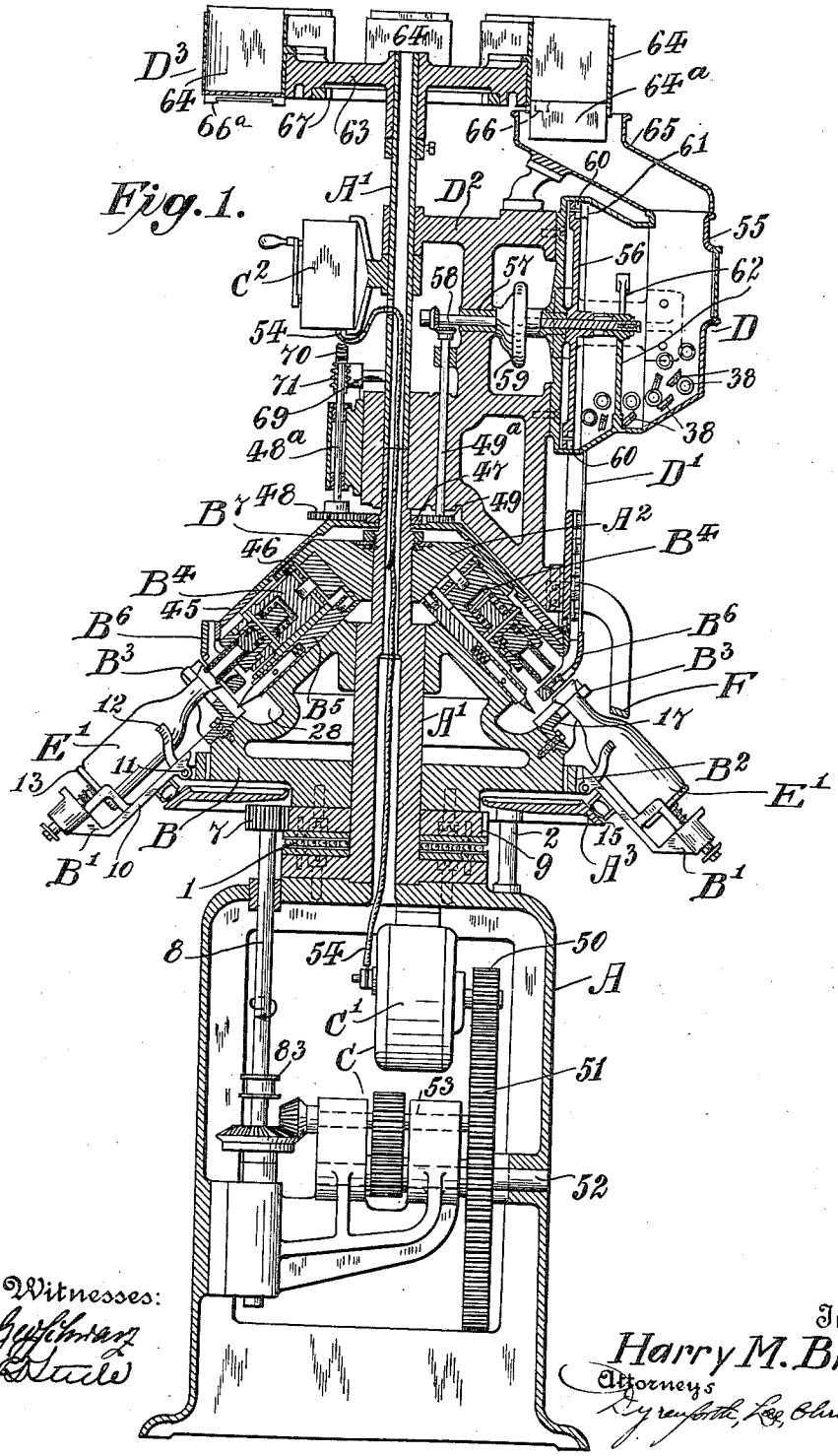
APPLICATION FILED MAY 5, 1915.

1,235,429.

Patented July 31, 1917.

6 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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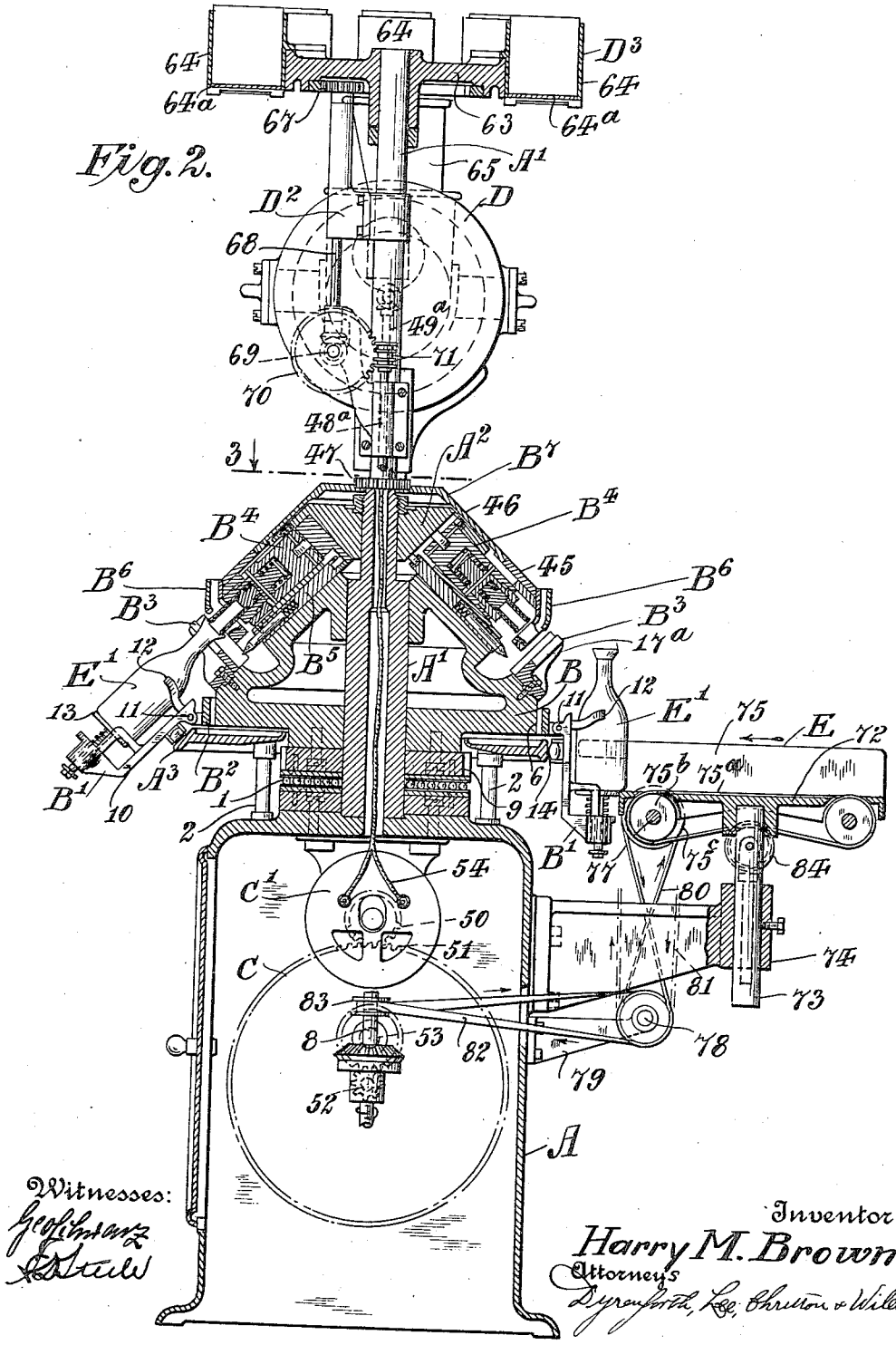
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6 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

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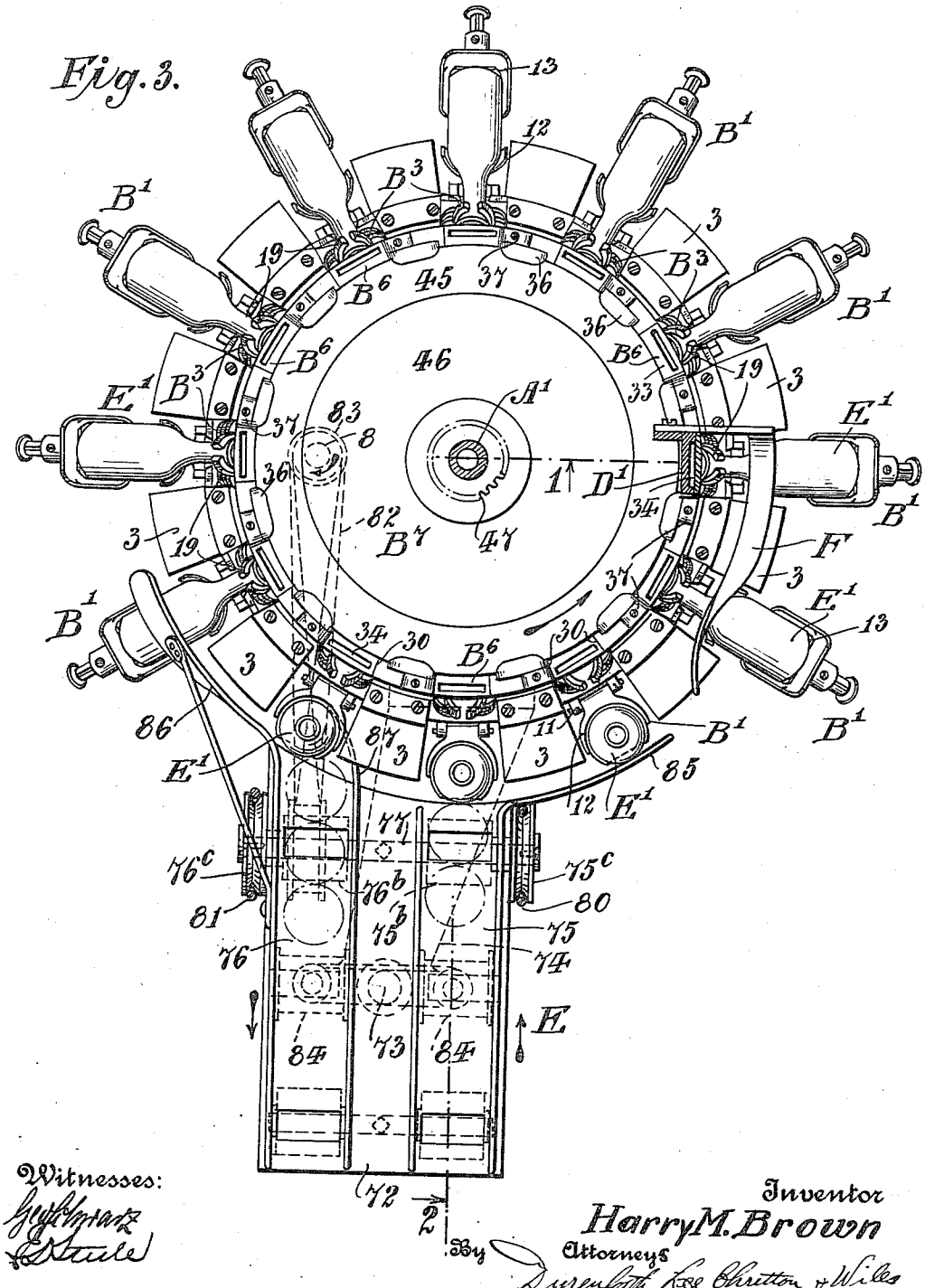
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6 SHEETS—SHEET 3.

Fig. 3.



Witnesses:

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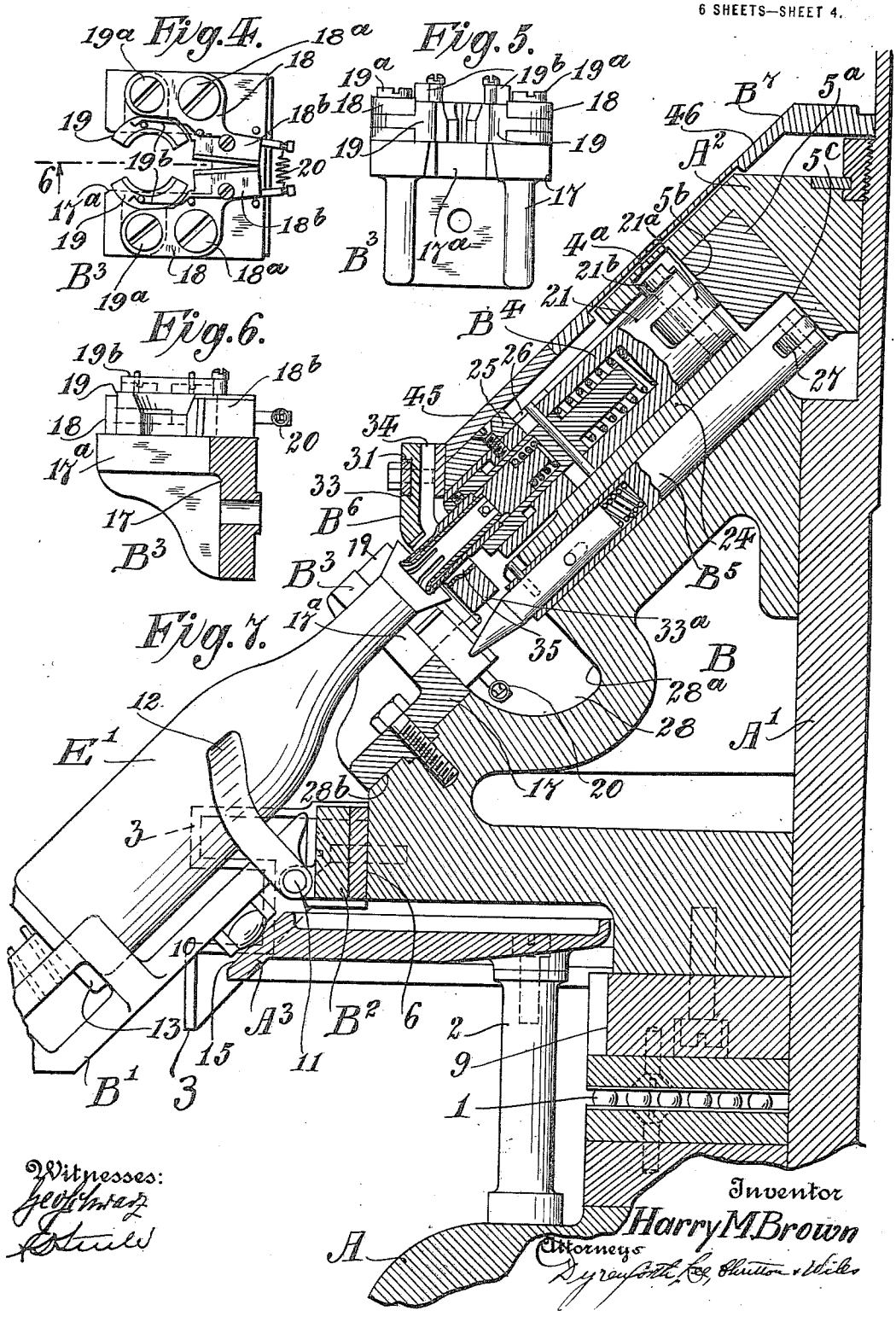
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6 SHEETS—SHEET 4.



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6 SHEETS—SHEET 5.

Fig. 8.

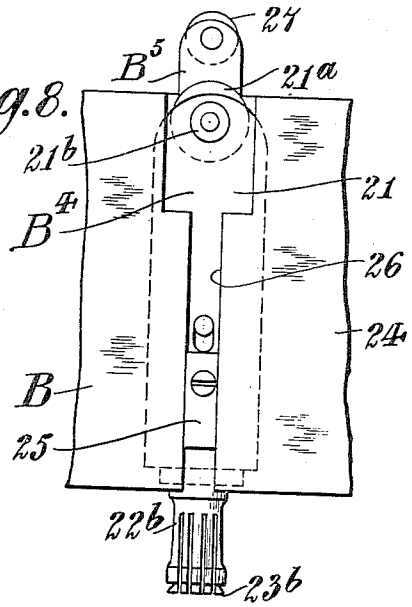


Fig. 9.

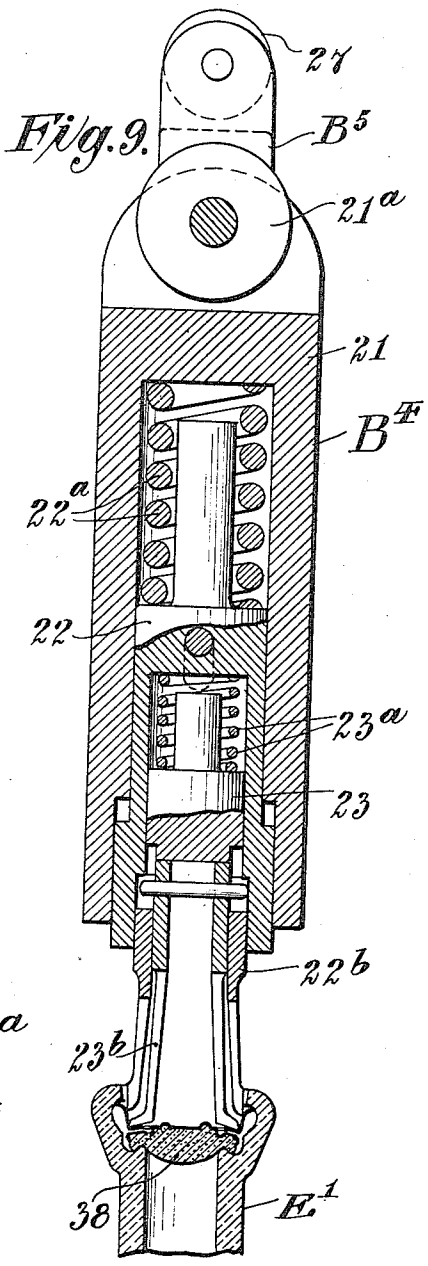


Fig. 10.

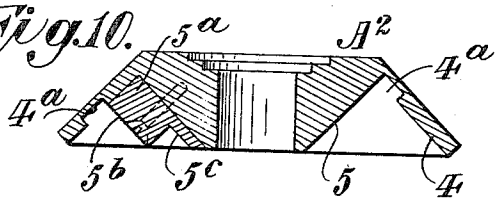
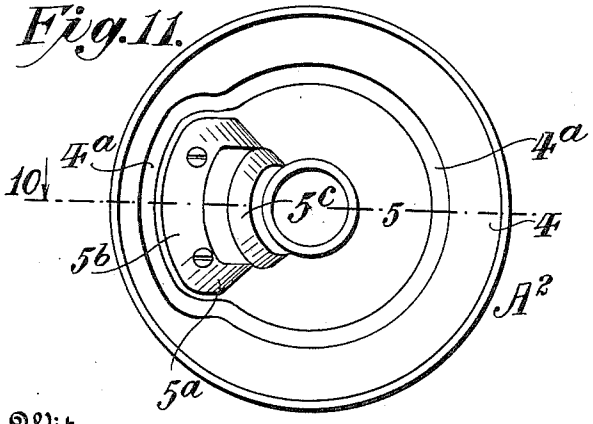


Fig. 11.



Witnesses:

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BOTTLE STOPPERING MACHINE.

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1,235,429.

Patented July 31, 1917.

6 SHEETS—SHEET 6.

Fig. 12.

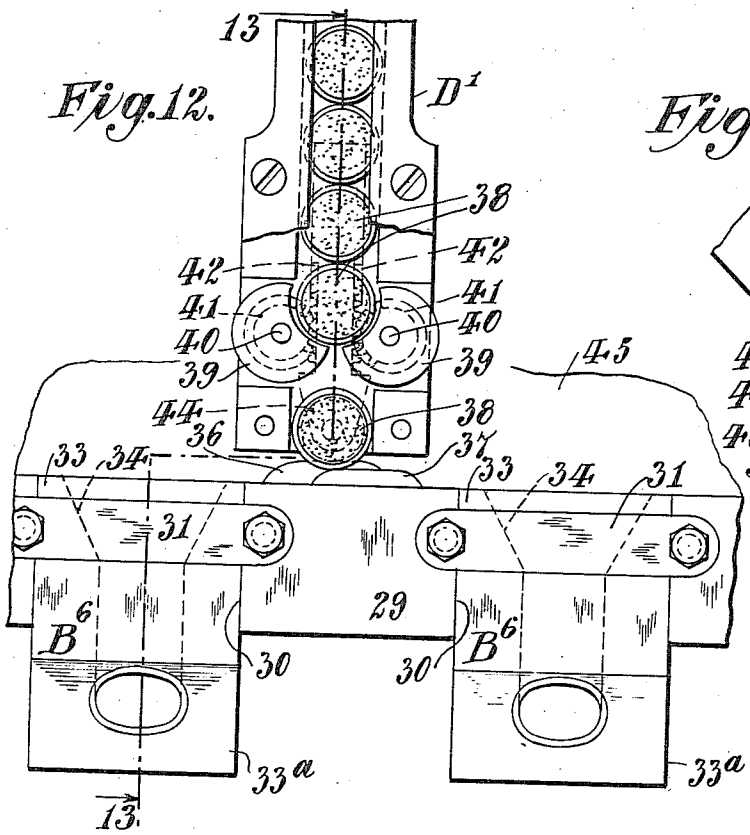


Fig. 13.

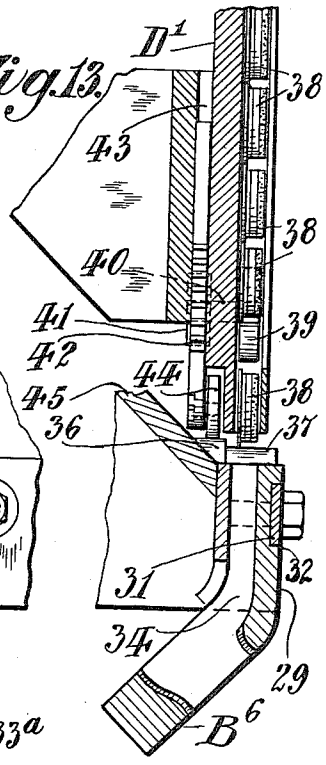


Fig. 14.

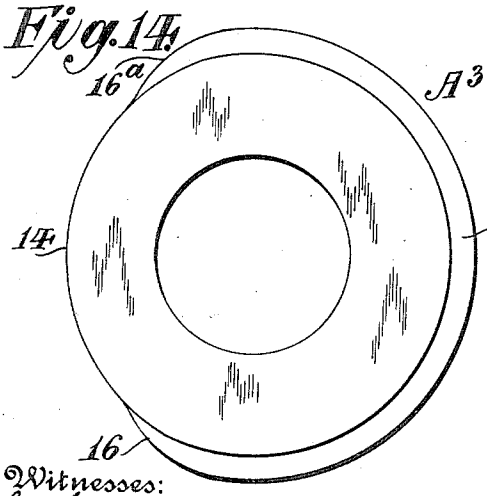
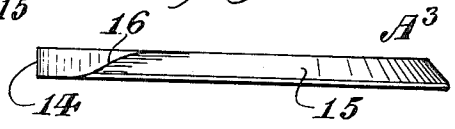


Fig. 15.



Witnesses:

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UNITED STATES PATENT OFFICE.

HARRY M. BROWN, OF BROOKLYN, NEW YORK, ASSIGNOR TO SPRING STOPPER COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF DELAWARE.

BOTTLE-STOPPERING MACHINE.

1,235,429. Specification of Letters Patent. Patented July 31, 1917.

Application filed May 5, 1915. Serial No. 25,906.

To all whom it may concern:

Be it known that I, HARRY M. BROWN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Bottle-Stoppering Machines, of which the following is a specification.

This invention relates particularly to machines for applying seals, or stoppers, to bottles; and the primary object is to provide a machine of large capacity, operating in an improved manner, and capable of performing its work with certainty and with practically no danger of breakage to the bottles.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents a vertical sectional view of a machine constructed in accordance with the invention, the section being taken as indicated at line 1 of Fig. 3; Fig. 2, a vertical section taken as indicated at line 2 of Fig. 3; Fig. 3, a plan section taken as indicated at line 3 of Fig. 2; Fig. 4, a plan view of one of the neck-clamping devices employed; Fig. 5, a front elevational view of the same; Fig. 6, a sectional view taken as indicated at line 6 of Fig. 4; Fig. 7, an enlarged broken vertical sectional view taken in a plane which intercepts the high portion of the stationary cam which operates the annularly arranged stoppering tools and clamp-closing plungers carried by the rotary head employed; Fig. 8, a broken view showing a portion of the conical surface of the rotary head mentioned, and one of the inclined stoppering tools reciprocably mounted thereon; Fig. 9, an enlarged broken sectional view of one of the stoppering tools, illustrating the manner in which the stopper is forced into the mouth of the bottle; Fig. 10, a sectional view of the fixed cam which actuates the annularly moving stoppering tools and clamp-closing plungers, the section being taken as indicated at line 10 of Fig. 11; Fig. 11, a bottom view of the cam mentioned; Fig. 12, a broken elevational view showing a portion of the rotary head mentioned and two of the stopper-guides carried by said rotary head and the relation of these parts to the stationary stopper-chute; Fig. 13, a broken sectional view, taken as indicated at line 13 of Fig. 12; Fig. 14, a plan view of a stationary cam employed for actuating the tiltable bottle-holders, which are mounted on a ring carried by the rotary head mentioned; and Fig. 15, an elevational view of the cam shown in Fig. 14.

In the preferred embodiment of the invention, which is illustrated, A represents a hollow frame, or housing, upon which is fixedly mounted a central vertical shaft, or standard, A^1, to which is fixedly attached a stationary plunger-actuating cam A^2; A^3, a stationary bottle-support actuating cam fixedly mounted on posts 2 carried by the upper portion of the frame A; B, a rotary head for which the lower portion of the shaft A^1 serves as a journal and which is supported on the frame A, through the medium of an anti-friction bearing 1; B^1, an annular series of bottle-holders carried by a ring B^2 which is fixedly secured to the periphery of the base-portion of the rotary head B, the ring B^2 carrying, also, a series of guards 3, which alternate with the bottle-supports B^1 and which serve to prevent bottles from being fed into the machine, except when a holder is in proper position to receive the bottle; B^3, an annular series of neck-clamps mounted on the lower portion of the rotary head B; B^4, an annular series of inclined stoppering tools reciprocable in inclined guides, with which the rotary head B is equipped; B^5, a series of inclined clamp-actuating plungers carried by the head B and associated with the stoppering tools B^4; B^6, an annular series of stopper-guides, or chute-sections, fixedly secured to the peripheral portion of the rotary head B and adapted to successively receive stoppers from a stationary stopper-chute; B^7, a shield, or cover, mounted to rotate with the head B; C, mechanism mounted in the frame A and serving to actuate the rotary head B, said mechanism being driven by a motor C^1 electrically connected with a controller C^2 carried by the fixed shaft A^1; D, stopper-selecting and feeding mechanism equipped with a fixed stopper-chute D^1, with the lower end of which the stopper-guides B^6, carried by the rotary head B, successively register, the mechanism D being mounted on the frame-member D^2 fixedly secured to the shaft or standard A^1; D^3 a rotary stopper-supply device adapted to periodically drop

a charge of stoppers into the hopper of the mechanism D; E, mechanism for delivering and discharging the bottles E^1; and F, a segmental guard, or cam, carried by the fixed stopper-chute D^1 and serving to insure the proper engagement of the bottle-neck with the neck-clamp before the bottle reaches the point where the stoppering action occurs.

The frame A may be of any suitable construction. The form shown is simple and well adapted to the purpose.

The stationary cam A^2 (Figs. 7, 10 and 11) is fixedly mounted on the standard A^1 a sufficient distance above the frame A to afford clearance for the rotary head B. It comprises a disk which has a frusto-conical outer surface, and which is cut away at its lower side to provide an inclined flange 4 and a downwardly-converging conical surface 5, which affords a cam surface beneath or under which the cam-rollers at the upper ends of the plungers B^4 and B^5 ride. The downwardly tapering conical surface 5 is provided with an insert-piece 5^a which affords a high point 5^b adapted to depress the stoppering plungers in succession, and a high point 5^c adapted to depress the clamp-actuating plungers in succession. In the inner surface of the flange 4 is provided a cam-groove 4^a adapted to retract the plungers B^4 after the stoppering operation.

The rotary head B is preferably of the frusto-conical form illustrated, being provided, however, above the anti-friction bearing 1 with a vertical surface 6, to which the ring B^2 is fixedly secured in any suitable manner. As illustrated in Fig. 1, the head B is rotated through the medium of a pinion 7 carried by a vertical shaft 8, forming a part of the mechanism C, the pinion 7 meshing with a gear 9, with which the lower portion of the head B is equipped.

Each bottle-holder B^1 comprises (Fig. 7) an arm 10 mounted on a pivot 11 carried by the ring B^2; a yoke 12 adapted to engage the side of the bottle; and a spring-supported disk, or seat, 13, adapted to serve as a yielding bearing for the lower end of the bottle. The bottle-holders B^1 successively assume a vertical position in passing the rear portion of the bottle-feeding and discharging mechanism E, and are tilted to an inclined position and sustained in such position by the cam A^3 to enable the stopper to be applied. This will be understood from Figs. 14 and 15, which show the cam A^3 provided with the curved low cam-surface 14, which permits the bottle-holder to assume a vertical position in passing the rear end of the mechanism E, and a high beveled cam-surface 15, which is reduced and suitably curved at its ends to coalesce with the surface 14, as indicated at the points 16 and 16^a.

Each neck-clamp B^3 comprises an angle-block 17 having an outwardly and upwardly-inclined flange, which is provided with a slot, or recess, 17^a, adapted to accommodate the bottle-neck; a pair of main jaws, or levers, 18, mounted on the block 17 by means of pivots 18^a; and a pair of auxiliary clamping jaws 19 connected by pivots 19^a with the main jaws 18. The auxiliary jaws 19 have their clamping portions in the form of segments, suitably shaped to accommodate the head portion of the bottle-neck. The auxiliary jaws are yieldingly held in position by springs 19^b carried by the main jaws 18. The main jaws are equipped with rearwardly-extending arms 18^b carrying studs connected by a spring 20, said spring serving to hold the jaws normally open. The upper portions of adjacent sides of the arm 18^b are beveled, and the pointed lower end of the jaw-closing plunger B^5 is adapted to work between the arms 18^b and close the jaws. The main jaws are held positively in the closed position during the stoppering operation. The auxiliary jaws 19 are self-adjusting, to enable them to engage the bottle-neck properly.

The stoppering tools B^4 are illustrated as of a form adapted to apply seals or stoppers to the internally-grooved mouth of a bottle. Such a form of stoppering tool is illustrated, for convenience merely, as the invention is applicable to the purpose of applying crown seals, or stoppers, for illustration, by substituting a stoppering tool adapted to such stoppers.

The stoppering tool B^4, in the form illustrated, comprises a cam-controlled plunger 21 equipped at its upper end with a main cam-roller 21^a which actuates the plunger during the working stroke, and equipped also with a laterally-projecting cam-roller 21^b which works in the cam-groove 4^a of the cam A^2, and serves to retract the plunger 21 and maintain it in the elevated position until the high portion of the cam is again encountered; a spring-projected plunger 22 mounted for reciprocation in the plunger, or shank, 21, and backed by a strong spring 22^a; a tool member 22^b fixedly secured in the lower end of the plunger 22; a plunger 23 reciprocably mounted in the plunger 22 and backed by a lighter spring 23^a; and a tool-member 23^b backed by the plunger 23 and reciprocable with relation to the tool-member 22^b.

The details of construction of the stoppering tool are unimportant, and have been given merely to facilitate an understanding of the stoppering operation. Each plunger, or tool-holder, 21, is reciprocably mounted in a correspondingly inclined guide 24, with which the conical surface of the rotary member B is provided. Each plunger 21 is equipped with a key, or feather, 25, which

moves in a vertical slot 26 opening from guide 24 to the conical face of the rotary member B.

Each clamp-actuating plunger B^5 works in a suitable guide back of the corresponding stoppering tool B^4, and is equipped at its upper end with a cam-roller 27, which works on the cam-face 5 and 5^b of the cam A^2.

The rotary head B has an annular recess 28 (Fig. 7) bounded on its upper side by an undercut wall 28^a. The neck-clamps B^3 are detachably mounted on an inclined surface 28^b below the recess 28, the neck-clamps being suitably spaced with relation to the undercut surface 28^a.

The rotary head also has a vertical surface 29 (Figs. 12 and 13) which lies above the space 28, and is provided with vertical grooves 30 for the inserted stopper-guides B^6. The stopper-guides are secured in position by metal straps 31 which enter corresponding horizontal slots 32 in the member B^6, and the vertical surface 29 of the rotary member B. Each member B^6 has a vertical upper portion 33 and an inwardly and downwardly inclined portion 33^a, which is accommodated by the annular recess 28 of the head B. Each member B^6 has a stopper passage 34, which is provided with a widened mouth or upper end, and turned inwardly at its lower end, where it terminates in a perforate socket 35, through which the stopper may be forced by the stoppering tool, and thus carried into the mouth of the bottle. The rotary member B is equipped above the ledge, which provides the vertical surface 29, with a series of cams 36 adapted to actuate a stopper-escapement, and with a series of cams, or stopper-supports, 37, upon which the stopper 38 can drop when it passes the escapement shown in Fig. 12. One of the cams 36 and one of the cams 37 is disposed slightly in advance of each guide or chute-section B^6.

The stopper-chute D^1 is equipped with a pair of oscillating escapement-disks 39 having companion recesses adapted to accommodate the stopper. The disks 39 are mounted on shafts 40 equipped with pinions 41, which mesh with a rack 42 movable in a vertical guide 43 disposed back of the chute D^1. The lower end of the rack 42 is equipped with a cam-roller 44 adapted to be periodically elevated by the cams 36, as they pass in succession beneath the cam-roller.

The shield B^7, which rotates with the head B, comprises a lower frusto-conical section 45 and an upper section 46, which freely incloses the stationary cam A^2. The section 45 is carried at its lower edge on the portion of the rotary head B which carries the stopper-guides B^6. The top member 46 has secured thereto a pinion 47 which is journaled on the vertical shaft A^1. The pinion 47 meshes with pinions 48 and 49 secured to the lower ends of small vertical shafts 48^a and 49^a, which are journaled in the frame-member D^2. The shaft 48^a serves to actuate the device D^3, and the shaft 49^a serves to actuate the stopper-selecting mechanism D.

The actuating mechanism C of the machine comprises a pinion 50 mounted on the motor-shaft, meshing with a gear 51 secured to a shaft 52, and a counter-shaft 53 connected by spur-gears to the shaft 52, and by beveled gears to the vertical shaft 8. Electric conductors 54 extend up from the motor through the shaft, or standard A^1 and connect with the electric controller C^2, which, it will be understood, is not shown in Fig. 2.

The stopper-selecting and feeding mechanism D comprises a hopper 55, which is provided with a sloping bottom, and which is fixedly mounted on the frame-member D^2; a vertical disk 56 disposed adjacent the inner wall of the hopper and mounted on a tubular horizontal shaft 57 journaled in the frame-member D^2; and a shaft 58 actuated by the shaft 49^a and on which the tubular shaft 57 is frictionally mounted, the tubular shaft 57 being equipped with a hand-wheel 59, by means of which the disk 56 may be rotated manually, if desired. The outer marginal portion of the disk 56 is equipped with permanent magnets 60, which serve to elevate the stoppers 38 to the upper orifice 61 of the stopper-chute D^1, which opens into the upper portion of the hopper, in proper position to receive the selected stoppers. It will be understood that the magnets attract the metal parts of the stoppers, and thus elevate the stoppers to the discharge orifice 61, which constitutes the inlet orifice of the stopper-chute D^1.

One end of the shaft 58 extends into the hopper and is supported by a spider, having arms 62.

The device D^3 comprises a disk, or spider, 63, journaled on the upper end of the standard A^1; and a series of annularly arranged receptacles 64 carried by the member 63 and provided with spring-closed bottoms 64^a adapted to be dropped, or thrown open, as each receptacle passes slowly over the upper end of a chute 65 which communicates with the upper end of the hopper 55. The bottoms 64 are depressed by means of cams 66, carried by the chute 65 and adapted to engage cam-lugs 66^a with which the bottoms 64 are equipped back of their pivots. The member 63 is equipped at its lower side with an annular gear 67, which meshes with a pinion secured on the upper end of a vertical shaft 68, which is actuated by a horizontal shaft 69 equipped with a worm-gear 70, which meshes with a worm 71, with which the upper end of the shaft 48^a is equipped. Thus, the receptacle-carrying member 63 is given a very slow movement of rotation, so as to cause a fresh charge of stoppers to be

introduced into the hopper 55 at proper intervals.

The bottle-feeding mechanism E may be of any suitable construction. The mechanism shown is adapted to receive bottles from a bottle-filling machine, deliver them to the annularly moving bottle-holders B^1, and finally to receive the stoppered bottles from said holders and discharge them from the machine. The mechanism E comprises a frame 72 carried by a post 73 supported on a bracket 74; an inlet passage, or run-way 75 equipped with an endless conveyer 75^a; an outlet passage, or run-way, 76, equipped with a similar conveyer belt (not shown); drums 75^b and 76^b mounted on a shaft 77 and equipped with actuating pulleys 75^c and 76^c, respectively; a shaft 78 mounted in brackets 79 and equipped with pulleys connected by a cross belt 80 and a straight belt 81 with the pulleys 75^c and 76^c, respectively; and a belt 82 serving to actuate the shaft 78, the belt 82 being actuated by a pulley 83 mounted on the vertical shaft 8 of the driving mechanism C. The device E is shown equipped with the conveyer tighteners 84.

The run-way 75 has its outer side extended to afford a segmental bottle-guide or guard 85, affording a guide for the outer sides of the bottles as they are carried by the holders B^1 toward the guard F. The outer side of the run-way 76 is extended and curved to form a guard 86 adapted to guide the bottles to the outgoing runway 76. The inner side of the run-way 76 is extended and curved, as indicated at 87, to provide a guide-member adapted to engage the inner sides of the bottles and guide them into the outgoing run-way 76.

The operation may be stated briefly:

The bottle- and tool-carrying head B rotates continuously, being actuated by the shaft 8 of the driving mechanism C. The bottle-delivering and discharging mechanism E also operates continuously, which is also true of the stopper-selecting and feeding mechanism D. As each bottle-holder B^1 passes the rear end of the ingoing bottle run-way 75, it receives a bottle, and as the bottle is carried toward the stopper-chute D^1, the bottle-holder B^1 is tilted to an inclined position by the stationary cam A^3 and maintained in the inclined position until after the stoppering operation. The neck-portion of the bottle passes beneath the cam, or guard, F, which thus insures the neck being entered in the corresponding neck-clamp B^3. When the corresponding stopper guide and support B^6 passes beneath the stopper chute D^1, it receives a stopper 38, the stopper escapement being actuated in time by the corresponding cam 36, the stopper dropping upon the cam 37 (Fig. 12) and finally rolling into the guide B^6, where it is supported by the inclined perforate socket 35. At the proper moment the corresponding stopper tool B^4 and the clamp-actuating plunger B^5 are depressed by the stationary cam A^2, the neck-clamp being closed and held locked while the stoppering operation is performed. At about the time the bottle reaches the guide 86 of the outgoing run-way 76, the holder B^1 rides down on to the low portion of the cam A^3, so that the holder will occupy a vertical position while passing the rear end of the bottle-feeding and discharging mechanism E. The stoppered bottles are engaged by the guide-member 87 of the outgoing bottle run-way 76, which thus causes the bottle to slide from the bottle support into the outgoing run-way.

The device D^3 rotates slowly, but continuously, and intermittently discharges a fresh supply of stoppers from the receptacles 64 through the chute 65 into the hopper 55 of the mechanism D.

The improved machine is durable, certain in its operation, possesses large capacity, and is of a character to prevent breakage of the bottles.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitation should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

What I claim as new, and desire to secure by Letters Patent, is:

1. In a machine of the character set forth, the combination of a rotary head equipped with an annular series of tiltable bottle-holding devices, inclined stoppering tools reciprocably mounted on said head, and a cam for actuating said stoppering tools.

2. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined neck-clamps, a series of upwardly and inwardly inclined stoppering tools reciprocably mounted on said head above the neck-clamps, a series of tiltable clamp-actuating plungers associated therewith, and a stationary cam-device serving to actuate said stoppering tools and clamp-actuating plungers.

3. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools, means for actuating said stoppering tools as they move in an orbital path, a series of tiltably mounted bottle-holders carried by said rotary head, and means for tilting the bottle-holders during their orbital movement.

4. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools, a series of neck-clamps mounted on said rotary head, a series of tiltably mounted bottle-holders carried by said rotary head, and

means for tilting the bottle-holders during their orbital movement.

5. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools, a series of neck-clamps mounted on said rotary head, a series of tiltably mounted bottle-holders carried by said rotary head, means for tilting the bottle-supports during their orbital movement, and a curved guard beneath which the upper portions of the bottles pass whereby they are tilted to the inclined position.

6. In a machine of the character set forth, the combination of a rotary head equipped with a series of reciprocably mounted inclined stoppering tools, a series of stopper-guiding and supporting devices having inwardly and downwardly-inclined perforate stopper-sockets, means for delivering stoppers to said stopper-guiding and supporting devices, bottle-supporting means associated with each stoppering tool and carried by said rotary head, and means for actuating the stoppering tools during their orbital movement.

7. In a machine of the character set forth, the combination of a rotary head equipped with a series of reciprocably mounted upwardly and inwardly inclined stoppering tools and a series of reciprocably mounted inclined clamp-actuating plungers disposed at the lower side of said stoppering tools, neck-clamping devices mounted on said rotary head, and a stationary cam device engaging the upper ends of said stoppering tools and said plungers and serving to actuate the stoppering tools and clamp-actuating plungers.

8. In a machine of the character set forth, the combination of a vertical standard, a rotary head through which said standard rises, a series of upwardly and inwardly inclined stoppering tools reciprocably mounted on said head, bottle-holding devices mounted on said head, and a stationary cam carried wholly by said standard above and serving to actuate said stoppering tools.

9. In a machine of the character set forth, the combination of a frame equipped with an upwardly-extending fixed shaft, a rotary head through which said shaft extends, a series of reciprocably mounted upwardly and inwardly inclined stoppering tools carried by said head, a series of upwardly and inwardly inclined clamp-actuating plungers carried by said head, a fixed cam-device carried by said shaft and disposed above and serving to actuate said stoppering tools and clamp-actuating plungers, and bottle-holding devices mounted on the lower portion of said rotary head.

10. In a machine of the character set forth, the combination of a frame equipped with an upwardly-extending fixed shaft, a rotary head through which said shaft extends equipped with a series of inclined stoppering tools, a cam-device fixedly mounted on said shaft and disposed above the stoppering tools, and tiltable bottle-holding devices mounted on the lower portion of said rotary head.

11. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined reciprocable stoppering tools, means for actuating said stoppering tools during their orbital movement, stopper-holding means associated with the stoppering tools, a series of pivotally mounted bottle-holders carried by said rotary head, and a stationary cam serving to swing the bottle-holders to an inclined position during their orbital movement.

12. In a machine of the character set forth, the combination of a rotary head, a stationary shaft extending upwardly therethrough, a stopper-selecting and feeding device mounted on and carried wholly by said shaft and disposed above said rotary head and equipped with a stopper-chute, a series of reciprocably mounted upwardly and inwardly inclined stoppering tools carried by the said head, cam-means carried by said shaft and serving to actuate the stoppering tools during their orbital movement, a series of stopper-guides and holders carried by said head and associated with the stoppering tools, and a series of bottle-holders carried by said rotary head.

13. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools and a series of clamp-actuating plungers disposed at the lower sides of the stoppering tools, a series of neck-clamps mounted on the rotary head, each having a pair of main jaws adapted to be actuated by said plungers, and a pair of self-centering auxiliary jaws mounted on the main jaws, a stationary cam-device serving to actuate the stoppering tools and clamp-actuating plungers, a series of tiltably mounted bottle-holders carried by said rotary head, and means for tilting said bottle-holders during the orbital movement thereof.

14. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools and a series of clamp-actuating plungers disposed at the lower sides of the stoppering tools, a series of neck-clamps mounted on the rotary head, each having a pair of main jaws adapted to be actuated by said plungers, and a pair of self-centering auxiliary jaws mounted on the main jaws, a stationary cam-device serving to actuate the stoppering tools and clamp-actuating plungers, a series of stopper-guides carried by said head and having inwardly and down-

wardly inclined perforate stopper-sockets through which the stoppering tools work, a series of tiltably mounted bottle-holders carried by said rotary head, and means for tilting said bottle-holders during the orbital movement thereon.

15. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools, means for actuating said stoppering tools during their orbital movement, a series of tiltably-mounted bottle-holders carried by said rotary head, means for tilting said bottle-holders to an inclined position as they are carried to the stoppering position, a bottle-feeding device provided with an ingoing bottle run-way, and means for moving the bottles therethrough, and bottle-guards carried by said rotary head and alternating with said bottle-holders.

16. In a machine of the character set forth, the combination of a rotary head, a series of inclined stoppering tools mounted thereon, means for actuating said stoppering tools during their orbital movement, bottle-feeding mechanism provided with an ingoing bottle run-way, a series of tiltably mounted bottle-holders carried by said rotary head, and means for tilting the bottle-holders and maintaining them in an inclined position until they pass the stoppering position and then dropping the bottle-holders and maintaining them substantially in an upright position until they pass said bottle run-way.

17. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools, a stationary cam serving to actuate said stoppering tools during their orbital movement, a series of tiltably mounted bottle-holders carried by said rotary head, bottle-feeding mechanism having an ingoing bottle run-way and an outgoing bottle run-way equipped with means for moving bottles therethrough, and a cam serving to tilt the bottle-holders to an inclined position, to maintain them in the inclined position until they pass the stoppering position, return them to an upright position and maintain them in the upright position until they pass the bottle-feeding mechanism.

18. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools, means for actuating said stoppering tools during their orbital movement, a series of tiltably-mounted bottle-holders carried by said rotary head and which occupy substantially a vertical position while passing a bottle-receiving point, and means for feeding bottles to the holders while in the vertical position.

19. In a machine of the character set forth, the combination of a rotary head, a series of inclined stoppering tools carried thereby, means for actuating said stoppering tools, a series of tiltable bottle-supports carried by the rotary head which are open at their outer sides and equipped with spring-supported members on which the lower ends of the bottles may rest, and means for tilting the bottle-supports to an inclined position as they are carried to the stoppering position.

20. In a machine of the character set forth, the combination of stopper-applying mechanism, stopper-selecting and feeding mechanism, including a hopper, and power-actuated stopper-charging mechanism equipped with a series of receptacles adapted to be brought successively in position and discharge their contents into the hopper of the stopper-selecting and feeding mechanism.

21. In a machine of the character set forth, the combination of a rotary head, stoppering tools reciprocably mounted thereon, a stationary shaft extending through said rotary head, a cam mounted on said shaft and serving to actuate the stoppering tools, a series of bottle-supporting devices carried by the rotary head, stopper-selecting and feeding mechanism carried by said shaft, and stopper-charging mechanism carried by said shaft and actuated through the medium of said rotary head.

22. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined stoppering tools reciprocably mounted thereon, means for actuating said stoppering tools, a series of detachably mounted neck-clamps carried by the rotary head, a series of tiltably mounted bottle-holders carried by the rotary head, and means for tilting the bottle-holders to an inclined position as they are carried to the stoppering position.

23. In a machine of the character set forth, the combination of a rotary head, a series of stoppering tools reciprocably mounted thereon, means for actuating said stoppering tools, a series of stopper-guiding and supporting devices carried by the rotary head, stopper-selecting and feeding mechanism equipped with a stopper-chute with which said stopper-guiding and supporting devices are successively brought into registration, a series of cams carried by the rotary head, a stopper escapement associated with the stopper-chute and periodically actuated by said cams, and a series of stopper-supporting cams carried by said rotary head and arranged in advance of the stopper-guiding and supporting devices with which they respectively correspond.

24. In a machine of the character set forth, the combination with a stopper-chute equipped with an escapement device, of a

rotary head equipped with a series of stopper-guiding and supporting devices, and equipped in advance of each of said stopper-guiding and supporting devices with an escapement actuating cam, a series of stoppering tools mounted on the rotary head, actuating means therefor, and a series of bottle-holding devices mounted on said rotary head.

25. In a machine of the character set forth, the combination of a conical rotary head, provided with a peripheral recess, a series of neck-clamps mounted on the head and disposed at the lower side of said recess, a series of inclined stoppering tools mounted on the head and extending into said recess, a series of stopper-guiding devices carried by said head and equipped with perforate stopper-sockets disposed in said recess above the neck-clamps, means for actuating the stoppering tools, and a series of bottle-holders mounted on the rotary head.

26. In a machine of the character set forth, the combination of a conical rotary head, provided with a peripheral recess, a series of neck-clamps mounted on the head and disposed at the lower side of said recess, a series of inclined stoppering tools mounted on the head and extending into said recess, a series of stopper-guiding devices carried by said head and equipped with perforate stopper-sockets disposed in said recess above the neck-clamps, means for actuating the stoppering tools, a series of tiltably mounted bottle-holders connected with the rotary head below said neck-clamps, and means for controlling the swinging movements of said bottle-holders during their orbital movement.

27. In a machine of the character set forth, the combination of a conical rotary head provided with a peripheral recess, a series of neck-clamps mounted on said head at the lower side of said recess, a series of inclined reciprocable stoppering tools carried by said head and having their operative ends disposed at said recess, a series of inclined clamp-actuating plungers disposed at the lower sides of said stoppering tools and having their operative ends disposed at said recess, a stationary cam-device serving to actuate the stoppering tools and clamp-actuating plungers, a series of stopper-guiding and supporting devices having perforate sockets disposed in said recess, a series of tiltably mounted bottle-holders connected with the rotary head below the neck-clamps, and a cam controlling the swinging movements of said bottle-holders during their orbital movement.

28. In a machine of the character set forth, the combination of a rotary head equipped with a series of inclined reciprocable tool-holders, a stationary cam provided with a cam surface adapted to successively depress the tool-holders and equipped with a cam groove adapted to retract the tool-holders, stoppering tools carried by said tool-holders, bottle-supporting devices carried by the rotary head, and means for delivering stoppers to the paths of the stoppering tools.

29. In a machine of the character set forth, the combination of a housing and a stationary standard rising therefrom, a rotary head mounted on the upper end of said housing and through which said standard extends; a stationary cam carried by said housing and encircling the base-portion of the rotary head, a series of tiltably mounted bottle-holders carried by the rotary head and controlled by said cam, a series of inclined stoppering tools reciprocably mounted on the head, and a stationary cam carried by said standard and serving to actuate said stoppering tools.

30. In a machine of the character set forth, the combination of a housing, driving mechanism mounted therein, a rotary head mounted on said housing and equipped with a series of tiltably mounted bottle-supports, a cam carried by said housing and controlling the swinging movements of said bottle-supports, bottle-feeding and discharging mechanism geared to said driving mechanism, a series of inclined stoppering tools reciprocably mounted on said head, a fixed shaft rising from said housing, and a stationary cam carried by said shaft and serving to actuate the stoppering tools.

HARRY M. BROWN.

In presence of—
CLAYTON F. MCKENLY,
MARA B. MARTIN.