

APPLICATION FILED SEPT. 2, 1904.

Patented July 27, 1909.

3 SHEETS—SHEET 1.

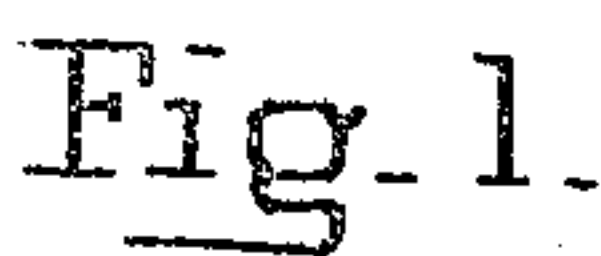


Fig. 2

Witnesses:

Inventor.

Frederick Recht,

by

Samuel W. Balch
Attorney

Attorney

F. RECHT.
MACHINE FOR APPLYING CAPS TO BOTTLES.
APPLICATION FILED SEPT. 2, 1904.

929,248.

Patented July 27, 1909.

3 SHEETS—SHEET 2.

Fig 3.

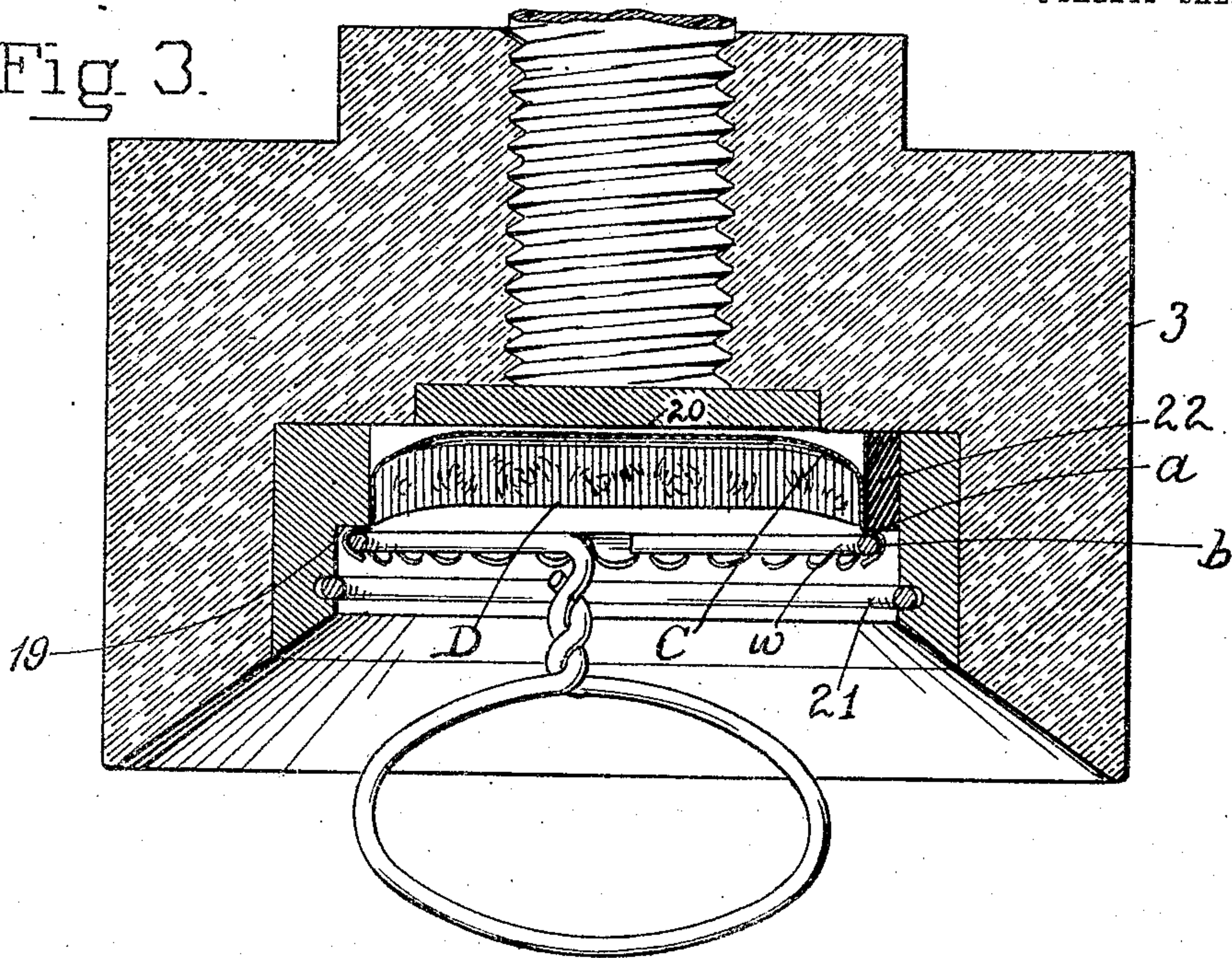
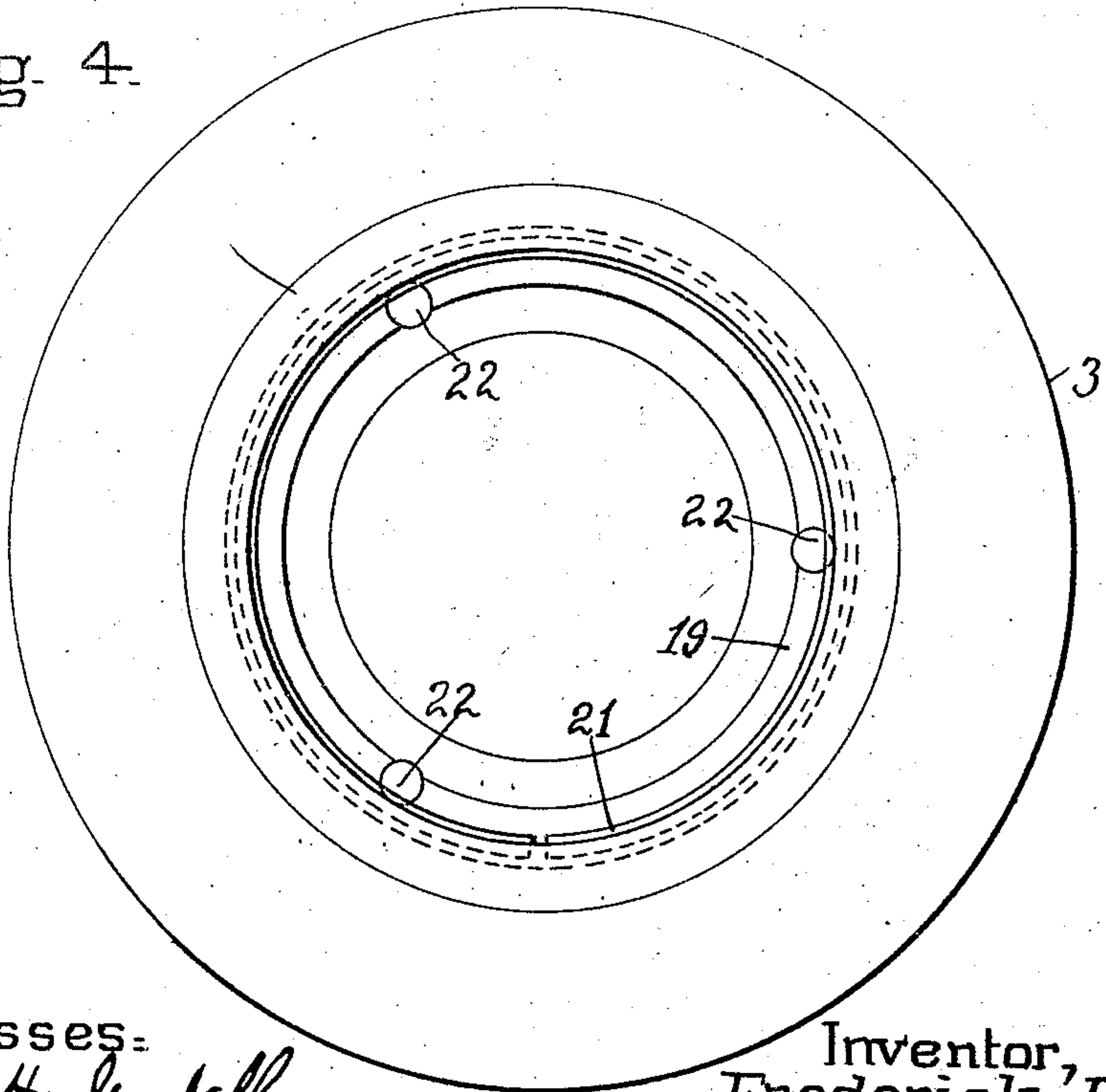


Fig 4.



Witnesses:

Oscar H. Goodell.
Chas. L. Curtis

Inventor,
Frederick Recht,

by Samuel W. Balch
Attorney.

F. RECHT.
MACHINE FOR APPLYING CAPS TO BOTTLES.
APPLICATION FILED SEPT. 2, 1904.

929,248.

Patented July 27, 1909.

3 SHEETS—SHEET 3.

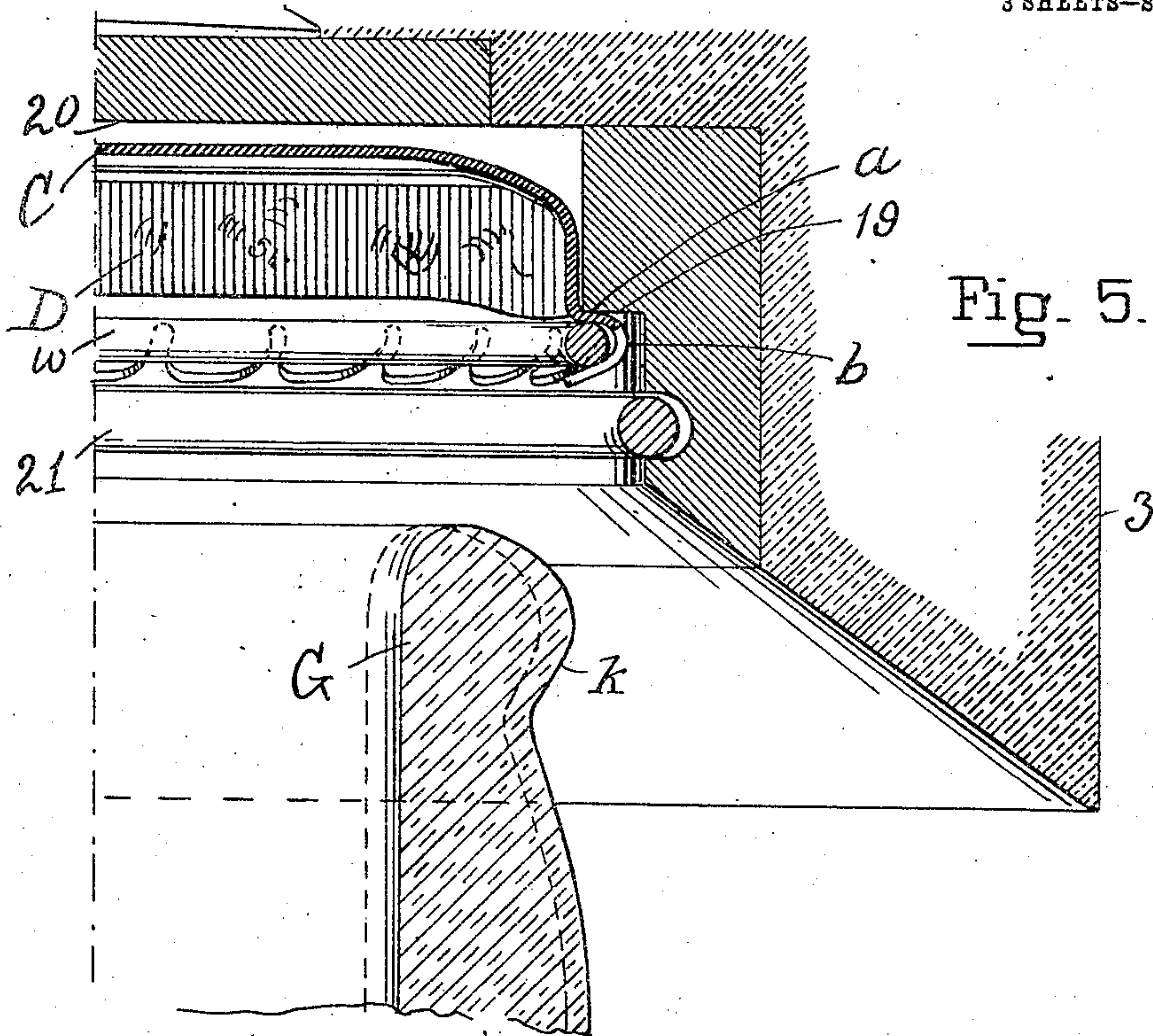


Fig. 5.

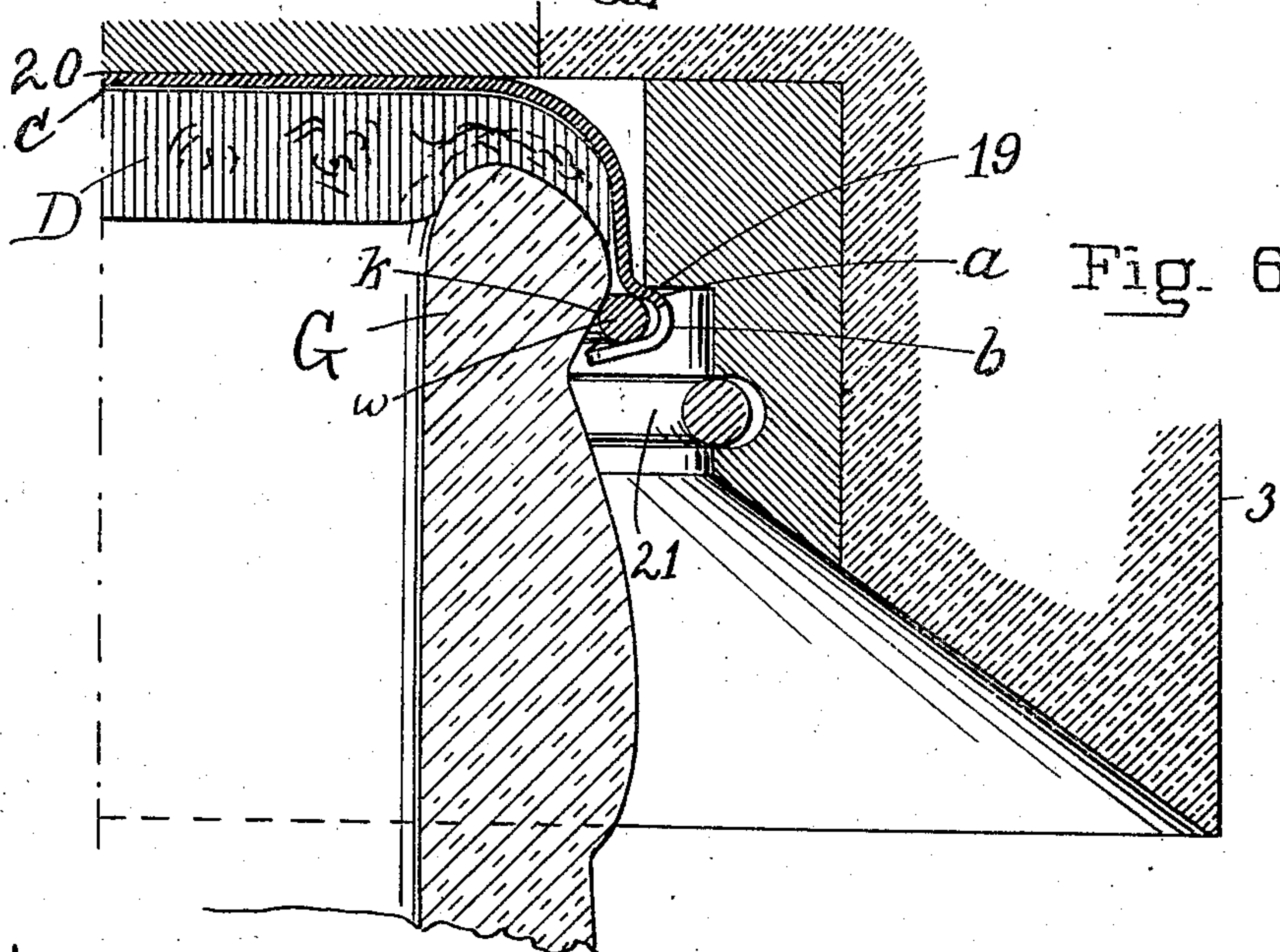


Fig. 6.

Witnesses:
Oscar H. Goodell.
Chas. L. Curtis

Inventor,
Frederick Recht,
by Samuel W. Balch
Attorney.

UNITED STATES PATENT OFFICE.

FREDERICK RECHT, OF NEW YORK, N. Y.

MACHINE FOR APPLYING CAPS TO BOTTLES.

No. 929,248.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed September 2, 1904. Serial No. 223,088.

To all whom it may concern:

Be it known that I, FREDERICK RECHT, a citizen of the United States of America, and a resident of the borough of Brooklyn, in the city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Machines for Applying Caps to Bottles, of which the following is a specification.

10 This invention relates to the application of a flanged sealing cap over the mouth of a bottle with an outwardly projecting lip, the cap being formed with an annular bead exterior to the bottle-lip, the bead having a shoulder substantially at right angles to the axis of the cap and a part depending from the shoulder constructed to lock against a shoulder on the underside of the lip.

15 In the attachment of caps of this general description to bottles it is necessary first to force the sealing medium within the cap into intimate contact with the mouth of the bottle by relative movement in the direction of the bottle axis of two parts of the apparatus for applying the cap, one part a machine-head resting against the cap, and the other part a table supporting the bottle, and, second after and while the cap and bottle are so clamped force that part of the cap which is to effect the locking of the cap toward the bottle axis into engagement with the shoulder or underside of the bottle-lip. In such apparatus as has been heretofore devised for effecting the closure of such caps on the mouths of bottles, separate instrumentalities have been required to perform the two above-defined operations, one instrumentality acting first on the top of the cap, and the other instrumentality following in action and pressing toward the bottle-axis against some portion of the cap which is exterior to the bottle lip, usually by a wedging or camming or rolling action to positively force inwardly the parts against which the instrumentality contacts.

20 My present invention has been made with especial reference to its applicability in effecting the closure on a bottle of a cap which has, in addition to the characteristics above noted, a bead formed on the cap which is exterior to and projects in whole or in part beyond the bottle-lip when laid on the bottle-mouth. Such a form of bottle-cap is set forth in United States Letters-Patent No. 646,627 granted to me April 3, 1900, and, an improvement thereon, in connection with

which my present invention is illustrated, is set forth in an application for Letters-Patent of the United States entitled caps for bottles executed by me concurrently with this application on which Patent No. 796,354 was granted August 1, 1905. The bead has a certain degree of stiffness or resistance to change of form in order that the objects herein set forth may be properly carried out in the manner described.

25 In applying caps of this character one object of my invention is to effect the locking engagement of the cap and bottle by so making and applying the instrumentality for this purpose that the portion of the shoulder of the bead against which it directly acts is positively forced downwardly rather than inwardly, and by a rolling action of the bead the locking engagement is effected by a part depending from the shoulder which is a different part of the cap from that which is directly operated upon.

30 Another object of my invention is to effect the movement of the cap relatively to the bottle in the direction of the bottle-axis and the consequent forcing of the sealing medium into intimate contact with the bottle-mouth by pressure applied to the shoulder of the bead exterior to the bottle-lip. The two operations are made to follow one another properly by reason of the proper proportion of the cap, the bead having such stiffness that it yields to change of form so that the second operation may be performed only after the first operation is completed. The two operations can therefore be performed by the same instrumentality, thereby much simplifying the apparatus.

35 In the accompanying three sheets of drawings which form a part of this application,— Figure 1 is a front elevation drawn to a reduced scale of a foot-power machine embodying my invention in which the machine-head is shown in section along a vertical plane through the axis, a cap is shown in section in place in the head, and a bottle is shown in position to be capped. Fig. 2 is a side elevation of the machine drawn to the same scale as the preceding figure with the bottle in the machine and a cap applied thereto. Fig. 3 is a vertical section drawn to an enlarged scale along the axis of the chuck or part of the machine-head which contains the instrumentality directly concerned in applying and effecting the closure of the cap on the bottle. Fig. 4 is a view of

the chuck from underneath drawn to the same scale as the preceding figure. Fig. 5 is a vertical section through a portion of the chuck drawn to a still larger scale showing the relative proportions of the operating parts of the chuck, the cap before it is applied to the bottle, and, in full and dotted lines, the outline of the mouths and lips of respectively large and small-mouthed bottles to which the cap can be successfully applied. Fig. 6 is a section drawn to the same scale as the preceding figure showing the cap applied to a bottle of average size.

For the purpose of illustrating a complete embodiment of my invention a foot-power machine is shown in Figs. 1 and 2. A column 1 has a forwardly projecting arm 2 which carries a pressure-applying or machine head 3, suitably constructed to act upon the cap, apply it to the mouth of the bottle, compress the sealing disk between the cap and bottle-mouth, and effect a locking engagement between the cap and bottle upon the application of pressure in the direction of the bottle axis $x-x$ between the pressure-applying head and a table 4 which underlies the bottle in the axis of the machine. The table surmounts a two-part shank, one part 5 of which is a part of the table casting, and the other part 6 of which is threaded or screwed therein. By screwing the one part on the other, the height of the table may be adjusted to suit different lengths of bottles. The two-part shank is guided by arms 7 8, which project from the column.

The actuating mechanism consists of a foot-treadle 9 which is fulcrumed at 10 to lugs cast on the underside of the base of the machine. Midway of the treadle is a mortise in which the lower end of a link 11 is pinned. The upper end of this link is pinned to the forked arm 12 of a bent lever. The fulcrum of this bent lever is a pin 13, the ends of which rest on two pillow-blocks 14. The pillow-blocks are supported by springs 15, and lie in two vertical spring-pockets 16 which are cast in the base of the column. The pockets lie on opposite sides of the bent lever and the axis of the machine. The springs are strongly compressed and normally force the pillow-blocks against the tops of the pockets by which they are held under an initial strain when the mechanism is otherwise relaxed. The other arm 17 of the bent lever, also forked, has pinned thereto the lower end of a link 18, the upper end of which is pinned to the lower part of the shank of the table. This arm and link form a toggle which is straightened under the table by the depression of the treadle. The springs serve as an elastic abutment for the toggle which yields when the toggle is straightened to allow for slight variations in the height of bottles from the height for

which the table may have been adjusted. Depression of the treadle with a cap and bottle in place lifts the table and forces the cap and bottle against the pressure-applying head, and the pressure-applying head effects the closure by the instrumentality which will now be described.

The essential feature of the machine-head which effects the objects of my invention is an annular bearing face 19. This rests against the shoulder a of the bead b of the cap C , the shoulder being substantially at right angles to the axis of the cap. The part of the bearing face which actually contacts with the bead is at the corner adjoining the countersunk portion of the head in which the crown of the cap lies. There is clearance between the crown of the cap and the bottom of the countersink, and between the side flange of the cap and the sides of the countersink. The latter clearance is a few thousandths of an inch, which is sufficient to allow for the slight irregularities and variations in the size of the caps, but is preferably not much more, so that the bearing face will rest against the bead quite close to where it springs from the flange of the cap, as I find that a machine in which the bed is so made, gives a satisfactory closure. The bearing face is preferably horizontal, and the shoulder of the bead against which it contacts is horizontal or nearly so, departing therefrom by less than the angle of friction of the contacting parts with the direction of movement. The bearing face consequently presses substantially normally against the shoulder of the bead, and its action is to force the part of the bead against which it contacts in the direction of the bottle-axis, and of itself exert no wedging action, thereby avoiding wear. The action of pressure in the direction of the bottle-axis thus brought to bear on the shoulder of the bead is, first, to forcibly draw the cap down and compress the sealing medium D within the cap into sealing contact with the bottle-mouth G , and, second, when the sealing medium has been compressed sufficiently and further compression is sufficiently resisted, overcome the stiffness of the bead and roll it downwardly approximately about its line of juncture with the depending flange of the cap. The wire w contained within the bead, and also the lower margin of the bead, are thereby carried inwardly toward the axis and one or the other or both are thereby brought into locking engagement with the shoulder k of the bottle-lip. The axial pressure requisite for effecting the locking engagement in this manner is sufficient, if continued indefinitely, to pull apart the depending flange of the cap or shear off the bead therefrom. Means are therefore provided for limiting the movement of the parts in the direction of the axis of the bottle.

These means are afforded by the provision in the machine-head of a stop-face 20 which is the bottom of the countersink in the chuck at a proper depth so that it will come into engagement with the part of the cap which overlies the bottle-mouth when the rolling of the bead and consequent locking engagement with the shoulder of the bottle-lip has been effected. This limiting action, since it is through the cap and sealing medium, which are quite uniform, against the bottle-mouth, will be in proper adjustment irrespective of variations in the height of bottles.

The mouth of the machine-head or chuck which carries the annular bearing face and stop-face is funnel shaped and spaced below the cap holding and closing elements so that the bottle-mouth will be guided to the axial line when carelessly positioned by the operator before striking the cap and collision with the bead of the cap avoided. A non-continuous wire ring 21 set loosely in a groove in the chuck also assists in centering the bottle. The opening in this ring can be smaller than the outside diameter of the cap, since it will readily spring open to allow the caps to pass.

Blocks of rubber 22 are set in notches in the sides of the countersunk space and project slightly into the space. They hold the caps in the chuck preparatory to the operation of the machine.

What I claim as new and desire to secure by Letters-Patent of the United States is:—

1. In a machine for effecting the closure of a metallic cap on the mouth of a bottle, the bottle being provided with a lip and the cap being formed with an annular bead exterior to the bottle-lip, the bead having a shoulder substantially at right angles to the axis of the cap and a part depending from the shoulder and adapted to engage the bottle-lip, a head having a bearing face substantially at right angles to the axis of the cap and adapted to bear substantially normally against the shoulder of the bead to roll the bead by forcing the shoulder in the direction of the bottle-axis and thereby effecting the locking engagement with the bottle, a support for the bottle, and means for effecting relative movement of the head and bottle-support in the direction of the bottle-axis, substantially as described.

2. In a machine for effecting the closure of a metallic cap on the mouth of a bottle, the bottle being provided with a lip and the cap being formed with an annular bead exterior to the bottle-lip, the bead having a shoulder substantially at right angles to the axis of the cap and a part depending from the shoulder and adapted to engage the bottle-lip, a head having a bearing face and a stop-face, the bearing face substantially at right angles to the axis of the cap and being adapted to

bear substantially normally against the shoulder of the bead to roll the bead by forcing the shoulder in the direction of the bottle-axis and thereby effecting the locking engagement with the bottle, and the stop-face being fixed in relation to the bearing face so that it will come into engagement with that part of the cap which overlies the bottle-mouth when the bending action has been completed, a support for the bottle, and means for effecting relative movement of the head and bottle support in the direction of the bottle-axis, substantially as described.

3. In a machine for effecting the closure of a metallic cap on the mouth of a bottle, the bottle being provided with a lip and the cap being formed with an annular bead exterior to the bottle-lip, the bead having a shoulder substantially at right angles to the axis of the cap and a part depending from the shoulder and adapted to engage the bottle-lip, a head having a funnel shaped mouth suitably positioned to guide the bottle mouth to the axial line before striking the cap and having a bearing face substantially at right angles to the axis of the cap adapted to bear substantially normally against the shoulder of the bead to roll the bead by forcing the shoulder in the direction of the bottle-axis and thereby effecting the locking engagement with the bottle, a support for the bottle, and means for effecting relative movement of the head and bottle-support in the direction of the bottle axis, substantially as described.

4. In a machine for effecting the closure of a metallic cap provided with a locking wire on the mouth of the bottle, the bottle being provided with a lip and the cap being formed with an annular bead exterior to the bottle lip inclosing the wire and having a shoulder above the wire substantially at right angles to the axis of the cap and a part depending from the shoulder and adapted to engage the wire, the combination of a head having a bearing face to bear substantially normally against the shoulder of the head above the wire to roll the bead by forcing the shoulder in the direction of the bottle axis, and thereby close the bead upon the wire and effect the locking engagement of the wire with the bottle, a support for the bottle, and means for effecting relative movement of the head and bottle-support in the direction of the bottle axis, substantially as described.

5. In a machine for effecting the closure of a metallic cap on the mouth of a bottle, the bottle being provided with a lip and the cap being provided with means for effecting a locking engagement with the bottle-lip, a head having a bearing face substantially at right angles to the axis of the cap and adapted to bear against the lip-engaging means of the cap to effect the engagement of the cap with the bottle-lip, a spring ring with an interior diameter less than the out-

side diameter of the cap suitably positioned
in the mouth of the head to guide the bottle
mouth toward the axial line of the cap, and
means for effecting relative movement of the
5 head and bottle-support in the direction of
the bottle-axis, substantially as described.

Signed by me at New York city, borough

of Manhattan, on the 26th day of August,
1904.

FREDERICK RECHT.

Witnesses:

SAMUEL W. BALOH,
OSCAR H. GOODELL.