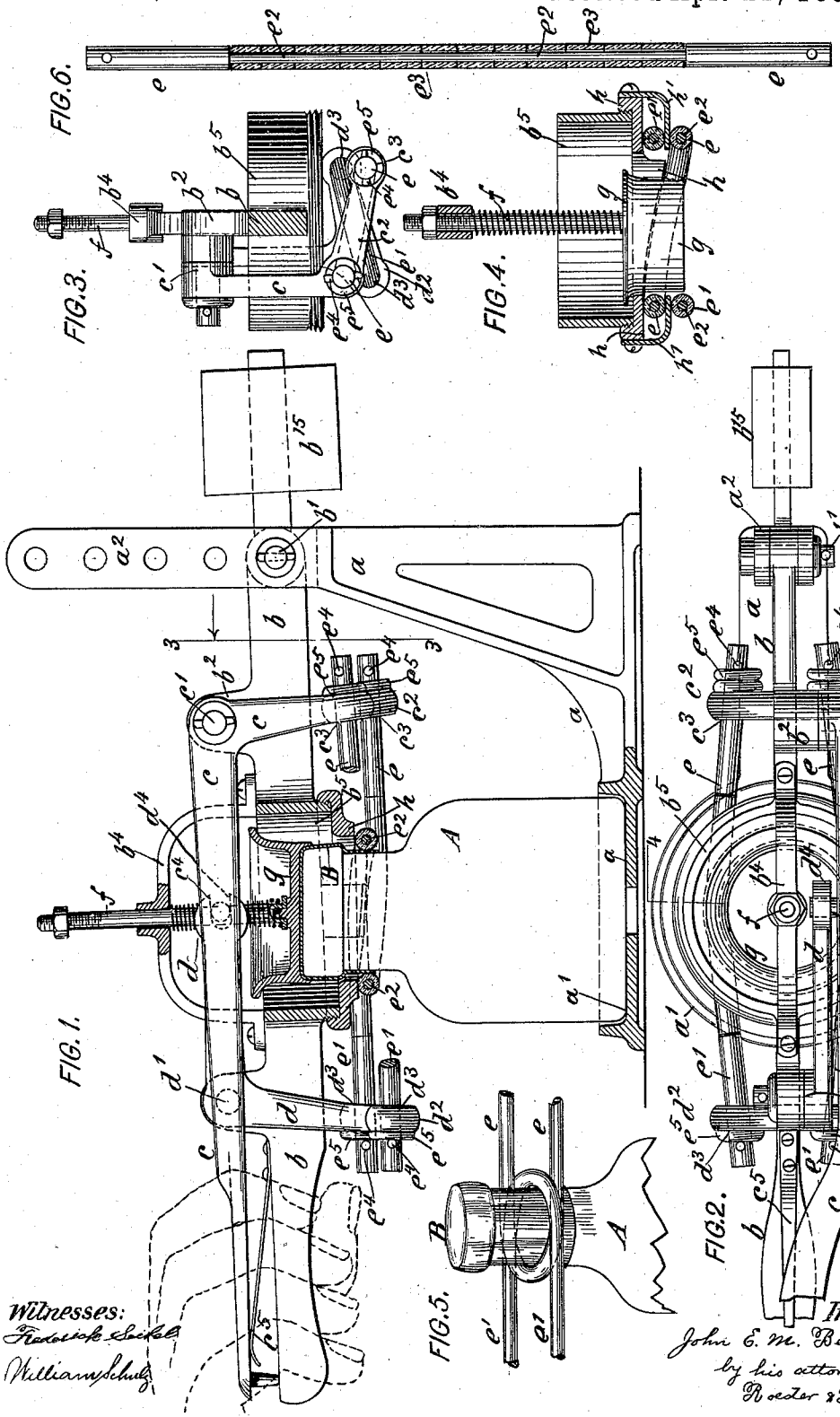
(No Model.) 5 Sheets—Sheet 1.

J. E. M. BECKER.

BOTTLE CAPPING MACHINE.

No. 558,760. Patented Apr. 21, 1896.



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William Schulz

Inventor:
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by his attorneys
Roester & Briesen

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(No Model.) 5 Sheets—Sheet 2.

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BOTTLE CAPPING MACHINE.

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FIG. 7.

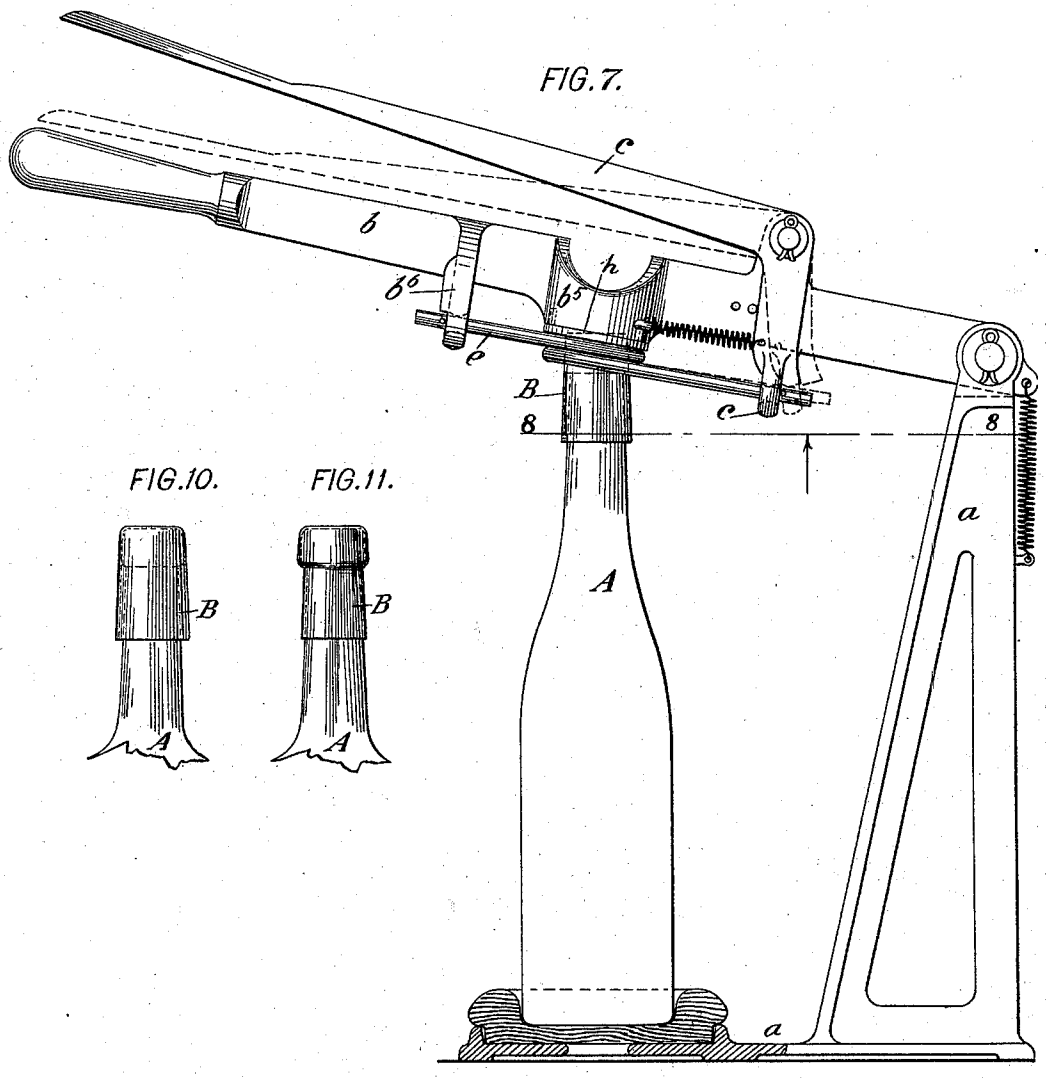


FIG. 10.

FIG. 11.

FIG. 8.

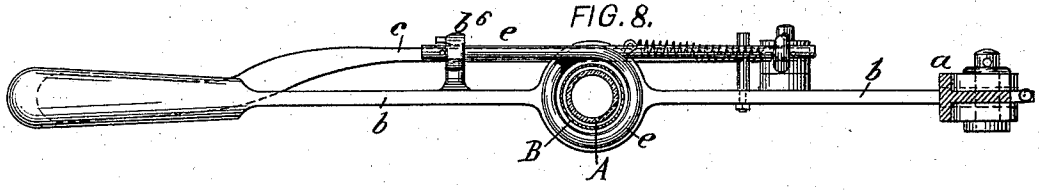
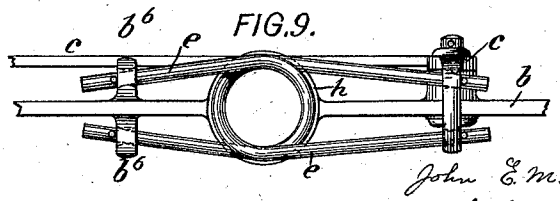


FIG. 9.



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(No Model.) 5 Sheets—Sheet 3.

J. E. M. BECKER.

BOTTLE CAPPING MACHINE.

No. 558,760. Patented Apr. 21, 1896.

FIG. 12.

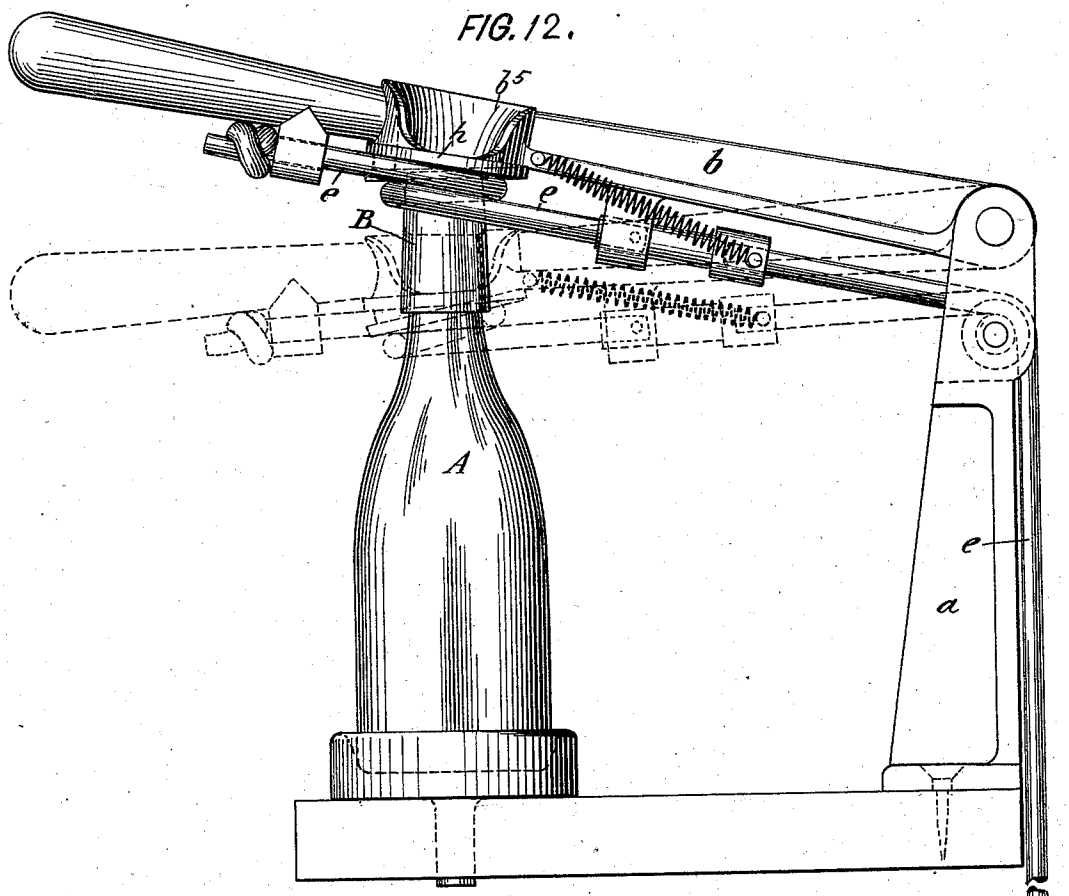


FIG. 13.

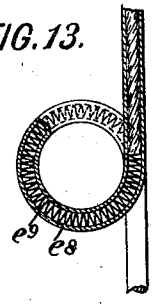


FIG. 14.

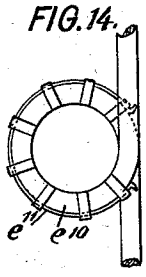
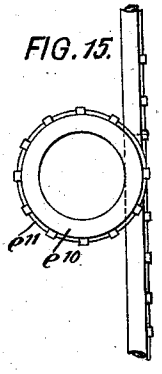


FIG. 15.



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J. E. M. BECKER.

BOTTLE CAPPING MACHINE.

No. 558,760. Patented Apr. 21, 1896.

FIG. 16.

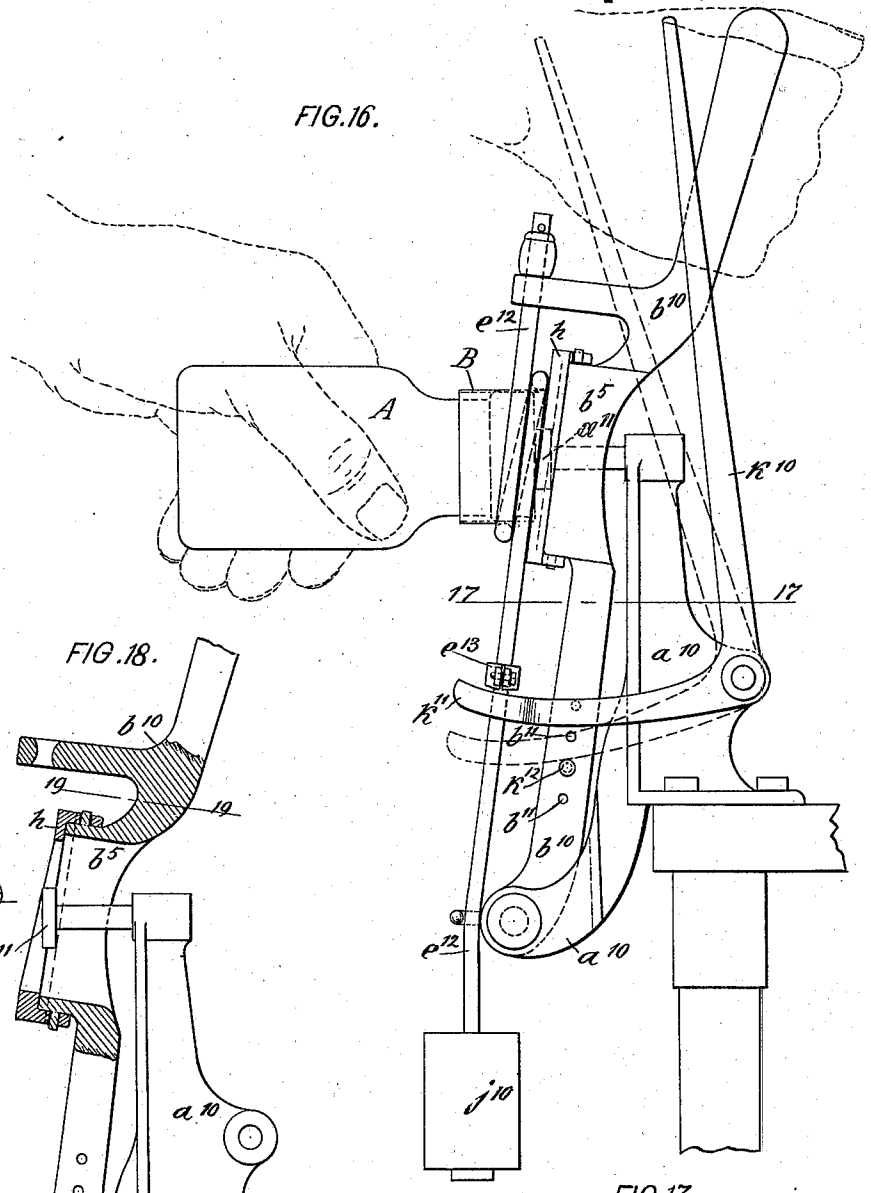


FIG. 18.

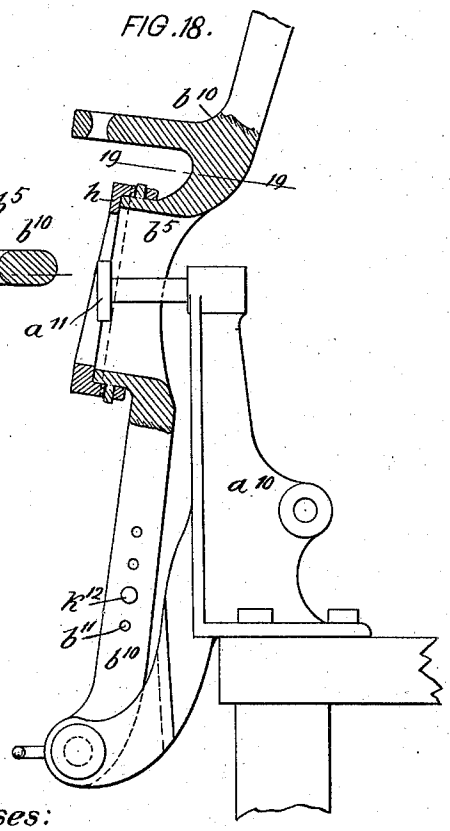


FIG. 19.

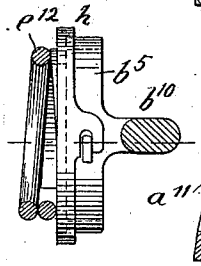
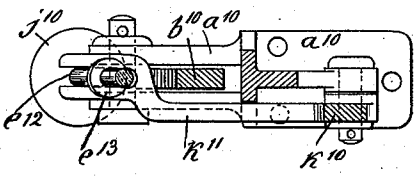


FIG. 17.



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(No Model.) 5 Sheets—Sheet 5.

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BOTTLE CAPPING MACHINE.

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FIG. 20.

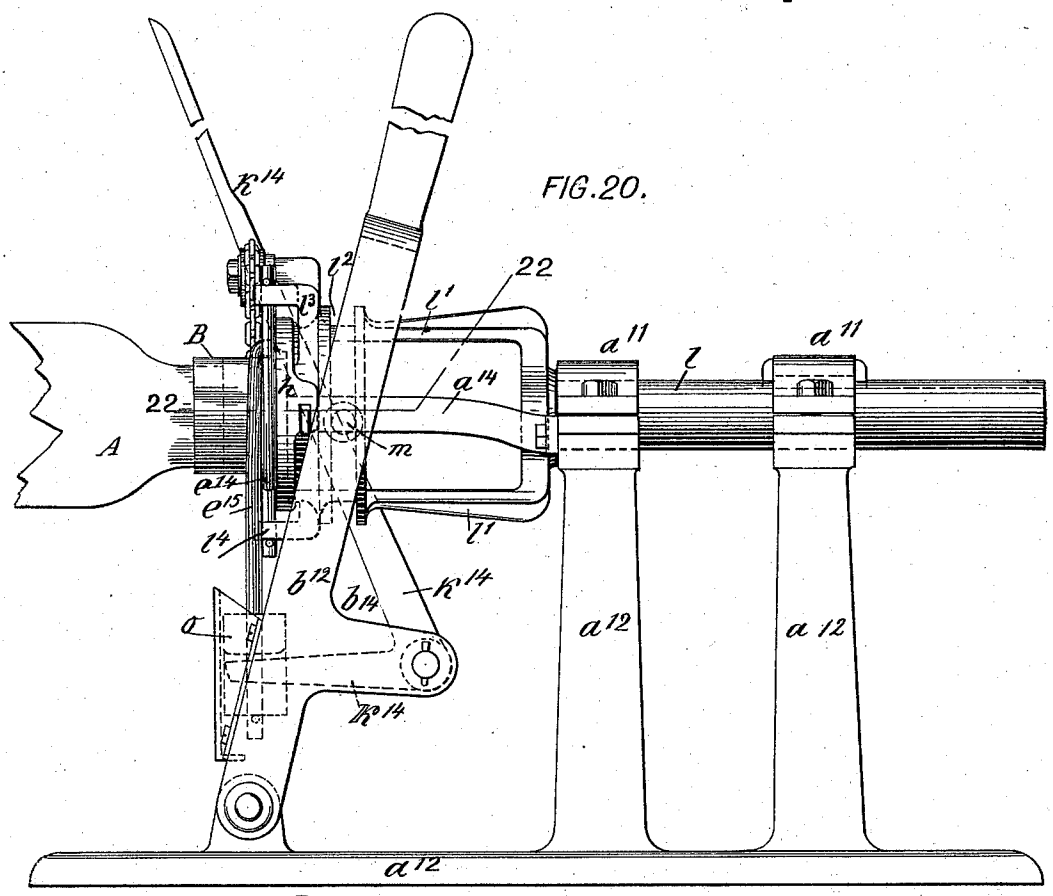


FIG. 21.

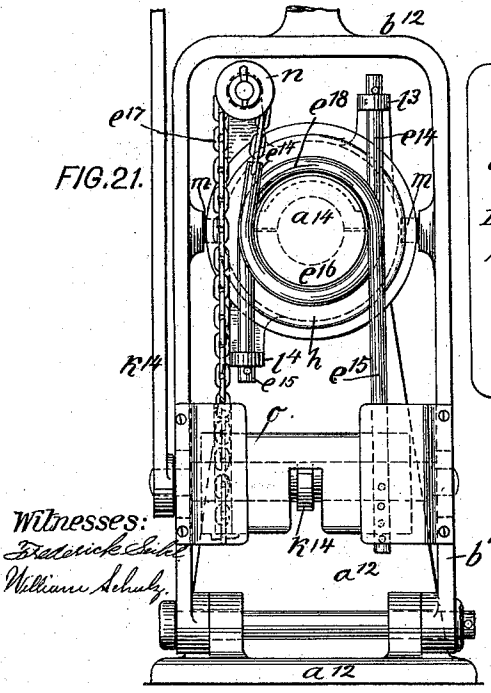


FIG. 22.

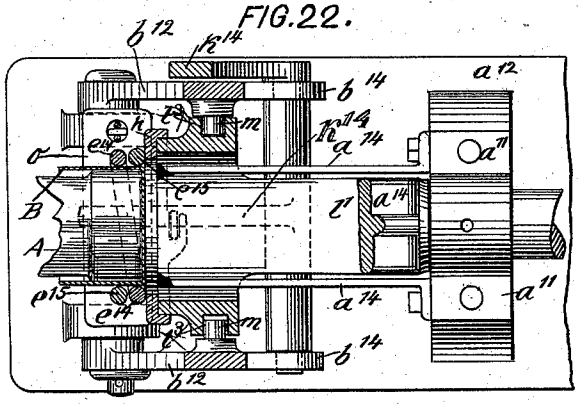
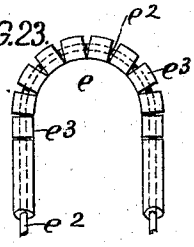


FIG. 23.



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UNITED STATES PATENT OFFICE.

JOHN E. M. BECKER, OF NEW YORK, N. Y.

BOTTLE-CAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 558,760, dated April 21, 1896.

Application filed October 5, 1895. Serial No. 564,716. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. M. BECKER, of New York city, New York, have invented an Improved Bottle-Capping Machine, of which the following is a specification.

This invention relates to a machine for compressing or contracting the lower end of a soft-metal cap after it has been slipped over the head of a bottle or jar in such a manner that the cap becomes properly attached to the bottle or jar. By my invention the compression of the cap is automatically accomplished by a weight and a lever or a system of levers in a very simple and rapid manner.

In the accompanying drawings, Figure 1 is a sectional elevation of a bottle-capping machine, showing an embodiment of my invention; Fig. 2, a plan thereof; Fig. 3, a vertical transverse section on line 3 3, Fig. 1. Fig. 4 is a sectional detail, mainly on line 4 4, Fig. 2; Fig. 5, a perspective view showing the flexible bands in position around the bottle-neck; Fig. 6, a detail of the flexible band *e*. Fig. 7 is a sectional elevation of a modification of the machine; Fig. 8, a horizontal section on line 8 8, Fig. 7; Fig. 9, an under view of a modification of Fig. 7, showing two flexible bands. Figs. 10 and 11 show a bottle-head and metal cap before and after the latter is subjected to the action of the machine. Fig. 12 is an elevation of a further modification of the machine. Figs. 13 to 15 are details of various constructions of the flexible band. Fig. 16 is an elevation of a further modification of the machine; Fig. 17, a section on line 17 17, Fig. 16. Fig. 18 is a sectional elevation of part of the machine shown in Fig. 16; Fig. 19, a section on line 19 19, Fig. 18, showing also the flexible loop *e* in section. Fig. 20 is a side elevation of a further modification of the machine; Fig. 21, a front elevation thereof; Fig. 22, a horizontal section on line 22 22, Fig. 20; and Fig. 23, a further detail of the flexible band *e*.

In Figs. 1 to 5 the letter *a* represents the frame of the machine, provided with a seat a', adapted for the reception of a bottle or jar A. To an arm a^2 of the frame there is adjustably pivoted at b' one end of a hand-lever *b*, adapted to be oscillated in a vertical plane. The lever *b* is provided with a projection b^2, to which is pivoted at c' an elbow-lever *c*, the horizontal arm of which terminates in a handle, while its vertical arm is provided with a lateral extension c^2, in which are formed two perforations c^3. To the lever *b* is furthermore pivoted at d' a second elbow-lever *d*, provided with the lateral extension d^2, having perforations d^3, placed substantially opposite the perforations c^3. The lever *d* is connected to the lever *c* by means of a pin c^4, projecting laterally from lever *c* and engaging slot d^4 of lever *d*.

As thus far described it will be seen that when the lever *c* is depressed the lower ends of the levers *c d* will diverge and that if the lever *c* is raised the lower ends of the levers *c d* will converge.

Within the seats c^3 d^3 of the levers *c d* there are secured the ends of two more or less flexible bands or straps *e e'*, which are so curved or looped as to encircle partly or completely the neck of the jar or bottle A and form permanent loops. As represented in the drawings, the two free ends of looped band *e* are connected to the lever *c*, while the two free ends of the looped band *e'* are connected to the lever *d*. It is obvious, however, that the two free ends of the same band may be attached to opposite levers, their function being to engage with their loop the bottle-neck and compress the metal cap slipped around such neck. The bands *e e'* may be formed of any strong flexible material, such as rubber, leather, rope, braid, &c. I prefer to provide them with a reinforcing-core e^2, Figs. 6 and 23, made of straight or coiled spring-wire and of a surrounding jacket e^3. This jacket may be composed of a series of independently-revoluble cylindrical rollers, so that a rolling action is produced when the band is forced down over the cap. The rollers e^3 are made elastic, so that they will curve freely in the direction of their major axis and will thus closely hug the metal cap at every point of its periphery.

In Fig. 13 the band *e* is shown to be composed of a continuous flexible tubular casing e^8 and an inclosed spiral spring e^9.

In Fig. 14 the band consists of a flexible body e^{10} and an exterior spring e^{11}, secured around the looped portion of the body.

In Fig. 15 the spring e^{11} extends along the entire length of the flexible body e^{10}.

The lever b is provided with a bail b^4, that constitutes a bearing for sliding spring-rod f. To the lower end of this rod there is removably secured a loop-guide g, which is adapted to be seated upon the mouth of the bottle A.

The lever b has in vertical alinement with bottle A a curved or annular section b^5, to the lower end of which there is attached a shoulder h, adapted to bear upon the flexible band or bands $e\ e'$. The shoulder h is interchangeable, so as to fit bottles of different sizes, and its central opening should be of such a diameter as to admit the head of the bottle to be capped. From the shoulder h there depend the bent flanges h', that enter between the bands $e\ e'$ and prevent frictional contact between them.

The operation of the machine is as follows: The levers $b\ c$ are thrown up, a bottle or jar A is placed upon its seat a', and a cap B is slipped over the neck of the bottle in the manner indicated in Fig. 10. Both levers $b\ c$ are now simultaneously grasped and forced downward. This motion will cause the looped sections of the bands $e\ e'$, that had previously encircled the guide g, to be forced downward and off said guide by the shoulder h and around the capped bottle-neck. At the same time the diverging motion of the levers $c\ d$, previously described, will tighten up the looped sections of the bands $e\ e'$, so that they will firmly grasp the cap B and contract the same around the bottle-neck, Fig. 11. This compression will be uniform and positive, so that the cap is evenly and neatly affixed to the bottle. After this operation is completed the levers $b\ c$ are released, when a spring c^5 will throw the lever c up. This will cause the lower ends of the levers $c\ d$ to converge, so as to slacken the loops of the bands $e\ e'$, and thus release their hold upon the cap and bottle-neck. A counterweight b^{15} of lever b will now raise the levers $b\ c$ off the bottle; but during the beginning of this motion the guide g will still remain seated upon the bottle owing to its connection with the independent spring-rod f. The looped portions of the bands $e\ e'$ will thus slide from the bottle upon the guide g, and after the bands are thus seated the upward motion of the lever b will cause the guide g to be raised off the bottle, so that all parts are now in proper position for the next operation and the bottle A, properly capped, may be removed.

The lengths of the bands $e\ e'$ should be adjustable, so as to adapt them to bottle-necks of different diameters. To this effect the ends of the bands should be provided with pins or stops e^4, between which and the levers $c\ d$ a suitable number of washers e^5 may be interposed. In this way the operative portions of the bands between the levers may be lengthened or shortened at pleasure.

In Figs. 7 and 8 the lever d is dispensed with and the ends of the looped flexible band e are attached, respectively, to a projection b^6 of lever b and to the depending arm of lever c. By depressing the levers the flexible band e is laid and tightened around the bottle-neck, so as to compress the cap in the manner previously described.

In Fig. 9 the construction is the same as that illustrated in Figs. 7 and 8, excepting that two flexible bands e are employed instead of the single band shown in Fig. 7.

In Fig. 12 the construction is similar to that shown in Fig. 7, but the lever c is dispensed with and replaced by a treadle i, which is connected to one end of the flexible band e by means of a spring i'. The other end of the band e is attached to lever b in manner previously described. In use the lever b is first lowered to lay the loop of band e around the bottle-neck and then the treadle i is depressed to contract the loop and thus compress the metal cap B.

Figs. 16 to 19 illustrate a modification of the machine in which the bottle to be capped is placed in a horizontal position. In this modification the frame a^{10} carries the vertically-swinging lever b^{10}, to one end of which is secured the flexible looped band e^{12}, the other end of which sustains a weight j^{10}. To the frame a^{10} is pivoted a second lever k^{10}, having an arm k^{11}, adapted to be projected beneath an adjustable stop e^{13} of band e^{12}. The play of lever k^{10} may be limited by means of an adjustable stop k^{12}, adapted to be inserted into one of a series of openings b^{11} of lever b^{10}. In use the lever k^{10} is swung backward to engage stop e^{13}, and to thus raise the band e^{12} and open its loop. The bottle A with the cap in proper position is introduced through the loop of band e^{12} and held against a fixed rest a^{11} of frame a^{10}. The lever k^{10} is liberated, so that the weight j^{10} will be free to draw the loop of band e^{12} tightly around the head of the bottle. This loop is now pushed off the head and upon and along the neck of the bottle by means of the lever b^{10}, which is swung forward, so that the soft-metal cap is properly contracted around the bottle-neck. The lever k^{10} is next thrown backward to open the loop of band e^{12} sufficiently for permitting the withdrawal of the bottle. By means of the adjustable stop k^{12} the size of the loop may be adjusted so as to adapt the machine to cap bottles having differently-sized heads.

In Figs. 20 to 22 a horizontal sliding rod l is supported in bearings a^{11} of frame a^{12}. The forward end of rod l is provided with a forked head l', to which there is secured a ring l^2, having an outer circumferential groove. This groove is engaged by a pair of pins m, projecting inwardly from a forked lever b^{12}, fulcrumed to frame a^{12}. The ring l^2 is provided with a pair of lugs $l^3\ l^4$, to which are connected the ends of a pair of flexible bands $e^{14}\ e^{15}$. The band e^{14} extends from lug l^3 downward to form looped section e^{16}, and is thence connected to a weight o by a chain e^{17}, that passes over a roller n of ring l^2. The band e^{15} extends from lug l^4 upward to form looped sec-

tion e^{18}, and is thence also attached to weight *o*. This weight may be lifted by means of a lever k^{14}, pivoted to lug b^{14} of lever b^{12}. In use the lever k^{14} is thrown backward to raise the weight *o* and open the loops e^{16} e^{18}. The bottle is then held against a fixed rest a^{14} of frame a^{12} and the lever k^{14} liberated to release the weight and cause the loops e^{16} e^{18} to contract around the bottle-neck. The lever b^{12} is now thrown forward to draw the parts l l' l^2 forward and to thus move the contracted loops over the bottle-neck, so as to properly compress the soft-metal cap. After this operation is completed the lever k^{14} is thrown back to raise weight *o* and expand loops e^{16} e^{18}, so that the bottle may be liberated and removed.

What I claim is—

1. In a bottle-capping machine the combination of a flexible band having a permanently-looped section, with a shoulder engaging such looped section and adapted to force it over the bottle-neck, means for simultaneously contracting the loop, and a lever adapted to slacken the band and open the loop, substantially as specified.

2. In a bottle-capping machine the combination of a sliding rod with a ring carried thereby, a lever engaging the ring, a weight, a looped band connected to the ring and weight, and a lever for raising the weight and opening the loop, substantially as specified.

3. In a bottle-capping machine the combination of a sliding rod having a forked head with a grooved ring secured thereto, a lever having pins engaging the grooved ring, a weight, a pair of looped flexible bands secured at one end to the ring and at the other end to the weight, and means for raising said weight, substantially as specified.

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