

No. 690,488.

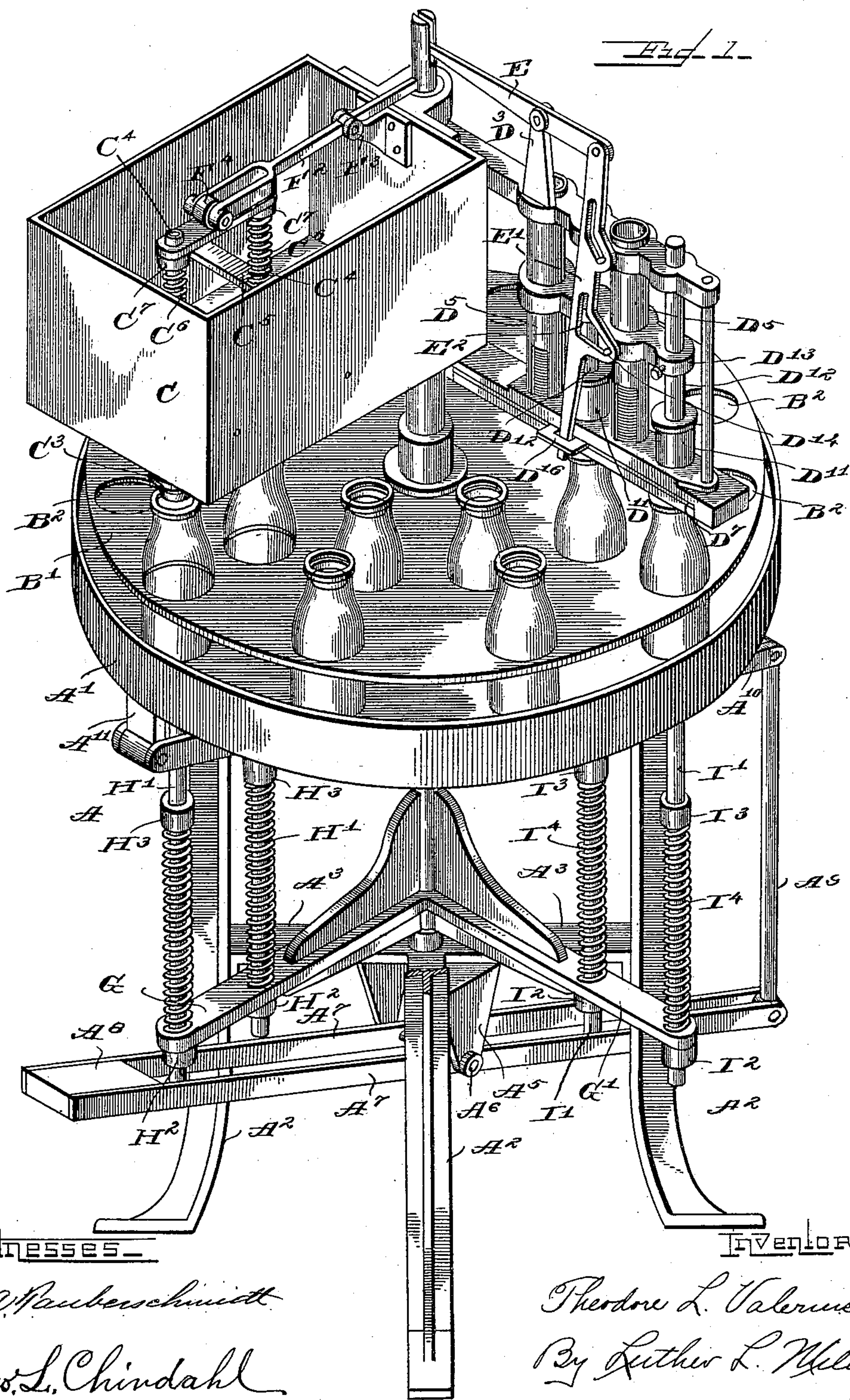
Patented Jan. 7, 1902.

T. L. VALERIUS.
BOTTLE FILLING AND CAPPING MACHINE.

(Application filed Feb. 23, 1901.)

(No Model.)

5 Sheets—Sheet 1.



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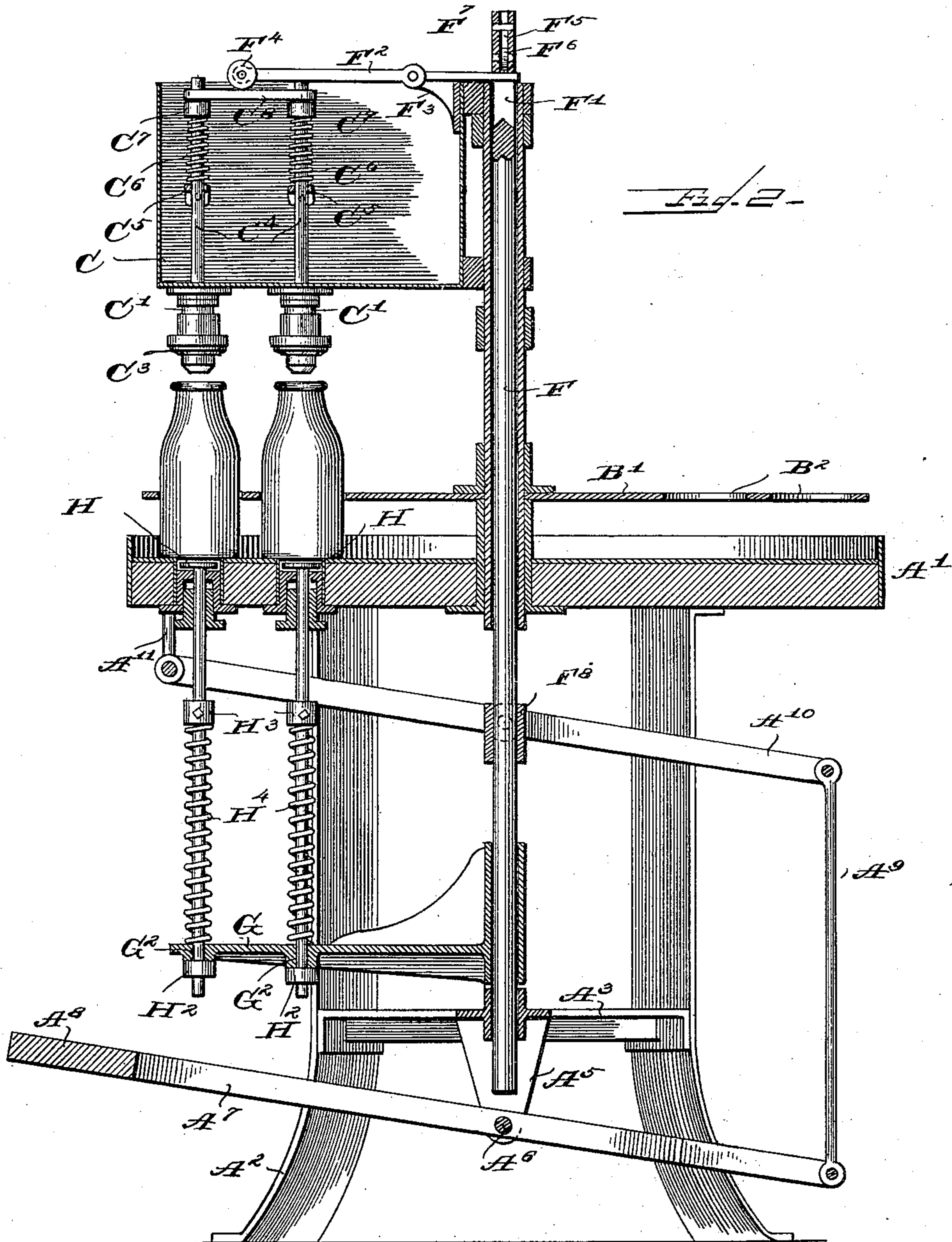
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5 Sheets—Sheet 2.



WITNESSES

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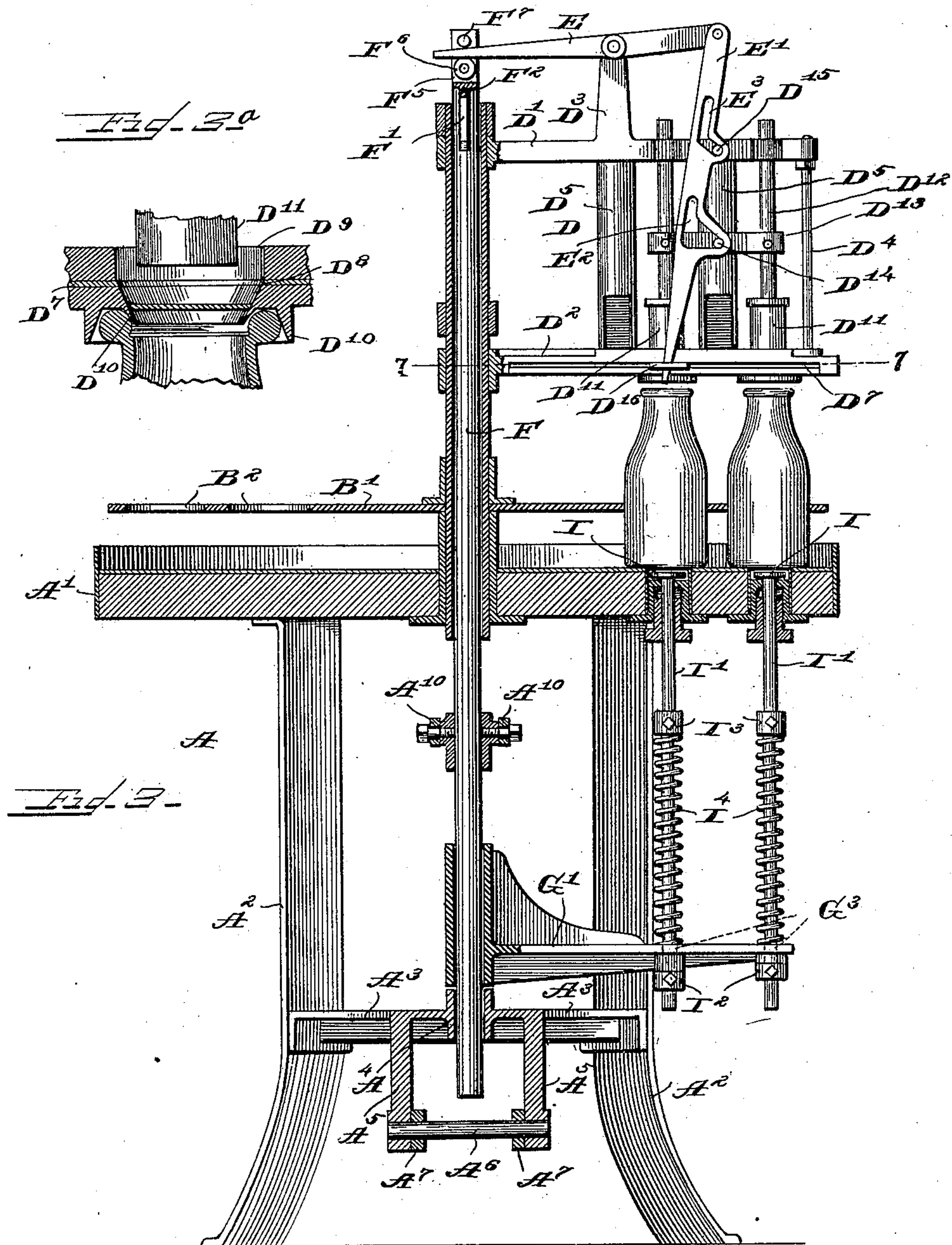
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5 Sheets—Sheet 3.



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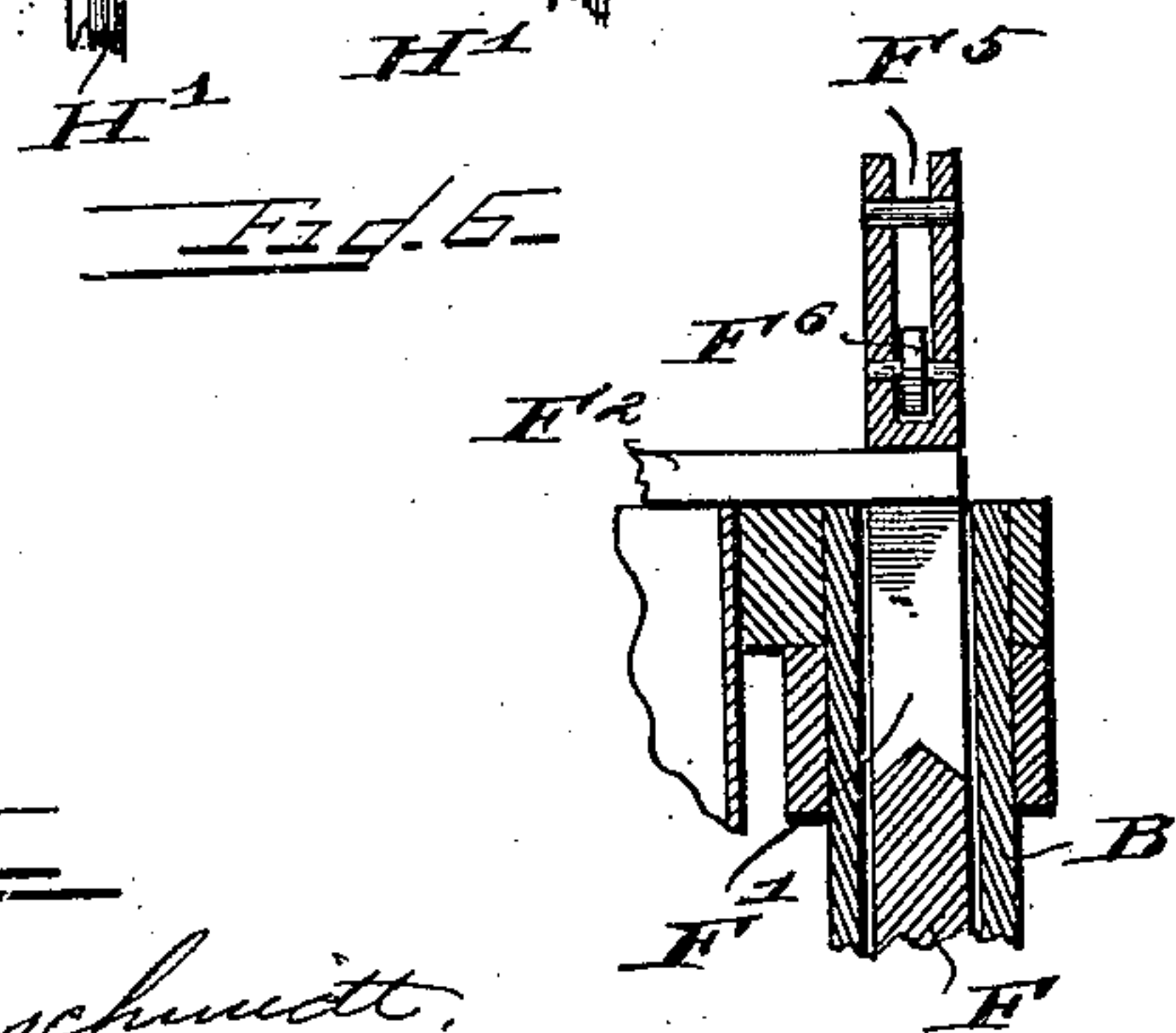
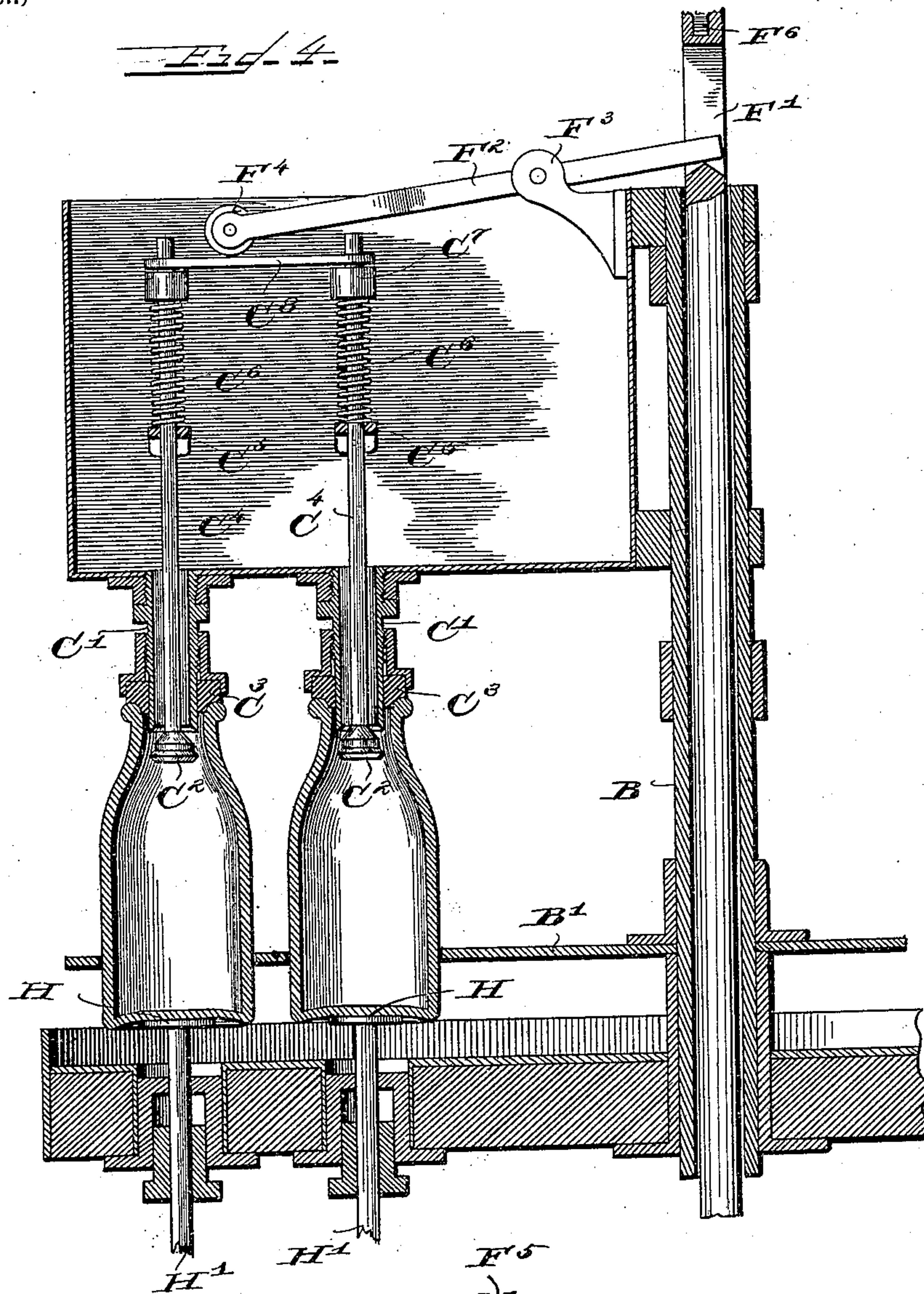
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5 Sheets—Sheet 4.

(No Model.)



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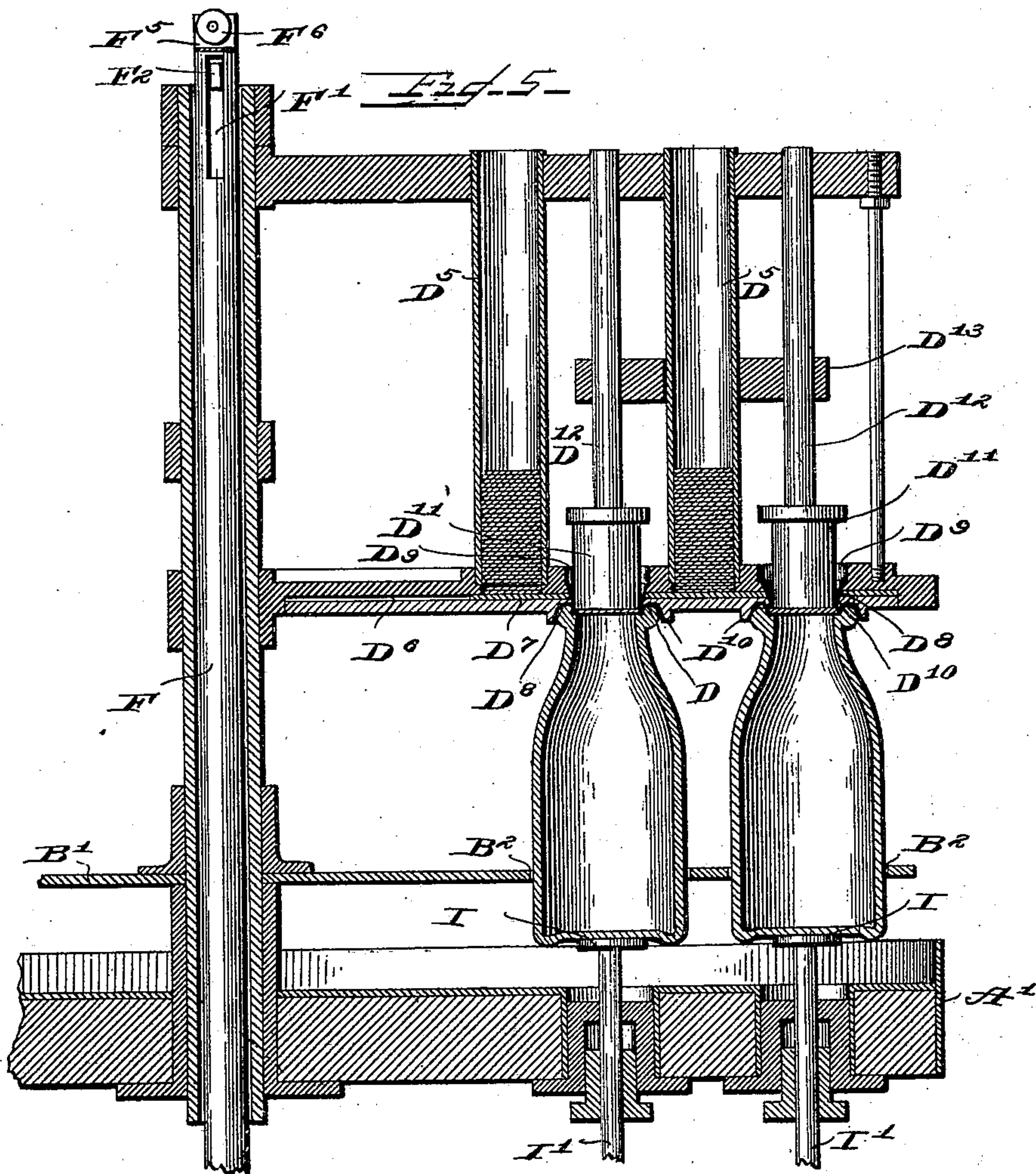


Fig. 5

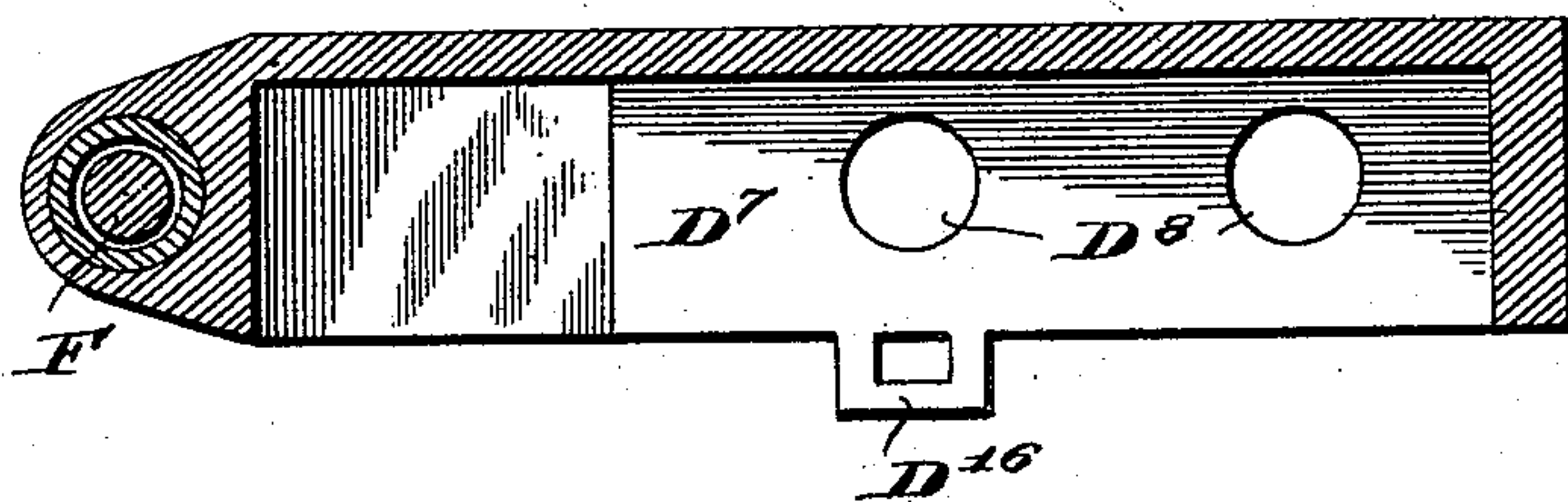


Fig. 7

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UNITED STATES PATENT OFFICE.

THEODORE L. VALERIUS, OF FORT ATKINSON, WISCONSIN, ASSIGNOR TO
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BOTTLE FILLING AND CAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 690,488, dated January 7, 1902.

Application filed February 23, 1901. Serial No. 48,505. (No model.)

To all whom it may concern:

Be it known that I, THEODORE L. VALERIUS, a citizen of the United States, residing at Fort Atkinson, in the county of Jefferson and State of Wisconsin, have invented certain new and useful Improvements in Bottle Filling and Capping Machines, of which the following is a specification.

The object of this invention is the production of an improved machine for filling and capping bottles. The mechanism herein shown and described is adapted for use in dairies for filling the form of bottle commonly used in retailing milk. It is clear, however, that the parts of the machine may be modified so that any form of bottle may be filled and capped.

In the embodiment herein shown of this invention the bottles are supported upon a table and carried around on said table in radial pairs by a freely-rotatable turn-table. A liquid-receptacle is mounted over said turn-table and has two downwardly-projecting filling-spouts adapted to coincide in turn with the mouths of each radial pair of bottles upon said table. At about ninety degrees from said liquid-receptacle a vertical framework is supported over said table, having the mechanism for inserting caps into the necks of the filled bottles. A foot-lever projects outward from underneath the table in a place convenient of access for the operator of the machine. A downward pressure upon the foot-treadle raises the empty bottles into engagement with the filling-spouts and the filled bottles into coincidence with the capping mechanism. A further depression of said foot-lever opens the filling-spouts and causes the capping mechanism to deliver caps into the spouts over the mouths of said filled bottles, and a further depression of said lever causes the plungers to descend into said spouts and force said caps into the mouths of the filled bottles. After each full depression of the foot-lever and its upward return movement the turn-table is moved by the operator to bring two empty bottles beneath the filling-spouts and two filled bottles beneath the capping-spouts. After the bottles have passed

the latter spouts they are removed from the table by a helper standing at the rear of the machine, and empty bottles are put in their places, so as to be presented in their turn to the filling-spouts.

In the accompanying drawings, Figure 1 is a perspective view of a bottle filling and capping machine embodying the features of my invention. Fig. 2 is a transverse vertical section through the filling mechanism and its operative means. Fig. 3 is a similar section through the capping mechanism. Fig. 3^a is an enlarged central section through the means for presenting the bottle centrally to the capping mechanism. Fig. 4 is an enlarged vertical central section taken through the filling mechanism, showing the filling-valves in an open position. Fig. 5 is an enlarged vertical central section taken through the capping mechanism, showing the same at a time in the operation when the plungers have just seated the caps in the throats of the filled bottles. Fig. 6 is a detail in vertical central section taken through the upper end of the central vertically-reciprocating rod. Fig. 7 is a horizontal section on dotted line 7 7 of Fig. 3, showing the slide for feeding the caps singly from each of the magazine-tubes, where a quantity of said caps is retained, to a position to be engaged by the capping-plungers and pressed firmly into place in the throats of the filled bottles.

Like letters of reference indicate corresponding parts throughout the several views.

In the construction of this filling and capping mechanism I provide a table A, having the top A' and the four supporting-legs A², rigidly fixed to said top. These legs are joined together intermediate their ends by the braces A³, which braces are provided with the central opening A⁴ and the depending ears A⁵, the latter having the pivotal bolt A⁶ extending between them. A foot-lever A⁷ is pivotally mounted upon said bolt A⁶ and at its forward end is provided with the treadle A⁸. At its rear end it has a pivotal engagement with the upwardly-extending connecting-rod A⁹. The upper end of this connecting-rod is pivotally attached to a second transverse lever

A¹⁰, the forward end of which lever is pivotally supported upon the depending lug A¹¹, fixed to the under side of the table-top A'. A tubular standard B extends upward through a central opening in the table-top A', rising to a considerable distance above said table-top. Just above the table-top the standard B is provided with the circular turn-table B', having openings B² for the reception of bottles. These openings are arranged in pairs on radial lines, and the turn-table is rotatably mounted upon the tubular standard B. Near the upper end of this standard B and affixed thereto is a receptacle C for containing the milk with which the bottles are to be filled, and extending downward from the lower side of said receptacle are two filling-spouts C', communicating with the interior of said liquid-receptacle by means of suitable openings in the bottom of the latter. The bottom end of each filling-spout is provided with a closure-plug C², of inverted-cone shape, and has surrounding its lower end a ring C³, of rubber or other elastic material, whereby a tight joint with the mouth of the bottle is obtained. Each of the two cone-shaped closures is provided with a tubular stem C⁴, extending upward through the filling-spouts and through stationary bearings C⁵, secured at their ends to the inner sides of the receptacle C. Above said bearings said tubular stems are surrounded by springs C⁶ and near their upper ends with the collars C⁷. Upon said collars and extending between the two stems is a cross-bar C⁸, adapted to receive a downward pressure, which when sufficient to compress the springs C⁶ opens the filling-spouts and permits liquid to run from the receptacle C through said spouts. The springs C⁶ normally hold the closure-plugs firmly against their seats in the filling-spouts and prevent the escape of the contents of the liquid-receptacle C. The tubular stems C⁴ communicate with the interior of the bottles being filled and afford means for the escape of air therefrom.

The capping mechanism (shown in Fig. 3) is supported upon a vertical framework D, extending at an angle of about ninety degrees from the liquid-receptacle C. This framework comprises the two horizontal arms D' and D², the ear D³ extending upward from the former and the vertical rod D⁴ connecting the outer ends of said horizontal arms. Tubular cap-magazines D⁵ are supported between the two arms D' and D², being open at their upper ends. The lower ends of the magazines communicate with a slide-opening D⁶ in the arm D², which opening extends lengthwise of said arm. A slide-plate D⁷ is adapted to be reciprocated in said opening, and this slide-plate has two holes D⁸ through it, which are intended to register with the lower ends of the magazines when the slide-plate is at one extremity of its movement and with the openings D⁹ through the arm D², one of which openings is adjacent to each of the cap-maga-

zines. The openings D⁹ are each provided with the annular raised rims D¹⁰ for centering the bottle to be capped. Just below the slide-plate D⁷ the walls of each of the openings D⁹ contract to a diameter a little less than that of the cap, so that when the cap is delivered by the coincidence of the openings D⁸ in the slide-plate with the openings D⁹ the cap will be dropped from said plate to said contracted portion of the opening D⁹. Two plungers D¹¹ are provided with stems D¹², extending upward through suitable guide-openings in the upper arm D'. A cross-bar D¹³ surrounds one of the cap-magazines D⁵, is guided thereon, and is affixed to the stems D¹² of the plungers D¹¹. This cross-bar is provided with a stud D¹⁴, and the arm D' has a similar stud D¹⁵ directly above said stud D¹⁴. The cross-bar D¹³ is adapted to have a vertical reciprocatory movement on its supporting cap-magazine. The slide-plate D⁷ is provided with a loop D¹⁶ for receiving the end of its operating-lever, to be later described herein. The rims D¹⁰, as hereinbefore stated, are for causing the bottles to exactly register with the capping mechanism. The outer rim is intended to center the bottle approximately with the opening D⁹; but as the tops of the bottles are not always regular in form or concentric with the respective throats thereof it has been found necessary to provide the inner rim, which is adapted to fit within the throat of the bottle, and thereby to cause the opening D⁹ and said throat to exactly register.

A lever E is pivotally supported upon the upwardly-extending ear D³. At its outer end this lever is pivotally connected with a cam-bar E', having the L-shaped cam-openings E² and E³ therein, which openings receive the studs D¹⁴ and D¹⁵, respectively. The lower end of the cam-bar E' projects through the loop D¹⁶ of the slide-plate D⁷. The inclination of the lower branch of the opening E² of the cam-bar E' causes the lower end of said lever to be moved from left to right, Fig. 3, and this movement reciprocates the slide D⁷ in the same direction. The vertical length of the opening E² is somewhat less than that of the opening E³, so that after said cam-bar is moved sidewise it may have a further vertical reciprocatory movement to depress the plungers D¹¹ and force the caps into the throats of the bottles. This movement is limited by the difference between the vertical length of the openings E² and E³.

A vertically-reciprocating rod F extends through the central opening A⁴ in the braces A³ and upward through tubular standard B. At its upper end this rod is provided with the transverse opening F' for the reception of a lever F², pivotally mounted at F³ and having a friction-roller F⁴ at its outer end adapted to bear upon the cross-bar C⁸, hereinbefore described. Above said elongated opening F' is a similar opening F⁵, and in this opening is provided a friction-roller F⁶ and a stop-pin F⁷, the distance between the roller and the

pin being sufficient to receive the end of the lever E. The plane of the opening F' is at right angles to that of the opening F⁵. The vertically-reciprocating rod F is supported between the trunnions F⁸ of the transverse lever A¹⁰. It will be seen that by means of this connection a downward pressure upon the treadle A⁸ will raise the reciprocating rod F, open the milk-delivery spouts C', and operate the capping mechanism. Two arms G and G', formed integral and extending at right angles to each other, are fixed upon the vertically-reciprocating rod F. The arm G is provided with two openings G² for receiving the elevator-rods, to be later described, for the filling mechanism. The arm G' is likewise provided with openings G³ for receiving similar elevator-rods, to be later described, for the capping mechanism.

H represents the elevator-disks for the filling mechanism. They lie normally in depressions in the top A' of the table A. Each is provided with a stem H', extending downward through the openings G² of the arm G, and is provided with a fixed collar H² below said arm, also with a fixed collar H³ intermediate its ends, and with a coil-spring H⁴ between said last-mentioned collar and the arm G. When the arm is raised, the springs H⁴ are compressed, raising the bottles to be filled into contact with the rubber rings C³ of the filling-spouts, where they are held by the action of the springs H⁴.

I refers to the elevator-disks for the capping mechanism; I', to the rods; I², to the collars fixed at the lower ends of said rods beneath the arm G'; I³, to the collars fixed intermediate the ends of said rods, and I⁴ to the compression-springs between said last-mentioned collars and the upper side of the arm G'. An upward movement of the vertically-reciprocating rod F thus raises the arms G and G', compresses the elevator-springs H⁴ and I⁴, and raises the empty bottles into coincidence with the filling-spouts and the filled bottles into coincidence with the capping mechanism.

In operation bottles are placed in the openings B² of the turn-table B' and said turn-table rotated by the hand of the operator until the first pair of empty bottles is brought directly beneath the filling-spouts C'. The foot of the operator is then placed upon the treadle A⁸, and pressure being exerted thereon the vertically-reciprocating rod F is lifted by reason of the connection between the foot-lever A⁷ and said rod. The elevation of this vertically-reciprocating rod raises the elevator-disks H, lifting the empty bottles so that their mouths are brought into engagement with the rubber rings C³ of the filling-spouts. Further depressing the treadle A⁸ raises the vertically-reciprocating rod F until the lower end of the opening F' engages the lever F². The upward movement of the rear end of this lever depresses the forward end thereof, it bearing upon the cross-bar C⁸ and compress-

ing the springs C⁶, which surround the tubular stems C⁴ of the cone-shaped closures C², opening the filling-spouts, and permitting the liquid in the receptacle C to be discharged into the empty bottles. As soon as the bottles are filled the pressure upon the treadle is withdrawn, and the elevator mechanism carries the bottles back upon the table-top A'. The turn-table B' is rotated by the hand of the operator until the second pair of bottles is brought underneath the filling-spouts, when the same operation is repeated and these bottles filled. The third set is likewise filled. When the fourth set of bottles is brought under the filling-spouts, the first set has been advanced so that they stand directly beneath the capping mechanism. A downward pressure upon the foot-treadle A⁸ now raises the first pair of filled bottles into engagement with the capping mechanism and the empty bottles into engagement with the filling mechanism. The upward movement of the reciprocating rod F produces a downward movement of the cam-lever E', which, by reason of the studs D¹⁴ and D¹⁵, is moved from left to right, Fig. 3, moving the slidable plate D' so that its openings D⁸ are shifted from beneath the cap-magazines to a position directly below the plungers. When they reach this position, the cap in each of the openings D⁸ is dropped into the opening in the arm D², where it is retained directly above the mouth of the filled bottle. The cam-lever E' continues in its downward movement until the upper end of the L-shaped opening E² engages the stud D¹⁴, when the plungers D¹¹ are depressed through a distance equal to the difference between the vertical lengths of the L-shaped openings E² and E³. During this capping operation the filling-spouts have been opened and milk from the receptacle C has been permitted to run into the empty bottles, the foot-lever A⁸ being held depressed until said bottles are filled. As soon as said bottles are filled the foot-lever is released and the mechanism assumes its first or normal position. The turn-table B' is again rotated to bring the next succeeding pair of empty bottles beneath the filling-spouts, and this rotation places the filled and capped bottles in the rear of the capping mechanism, from whence they are removed by an assistant, who stands back of the machine to remove filled and capped bottles and to replace them with empty bottles. The cap-magazines D⁵ are supplied with caps through their open upper ends. The thickness of the slidable plate D' is about equal to the thickness of the cap, so that only one closure is delivered at a time.

I claim as my invention—

1. In a capping-machine, in combination, a table for the bottles; a magazine adapted to hold a plurality of closures; a movable plate having means for carrying one closure from the magazine to a point adjacent to the throat of the bottle to be capped; a plunger for seat-

- ing the closure in the throat of the bottle; a pivoted cam-bar having a cam-opening therein; a stud fixed with relation to the frame of the machine, adapted to lie within said cam-opening and move said cam-bar on its pivot; means for connecting the cam-bar with the plunger to reciprocate the latter; and means for connecting the cam-bar with the plate to move said plate.
- 10 2. In a capping-machine, in combination, a table for the bottles; a magazine adapted to hold a plurality of closures, mounted over said table; a slidable plate having an opening therein, which opening is adapted to be moved
15 into coincidence with the closure-magazine, also into coincidence with the throat of the bottle to be capped; a plunger for seating the closure in the throat of the bottle; a lever pivotally supported upon the frame of the machine; a treadle for moving said lever; a cam-bar pivotally supported near the outer end of
20 said lever, said cam-bar having a cam-opening therein; a stud fixed with relation to the frame of the machine, adapted to lie in said opening to move said cam-bar on its pivot; means for loosely connecting the cam-bar with the plunger to reciprocate the latter; and means for connecting said cam-bar with the plate to slide said plate.
- 30 3. In a capping-machine, in combination, a rotatable table for the bottles; a magazine adapted to hold a plurality of closures; a slidable plate having an opening adapted to be placed in coincidence with the magazine, also
35 with the throat of the bottle; a plunger for seating the closure in the throat of the bottle; a cam-bar pivotally mounted at one of its ends and having two cam-openings therein, one of which openings is shorter than the other; a stud fixed with relation to the frame of the machine, adapted to lie in the longer of said cam-openings; means for longitudinally reciprocating said cam-bar; a stud fixed with relation to said plunger, adapted to lie within
45 the shorter of the cam-openings in the cam-bar; and means for connecting the lower end of said cam-bar with the sliding plate.
4. In a capping-machine, in combination, a table for the bottles; a magazine adapted to
50 hold a plurality of closures; a slidable plate having means for carrying one closure from the magazine to a point adjacent to the throat of the bottle to be capped; an elevator mechanism for raising said bottle; a plunger for seating the closure in the throat of the bottle; a cam-bar pivotally mounted near one of its ends, and having two cam-openings therein; a stud fixed with relation to the frame of the machine, adapted to lie in one of said openings; a stud fixed with relation to the plunger, adapted to lie in the other of said openings; means for connecting the lower end of the cam-bar with the sliding plate; means for longitudinally reciprocating said cam-bar; and means for operating said elevator mechanism.
5. In a capping-machine, in combination, a table for the bottles; means for moving the bottles upon said table; a magazine adapted to hold a plurality of closures; a slidable plate
70 having an opening adapted to be placed in coincidence with the magazine, also with the throat of the bottle to be capped; a plunger for seating the closure in the throat of the bottle; an elevator mechanism for raising a
75 bottle into engagement with the capping mechanism; a lever pivotally supported upon the frame of the machine; a vertically-reciprocating rod for moving said lever; a treadle for reciprocating said rod; a cam-bar pivotally mounted near the free end of said lever, said cam-bar having two cam-openings therein, one of which openings is shorter than the other; a stud fixed with relation to the frame of the machine, adapted to lie in the longer
85 of said cam-openings, to oscillate said cam-bar upon its supporting-pivot; a stud fixed with relation to the plunger, adapted to lie in the shorter of said cam-openings; and means for connecting the lower end of said cam-bar
90 with said sliding plate.
6. In a capping-machine, in combination, a table for the bottles; means for moving the bottles upon the latter; a magazine adapted to hold a plurality of closures; a slidable plate
95 having an opening adapted to be placed into coincidence with the magazine, also with the throat of the bottle to be capped; a plunger for seating the closure in the throat of the bottle; an elevator mechanism comprising an
100 elevator-disk, a stem for said disk, a spring mounted on said stem, and an arm adapted to raise said disk through said spring; a cam-lever adapted to move the slidable plate and to reciprocate said plunger; and means for
105 moving said cam-lever and for operating said elevator mechanism.
7. In a capping-machine, in combination, a table for the bottles; a magazine adapted to hold a plurality of closures; a movable plate
110 having means for carrying one closure from the magazine to a point adjacent to the throat of the bottle to be capped; a plunger for seating the closure in the throat of the bottle; a cam-lever having L-shaped openings therein; a stud fixed with relation to said table, adapted to lie in one of said openings; a stud fixed with relation to the plunger, for lying in another of said L-shaped openings; means for longitudinally moving said cam-lever; and
120 means for connecting the lever with the movable plate.
8. In a capping-machine, in combination, a table for the bottles; a perforated turn-table rotatably mounted over said table, for moving the bottles upon the latter; a magazine adapted to hold a plurality of closures; a slidable plate having an opening adapted to be placed in coincidence with the magazine, also with the throat of the bottle to be capped; a plunger for seating a closure in the throat of a bottle; a cam-lever having L-shaped openings therein; a stud fixed with relation to said table, adapted to lie in one of said openings;

a stud fixed with relation to the plunger, for lying in the other of said L-shaped openings; a lever having a pivotal connection with said cam-lever; a tilting lever having a pivotal connection with said cam-lever; a reciprocating rod for moving said tilting lever; a treadle for operating said reciprocating rod; and means for connecting the cam-lever with the slidable plate.

9. In a capping-machine, in combination, a table for the bottles; a perforated turn-table rotatably mounted over said table, adapted to move the bottles upon the table in radial pairs; two magazines adapted to hold a plurality of closures; a slidable plate having an opening adapted to be placed in coincidence with each of the magazines, also with the throats of the bottles to be capped; two plungers for seating the closures in the throats of said bottles; an elevator mechanism comprising two elevator-disks, a stem for each of said disks, a spring on each of said stems, and an arm adapted to raise said disks by means of said springs; a tilting lever; a cam-lever pivotally connected with the free end of said tilting lever, which cam-lever has two L-shaped cam-openings therein; a stud fixed with relation to the supporting-table, and adapted to lie in one of said L-shaped openings; a second stud adapted to move with the plunger-rods, and adapted to engage the other of said L-shaped openings; a loop for connecting the lower end of said cam-lever with said sliding plate; a vertically-reciprocating rod having engagement with said tilting lever; a foot-lever; a treadle therefor; and a transverse lever for moving said vertically-reciprocating rod.

10. In a filling and capping machine, in combination, a table for moving the bottles; a filling mechanism; and a capping mechanism, the latter comprising a magazine adapted to hold the closures for the bottles, a movable plate having an opening adapted to be placed in coincidence with the magazine, also with the throat of the bottle to be capped, a plunger for seating a closure, a cam-bar having a cam-opening therein, a fixed stud adapted to

lie in said opening, means for connecting the cam-bar with said plate, means for connecting the cam-bar with the plunger, and means for longitudinally moving said cam-bar.

11. In a filling and capping machine, in combination, a table for moving the bottles; a filling mechanism; a capping mechanism, the latter comprising a magazine adapted to hold the closures for the bottles, a slidable plate having an opening adapted to be placed in coincidence with the magazine, also with the throat of the bottle to be capped, and a plunger for seating a closure; an elevator for raising a bottle to the filling mechanism; an elevator for raising a bottle to the capping mechanism; and a foot-lever for operating said elevator mechanisms, and for actuating the filling mechanism and the capping mechanism.

12. In a filling and capping machine, in combination, a table for the bottles; means for moving the bottles upon said table; a magazine adapted to hold a plurality of closures; a slidable plate having an opening adapted to be placed in coincidence with the magazine, also with the throat of the bottle to be capped; a plunger for seating a closure in the throat of the bottle; an elevator mechanism for raising a bottle into engagement with the filling mechanism; an elevator for raising a bottle into engagement with the capping mechanism; a cam-lever having two L-shaped openings therein; a stud fixed with relation to said table, adapted to lie in one of said openings; a stud fixed with relation to said plunger, adapted to lie in the other of said L-shaped openings; a loop for causing the cam-lever to engage the slidable plate; a tilting lever for moving said cam-lever; a reciprocating rod for moving said tilting lever; and a foot-lever for moving said reciprocating rod, and for operating said elevator mechanisms.

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Witnesses:

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