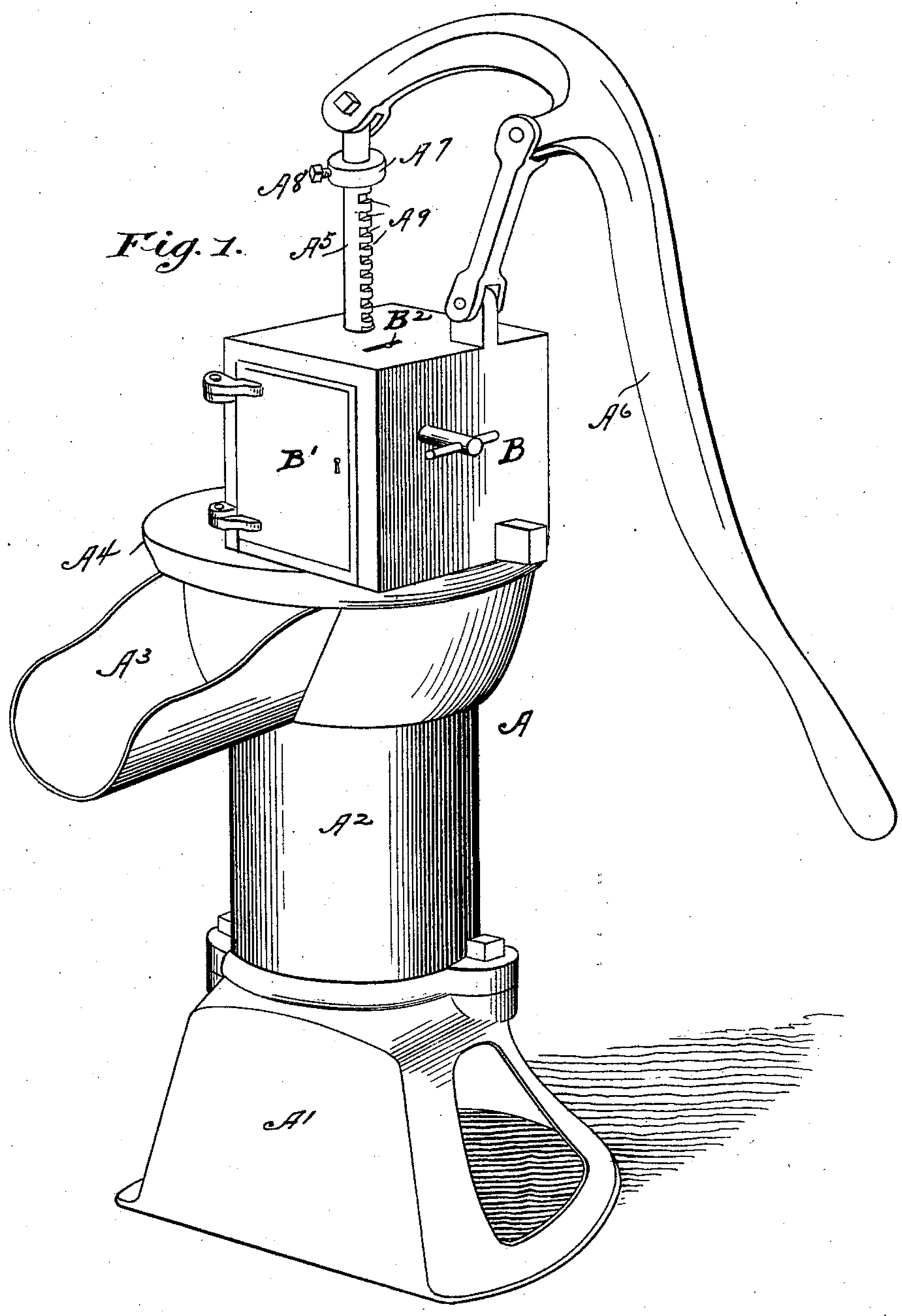
(No Model.) 5 Sheets—Sheet 1.

H. D. COLMAN.

CHECK CONTROLLED LIQUID DELIVERER.

No. 581,149. Patented Apr. 20, 1897.

Fig. 1.



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(No Model.) 5 Sheets—Sheet 2.

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CHECK CONTROLLED LIQUID DELIVERER.

No. 581,149. Patented Apr. 20, 1897.

Fig. 2.

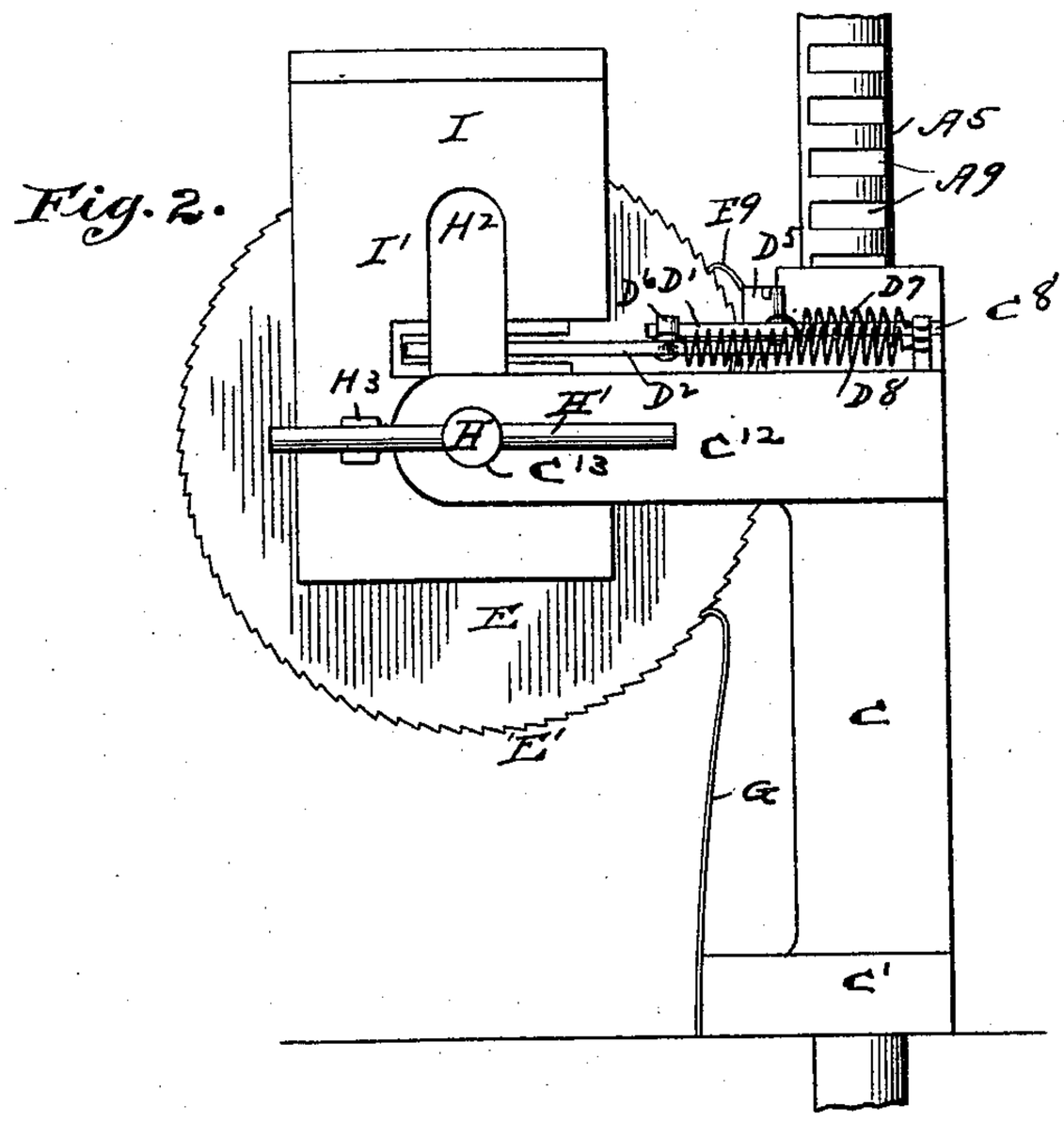
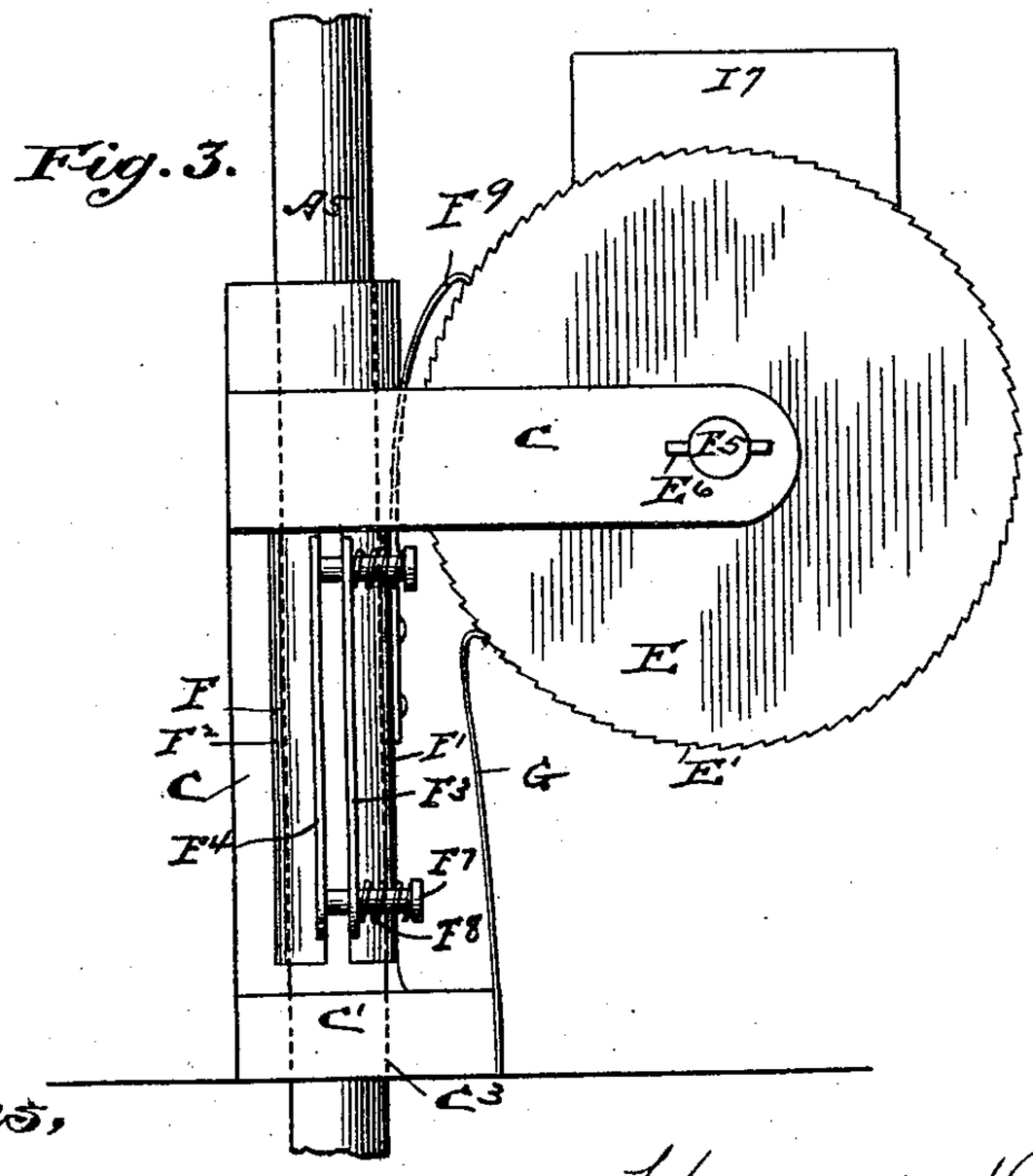


Fig. 3.



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(No Model.) 5 Sheets—Sheet 3.

H. D. COLMAN.

CHECK CONTROLLED LIQUID DELIVERER.

No. 581,149. Patented Apr. 20, 1897.

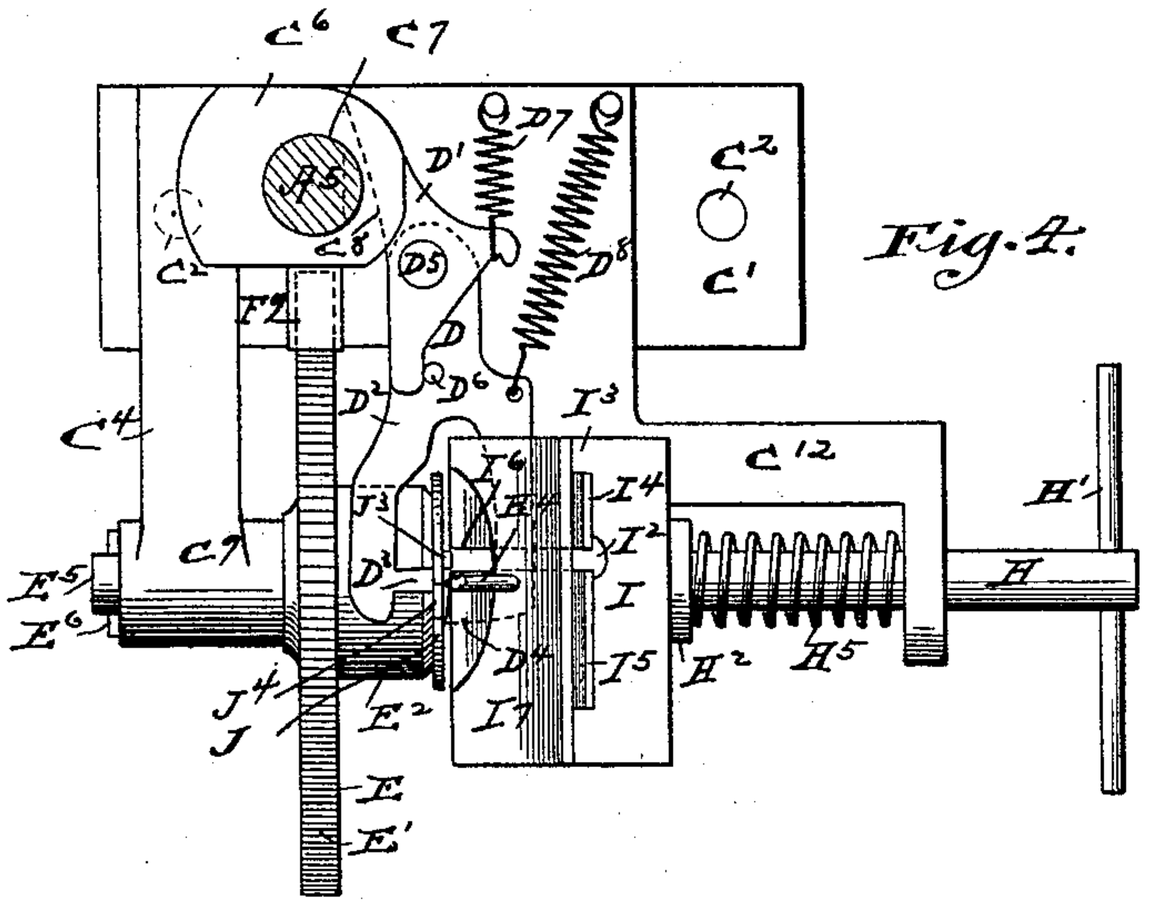

Fig. 4.

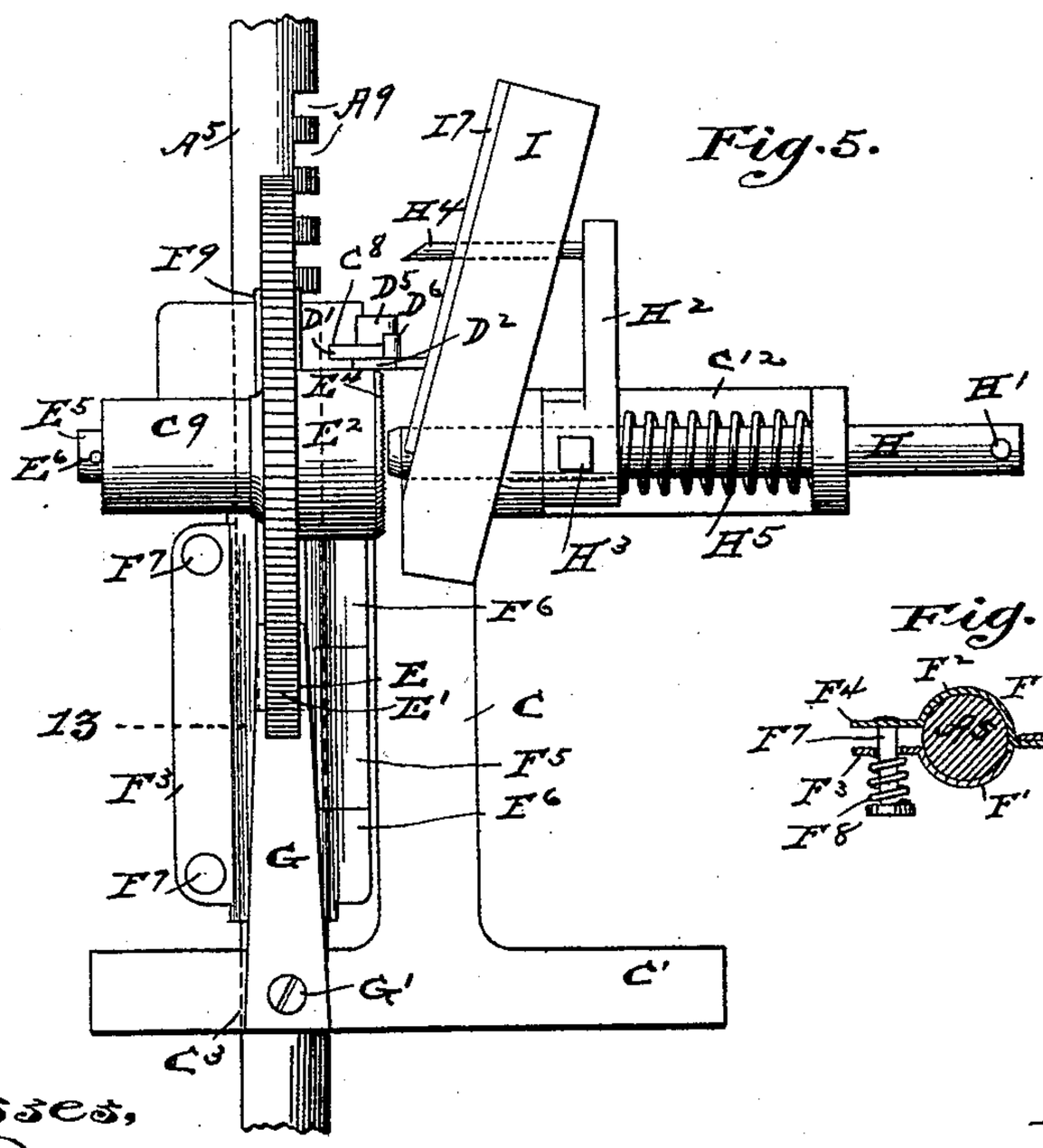

Fig. 5.

Fig. 13.

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(No Model.) 5 Sheets—Sheet 4.

H. D. COLMAN.

CHECK CONTROLLED LIQUID DELIVERER.

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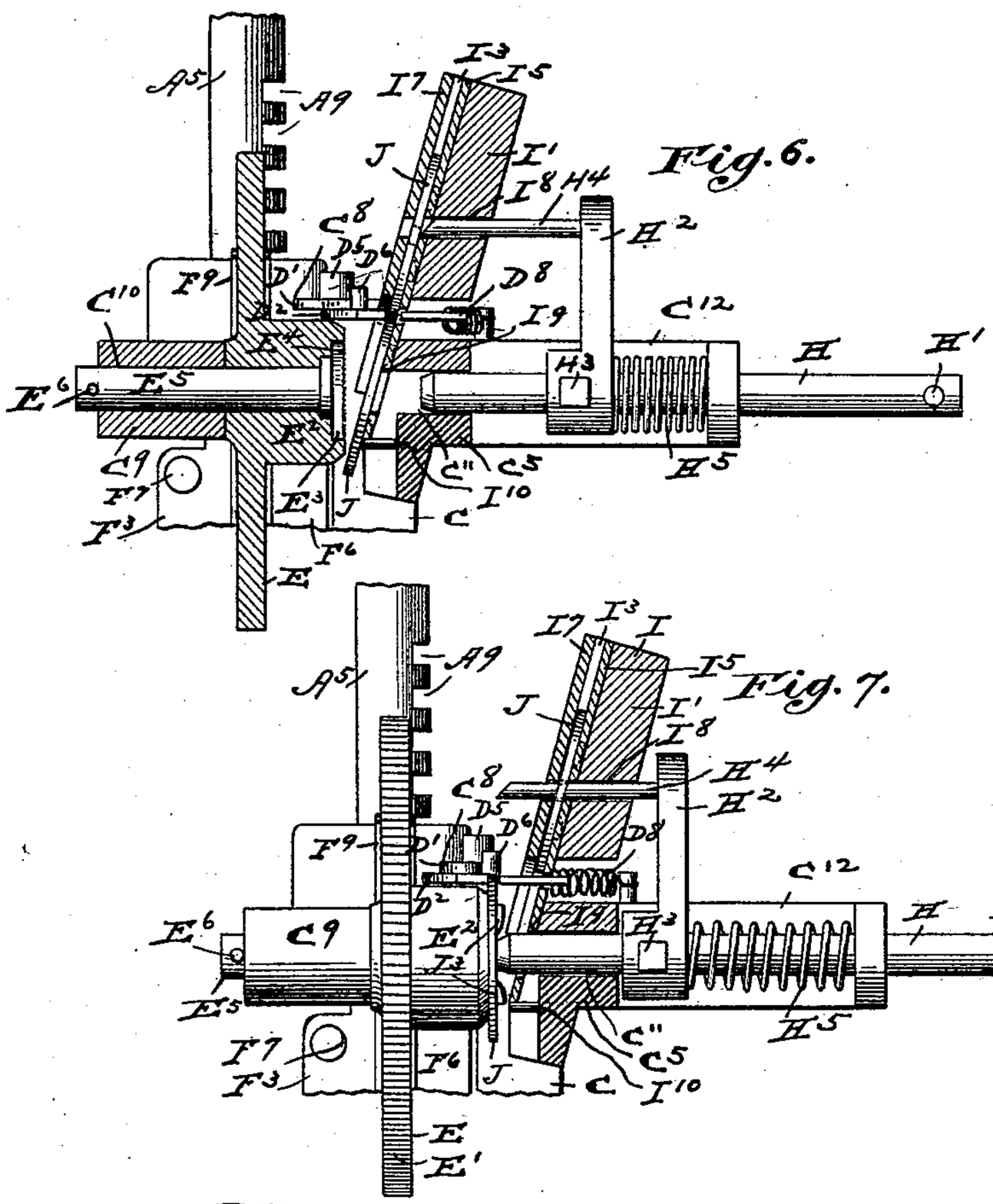

Fig. 6.

Fig. 7.

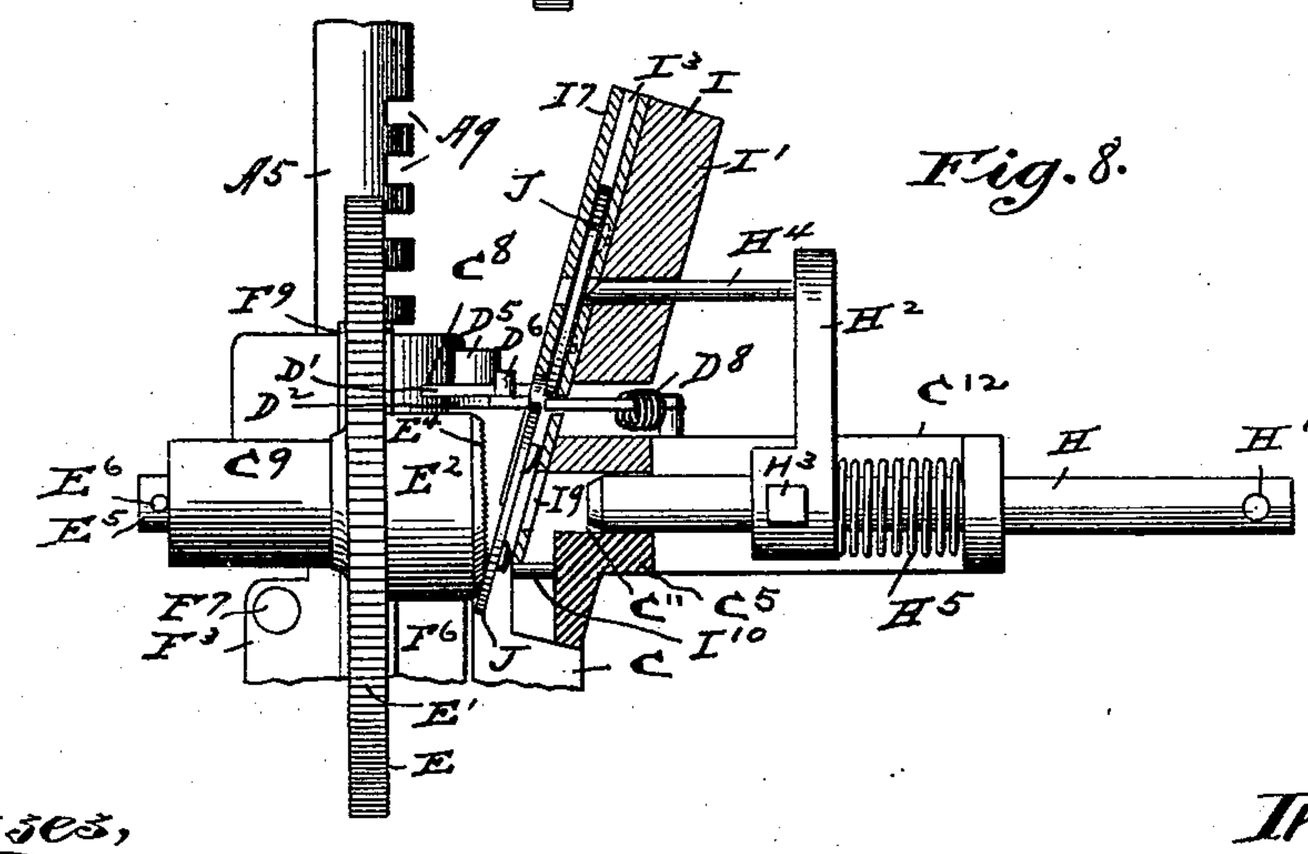

Fig. 8.

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(No Model.) 5 Sheets—Sheet 5.

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CHECK CONTROLLED LIQUID DELIVERER.

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Fig. 9.

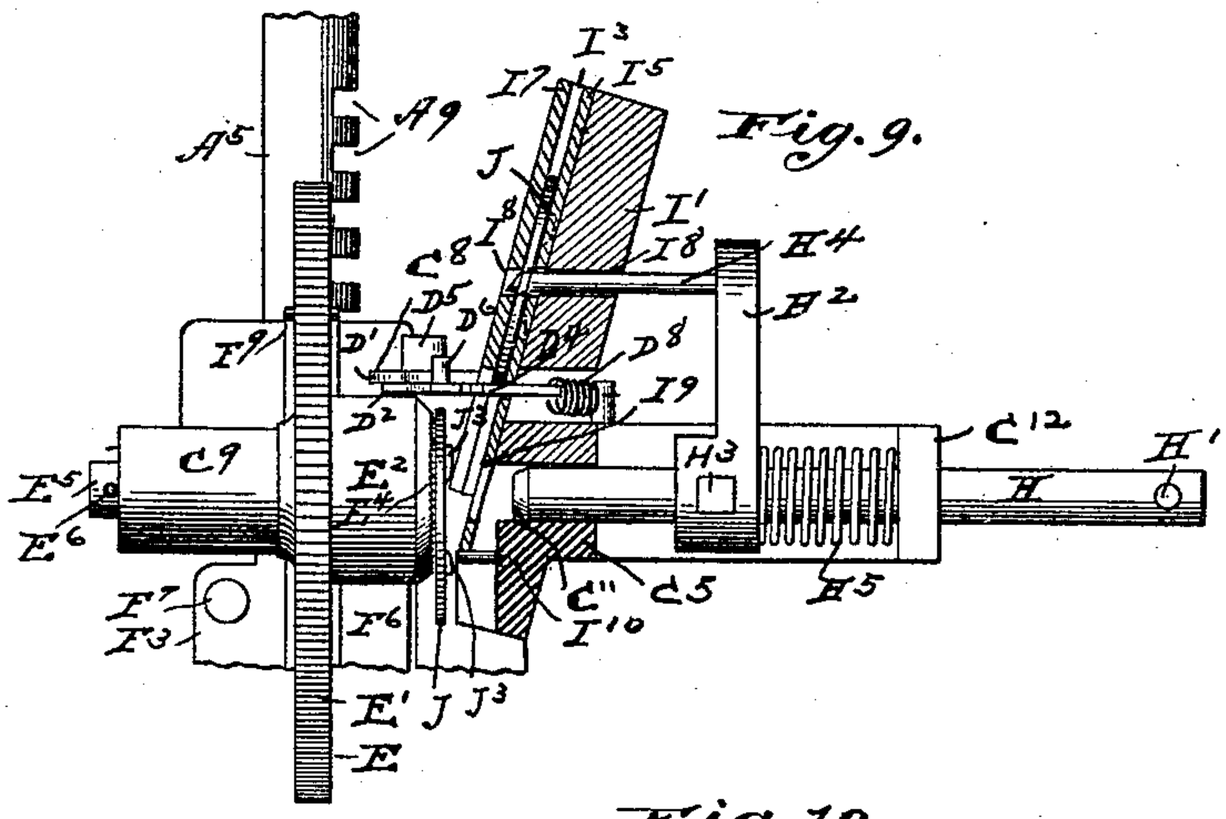


Fig. 10.

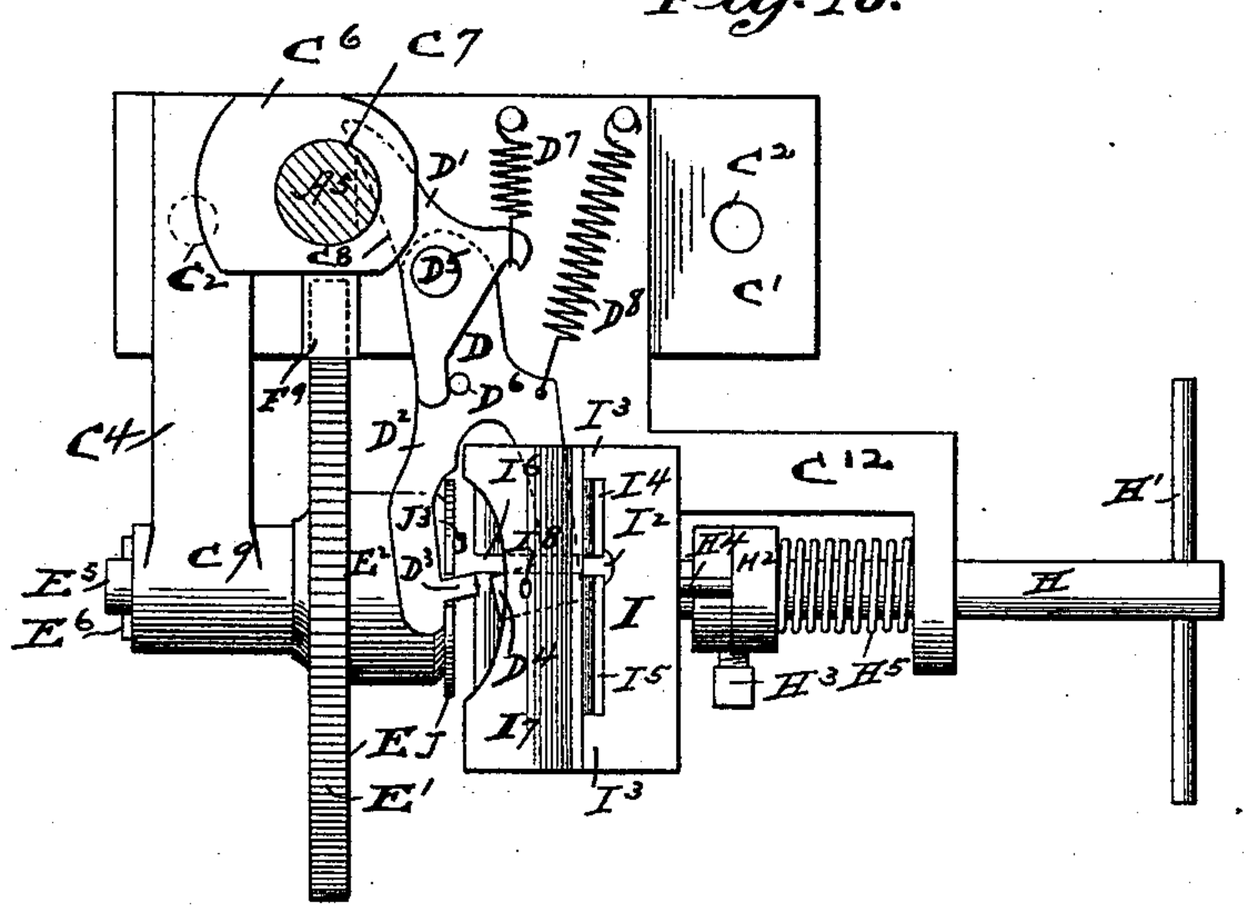


Fig. 11.

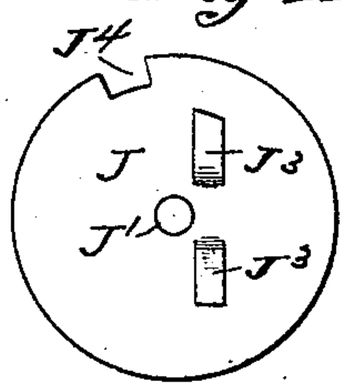
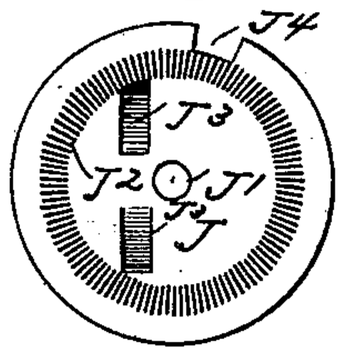


Fig. 12.



Witnesses,
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Attys.

UNITED STATES PATENT OFFICE.

HOWARD D. COLMAN, OF ROCKFORD, ILLINOIS.

CHECK-CONTROLLED LIQUID-DELIVERER.

SPECIFICATION forming part of Letters Patent No. 581,149, dated April 20, 1897.

Application filed May 13, 1896. Serial No. 591,444. (No model.)

To all whom it may concern:

Be it known that I, HOWARD D. COLMAN, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Check-Controlled Liquid-Deliverers for Delivering Variable Quantities of Liquid, of which the following is a specification.

The object of this invention is to produce an apparatus for delivering one or more delivery units of liquid, which delivery unit quantity is susceptible of an adjustable alteration and wherein the number of unit deliveries is controlled by the peculiar conformation of the inserted check. The apparatus thus outlined is adapted to use in creameries employing separators, where a certain proportion of the milk received (about eighty-five per cent. thereof) is redelivered as skim-milk to the patron of the creamery after the butter-fats have been extracted from the new milk. This object I attain by employing a common pump, each stroke of which is capable of delivering a certain quantity of liquid, which quantity is variably adjustable by means of a movable stop on the pump-rod limiting the length of the stroke, together with a counter mechanism for determining the number of strokes that may be taken, which latter mechanism is controlled by the peculiar conformation of a check introduced into the mechanism through the proper channel. While, however, it is especially designed in the form shown for this purpose, it is quite plain that the principle of this invention is broad enough to cover mechanism for permitting a certain predetermined repetition of a given operation to produce any one of many different results.

In the accompanying drawings, which form a part of this specification, Figure 1 is a perspective view of my invention. Fig. 2 is an elevation of the counter mechanism. Fig. 3 is an elevation of the counter mechanism, showing the pump-rod and the surrounding friction-sleeve. Fig. 4 is a plan view of the counter, showing a check in the position of operative engagement with the mechanism. Fig. 5 is an elevation of the counter mechanism with the check removed. Fig. 6 is a view, partly in section, somewhat similar to Fig. 5, showing the pusher-rod withdrawn to permit the checks in the check-chute to descend, the lower check therein having assumed a position to engage the teeth on the hub of the ratchet-wheel when the pusher-rod resumes its forward position. Fig. 7 is an elevation, partly in section, of the same parts shown in the preceding figure. The pusher-rod, however, is represented in its forward position, pressing the check into contact with the teeth on the hub of the ratchet-wheel and into operative engagement with the mechanism. Fig 8 is an elevation similar to the foregoing figure, but representing the pusher-rod withdrawn to show the position assumed by the check when the pressure of that rod is removed at any time before the check has completed its work and been rotated to the position in which it may fall clear of the mechanism. Fig. 9 is an elevation of the counter mechanism, showing the check freed from the engaging parts and falling from its place in the machine, the pusher-rod being withdrawn nearly to that point at which the next succeeding check will drop down the chute and assume a position to be engaged by the operating parts. Fig. 10 is a plan view of the counter mechanism, showing the various parts in the same relative positions as they are represented to occupy in Fig. 9. Fig. 11 is a rear view of the check. Fig. 12 is a face view of the check. Fig. 13 is a transverse section through the pump-rod and the surrounding friction-sleeve.

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

A is a pump of common construction.

A' is the pump-base.

A^2 is the pump-barrel.

A^3 is the pump-spout.

A^4 is the pump-spout cover.

A^5 is the pump-rod.

A^6 is the pump lever or handle, having the usual connections.

A^7 is a collar on the pump-rod capable of a sliding movement thereon.

A^8 is a set-screw extending through the collar for engaging the pump-rod and fixing the collar at any desired point in its length. By means of this adjustably-movable collar the length of the stroke of the pump-rod and con-

sequently the quantity of liquid delivered at each stroke of the pump may be changed at the pleasure of the operator.

A^9 are notches cut at regular intervals into one side of the pump-rod, which notches are to admit a detent for locking the operation of the pump, to be more fully described hereinafter.

B is a box for inclosing the counter mechanism and is mounted on the pump-cover A^4.

B′ is a hinged door for the box.

B^2 is a check-aperture in the box B, through which aperture the check is passed by the operator when desiring to use the pump.

The pump-rod A^5 extends through the box B into the pump-barrel, where it is provided with the usual pump-valve.

C is a supporting-standard within the box B for the counter mechanism. C′ is the base thereof, having the two openings C^2 for securing it to the bottom of the box.

C^3 is an opening through the base for the passage of the pump-rod A^5.

C^4 C^5 are arms extending from the standard for supporting parts of the counter mechanism within the box B.

C^6 is a boss on the supporting-standard.

C^7 is an opening in the boss in vertical alinement with the opening C^3 for the passage of the pump-rod through both openings intermediate its ends.

C^8 is a narrow opening through the side of the boss for admitting the detent (to be later described) for engaging the notches A^9 in the pump-rod A^5.

C^9 is a boss at the forward extremity of the arm C^4, and C^{10} is an opening therein providing a bearing for the spindle E^5 of the ratchet-wheel E, to be later described.

C^{11} is an opening through the arm C^5 in horizontal alinement with the opening C^{10}, the former opening being for the passage of the pusher-rod H, to be hereinafter described.

C^{12} is a supplemental right-angled arm extending from the side of the arm C^5.

C^{13} is an opening through the transverse portion of the arm C^{12} in horizontal alinement with both openings C^{10} and C^{11}.

D is a two-part detent-lever for engaging the notches A^9 of the pump-rod A^5 and preventing the operation of the pump A.

D′ is the rear portion of the lever D and lies in the opening C^8 in the boss C^6.

D^2 is the bifurcated forward end of the lever D.

D^3 is a narrow transverse projection extending inward from one of the bifurcations of the forward section D^2 of the lever D.

D^4 is a projection similar to the projection D^3, extending inward from the other bifurcation of the forward portion D^2 of the locking-lever opposite to the projection D^3, a slight space remaining between the adjacent ends of the projections D^3 D^4 sufficient to permit the passage of the check.

D^5 is the pivot, upon which the two parts of the lever D have a slight oscillatory motion independent of each other.

D^6 is a pin projecting from the portion D^2 of the two-part lever for engaging the rear portion D′ forward of their common pivot D^5. By this connection between the two parts of the detent-lever the rear portion D′ may be oscillated in a measure independently of the forward portion.

D^7 is a coiled spring extending between a fixed point on the standard and the rear portion of the lever D for oscillating the rear portion D′ of the lever D toward an engagement with the notches A^9 of the pump-rod.

D^8 is a like spring having a connection with the forward portion of the lever D and tends to oscillate the forward portion of the lever D to permit the engagement of the notches A^9 of the pump-rod A^5 by the rear portion of that lever.

E is a ratchet-wheel for counting the strokes of the pump-rod A^5.

E′ are the ratchet-teeth thereon.

E^2 is a central integral hub extending from the face of the ratchet-wheel.

E^3 is an annular raised rim on the face of the hub.

E^4 are radial teeth cut into the rim, equaling in number the ratchet-teeth E′.

E^5 is a spindle rigidly set in the center of the ratchet-wheel E and extending only from the rear. This shaft is mounted in the opening C^{10}, and forms in that bearing a rotative support for the ratchet-wheel.

E^6 is a pin extending through an opening in shaft E^5 for holding that shaft in its bearing C^{10}.

F is a friction-sleeve for the pump-rod A^5, composed of two semitubular parts F′ and F^2, having the integral flanges F^3 and F^4, respectively. This friction-sleeve grips the pump-rod firmly enough to travel with that rod, but loosely enough for the rod to slide through it after the friction-sleeve has reached the limit of its vertical movement in either direction.

F^5 is a flange on the part F^2, cut away from the ends to form a tongue projection.

F^6 is a flange on the part F′, provided with an elongated opening corresponding with the tongue F^5 and intended to receive the same, whereby the two semitubular sections are hinged together.

F^7 are headed pins extending through openings in the flange F^3 and riveted securely in opposite openings in the flange F^4.

F^8 are coiled springs surrounding the pins F^7 for producing the necessary frictional contact between the friction-sleeve F and the pump-rod A^5.

F^9 is a curved spring-pawl for engaging the ratchet-teeth E′, affixed at its lower end to the friction-sleeve F. The vertical movement of the friction-sleeve within the limits of the frame is just sufficient to permit the spring-pawl F^9 to pass over and engage one additional tooth of the ratchet-wheel E on each upward

movement of the pump-rod and to rotate the ratchet-wheel through the space of one of its teeth on each downward movement of the rod.

G is a curved spring-detent for preventing rotation of the ratchet-wheel except in one direction.

G′ is a screw for fixing the lower end of the detent to base C′.

H is a sliding pusher-rod lying in the alined openings C^{11} and C^{13}.

H′ is a handle for the rod H.

H^2 is an upright arm mounted on the rod H.

H^3 is a set-screw for fixing the arm H^2 in relation to the rod H.

H^4 is a check-pin mounted in the upper end of the arm H^2 and lying parallel to the rod H.

H^5 is a coiled spring surrounding the pusher-rod H, tending to force the rod toward the hub E^2 of the ratchet-wheel E.

I is an inclined upwardly-extending check-chute, the wall I′ of which is formed integrally with the arm C^5.

I^2 is a groove in the wall I′, extending lengthwise thereof to receive projections on a check passing down the check-chute I.

I^3 are two raised ribs at the sides of the wall I′.

I^4 and I^5, secured to the wall I′, form a two-part brass lining for one side of the check-chute. The small space I^6 occurring between them overlies the groove I^2.

I^7 is a face-plate of brass, forming the remaining side of the check-chute, and is secured to the ribs I^3, the thickness of the ribs I^3 being sufficient to leave a space in the chute slightly wider than the thickness of the check to permit the free passage of the latter therethrough.

I^8 is an opening extending through the wall I′, the lining I^5, and the face-plate I^7. The check-pin H^4 passes through the opening.

I^9 is an opening through the lining-plate I^5 to permit the passage of the pusher-rod F.

I^{10} is a fixed stop-pin at the lower end of the channel I^6.

J is the check, which determines the action of the counter mechanism.

J′ is a circular opening at the center of the check.

J^2 is a ring of short radial depressions in the face of the check, coinciding with the radial teeth E^4 of the ratchet-wheel and intended to be engaged by said radial teeth.

J^3 are two lugs on the rear face of the check, both on one side of a line drawn through the center of the check and formed by punching depressions in the opposite face thereof. These lugs coincide with and lie in the groove I^2 when the check is within the check-chute I and insures that the check will reach the mechanism in the proper position to be acted upon, and also that the quantity delivered agrees with the denomination of the particular check in control of the delivery mechanism. The lugs are formed eccentric or to one side of a center line through the check to guard against the presentation of check in other than the correct position, and that the radial teeth E^4 shall engage the proper radial depressions J^2.

J^4 is a notch cut out from the outer edge of the check J, its position relative to a line drawn through the lugs J^3 determining the delivery value of the check, and such value, in figures designating the number of pounds, is stamped on the face of the check.

In operation suitable pipe connection is made between the pump A and the skim-milk tank of the creamery. When the new milk is delivered by a patron of the creamery, it is weighed and checks representing the weight of the quantity delivered are returned to such patron, who goes to the skim-milk pump and inserts one or more of the checks into the check-chute through aperture B^2. In order to get the check into the check-chute, he must present it in such a position that the lugs J^3 lie in the channel I^2, and by this means the check always reaches the mechanism in proper position to be acted upon. Upon its insertion into the check-aperture the check slides down the chute until its lower edge rests against the check-pin H^4. The operator now draws back the pusher-rod H, compressing the spring H^5 until the check-pin ceases to support the check, and it falls farther down the chute to a point where the lower lug J^3 strikes against and rests upon the stop-pin I^{10}. The descending check having passed between the projections D^3 and D^4 comes to rest with its upper edge between those projections. The pusher-rod H, now being released, forces the check against the hub E^2 of the ratchet-wheel E and the radial depressions J^2 coincide with and are engaged by the teeth E^4. The check in this position bears against the projection D^3 of the bifurcated lever D^2, and thereby presses the latter backward against the action of the spring D^8. This pressure, by reason of the engagement of the pin D^6 with the member D′ of the lever D, withdraws the latter from the notches A^9 in the pump-rod, leaving the pump free to be operated. At each stroke of the pump the friction-sleeve F is caused to move upward and downward with the pump-rod through a small distance, its movement being limited to a distance equal to the difference between its length and its space in the standard, after which movement the pump-rod slides through the sleeve. This distance is so arranged that at each upward movement of the pump-rod the spring-pawl F^9 will be raised far enough to reach over and engage one tooth of the ratchet-wheel E, and on its downward movement to rotate that wheel the distance of one tooth, the spring-detent G preventing any accidental rotation of the wheel. The check engaged by the teeth E^4 rotates with the ratchet-wheel until the notch J^4 is turned opposite the projection D^3, into which notch that projection slips, permitting the springs D^7 and D^8 to oscillate the lever D into engagement with one of the notches A^9 in the

pump-rod, locking the further action of the pump until the lever shall again be withdrawn. Several checks may be fed into the check-aperture, one after another, until the chute is filled, and as the pusher-rod H is drawn back to admit another check into a position for engagement with the teeth E^4 the check engaged by those teeth will fall to the box-bottom free from the mechanism, providing its delivery has been exhausted. Otherwise its notch J^4 will not coincide with the projection D^3 of the lever D, and the drawing back of the pusher-rod will only permit that projection to tilt the check backward, in which position the lower edge of the rim E^3 presents an obstruction to the escape of the check, rendering it impossible for it to drop from its position until its work is done.

The inclined position of the check-chute is necessary to prevent the check falling through the mechanism without engagement upon its introduction therein. An examination of the drawings, and particularly Figs. 6, 7, and 8, will make this plain, for it will be seen upon inspection that when the check first falls to the bottom of the chute the lower edge of the rim, as well as the stop-pin I^{10}, engaging with the lower one of the lugs J^3, arrests its downward course at the proper moment. After the check has been rotated somewhat, however, this lug will have been turned to such a position that it no longer engages the pin I^{10} when the pusher-rod is drawn back, but depends for its support upon the inclined position which the pressure of the projection D^3 of the detent-lever causes it to assume, together with the fact that it is at all times grasped between three bearing-points, to wit—the unyielding rim E^3 at its lower edge, the pusher-rod in the middle of its opposite face, and the projection D^3 at its upper edge, the latter being spring-actuated to maintain the contact of the lower edge with the rim E^6.

The object in making the lever D in two parts and providing a spring for each part is that the forward portion thereof shall always be free to tilt the check when the pressure of the pusher-rod is withdrawn, even though the opposite end of the lever D is resting upon a tooth of the stationary pump-rod and cannot enter one of the notches A^9, and as the check cannot free itself from the mechanism unless it is released while in an upright position it cannot escape from its place until the lever D exerts no pressure to tilt it, and this occurs normally only when the projection D^3 can enter the notch J^4, and when the work of the check is done. The forward portion D^2 of the detent-lever stops against the face-plate I^7, its movement in this direction being sufficient, however, to permit the arm having the projection D^3 to free the check from the teeth E^4 and therein to assist it in falling from the mechanism at the proper time.

When there are several checks in the chute and one in operative engagement with the mechanism, a withdrawal of the pusher-rod permits all the checks in the chute to descend until the lower edge of the lower one rests upon the arm D^4 of the bifurcated member of the lever D or upon the upper edge of the check in the mechanism if the pusher-rod is drawn back far enough, but upon releasing the rod the check-pin H^4, entering the opening J′ of the lower check in the chute, raises it sufficiently to clear the arm D^4, and the weight of all the checks in the chute will thus be borne by the check-pin.

The length of the check-pin H^4 is sufficient to retain the next succeeding check in the chute an instant after the lately-engaged check is released by the withdrawal of the pusher-rod, in order to permit the latter check to free itself from the tooth E^4 and escape before such succeeding check should be released, in order that there may be no clogging of the checks.

I have fitted the check-chute with a brass lining that the free passage of the check may not be impeded by rust on the walls of the chute.

In practice I have set the collar A^7 at such a point on the pump-rod that striking against the top of the box B it limits the stroke of the pump to a delivery of about eighty-five per cent. of the face value of the check or checks, that being about the quantity of skim-milk remaining after the extraction of the butter-fats.

For convenience I have used a pump having a delivery of two and one-half pounds for each full stroke, this number being a multiple of any check, the lowest denomination being for ten pounds and increasing by the number to a check for two hundred pounds. Thus a ten-pound check will permit four strokes of the pump, and if they were full strokes the delivery would be ten pounds, but as the stroke has been restricted fifteen per cent., a reduction for the butter-fats removed, the delivery will be only eight and one-half pounds of skim-milk and in like proportion for any check inserted.

I claim—

1. In a check-controlled delivery apparatus, in combination a delivery mechanism arranged to deliver a certain unit quantity at each unit delivery and means for limiting the unit deliveries to a number representing the delivery value of any one of two or more checks or tokens of different delivery values, substantially as and for the purpose specified.

2. In a check-controlled delivery apparatus, in combination, a delivery mechanism arranged to deliver a certain adjustable quantity at each unit delivery and means for limiting the unit deliveries to a number representing the delivery value of any one of two or more checks or tokens of different delivery values, substantially as and for the purpose specified.

3. In a check-controlled delivery apparatus, in combination, a delivery mechanism and means for permitting any number of several

prearranged delivery movements of the mechanism, determined by the form of the check or token in control of the mechanism, substantially as and for the purpose specified.

4. In a check-controlled delivery apparatus, in combination, a delivery mechanism arranged to deliver by a series of partial delivery movements and means for limiting the quantity delivered by the series to a quantity representing the delivery value of any oue of two or more checks or tokens of different delivery values, substantially as and for the purpose specified.

5. In a check-controlled delivery apparatus, in combination, a volume-measuring mechanism, means for arresting the delivery when a predetermined quantity has been delivered, and means for bringing a check or token into engagement with the arresting means to release the delivery apparatus and by the position of a single release device thereon, govern the time of releasing said arresting means to vary the delivery, substantially as and for the purpose specified.

6. In a check-controlled delivery apparatus, in combination, a pump and means for limiting the number of the strokes thereof to a number representing the delivery value of any one of two or more checks or tokens of different delivery values, substantially as and for the purpose specified.

7. In a delivery apparatus, the combination of a pump, mechanism for controlling the operation thereof and governing means therefor adapted to be controlled by one of a number of checks or tokens and thereby varying the delivery of the apparatus, substantially as and for the purpose specified.

8. In a check-controlled delivery apparatus, in combination, a delivery-pump and means for limiting the operation of the pump, means for engaging a token with the limiting device and releasing the same after a period of operation depending upon the position on the token of a releasing means for the limiting device, substantially as and for the purpose specified.

9. In a check-controlled delivery apparatus, in combination, a delivery-pump, means for limiting the operation of the piston thereof, means for engaging a token with the limiting device and releasing the same after a period of operation depending upon the position on the token of a releasing means for the limiting device, substantially as and for the purpose specified.

10. In a check-controlled delivery apparatus, in combination, a delivery mechanism arranged to deliver a certain unit quantity at each unit delivery, a detent, and means for withdrawing the detent to permit a series of unit deliveries limited to the number representing the delivery value of any one of two or more checks or tokens of different delivery values, substantially as and for the purpose specified.

11. In a check-controlled delivery apparatus, in combination, a delivery mechanism, a detent for arresting the action thereof, a ratchet-wheel rotated by the delivery mechanism, means controlled by the ratchet-wheel for suspending the engagement of the detent to permit a series of unit deliveries limited to a number representing the delivery value of any one of two or more checks or tokens of different delivery values, substantially as and for the purpose specified.

12. In a check-controlled delivery apparatus, in combination, a delivery mechanism, a detent for arresting the action of the delivery mechanism, a spring for the detent, a ratchet-wheel rotated by the movements of the delivery mechanism, means controlled by the ratchet-wheel for suspending the engagement of the detent to permit a series of unit deliveries limited to a number representing the delivery value of any one of two or more checks or tokens of different delivery values, substantially as and for the purpose specified.

13. In a check-controlled delivery apparatus, in combination, a pump, a detent for arresting the action thereof, a spring for holding the detent in engagement, a ratchet-wheel rotated by the movements of the pump-rod, means controlled by the ratchet-wheel for suspending the engagement of the detent to permit a delivery representing in quantity the delivery value of any one of two or more checks or tokens of different delivery values, substantially as and for the purpose specified.

14. In a check-controlled delivery apparatus, in combination, a delivery mechanism, a two-part detent-lever for arresting the action thereof, a common pivot for the two parts of the lever, a spring for each part, a pin on one part for engaging the other part of the lever, means for moving the detent-lever against the action of the springs, and means for releasing the detent after a certain predetermined delivery, substantially as and for the purpose specified.

15. In a check-controlled delivery apparatus, in combination, a pump having a notch in the pump-rod, a detent-lever for engaging the notch, a spring for holding the lever in engagement with the notch, a ratchet-wheel, a friction-sleeve on the pump-rod, a pawl on the sleeve for engaging the ratchet-teeth, a hub for the ratchet-wheel, radial teeth on the hub, and means for moving the detent-lever out of engagement with the notch in the pump-rod, substantially as and for the purpose specified.

16. In a check-controlled delivery apparatus, in combination, a pump having a notch in the pump-rod, a movable adjustable collar on the pump-rod, a detent-lever for engaging the notch, a spring for holding the lever in engagement with the notch, a ratchet-wheel, a friction-sleeve on the pump-rod, a pawl on the sleeve for engaging the ratchet-wheel, a hub for the ratchet-wheel, radial teeth on the hub, a pusher-rod, a spring for the pusher-rod, a check-chute, and means for moving the detent-lever out of engagement with the

notch in the pump-rod, substantially as and for the purpose specified.

17. As a new article of manufacture, a check or token for check-controlled apparatus, a disk having means for presenting it to the mechanism in a certain predetermined position and having an opening in the disk adapted to receive the stop-detent device and by its position governing the amount of the delivery, substantially as and for the purpose specified.

18. As a new article of manufacture, a check or token for coin-controlled apparatus, a disk having an eccentric projection, and an opening near the edge of the disk, substantially as and for the purpose specified.

19. As a new article of manufacture, a check or token for coin-controlled apparatus, a disk having two eccentric lugs, a ring of radial depressions in its face, and a notch formed in its outer edge, substantially as and for the purpose specified.

HOWARD D. COLMAN.

Witnesses:
BURTON W. NORTON,
NELLIE BUNKER.