N. ANDERSON.

METER ACTUATED CUT-OFF DEVICE.

APPLICATION FILED JAN. 25, 1916.

1,301,781.

Patented Apr. 22, 1919.

3 SHEETS—SHEET 1.

Fig. 1.

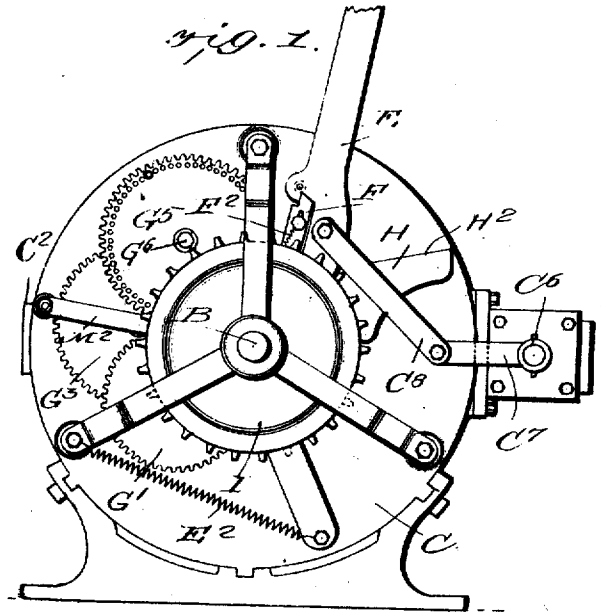


Fig. 2.

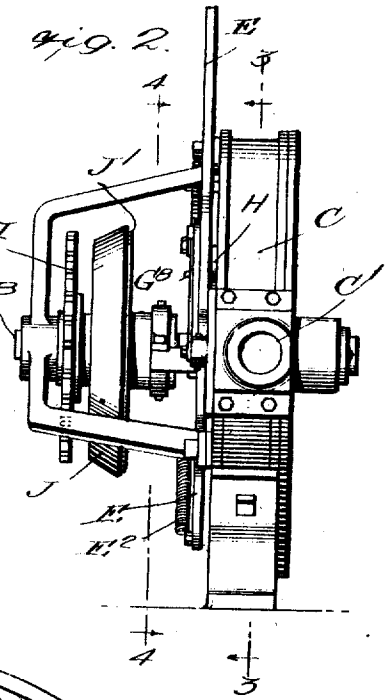
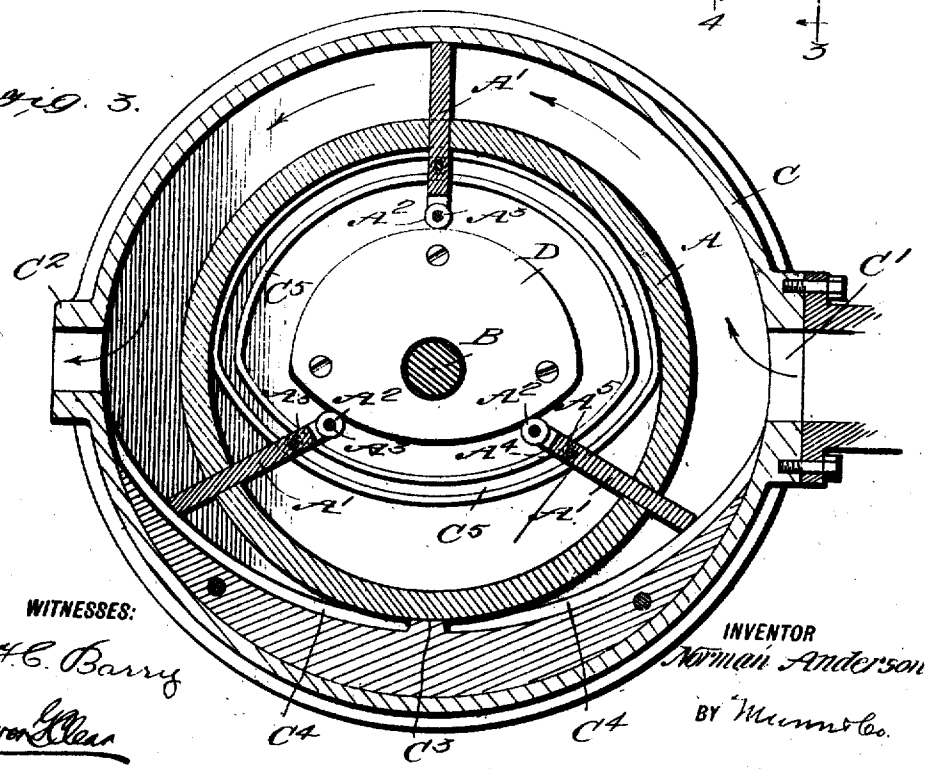


Fig. 3.



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3 SHEETS—SHEET 2.

Fig. 4.

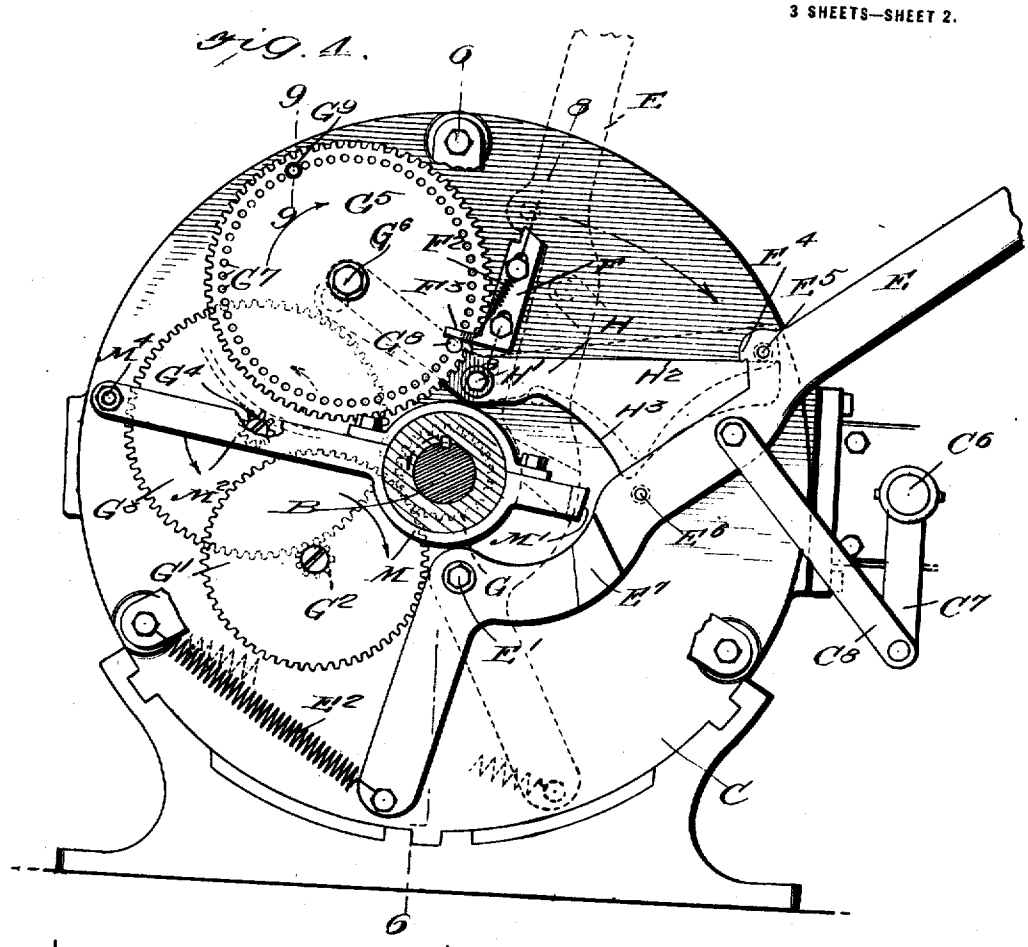
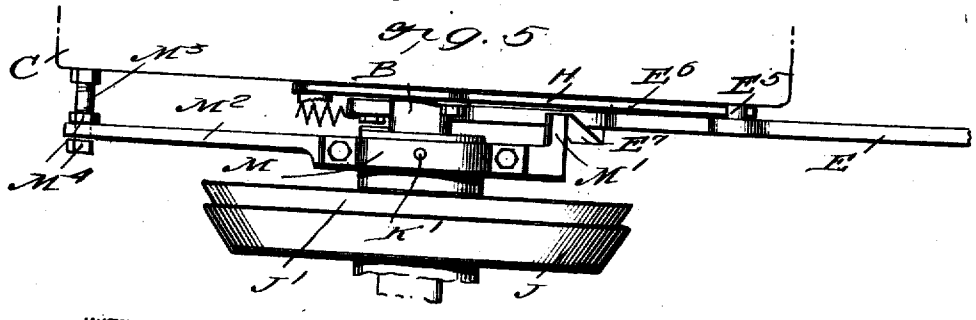


Fig. 5.



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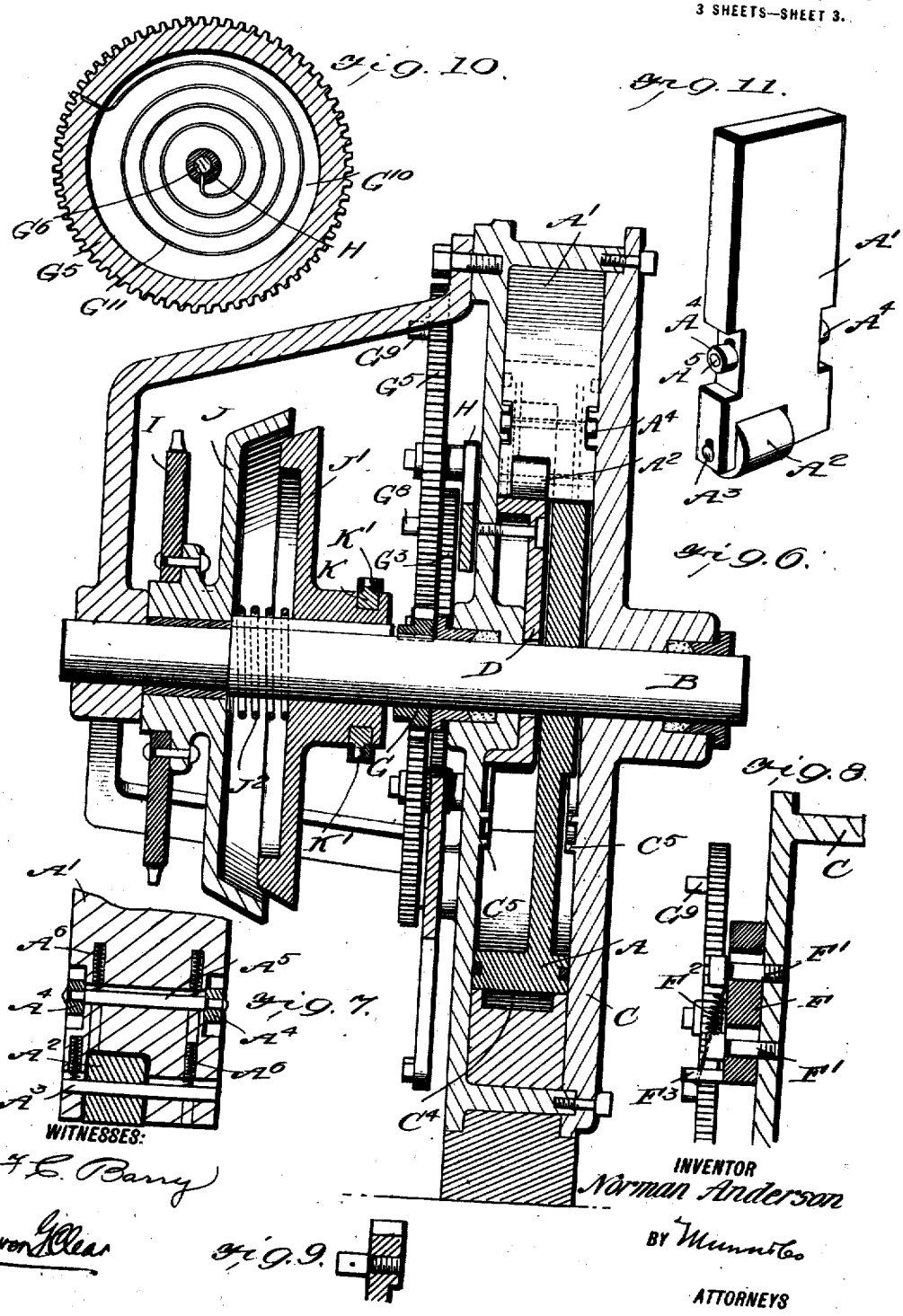
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

NORMAN ANDERSON, OF DULUTH, MINNESOTA.

METER-ACTUATED CUT-OFF DEVICE.

1,301,781. Specification of Letters Patent. Patented Apr. 22, 1919.

Application filed January 25, 1916. Serial No. 74,226.

To all whom it may concern:

Be it known that I, NORMAN ANDERSON, a citizen of the United States, and a resident of Duluth, in the county of Saint Louis and State of Minnesota, have invented certain new and useful Improvements in Meter-Actuated Cut-Off Devices, of which the following is a specification.

My present invention relates generally to meter actuated cut-off devices, and more particularly to a durable, effective, and inexpensive device of this nature for use in connection with concrete mixing machines and apparatus, my object being to provide an accurate, unfailing means for the purpose stated which will operate with equal facility where the liquid is either of sufficient pressure to carry through of itself, or is required to be pumped through.

A further object of my invention is to provide a metering mechanism capable of interchangeable use to either force the water through or be actuated by the water in its passage through, where it is sufficient in pressure to do so.

A still further object of my invention is to provide a metering device having certain novel details whereby to prevent adverse pressure action, or clogging by extraneous matter.

A still further object of my invention is to provide meter-actuated cut-off connections, including a member having means whereby to control a clutch, as well as a liquid valve.

A still further object of my invention is to provide cut-off connections including a manually adjustable index member, together with means whereby to effect return of said member to zero position after each automatic cut-off operation.

The means which I prefer to utilize for the accomplishment of the above and certain other objects, will be apparent from the following description, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side elevation.

Fig. 2 is an end view.

Fig. 3 is an enlarged vertical section taken on line 3—3 of Fig. 2.

Fig. 4 is a similar view taken on line 4—4 of Fig. 2.

Fig. 5 is an enlarged plan view of the clutch and adjacent parts.

Fig. 6 is a vertical transverse section taken on line 6—6 of Fig. 4.

Fig. 7 is a detail section through the inner end of one of the rotor blades.

Fig. 8 is a detail section taken on line 8—8 of Fig. 4.

Fig. 9 is a similar view taken on line 9—9 of Fig. 4.

Fig. 10 is a similar view through the index member.

Fig. 11 is a perspective view of one of the rotor blades removed.

Referring now to these figures, and particularly to Figs. 3 and 6, the rotor A of the metering device is as usual mounted upon a shaft B within a casing C and is provided with a series of radially movable guided blades A′ engageable at their outer ends against the inner peripheral surface of the casing C, the latter being provided at one side with an inlet C′ and at its opposite side with an outlet C^2, and having a portion thereof at C^3 as particularly seen in Fig. 3, against which the lower peripheral portion of the rotor A snugly engages at a point midway between the inlet C′ and outlet C^2 and upon the opposite side of the rotor as compared to that side constituting the path of movement between the said inlet and outlet.

Each of the blades A′, one of which is shown in detail in Fig. 11, is cut away at its inner end and transversely slotted to receive a roller A^2 and its shaft A^3, and is also cut away at its opposite sides and intermediate its ends to receive rollers A^4 at opposite sides thereof and the shaft A^5 upon the opposite ends of which said rollers are mounted, it being noted from Fig. 7 in particular, that the shafts A^3 and A^5 of rollers A^2 and A^4, have movement bodily in the direction of the length of the blade A′ under tension of coil springs A^6. Thus, each of the blades, in addition to its guided retraction, in operation as presently described, is permitted a spring controlled yielding movement under the presence of extraneous matter in the fluid flowing through casing C to prevent binding and clogging.

The rollers A^2 at the inner ends of the several blades A′ engage an inner cam member D secured centrally of the casing C and the intermediate rollers A^4 are disposed within cam tracks C^5 formed upon the inner surfaces of the side walls of the casing C, and

the use of which permits of desired retraction of the blade during each half circle of movement thereof below the horizontal plane of the rotor axis, so as to obviate undesirable and uneven wear of the outer end of the blade against the irregularly shaped lower portion of casing C, which lower portion it will be noted is grooved at C^4 upon opposite sides of the point C^3 of contact of the rotor, to prevent adverse pressure action.

The water inlet C′ to the casing C is, as usual, controlled by a valve, the stem of which is seen at C^6 in Fig. 4, and which is provided with an arm C^7 connected by a connecting arm C^8 to a lever E, at a point intermediate the ends of the latter.

This lever E just referred to, is pivotally mounted at E′ upon one side of the casing C, and is normally held in the position shown in full lines in Fig. 4, maintaining the intake valve in closed position, through the action of a spring E^2 anchored at one end to a portion of the casing and connected at its opposite end to the lower end of said lever. Lever E is movable to an upright position, as shown in dotted lines in Fig. 4, in which position the intake valve is opened, permitting the flow of water through the casing C, and is provided with an intermediate side lug E^4 with which a latch member F is engageable in the upright position of the lever.

Latch member F just referred to, and as most clearly seen in Figs. 4 and 8, has a guided movement in a substantially vertical direction upon guide pins F′ extending outwardly from the casing C, and is normally held in uppermost position under the tension of a spring F^2 so as to maintain its upper engaging nose in position to coöperate with the lever lug E^4 before mentioned, whenever the lever is moved to its upright operative position. The lower end of latch member is also provided with a laterally projecting lug F^3 as seen in Fig. 4, and for a purpose which will be presently described.

On the shaft B of the metering device, outside of the casing A, is secured a gear wheel G which, through a train of gears including gears G′, G^2, G^3, and G^4, transmits rotation to an index wheel G^5, this latter wheel being revolubly mounted at G^6 upon one end of a lever H intermediately pivoted upon the adjacent side of the casing C at H′, and having its other end portion extending adjacent to the lever E and provided with upper and lower cam engaging edges H^2 and H^3 respectively, the index wheel being by virtue of its mounting as described, movable into and out of engagement with the next adjacent gear wheel G^4 of the gear train.

The index wheel is provided with an annular series of apertures G^7 in one of which is mounted a permanent stop member G^8 and in any other aperture of which series may be disposed an index pin G^9, it being noted from Fig. 9 that the several apertures of the series G^7 and the index pin G^9 may be threaded for screw engagement. The body of the index wheel G^5 is cored out at its side nearest the casing C, and as shown particularly in Fig. 10, to provide an annular chamber G^{10} in which is disposed a spiral spring G^{11}, the outer end of which is securely anchored in the index wheel and the inner end of which is just as securely anchored in a portion of the supporting lever H. By means of this spring G^{11}, the index wheel is normally maintained in a zero position with its stop member G^8 against the lower face of the latterally projecting lug F^3 of the latch member F as clearly seen in Fig. 4, and is returned after each automatic operation to such zero position, subsequent to its bodily movement out of contact with the engaging gear G^4 of the gear train, by movement of the lever H upon its pivot H′ under actuation of the lever E in its movement to inoperative position, as will be now described.

Lever E is provided with laterally projecting rollers E^5 and E^6 spaced apart and respectively engageable with the upper and lower edges H^2 and H^3 of the lever H before described.

Thus, in the operation of the device, when the lever E is moved to upright position to start the flow of water, its roller E^6 engaging the lower edge H^3 of lever H, forces the adjacent end of the lever upwardly, thus lowering the index wheel G^5 into engagement with the next adjacent gear wheel G^4 of the gear train, so that rotation of the shaft B of the rotor is transmitted through the gear train to the index member, which then rotates in the direction of the arrow, Fig. 4, until the manually adjusted index pin G^9 engages the upper surface of the lateral extension F^3 of the latch member F, and lowers said latch member against the tension of its spring F^2 out of engagement with the lug E^4 of the operating lever E. Upon such release, the lever controlling spring E^2 acts to throw the lever downwardly to the full line position in Fig. 4, during which movement the upper laterally projecting roller E^5 of lever E engages the upper surface H^2 of the lever H and forces the lever downwardly, lifting the index wheel G^5 out of engagement with the gear wheel G^4 and thus enabling the index wheel spring G^{11} to rotate the wheel in a counter clockwise direction back to zero point as before described, and instantly setting the entire device ready for the next operation.

In order that the apparatus as thus described may operate equally well in connection with, a water supply lacking the requisite pressure to carry it through the casing C and actuate the rotor A in its passage, I provide the shaft B upon its end portion ex-

tended laterally beyond the main operating lever E and the gears before described, with a sprocket member I loosely disposed thereon in connection with one member J of a friction clutch, the other member J′ of which is splined upon the shaft B and normally held out of contact with its companion member J by means of a spring J^2 compressed therebetween.

The movable clutch member J′ is provided with an annular groove in which is rotatably seated a ring K, and this ring, as best seen in Fig. 6, is provided at diametrically opposite points, with vertically projecting pivot pins K′ forming the intermediate fulcrum for a clutch actuating yoke M, this yoke, as best seen in Fig. 5, being provided at one side with a laterally projecting lug M′ and at its opposite end with an extending arm M^2.

The main operating lever is provided with an intermediate side cam E^7 engageable with the lug M′ of the yoke M when the said lever is raised to operative position to force the yoke M with the movable clutch member J laterally in order to engage said clutch member with the companion member J, by virtue of the fact that the outer end of the yoke arm M^2 as shown in Fig. 5, is pivotally disposed upon a post M^3 projecting laterally from the casing C. It will be noted that this pivot of the arm M^2 is adjustable to take up wear of the parts, the post end being to this end threaded for the reception of nuts M^4, between which the end of arm M^2 is loosely confined.

Thus, where the water supply is without sufficient pressure to carry itself through the metering device, power from any suitable source is communicated to the sprocket member I, and may be continuous, the operating lever E in each movement thereof to operative position, effecting engagement of the clutch members J and J′ as just above described, in addition to opening the intake valve as before described, whereby such power will be communicated to the shaft B of the metering device and the water pumped through the device through the action of the rotor A, with its several parts as first above described.

I am thus enabled to provide a meter actuated cut-off device, the strong, durable, and interchangeable nature of which peculiarly fits it for use in connection with concrete mixing machines and apparatus, and the accurate unfailing qualities of which together with its instantaneous return to normal position and readiness for successive operations without manual effort except for the movement of the main lever E, recommend it strongly for such work.

Thus, the rotor A and its blades are capable of operation either as a pump or as a rotary motor. When in operation as a pump, the power-transmitting connection from the driving means to the rotor is controlled by the hand-lever E, and this same hand-lever, in the manner shown, and as previously stated, controls the transmission of power from the shaft of the rotor to the index wheel G^5 upon which the adjustable tripping device is provided for automatically releasing the hand-lever as soon as the predetermined quantity of liquid has passed through the motor or pump.

I claim:

1. In a liquid metering machine, the combination of a motor operable by liquid pressure, a valve to control the flow of liquid through the motor, so that when the valve is closed the motor will stop, mechanism for connection with a source of power to operate said motor as a pump, having a clutch to control the transmission of power to the pump, and means to predetermine the quantity of liquid which it is desired to have pass through the machine and to automatically open said clutch and close said valve, whereby the machine whether operating as a motor or a pump is automatically stopped after the passage of the predetermined quantity of liquid.

2. The structure of claim 1, as stated, said motor having rotary means inclosed to receive the liquid, so that the machine is operable either as a rotary motor or as a rotary force pump.

3. The structure of claim 1, as stated, said means including a wheel which rotates continuously while the machine is in operation and a tripper adjustable to different positions on said wheel to vary the quantity of liquid.

4. The structure of claim 1, as stated, said clutch being disposed between said mechanism and said motor, and a handle to control said clutch and also said valve.

5. The structure of claim 1, as stated, said means including a pivoted lever for supporting said index device, a handle connected to operate said lever and to control said clutch, a catch to hold said handle in operated position, and a tripper on said index device to release said catch.

6. In a meter and automatic cut-off machine, a rotary fluid motor, mechanism including a clutch to operate the motor as a pump, a valve, a lever connected to control said valve and also said clutch, a catch to hold said lever in position to hold the valve open and the clutch closed, a rotary device which rotates continuously while the machine is in operation and which serves automatically to release said catch after a predetermined quantity of fluid has passed through said motor, gearing to connect said motor with said device so that said device will rotate more slowly than the motor, and a spring to automatically restore said lever

and valve and clutch to the inoperaitve position thereof when the catch is released.

7. A structure as specified in claim 6, said device comprising a gear wheel, a tripper to engage the catch, and a series of positions on said gear wheel for said tripper so that the device can be adjusted to vary the quantity of fluid.

8. A structure as specified in claim 6, and means to automatically disconnect said device from said gearing when the catch is released.

9. A structure as specified in claim 6, and means operated by said lever to automatically disconnect said device from said gearing when said catch is released.

10. A structure as specified in claim 6, and a pivoted member on which said device is carried, and means on said lever to engage said member to disconnect the device from said gearing when the catch is released.

11. A structure as specified in claims 6 and 8, and a spring to return said device to normal position when disconnected from the gearing.

12. A structure as specified in claim 6, said lever being pivoted to swing about an axis parallel with the axis of said motor, and the connection from said lever to said clutch including a cam by which the motion of said lever is converted into movement of the clutch along the axis of said motor.

NORMAN ANDERSON.