June 1, 1937. W. F. BERCK 2,082,375

SETTING MECHANISM FOR PREDETERMINING COUNTERS

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Fig. 1.

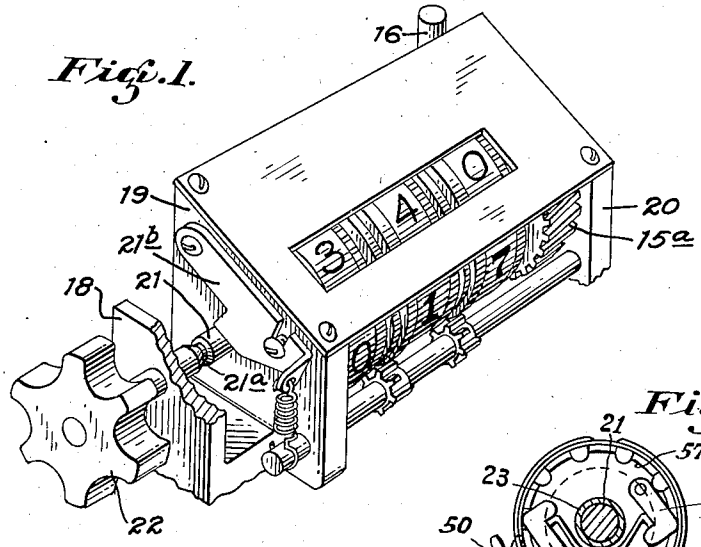


Fig. 9.

Fig. 5.

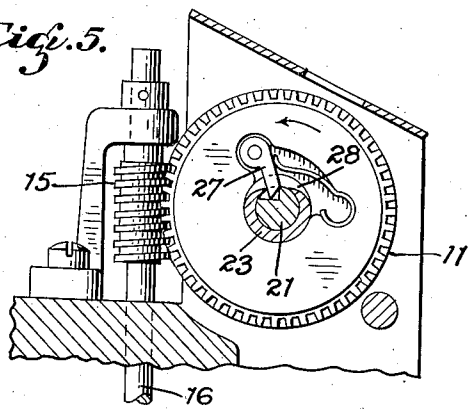
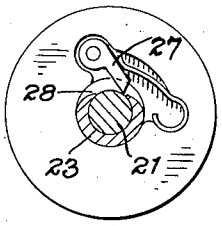


Fig. 6.



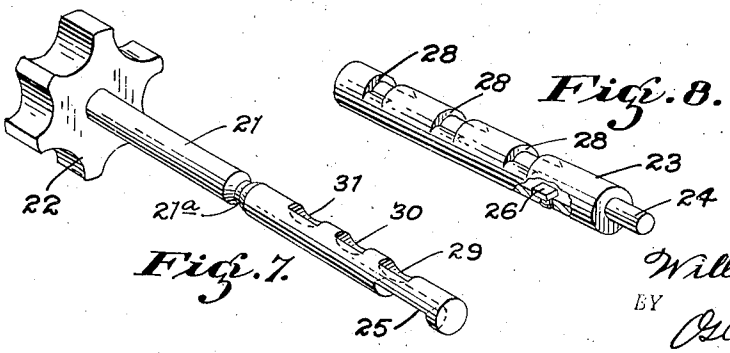


Fig. 7.

Fig. 8.

INVENTOR.
William F. Berck
BY
Oscar A. Mellin
ATTORNEY.

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Fig. 2.

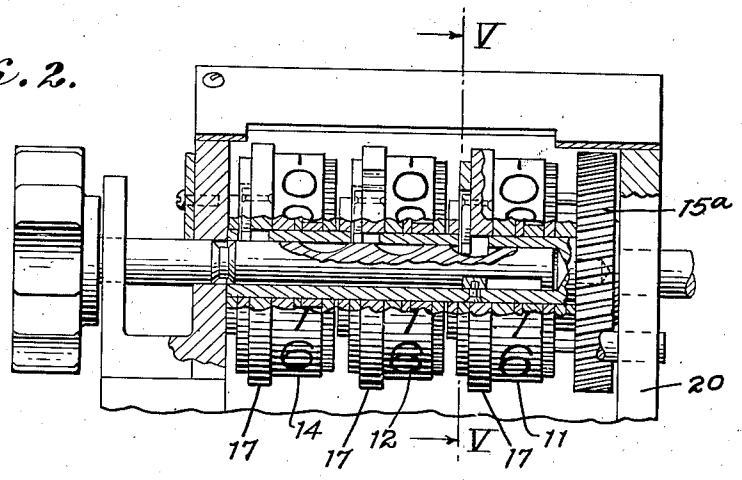


Fig. 3.

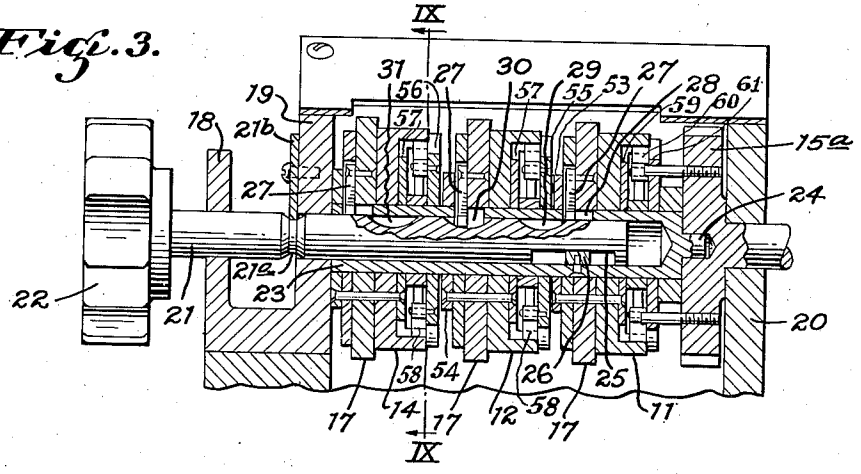
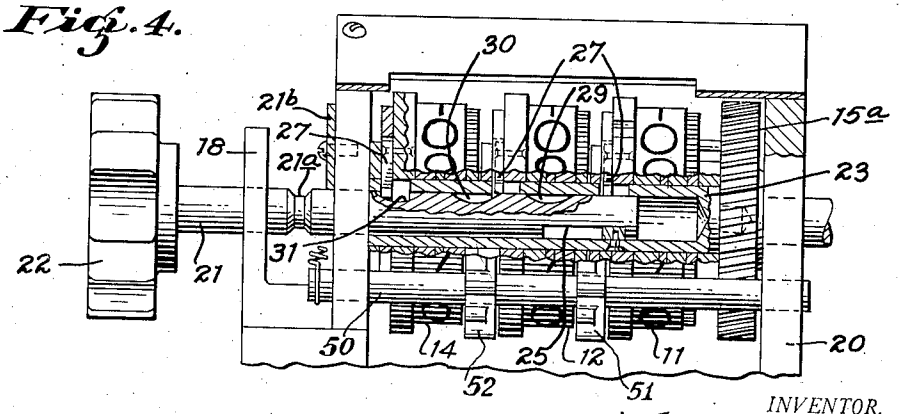


Fig. 4.



INVENTOR.
William F. Berck
BY
Oscar A. Mellin
ATTORNEY.

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UNITED STATES PATENT OFFICE

2,082,375

SETTING MECHANISM FOR PREDETERMINING COUNTERS

William F. Berck, Oakland, Calif., assignor to Ralph N. Brodie Company, Oakland, Calif., a corporation of California

Application May 13, 1935, Serial No. 21,196

1 Claim. (Cl. 235—117)

This invention relates to counter mechanisms for use in connection with liquid meters and like devices.

In a copending application entitled "Automatic shut-off mechanism for liquid meters", filed May 13, 1935, Ser. No. 21,197, I have disclosed an automatic mechanism for automatically closing a liquid meter shut-off valve after a predetermined volume of liquid has passed through the meter with which the valve is associated. This automatic mechanism is controlled by a counter mechanism operated by the meter, the setting of which counter mechanism determines the amount of liquid which will be discharged through the meter before the valve closes. This counter mechanism includes a selected number of counter wheels associated in the usual fashion so that they will operate to indicate units, tens and hundreds. For setting this predetermining counter each wheel is fitted with a separate operating member.

It is the principal object of my present invention to improve and simplify the construction and operation of such predetermining counters whereby I am enabled to produce a device of the character referred to wherein the setting of all the counter wheels may be effected by manipulation of a single operating member.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a perspective view of a predetermining counter mechanism embodying the preferred form of my invention.

Fig. 2 is a view in longitudinal section therethrough showing the operating member in position to operate the unit wheel.

Fig. 3 is a similar view showing the operating member in position to set the tens wheel.

Fig. 4 is a similar view showing the operating member in position to set the hundreds wheel.

Fig. 5 is a transverse sectional view taken on line V—V of Fig. 2.

Fig. 6 is a similar transverse section but disclosing only the mounting of one counter wheel on the operating member.

Fig. 7 is a perspective view of the operating member.

Fig. 8 is a perspective view of the sleeve in which the operating member is reciprocable.

Fig. 9 is a transverse sectional view taken on line IX—IX of Fig. 3.

Referring more particularly to the accompanying drawings, I there illustrate what I prefer to term a predetermining counter. This counter includes a units wheel 11, a tens wheel 12 and a hundreds wheel 14. The unit wheel 11 is driven by a worm gear drive 15 which is driven by the meter through the medium of a shaft 16. The counter wheels 11, 12 and 14 are operatively associated as in standard practice by mutilated gears and pinions so that upon each revolution of the units wheel 11, the tens wheel revolves one-tenth of a revolution and upon each complete revolution of the tens wheel, the hundreds wheel 14 revolves one-tenth of one revolution.

A pinion shaft 50 is provided on which is rotatably mounted a pinion 51 for the tens wheel 12 and a pinion 52 for the hundreds wheel 14. The units wheel 11 is fitted with a mutilated gear 53 to mesh with the pinion 51, and the tens wheel 12 is fitted with a mutilated gear 54 to mesh with the pinion 52. The pinion 51 is in mesh with a gear 55 adjacent the tens wheel, and the pinion 52 is in mesh with a gear 56 adjacent the hundred wheel. The ratio is such that the units wheel 11 will intermittently drive the gear 55 one-tenth of a revolution each time the units wheel completes one revolution, and the tens wheel will intermittently drive the gear 56 one-tenth of a revolution each time the tens wheel completes one revolution.

The gears 55 and 56 are connected to the tens and hundreds wheels respectively through a ratchet mechanism disclosed in Figs. 3 and 9. From these figures it will be seen that these wheels are each fitted with an internal ratchet wheel 57 engageable by pivotal pawls 58 carried by the gears 55 and 56. The engagement is such that rotation in one direction by the gears 55 and 56 will drive the wheels 12 and 14, but that the latter wheels are free to be turned in the opposite direction. This, of course, permits setting thereof. The units wheel is likewise fitted with a similar ratchet wheel 59 engaged by pawls 60 carried by a disk 61, which disk is driven by the worm gear 15a as shown in Fig. 3.

In operation, it is intended (as shown and described in my copending application referred to) to utilize these wheels to indicate the volume of liquid it is desired to discharge through the meter. For example, should the volume desired be 125 gallons, the units wheel is set at 5, the tens wheel is set at 2 and the hundreds wheel at 1. When the meter commences operating, these counter wheels retrograde toward zero and when all three reach zero, they operate a trip mechanism which causes closing of the meter shut-off valve, thus stopping the meter.

For this purpose they are fitted with trip members 17 relatively associated with the valve trip mechanism, not shown. It is believed unnecessary to go into the description of the tripping operation here inasmuch as the present invention relates solely to a simple means of setting the counter wheels 11, 12 and 14 prior to the operation of the meter.

Reference being had to the drawings, it will be seen that the counter mechanism is mounted in a frame which includes upright members 18, 19 and 20. Journalled in the upright members 18 and 19 is an operating member 21 in the form of a shaft having a knob 22 at its outermost end so that it may be grasped for use in manually manipulating the operating member 21. Arranged on the operating member 21 is a sleeve 23 in which the operating member 21 is reciprocable. This sleeve is provided with a pintle 24 which is journalled in the end of the worm gear 15a which forms a part of the worm gear drive 15, the shaft of this gear 15a being journalled in the frame member 20. It will thus be seen that due to the pintle bearing 24 and the fact that the operating member is journalled in the members 18 and 19 that the operating member will be rotatably supported in the frame of the counter. It will be noticed, however, that the sleeve 23 is held from endwise movement due to its being confined between the end of the gear 15a and the upright member 19.

To enable the operating member 21 to reciprocate in the sleeve 23 but to prevent it from rotating relative thereto, the operating member is formed with a keyway 25 which is engaged by a short key 26 fixed to the sleeve 23. The length of the keyway 25 is such that it enables a proper amount of reciprocable movement of the operating member 21 relative to the sleeve 23.

To enable turning movement of the operating member 21 and the sleeve 23 to impart turning movement to a selected counter wheel, each counter wheel is fitted with a spring-pressed pawl 27, as illustrated in Figs. 5 and 6. In register with each pawl 27, the sleeve 23 is formed with a circumferential slot 28 and through which the pawls 27 project to engage the periphery of the operating member 21. The operating member 21 is formed with three pawl engaging slots 29, 30 and 31. The spacing between these pawl engaging notches 29, 30 and 31 is less than the spacing between the circumferential slots 28 so that only one notch in the operating member 21 can be placed in register with a circumferential slot 28 in the sleeve 23 at a time. That is to say, when the notch 29 in the operating member 21 is in register with the slot 28 in the sleeve, registering with the pawl 27 of the units wheel, the remaining notches 30 and 31 are out of register with the other slots 28 in the sleeve 23. Thus, by axially adjusting the position of the operating member 21, the latter may be selectively placed into operating engagement with the counter wheels 11, 12 and 14 to set the same.

For example, when the operating member 21 is in its innermost position, as illustrated in Fig. 2, the notch 29 aligns with the innermost slot 28 of the sleeve 23 and is capable of engaging the pawl 27 of the units wheel. At this time the key 26 engages one end of the keyway 25 and prevents further inward movement of the operating member 21.

If it is desired to set the counter wheel 12, the operating member 21 is moved to its intermediate position, placing the notch 30 into alignment with the center slot 28 so that it will engage the pawl 27 of the tens wheel 12. In order to determine this intermediate position, the operating member 21 is formed with a circumferential groove 21a adapted to be engaged by a spring-pressed latch member 21b, such engagement indicating that the operating member is in position to operate the tens wheel 12.

To operate the hundreds wheel 14, the operating member 21 is moved to its outermost position which is determined by engagement of the key 26 with the innermost end of the keyway 25. In this position the notch 31 will be in register with the outermost slot 28 in the sleeve 23 and capable of engagement with the spring-pressed pawl 27 of the hundreds wheel 14.

It is thus seen that by axially adjusting the position of the operating member 21, it may be selectively placed in operative association with any one of the counter wheels 11, 12 and 14.

From Figs. 5 and 6 it will be noticed that the notches 29, 30 and 31 are formed by the use of an end mill so that rotation of the operating member 21 in one direction will so engage the pawl that the rotation of the operating member 21 will be accompanied by rotation of the selected counter wheel, but that rotation of the operating member in the opposite direction will be ineffective to turn the counter wheel.

In operation of the device, it is constructed and assembled as shown in the drawings and operatively associated with the meter and with the shut-off valve trip mechanism of the meter. Assuming that all of the counter wheels indicate zero (as they are numbered in standard practice) and it is desired to have the meter discharge say 135 gallons, the operating member through the medium of the knob or operating wheel 22 is moved axially to its inner most position which will be determined by engagement of the outermost end of the keyway 25 with the stationary key 26 in the sleeve 23. In this position the notch 29 will be in register with the innermost slot 28 in the sleeve 23 and consequently in register with the pawl 27 of the units wheel 11. The operating member 21 is then turned in the direction of the arrow in Fig. 5 through the medium of the knob 22 until the Figure 5 of the wheel 11 is in indicating position. The operating member 21 is then pulled axially outward until the spring-pressed latch member 21b engages the circumferential groove 21a in the operating member 21. This will indicate that the operating member 21 is in intermediate position with its notch 30 in register with the intermediate slot 28 in the sleeve 23. In such position the notch 30 will upon rotation of the operating member 21 engage the pawl 27 of the tens wheel 12 so that upon rotation of the operating member 21, rotation of the tens wheel 12 will result. Thus, rotation of the tens wheel 12 is produced until the numeral 3 thereon is in indicating position. The operating member 21 is then moved outward to its outermost position which is determined by engagement of the inner end of the keyway 25 with the key 26, at which time the outermost notch 31 in the operating member 21 will register with the outermost slot 28 in the sleeve 23 so that it will be in position to engage the pawl of the hundreds wheel 14. The operating member 21 is then rotated to rotate the wheel 14 until the numeral 1 thereon is in indicating position. The meter shut-off valve is then opened so that the meter will commence operating.

Operation of the meter will be accompanied by

operation of the worm gear drive 15 which will in turn properly drive the counter wheels 11, 12 and 14. These wheels are also driven in the direction of the arrow in Fig. 5 and will retrograde toward zero. When the zeros on the three wheels all align with the indicating position, the trip member 17 of these wheels will cause tripping of the shut-off valve to close the same and shut off the meter.

It is obvious that the sleeve 23 is essential due to the fact that the various gears and wheels must have a bearing thereon. This is obvious from the drawings when all of the mechanism in conjunction with the counter wheels is concerned. By the use of the sleeve 23 all of the mechanism can be so mounted thereon as to be axially immovable and will at all times have a bearing surface which would not be true should they be mounted on the member 21.

From the foregoing it is obvious that I have provided an improved and simplified setting mechanism for predetermining counters by means of which mechanism the predetermining counter may be set through the medium of a single operating member and while I have shown the preferred form of my invention, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claim.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

A device of the character described comprising a rotatably supported shaft-like operating member, an axially immovable sleeve mounted thereon and rotatable therewith, a plurality of rotatable elements rotatably mounted on said sleeve, a spring-pressed pawl on each element, said sleeve having a circumferential slot for each pawl and in register therewith, said member being formed with a notch for each pawl, the spacing between said notches being such that only one thereof may register with a slot in the sleeve at one time, said member being reciprocable in said sleeve whereby a selected notch may be placed in register with a selected slot in the sleeve, the registration of a notch with a slot enabling engagement of the adjacent pawl with the notch and thereby enabling turning of the wheel to which the pawl is connected by turning of the operating member.

WILLIAM F. BERCK.