

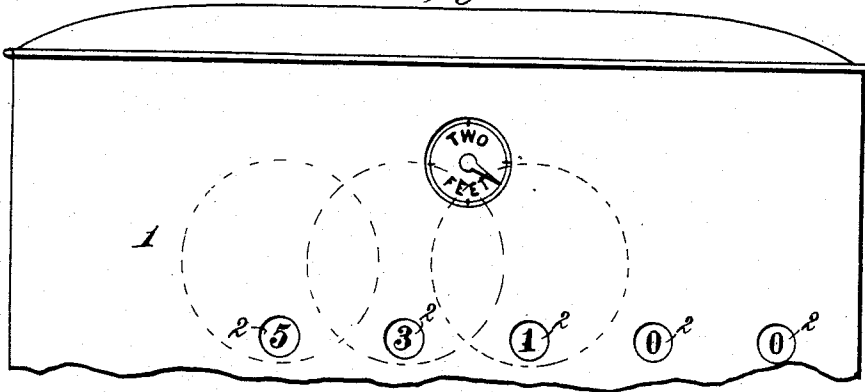
(No Model.)

P. FORD.  
REGISTERING MECHANISM.

No. 410,885.

Patented Sept. 10, 1889.

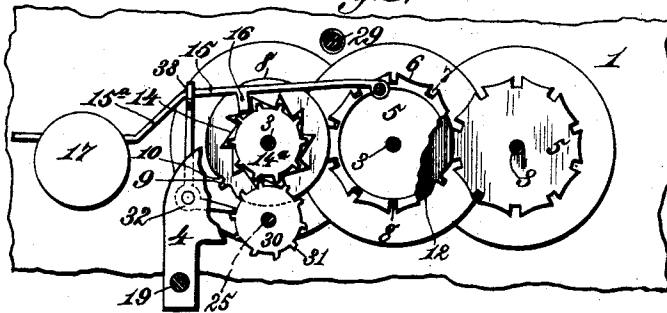
*Fig. 1.*



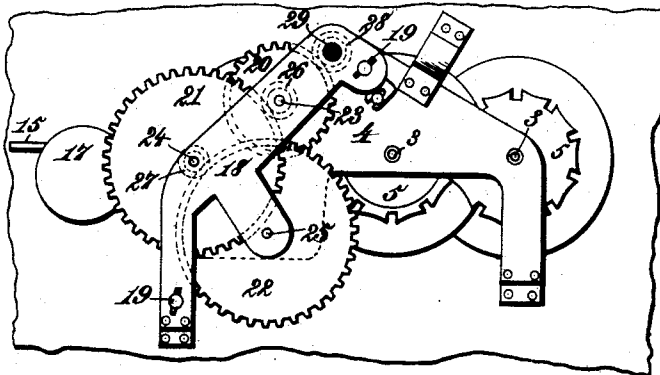
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

PIERCE FORD, OF TUCSON, ARIZONA TERRITORY, ASSIGNOR OF ONE-HALF  
TO WILLIAM W. FLEWELLING, OF SAME PLACE.

## REGISTERING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 410,885, dated September 10, 1889.

Application filed April 9, 1889. Serial No. 306,565. (No model.)

*To all whom it may concern:*

Be it known that I, PIERCE FORD, a citizen of the United States, residing at Tucson, in the county of Pima and Territory of Arizona, have  
5 invented new and useful Improvements in Registering Mechanism, of which the following is a specification.

My invention relates to that type of registering mechanism which is usually employed  
10 in gas-meters and other similar measuring apparatus, wherein the consumption is indicated by a train or series of registering-disks having suitable numerals, said disks being  
15 arranged in such manner that a single number on each disk shall be displayed through a sight-opening in the register-casing.

It is desirable in apparatus of this type that the successive movements of the registering-disks shall be intermittent or step-by-  
20 step, in contradistinction to the usual continuous progressive rotation, whereby the numerals are gradually withdrawn from and the succeeding numerals gradually brought into the  
25 sight-openings; and it is the main purpose of my invention to provide a simple and economical mechanism whereby the constant revolution of the measuring-shaft shall cause, at stated  
30 intervals, a step-by-step rotation of the units-wheel of the registering-train, which intermittent movement is in turn transmitted at each permutation to the tens, hundreds, or  
35 other permuting disks, whereby every change of one or more of said disks shall be made instantaneously at the moment when the measurement of volume is completed.

To this end the invention consists in the several novel features of construction and new combinations of parts hereinafter fully  
40 specified and described, and then definitely pointed out in the claims following this specification.

Referring to the accompanying drawings, Figure 1 is a front or face elevation of the  
45 register-casing, showing the sight-openings with the numerals on the disks appearing through the same. Fig. 2 is an edge elevation of a registering-train consisting of three disks, showing the manner of connecting the  
50 same. Fig. 3 is a rear view with the rearward bearing-plate for the shafts removed to show the drop-lever actuating the units-disk,

and the bell-crank and lift raising said lever. Fig. 4 is a rear elevation of the entire registering mechanism, showing the train of gearing operated continuously by the measuring-  
55 shaft by which the lift is actuated to raise the drop-lever.

In the said drawings the reference-numeral 1 denotes the register-casing, which is provided with a series of sight-openings 2,  
60 formed in the front plate of the casing, behind which the train of registering-disks is arranged. These disks are of any number and size and formed of any suitable material—  
65 such as brass plate—and they may be enameled or painted upon their exposed faces, where the numerals are arranged at equal intervals as near the periphery as may be required to enable them to appear in the sight-  
70 openings 2 as the disks are turned. The registering-disks are mounted upon stud-bearings 3, which project from a supporting-plate 4, parallel with the front plate of the casing.

Upon the back of each disk, save the units-disk, or upon the short shaft carrying the  
75 same, is rigidly mounted a Geneva stop-plate 5, consisting of a substantially circular plate having its periphery divided into a series of similar concave edges or peripheral faces 6,  
80 separated from each other by notches or indentations 7.

Upon the units-disk or the shaft carrying the same is rigidly mounted a circular plate  
85 8, having such diameter that its edge fits in the concave peripheral faces or edges 6 of the  
plate 5.

At a single point in the periphery of the disk or plate 8 is formed a tooth 9, the metal  
being slightly cut away upon both sides thereof to form shallow pockets 10. This  
90 tooth is so located that it engages one of the notches or indentations 7 at the moment when the figure 9 upon the units-disk is fully brought into the sight-opening, whereby upon  
95 the next change, in which the units-disk is moved to bring the zero-mark into the sight-opening, the tens-disk is simultaneously moved a single step to display its next succeeding figure, the angle formed by the in-  
100 dentation 7 of the concave face 6 of the Geneva stop-plate passing into one of the pockets 10 to permit the Geneva stop-plate to

turn, while the instant the change is effected the succeeding concave edge of said plate is brought into engagement with the circular edge of the disk or plate 8 or the other side of the tooth 9, thereby arresting the further rotation of the tens-disk until the tooth 9 again comes around after another nearly complete revolution of the units-disk.

Upon the tens-disk, between the same and its Geneva stop-plate, is mounted a circular plate 8, similar in all respects to the plate 8 of the units-disk, and engaging in like manner with a Geneva stop-plate 5 on the hundreds-disk. If the registering-train is extended to include four, five, six, or more registering-disks, the circular plate 8, as well as the Geneva stop-plate, is duplicated upon each, with the exception of the final registering-disk only.

Upon the rearward face of the circular plate 8, carried by the units-disk, is rigidly mounted a ratchet-wheel 14, having upon its face a pinion 14<sup>a</sup>, and upon a suitable bearing—such, for example, as that afforded by the stud-bearing of the tens-disk—is pivotally mounted one end of a drop-lever 15, which extends across the rear face of the circular plate 8 on the units-disk, and projects some distance beyond the latter. This lever carries a pawl 16, which, upon the downward stroke of the lever 15, engages one of the teeth of the ratchet 14, and carries the same far enough to produce a single shift of the units-disk.

The downstroke of the lever 15 may be produced by a weight 17; but I may also use a spring for this purpose instead of said weight, the spring being regarded as the equivalent of the weight, and hence I do not deem it essential to show the spring.

In the rear of the supporting-plate 4, I arrange a parallel inclined plate 18, connected to the plate 4 by posts 19. Between said plates 4 and 18 are arranged the large gears 20, 21, and 22, carried by shafts 23, 24, and 25, respectively. Upon the same shaft with the gears 20 and 21 are pinions 26 and 27, meshing, respectively, with the gears 21 and 22. Meshing with the gear 20 is a small pinion 28, carried by a shaft 29, upon which the measuring-wheel of the meter is mounted.

The end of the shaft 25 is projected through the plate 4 at a point a little below the ratchet 14, and upon its end is mounted a lift consisting of a pinion 30, having teeth 31, which are separated from each other by an interval having a definite relation to the space between the units on the first registering-disk proportionately to the diameter of the lift as compared with that of the units-disk.

Fulcrumed upon the plate 4 is a bell-crank lever 32, one end of which lies in the path of the teeth 31 of the lift 30, while the other end is provided with an eye 33, through which the lever 15 passes, the latter having a bent portion 15<sup>a</sup>, which forms an angle with the line of vibration of the bell-crank 32, whereby

rotation of the lift 30 will raise the foot or short arm of the bell-crank and throw the other arm toward the weighted or spring-actuated end of the drop-lever 15, thereby raising the pawl 16, mounted on said lever. As the tooth 31 of the lift approaches closely to the point where it will pass out of engagement with the short arm of the bell-crank 32, one of the teeth 31 comes into mesh with one of the teeth of the pinion 14<sup>a</sup> and slightly advances the ratchet-wheel, thereby bringing the tooth with which the pawl 16 is to engage directly beneath said pawl, and thus insuring an operative engagement. As the tooth 31 of the lift passes off the end of the bell-crank 32, the lever 15 makes a sudden downward stroke under the propulsion of the weight or spring, and its pawl 16 advances the ratchet-wheel, thereby turning the units-disk one step and displaying the figure thereon next in succession. If the register indicates a measurement of ninety-nine feet, the next change will operate all three of the disks simultaneously, and where a greater number of disks is used the weight or spring must have sufficient force to actuate the entire series.

By this invention it will be seen that the continuous rotation of the measuring-shaft will impart to the registering-disk a step-by-step or intermittent movement, whereby the indication of measurement is made at the instant when the cubical volume indicated has passed. Moreover, as the disks move simultaneously upon each permutation, the meter can be far more easily and correctly read than is possible when the registering-disks move gradually and continuously.

This registering mechanism may be used in connection with gas or water meters or upon any device used to measure the volume of a fluid.

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

1. In a registering mechanism for fluid-meters, the combination, with a series of disks connected together and having the shaft of the units-disk provided with a ratchet, of a drop-lever having a pawl to engage the ratchet, a train of gearing, a lift actuated by said gearing for raising the lever and permitting it to drop, and a rotary shaft for connecting with the measuring-wheel of a meter geared to and continuously driving the train of gearing which rotates the lift, substantially as described.

2. In a registering mechanism for fluid-meters, the combination of a series of connected registering-disks mounted on separate shafts, and the shaft of the units-wheel having a ratchet-wheel, a pivoted drop-lever having a pawl engaging the ratchet-wheel, a shaft having a revolving lift for raising the drop-lever, a shaft for connecting with the measuring-wheel of a meter, and a train of gearing driven by the measuring-wheel shaft and connected

with the lift to continuously rotate the latter, substantially as described.

3. In a registering mechanism for fluid-meters, the combination of a series of connected registering-disks mounted on separate shafts, and the shaft of the units-disk having a ratchet-wheel, a pivoted drop-lever having a weight and a pawl which engages the ratchet-wheel, a bell-crank lever having one arm connected with the drop-lever, a shaft having a revolving toothed lift acting on the other arm of the bell-crank lever, a shaft for connecting with the measuring-wheel of a meter, and a train of gearing driven by the measuring-wheel shaft and connecting with the lift to continuously rotate the latter, substantially as described.

4. In a registering mechanism for fluid-meters, the combination of a series of connected registering-disks mounted on separate shafts, and a shaft of the units-disk having a ratchet-wheel and a pinion, a pivoted weighted drop-lever having a pawl engaging the ratchet-wheel, a bell-crank lever having one arm engaging the drop-lever, a shaft having a revolving lift provided with teeth which engage the bell-crank lever and the pinion on the shaft of the units-disk, a shaft for connecting with the measuring-wheel of a meter, and a train of gearing driven by the measuring-wheel shaft and connecting with the lift to continuously rotate the latter, substantially as described.

5. In a registering mechanism for fluid-me-

ters, the combination of a series of registering-disks mounted on separate shafts connected by the stop-plates 5 and circular plates 8, and the shaft of the units-disk having a ratchet-wheel 14, a pivoted drop-lever 15, having a pawl 16, engaging the ratchet-wheel, a bell-crank lever 32, having one arm engaging the drop-lever, a shaft having a revolving toothed lift 30, engaging the other arm of the bell-crank lever, a shaft 29, for connecting with the measuring-wheel of a meter, and a train of gearing driven by the measuring-wheel shaft and connecting with the lift to continuously rotate the latter, substantially as described.

6. In a registering mechanism for fluid-meters, the combination of a series of registering-disks, each mounted on a separate or independent shaft, the stop-plates and circular plates for connecting the shafts of the registering-disks, a drop-lever for operating the units-registering disk, a revolving lift which raises the drop-lever and permits it to drop to rotate the units-registering disk, and a shaft for connecting with the measuring-wheel of a meter, geared to and rotating the lift, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

PIERCE FORD.

Witnesses:

CHAS. E. WALKER,  
JOHN E. MAGEE.