

T. P. Akers.

Leakage-Measure, Alarm & Indicator.
 N^o 75235

Patented Mar. 10, 1868.

Fig. 1.

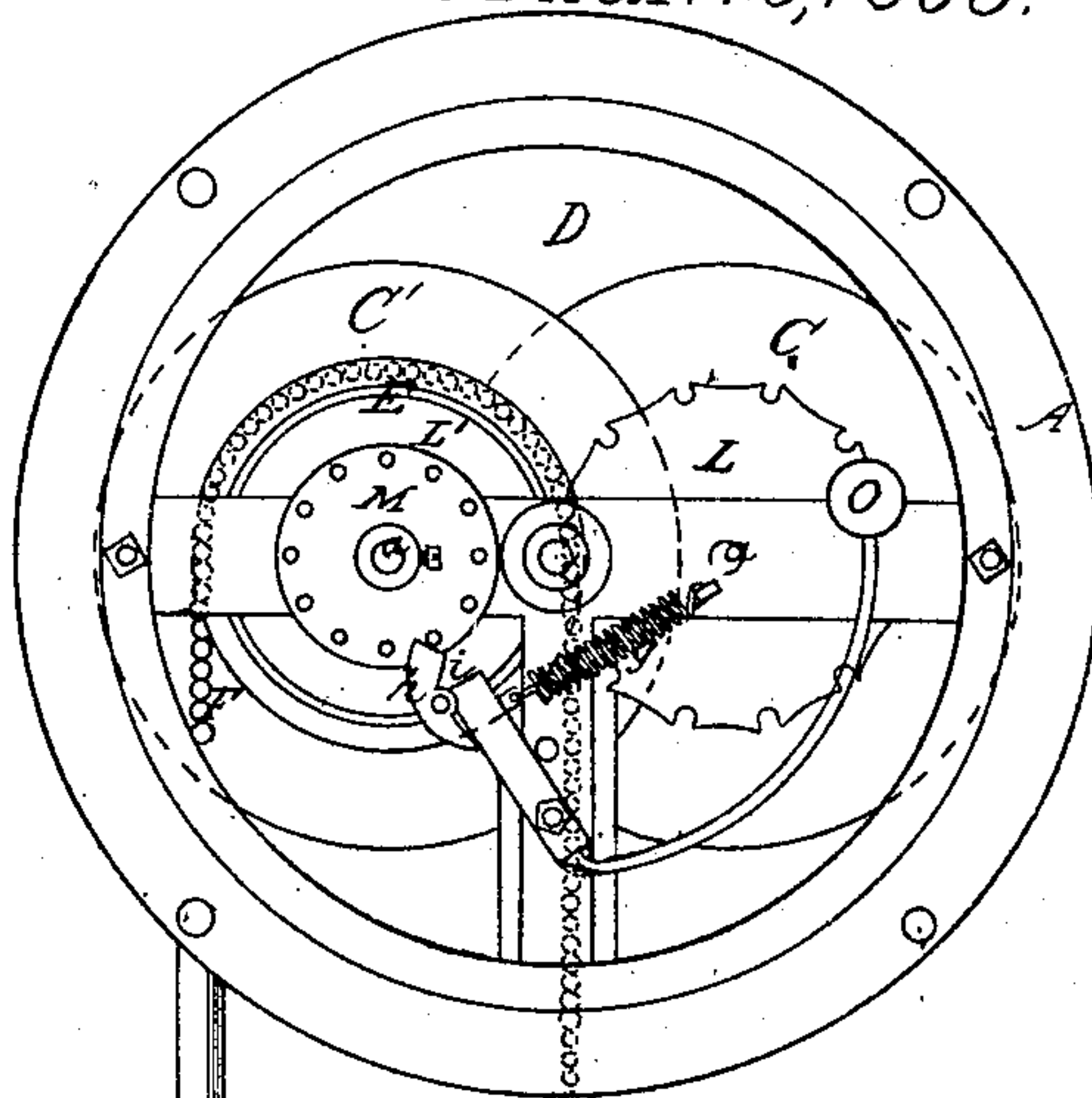
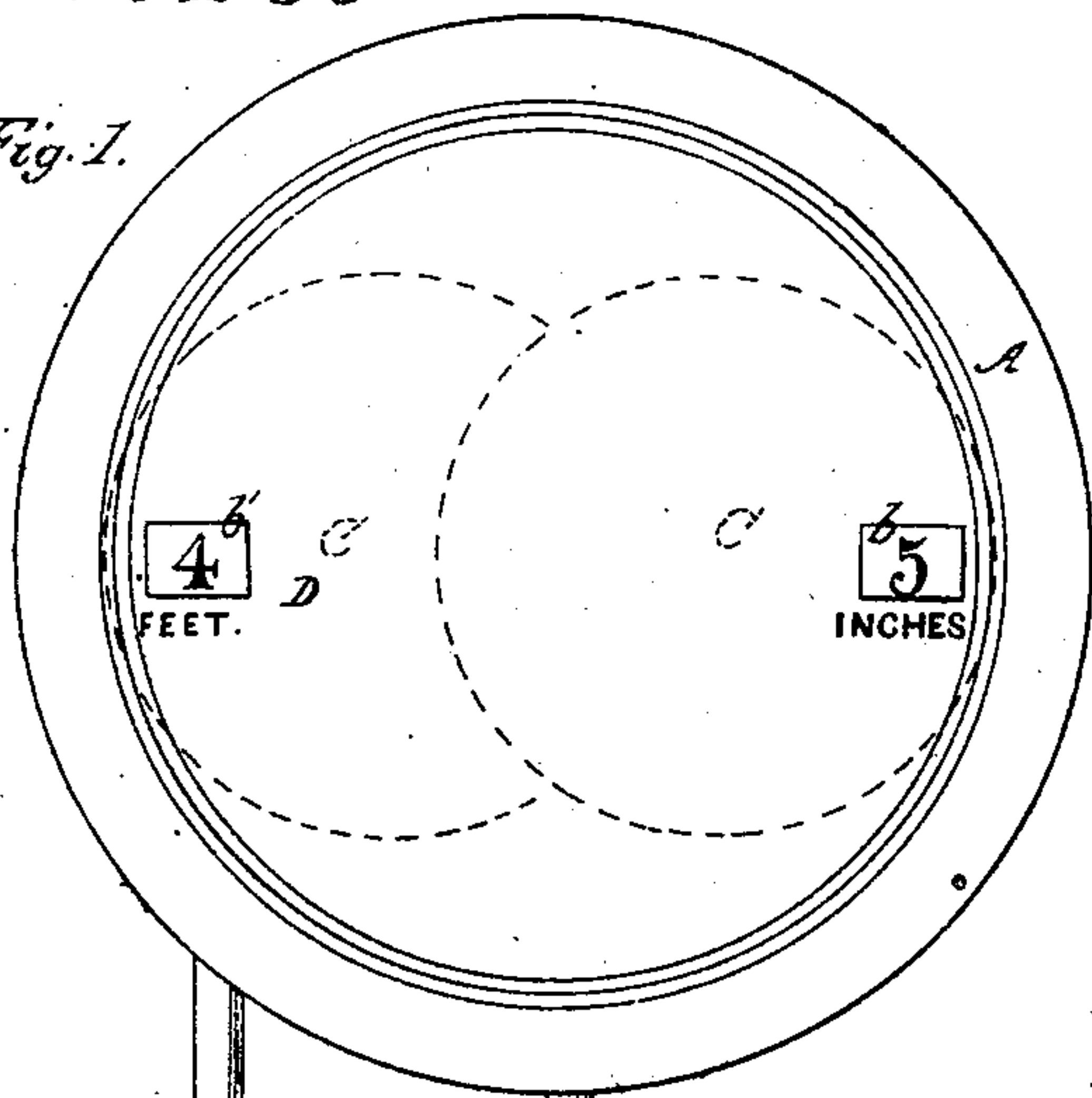


Fig. 2.

Fig. 3.

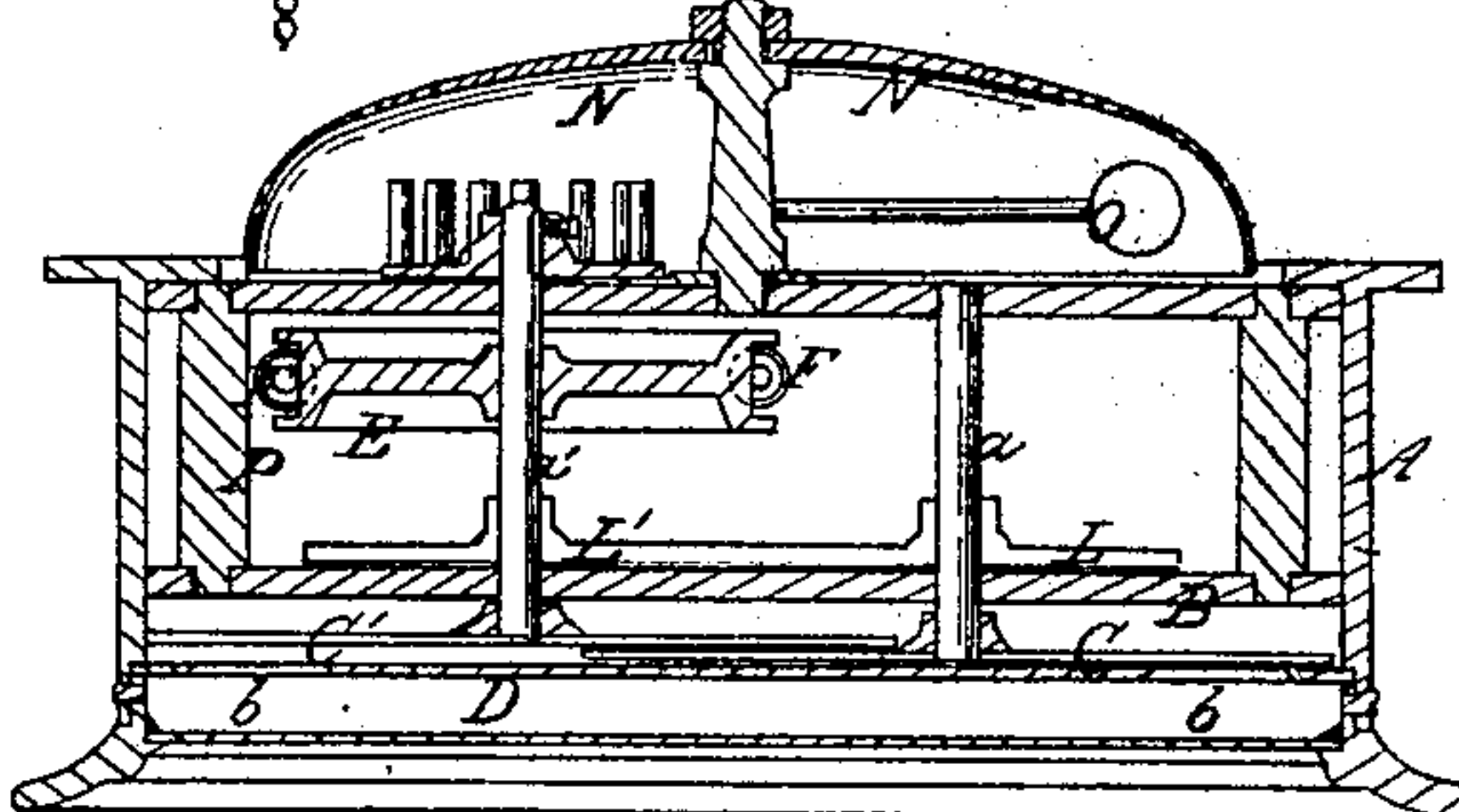
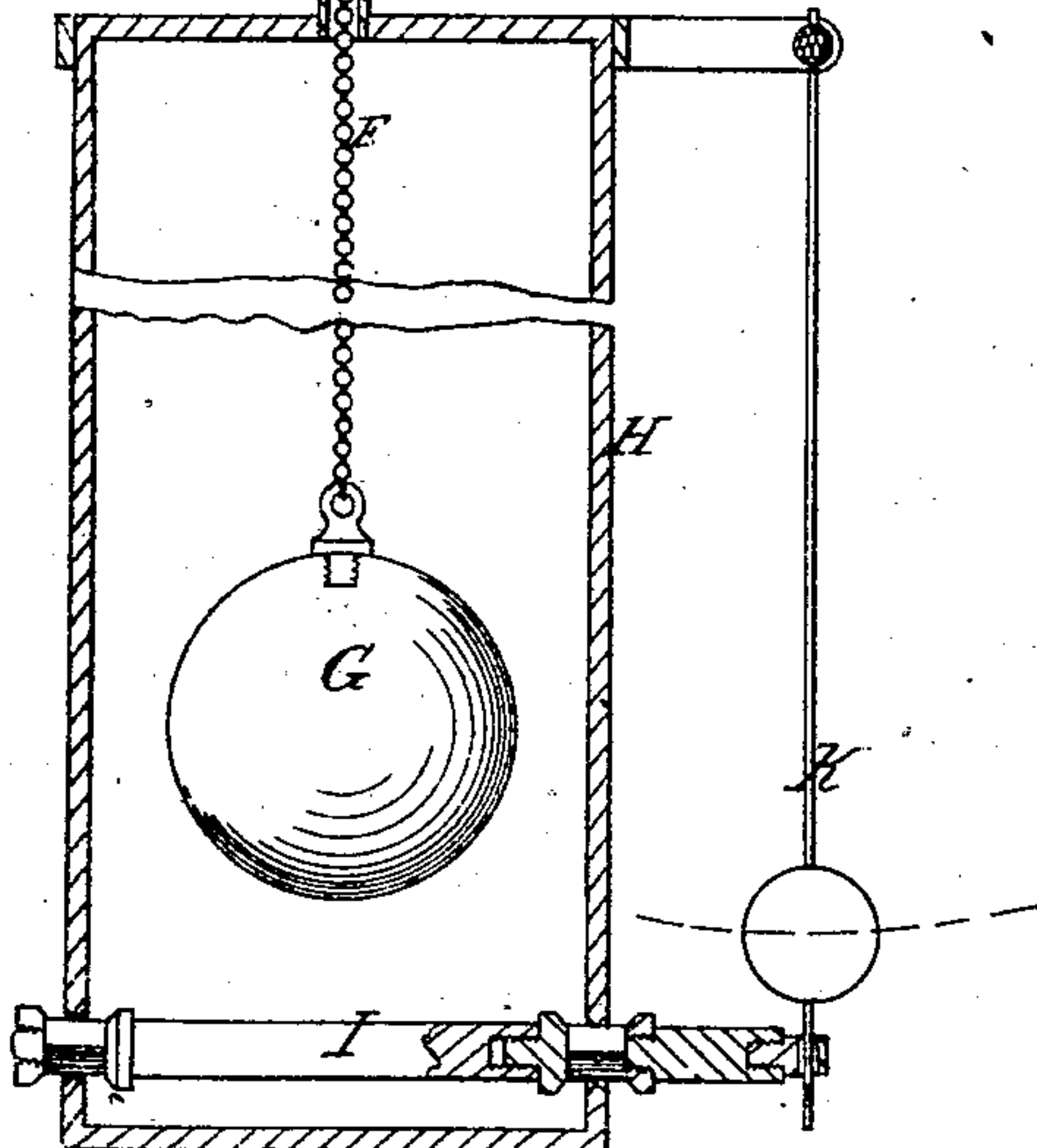
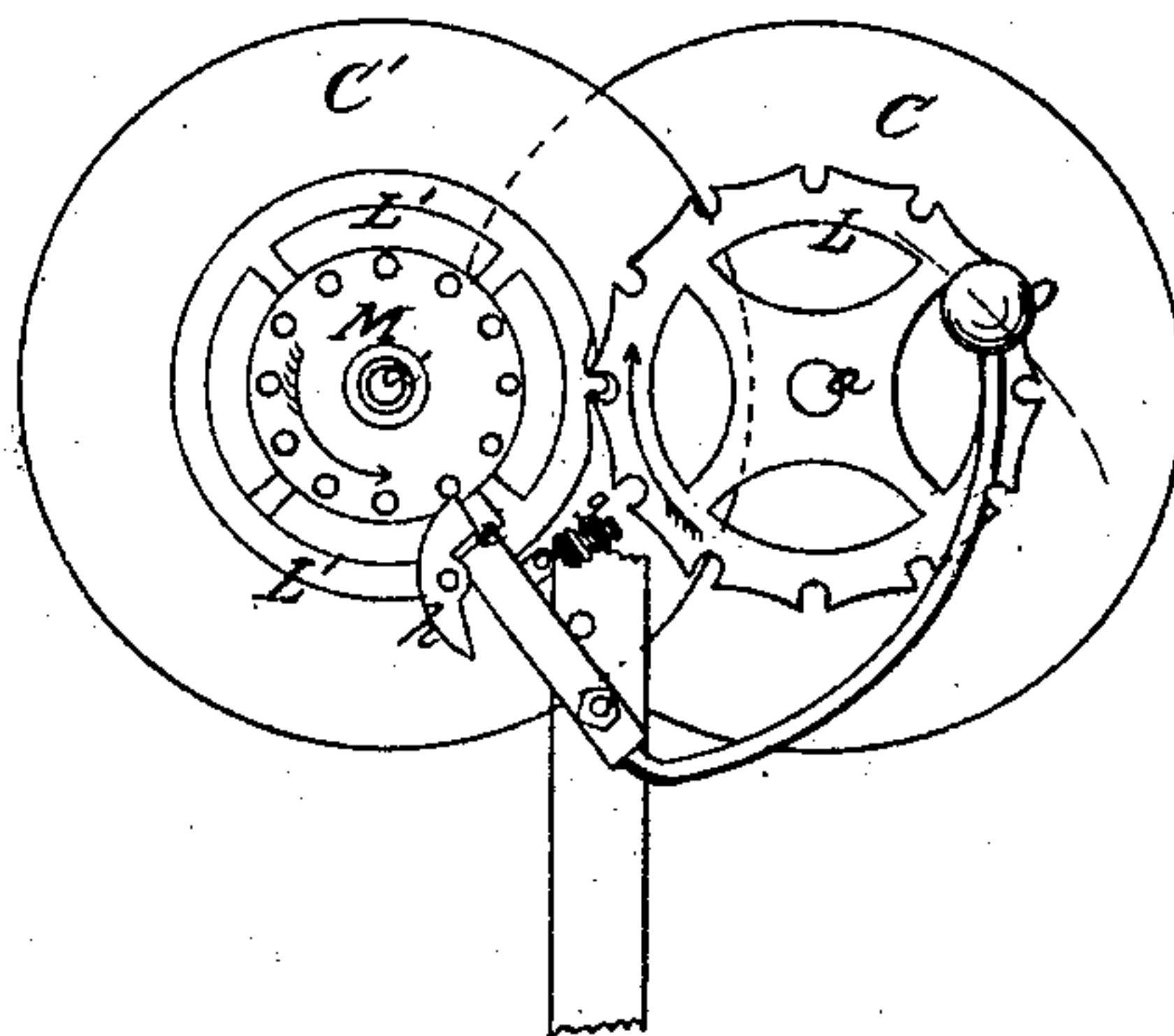


Fig. 4.



Witnesses.
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THOMAS P. AKERS, OF NEW YORK, N. Y.

Letters Patent No. 75,235, dated March 10, 1868.

IMPROVEMENT IN LEAKAGE-MEASURES, ALARMS, AND INDICATORS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, THOMAS P. AKERS, of the city, county, and State of New York, have invented a new and improved Leakage-Measure, Alarm, and Indicator for Ships and Vessels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view of a leakage-measure, alarm, and indicator, constructed according to my invention, and illustrated as applied to a ship's hold.

Figure 2 is a back view of the same, the weights and other lower portions of the instrument not being shown.

Figure 3 is a horizontal section of the instrument in the line $z z$ of figs. 1 and 2.

Figure 4 is an elevation from the rear of the gearing, &c., detached from the indicator-case.

Similar letters of reference in the several figures indicate corresponding parts.

The nature of my invention consists—

First. In a leakage-measurer employing two weights suspended upon a chain or cord which passes over a pulley of an alarm, or an alarm and indicator combined.

Second. It consists in the combination of such a leakage-measurer with an alarm, or with an indicator, or with an alarm and indicator combined.

Third. It consists in the combination of such a leakage-measurer with the mechanism known as the winding-stop movement of a watch, and with a bell-alarm, or with revolving disks having figures or characters upon their faces designating feet and inches, and with a stationary plate with apertures through it for the exposition of said figures or characters.

Fourth. It consists in a peculiar construction of the hammer-arm or handle of the bell-alarm.

Fifth. It consists in a combination of the hammer as constructed with the pin-wheel, "winding-stop movement," and the revolving chain drum and indicating-disks.

Sixth. It consists in the combination of the weight which measures the height of water in the hold of a vessel or ship, and a pendulum connected to poppet-valves of a closed cylinder in which said weight is placed.

Seventh. And finally, in an arrangement of all the gearing and other parts upon a frame within the case.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents a metal cylindric case, with glass front and open back, in all respects substantially similar to an ordinary "indicator-case." B is a metal spider or internal support, arranged permanently within the case A, for sustaining all the gearing and the alarm, as shown. C C' are two disks, marked with figures 1, 2, 3, and 4, up to 12, on one, and up to 11 and 0 on the other, thus indicating feet and inches—the disk C indicating feet, and the one, C', inches. These disks are arranged on shafts $a a'$, just behind a plate, D, which has apertures $b b'$ a little larger than the figures to be exposed through it, the apertures being in a position to have the figures come opposite to them as the disks revolve. The disk which indicates inches makes a full revolution for every twelfth of a revolution of the disk which indicates feet.

On the shaft of the inch-indicating disk a flanged pulley, E, is secured, and around this pulley a chain or cord, F, is passed entirely around once, and one end carried down into a ship's hold a suitable distance. On each end of this chain a weight is fastened, as represented. The weight G, I make of a greater diameter than the one G', and I prefer to make both weights of a substance which is comparatively solid. It is essential that the weight G' shall preponderate over the weight G, after the buoyancy of the water upon the weight G has been calculated. The relative diameters of the weights, to attain this result, would be about as five to three. The relative diameters would, however, require to be changed accordingly as the metals or substances of which they are made should be more or less dense.

The weight G is arranged within a closed cylinder in the hold of the vessel, and its chain guarded by a tube, c, which connects the cylinder and indicator-case together, as shown.

In order to have the water operate upon the weight G, I provide the cylinder H with a sliding poppet-valve, I, as shown, and in order to have the water shut off from the weight during the rolling motions of a ship, I con-

nect the valve at one end to a pendulum, K, which is suspended from the upper end of the cylinder H, as shown. The poppet-valve being double-acting, or consisting of two pairs of valves connected by one stem, as shown in the drawing, will exclude the moving water outside of the cylinder from the interior of the cylinder H, in both the right and left motions of the ship, and also will confine the water within the cylinder so as to prevent any change in its height under like motions of the ship; but while this is the case, water will have free access into the cylinder when the ship is in proper position or "trimmed." The weight G' is not encased in a valved cylinder, such as H, but is suspended in open space above the highest point that the water might rise to, reference also being had to the descent of said weight as the water rises in the ship's hold. The chain of this weight is also guarded and guided by a tube, c', pendent from the case A.

In order to secure a regular and proper revolution of the disks C C', and also to sound an alarm-bell, I arrange two wheels L L' upon the shafts of these disks, in the manner shown; and upon the outer end of the shaft which carries the inch-indicating disk, a pin-wheel, M, is also applied.

The wheel L is constructed with twelve notches in its circumference, and between these notches a concave surface is formed, such concave being a segment of a circle of the same diameter as the wheel L'. The wheel L' has but one tooth, and about the base of this tooth the metal of the wheel is cut away, in order that when this tooth gears into one or the other of the twelve notches of the wheel L, there shall be room enough for the highest points of the wheel L to pass by the wheel L'; but at all other times than those just named the wheel L remains immovably interlocked. This mechanical construction of wheels is not new, being known as the "winding-stop movement" of a watch; but the application or combination of such wheels in the manner I have shown is new.

N is an alarm-bell, arranged in rear of the gearing upon a stationary arbor of the spider, and O is a hammer for striking upon this bell. The arm of this hammer is pivoted to a bar of the spider in the usual manner, and actuated so as to recoil by means of a spring, g. At the tail-end of the hammer-arm a curved piece, h, is pivoted, and arranged so as to recoil by means of a spring, i, as shown. This curved piece becomes as though it were a rigid part of the hammer-arm when the pins of the pin-wheel strike upon it properly, i. e., so as to sound an alarm, but no longer remains as such rigid part of the hammer-arm when the motion of the pin-wheel is reversed, but, on the contrary, yields to the action of the pin-wheel, and relieves the hammer of any influence thereof. Such yielding attachments to hammer-arms may not be new broadly, but the way I have constructed and arranged the same is new.

The leading principle of my invention is the application of two weights to a pulley which is within the "indicating-case," and in connection with the same, having all the gearing for operating the indicating-disks, and also the alarm, within the same case. This end I attain by using weights comparatively solid, or of greater specific gravity than water, and applying these weights to a chain or cord which is continually being wound round the pulley at one side, and paid off from the same at the opposite side when the water in the hold is rising or falling.

There are some special features of my invention which I deem as particularly valuable.

In the first place, by using a pulley operated by weights, as herein explained, I obtain a uniform power at all stages of water, which would not be the case if I used a spring, for, in the use of a spring, it, when coiled up, as it is when there are but a few inches of water in the "hold," would generate more power than it would when there is a greater quantity of water in the hold. On this account, a float which sank an inch or two at first, when the spring was coiled up, would almost entirely submerge when the spring uncoils and becomes weak. In registering the rise of water in this way, we lose nearly the whole diameter of the float.

Again, by the use of the pulley, operated as described, I am not limited as to the amount of power to be employed. If I obtained my power from a spring wound up by the weight of the float, it is plain that I would be confined within very narrow limits. If my spring is too strong, it will lift the float entirely out of the water, and, on the other hand, if it is too weak, it will not move the mechanism necessary to indicate the rise of water, and to give the alarm. With the two unequal solids of greater specific gravity than water, as employed in my invention, I can generate any required power, and, what is absolutely essential to accuracy, my power is uniform at all stages of the water.

Another valuable feature in my invention is the employment of disks in conjunction with the "winding-stop movement" described. The periphery of one wheel of this movement being concave while that of the other is convex, the disk on the shaft of L, which shows the number of feet of water in the hold of the vessel, is held firmly in its place, while the disk on the shaft of L', which shows the number of inches of water, is allowed to revolve. By this simple and effective combination I obtain a forward and reverse movement, by which I can register a rise of water amounting in the aggregate to one hundred and fifty-five inches, and to give a separate alarm for each and every inch of the rise, and in the end I have precisely the same power that I had in the beginning; and all these results are produced by a single pulley acting upon two wheels, and through them upon two revolving disks. There are no springs, and no complication of cog-wheels or the like, to get out of order, everything connected with the arrangement being greatly simplified by the use of the pulley, and two wheels, and also rendered compact and effective, without liability of getting out of order.

Again, by the use of two solid balls, both of greater specific gravity than water, and such as are not affected in their weight by moisture or other causes, as glass, for example, I avoid all the difficulties that would be encountered by using hollow balls, which vary in their weight by absorbing and condensing water inside of them, or wooden floats which weigh more or less as they may happen to contain more or less water. I also overcome difficulties which would be experienced by using one solid and one float, both by simplifying the machine and rendering its action certain and useful at the first rising of the water beyond a safe height in the hold of the vessel.

Another valuable feature of my invention is the arrangement by which I prevent it from responding to the

vibrations of the water in the hold, resulting from the rolling of the vessel. Without this latter arrangement the careening of the vessel would be continually sounding the alarm, to the annoyance of the pilot and others, when in fact the vessel is not leaking. Moreover, the alarm would thus become a familiar sound, and would fail to attract attention when danger became real.

My invention, as a whole, is designed specially for application to vessels and ships whose holds are difficult of access, or dark, and otherwise not calculated to enable a person to inspect them with certainty.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Providing for indicating the height of leakage-water in the hold of a vessel by means of weights of greater specific gravity than water, suspended from a pulley, so that one of the weights shall rise and descend with the rise and fall of the water, and the other make similar movements, but in a reverse manner, and by its movements communicate motion to registering, indicating, or alarm-mechanism, substantially as described.

2. The combination of a leakage-measure which consists of two weights, and a chain, which is arranged to unwind from a pulley as fast as it winds upon the same, with an alarm, or with an indicator, or with a combined alarm and indicator, substantially as described.

3. The combination of the wheels L L', chain F, weights G G', pulley E, and disks C C', substantially as and for the purpose described.

4. The combination of a leakage-measure, operating substantially as described, with the figured disks, the alarm-devices, and the gearing L L and M, substantially in the manner and for the purpose described.

5. The curved piece h, constructed and applied to the hammer-arm substantially in the manner and for the purpose described.

6. The combination of the weight G, cylinder H, pendulum K, and double-acting poppet-valve, substantially as and for the purpose described.

7. Arranging all the gearing, the alarm-devices, the indicating-disks, and the pulley of the weight-chain or cord, upon a frame or spider of the case A, substantially as described.

Witness my hand, in the matter of my application for a patent for an improved leakage-alarm and indicator for ships and other vessels, this 14th day of February, A. D. 1868.

THOS. P. AKERS.

Witnesses:

R. T. CAMPBELL,
EDW. SCHAFER.