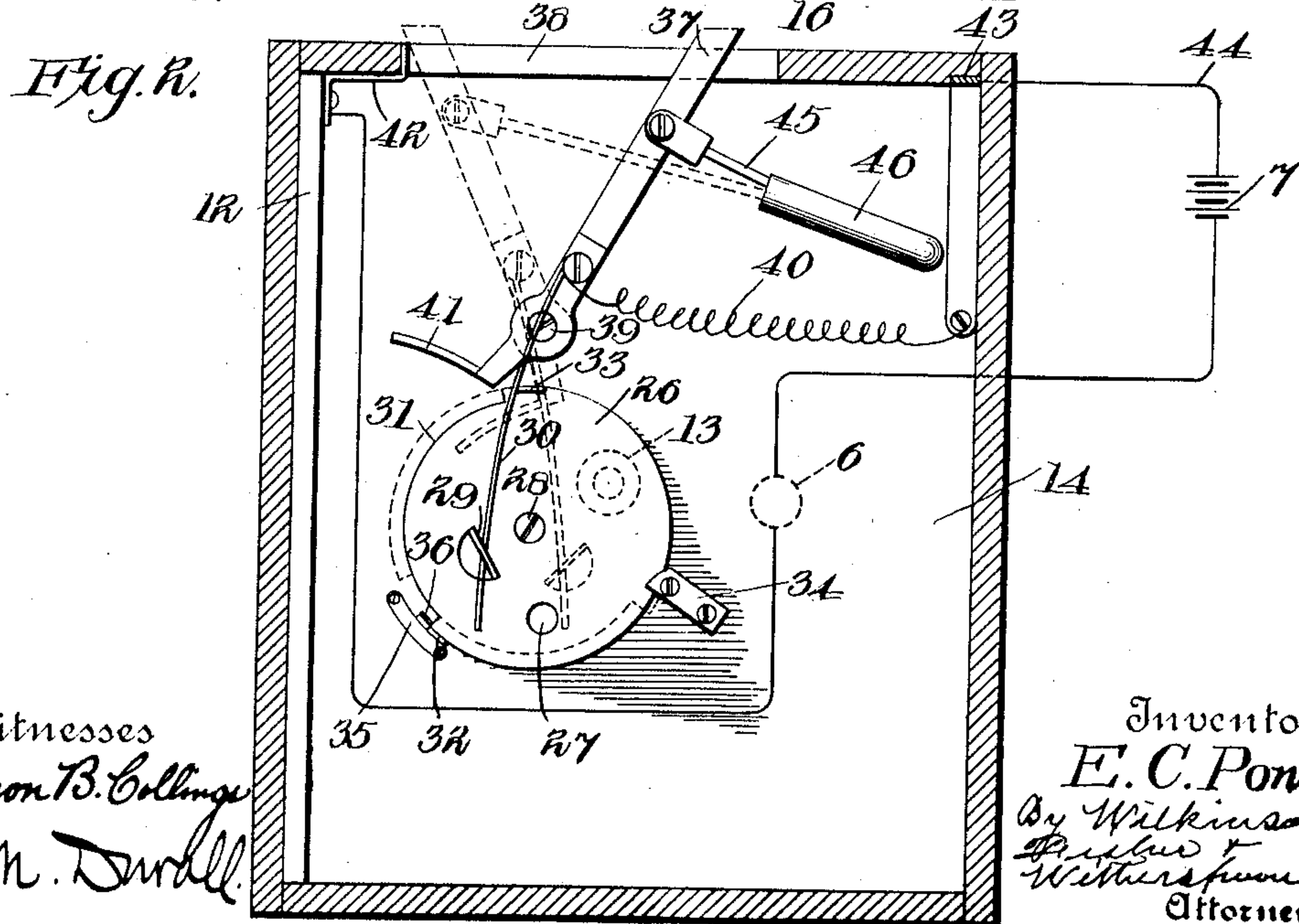
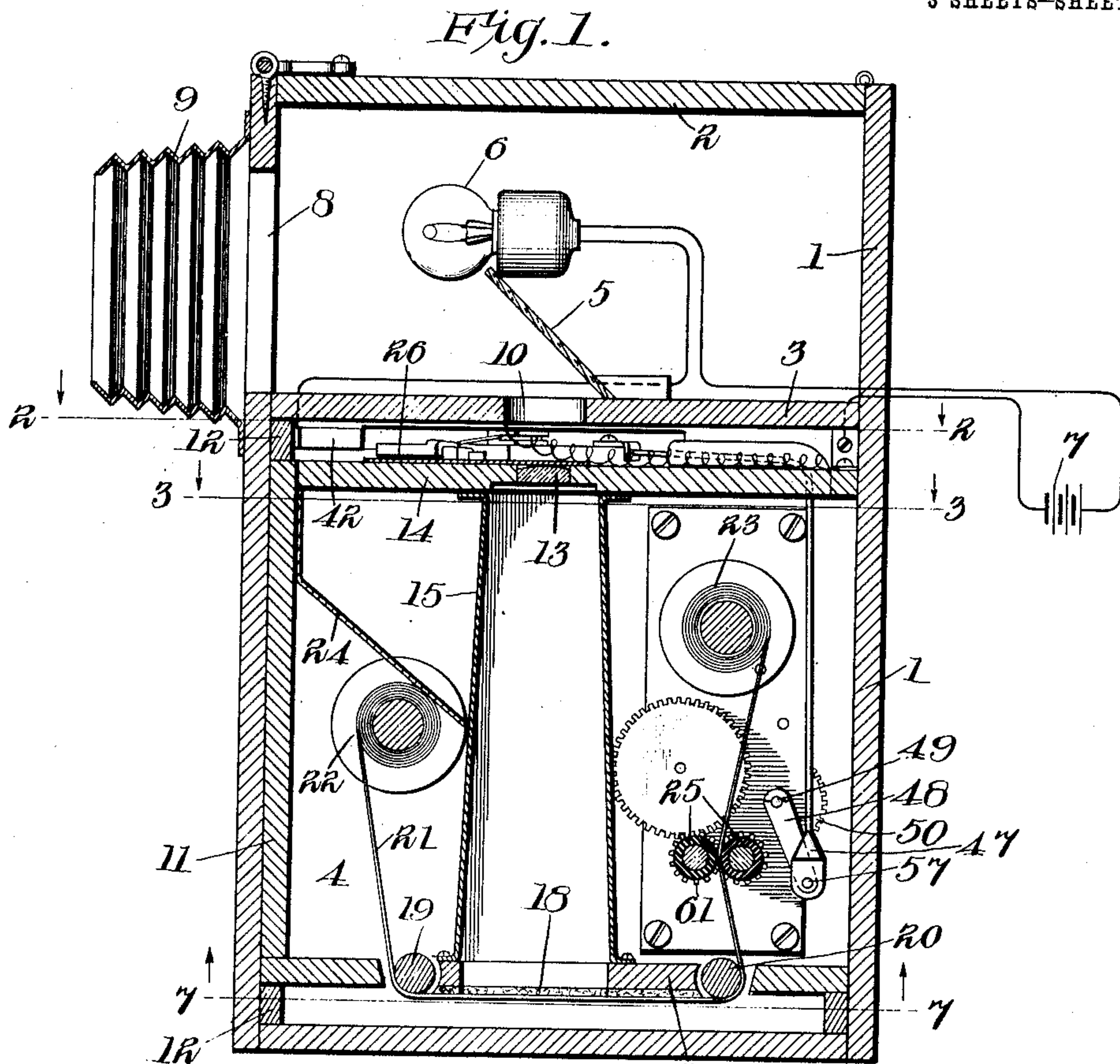


E. C. POND.
 PHOTOGRAPHIC METER READER.
 APPLICATION FILED APR. 30, 1910.

975,278.

Patented Nov. 8, 1910.

3 SHEETS—SHEET 1.



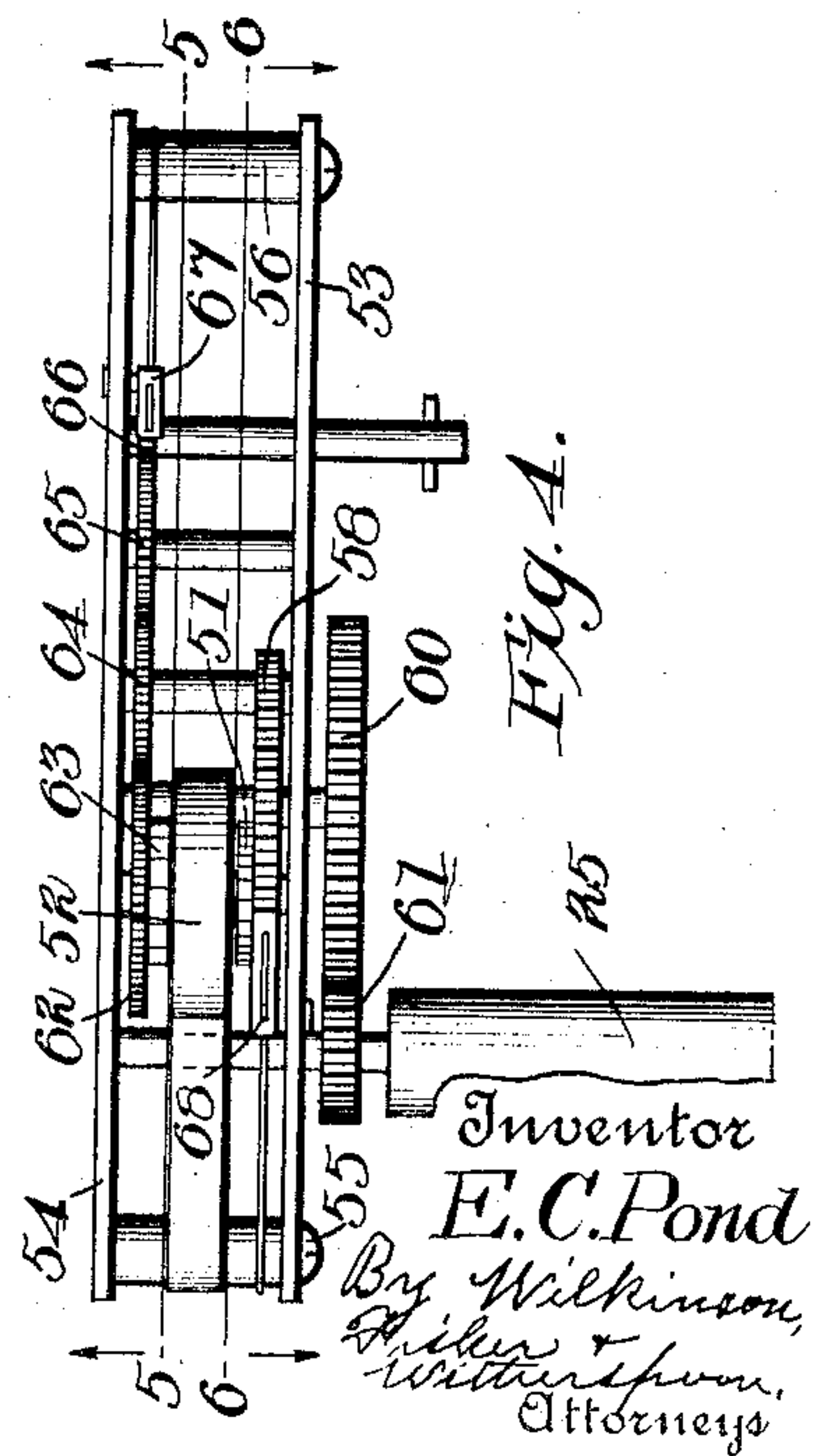
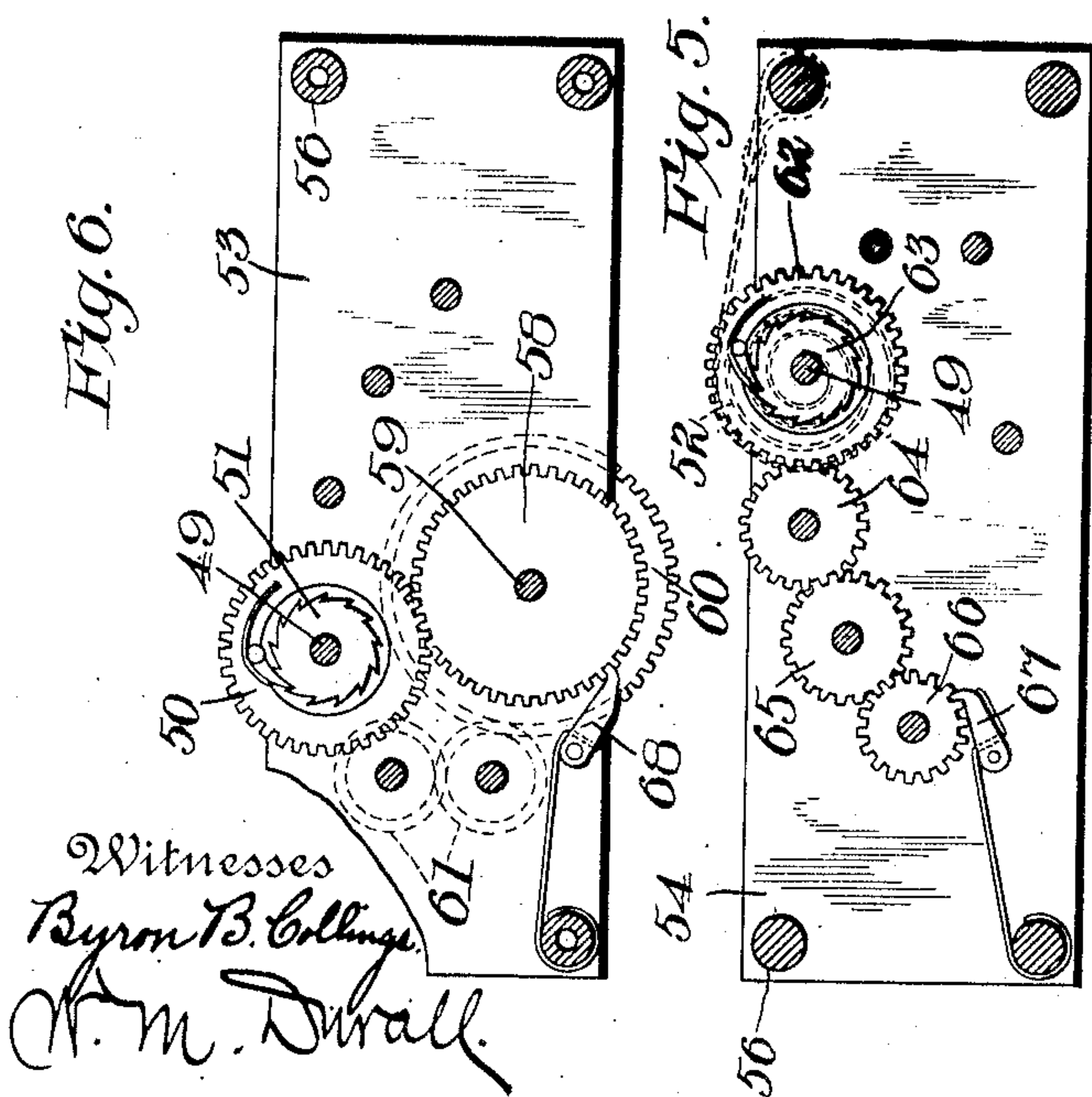
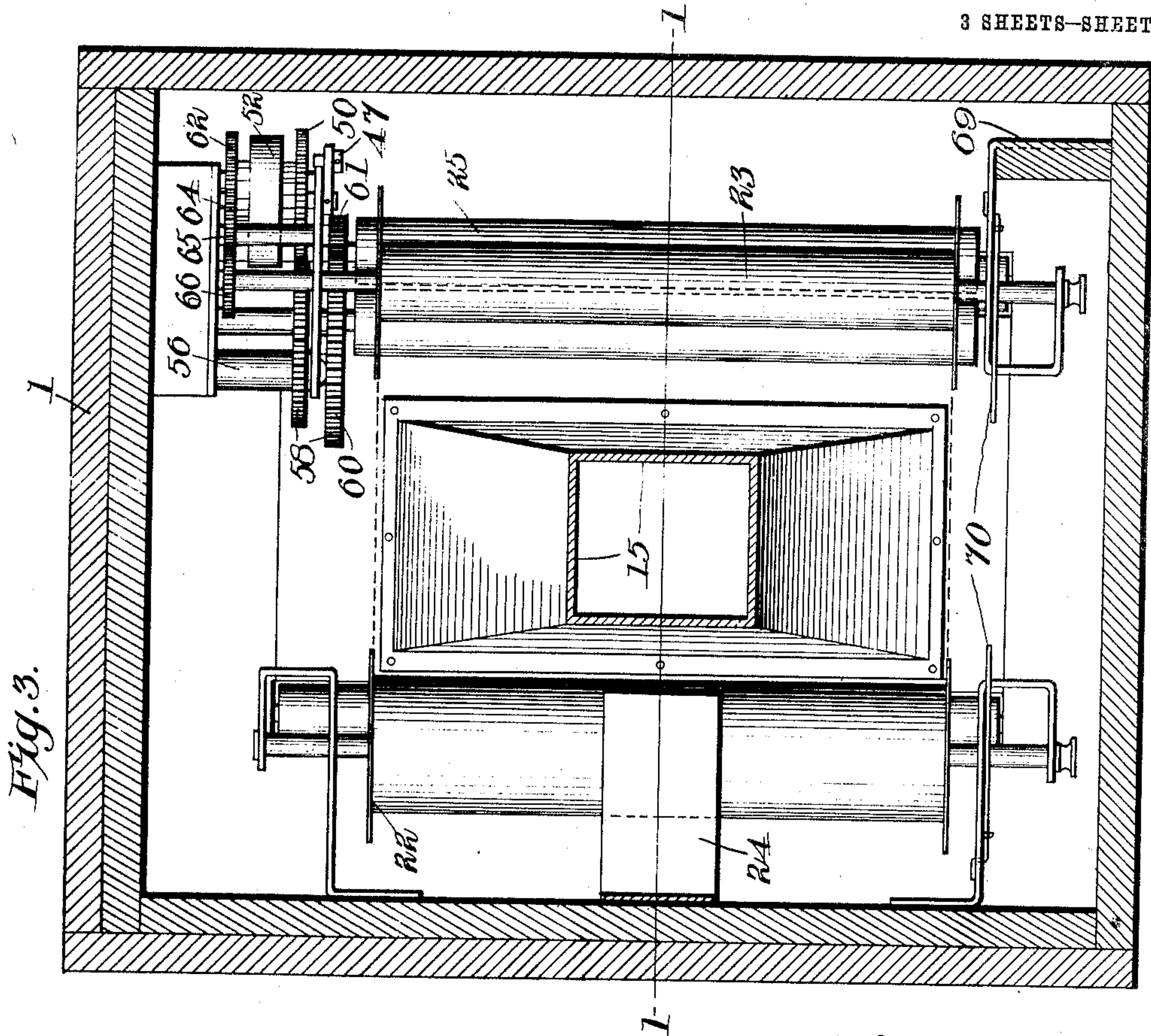
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3 SHEETS-SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 7.

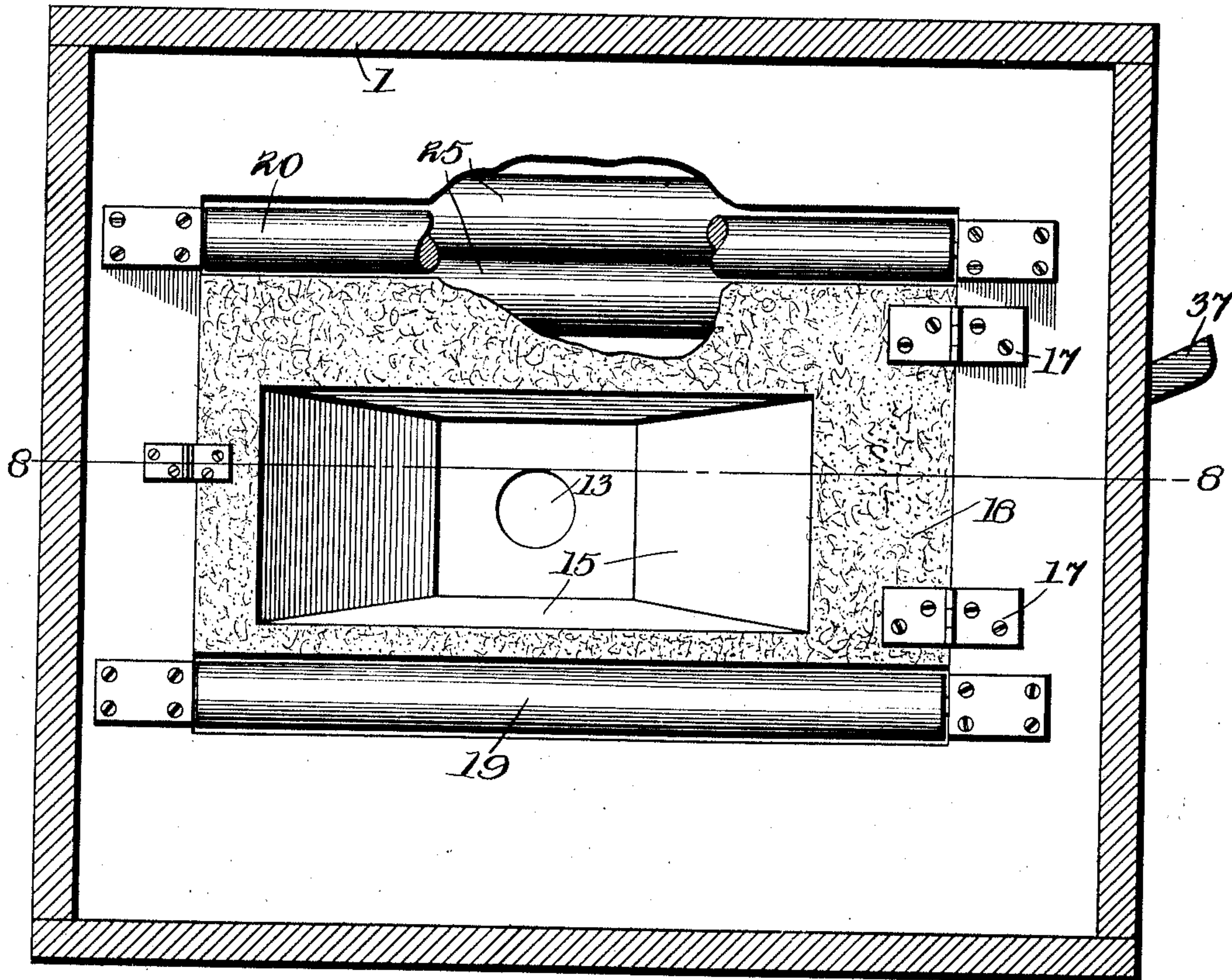


Fig. 8.

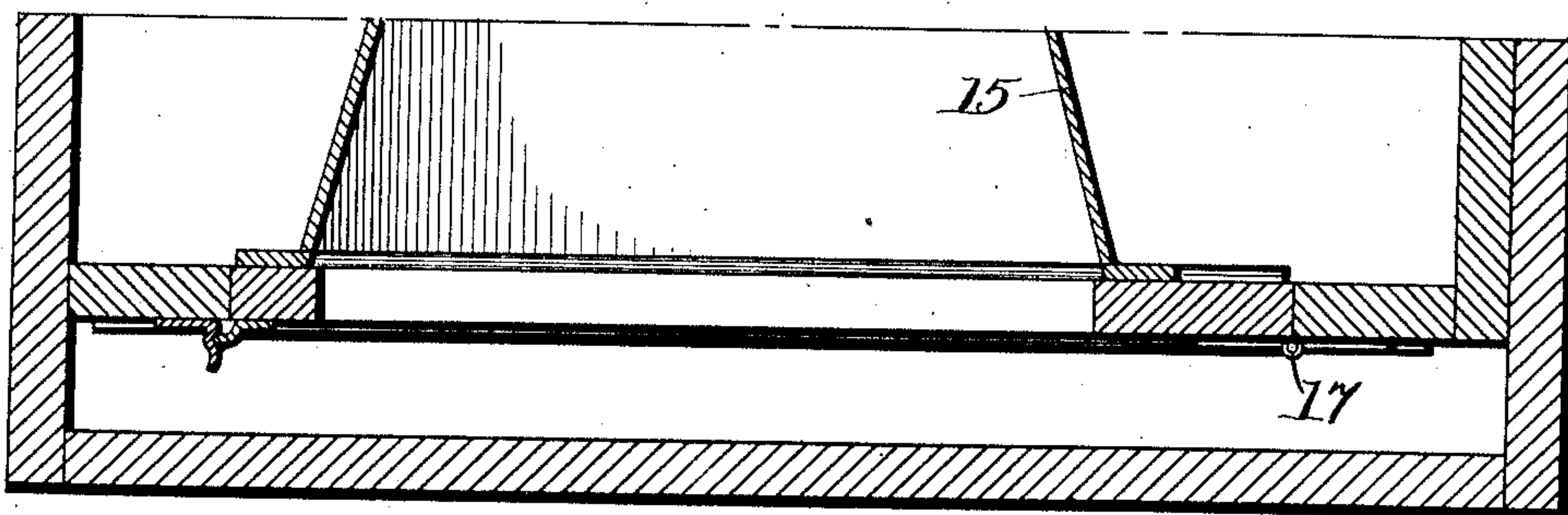
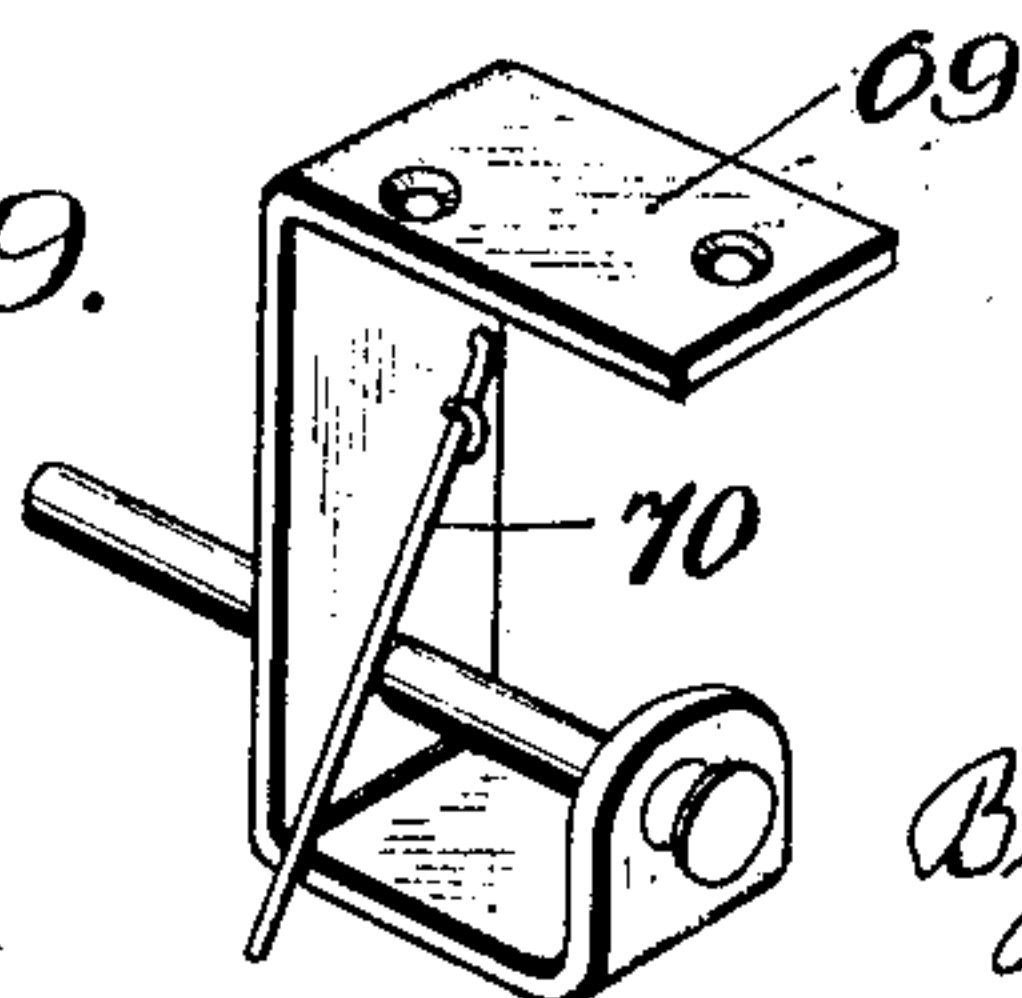


Fig. 9.



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UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC METER-READER.

975,278.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed April 30, 1910. Serial No. 558,699.

To all whom it may concern:

Be it known that I, EDWARD C. POND, a citizen of the United States, residing at Petersburg, in the county of Dinwiddie and State of Virginia, have invented certain new and useful Improvements in Photographic Meter-Readers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in photographic meter readers, it being an improvement upon my former application, filed May 27, 1909, Serial No. 498,725.

The object of my invention is to provide a simple device by means of which the indices of gas, water and electric meters may be readily photographed, making an accurate and infallible copy of said indices, thus preventing errors arising from improper or erroneous readings of the same. This invention, however, is not restricted to this use, as it could be used for various other purposes, such, for instance, as in connection with watchmen's time clocks, in which case it could be used to photograph the watchman as he makes the record.

With these objects in view, my invention consists in the construction and combinations of parts as hereinafter described and claimed.

In the accompanying drawings—Figure 1 is a longitudinal vertical section of my invention taken on the line 1—1 of Fig. 3. Fig. 2 is a horizontal cross-section thereof on the line 2—2 of Fig. 1, looking in the direction of the arrows. Fig. 3 is a horizontal cross-section thereof, on a larger scale, on the line 3—3 of Fig. 1, looking in the direction of the arrows. Fig. 4 is an inverted plan view of the gear mechanism for closing the circuit and advancing the roll of photographic paper. Fig. 5 is a section thereof on the line 5—5 of Fig. 4, looking in the direction of the arrows. Fig. 6 is a corresponding section on the line 6—6 of Fig. 4, looking in the direction of the arrows. Fig. 7 is a horizontal cross-section, on an enlarged scale, taken on the line 7—7 of Fig. 1, looking in the direction of the arrows, parts being broken away. Fig. 8 is a cross-section taken on the line 8—8 of Fig. 7, and Fig. 9 is a detail view of one of the roll holders.

1 represents a box or casing, provided with a hinged top 2 and with a partition 3, dividing the box or casing into two chambers, the lower chamber 4 being practically a camera obscura. The partition 3 is provided with an opening 10, located near the center thereof, and an inclined mirror 5 projects upwardly over this opening, said mirror being inclined at an angle of about 45°. Above the mirror is an electric lamp 6, which is in circuit with a battery 7. In practice the user carries the battery in his pocket, the insulated wires passing over his shoulder and into the box or casing 1. If desired, however, a dry battery may be used in the box itself, and any electrical device for causing the lamp 6 to be operated may be used, such as any generator operated to produce an electric current.

Opposite the lamp 6 and above the partition 3, a hole 8 is provided in the side of the box, and the box is adapted to be placed in front of a meter with the hole opposite the index thereof, whereupon a reading of the meter may be obtained by means hereinafter described. Preferably I employ in front of the hole 8 a collapsible hood 9, arranged to fold up against the side of the box 1 on the outside of the hole 8.

In the space 4 in the box 1, below the movable partition 3, is adapted to be slipped the camera box 11, held in place by strips 12 above and below the camera box. This box 11 is not a complete box, as one side and one end thereof are open. In the upper side of this box is an opening in which is inserted a lens 13, preferably a compound lens, said lens being directly under the hole 10 in the partition 3. Surrounding said lens and fastened to or resting against the upper end of the box 11, is a casing 15, open at both ends and having flared sides, as shown in Figs. 1 and 7. At the lower end, this casing is secured to the bottom 16 of the box 11 in any suitable manner. The bottom part of the box 11 is preferably hinged, as shown at 17 Fig. 7, so that when the box is removed from the main casing 1, ready access may be obtained to the interior of the box 11 for the purpose of removing or changing the roll of photographic paper hereinafter referred to. The casing 15 is preferably made as shown in Fig. 7. The bottom 16 of the box 11 is preferably provided with a covering of black felt 18, for the purpose of excluding

light, and in fact all joints of the apparatus may be similarly provided with light excluding means.

In the bottom 16 of the box are apertures, 5 in which are mounted guide rolls 19 and 20 for the roll of photographic paper 21. This photographic paper is mounted on a spool 22 carried in removable bearings, and the paper is fed from said spool 22 to a take-up 10 spool 23, also carried in removable bearings, said spools being located on opposite sides of the casing 15 and the strip of photographic paper passing over the rolls 19 and 20 and over the perforated felt strip 18 by a step by step movement hereinafter de- 15 scribed. 24 represents a spring, fastened inside of the box 11 and bearing directly on the roll of photographic paper on the spool 22.

20 The idea of having the bottom 16 of the casing hinged is that after the readings have been taken from a number of meters, the box 11 may be removed from the main casing, the bottom 16 opened, and the spools 22 25 and 23, carrying the photographic paper, removed and similar spools substituted.

The strip of photographic paper 21 passes between a pair of rubber covered rolls 25, which, by gearing hereinafter specifically 30 described, operate the strip of paper 21 to feed forward a definite length of such paper at every movement of the operating mechanism, thus obviating any irregularities of the feed due to the varying amounts 35 of paper on the spools 22 and 23. By the use of the rolls 25, a definite length of paper is fed at each movement.

The lens 13 is under ordinary conditions covered by a circular vibratory plate 26, 40 preferably made of metal, having a hole 27 therein, which is adapted, at certain portions of its movement, to be brought over the lens 13, registering therewith. The disk 26 is revolvably mounted on a pin 28, fast- 45 ened in the side of the box 11, and is provided with an up-turned flange 29, through which passes a spring 30. This disk is not exactly circular, being cut away as shown at 31, and being provided with two up-turned 50 stops 32 and 33. 34 represents a stop secured to the side of the box 11 and projecting over the edge of the disk 26, and 35 represents a clip, fastened to the side of the box 11 and having an upwardly projecting 55 portion 36. The up-turned part 32 is adapted to strike the stop 34 and the part 36, which limit the movement in either direc- tion.

The movement of the disk 26 is effected 60 by means of the hand lever 37, which projects through a slot 38 in the side of the box or casing 1. This lever is mounted on a pivot 39 and has connected to it one of the circuit wires 40 from the battery or other 65 electric device 7. On the under side of the

pivot pin 39 is arranged a curved extension 41, against which the stop 33 engages temporarily as the lever 37 is moved from the position shown in full lines in Fig. 2 to the dotted line position therein. This is for the 70 purpose of retarding the motion of the disk 26 until the spring 30 has become considerably flexed, and after the end of the part 41 becomes disengaged from the stop 33 this spring brings the disk 26 sharply around 75 until the projection 32 strikes the stop 34, thus insuring an exact registry of the hole 27 and the lens 13.

The electric circuit runs from the battery 7 through the lamp 6, and then to a metal 80 angle piece 42, fastened in the inside of the casing 1 just under the partition 3, with one edge extending out into the slot 38, as is shown in Fig. 2. The wire 40, which is con- 85 nected to the lever 37, is attached to a bent metal strip 43, carried on the outside of the box 11, which strip is connected by the wire 44 back to the battery 7. It will thus be seen that as long as the lever 37 is held in the po- 90 sition shown in dotted lines in Fig. 2, in contact with the strip 42, that the circuit through the lamp 6 will be completed and that the opening 27 will be in registry with the lens 13. The lever 37 is only operated 95 when it is desired to take a photographic reading. The movement of the lever 37 also operates to feed the photographic paper from the spool 22 to the spool 23 by the gearing, which will now be described. To 100 the lever 37 is attached one end of a flexible cord 45, which runs through a protecting tube 46 and is attached to a head 47, pivoted to an arm 48 carried by the shaft 49. On the shaft 49 is loosely mounted a gear wheel 105 50, which moves freely in one direction and is driven in the other direction by the ordinary pawl and ratchet mechanism 51. A coiled spring 52 normally returns the parts to their original position. This gearing is supported by a frame, consisting of two 110 parallel plates 53 and 54, supported on bolts such as 55, passing through the frame and into the box 11, these plates being spaced apart by washers such as 56. The pin or screw 57, which flexibly connects the head 115 47 to the arm 48, projects far enough through so as to strike the plate 53 under the influence of the spring 52.

The gear wheel 50 engages a gear wheel 58 on the shaft 59, and on this shaft is also 120 mounted a gear wheel 60, which engages a gear wheel 61 on one of the feed rolls 25, these feed rolls being geared together, as shown in Fig. 1. On the shaft 49 is also 125 loosely mounted a gear wheel 62, which is free to revolve in one direction and driven in the other direction by the pawl and ratchet 63. This gear wheel meshes with a gear wheel 64, which in turn meshes with a gear wheel 65, which latter in turn meshes 130

with a gear wheel 66 on the shaft of the take-up spool 23. A spring pawl 67 prevents rearward motion of the spool 23, and a similar pawl 68 prevents rearward motion of the gear wheel 58. It will thus be seen, from the construction described, that a movement of the lever 37 will move the feed rolls 25 a definite distance, feeding forward a definite length of photographic paper, but this paper will not be wound upon the spool 23 until the lever 37 is released. This insures the feeding of a definite length of photographic paper on each movement of the lever 37.

To prevent the spools 22 and 23 from revolving too freely, I have devised a friction device, as shown in Fig. 9, consisting of a bent bracket 69, furnished with bearings through which the shafts of the spools pass, and a spring 70 bearing against said shaft, said bracket being adapted to be secured to the box 11 in any suitable manner.

The operation is as follows:—The operator places the hood 9 in close proximity to a meter and moves the lever 37 until it strikes the strip 42. This motion feeds a fresh portion of the strip of photographic paper 21, so as to bring it immediately below the lens 13. When the lever 37 strikes the strip 42, the lamp 6 is immediately lighted, and the lever 37 being held there a few seconds, the image or object in front of 8 is reproduced upon the sensitized paper 21. The operator then releases the lever 37, whereupon the spring 52 brings the parts back to their original position, and on this motion the take-up spool 23 is operated and the operation is completed.

While I have thus described my invention, I wish it to be distinctly understood that I do not limit myself to the exact construction shown and described, as this could be varied considerably without departing from the spirit of my invention.

While sensitized paper is described in the operation of this camera, it is to be distinctly understood, that a film or any chemically prepared photographic paper can be used with said camera to obtain a reproduction of the image or object photographed.

I claim:—

1. In a photographic meter reader, the combination of a camera casing provided with a lens and shutter, spools to which the ends of a roll of sensitized paper are attached, said paper being adapted to travel from one of said spools to the other, an electric light mounted in said casing, a lever, connections whereby a single movement of said lever will close the circuit through said electric light and will operate said shutter, and means intermediate said spools for feeding the sensitized paper equal distances on each operation of the lever, said means also operating to take up the paper on one of

said spools after the feeding movement, substantially as described.

2. In a photographic meter reader, the combination of a camera casing provided with a lens and a shutter, spools to which a roll of sensitized paper is attached, said paper being adapted to travel from one of said spools to the other, an electric light mounted in said casing, a lever, connections whereby a single movement of said lever will close the circuit through said light and will operate said shutter, a strap attached to said lever, a spring operatively opposed to the movement of said lever, and gearing whereby the movement of said strap in one direction automatically feeds a certain amount of the sensitized paper, said gearing operating subsequently, under the action of said spring, to take up on the receiving spool the paper fed, substantially as described.

3. In a photographic meter reader, the combination of a casing provided with an electric lamp, a mirror, a lens, and a shutter, a pair of rolls carrying sensitized paper, a lever, connections for operating said shutter and closing the circuit through said electric lamp, a flexible strap connected to said lever, a spring normally pressing said strap and said lever in one direction, paper feeding devices located between said spools and gearing, operatively connected to said paper feeding devices and said receiving spool, whereby a definite length of paper is fed on each movement of the lever and afterward taken up on said receiving spool, substantially as described.

4. In a photographic meter reader, the combination of a camera casing provided with a flexible hood, a lens, a shutter, a mirror, and an electric lamp, rolls carrying sensitized paper, feeding devices for said paper adapted to operate on the paper between said rolls, a lever, a flexible strap connected to said lever, connections between said lever and said shutter, a spring normally pressing said strap and said lever in one direction, and gearing whereby the movement of said lever in one direction will operate said feeding devices to feed a definite amount of the paper off from the feeding roll, including ratchet gearing operating said feeding device on the movement of the lever to close the electric circuit through the lamp, and other gearing whereby the spring, when the lever is released, will operate the take-up roll to wind upon it the part of the paper fed from the delivery roll, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

EDWARD C. POND.

Witnesses:

HILL BEASLEY,
WILLARD E. TALBOTT.