

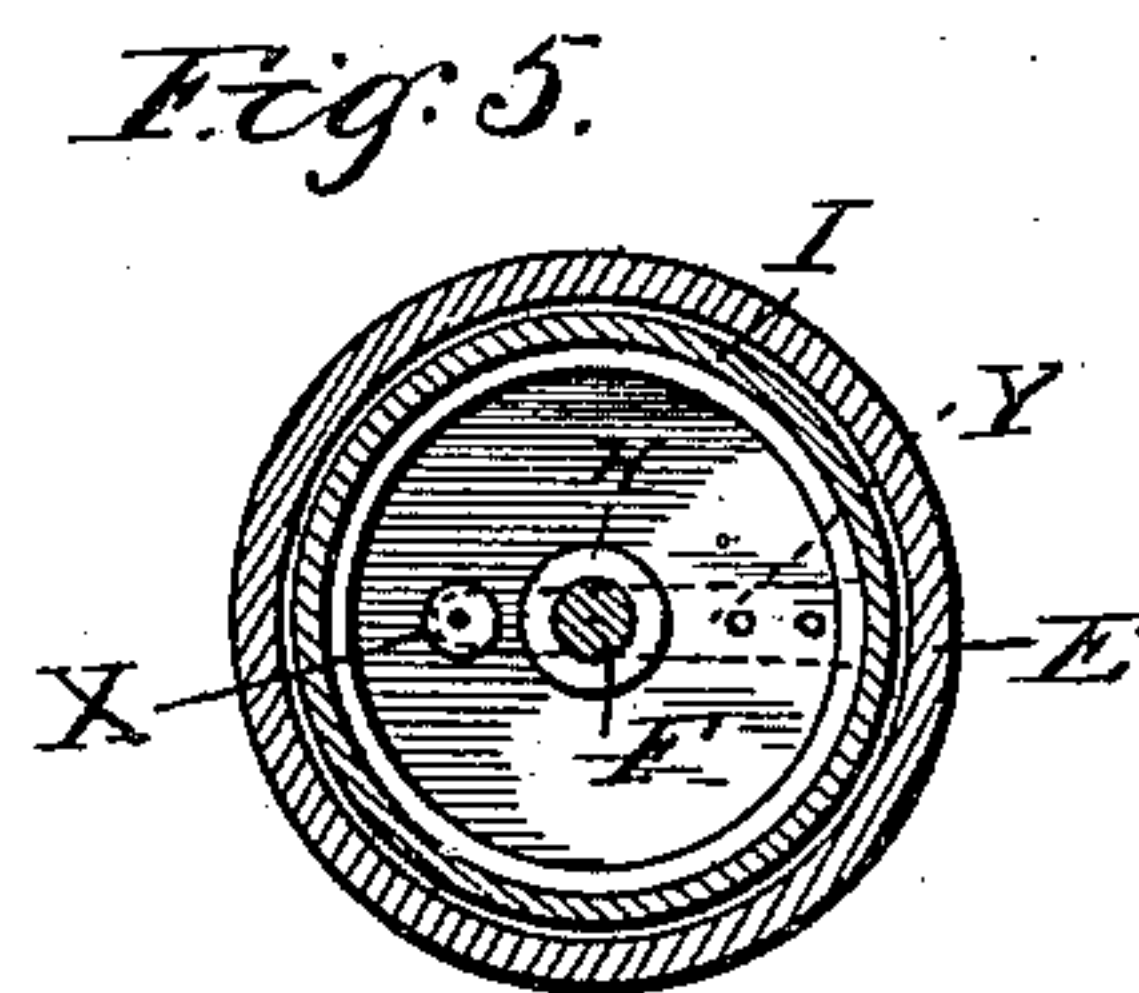
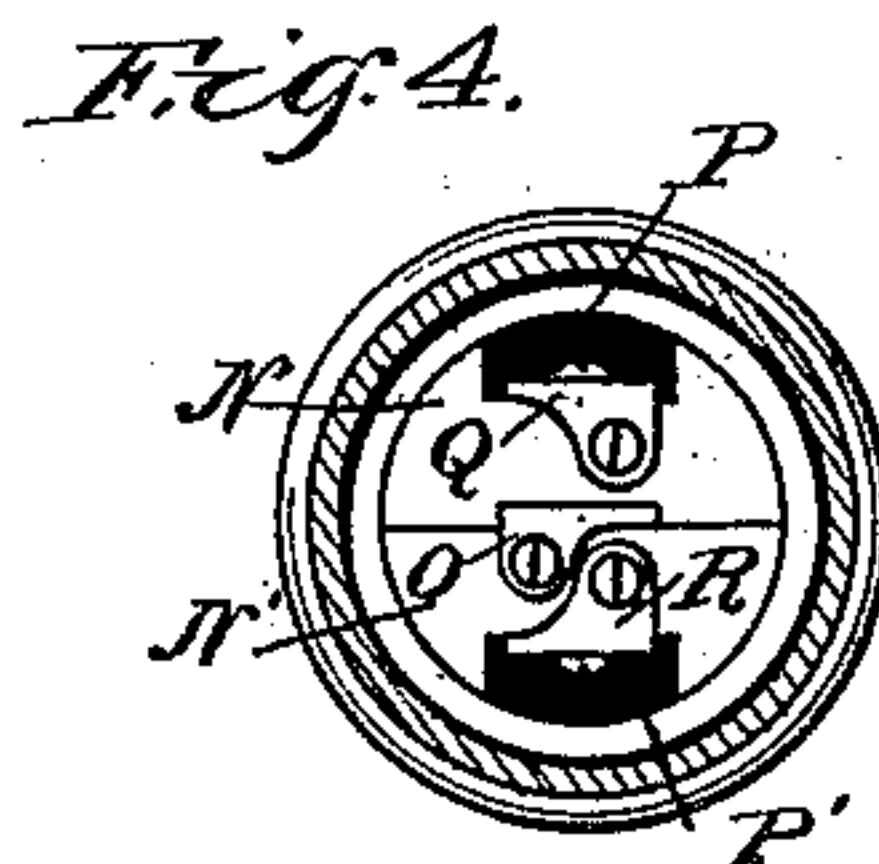
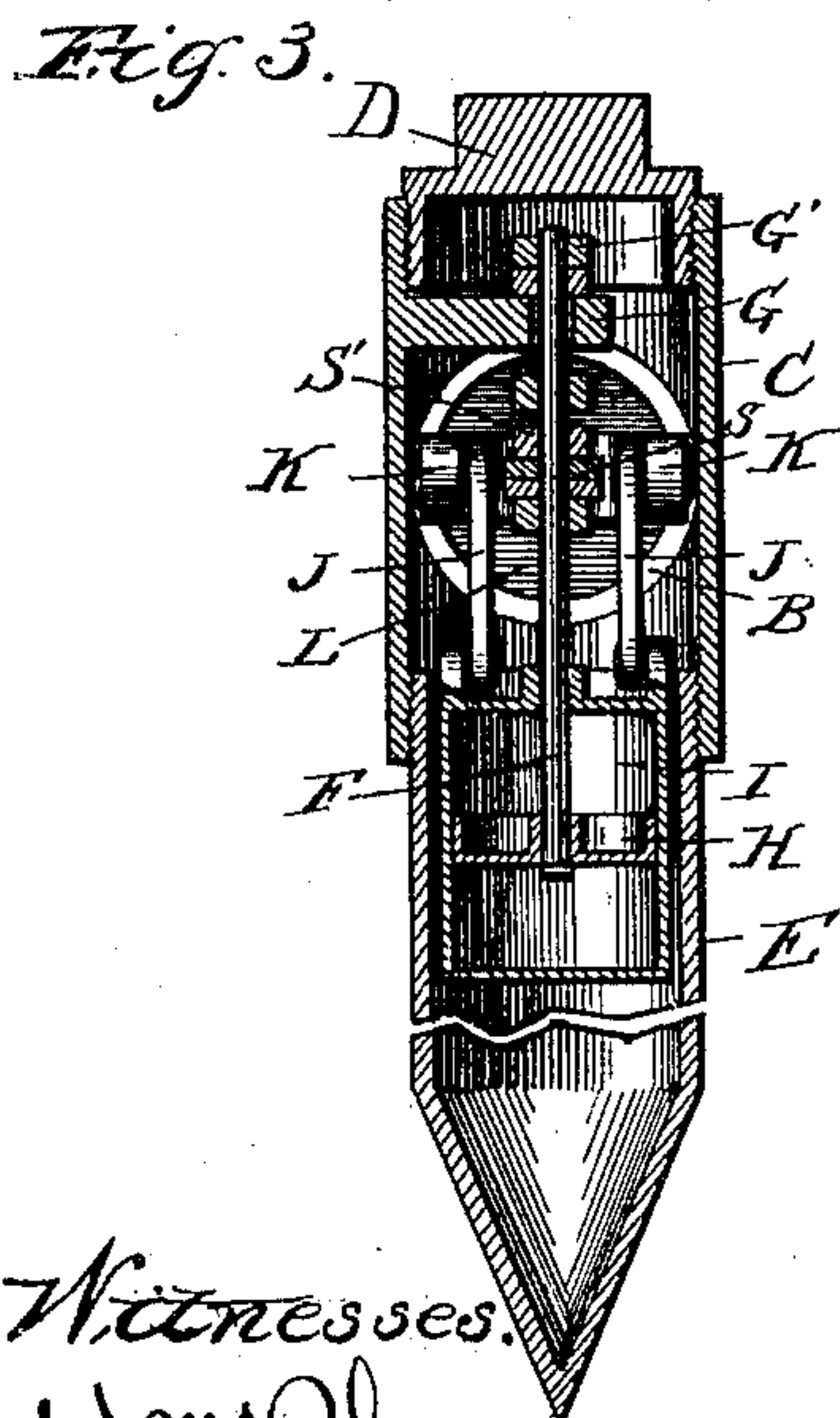
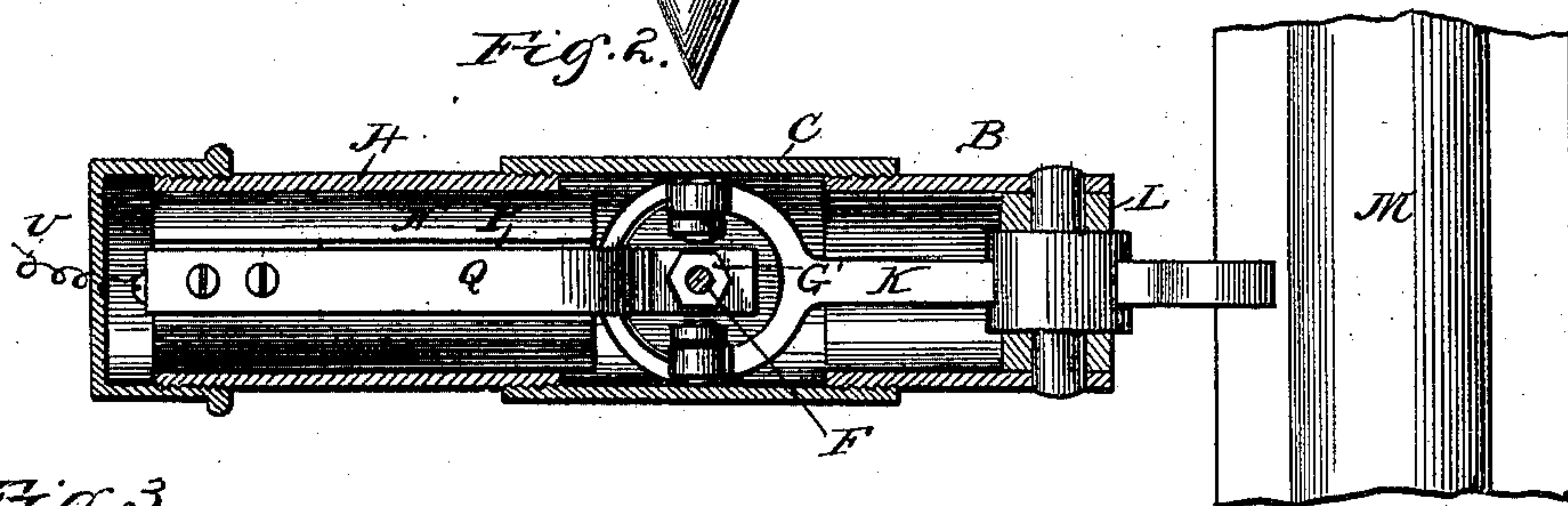
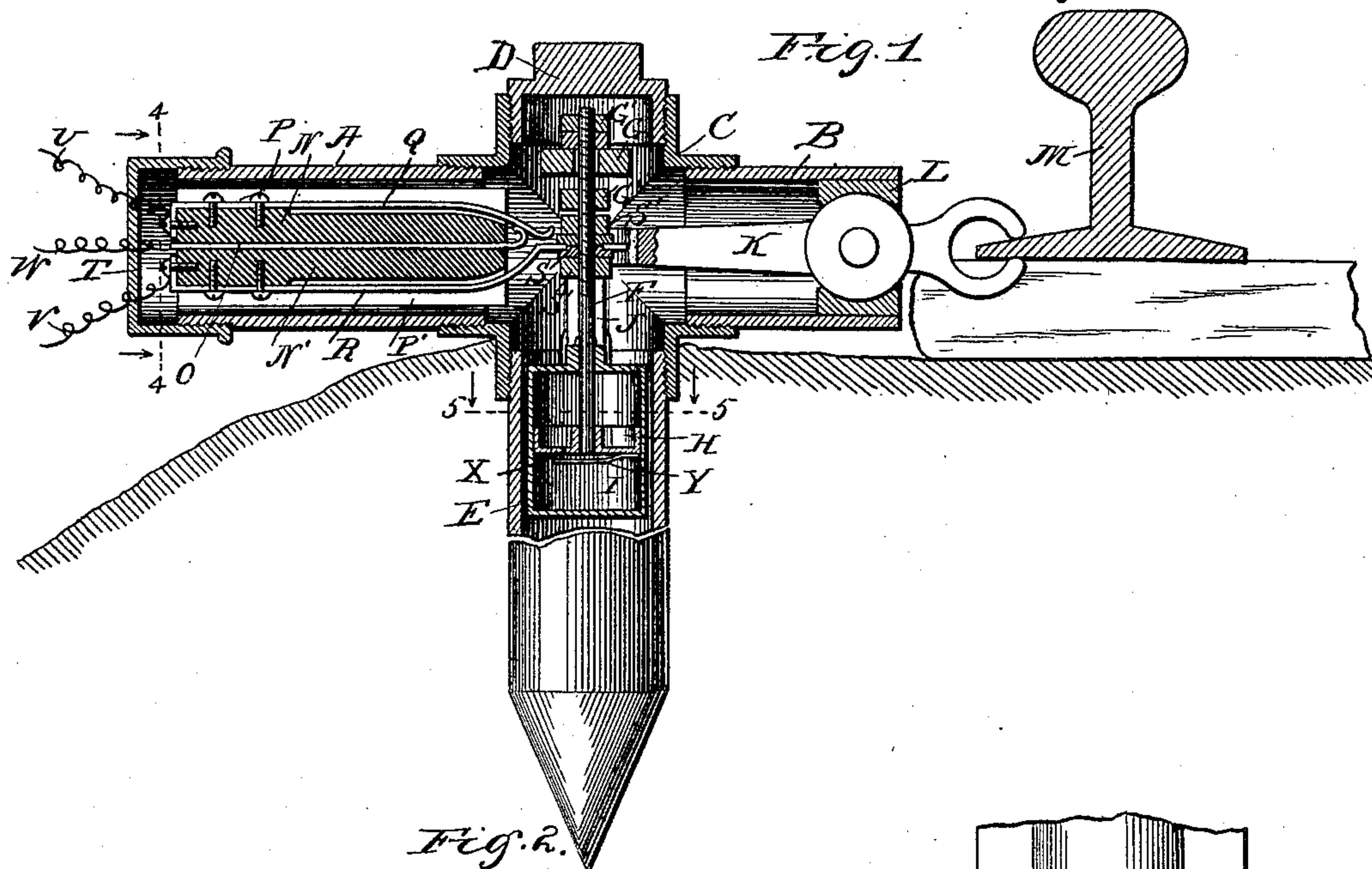
(No Model.)

M. S. CONLY.

TRACK INSTRUMENT FOR RAILROAD SIGNALS.

No. 428,041.

Patented May 13, 1890.



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# UNITED STATES PATENT OFFICE.

MAHLON S. CONLY, OF HYDE PARK, ILLINOIS.

## TRACK-INSTRUMENT FOR RAILROAD-SIGNALS.

SPECIFICATION forming part of Letters Patent No. 428,041, dated May 13, 1890.

Application filed February 15, 1889. Serial No. 300,024. (No model.)

*To all whom it may concern:*

Be it known that I, MAHLON S. CONLY, a citizen of the United States, residing in the village of Hyde Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Track-Instruments for Railroad-Signals, of which the following is a specification.

This invention relates to improvements in track-instruments for use in connection with automatic electric signaling apparatus, commonly known as "block-signals for railways," through the medium of which instruments the weight of a passing train is utilized for operating the signaling apparatus.

The principal objection to these instruments as heretofore constructed is that they are not only exposed to the action of the elements, but also to tampering by irresponsible parties, as well as to accidental operation by hand-cars, railway-velocipedes, and even pedestrians, which thereby causes the signal to be falsely exposed, and thus occasion annoying and sometimes dangerous delays to trains, which must heed such false signals, and besides this the instruments when placed upon the ground require constant adjustment on account of their changing position relative to the rail, owing to the swelling and sinking of the ground.

One of the objects of this invention is to avoid the necessity for the direct engagement of the wheel with the instrument for operating the same and to utilize the weight alone of a passing train for actuating the instrument in both directions, whereby the circuit through the instrument will be positively opened and closed by the action of the passing train.

Another object is to prevent the action of the track-instrument, and consequently of the signaling apparatus, by any force substantially less than the weight of a passing train, or at least sufficient to bend or deflect the track in an equal degree with that occasioned by the passing train, whereby is avoided either intentional or accidental operation thereof by a hand-car or pedestrian.

A further object is to have the instrument of such a character that it will automatically adjust itself to the variations in the position of the track relative thereto, due to the swell-

ing and sinking of the ground, and thereby avoid the necessity for adjustment by hand, and at the same time insure a successful operation of the instrument at all times and under all circumstances.

Other objects are to provide novel and efficient mechanism for carrying out the objects of my invention, all as illustrated in the accompanying drawings, in which—

Figure 1 represents a central vertical section through a track-instrument embodying my invention, showing its relation to a railway-track; Fig. 2, a horizontal section through the casing containing the operative parts thereof which are shown in detail; Fig. 3, a transverse vertical section through the center thereof, at right angles to Fig. 1; Fig. 4, a detail section on the line 4 4 of Fig. 1, looking in the direction indicated by the arrows; and Fig. 5, a detail section on the line 5 5 of Fig. 1, looking in the direction indicated by the arrows.

Similar letters of reference indicate the same parts in the several figures of the drawings.

The operating parts of my instrument are contained in a casing of any suitable construction or material, but preferably consists of ordinary piping comprising two horizontal sections A B, screwed at opposite sides into a cross-coupling C, the upper opening of which coupling is closed by a screw-plug D, while into the lower opening is screwed the upper end of a vertical pipe-section E, of any suitable length, preferably pointed at the lower end thereof to facilitate the driving of this section into the ground, so as to constitute a support for the entire casing.

Within the center of the casing—that is, extending axially through the vertical portion of the coupling C and down into the pipe-section E—is a screw-threaded piston-rod F, guided at its upper end in a suitable bracket G, projecting from the wall of the coupling and limited in its reciprocations by nuts G' thereon above and below said bracket, the lower end of said rod carrying a piston H, working in a closed cylinder I, which latter works and is guided in the pipe-section E and supported and actuated by links J, depending from the inner bifurcated end of a lever K, pivoted in a suitable plug L, closing the end of the hori-



zontal pipe-section B, the opposite or outer end of which lever is also bifurcated, so as to receive the flange of the rail M between the ends thereof, the extremities of the bifurcated portion being preferably rounded, as shown in Fig. 1, so as to fit snugly and without play upon the flange of the rail, and at the same time constitute a sliding connection between the lever and the rail, so that a vertical movement of the latter will produce a corresponding movement of the former. The same result would of course be attained by a pin-and-slot connection between the lever and rail, or any other form of connection which would cause the rail to actuate the lever positively in both directions—that is, depress the end of the lever when the rail is depressed and elevate and return the same to its normal position when the rail springs back to its normal elevated position—and I therefore do not limit myself to the exact form or construction herein shown.

In the pipe-section A is inserted a pair of semicircular filling-blocks N N', of some insulating material, between which is confined a metallic contact-strip O, while in longitudinal peripheral grooves P P' are located metallic tongues Q R, secured at their outer ends to the blocks N N', respectively.

The inner ends of these links extend into the interior of the coupling C, the tongue Q, freely and normally in contact with the end of the plate O, and the end of the tongue R, below and out of contact with either the tongue or plate and confined between insulating-washers S, adjusted and secured upon the piston-rod F by nuts S'.

On the end of the pipe-section A may be screwed or otherwise fitted a cap T, serving to exclude dust and moisture from the interior of the casing, every other part of which is closed, as before described.

To the ends of the metallic tongues Q R are attached the terminal wires U V of an electric circuit in which are included suitable signaling devices adapted and arranged to be operated upon the closing of the circuit by contact between the inner ends of said tongues, the construction, operation, and location of which devices are immaterial so far as relates to this invention. To the metallic plate O may also be secured a wire W, connecting with a relay or secondary circuit or with a closed primary circuit, including electrical signaling devices, which will be actuated by the opening of the circuit when contact is broken between the tongue Q and said plate, or this plate may serve as a relief or leak branch for the main circuit to prevent sparking between the tongues Q R, or, in fact, may be omitted altogether, if not required for some such special purpose as just enumerated.

The operation of the instrument is as follows: When the track is depressed by the weight of a passing train, the outer end of the lever will also be depressed and the inner end correspondingly elevated, carrying

with it the air-cylinder or piston-chamber, which, being closed, will cause the piston to be likewise elevated, by reason of the expansion of the air above and contraction of the air below the piston, due to the sudden rising of the piston-cylinder. The elevation of the piston, carrying with it the piston-rod, causes a corresponding elevation of the end of the tongue R into contact with the tongue Q, thus completing the electric circuit through these tongues, and if the plate O be employed it will also cause the opening of the circuit between the tongue Q and said plate simultaneously with the closing of the circuit between the two tongues, and as both of the tongues are flexible and elastic a variation in the degree of movement thereof will make no difference so long as contact is established. The return or springing back of the track to its normal elevated position will of course cause a reversal of the position of all of these parts by the return of the piston-cylinder to its normal depressed position, thereby breaking the contact between the tongues and re-establishing the circuit between the tongue Q and the metallic plate. It will also be observed that variations in the degree of vibration of the lever will not alter the prompt and efficient action of the parts, and that if the movement produced by a train of unusual weight is greater than the operating parts are adjusted for, then the air in the piston-chamber will serve as an elastic or yielding cushion, which will relieve the piston and its connections of the direct force of the lever, which would otherwise cause the fracture of some of the parts were a rigid connection between the lever and piston-rod employed. For additional security, however, and to avoid the possibility of injury to the parts by too great compression of the atmosphere in the piston-cylinder, I provide a safety-valve X, attached to the end of a flat spring Y and working through the piston in either direction, so that when the compression becomes too great for the safety of the parts this valve will open and permit the air to pass from the lower compression to the upper expansion chamber of the piston-cylinder, and when the cylinder is moved in the opposite direction the air will pass back again until the equilibrium is established between the air-chambers on each side of the piston.

Another important function of this yielding connection between the lever and piston-rod or equivalent devices employed for operating one of the tongues is that the devices will be automatically self-adjusting, so that changes in the position of the track relative to the instrument, or vice versa, occasioned by the elements—that is, moisture, heat, and cold—will not in any way affect the perfect operation of the instrument. These changes of course take place slowly, the ground sinking or swelling gradually with the change of seasons and the track possibly rising slightly when expanded by the heat of summer; but



such changes are so gradual that the rising and falling of the piston-cylinder, carried up and down by the movement of the track-lever, will have no effect upon the piston, because the air in the cylinder will pass so gradually from one side of the piston to the other that it will remain in substantial equilibrium at all times, except when under action by the force of a passing train.

From the foregoing it will be understood that this instrument depends solely upon the weight of a passing train for its actuation, and is entirely independent of the wheel, tread, and flange, and that the operative parts of the instrument are not only protected from the action of the elements, but are also placed beyond the possibility of either accidental or intentional operation by a hand-car, railway-velocipede, or passing pedestrian, for the instrument cannot be operated by any force substantially less than the weight of a passing train, and such a force could obviously not be otherwise exerted thereon; hence the instrument is an absolute safeguard against tampering therewith and causing the false setting of the signals controlled thereby by irresponsible parties, and thus avoid any danger of unnecessary and annoying delay to trains, which must obey the signals whether set falsely or otherwise.

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

1. In a track-instrument for railroad-signals, the combination, with a rail, of circuit making and breaking devices, a piston-rod for operating the same, a lever connected with the rail-flange at one end, a closed cylinder attached to the opposite end thereof, and a piston on the piston-rod working in and actuated by the movements of said cylinder, substantially as described.

2. In a track-instrument for railroad-signals, the combination, with a rail, of circuit making and breaking devices, a piston-rod for actuating the same, a closed piston-chamber, a piston on said rod working in said chamber, and mechanism connected with and actuated

by the rail for reciprocating said cylinder, and thereby operating the piston, substantially as described.

3. In a track-instrument for railroad-signals, the combination, with a rail, of circuit making and breaking devices, a piston-rod operating the same, a closed piston-chamber, a piston on said rod working in said chamber, a safety-valve in said piston, and mechanism for operating the piston-chamber connected with and actuated by the rail, substantially as described.

4. In a track-instrument for railroad-signals, the combination, with a rail, of circuit making and breaking devices, a piston-rod for operating the same, the piston thereof, a lever bifurcated at its outer end for the reception of the rail-flange, a closed chamber in which said piston works, and a link-connection between said chamber and lever, substantially as described.

5. In a track-instrument for railroad-signals, the combination, with a rail, of a vertically-reciprocating piston-rod, the piston thereof, a vertically-reciprocating closed cylinder in which said piston works, opposing contact-plates, one of which is free and the other attached to and operated by said piston-rod, a lever bifurcated at one end for reception of the rail-flange, and a link-connection between said lever and closed cylinder, substantially as described.

6. In a track-instrument for railroad-signals, the combination, with a rail, of a vertically-reciprocating piston-rod, the piston thereof, a vertically-reciprocating closed cylinder in which said piston works, opposing contact-plates, one of which is free and the other attached to and operated by the piston-rod, a contact-strip normally in contact with the free plate, a lever bifurcated at one end for reception of the rail-flange, and a link-connection between said lever and a closed cylinder, substantially as described.

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