

G. H. SNOW.

Circuit-Closers for Railroad Signals.

No. 143,935.

Patented Oct. 21, 1873.

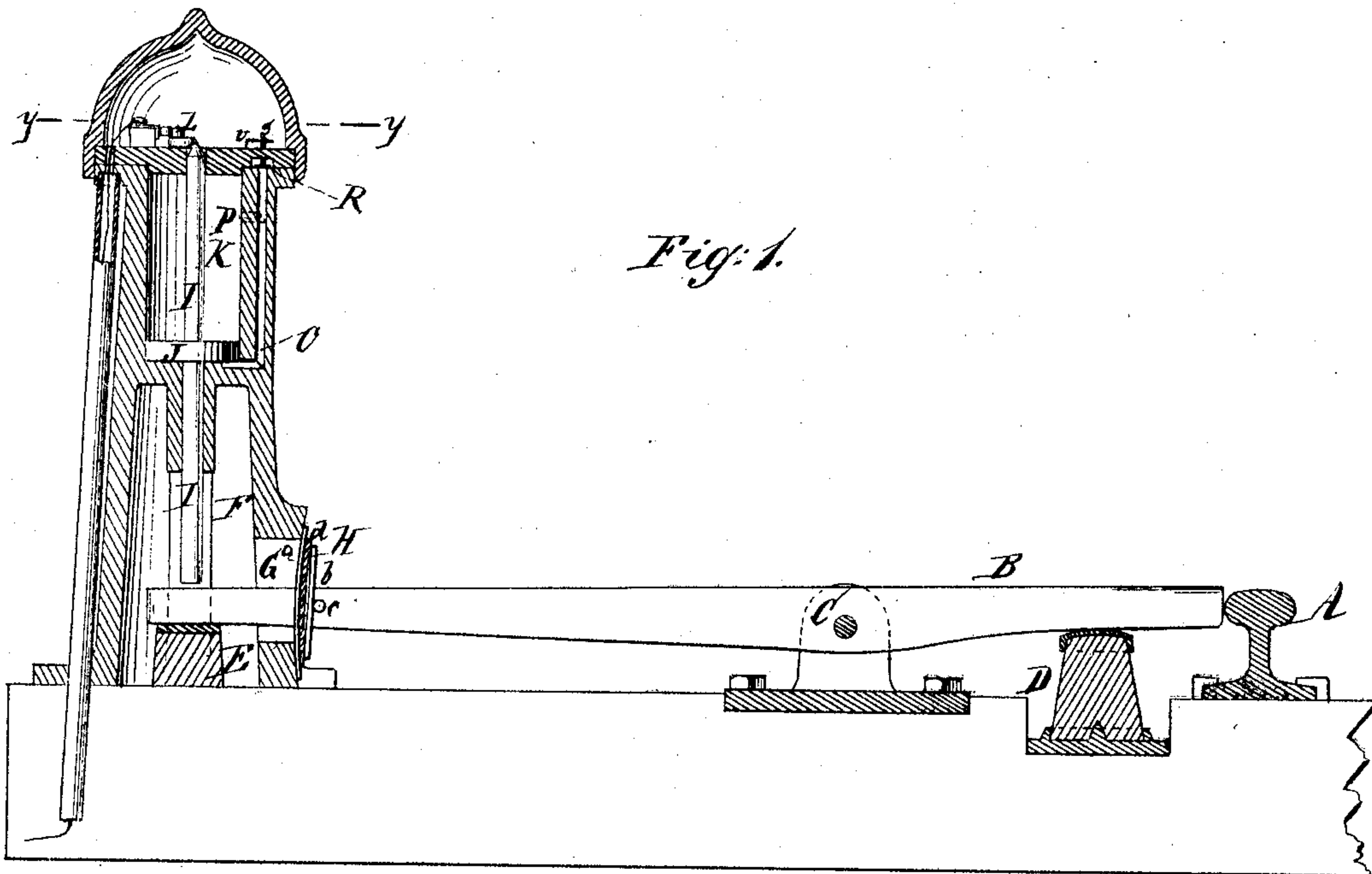


Fig. 1.

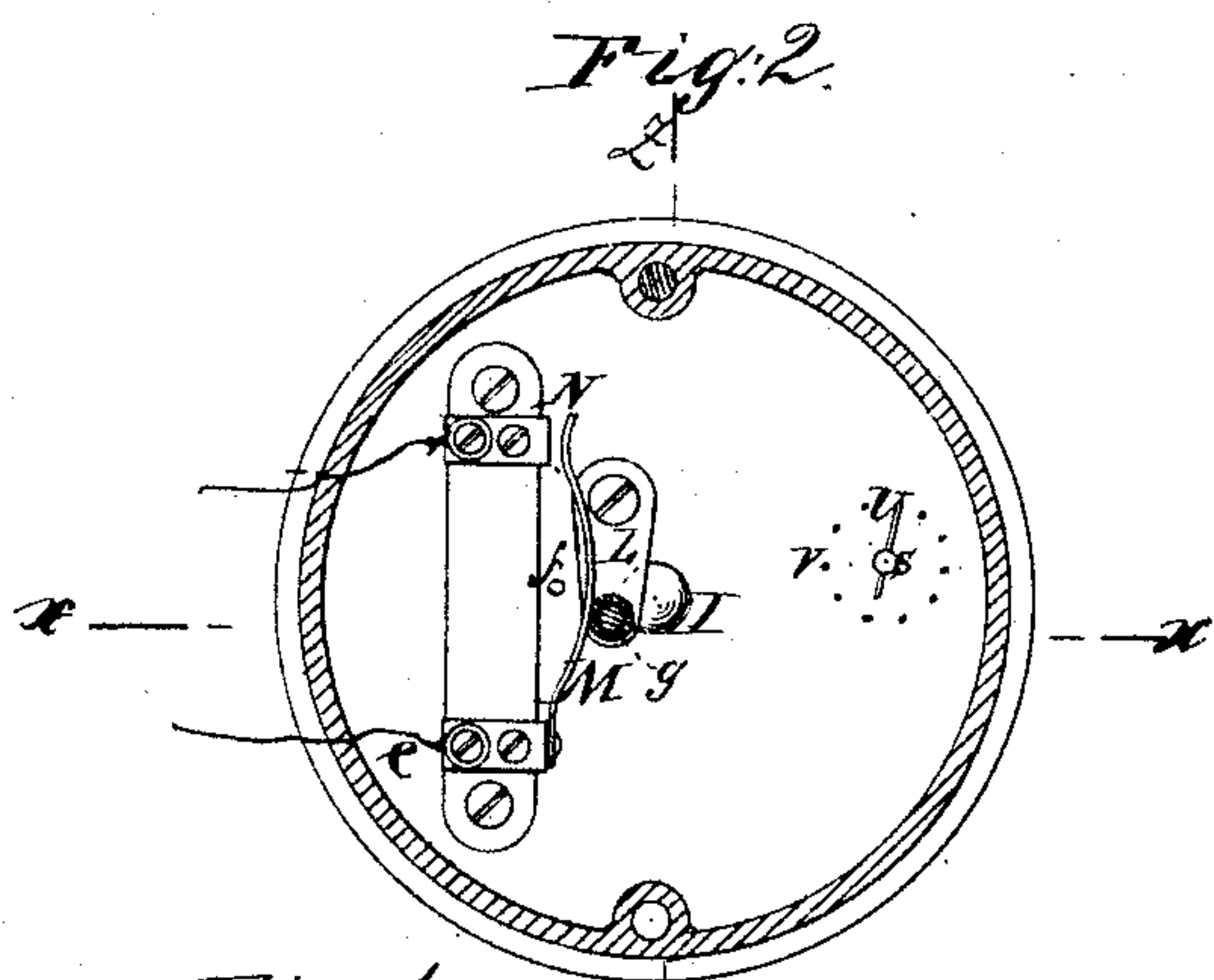


Fig. 2.

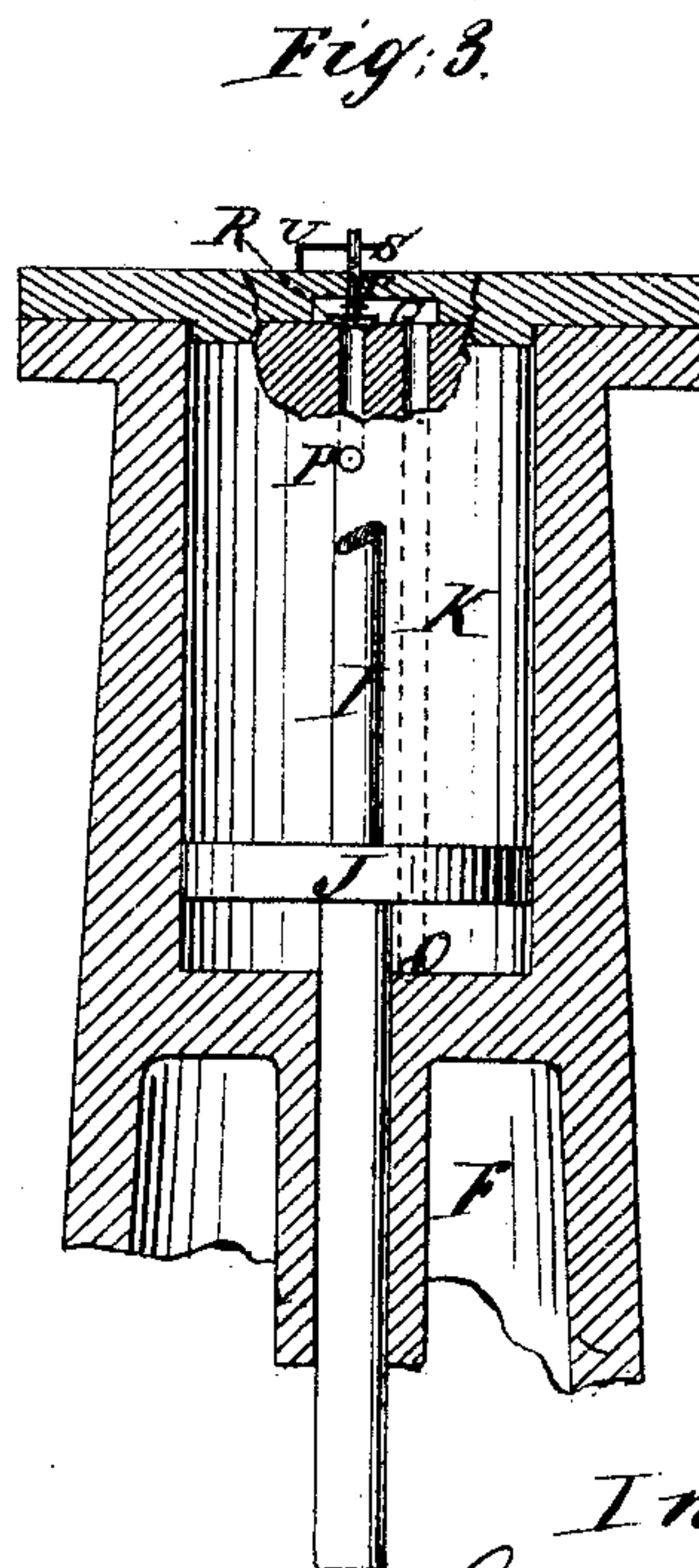


Fig. 3.

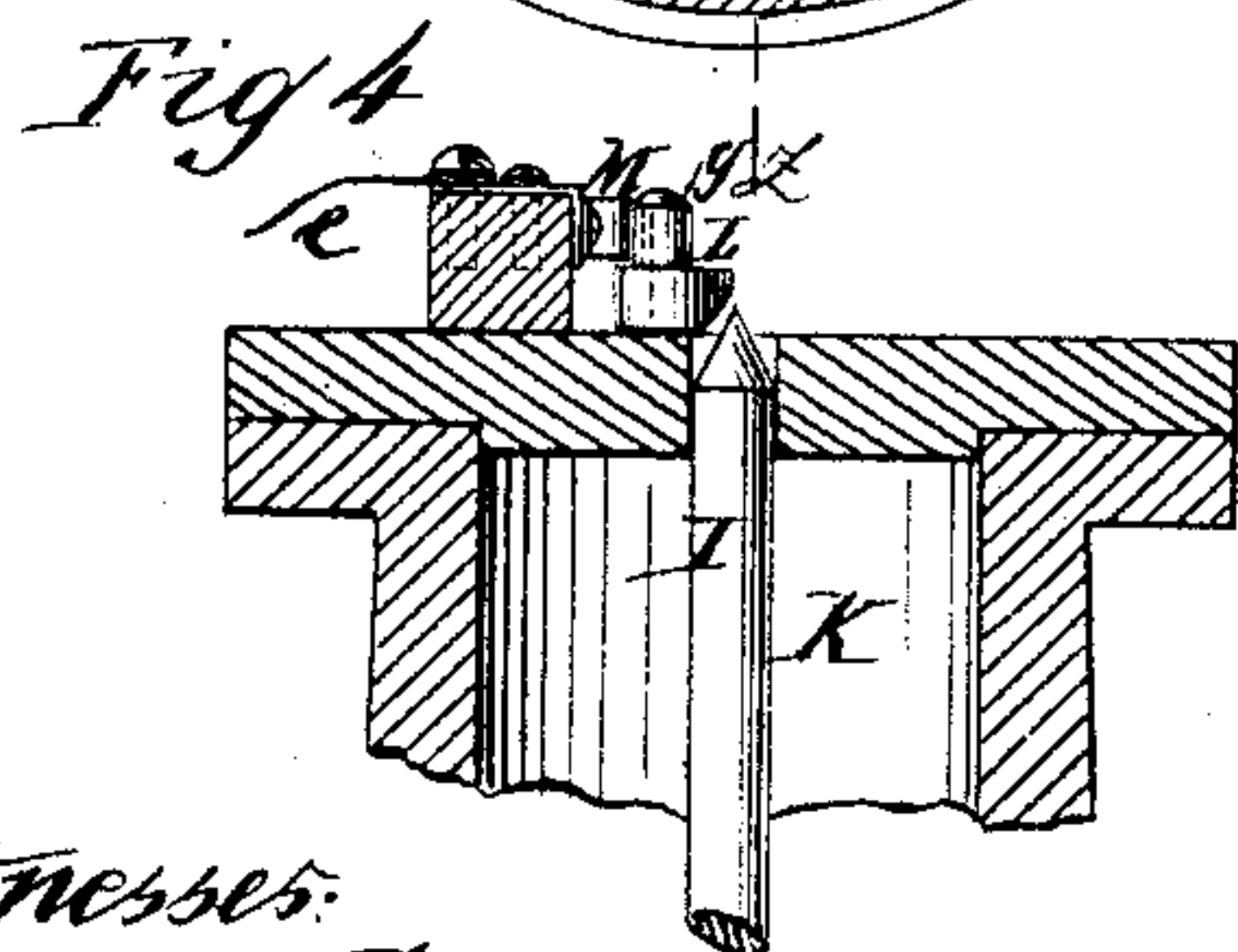


Fig. 4.

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IMPROVEMENT IN CIRCUIT-CLOSERS FOR RAILROAD-SIGNALS.

Specification forming part of Letters Patent No. **143,935**, dated October 21, 1873; application filed May 24, 1873.

To all whom it may concern:

Be it known that I, GEORGE H. SNOW, of West Meriden, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Electric-Circuit Instruments for Railway and other Signals; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 is a vertical section of my improvement, the plane of section being in the direction of the line *x x* of Fig. 2. Fig. 2 is a horizontal section of the upper part of the apparatus, taken in the plane of the line *y y* of Fig. 1. Fig. 3 is a vertical section of the air-chamber, the plane of section being indicated by the line *z z*, Fig. 2. Fig. 4 is a detailed view in section of the upper part of the air-chamber, the same view showing also the key-lever.

This invention relates to electric-circuit instruments for railway and other signals; and consists, among other things, in the use of a piston moving in an air-chamber for communicating motion from the track-lever to the key-lever of the circuit-closing apparatus, the upper and lower parts of the air-chamber being made to communicate with each other by passages so arranged that, when the piston is forced upward to operate the key-lever, part of the air which is above the piston is forced out of the chamber through one of the passages through an opening placed a little below the top of the chamber. When the piston has risen opposite to such opening the communication of said passage with the upper part of the chamber is cut off by the piston, and the air remaining in the top of the chamber is confined there by the piston, and constitutes an air-cushion, which prevents the piston from being slammed up against the head of the chamber or cylinder. The piston-rod passes up through the cylinder-head and alongside of the key-lever, which, as well as the part of the piston-rod that is next to and comes in contact with it, is so formed and arranged that when the end of the piston-rod protrudes beyond the head the key-lever is pushed by the piston against the hammer or key so as to close the circuit, the key consisting of a spring-plate,

one end of which is permanently connected with a wire extending to one of the poles of the battery, while its free end is opposite the anvil, which is in connection with the other pole. The other end of the piston-rod extends through the opposite end of the cylinder or air-chamber, and terminates over and close to the inner end of the track-lever, so that it will be raised when that end of the track-lever is raised by a passing train. When the piston is thus raised, the air which is driven out before it passes through the air-chamber into the lower part of the cylinder under the piston, and, when the piston falls back, the air thus introduced below it is retarded in its return to the other end of the cylinder by a valve in the air-passage so arranged and adjusted that the air is caused to pass through it slowly, and consequently the fall of the piston is retarded, whereby the piston-rod is kept in contact with the key-lever and the circuit held closed for a longer period than would be the case if the piston were allowed to fall freely as soon as the action of the track-lever ceased. The key and key-lever are suitably inclosed so as to keep out dust, and the lower end of the piston-rod moves in a closed chamber, in which the outer end of the track-lever also works, the opening therein that receives the track-lever being closed or packed by means of movable plates fixed around the lever so as to overlap and press against the opening, and thereby pack it against the entrance of dust.

The letter A designates one of the rails of a railway-track, and B is a track-lever moving upon a fulcrum, C, and so arranged that its outer end is near enough to the rail to be depressed by the wheels of passing trains, the lever being raised again, and held up after the train has passed by, by a spring, D. The outer end of the track-lever also rests upon a spring, E, within a chamber, F, into which chamber the track-lever extends through a hole, G, in its side, which hole is covered to exclude dust by a sliding cover, H, mounted on the track-lever, and which, in this example, consists of a thin elastic plate, *a*, of metal, surrounding the lever just outside the hole G, and large enough to overlap its edges in all positions of the lever. The plate *a* is held up against the wall of the chamber F by a rigid plate, *b*, that also surrounds the lever, and is kept in place by a pin, *c*. A thin sheet of india-rubber, *d*, is interposed between the inner

and outer plates *a b*. The outer end of the track-lever is directly under the lower end of the piston-rod I of a piston, J, which works in a vertical air chamber or cylinder, K, the upper end of the piston-rod extending up through the top of the cylinder, as is shown in the drawing, so that when the piston is in its lowest position, the track-lever being at rest, the upper tapering end of the piston-rod occupies the opening in the cylinder-head, through which it passes, its point protruding just far enough to form a stop to the beveled key-lever L, which is pressed against the tapering point of the piston-rod by the spring-key M of the circuit-closing apparatus. The key-lever L is pivoted on the top of the cylinder K, between the piston-rod and the spring-key M, and one end of said key is put permanently in connection with one of the poles of an electrical battery, while its other end is so arranged, with respect to the anvil N, that it will be brought in contact with said anvil, by the operation of the key-lever, whenever the piston-rod is raised far enough to take its tapering end above the beveled edge of the key-lever. A stop, *f*, limits the extent of the movement of the key-lever. The part of the key-lever which comes in contact with the key is insulated by means of india-rubber *g*, or other suitable material. The piston-rod is fitted as accurately as possible in the holes in the ends of the cylinder, so as to prevent the free passage of air as much as possible, and yet allow the easy movements of the piston-rod. The wall of the cylinder K is provided with two air-passages, one of which, O, opens into the cylinder at its lowest part, and the other, P, opens into the cylinder a little below its top, both passages being made to extend through the top of the wall of the cylinder, where they are intersected by a groove, Q, formed on the under side of the upper head of the cylinder. The upper end of the passage P is provided with a valve, R, which plays between collars on a screw valve-stem, S, which is screwed through a tapped hole, T, extending up through the said cylinder-head, so that the valve-stem can be screwed up or down to adjust the valve. The valve-stem is turned and locked by means of a pin, U, which goes through it above the head, and serves as a handle wherewith to turn it, and it is locked by inserting its bent end into one or another of the depressions V provided for that purpose on the upper surface of the cylinder-head, as indicated in Fig. 2. The valve R is so arranged that the air which is forced upward by the rising piston is allowed to pass out through the passage P into the horizontal passage Q, and down through passage into the part of the cylinder below the piston, the valve opening readily and rising on its stem; but in order to prevent the air from returning rapidly through said passages when the piston descends, I adjust the valve by means of its screw in such a manner that it is nearly closed upon its seat, and the air is allowed to pass into the pas-

sage P slowly, the pressure of the air on the back of the valve keeping it down as near to its seat as the adjustment of the valve-stem permits. The position of the mouth of the passage P in the side of the cylinder K causes an air-cushion to be formed between the piston and the upper head of the cylinder as soon as the piston has covered the mouth of that passage, and, as the piston rises above that point, the air thus confined becomes compressed and forms an efficient air-cushion, which prevents the piston from slamming up against the cylinder-head.

It will be observed, from the construction and arrangement of the parts, that the key-lever will be pushed by the piston-rod against the key, so as to close the circuit, immediately after the piston begins its upward movement, and that the continued upward movement of the piston will carry the top of the piston-rod a considerable distance above the key-lever, the side of the piston-rod meanwhile, throughout its whole ascent, pressing against the key-lever, so as to keep the circuit closed. In order still further to prolong the time the circuit is kept closed, and to prevent it from being suddenly opened after the fall of the track-lever, the air below the piston is controlled in its return to the upper part of the piston by means of the valve R, which can be adjusted, as described, so as to retard the return of the air under the pressure of the falling piston, and cause the piston and the piston-rod to fall more or less slowly, and thereby keep the key M pressed against the anvil a longer or shorter time, as may be desired.

The top of the cylinder is provided with a close-fitting cap, W, to protect the circuit-closing apparatus, and the wires *e e'* are led through a suitable tube to the battery.

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

1. The combination, with the key-lever L of a circuit-closing instrument, of a piston, J, and cylinder K, substantially as described.

2. The air-cushion formed in the top of the cylinder K by means of the piston J and the passage P, substantially as described.

3. The air-passages O, Q, and P, communicating with the interior of the cylinder K above and below the piston J, in combination with the piston J and key-lever L, substantially as described.

4. The adjustable valve R, which controls the return of the air from the part of the cylinder below the piston to the part above the piston, substantially as described.

5. The combination, with the outer end of the track-lever B, of a spring, E, whereon the track-lever rests, substantially as described.

6. The packing device H, arranged upon the track-lever, so as to close the opening G of chamber F, substantially as described.

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Witnesses:

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