

(No Model.)

4 Sheets—Sheet 1.

E. L. HARRISON.

ELECTRIC RAILWAY SIGNALING APPARATUS.

No. 448,031.

Patented Mar. 10, 1891.

Fig. 1

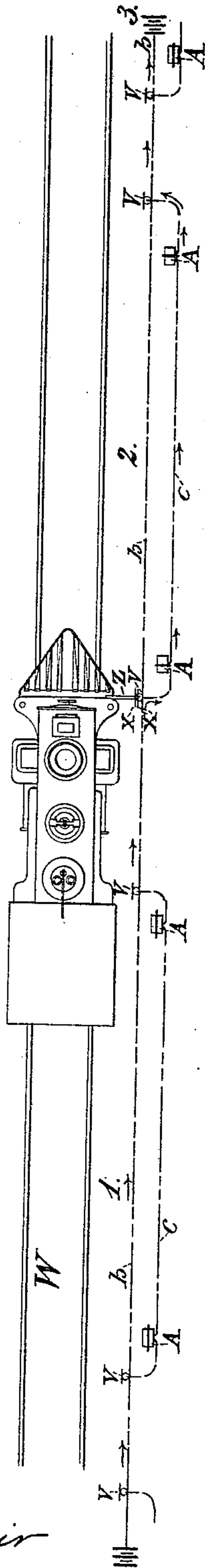
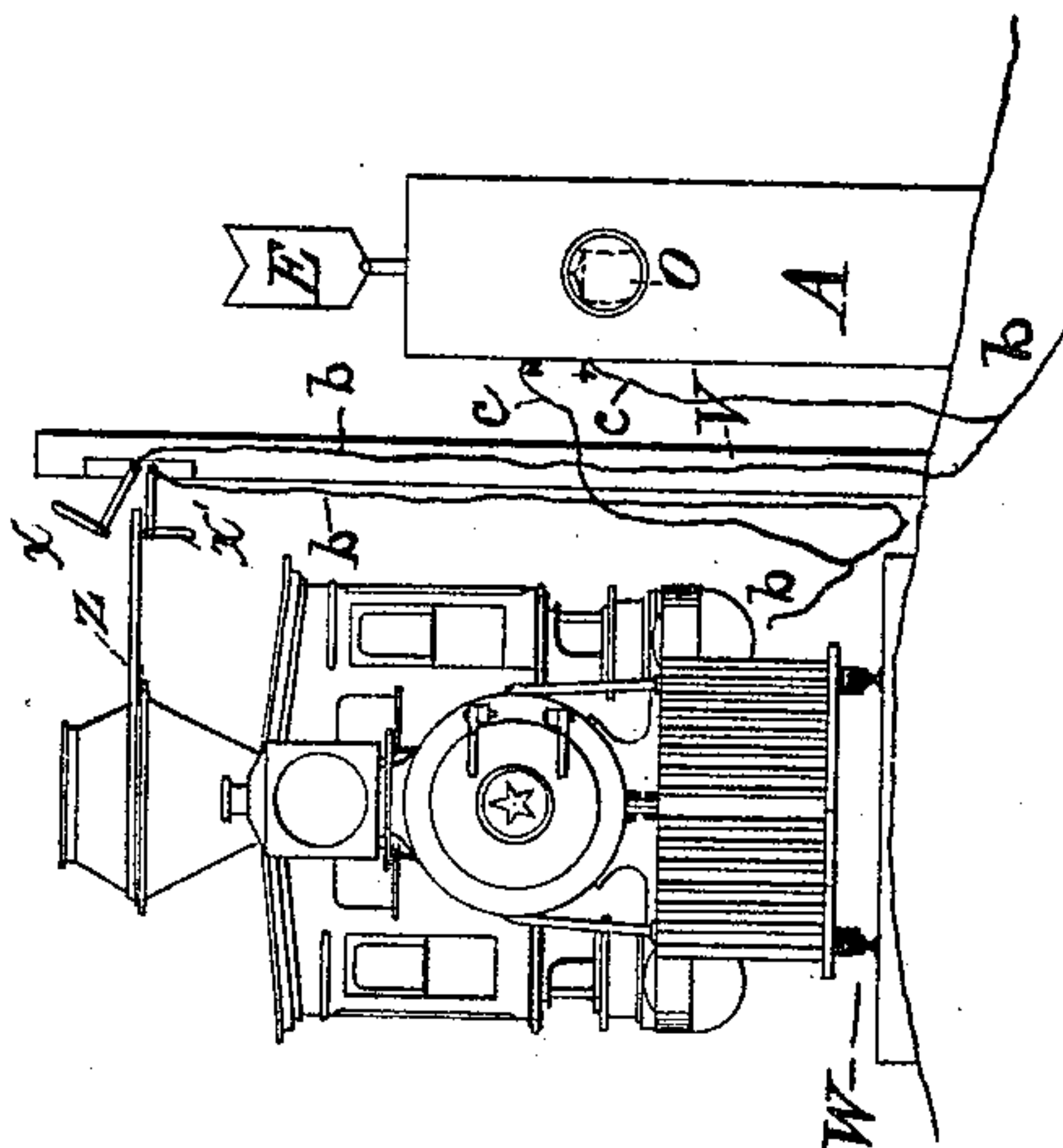


Fig. 2



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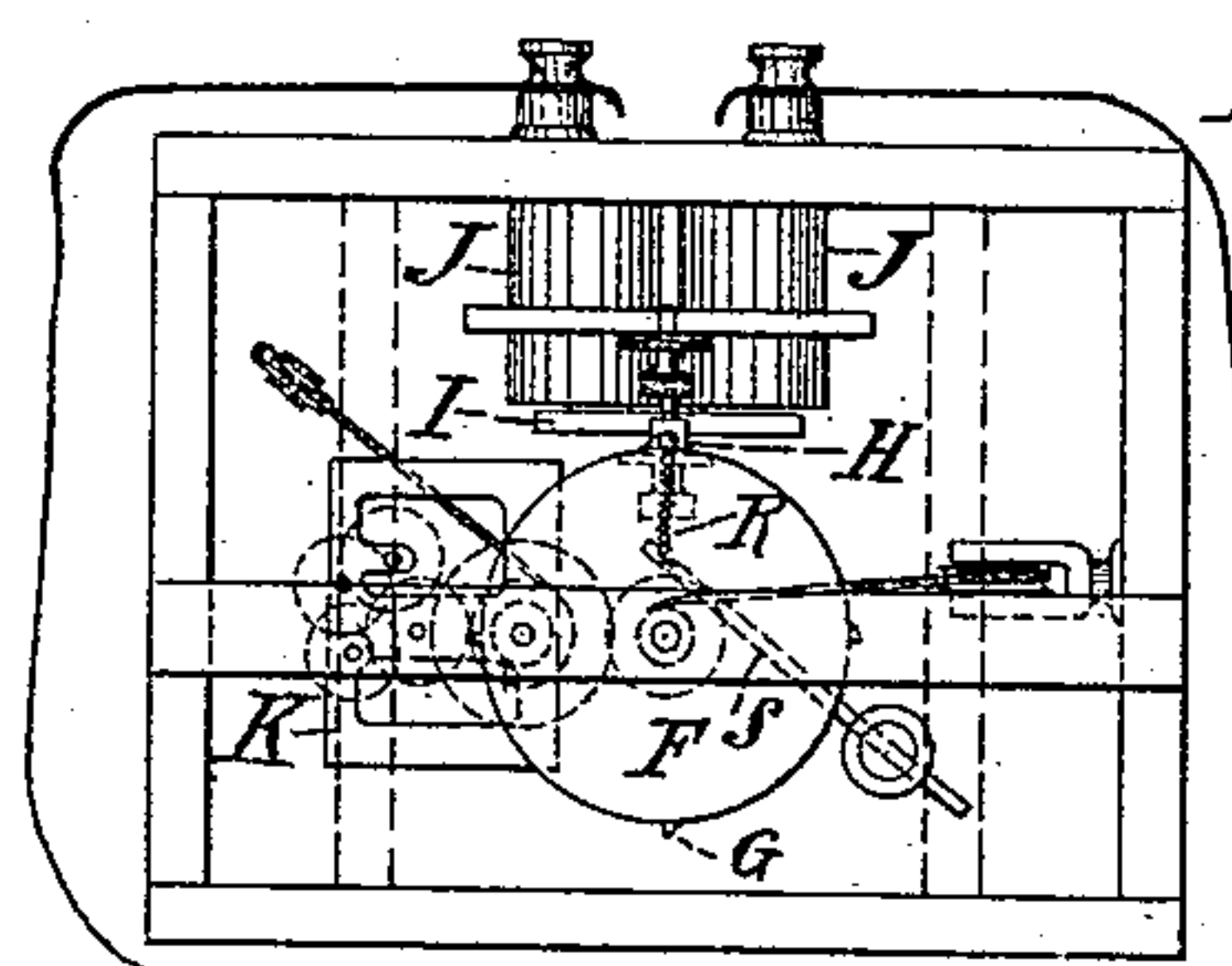


Fig. 3

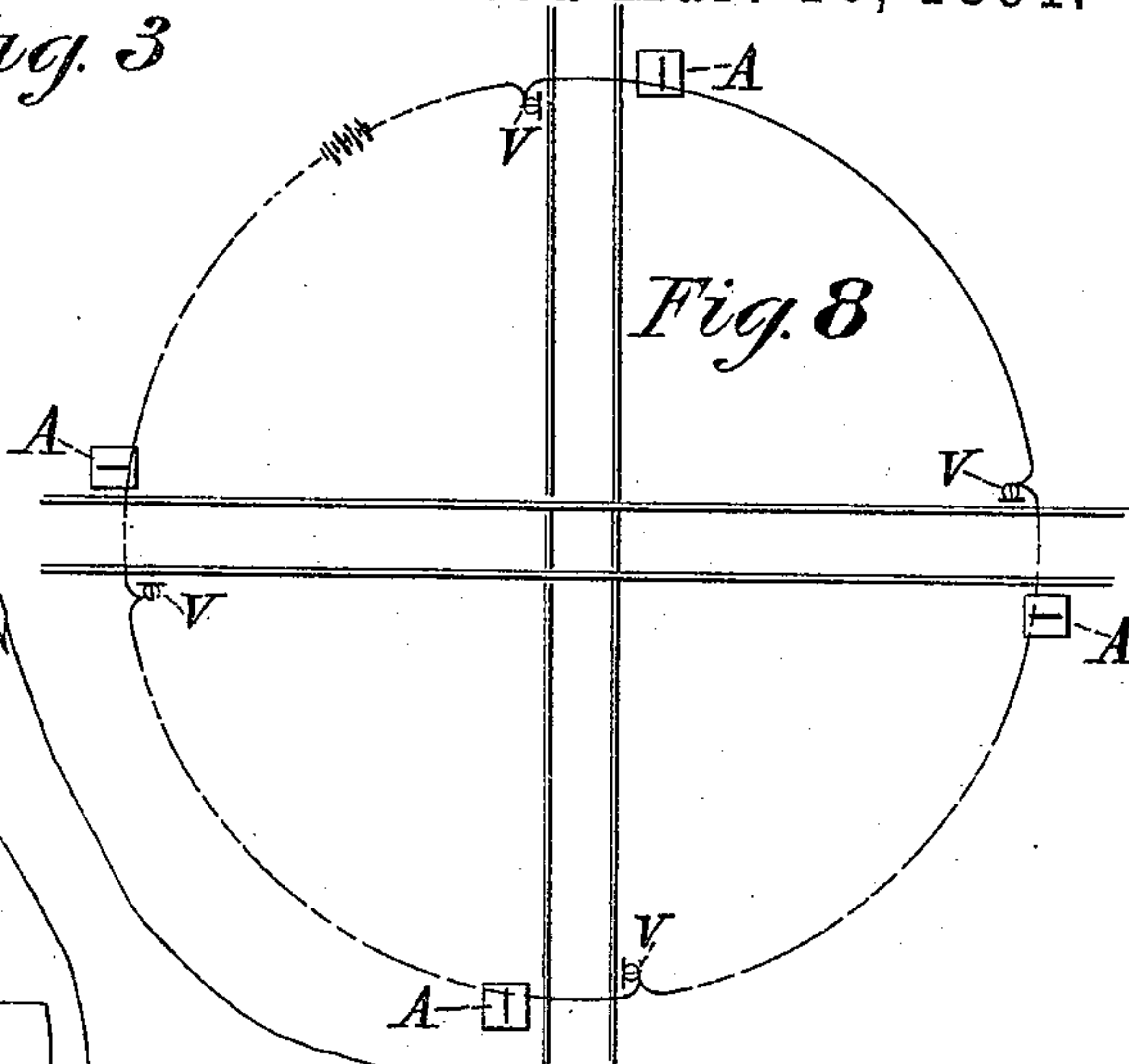


Fig. 8

Fig. 5

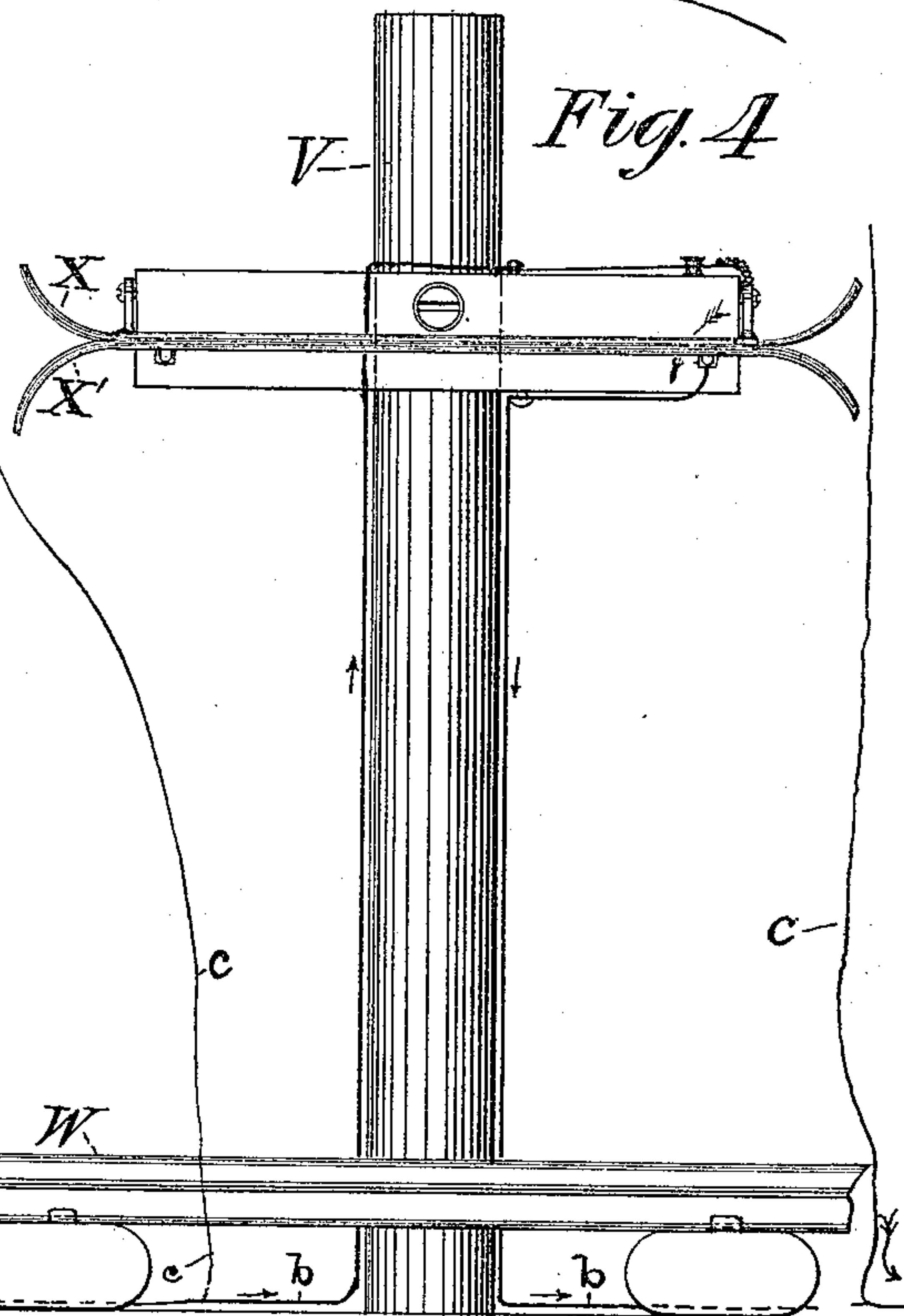
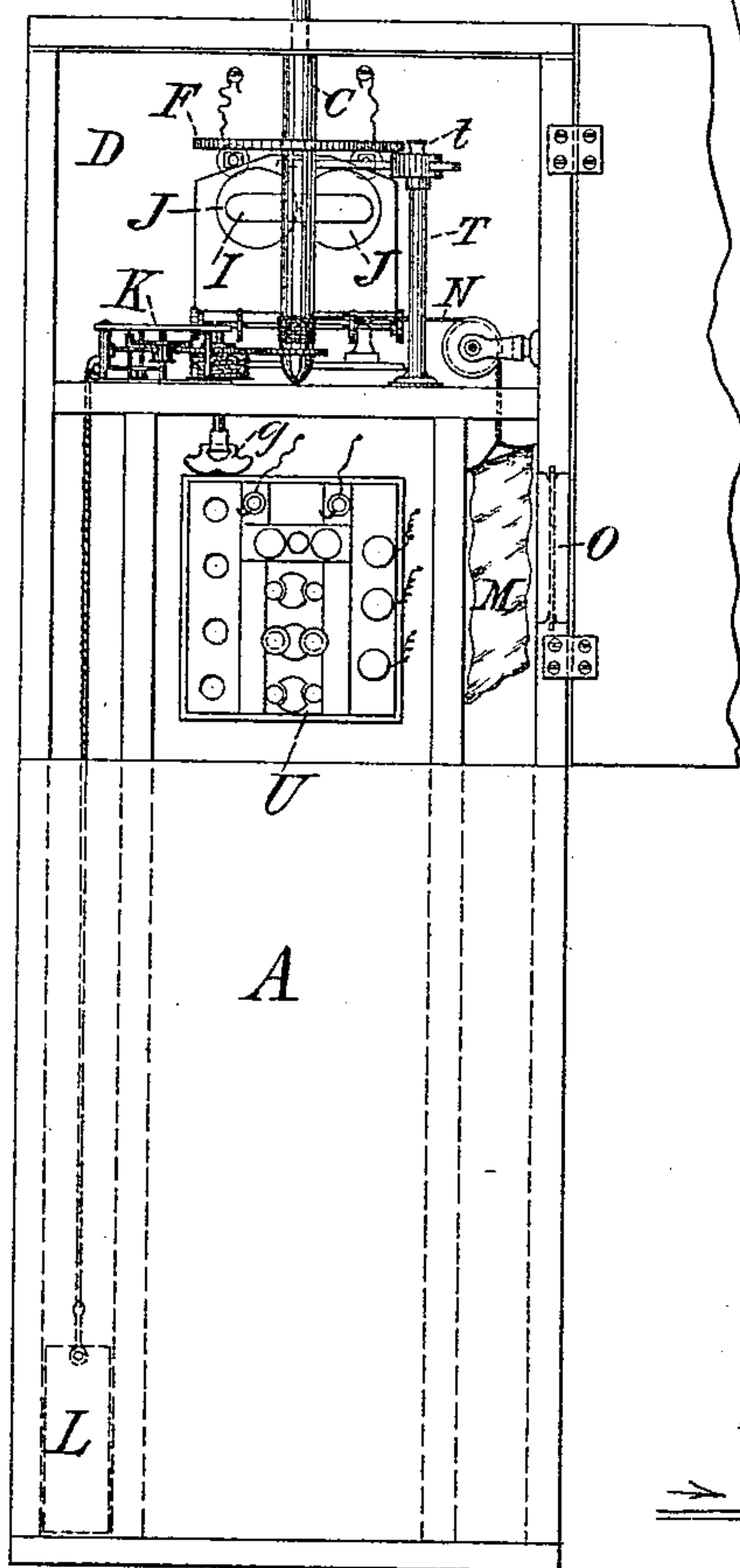


Fig. 4

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Fig. 6

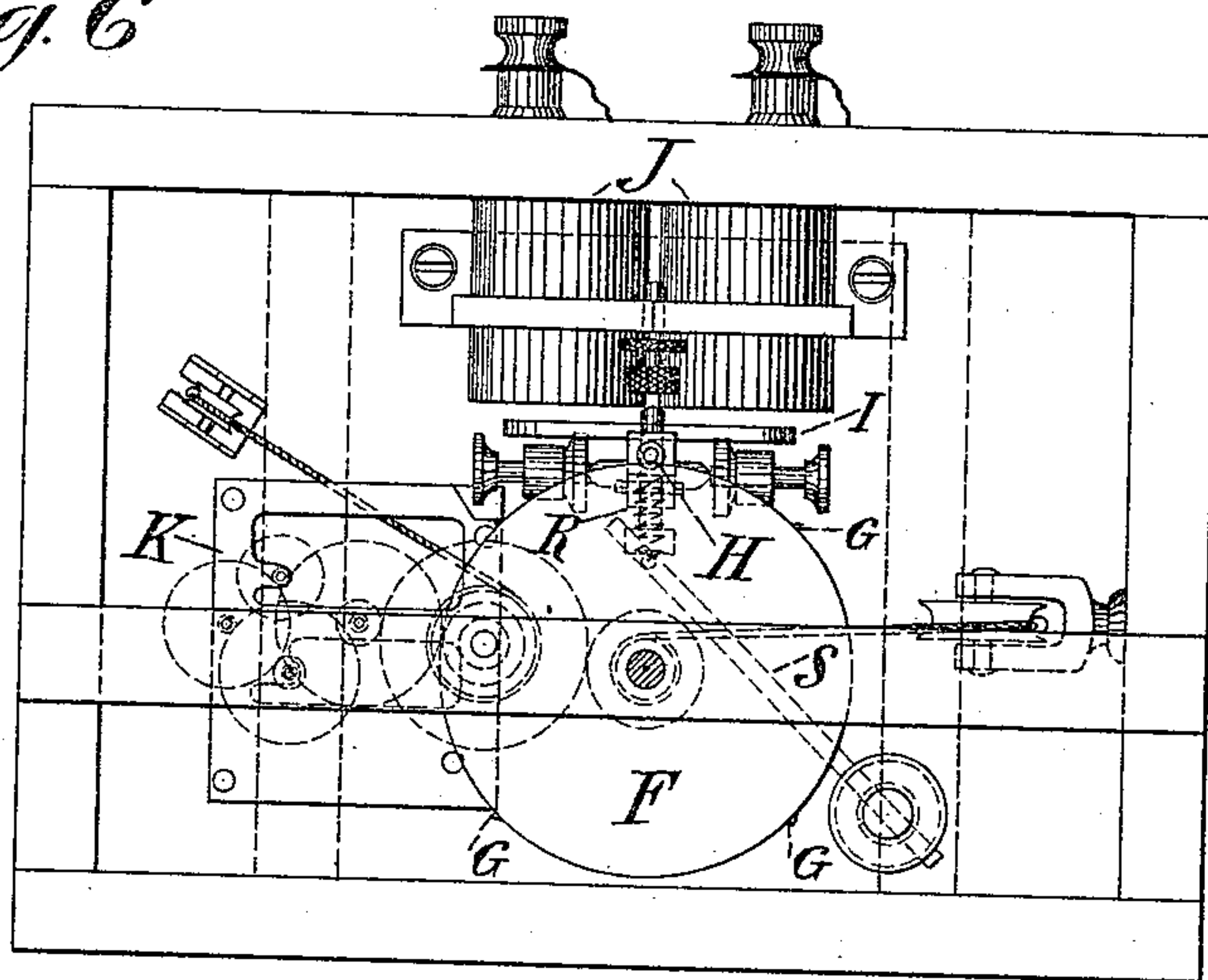
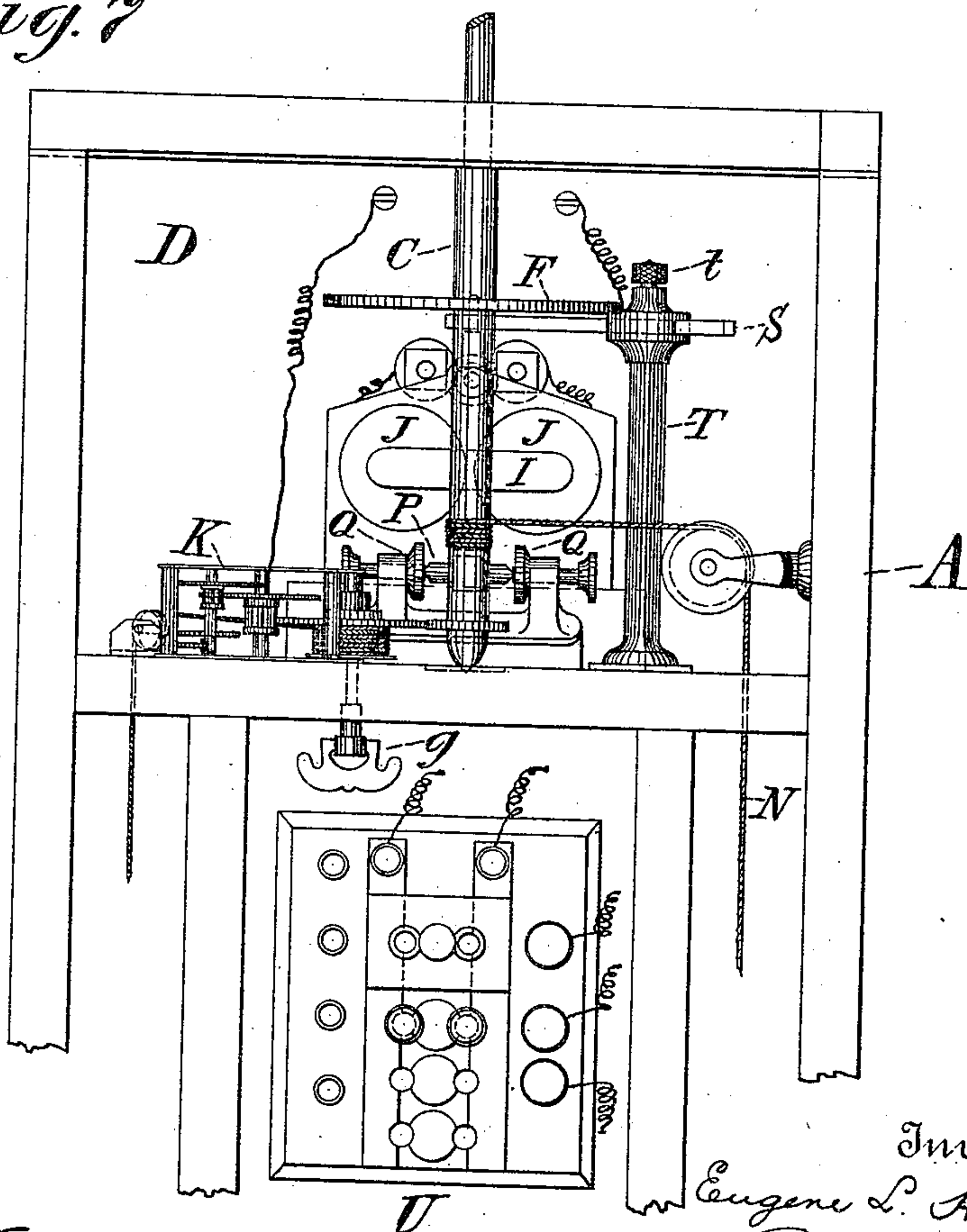


Fig. 7



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Fig 6a

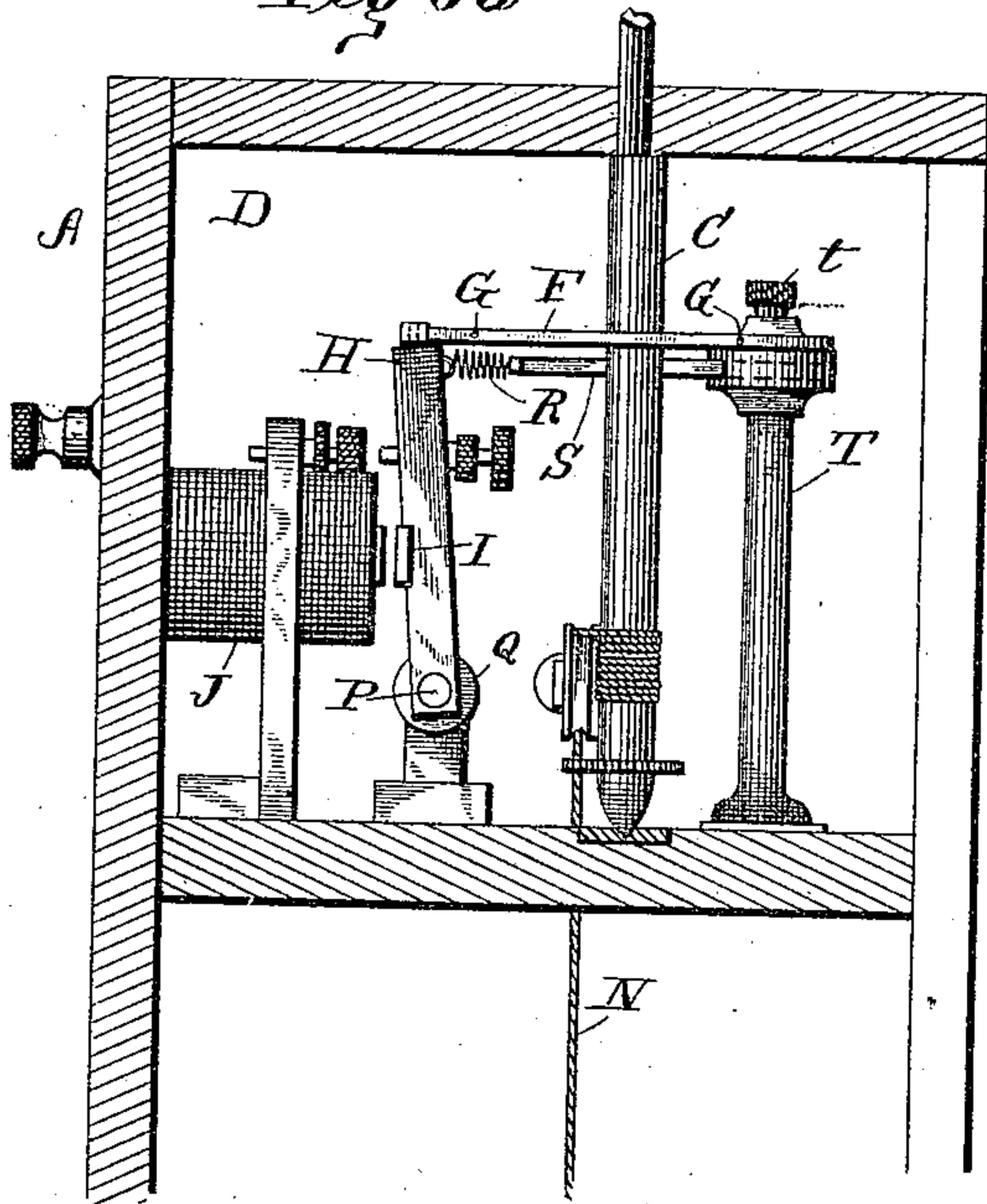
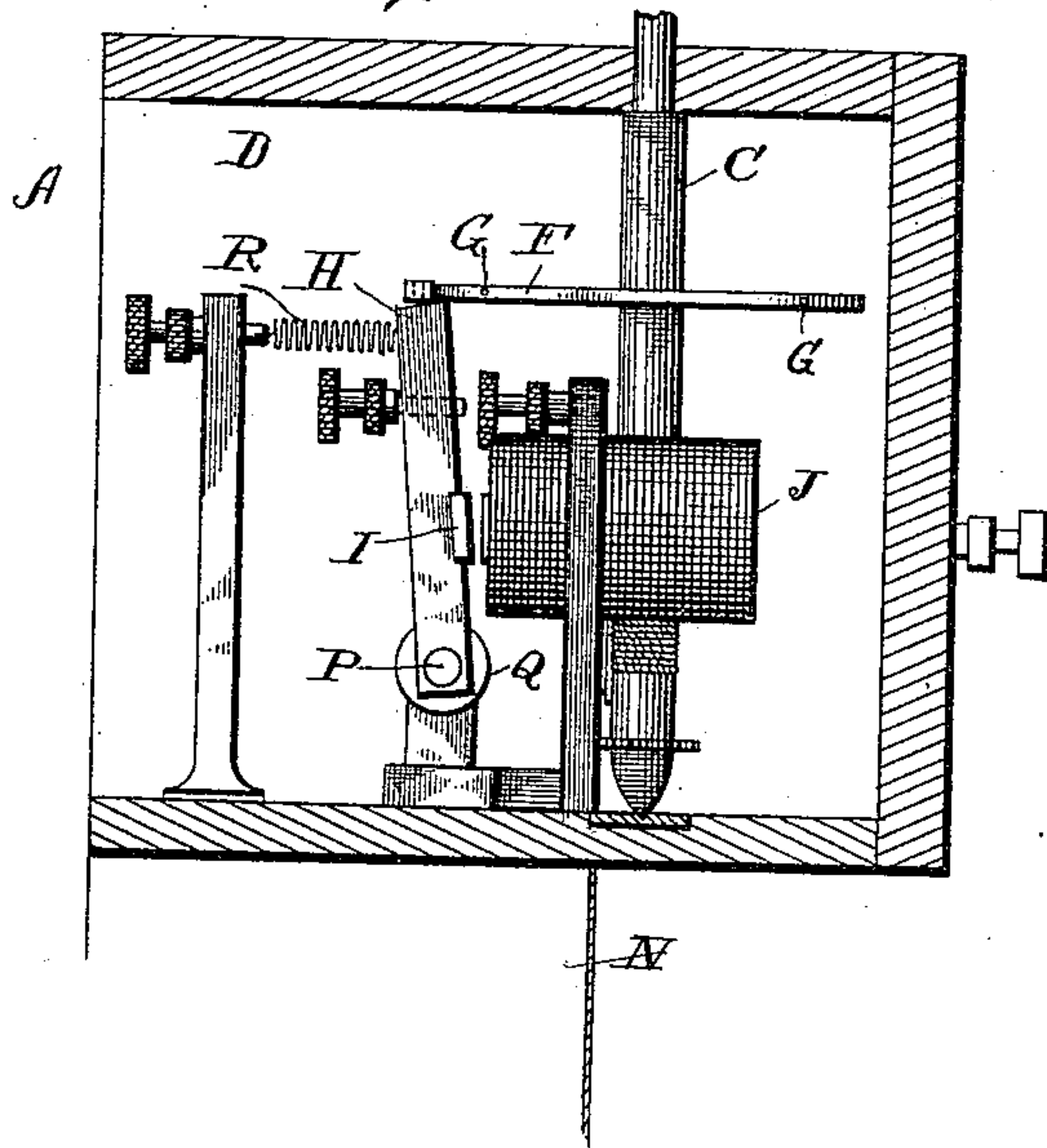


Fig 9



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UNITED STATES PATENT OFFICE.

EUGENE L. HARRISON, OF CROOKSTON, MINNESOTA.

ELECTRIC RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 448,031, dated March 10, 1891.

Application filed March 4, 1890. Serial No. 342,596. (No model.)

To all whom it may concern:

Be it known that I, EUGENE L. HARRISON, a citizen of the United States, residing at Crookston, in the county of Polk and State of Minnesota, have invented certain new and useful Improvements in Electric Railway Signaling Apparatus; 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 has reference to that class of railway-signals in which the engine or cars actuate an electric circuit to show danger and safety signals.

The object sought to be accomplished is to produce a positive and simple device which will require but slight attention and always denote the presence or absence of trains upon certain sections or blocks of the track; and to this end my invention consists in certain peculiarities and combinations of parts more fully described hereinafter, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 represents a track equipped with my device; Fig. 2, a view of one of the signal-boxes and the circuit opening and closing jaws in the act of being opened by a passing locomotive; Figs. 3 and 4, enlarged detail views of the post provided with my circuit-actuating jaws and the electro-magnetic signaling apparatus connected therewith; Fig. 5, a separate view of one of the boxes containing the electro-magnetic apparatus; Fig. 6, an enlarged top view of said apparatus. Fig. 6^a is a vertical section thereof; Fig. 7, an enlarged front elevation thereof, and Fig. 8 my invention as applied to a railway-crossing. Fig. 9 is a vertical section corresponding to Fig. 6^a, showing the electro-magnetic apparatus employed in the system shown in Fig. 8.

The electro-magnetic mechanism for actuating the signals is placed within an upright box or other suitable shelter A, which is located at the side of the track at the beginning and ending of the blocks 1 2 3. It will be seen in Figs. 6, 6^a, and 7 that this mechanism comprises a vertical spindle C, pivoted

within the chamber D in the upper part of the box A. This spindle is surmounted by a signal E, and it also carries a fixed horizontal disk F, having four catches G upon its periphery, which engage a trip H, connected with and actuated by the armature I of the electro-magnets J. The vertical spindle C is rotated by the clock mechanism K, which is operated by the weight L.

In order to give notice that the clock mechanism has run down, an indicating device is provided. This consists in the present instance of a red flag M, suspended from a cord N, which has its opposite end secured to wind upon the spindle C, so that the cord will become wound up sufficiently upon the spindle to raise the flag opposite the window O, where it will be readily seen and show that the machine needs rewinding. The rewinding operation is performed by the key g.

The trip H consists of an upright bar supported upon the trunnions P, pivoted in adjustable bearings Q. The armature I is secured to the pivoted trip, so that when the former is attracted by the magnets the latter will be drawn away from the catches G upon the disk F, thereby releasing the spindle in the manner to be described hereinafter. The trip is normally held against the edge of the disk by means of a coil-spring R, having one end secured to the upper free end of the trip and the other end to a horizontal arm S, which passes transversely through the post T and is adjustably secured thereto by the set-screw t. This arrangement permits the spring to be given any desired tension. The spring should always have sufficient force to keep the trip drawn against the periphery of the disk when the armature is released by the withdrawal of the current from the electro-magnets, but not enough force to prevent the latter from attracting the armature when the electro-magnets are energized.

A cut-out and lightning-arrester U, of the usual or any suitable form, is located within the box A below the coil and clock mechanism and can be used when occasion demands.

Insulated posts V are located at or near the signals A and alongside the track W. These posts are provided with a pair of metal jaws

X X', formed of elongated pieces of heavy wire, with their ends curved outwardly to receive a round arm Z, projecting from the side of the passing locomotive. The jaw X, Fig. 2, is connected with the incoming or nigh wire *b*, and the jaw X' with the outgoing or far wire *b*, from which it is clear that when the jaws are separated the nigh wire *c* will take the current from nigh wire *b* and carry it through the far wire *c* and far wire *b*. This arm is composed of any suitable non-conducting material, which, as it passes between the jaws, will positively break the closed circuit. The lower jaw X' is rigidly secured to the cross-piece *a*, and the upper jaw X is hinged and rests by its own gravity upon the lower one, so that the two when closed form a part of the main circuit *b*.

In Fig. 1 it will be seen that the track is provided with two normally-closed electric circuits, a main circuit *b*, and several branch circuits *c*, and these latter represent the sections 1 2 3, and so on, into which the main circuit is divided. The electro-magnets for actuating the signals are located within the branch circuits *c*, so that a current passing over these will actuate them.

When thus constructed my device operates as follows: As the engine leaves section 1 and enters upon section 2 the projecting arm Z passes between the jaws X X', spreads them apart, breaks the main circuit *b*, and diverts the current around the branch circuit *c*, as shown by arrows in Fig. 1, and in so doing energizes the electro-magnets, which attract the armature I, thereby withdrawing the trip H for an instant from the quarterly catches G upon the disk and allowing the clock mechanism to give the spindle a quarter-turn to shift the signals guarding both ends of section 2 to "danger." While the engine is upon section 2 the signals at both ends thereof remain turned to "danger;" but upon leaving the terminus of this section the projecting arm upon the passing locomotive opens the jaws upon the succeeding post, thereby again breaking the circuit, energizing the electro-magnets, and giving the spindle and signal a quarter-turn to signify "safety." Immediately upon entering section 3 the operation of diverting the current to the branch circuit is repeated and the signals are again turned to "danger." Hence it will be seen that each opening of the jaws releases the spindle and gives the signal a quarter-turn, thereby alternately denoting either "safety" or "danger" upon the section occupied, and, further, at each opening of the jaws the current is confined to or between intermediate points along the main wire and only operates between such points during the brief time that the projecting arm is holding open the jaws. At crossings a single continuous closed circuit is provided, as shown in Fig. 8, so that when the engine enters within the inclosure shown the jaws will be

opened, the circuit broken, and all the signals set at "danger," as the wires are all connected, until the circuit is again broken by the engine when it reaches the opposite side of the crossing, whereupon the signals will be returned to "safety."

In this form of my invention the position of some of the parts of the electro-magnetic apparatus is reversed, so that they will operate properly with a normally-closed circuit.

Referring to Fig. 9, it will be seen that the trip H is drawn normally against the disk F by the action of the magnet on the armature I, secured to the trip, and is drawn away (when the current is broken) by the spring R to permit the proper signal.

It is evident that my invention might be changed in many slight ways which would suggest themselves to a skilled mechanic. Therefore I do not limit myself to the exact construction herein shown, but consider myself entitled to all such variations as come within the scope and spirit of the invention.

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

1. In a railway signaling apparatus, a series of electro-magnetic signals included within a branch circuit, in combination with a main circuit provided with opening and closing jaws located at intervals along the circuit and a moving object adapted to traverse a contiguous track and to actuate the jaws, in the manner and for the purpose substantially as described.

2. In a railway signaling apparatus, a main circuit provided with opening and closing devices arranged therein and branch circuits connected therewith, in combination with an electro-magnetic signaling mechanism consisting of an electro-magnet, a trip actuated by said magnet, a rotary spindle normally held in check by said trip, clock mechanism for actuating the spindle, and an auxiliary signal arranged to show when said clock mechanism needs rewinding, as and for the purpose substantially as described.

3. The combination, in an electric signaling apparatus for railways, of a main circuit running contiguous to the track, opening and closing devices arranged within the circuit, branch circuits having electro-magnetic signals located at the beginning and ending of each, and a moving object provided with an arm arranged to actuate the opening and closing devices, as and for the purpose substantially as described.

4. In an electric signaling apparatus, a main circuit containing a series of jaws through which the current passes, posts or suitable supports for said jaws, branch circuits containing electro-magnetic signals actuated by the opening and closing of the jaws, and a moving object adapted to open said jaws, in the manner and for the purpose substantially as described.

5. In an electric signaling apparatus, the combination, with a main circuit provided with opening and closing devices, of a series of branch circuits containing electro-magnetic signaling devices and an opening device located upon the engine or train, whereby the current will be diverted from the main line to each branch circuit whenever the jaws are

actuated in the manner and for the purpose described.

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

EUGENE L. HARRISON.

Witnesses:

C. F. PAGE,

A. A. MILLER.