

(No Model.)

2 Sheets—Sheet 1.

C. W. PRIDHAM.

RAILWAY SIGNAL.

No. 352,571.

Patented Nov. 16, 1886.

Fig: 2.

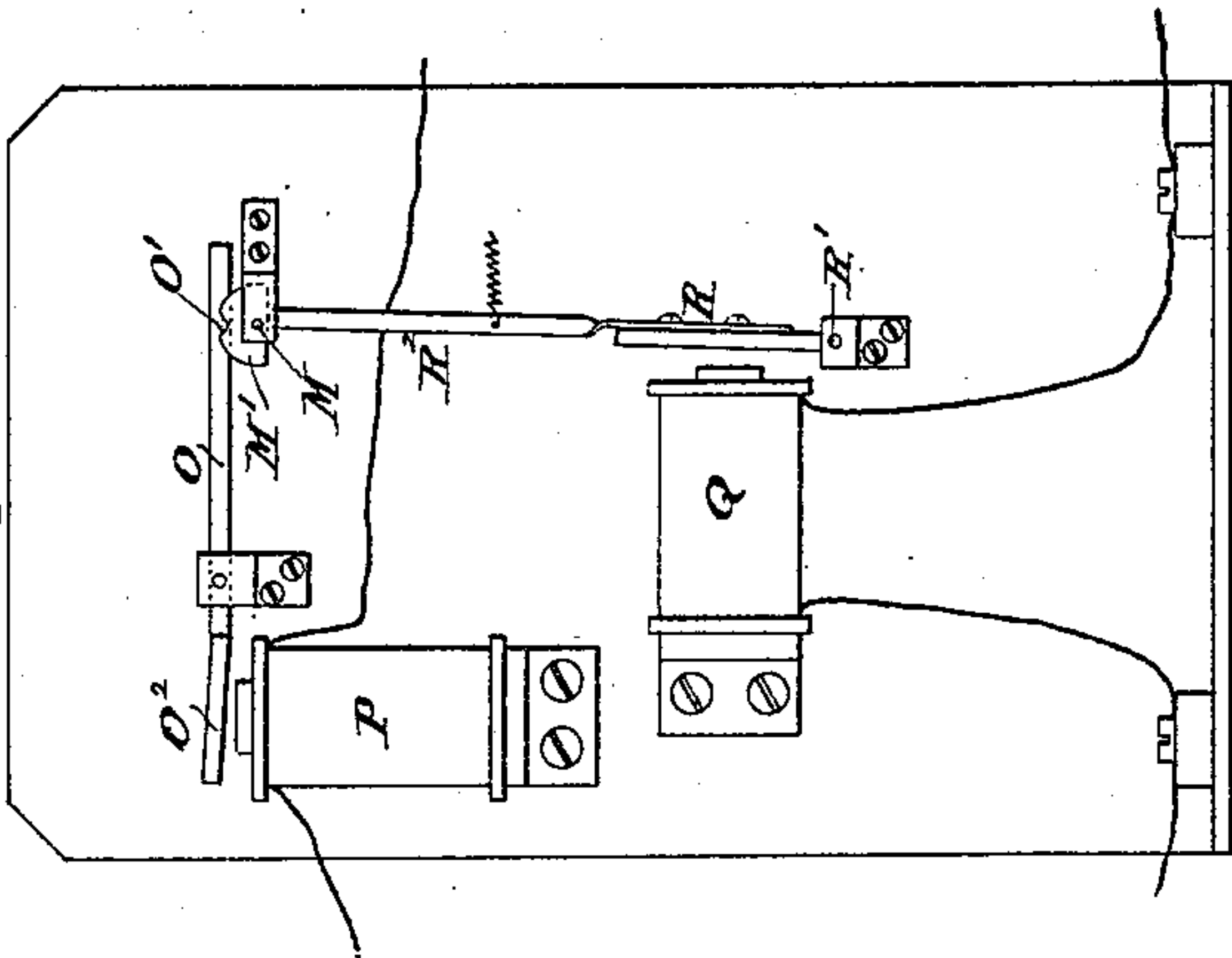
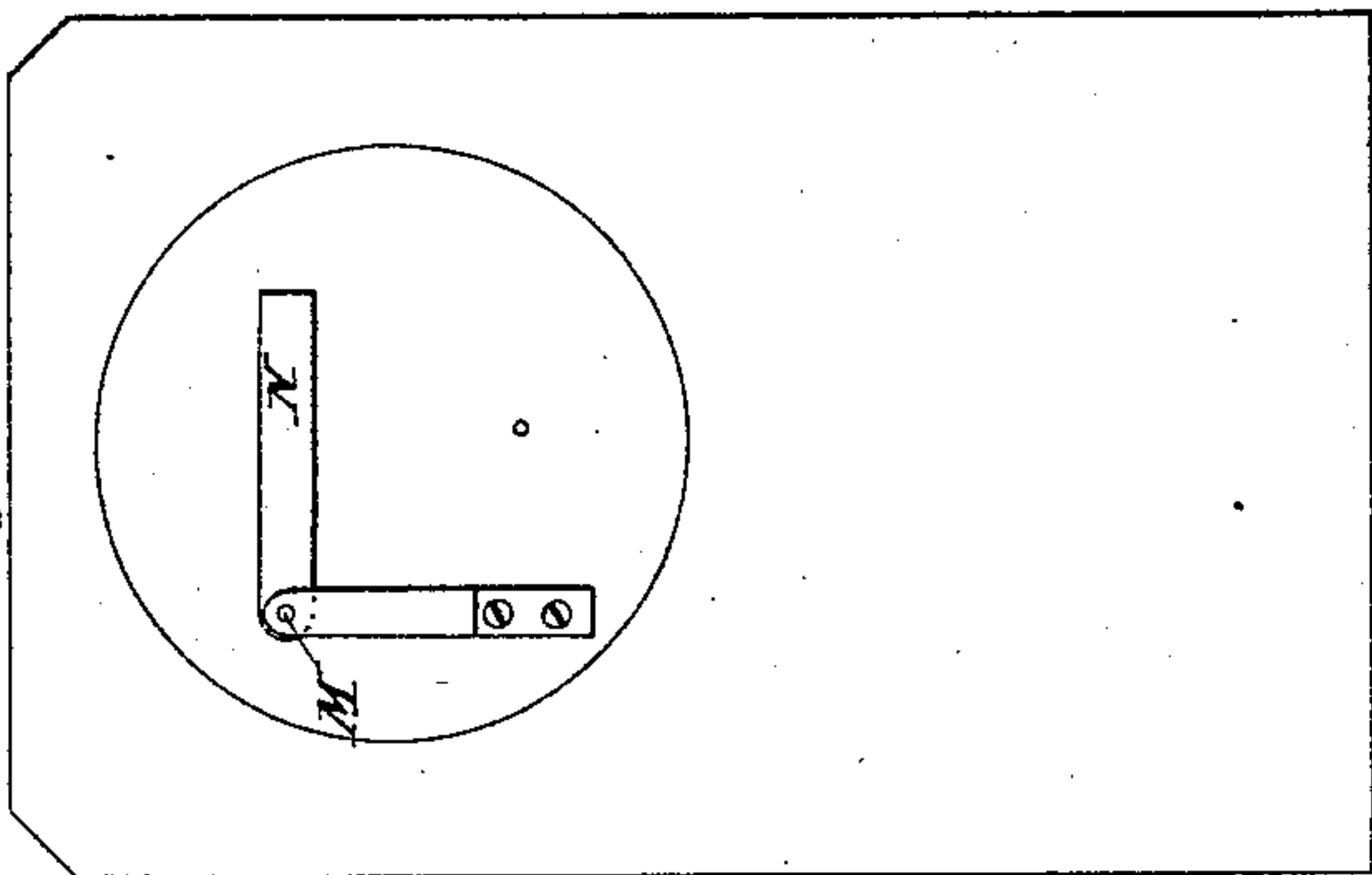


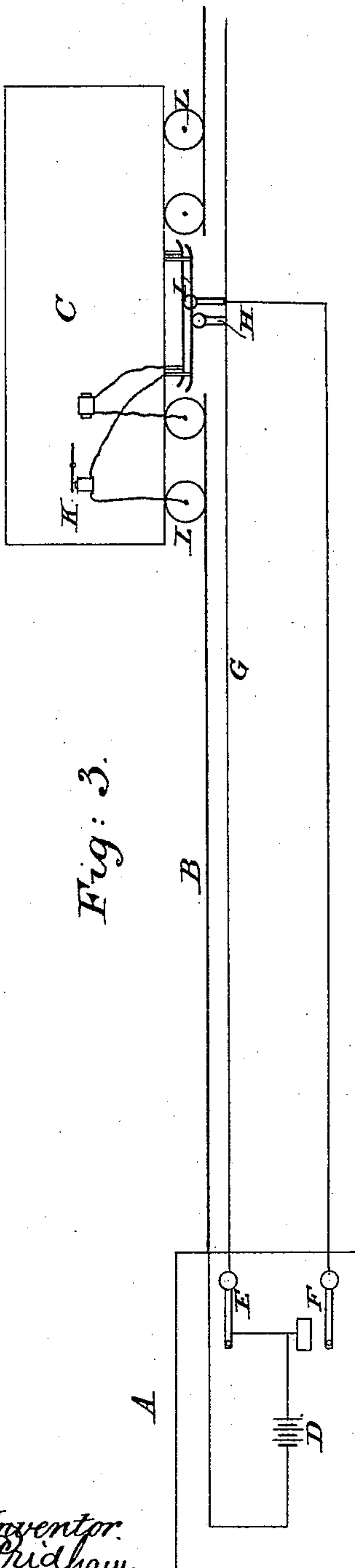
Fig: 1.



Witnesses:
E. C. Davidson.
L. B. Wright

Charles William ^{Inventor.} Pridham
by his Attorneys
Baldwin, Hopkins & Pease.

Fig: 3.



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Fig: 4.

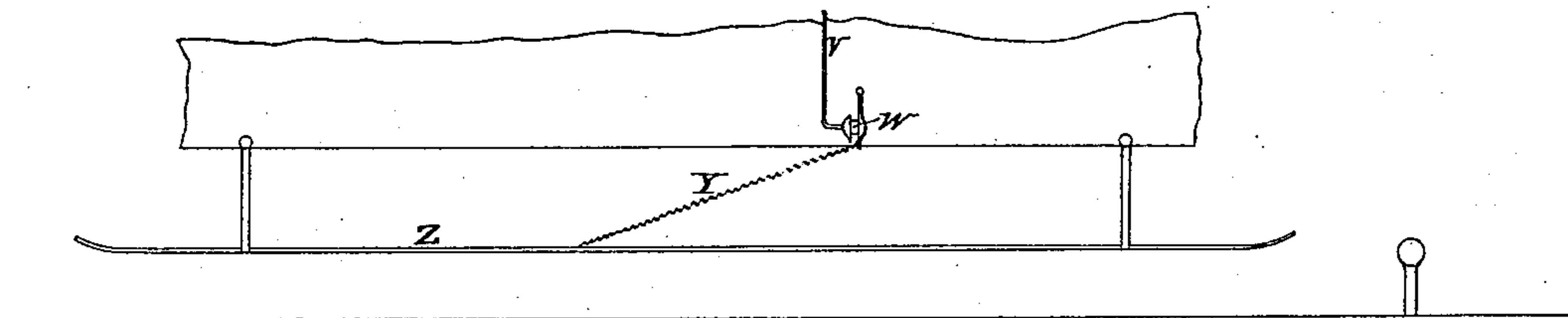


Fig: 5.

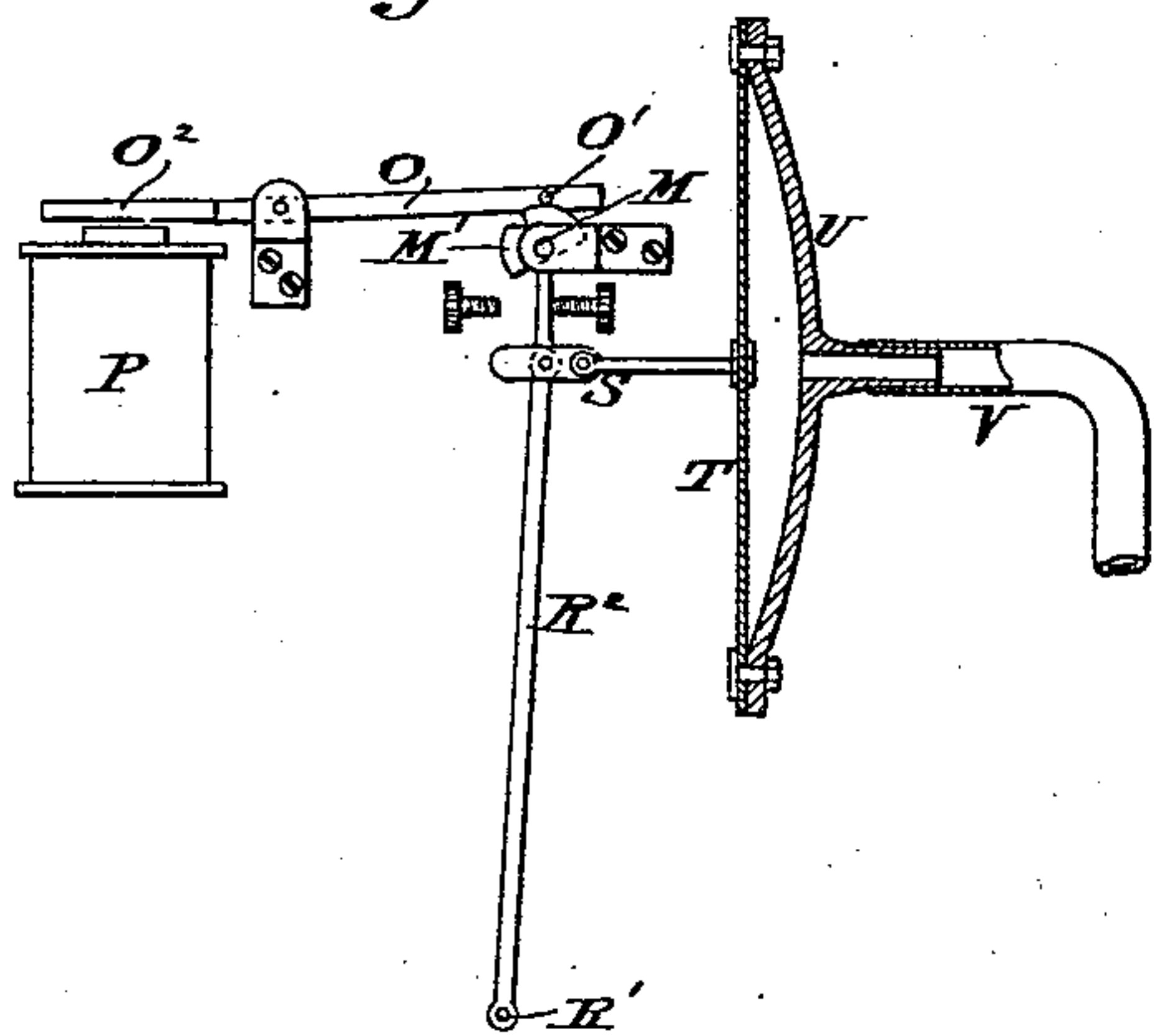
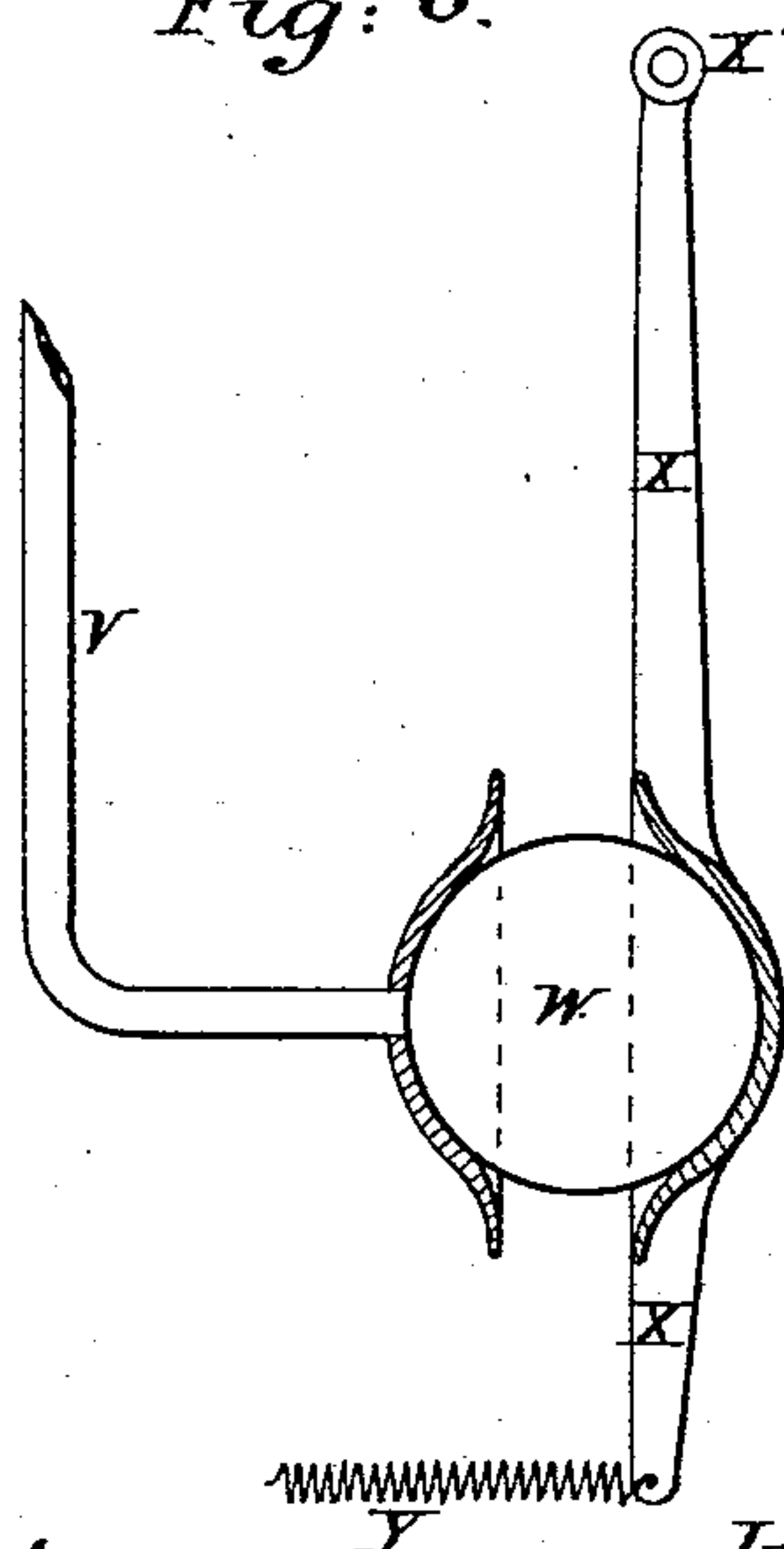


Fig: 6.



Witnesses
E. Davidson
L. B. Night

Inventor.
Charles William Pridham
By his Attorneys
T. Baldwin, Hopkins & Phipps

UNITED STATES PATENT OFFICE.

CHARLES WILLIAM PRIDHAM, OF EARLS COURT ROAD, COUNTY OF MIDDLESEX, ENGLAND.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 352,571, dated November 16, 1886.

Application filed October 21, 1885. Serial No. 180,557. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WILLIAM PRIDHAM, a subject of the Queen of Great Britain, residing at 62 Hogarth Road, Earls Court Road, in the county of Middlesex, England, physician, have invented certain new and useful Improvements in Train-Signaling on Railways, of which the following is a specification.

10 The object of my invention is to enable an operator at a station or in a signal-cabin to transmit electric telegraphic signals to the driver of a train, especially such signals as are required to instruct the driver whether to stop
15 or to proceed. These signals are received upon an instrument provided on the train, and preferably on the engine within sight of the engine-driver. Among the advantages derived are that the signals cannot be obscured
20 by fog, and can be transmitted without difficulty for longer distances than by the semaphore apparatus in common use. The instrument upon the train is provided with a signal arm or indicator, which is connected with the
25 armature of an electro-magnet in such manner that when an electric current passes in the coils of the magnet and the armature is attracted the signal arm or indicator is brought to a position which indicates "safety" or "go
30 on." The current to produce this effect is transmitted from a signal cabin or station by means of an ordinary circuit-closing key, with which the signal-man is provided. The current passes from a battery, through the
35 key and a line-wire, to a contact-post by the side of the line of railway. The train carries a metal bar, which rubs over the insulated head of the contact-post, and the current passes from the head of the post to the
40 contact-bar, thence to the electro-magnet above mentioned to the metal work in connection with the wheels. The wheels lead the current to the rails, and the current returns by earth to the battery. The signal arm or in-
45 dicator is brought to the "danger" or "stop" position, when required, by other and independent apparatus. That which I usually employ is simply a repetition of the apparatus already described, and comprises another line-
50 wire, a key, another contact post or posts on

the line, and another electro-magnet in the instrument on the train. The only material difference is that the armature of the latter electro-magnet is differently connected with the signal arm or indicator, and when attracted
55 places it at the "danger" or "stop" position; but in place of this arrangement, by which the signal arm or indicator is set by electrical means to the "danger" or "stop" position, it may be so set by means of parts
60 moved mechanically when a bar or instrument on the train strikes against a post by the side of the line.

In the drawings, Figure 1 is a front view, and Fig. 2 is a back view, of the instrument
65 on the train. Fig. 3 is a diagram of the circuit arrangements. Fig. 4 is an elevation of a contact-bar on the train and a contact-post on the line. Figs. 5 and 6 show a modification, and are sectional elevations of mechanism
70 for setting the signal arm or indicator to the "danger" or "stop" position without the aid of an electric current. These parts are also indicated in Fig. 4.

In Fig. 3 the inclosure (marked A) represents the signal cabin or station. B represents
75 one of the rails of the railway; C, a vehicle running thereon; D, a battery; E and F, two finger-keys; G, an insulated line-wire; H, a contact-post by the side of the line; I, a con-
80 tact-bar carried by the train. K is the instrument containing the electro-magnet, the armature of which when attracted puts the signal-arm to the "go on" or "safety" position. L are the wheels of the train. With the parts
85 in the positions indicated in the figures, the circuit is closed, and it can be readily traced from D by E, G, H, I, K, L, and B back to D, the battery D and the rails B both being connected to earth. The signal arm or indicator
90 on the vehicle consequently assumes the "safety" or "go-on" position. The other key, F, is in connection, in a precisely similar manner, with another line-wire and another contact post or posts on the line which come in con-
95 tact with another contact-bar on the train connected with another electro-magnet, whence the circuit is completed by the wheels L and rails B, as before. The sole difference is that the armature of the second electro-magnet is
100

so connected with the signal arm or indicator that when it is attracted the signal arm or indicator is brought to the "danger" or "stop" position. This I will proceed more fully to explain in reference to Figs. 1 and 2, which show in detail the instrument marked K in Fig. 3.

M is an axis on which is fixed the signal arm or indicator N. It is shown in the figure in the "danger" or "stop" position, and it is retained there by a pin, O', on a lever, O, which is now engaged in a notch in a half-wheel, M', fixed on the axis M. The lever O carries an iron armature, O'', immediately over the poles of the electro-magnet P. This magnet is in the circuit D E G H I K L B. When the circuit is closed, the magnet attracts its armature, the pin O' is lifted, and the signal arm or indicator falls by its own weight to the "safety" or "go on" position. Q is another electro-magnet. Its coils are in the duplicate circuit, or that through the second line-wire. This circuit is entirely separate from the first, except that the same battery may serve, and the return in both cases is by the wheels and rails and the earth connection which the rails form.

There are separate contact-posts and contact-bars, and preferably these are at a distance from the first toward the other side of the line. When the key F is closed and the corresponding contact-bar is against its contact-post, the magnet Q attracts its armature R. The armature R has its fulcrum at R', and it carries an arm, R'', which acts against the under side of the half-wheel M'. When the armature R is attracted, the half-wheel M' is partly rotated, the signal arm or indicator is raised, and the pin O' drops in and retains it until the lever O is again lifted by the magnet P to give the "safety" or "go on" signal. In this arrangement the "danger" or "stop" signal is given only when the key F is closed, and the "safety" signal only when the key E is closed; or a single double-acting key may be employed.

Various sorts of contact-makers may be employed; but that which I prefer consists of a light T-iron bar—say about twelve feet long. It is hung horizontally beneath the tender of one of the carriages of the train, about a foot within the line of one of the rails and the same distance from the road. The flat of the T is on the under side, and the ends of the bar are curved upward, so as to rise three or four inches above the middle of the bar.

The bar may be hung underneath the carriage by leather straps, or in any other convenient way which insures sufficient insulation and allows the bar to swing freely. The contact-makers on the train work in connection with posts arranged in pairs along the line of railway—one toward the right side of the line, the other to the left. The heads of these posts are globular and of cast-iron. They stand to a height about an inch to an inch and a half above the under surface of the T-iron

bar, so that the head of the post with certainty comes into contact with the under side of the bar and establishes good electrical contact as the train passes. The globular head of each post is insulated, and is electrically connected with the line-wire. In the modification illustrated by Figs. 5 and 6 the key F and the line-wire connected with it are dispensed with, while the corresponding contact-posts and contact-bar on the train are retained, but they have no electrical connections. The electro-magnet Q also is dispensed with, but the arm R'', with its fulcrum R', is retained. A link, S, connects it with a flexible diaphragm, T, which closes a cup-like vessel, U, from which a pipe, V, passes to the interior of the india-rubber ball W. The ball W is held between two concave surfaces, of which one is movable, being mounted on a lever, X, having its fulcrum at X'. A long coiled spring of wire, Y, connects the lever X with the contact-bar Z. (Shown in Fig. 4.) This contact-bar Z is without electrical connection, but when it is moved by coming against a contact-post the ball W is pressed. The air expelled from the ball then deflects the diaphragm T, and moving the arm R'' raises the signal arm or indicator to the "danger" or "stop" position. This will take place each time the post is passed, but the signal arm or indicator will at once be taken down again in the manner already described, if the "danger" or "stop" signal is not required.

What I claim is—

1. The combination of apparatus for train-signaling, consisting of the following parts: at the signal-cabin a battery and finger-keys for applying the battery to one or other of two line-wires, on the line the said insulated line-wires and contact-posts connected therewith, and on the train a semaphore-arm or like signal apparatus; also two contact-bars making contact with the contact-posts, and means for raising the signal to allow it to be latched in the "danger" position, and independent apparatus for lifting the latch when the signal is not required to be retained.

2. The combination of apparatus for train-signaling, consisting of the following parts: at the signal-cabin a battery and a finger-key for applying the battery to a line-wire; on the line the said insulated line-wire and a contact post or posts connected therewith, and on the train a semaphore-arm or like signal and mechanical apparatus for raising the signal as the train passes a contact-post; also a contact-bar making contact with the contact-posts, and an electro-magnet or equivalent instrument for lifting the latch when the signal is not required to be retained.

CHARLES WILLIAM PRIDHAM.

Witnesses:

GEO. J. B. FRANKLIN,

HERBERT E. DALE,

Both of 17 Gracechurch St., London, E. C.