(No Model.) 2 Sheets—Sheet 1.

C. A. STONE & E. S. WEBSTER.

ELECTRIC RAILWAY SWITCH.

No. 485,668. Patented Nov. 8, 1892.

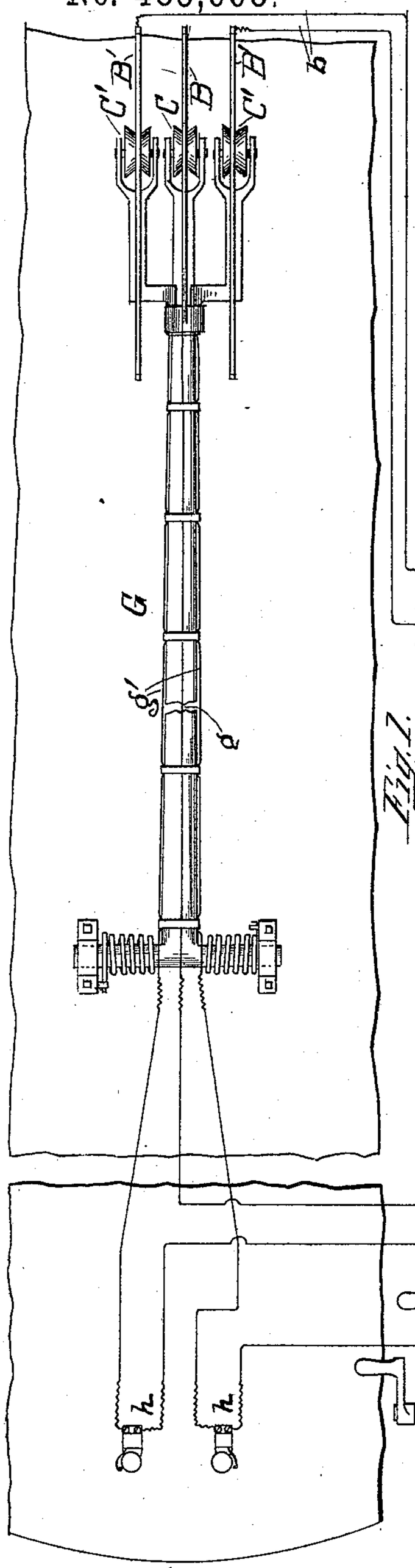

Fig. 1.

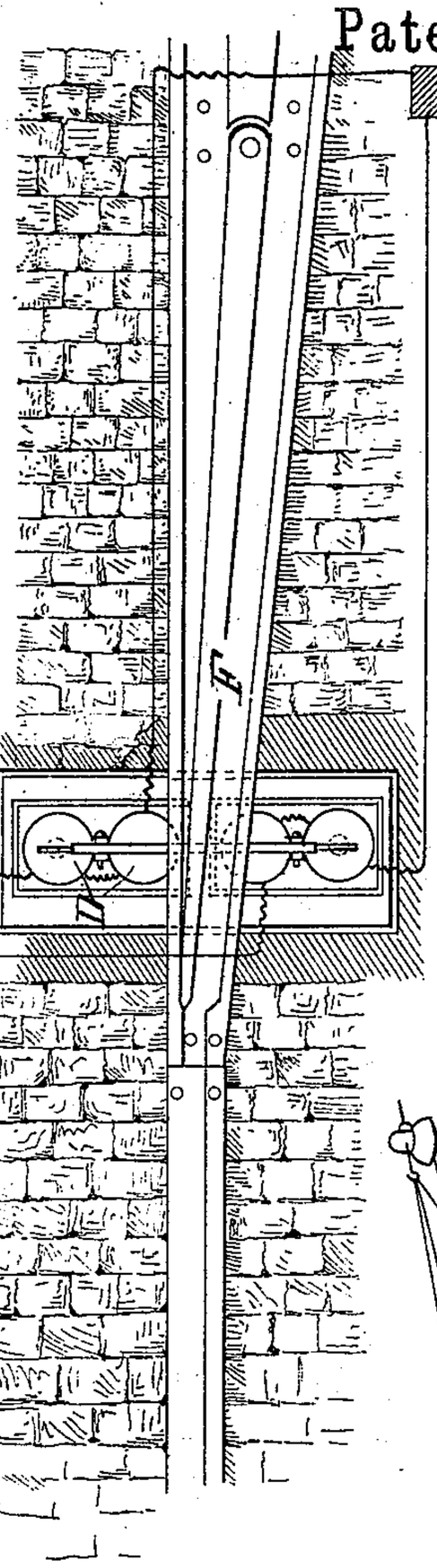

Fig. 2.

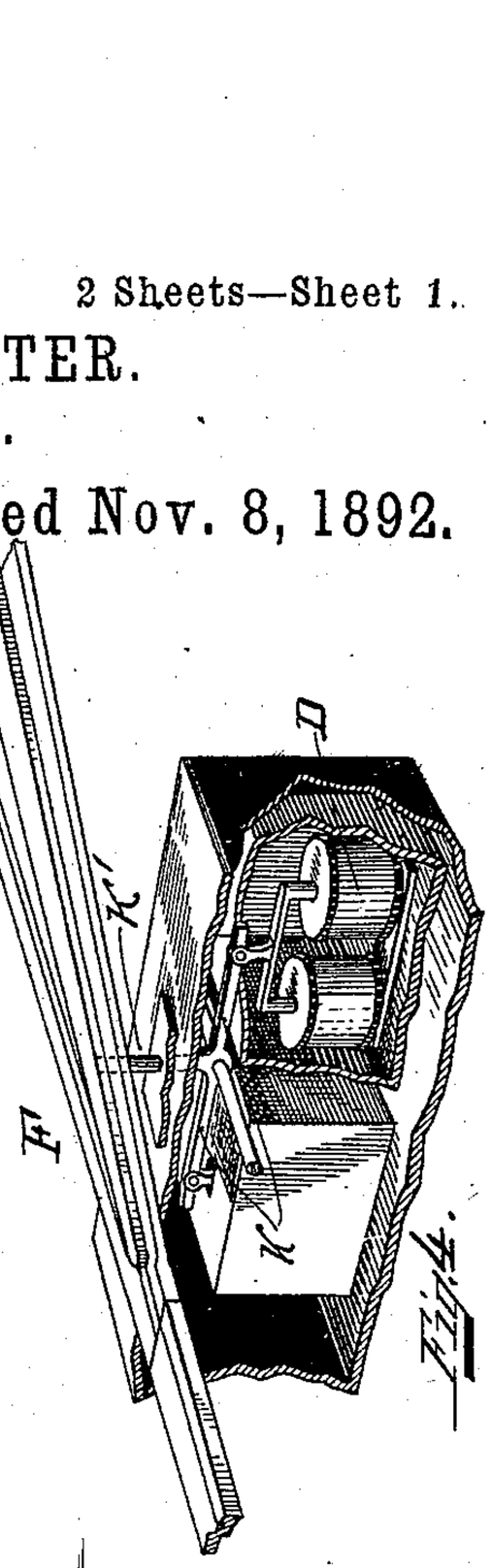

Fig. 4.

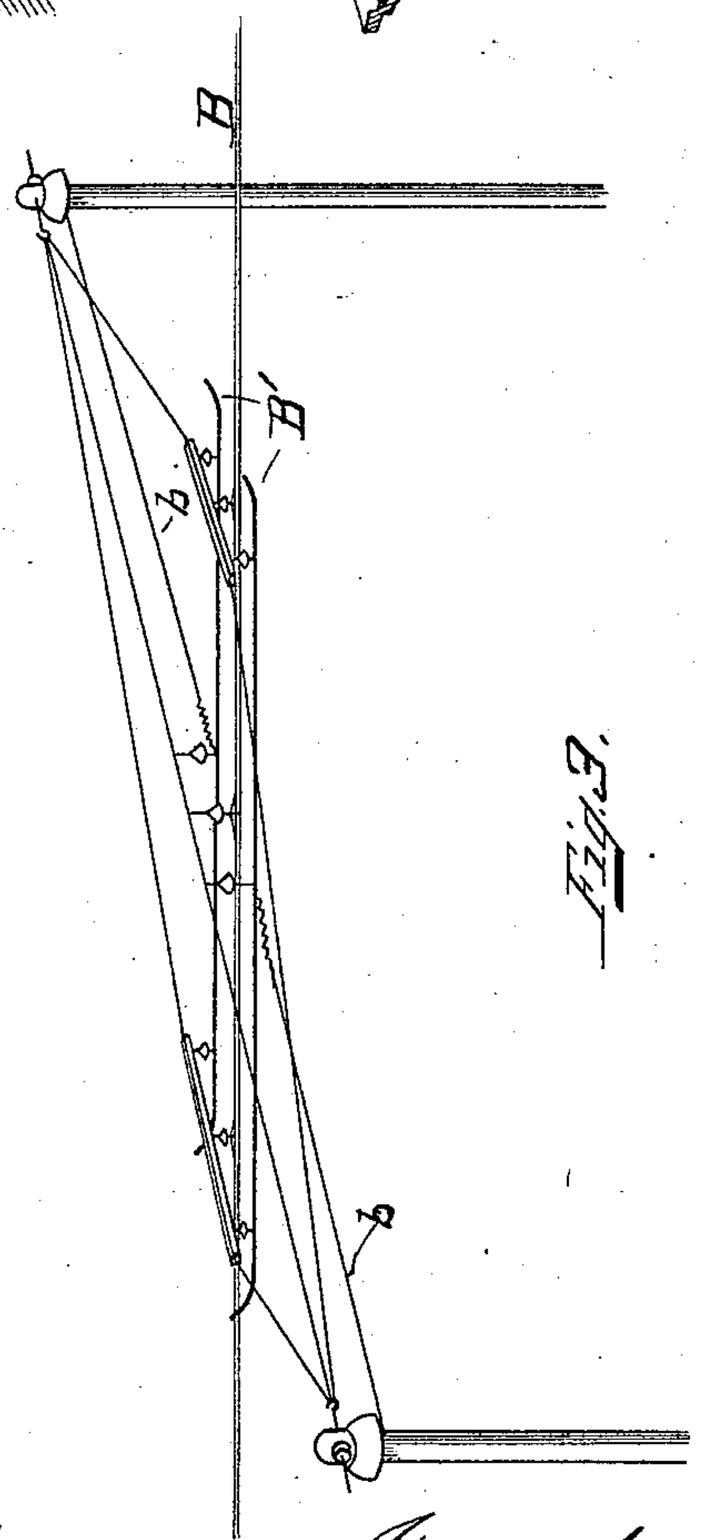

Fig. 3.

Witnesses.
Harold B. Linney
Walter J. Hand

Inventors
Chas. A. Stone & Edwin S. Webster.
by G. H. Plympton atty

(No Model.) 2 Sheets—Sheet 2.

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ELECTRIC RAILWAY SWITCH.

No. 485,668. Patented Nov. 8, 1892.

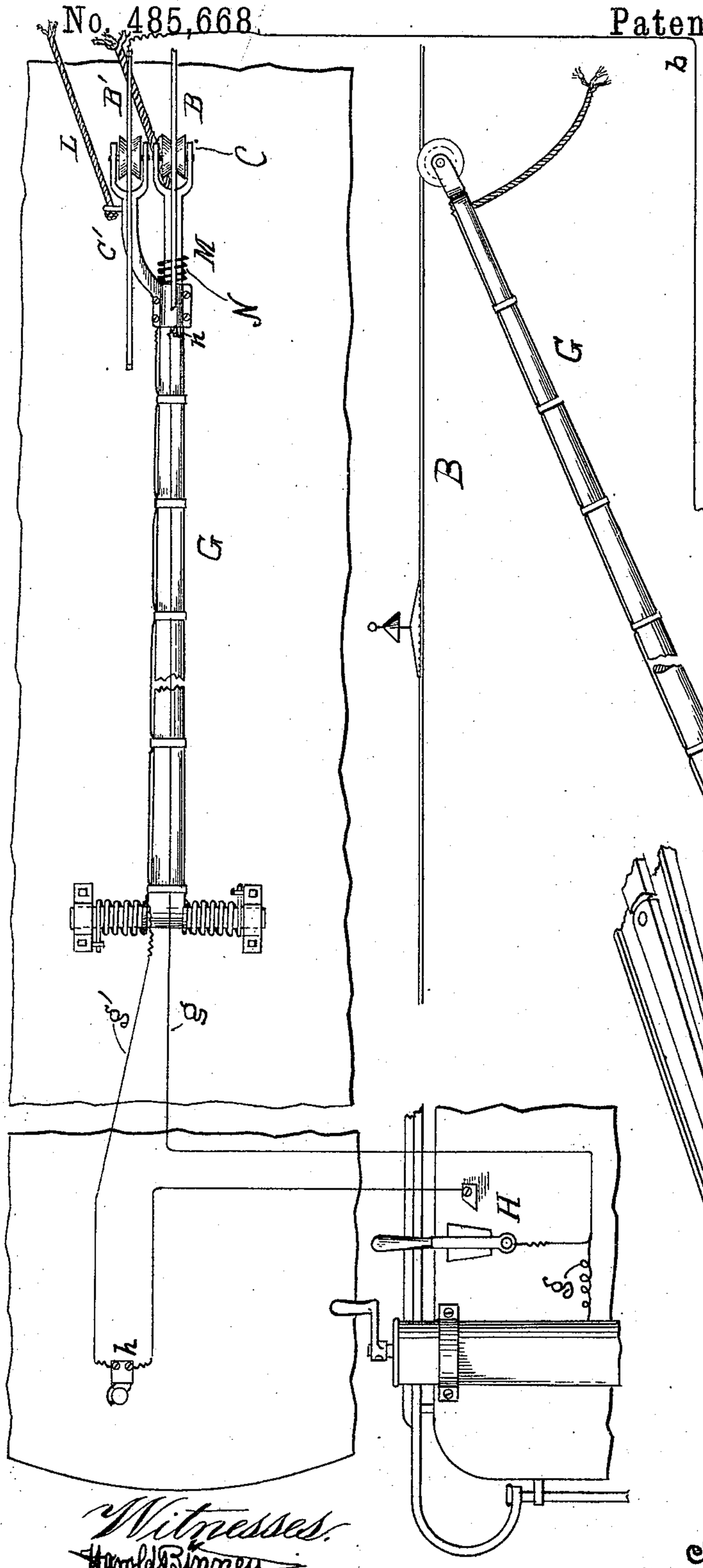

Fig. 1.

Fig. 2.

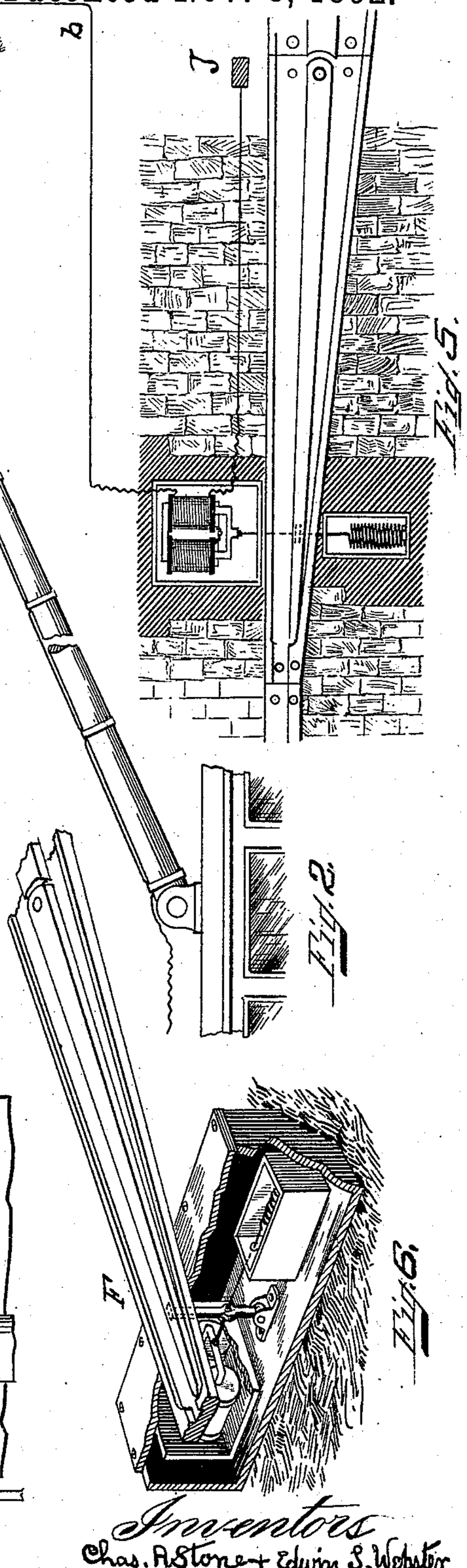

Fig. 5.

Fig. 6.

Witnesses.
Harold Binney
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Inventors
Chas. A. Stone & Edwin S. Webster
by G. W. Phillips
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UNITED STATES PATENT OFFICE.

CHARLES A. STONE AND EDWIN S. WEBSTER, OF BOSTON, MASSACHUSETTS.

ELECTRIC-RAILWAY SWITCH.

SPECIFICATION forming part of Letters Patent No. 485,668, dated November 8, 1892.

Application filed October 30, 1890. Serial No. 369,819. (No model.)

To all whom it may concern:

Be it known that we, CHARLES A. STONE and EDWIN S. WEBSTER, residents of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electrical-Railway Switches, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Our invention relates to electrical railways, particularly those having overhead conductors; and it consists in the means of operating switches constructed, arranged, and combined substantially in the manner herein shown, described, and claimed.

The object of our invention is to provide suitable means for controlling the track-switches directly from the moving car. We effect this by operating the track-switch tongues by an electric current controlled by a switch on the moving car and taken from the car by a supplemental trolley or brush to overhead conductors connecting with electro-dynamic means for moving the track-switch tongues.

In the accompanying drawings, Figure 1 is a view of the several parts of our device diagrammatically arranged and showing the trolley mechanism and track-switch in plan. Fig. 2 is a side elevation of the trolley and trolley-arm. Fig. 3 is a perspective of the overhead conductors. Fig. 4 is a perspective of the track-switch. Fig. 5 is a diagrammatic view of a modified form of our invention, and Fig. 6 a perspective view of a part of the same.

Like letters of reference indicate like parts.

B is the overhead conductor from source of power, and C the trolley-wheel for taking current to the car.

B′ are supplemental conductors connected with magnets for operating track-switches and C′ supplemental trolley-wheels for said conductors. These supplemental conductors run parallel to and beside the main overhead line B for any desired distance adjacent to the track-switch to be operated by them, and are connected by wires with solenoids or long-pull magnets D for moving the tongue of the switch F. They may be suspended in any suitable way, as by the cross-braces and hangers shown in Fig. 3.

We prefer, as shown in the drawings, to locate solenoids D of the complete magnetic-circuit type in a box directly under the track-switch and to move the switch by a bell-crank lever K, having operated arms *k*, bearing the armatures, and the operating-arm *k′*, projecting from the box to the switch-tongue. In this manner the box may be practically closed, since the arm moving the switch-tongue is the only moving part entering the box. The remaining terminals of the solenoids or electromagnets are grounded or led to the return-conductor J if one be supplied, which of course is connected through the source of power with conductor B.

Our trolley-arm G is of any desired form, and carries the main current-conductor *g* from trolley-wheel C and the two conductors *g′* from trolley-wheels C′, all three wheels being carried by the one arm. The conductor *g* carries current in the usual way to the car-motor, and is also connected with the movable contact of the hand-switch H. The conductors *g′* are led to two fixed contacts, over which the lever H moves. This is shown in Fig. 1. It will now be seen that while the trolley-wheels C′ are in contact with the conductors B′ a current may be sent to one or the other solenoid of the track-switch by placing lever H on one or the other contacts. The current then flows from wire *g* to lever H back on one wire *g′*, the conductor B′, wire *b*, through solenoid D, to earth or return-circuit. The solenoid or long-pull magnet draws the armature and sets the switch. We include in the conductors *g′* the electric alarm-bells *h h*, which serve the purpose, in case the motorneer fails to shut the current off after passing the switch, of calling attention to the switch, and so preventing the burning out of the solenoid D by the possible too-long continuation of current.

In many cases it is better and simpler to have but one solenoid at each track-switch with an opposing spring. This modification is shown in Figs. 5 and 6. There is then but one supplemental conductor B and but one set of connections and contact. Our track-switch will then be set by the spring in one position and drawn temporarily to the other when so desired for a passing car. Indeed, in this case, being a spring-switch, it would only be necessary to set it electrically in one of the four possible cases—to wit, whenever

in going in one direction it is necessary to temporarily set the switch. The car-wheel itself would place the switch on returning. In Fig. 5 is also shown a cord L, attached to the supplemental trolley to enable the motorneer to withdraw it from position to contact with its wire when not needed. For this purpose it is sleeved to the trolley-arm at M and held in position by the spring N against the wire or the stops *n*. It will be seen that this device may also serve in place of the switch H. It is also obvious that our invention is applicable with but a change of familiar details to other forms of track-switch and to the two-wire overhead or conduit system, and hence these applications are not set forth *in extenso*. Many other uses will doubtless arise wherein any one skilled in the art of electric railways may readily apply our device. We do not therefore limit ourselves to the precise mode of operation or construction of parts, but desire to cover, broadly, our means of operating track-switches electrically without necessitating contacts exposed in the road-bed or proximity thereto. We are aware that such contacts have been suggested, and we do not therefore desire to cover such construction. We are also aware that several inventors have automatically closed the contacts of a fixed switch placed near the track by means of the moving cars and special electro-motive force, and so operated their switches. We, on the contrary, have our switches entirely under the control of the car-operator.

What we do claim is—

1. In combination with the other operating parts of a railway system, a vehicle therefor, a current-switch H upon the said vehicle, an electrically-controlled track-switch, and a source of electric power connected in circuit with the said current-switch, and an alarm-bell or other current-indicator included in such circuit, substantially as and for the purposes set forth.

2. A railway-switch-operating mechanism consisting of a bell-crank lever K, having an arm *k'* for moving the switch-tongue and one or more arms *k*, and one or more solenoids or long-pull magnets for operating the said arms *k*, substantially as and for the purposes set forth.

3. In combination with the main trolley-arm, a supplemental trolley and means, as L, for separately controlling the same, substantially as set forth.

4. In combination with the trolley-arm of an electrically-propelled vehicle, a supplemental trolley and means for pressing the said supplemental trolley with yielding pressure against its trolley-wire or other conductor, and a supplemental trolley-wire for the said supplemental trolley, and a track-switch electrically controlled and connected with the said supplemental trolley-wire, substantially as and for the purposes set forth.

In testimony we have hereunto set our hands, this 20th day of October, 1890, in presence of the subscribing witnesses.

CHARLES A. STONE.
EDWIN S. WEBSTER.

Witnesses:
F. GERTRUDE THWING,
L. J. WEBSTER.