

(No Model.)

2 Sheets—Sheet 1.

JOSE LLORET Y TEPES.
ELECTRIC RAILWAY SIGNAL.

No. 308,845.

Patented Dec. 2, 1884.

Fig. 1.

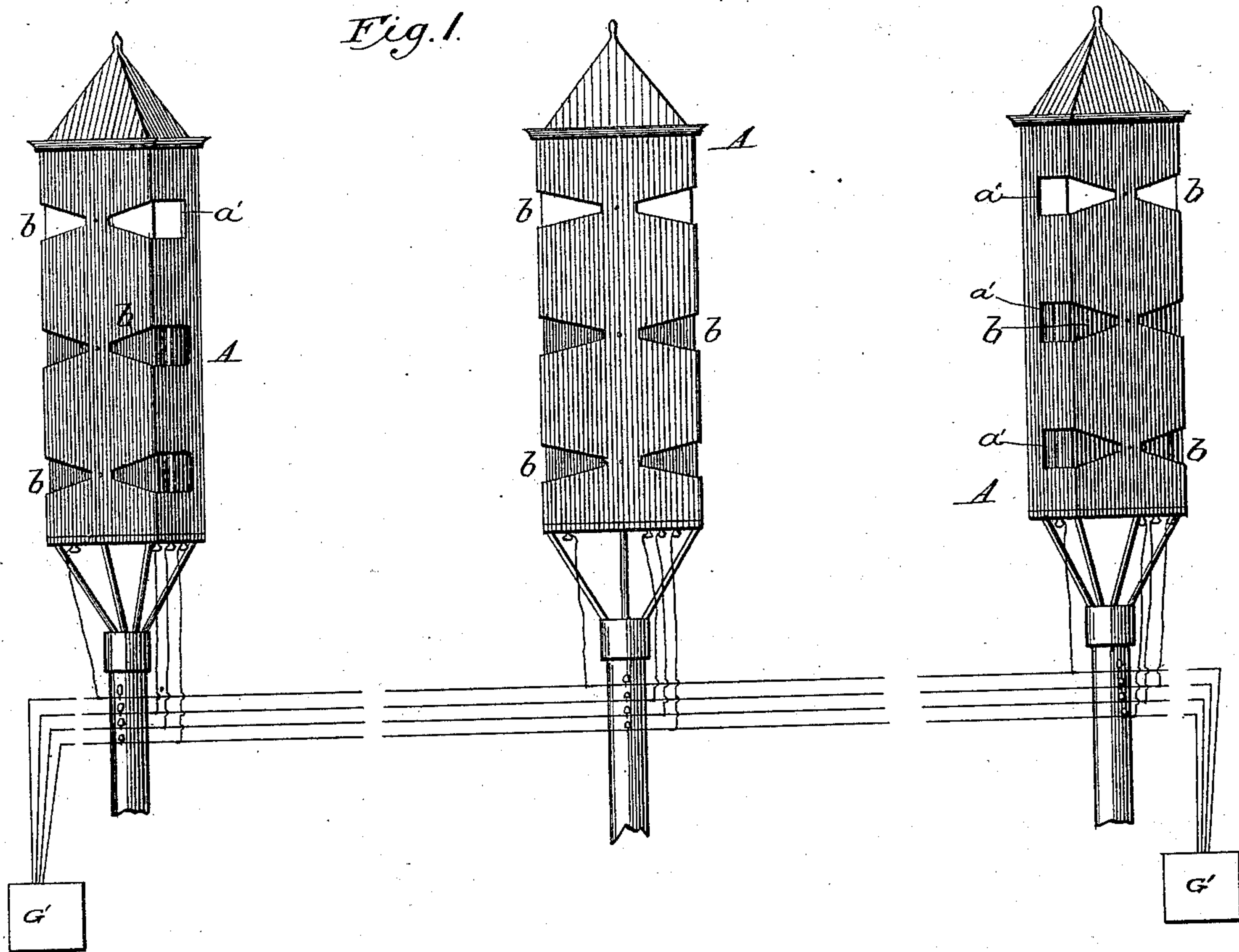


Fig. 2.

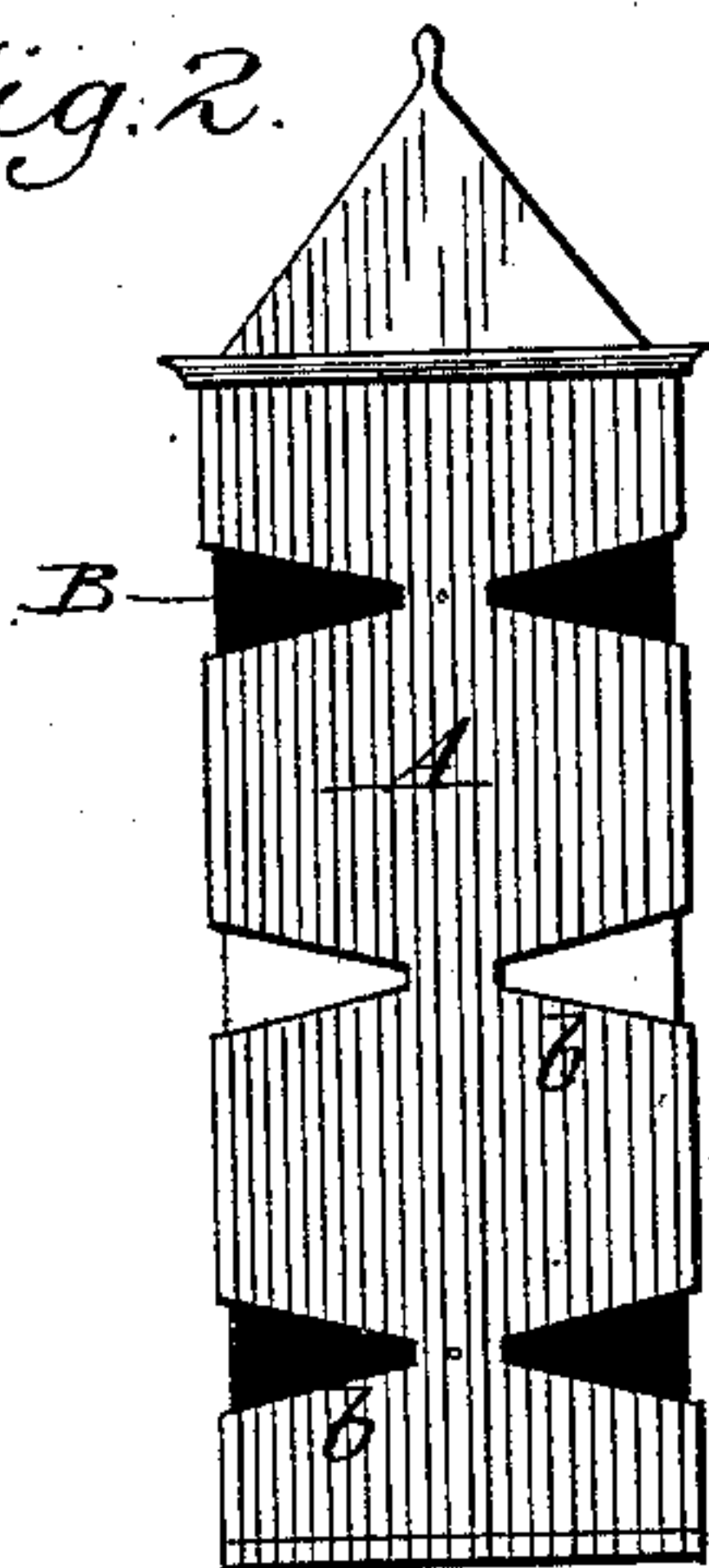


Fig. 3.

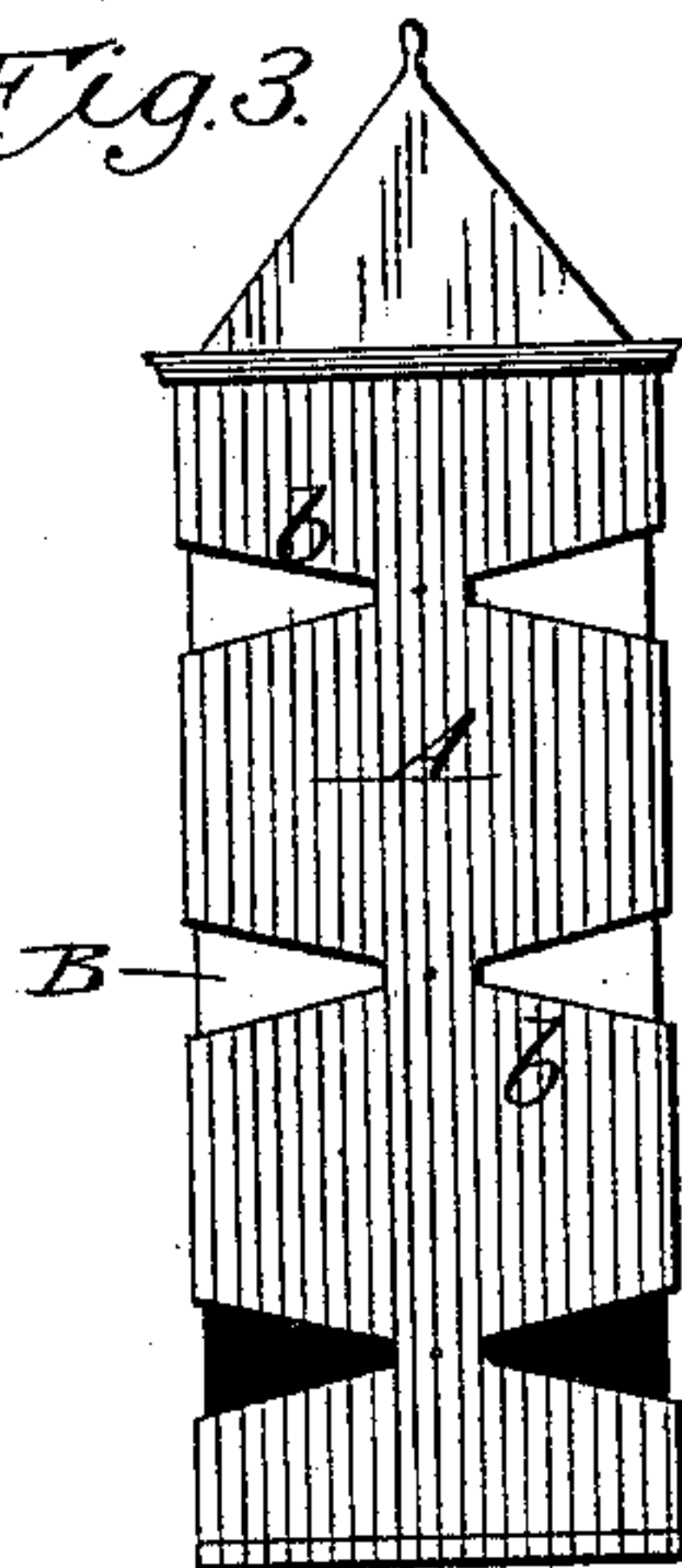
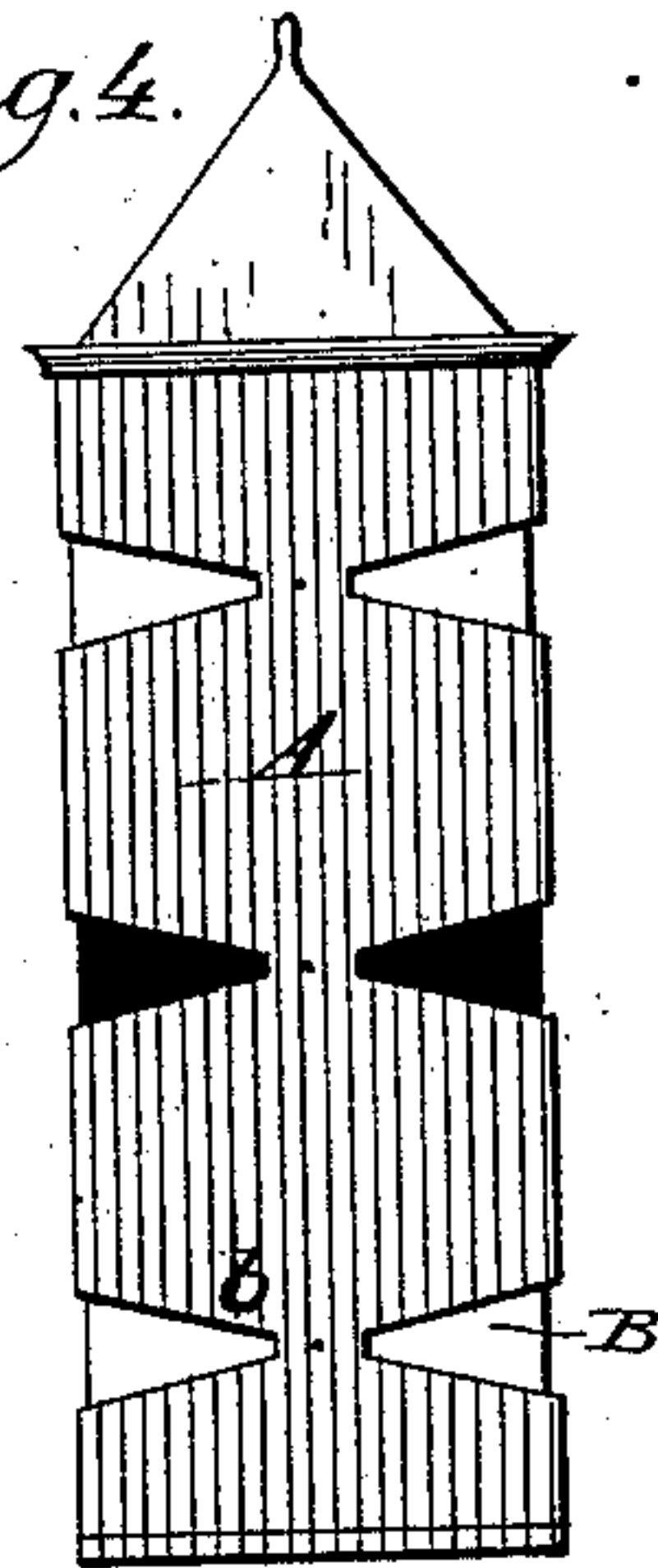


Fig. 4.



WITNESSES

James P. Hollingsworth
Newton Wyckoff

INVENTOR

Jose Lloret y. Tepes.
By P. T. Dodge.
Attorney

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Fig. 5.

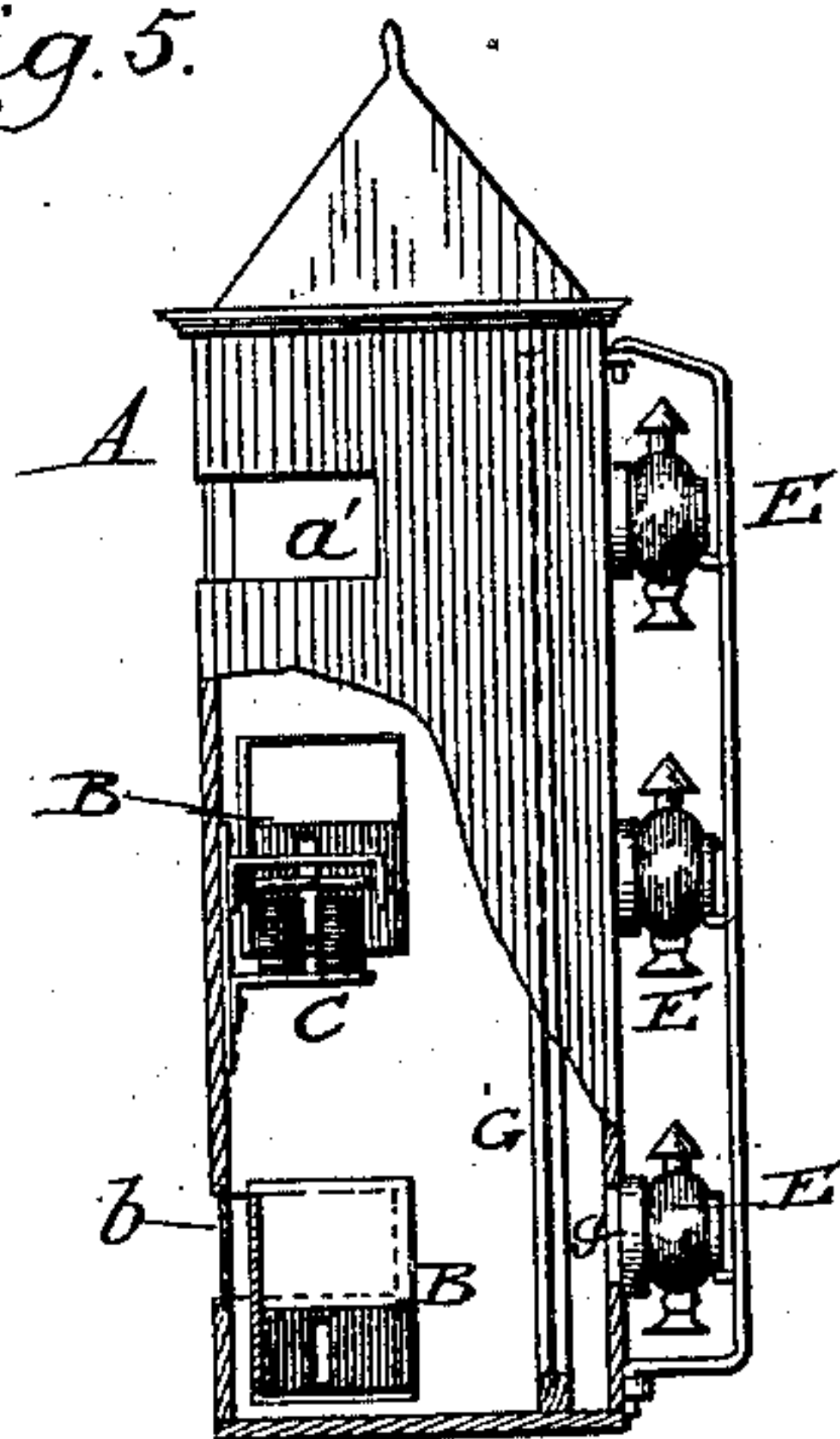


Fig. 6.

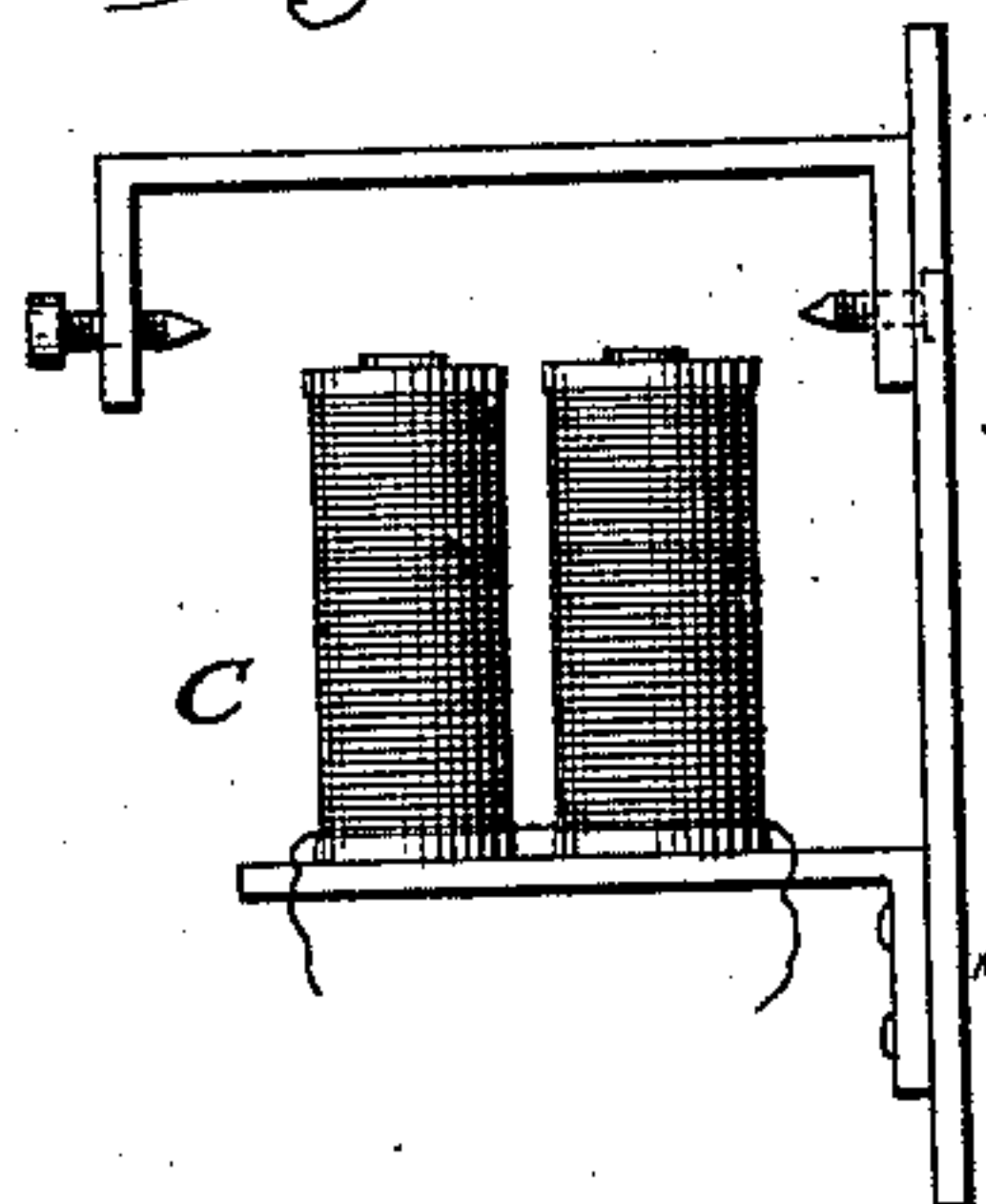


Fig. 7.

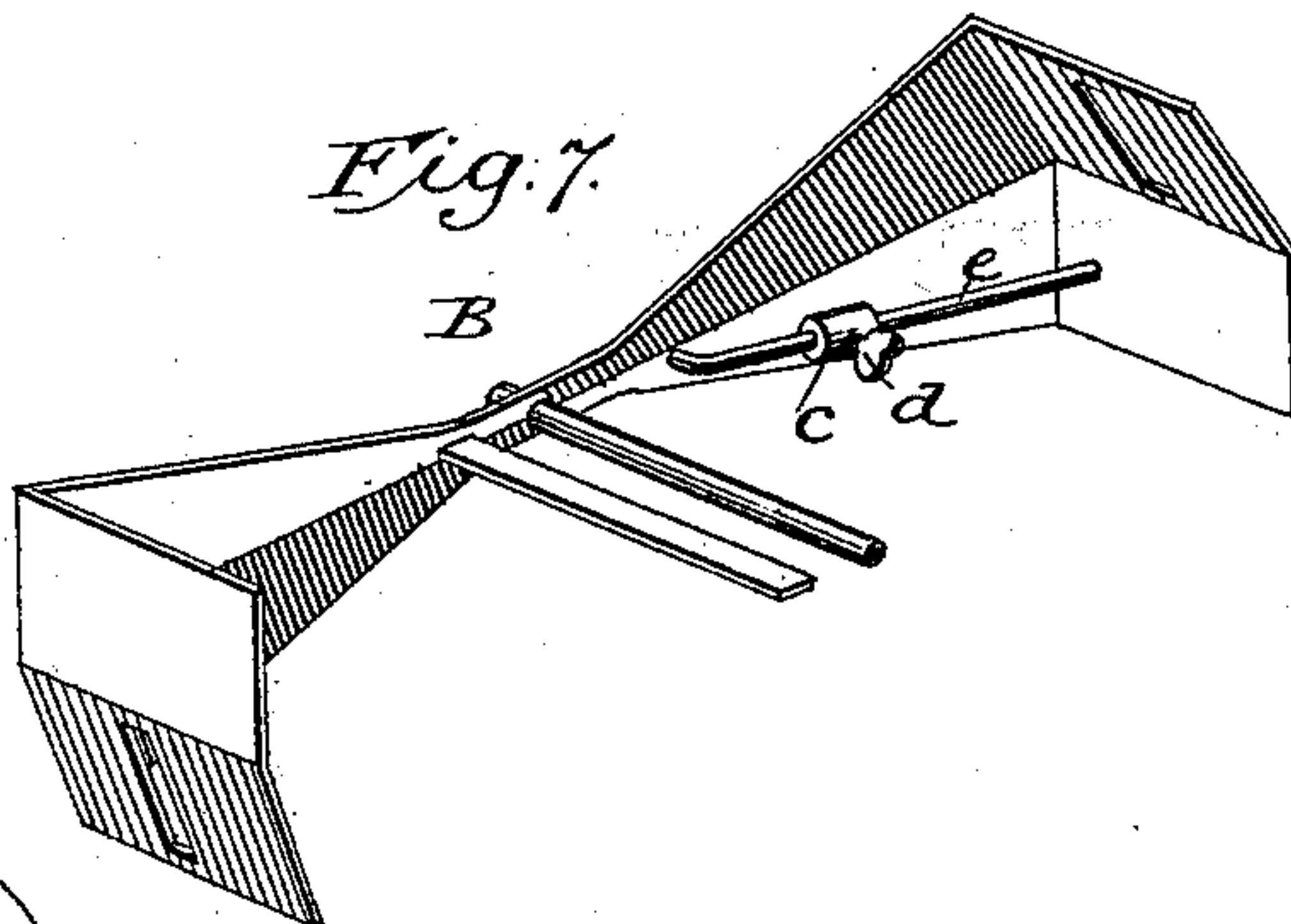
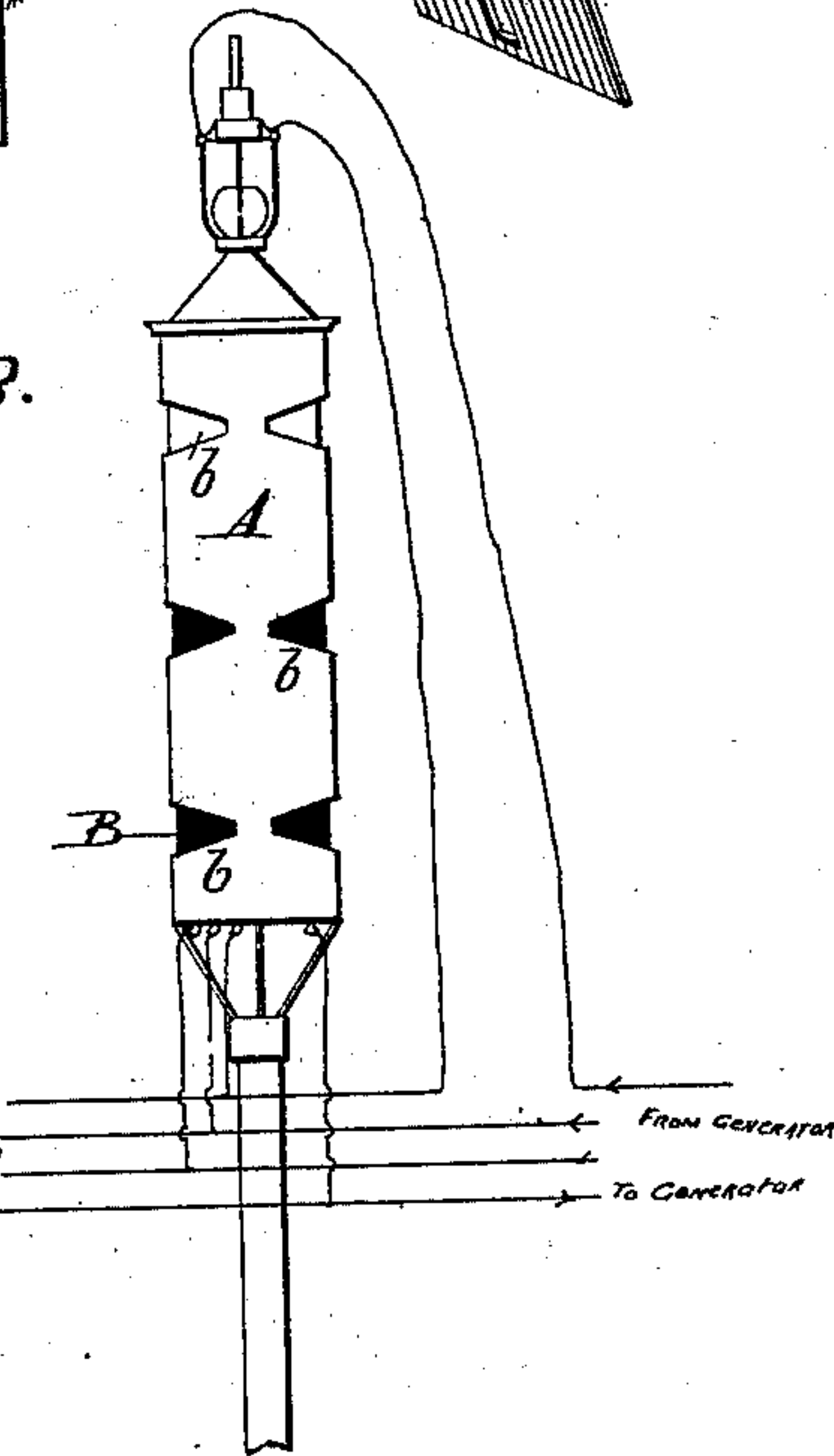


Fig. 8.



WITNESSES

Frederic P. Hollingsworth
Anton Myckoff

INVENTOR

Jose Lloret y Tepes
By *R. T. Dodge*
Attorney

UNITED STATES PATENT OFFICE.

JOSE LLORET Y TEPES, OF MADRID, SPAIN.

ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 308,845, dated December 2, 1884.

Application filed August 22, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOSE LLORET Y TEPES, of Madrid, in the Kingdom of Spain, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

The aim of my invention is to provide a system of signals whereby the position of trains moving in opposite directions on a railway may be indicated both day and night, not only at the stations, but at such intermediate points as may be demanded, and also to provide means whereby in the event of the accident to or stoppage of a train, or the obstruction of a track at points between stations, warning may be given in both directions over the line.

To this end it consists in the series of visual signals of the peculiar construction hereinafter described, and in the combination thereof with of electric circuits specially arranged for operating and controlling the same.

The accompanying drawings represent my apparatus embodied in its preferred form.

Referring to the accompanying drawings, Figure 1 is a view illustrating three of my signals arranged upon a line between two stations. Figs. 2, 3, and 4 are diagrams illustrating the appearance of the signal as adjusted to give different indications. Fig. 5 is a side elevation of the signal, partly in section. Fig. 6 is a view of one of the magnets such as are employed for operating the movable targets or shutters. Fig. 7 is a perspective view of one of the targets or shutters.

In proceeding to construct my apparatus I first provide a number of signal boxes or instruments, A, which may be duplicates of each other in every respect, and which are designed to be mounted upon posts similar to telegraph-posts, or upon other suitable supports at the stations and at such intermediate points as may be demanded. In constructing each signal I first provide a rectangular case or body, usually of a height of about two meters and of a width of about forty centimeters, of wood, iron, or other material, and with an inclined roof or top to exclude rain. This body is preferably painted of a dark color, in order that the shutters or signals hereinafter described may be the more clearly distinguished. In the front side of this case or body

I form three pairs of openings, *b*, these openings commencing at a point near the middle, and increasing in width toward the farther edge. Each opening may have its outer side continued backward in a rectangular form in the side of the body, as represented at *a'*, Fig. 5. In each of these openings I fix permanently a pane of clear glass or equivalent transparent material, to exclude the wind and rain. Within the body, behind each pair of openings, I mount on a horizontal pivot a rocking shutter or signal proper, B, composed of sheet metal or of a thin skeleton frame covered with woven fabric or equivalent material. Each of these shutters or signals is made of increasing width from the central shaft or spindle toward the ends, and has the two ends extended backward at right angles, whereby they are adapted to close the corresponding openings in the front of the case or body, each shutter serving to close one pair of openings, through which it may be viewed from the exterior. Each end of the shutter has one half of its width painted dark or made of a dark color and rendered impervious to light, while the remaining half is painted white, or made of white or transparent glass, or of light woven fabric or equivalent material, through which the interior light may be viewed at night.

Owing to the fact that one half of the signal is light and the other dark, it follows that when tipped in one direction upon its pivot it will close the corresponding openings of the body, so that the outer surface will be wholly dark, and that when tipped in the opposite direction it will present to view through the openings white surfaces during the day and at night present a lighted surface. It will be understood that each signal-box contains three of these shutters or signals—one for each pair of openings.

For the purpose of operating the signals, I combine with each one an electro-magnet, C, fixed in position within the body, with its poles presented in position to attract a plate or armature applied to the signal-shutter in such manner as to tip the same in one direction. The shutter is provided at one end with a weight, *c*, secured by a thumb-screw, *d*, upon a longitudinal rod, *e*. This weight serves to turn the shutter in the opposite direction from

that in which it is turned by the magnet, and to adjust it automatically to such position whenever the action of the magnet ceases. It also prevents the signal from being retained in position by the residuary magnetism after the circuit is open.

It is to be noted that owing to the lateral extension of the opening a' in the box, and the backward extension of the ends of the shutters, the position of the shutters or signals proper may be viewed not only from the front of the body, but also from the sides, thus enabling those upon trains which are approaching the same from either direction to observe the position of the parts from a distance.

To illuminate the interior of the apparatus, that the light may be seen through such of the front apertures as are not closed, by night, and also by day when demanded, I propose to use oil-lamps, gas-lights, electric lights, or any other suitable means of artificial illumination. I recommend for such signal three lanterns, E, the bodies of which are closed, except at the front side. I arrange these lanterns at the rear side of the body A, behind the respective shutters or signals, first providing the body, however, with glazed openings g , to admit of the light being thrown therein. The brilliancy of the illumination may be increased by providing each lantern with a reflector, to direct the rays forward toward the front openings and through the transparent portions of the shutters or targets. I recommend that the lanterns be attached to the rear side of the body, and that it be hinged after the manner of a door, in order that it may give access to the interior without disconnecting or removing the lanterns.

To prevent the heat of the lanterns from affecting the temperature within the body of the signal, I propose to provide the latter with ventilating-openings in the base near the back, and in order to prevent the wind from affecting the shutter or target and to exclude dust therefrom I provide a glazed door or partition, G, within the body, as shown.

Having provided a number of signal apparatus such as above described, I fix the same in position at the stations, crossings, and other intermediate points, as may be demanded. I then extend lengthwise of the road from each station to the next four conducting-wires coated with insulating material or carried by insulated supports. One of the conductors embraces all the magnets of the upper shutters or targets, another all the magnets of the middle shutters, and a third the magnets of the bottom shutters, while the fourth is used to complete the circuit through all the others.

The purposes of the respective shutters may be fixed arbitrarily; but I prefer to use the top and middle shutters, respectively, for trains moving in opposite directions, and the bottom shutters as special danger-signals.

At each station, and at such other points as may be deemed necessary, I employ a commutator or switch-board, G' , or any equiva-

lent form of apparatus, of which many are known in the art, to open and close the various circuits independently. I introduce into the circuits galvanic batteries, dynamo-electric machines, storage-batteries, or other means for supplying an electric current.

When the dynamic apparatus is employed, it may also be made to actuate electric lamps which will be embraced in the circuit, as shown in Fig. 8. In such case the signal-controlling magnet may be mounted directly in the circuit with the lamp or in a branch or derived circuit, as preferred. If the signal-lights be used only to indicate "danger," great economy will result, as the currents will only be required during a small portion of the time.

Whenever a train is about to leave a station, the proper attendant operating the switch in the proper manner causes the upper signals or targets throughout the system to the next station to indicate that the track is occupied. When a train starts in the opposite direction, the middle targets are set in like manner. By these actions a train moving in either direction will be notified of the proximity of the other. In the event of the stoppage of a train between stations, the breaking of the track, or when for any other reasons a special warning is demanded, the bottom targets are set to the proper position by the manipulation of the nearest switch.

The form of the front openings and targets may be modified to any extent demanded.

Having thus described my invention, what I claim is—

1. The herein-described system of signals, consisting of a series of signal bodies or cases, each provided with three openings, targets or shutters pivoted behind the respective openings, an electro-magnet for each target, three distinct circuits embracing, respectively, like magnets of the various signals, and switches to control said circuits independently of each other.

2. In a signal, the combination of the rectangular case or body provided with the openings extending across the front, and also backward in the sides, in combination with the pivoted shutters or targets having their ends extended backward to cover the side openings, as shown and described.

3. An electric-signal system comprising a series of signal-boxes provided each with three distinct signal-openings and corresponding independent targets or shutters and electro-magnets to actuate the same, combined with three separate circuits, each embracing all the magnets of one set of targets throughout the system.

4. The body provided with the front openings and the rear door with openings therein, in combination with the pivoted internal targets or shutters and the lights attached to the door.

5. In combination with the pivoted targets or signals and the lamps, the body provided

with the front openings to expose the targets, and the rear openings to admit the light, both being glazed, as described.

6. In combination with the pivoted targets
5 or shutters, their actuating magnets, and the lamps at the rear, the case or body provided with the front openings to expose the targets, the rear openings to admit the light, the bot-

tom openings for ventilation, and the internal glazed partition to protect the targets and 10 magnets from wind and dust.

JOSE LLORET Y TEPES.

Witnesses:

IGNACIO FIGUERON HERNANDO,
PABLO CANTERO.