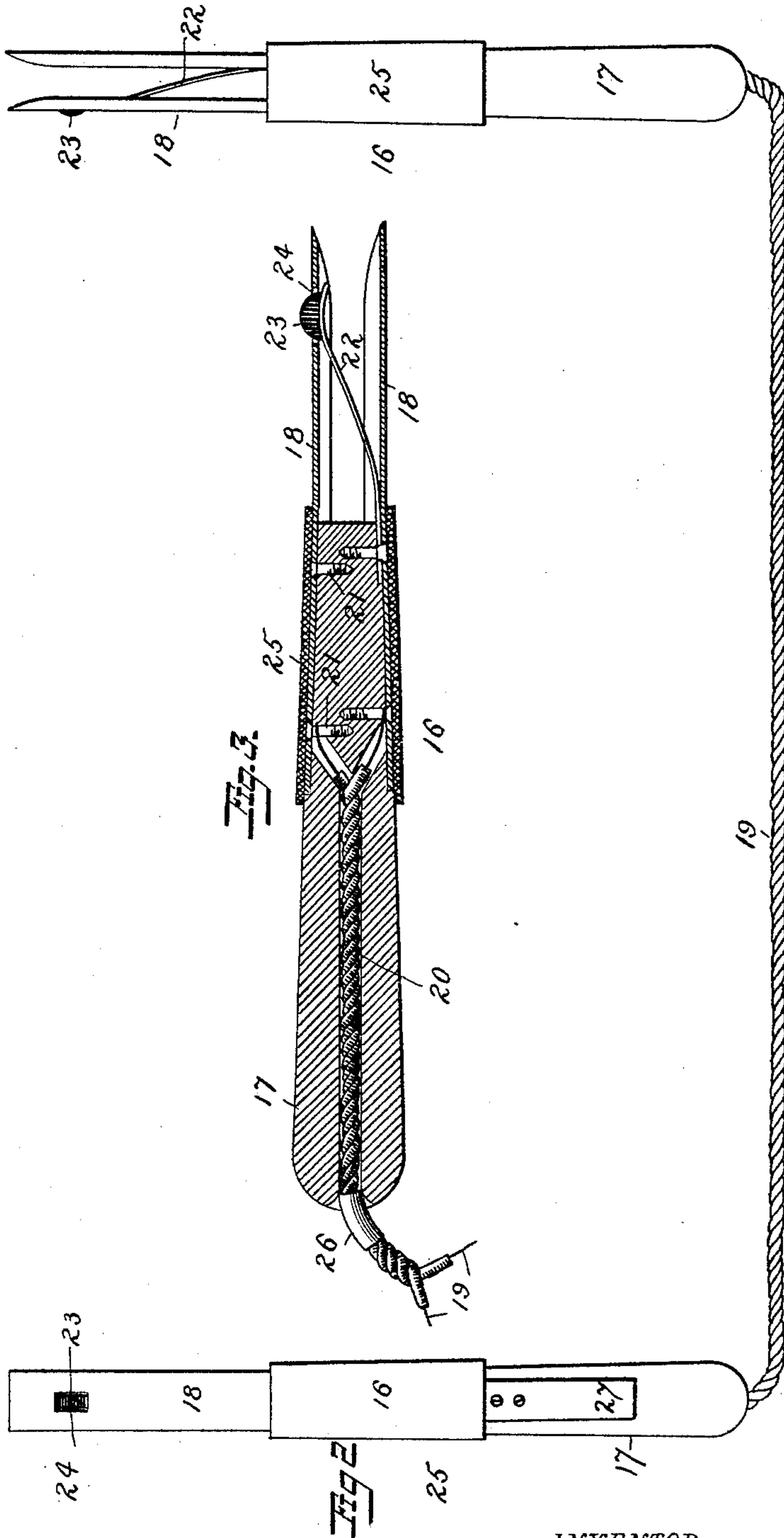


2 Sheets—Sheet 1.

# ELECTRIC SIGNAL FOR RAILWAY TRAINS.

Patented Oct. 13, 1891.



J. S. Barker.  
A. M. Hamilton

INVENTOR  
Lawrence Dury  
by Charles Wm. Kings  
Attorneys

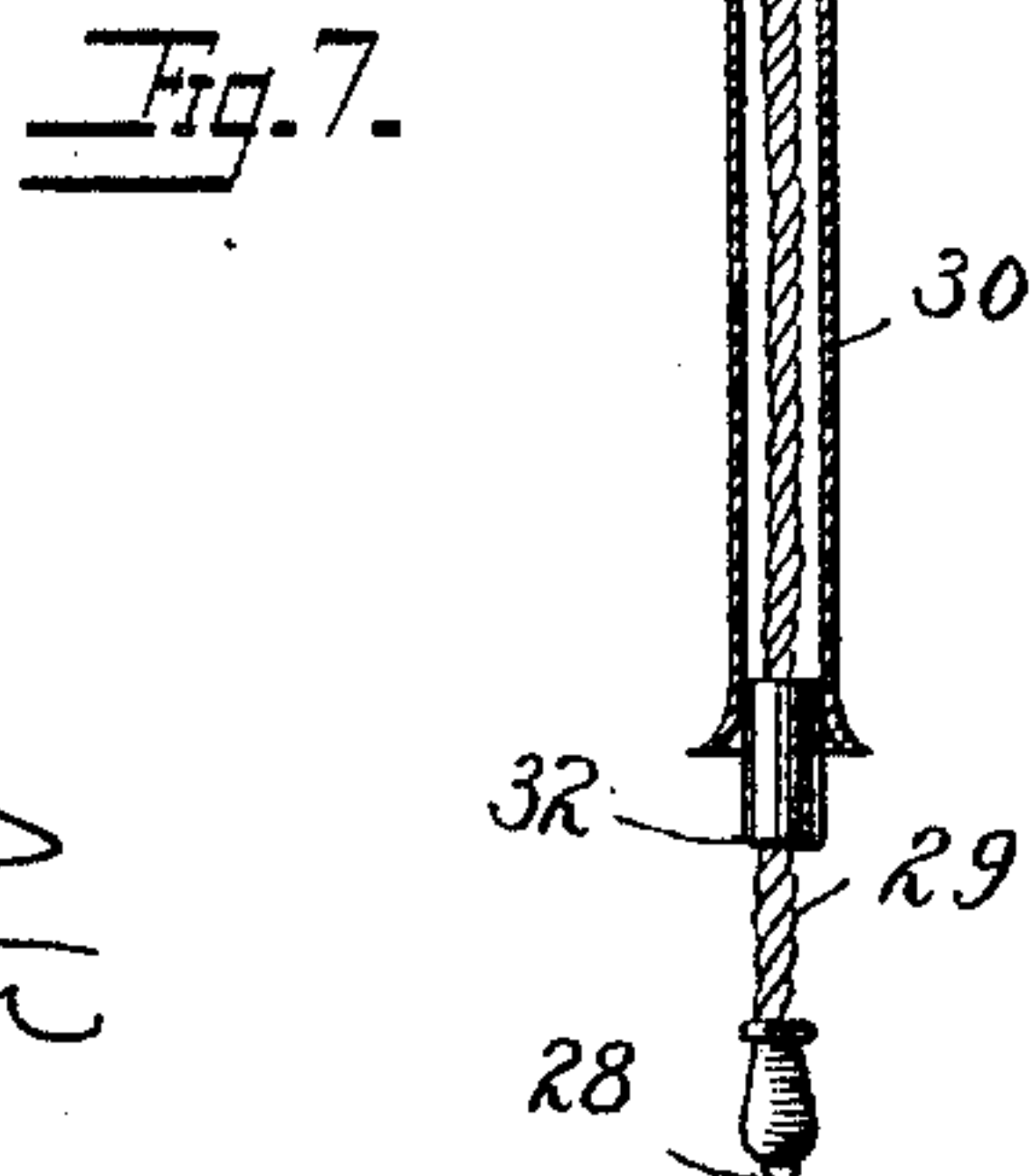
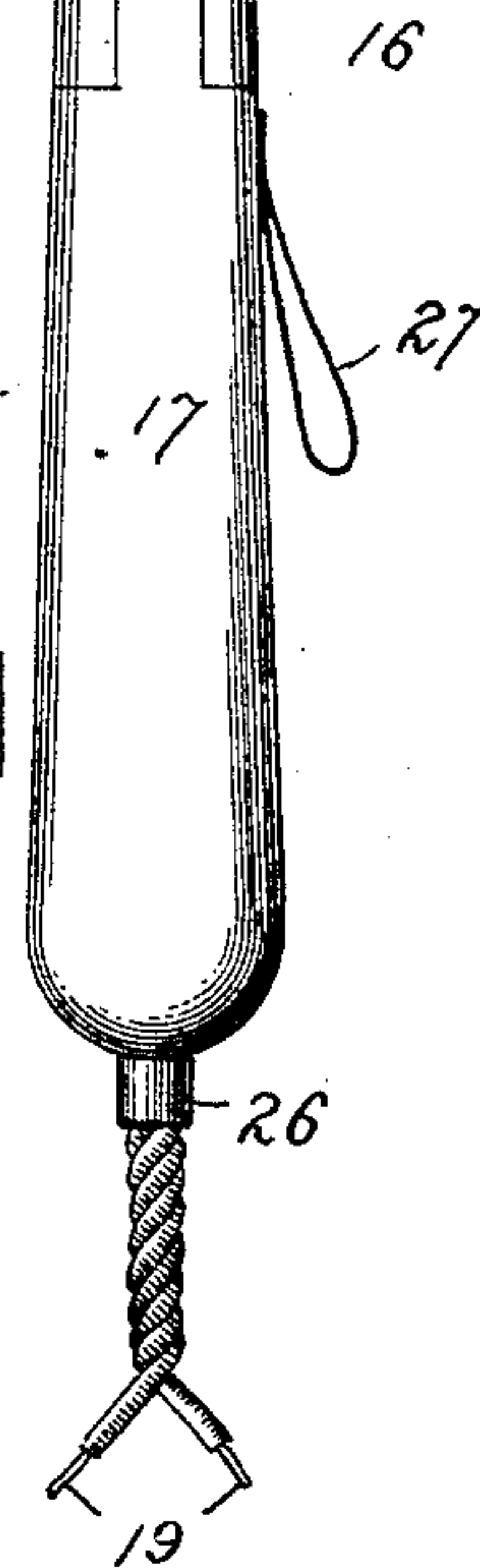
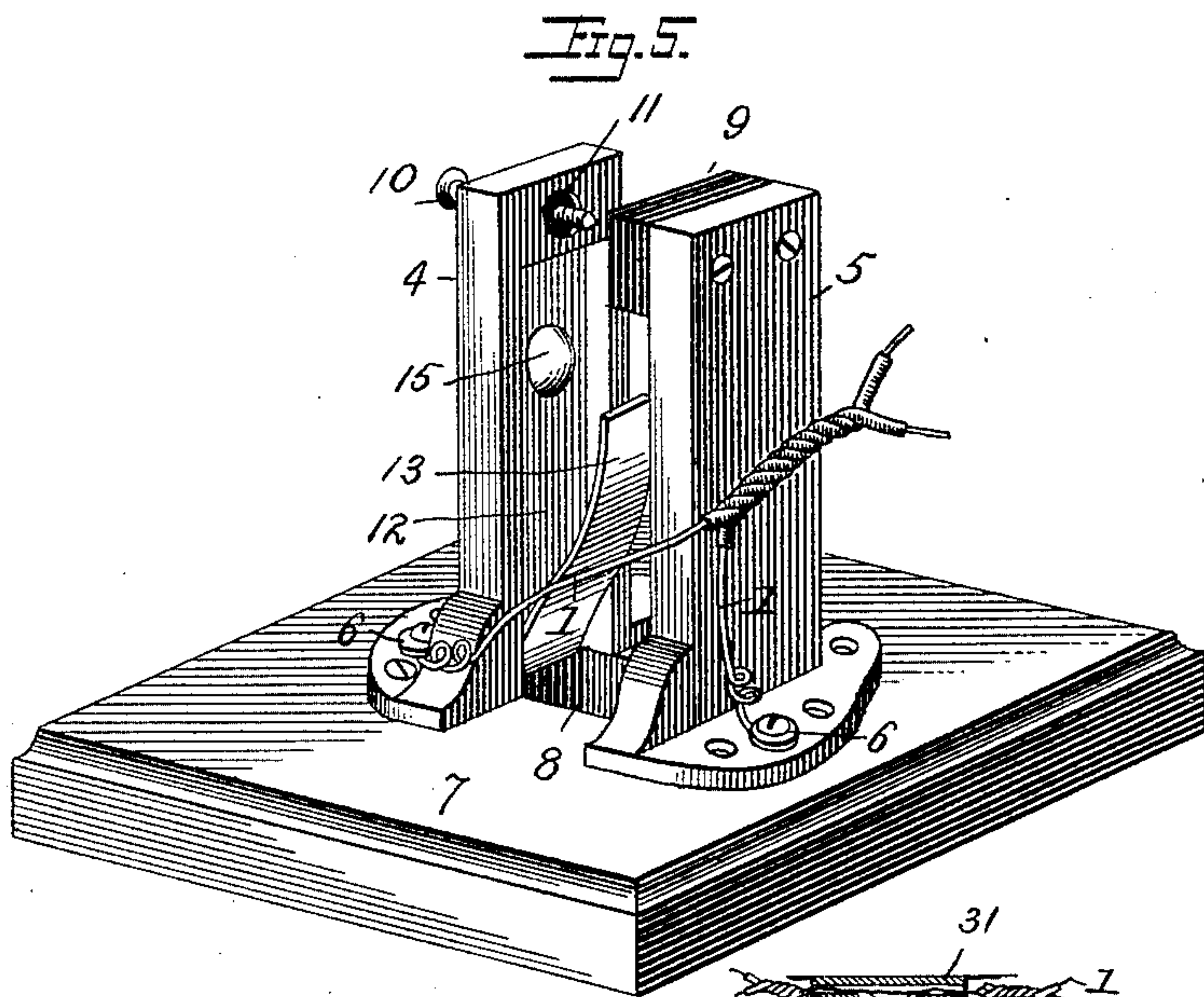
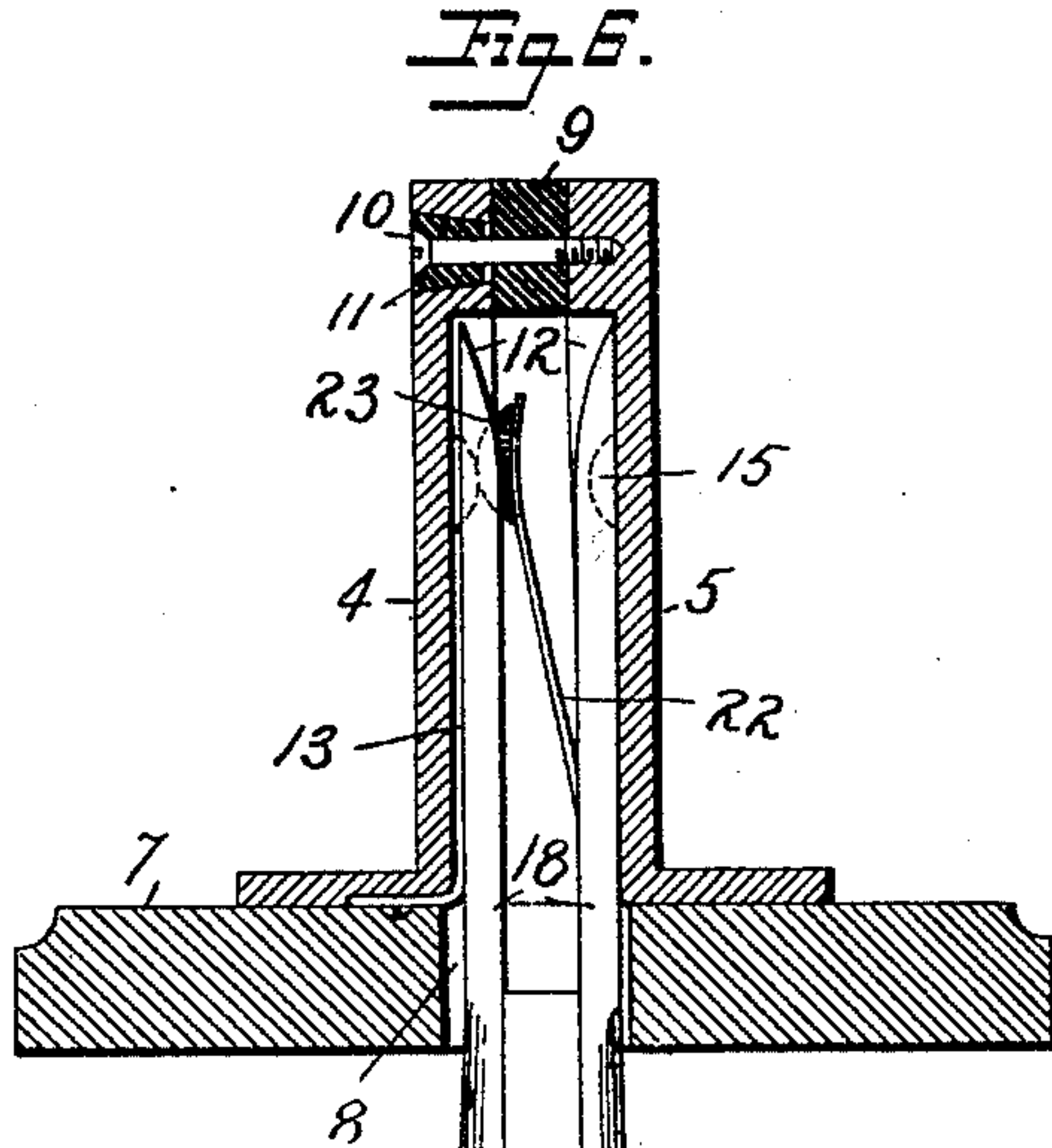
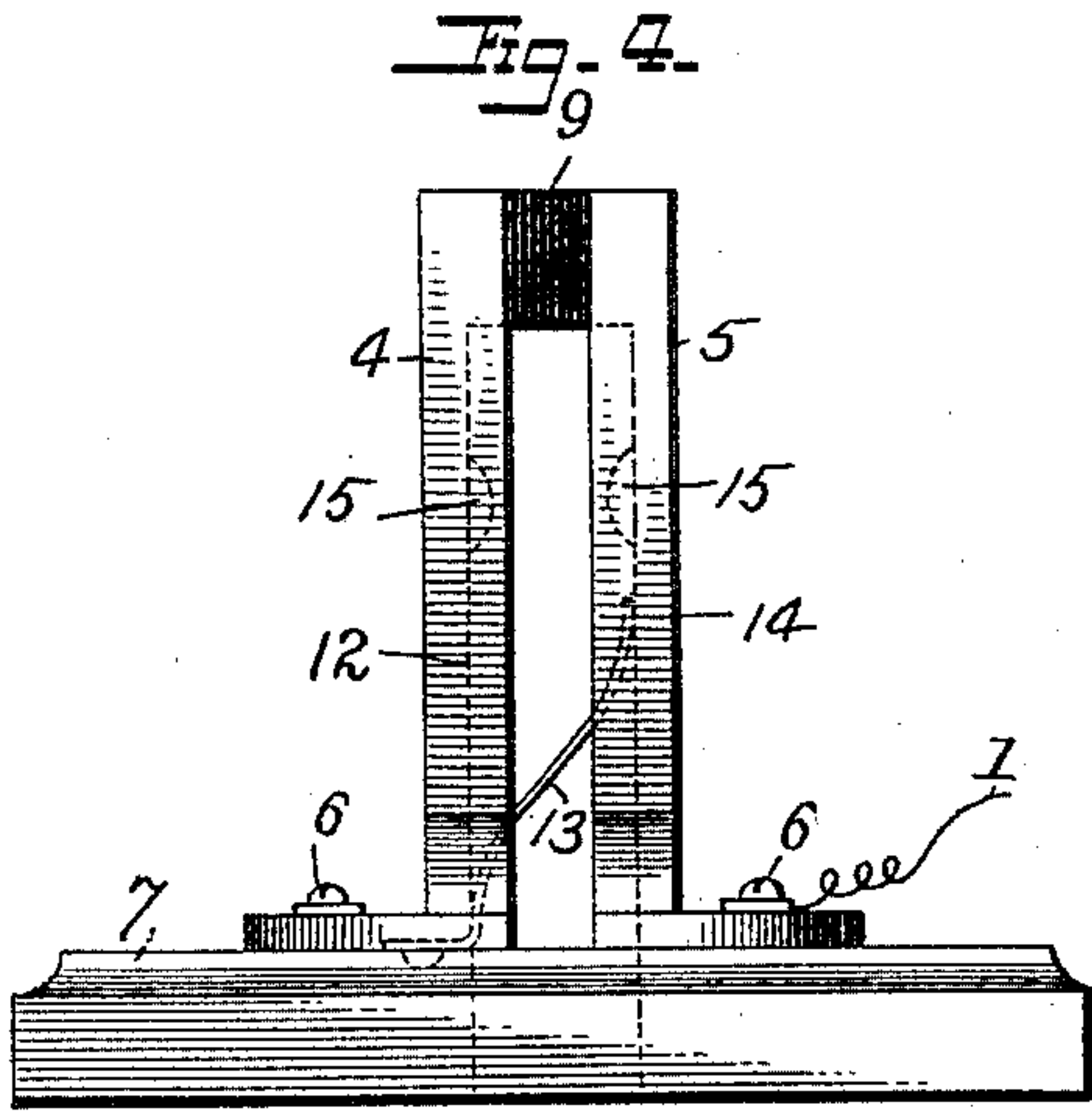
(No Model.)

2 Sheets—Sheet 2.

L. DUNN.  
ELECTRIC SIGNAL FOR RAILWAY TRAINS.

No. 460,958.

Patented Oct. 13, 1891



WITNESSES

*J. S. Barker*  
*A. M. Hamilton*

INVENTOR

*Lawrence Dunn*  
*by Charles W. King*  
Attorneys



# UNITED STATES PATENT OFFICE.

LAWRENCE DUNN, OF FORT SMITH, ARKANSAS.

## ELECTRIC SIGNAL FOR RAILWAY-TRAINS.

SPECIFICATION forming part of Letters Patent No. 460,958, dated October 13, 1891.

Application filed February 18, 1891. Serial No. 381,842. (No model.)

*To all whom it may concern:*

Be it known that I, LAWRENCE DUNN, a citizen of the United States, residing at Fort Smith, in the county of Sebastian and State of Arkansas, have invented certain new and useful Improvements in Electric Train-Signaling Devices; 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.

This invention relates to electric devices for signaling from one part of a railway-train to another, or particularly to the locomotive; it having for its object to supersede the bell and rope now in common use, and to improve and render more effective the electric train-signaling systems. It includes an electric metallic circuit extending through the train and operated by a suitable motor, (as a battery situated on the locomotive,) and in which circuit is placed a signal-bell on the locomotive, and push-buttons or equivalent devices for closing the circuit, located at various convenient points throughout the train. The wires in each car which form the metallic circuit terminate at either end of the car in spring-jacks whose normal tendency is to close the circuit at each end of the car. In order to unite the conducting-wires in two adjacent cars, I make use of an electric coupling, consisting of two insulated wires terminating at each end in a plug adapted to be inserted into the spring-jacks on the cars. These plugs are so constructed that normally the two conductors are electrically connected at each end, thus closing the circuit at both ends of the coupling. When, however, a plug is inserted into one of the spring-jacks, such act causes the electric connection between the opposite conductors in both the plug and the jack to be broken, and there is established a continuous open circuit from the car to the coupling, and from that to the next car, and so on, as far as the cars and couplings are united. At the rear end of the train I propose to use a dead or insulating plug or a switch in order to keep the circuit open. These are the general features of my invention, while the distinguishing or characteristic points of invention are the construction of the connecting-

plugs, of the spring-jacks into which the plugs are inserted, the tubes through which the suspended wires carrying circuit-closing devices and arranged at convenient places through the train pass and by which they are protected, and the spring-supports for the connecting or coupling wires between the locomotive and the first car of the train.

In the accompanying drawings, wherein my invention is illustrated, Figure 1 is a longitudinal sectional view of a railway-train having my electric signaling devices applied thereto. Fig. 2 is a side view of the electric coupling, the two plugs being turned so as to show their appearance when seen from points at right angles to each other. Fig. 3 is a central longitudinal section of one of the plugs. Fig. 4 is an elevation of the spring-jack. Fig. 5 is a perspective view of the same, one of the metallic side plates being moved back to better show the interior construction of the jack. Fig. 6 is a section of the jack with the plug inserted therein. Fig. 7 is a longitudinal section of the tube surrounding the suspended wires in the cars carrying the push-button.

Within each car of the train are arranged two insulated wires 1, which form parts of a metallic circuit which, when properly connected, extends through the entire train to the locomotive, where there is arranged a signal-bell 2 and a battery 3. Each wire 1 is connected at either end with a spring-jack 4. These spring-jacks are duplicates of each other, and each consists of two plates 5, of brass or other suitable conducting material, one wire 1 being connected with each plate by the screws 6 or in any other suitable manner. The plates 5 are insulated from each other, being secured to a block 7, of wood or other suitable non-conducting material, upon opposite sides of a hole 8 through the block and having between their outer or free ends a piece of non-conducting material 9. In order to connect the outer ends of the two plates without uniting them electrically, I use the screw 10, which passes through a block of rubber 11, seated in an aperture in one of the plates and, passing through the non-conducting piece 9, screws into the opposite plate 5, and thus holds the two together.



The opposing sides of the two plates are recessed, as shown at 12 in Fig. 5 and by the dotted lines in Fig. 4.

13 is a metal spring attached at one end to one of the side plates of the jack and adapted to bear against the opposite plate, as at 14, and thus, when in this its normal position, establish a metallic connection between the two plates of the jack. 15 15 are bosses or projections on the inner faces of the side plates of the jack, arranged in the recesses 12. While I have shown one of these projections 15 on the inner face of each plate 5, and prefer so to make the jack, yet a single such projection—that is, on one plate only—would operate successfully, but not to the same degree as do two. There is one of these jacks at each end of the car, arranged preferably on the inner side of the roof or hood which covers the platform, although this location is not essential.

The couplings which are used between the cars are shown in detail in Figs. 2 and 3. The plugs 16, which terminate these couplings, consist each of a wooden handle 17, to one of which are secured two brass plates 18 18. The handle is hollow, and through the opening 20 therein pass the insulated wires 19, each wire being connected to one of the plates 18 in any suitable manner, as by being wound around one of the screws 21, which fasten the plates to the handle.

22 is a metallic spring secured to one of the plates 18 and adapted, when in its normal position, to bear upon the opposite plate, and thus establish a metallic connection between them, and 23 is a hard-rubber projection or tip secured to the spring near its end and adapted to project through the opening 24 in the plate 18. The end of the spring 23, which is connected with the plate 18, is arranged between such plate and the wooden handle 17, these parts being held together by one of the screws 21. An advantage which arises from this mode of attaching the spring is that should it become broken it can be easily replaced by another, the only tool required being a small screw-driver; and, further, this connection tends to preserve a good metallic contact, as the contacting faces of the plate and spring are well protected and covered, and hence not liable to become separated by an accumulation of dust or by corrosion.

25 is a rubber band encircling the handle where the plates 18 are fastened to it and serving to protect the plug from sleet and rain, which might cause the current to be short-circuited.

26 is a covering of rubber or other suitable material for the insulated wires 19 where they emerge from the handle 17, into the opening 20 of which the said covering extends for a short distance, serving to protect them from wear, which would soon destroy the insulation were no protection used and the wires allowed to rub against the hard material of

the handle, as they sway by reason of the motion of the train.

27 is a strap or looped handle by which the plug may be pulled out from the jack.

To unite the metallic circuits of two adjacent cars, the plugs are inserted into the jacks through the holes 8 until they occupy the position shown in Fig. 6, with the bosses or projections 15 on the plates 5 projecting through the openings 24 in the plates 18, which serve to lock the plugs in place, and prevent their detachment by any of the ordinary motions of the train. When in this position the metallic plates 5 and 18, which are kept bright and smooth by sliding upon each other when the plug is inserted and withdrawn, are in direct contact with each other. By the act of inserting the plug into the jack the spring 13 is forced away by the plates 18 from its contact at 14 with the plate 5, and is caused to lie in the recess 12 in the other plate, as shown in Fig. 6, thus opening the circuit at this point, and at the same time, that is, when the plug is inserted into the jack, the boss or projection 15 bears upon the hard-rubber projection or tip 23, and forces the spring 22 inward and out of contact with the metallic plates 18 on which it bore, so that the circuit, which before was closed at this point, is here opened also. It will thus be seen that the mere coupling together of the electric conductors in the different cars opens the circuit between them, and that when they are uncoupled the circuit is automatically closed at each break therein, as the springs both in the jacks and plugs automatically return to their normal position. From this it follows that should the train separate, or one of the plugs be pulled out, the engineer will be notified of such fact by the ringing of the bell 2, which will continue so long as the circuit remains closed.

At convenient points throughout the train are arranged the push-buttons 28, by which the circuit may be intentionally closed and the bell in the locomotive rung. These push-buttons may be secured to the inner side walls of the car and to its ends above the platforms or suspended by the wires 29, or both arrangements may be used, as shown in Fig. 1.

In order to prevent undue swaying of the wires 29, which are preferably suspended above the central aisle of the car, I propose to pass them through a tube 30, which may be secured to a plate fastened to the top of the car, as shown in Fig. 1. The lower end of the tube is made flaring to prevent wearing of the insulating material of the wires 29, but as a further protection I prefer to employ the encircling band 32 of rubber or like material which surrounds the wires 29 where they emerge from the tube.

Where the connecting-wires between the plugs 4 are long, as the coupling between the locomotive-cab and the baggage or first car of



the train, they are apt to sway to an undesirable extent, and difficulty has been experienced in keeping the plugs from being pulled out of the jacks, and in passing over the locomotive-tender the wires 19 sag so low as to be in way of the fireman and engineer. To prevent this I hold up the wires 19 between the plugs 16 by spring-supports, as shown in Fig. 1. As shown, these supports consist of coiled springs 33, which are each at one end secured to wires 19 in any suitable way, as by wrapping them around the wires, as at 34 34. At their other ends they are secured, respectively, to the first car of the train and to the cab by hooks 35. These spring-supports take up the slack in the coupling-wires and hold them out of the way of the locomotive attendants, as well as preventing them from excessive swaying and yet give the necessary elasticity to the coupling.

In order that the circuit throughout the whole train after it has been made up shall be normally open, I insert a dead-plug 36, Fig. 1, into the jack at the rear end of the train, which merely serves to force back the spring 13 out of contact at 14 with the plate 5, without at the same time establishing any other circuit, as do the plugs 16.

Of course a switch of any kind at the rear of the train to open the circuit could be used as well as the dead-plug.

Without limiting myself to the precise construction and arrangement of parts shown, what I claim is—

1. In an electric signaling device, the herein-described spring-jack situated at the end of the metallic circuit in a car and consisting of a perforated block of non-conducting material, two metallic plates secured to such block on opposite sides of the perforation therein and having their ends connected together by an insulating connection, and a short-circuiting spring adapted normally to form a metallic connection between the two plates of the jack, substantially as set forth.

2. The herein-described jack, consisting of

the two plates to which the conductor-wires are secured, having an inward-projecting boss, in combination with a connecting or coupling plug adapted to be inserted into the jack and having metallic plates which make contact with the plates of the plug, one of the plates being perforated to permit the passage of the said boss through it in order to hold the plug in the jack, substantially as set forth.

3. In an electric signaling device, the herein-described spring-jack, consisting of the two metallic plates 5, each recessed upon its inner side and provided with a boss or projection, and the spring 13, substantially as set forth.

4. In an electric signaling device, the herein-described spring-jack, consisting of the perforated block of insulating material, the two metallic plates 5, to which the circuit-wires are connected, one situated on each side of the hole in the said block, each plate being recessed on its inner face and provided with a boss or projection 15, the spring 13, and the insulating connection uniting the outer ends of the plates, substantially as set forth.

5. In combination with an electric-conductor coupling for uniting two cars, consisting in part of flexible wire, an elastic support above the conductor and connected at its ends to the cars, so as to be under tension, and between its ends connected to the flexible wire of the coupling.

6. In an electric train-signaling device, the combination, with the electric-conductor coupling for uniting two cars, and consisting in part of a flexible wire, of the spring-supports for the said wire, consisting of the coiled springs each connected with the wire between its ends at one end and with one of the cars, respectively, at the other end, substantially as set forth.

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

LAWRENCE DUNN.

Witnesses:

T. H. DUBOIS,  
G. S. WHYBARK.