

No. 720,901.

PATENTED FEB. 17, 1903.

J. DOYLE.  
TELEGRAPHIC SYSTEM.  
APPLICATION FILED JUNE 19, 1902.

NO MODEL.

Fig. 1.

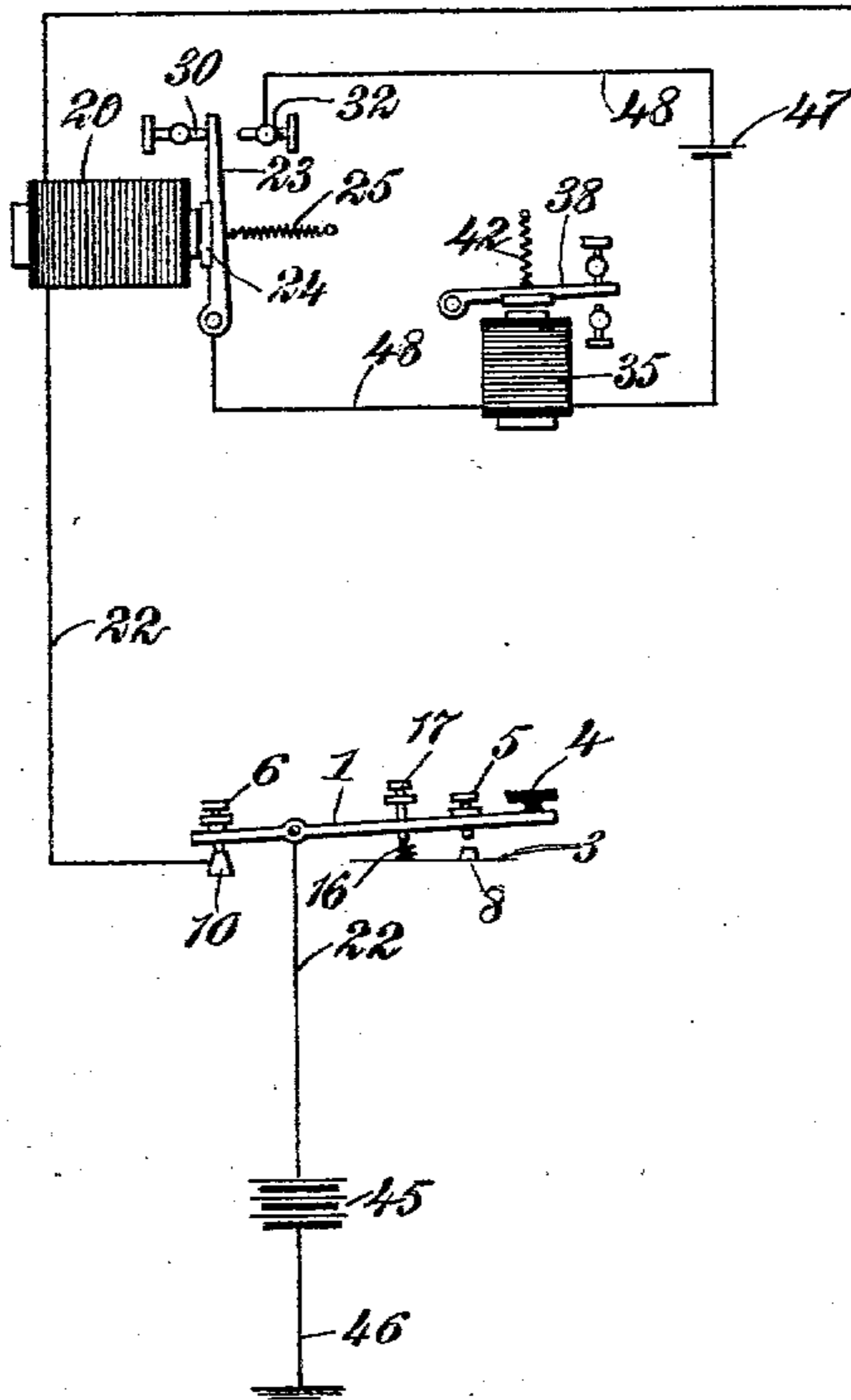


Fig. 2.

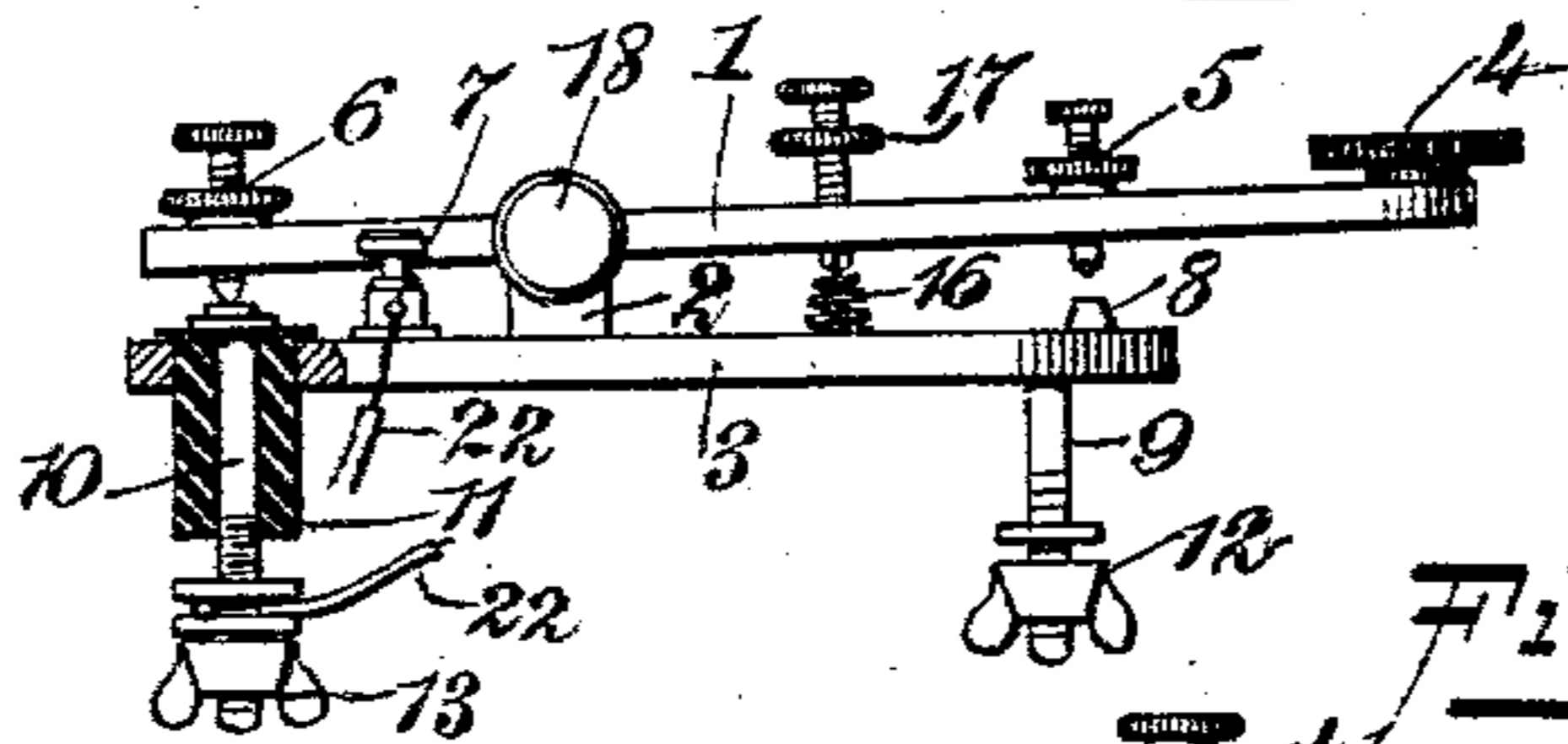


Fig. 3.

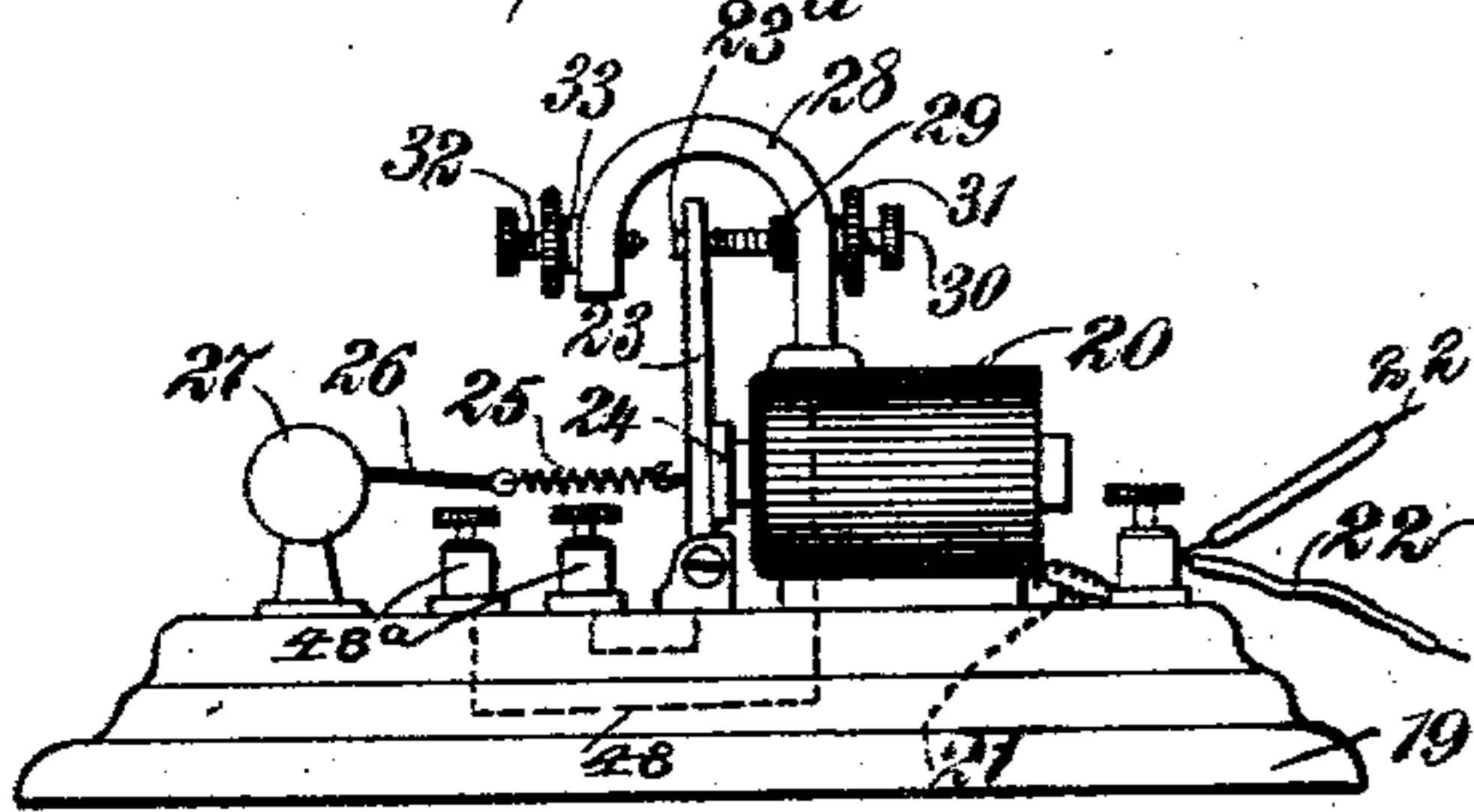
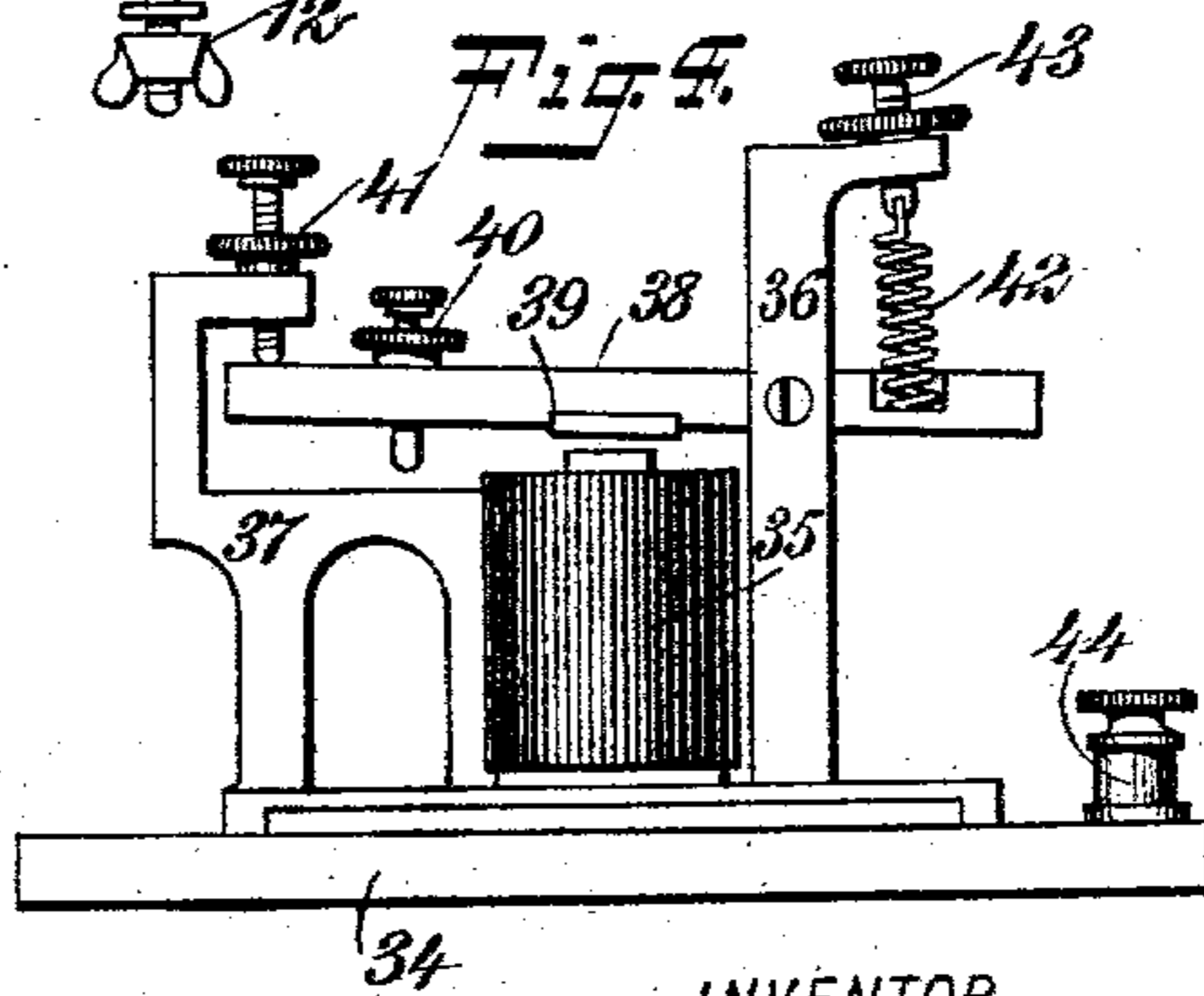


Fig. 4.



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# UNITED STATES PATENT OFFICE.

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## TELEGRAPHIC SYSTEM.

SPECIFICATION forming part of Letters Patent No. 720,901, dated February 17, 1903.

Application filed June 19, 1902. Serial No. 112,323. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN DOYLE, a citizen of the United States, and a resident of Norwood, in the county of Bergen and State of New Jersey, have invented new and useful Improvements in Telegraphic Systems, of which the following is a full, clear, and exact description.

My invention relates to telegraphic systems, and more particularly to an improvement upon the ordinary Morse system commonly used in the majority of telegraph-offices in this country.

My more particular object is to make a system in which it will be impossible for the telegraph operator to leave the line open.

It should be borne in mind that in many of the systems now in use each key is provided with a small switch, or "circuit-closer," as it is called, whereby the circuit is closed immediately after each use of the key. Normally when the line is not in immediate use the current passes through each and every circuit-closer upon the line from one of its ends to the other. Should an operator carelessly fail to close his key, all business upon the line is suspended for the time being, and great hardship to business is very apt to result. The line is also apt to be left open by accidentally moving the circuit-closer and by the same being meddled with by unauthorized persons, more particularly when the operator is temporarily away from his desk.

The system constituting the subject-matter of the present invention is such that no circuit-closers are employed, and the normal position of the key is such as to keep the line closed. It is only when the key is depressed that the line is opened. To accomplish this result and yet make as few innovations as possible in the old system, I make certain changes in the key and in the relay, together with the connections therefor.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a diagram showing my invention as applied to an ordinary telegraph-office—say one of the terminal offices. Fig. 2 is a side elevation of the key and its immediate connections, certain parts being broken

away. Fig. 3 is a side elevation of the relay used in my system; and Fig. 4 is a side elevation of the sounder, which is of the usual pattern.

A key-lever 1 is pivotally journaled between the posts 2, which are rigidly secured upon the bed-plate 3. A finger-button 4 is mounted upon the long end of the key-lever in the usual manner.

5 represents the adjusting-screws for limiting the downward play of the key.

6 is an adjustable contact-screw, and 7 represents posts whereby the key is connected with the line.

An anvil 8 is mounted upon the bed-plate 3 and arrests the downward movement of the key, and depending from the bed-plate 3 are screws 9 10, the latter being insulated by the tube 11, of hard rubber. Upon the screws 9 10 are revolubly mounted thumb-nuts 12 13 in the usual manner.

The line-wires are shown at 22. They may be secured to the posts 7 or to the screws 9 10 in the usual manner.

The key-lever is supported by a pyramidal spiral spring 16, which is adjustable by means of screws 17. The key-lever is laterally adjustable by means of the screws 18. The structure of the key is therefore considerably like that of the old-style key, but with this difference, that the contact is made from the screw 6 to the screw 10 at the back of the key and not through the screw 5, anvil 8, and screw 9 at the front of the key. Thus in my form of key the tension of the spring 16 normally keeps the circuit closed, as may be seen from the position of the key as shown in Fig. 2.

The relay (shown in Fig. 3) comprises a base-plate 19, a magnet 20, wires 21, connecting the magnet with the line-wires 22, a movable tongue 23, supporting an iron armature 24 and provided with a contact 23<sup>a</sup>, a spiral spring 25 for tensioning the tongue 23 and the armature 24, a thread 26, connecting the spring 25 with the manually-operated tension-wheel 27, the arch 28, and various other parts, substantially as in the ordinary relay. There are, however, certain differences in construction, which will now be pointed out. The arch 28, which is of metal, is rigidly fitted with a sleeve 29, of vulcanite, and within this sleeve is mounted a threaded screw 30, provided

with an adjusting-nut 31. By this arrangement the screw 30 is insulated from the metallic arch 28. The contact-screw of the relay is shown at 32 and is provided with an adjusting-nut 33. It will be noted that in the ordinary relay the relative positions of the contact-screw 32 and the ordinary screw 30 are reversed—that is to say, in the ordinary relay when the armature 24 is drawn toward the magnet the tongue 23 is drawn in the direction of the screw with which it makes electrical contact, whereas in my relay when the armature 24 is drawn toward the magnet 20 the tongue 23 breaks contact with the screw 32. The effect of this change in the structure of the relay is that when the main circuit is thrown open the contacts of the relay are closed instead of opened.

In my system no change is made in the structure of the sounder. It consists of a base-board 34, magnet 35, framework 36 37, oscillating beam 38, provided with an armature 39, adjusting-screws 40 41, compression-spring 42, spring adjustment 43, and binding-screws 44. The main battery (see Fig. 1) is shown at 45, the terminal ground-wire at 46, the local battery at 47, the local-circuit wire at 48, and the local binding-posts at 48<sup>a</sup>.

The operation of my device is as follows:

An operator desiring to use the line places his finger upon the finger-button 4 and abruptly presses the same downward, just as he would do with the old system, supposing the line thereof to be opened. In depressing the key-lever the contact between the screws 6 and 10 is broken, the line-circuit thereby being opened. The magnet 20 thereupon releases the armature 24, and this armature under tension of the spring 25 is drawn away from the magnet, thus moving the tongue 23 outward and causing the contact-point 23<sup>a</sup> to engage the contact-screw 32. This closes the local circuit of the battery 47, thereby causing the sounder to make its own stroke. The pressure upon the button being relaxed the main circuit is again closed between the screws 6 and 10, the relay-magnet 20 breaks the local circuit, and the sounder makes its upstroke. While, therefore, the armature of the sounder follows the movements of the key, the armature of the relay moves in the opposite direction relatively to its magnet.

As many operators prefer not to use a sounder, but to listen directly to the clicking of the relay, it is expedient to have the relay so proportioned and so tensioned as to

give out the natural sound regardless of the erratic direction in which the armature moves relatively to the magnet. This can easily be done by shaping the contact 23<sup>a</sup> and properly tensioning the spring 25 by means of the adjusting tension-wheel 27. It will thus be seen that not only will the sounder give its customary sound and that this sound is in accord with the movements of the key, but that even the relay can be made to simulate the sound of the relay in the old system. An operator accustomed to the old system would hardly notice the difference in the action of any of the instruments, except that he would find no way to leave the line open and would be spared the work of operating the circuit-closer.

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

A telegraphic system comprising a normally closed main circuit, a relay connected therewith and normally energized, said relay being provided with a magnetic member and with contacts normally held open by said magnetic member but free to close when said magnetic member is deenergized, a local battery and a sounder connected with said relay and controlled by said contacts, and a key for energizing said relay, said key comprising a bed-plate provided at its front portion with an anvil made of metal and strengthened by the omission of insulating material; and at its rear portion with an insulating-sleeve passing through said plate, a table-screw provided with an anvil-head, and mounted within said sleeve and thereby insulated from said bed-plate, an oscillating lever mounted upon and electrically connected with said bed-plate, said lever being provided with a finger-button and with adjustable screws for alternately engaging said anvil and said table-screw, and a spring connected with said oscillating lever for tensioning the same, the arrangement being such that the strain of the downstroke is received upon the strengthened anvil and the strain of the upstroke is borne by the said anvil-head of said table-screw and thence transmitted to the insulating-sleeve.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN DOYLE.

Witnesses:

WM. J. QUINN,  
C. W. CONKLIN.