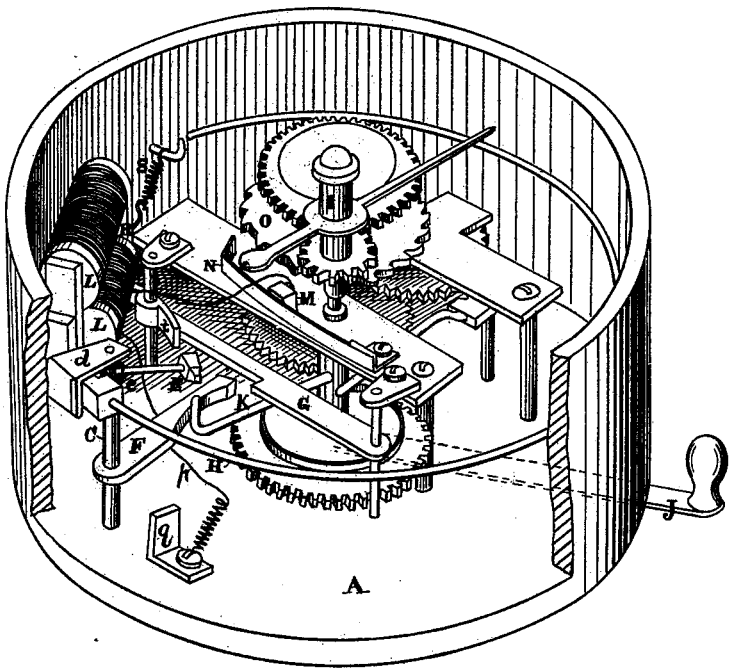
2 Sheets—Sheet 1.

S. D. FIELD.

DISTRICT TELEGRRAPH SIGNAL-BOX.

No. 189,717. Patented April 17, 1877.

Fig. 1.



Witnesses
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Inventor
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2 Sheets—Sheet 2.

S. D. FIELD.

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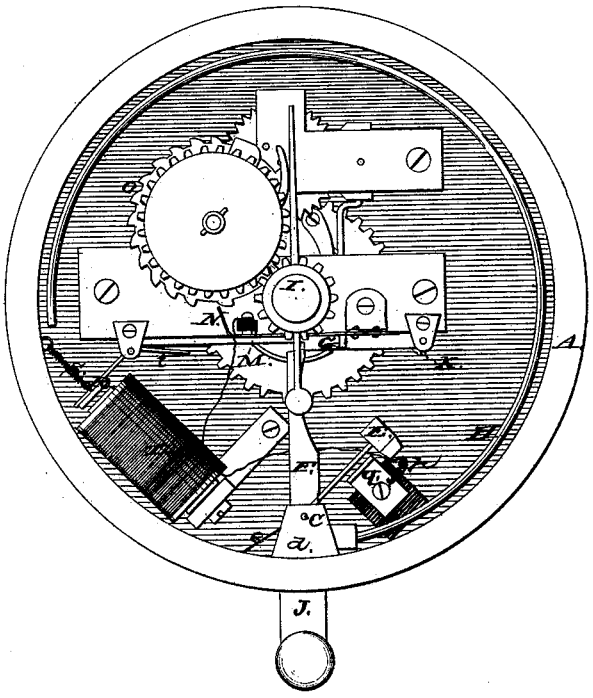
Fig. 2.



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UNITED STATES PATENT OFFICE.

STEPHEN D. FIELD, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN DISTRICT-TELEGRAPH SIGNAL-BOXES.

Specification forming part of Letters Patent No. **189,717**, dated April 17, 1877; application filed January 2, 1877.

To all whom it may concern:

Be it known that I, STEPHEN DUDLEY FIELD, of the city and county of San Francisco, State of California, have invented an Improvement in District-Telegraph Signal-Boxes; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

My invention relates to an improvement in district-telegraph signal-boxes; and it consists in the combination, with each signal-box, of an alarm or sounding apparatus, consisting of a series of tripping-levers, a trigger, and an alarm device, which are so arranged that the alarm can either be set by the act of transmitting a signal or by an independent action, and afterward released by the operator at the central station, by shunting a portion of the resistance in the line-circuit, by increasing the battery-power, or reversing the line-battery, so as to sound an alarm or signal at the box from which a signal has been received.

The alarm is connected with the same wire over which is transmitted the signal from the signal-box to the central station; but I interpose in the same circuit an electro-magnet of low resistance, that will not be affected by the electric current in ordinary use upon the line, so that signals can be transmitted over the line after the alarm is set without affecting the electro-magnet or alarm mechanism. After the signal has been received at the central station, the operator or receiver can, by simply increasing the battery-power, or by shunting a portion of the resistance in the line-circuits, or by reversing the line-battery, sound the alarm at the box from which the signal was sent, so as to notify the sender that his signal has been received and is understood.

Referring to the accompanying drawings, Figure 1 is a side view, with a portion of the case broken away to show the interior mechanism; Fig. 2, a top or plan view.

Let A represent the box or case inside of which the mechanism which transmits the call or signal to the central office is contained, and the circuit-wire.

Inside of this box or case I mount a shaft, *c*, which bears in suitable supports or standards *d* at each end, and to this shaft I attach a hammer, E. A suitable spring, *e*, is arranged to keep this shaft in its proper position. An arm, F, projects from this shaft, so that when the shaft is partially rotated to raise the hammer the extremity of the arm will engage with a notch on the under side of a latch-plate, G, which is pivoted at one end only, as represented.

H is a steel bar or other bell or gong, against which the hammer E will strike, so as to sound an alarm when the arm F is released from the notch in the latch G.

This alarm, however, can be varied, or some other mechanical alarm could be substituted for it, as most convenient.

I is the center post or shaft of the signal mechanism, which must be partially rotated by means of the outside lever J, in order to wind up the spring which actuates the signal-train.

An arm, K, projects from this post, so that the act of rotating it in order to wind up the spring causes the arm K to engage with the arm F, and lift it until its point or extremity strikes and lifts the latch-plate G, and passes behind the notch in it, thus raising the hammer to a striking position.

When the lever J is released, and the post or shaft I is rotated back again by the power of the spring which it winds up, the arm F follows the arm K until it engages with the notch in the latch-plate. This notch will then engage with and retain the arm F until the signal mechanism completes its transmission of the message, thus leaving the hammer in an elevated position, ready to strike upon the steel bar or other resonant device upon the liberation of the arm F from the notch in the latch-plate.

L L is an electro-magnet, which is placed inside of the box or case, one terminal of the magnet connecting with the insulated contact-point or key M, with which the spring N is successively brought in contact by the irregularities of the character-wheel *o*, while the other terminal of the magnet is connected, by a wire, *p*, with a standard, *q*, which is insulated from the box, and against which the arm F bears when the hammer is down. This standard is connected with the circuit-wire, so that the current will be shunted from the

magnet when the hammer is down, but will flow through the electro-magnet as soon as the arm F is lifted free from the standard *q*.

This armature R is supported in its proper position by a spring, S, and has attached to it one arm of a bent lever, *t*. This lever is pivoted at its middle, so that its opposite arm will strike and lift the free end of the latch-plate G, and lift it sufficiently to release the arm F from the notch when the armature is closed against the magnet.

As the electric current in ordinary use upon the line is not sufficiently powerful to cause the magnet to attract the armature when the alarm device is set and the magnet in circuit, the signal will be transmitted readily through the magnets; but after the signal has been transmitted and received, the operator at the central station can, by an increase of the battery-power, or by shunting a portion of the resistance in the line circuit, cause the magnets to attract the armature, and thus release the arm F, and allow the hammer to strike the gong as a signal that the message has been received; or the same result can be accomplished by using a polarized electro-magnet in the place of the ordinary electro-magnet heretofore described, and actuating the polarized magnet by reversing the polarity of the ordinary line-battery, or by using another battery with its polarity opposite to that of the ordinary line-current.

In an "electro-mechanical" alarm apparatus I prefer to use the heel-and-toe system of levers on tripping device, substantially as above described, because this allows a greater throw of trips with a smaller magnetic force, the theory being that as magnetism diminishes in proportion to the square of distance from the armature, the shifting of the leverage allows a very feeble attraction to start the action.

Electro-magnets have been heretofore used in district signal-boxes in the following manner:

First, by a cut off opened when the box is started, and cut out by the train when the signal is complete. This gives a rattling sound by the vibration of the magnet-armature while the signal is being sent; but as the box-gearing accomplishes the cutting out it is impossible for the operator at the central station to respond that he understands.

Second, a magnet (with its armature or other sounding device) permanently in circuit, and responding to all breaks and closes on said circuit. This device is objectionable, because the great number of magnet-coils, one in each box, requires an immense battery-power, and also because of the annoyance caused box-holders by the tapping of signals other than their own.

In my device the cut-off is removed by the action of starting the box, and replaced by the action of the operator at the central station in responding his understanding of the call, as heretofore described.

My invention, therefore, embodies a cut-off opened by the subscriber, either unconsciously while setting the box, or at pleasure, by moving a special lever, which may be an extension of the same through the side of the box, and closed by an increase of battery-power, however obtained, the end to be attained being to return a responsive signal from the central station to the person sending in a signal, signifying that the signal has been received and is understood.

This arrangement of signals and response can also be used in hotels and other similar places, instead of the annunciators ordinarily used.

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

1. The combination, with an electric-signal transmitter, of an electro magnet, L L, of low resistance, the armature of which is connected with a mechanical alarm or sounder, so that said electro-magnet will remain dormant under the ordinary electric current while the message is being transmitted, but is capable of being subsequently magnetized, so as to operate the sounder, by an increase of the main-line battery-power, either by shunting resistance or increasing cells, or by reversal of the main battery, substantially as above specified.

2. A mechanical return-signal or sounder attachment to district-telegraph signal-boxes, which serves also as a cut out, said cut-out being opened by the operation of setting or operating the main signal, and released and closed by the action of an electro or polarized magnet, by means of an increased current or reversed battery, substantially as and for the purpose above described.

3. In combination with a telegraphic signal apparatus, a mechanical alarm or sounder, operated by an electro-magnet of low resistance, which is interposed in the circuit between the signal apparatus and a distant station, so that after the signal has passed over the wire a response signal or alarm can be sounded by momentarily increasing the battery-power, substantially as above specified.

4. In combination with a telegraphic signal-box, A, a mechanical alarm or sounder which is set by the same operation that winds up the signal mechanism, and which remains in its set position until after the message has been transmitted, and which is subsequently operated to give an alarm by an increased battery-current sent over the same wires that transmitted the message, substantially as above specified.

In witness whereof I have hereunto set my hand and seal.

STEPHEN DUDLEY FIELD. [L. S.]

Witnesses:
GEO. H. STRONG,
GEO. S. LADD.