

B. B. TOYE.
TELEGRAPHIC RELAY.

Fig. 1.

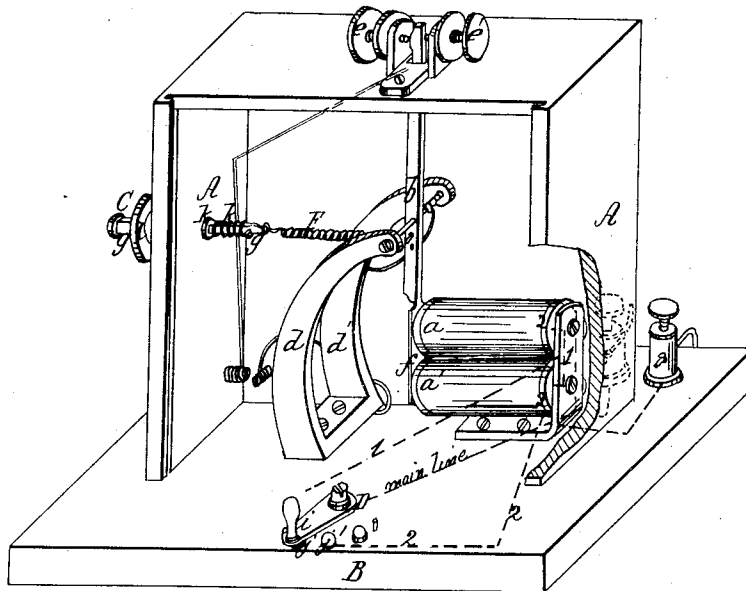
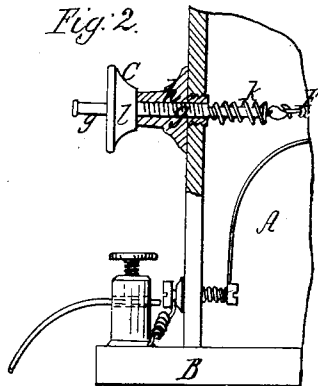


Fig. 2.



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BENJAMIN BIRDWOOD TOYE, OF TORONTO, CANADA.

Letters Patent No. 110,090, dated December 13, 1870.

IMPROVEMENT IN TELEGRAPHIC RELAYS.

The Schedule referred to in these Letters Patent and making part of the same.

I, BENJAMIN BIRDWOOD TOYE, of the city of Toronto, county of York, province of Ontario, and Dominion of Canada, have invented certain new and useful Improvements in "Telegraphic Relays," of which the following is a specification.

Nature of the Invention.

The object of this invention is to improve the working of "electric telegraphs," more particularly under certain conditions of weather, by reducing the "resistance," and also to admit of a greater number of "relays" being placed in the electric circuit of a telegraph line.

The invention consists in using or winding on the spools or helices one-fourth to one-eighth the quantity of copper wire ordinarily used;

Also, in providing a light-lever armature, which does away with the usual cross-bar;

Also, a safety-"adjuster," so constructed that it cannot be over-stretched;

Also, an auxiliary adjuster to "cut out" one of the spools or a portion of the wire contained on said spools; and,

Furthermore, in the arrangement of the relay as a whole, to be hereinafter specified.

General Description.

In the drawing—

Figure 1 is a perspective view of my relay.

Figure 2 shows the safety-adjuster part in section.

A is the box covering the working parts, and

B, the base.

a a' are the helices or spools wound with one-fourth to one-eighth the quantity of copper wire used on ordinary relays, said reduced quantity representing a resistance of from only one to eight miles, whereas ordinary relays have a resistance of from ten to thirty miles of No. 9 galvanized iron wire, such as is commonly used for telegraph lines. The resistance of the ordinary relay has the effect, when a number are employed on a telegraph line, of retarding electric communication, and rendering it difficult to work the lines, especially in wet, damp, and foggy weather.

By my invention a greater number of relays can be used, and the line work well in bad weather, in consequence of the low resistance offered by my instrument.

b is a light-lever armature, standing upright, and having a small shaft, *c*, with pivot points, run through its center, and which works between two arms, *d d'*.

This armature is flattened below the shaft *c*, the flat part *f* standing opposite the magnetic cores of the spools *a a'*.

The upper end protrudes through the box A, and plays between two adjusting-screws, *e e'*.

C is the safety-adjuster, consisting of the usual spring F, attached to the armature *b*, the other end hooked to a long, square rod, *g*, which passes longitudinally through a stop-piece, *h*, set in the side of box A, and has a screw-thread on its upper and lower face.

The bar works loose through the stop-piece *h*, and inside the box is encircled by a spiral spring, K, fastened near the hook of the bar, which prevents the spring F, attached to the armature, from being over-stretched, as is the case with adjusters now in use.

Outside the box an adjusting thumb-nut, *l*, works on the end of the bar *g*, by which the operator adjusts the armature by the means specified above.

D is an auxiliary adjuster or "cut-off" which is so arranged with the wire connections (see dotted lines) that portions of the wire or spools may be cut out from the electric circuit.

This is done by means of the movable arm or switch *i*, which, by placing it on knobs *j j'*, reduces the resistance by withdrawing the electricity from portions of the wire of said spools or helices. For example, by moving the arm or switch *i* onto knob *j*, (see fig. 1,) the entire wire of one of the spools is cut out from the electric circuit, for the purpose of reducing the attraction of the cores upon the armature. This will at the same time improve the general working of the line, because that amount of resistance is taken out of the electric circuit. This not only has a local effect, but has also the general effect of improving the working of the line by cutting out the resistance, while in ordinary relays the withdrawing or adjusting back of the cores, as is customary, has a local effect only.

By putting the switch on knob *j'* it cuts out one-half only of one spool, at the discretion of the operator, according to the condition or working of the line. This is accomplished by having one-half of the wire on that spool divided from the other half. This, I believe, has never before been done.

Cut-offs and "switches" are common in telegraphy. Such I do not claim, broadly; but I am not aware that they have ever before been connected with one or more of the spools or cores to reduce the effect of the electricity or magnetism, and make still less the resistance on the wires. This I consider an important feature of novelty in my relay.

Claims.

I claim as my invention—

1. The lever armature *b*, without a cross-bar, its lower or flat part being acted on directly by the cores,

and arranged in the manner and for the purpose hereinbefore set forth.

2. The safety-adjuster C, consisting of the bar *g*, its special spring K, the stop-piece *h*, and adjusting thumb-nut *i*, in combination with the spiral spring *f* and bar *b*, in the manner and for the purpose specified.

3. The auxiliary adjuster or cut-off D, with switch *i* and knobs *j j'*, with wires 1 2 running to the helices *a a'*, so that more or less of the magnetism in the spools or cores may be cut out and the resistance on the wire reduced, as hereinbefore set forth.

4. The combination and arrangement of the relay, as a whole, consisting of spools *a a'*, vertical armature *b* arranged between arms *d d'*, safety-adjuster C, and auxiliary adjuster D, arranged substantially as and for the purpose hereinbefore set forth.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

BEN. B. TOYE.

Witnesses:

J. R. DRAKE,

C. N. WOODWARD.