S. D. FIELD.

TELEGRAPH SYSTEM.

APPLICATION FILED DEC. 1, 1906.

904,768.

Patented Nov. 24, 1908.

Fig. 1.

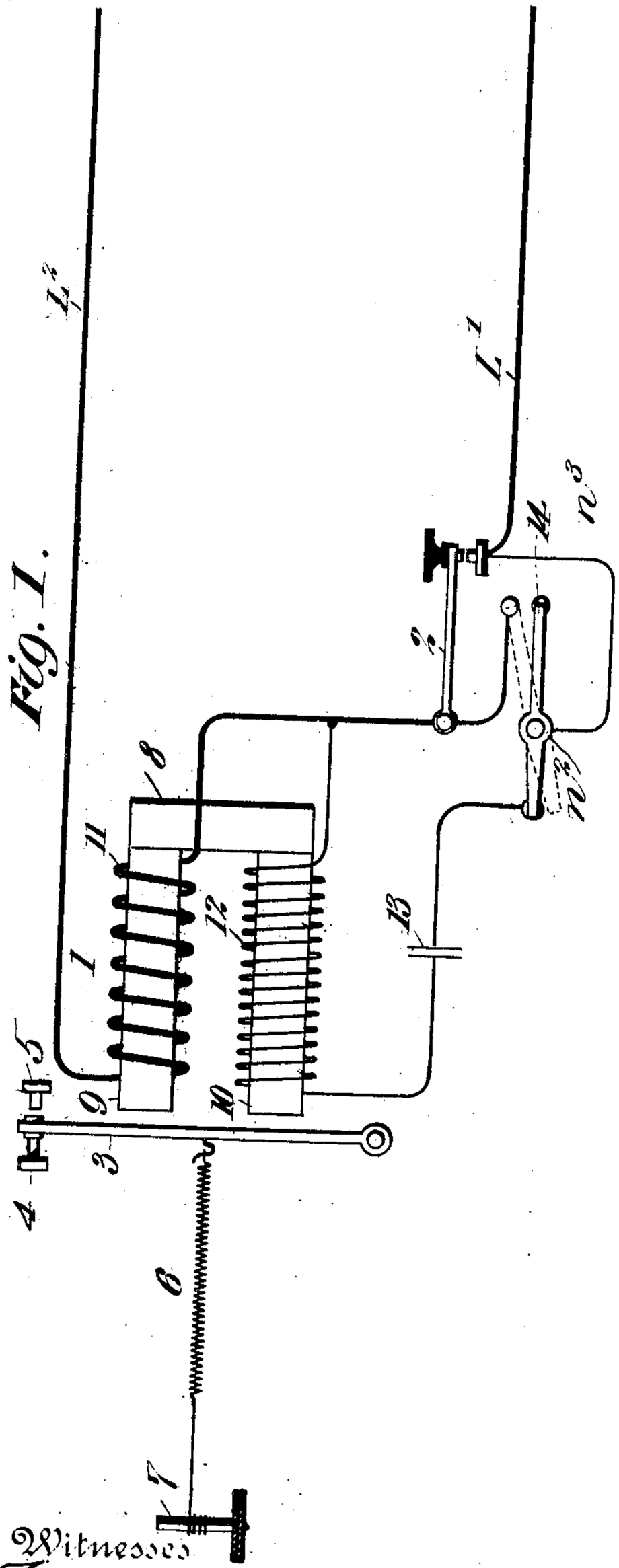


Fig. 2.

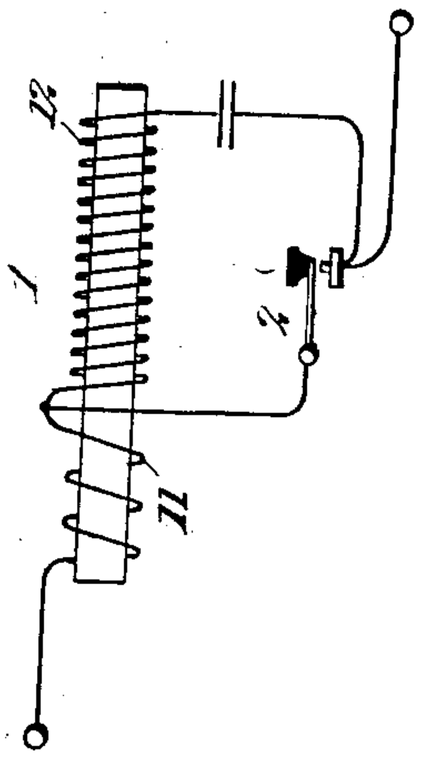
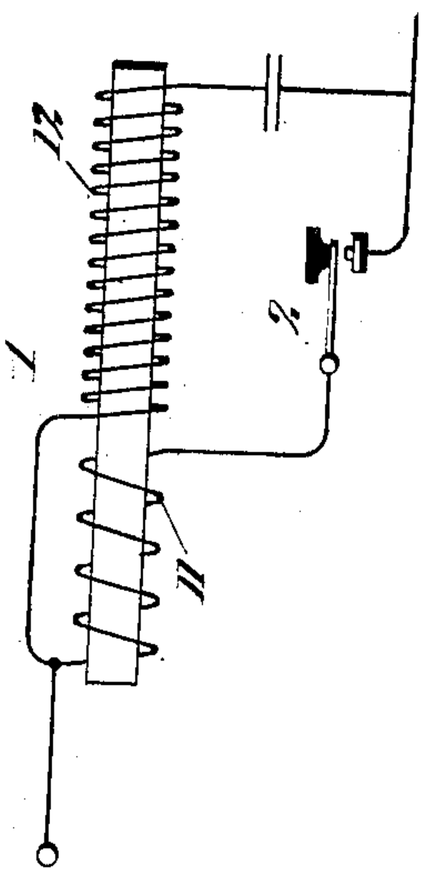


Fig. 3.



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TELEGRAPH SYSTEM.

No. 904,768. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed December 1, 1906. Serial No. 345,866.

To all whom it may concern:

Be it known that I, STEPHEN D. FIELD, a citizen of the United States, residing at Stockbridge, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Telegraph Systems, of which the following is a full, clear, and exact description.

My invention relates to a method of accelerating or sharpening the signals in telegraphy.

It is particularly adaptable to long telegraph lines where the signals are ordinarily retarded or sluggish by the line inductance and capacity.

In the drawings: Figure 1 is a diagrammatic view showing an arrangement of circuits at a single station of a telegraph line, and embodying the principles of my invention; Fig. 2 is a view of the same in more diagrammatic form; Fig. 3 shows a slight modification.

In carrying out my invention I make use of magnetism in an iron body which is utilized to generate an electromotive force both at the inception and at the completion of the signals. These momentary electromotive forces are applied to make the current changes therein more abrupt, and thereby sharpen or accelerate the signals. In the present application I have shown the ordinary relays wound so that the iron of their construction will be magnetized to operate in the above way.

Referring to Fig. 1, 1 is a telegraph relay, and 2 is an ordinary transmitting key. 3 denotes the armature of the relay moving between stops 4 and 5, and normally tensioned against the back stop by the spring 6, adjusted by the thumb wheel 7. The magnet 8 of the relay 1 has cores 9 and 10, of which 9 is wound with a few turns of wire 11 in the line circuit, while 10 has a considerably larger number of turns in circuit with a condenser 13, and bridged across the key 2. 14 denotes a circuit closing switch having an arm n^2, which completes this bridging circuit through a connection n^3, when in the full line position shown in Fig. 1. L′ and L² are the line connections.

Fig. 2 is exactly like Fig. 1, except the representation is in purely diagrammatic form. A detailed description of this figure is therefore unnecessary. The construction of Fig. 3 is also like that of Fig. 1, except that the winding 12 is bridged across both the winding 11 and the key 2, instead of the key 2 alone as in the preceding form.

The method of operation is as follows: When the key 2 is closed, current flows through the winding 11, and energizes the core 9 enough to cause it to attract the armature. When the key 2 is opened, the current no longer has this path, but is obliged to traverse the winding 12 through the condenser, in which path it is subjected to the counter E. M. F. due to the dying out magnetism of the core 9. This counter E. M. F. of coil 11, of course, greatly preponderates over the direct E. M. F. of the winding 12 on account of the larger number of turns therein. This line current is therefore arrested promptly as is desired. The condenser 13 acts in the manner of all condensers, permitting, for a momentary interval, a current flow therethrough exactly as if it were not in the circuit. When the key 2 is closed, the reverse effect takes place since current now passes through the winding 12, (due to the condenser discharge). This current assists in the prompt magnetization of the core 9, and thereby the flow of current in the line. The signals in the line are therefore accelerated and sluggishness overcome, since the abruptness of the current variations is increased both at the beginning and at the end thereof.

What I claim, is:—

1. The method of accelerating the transmission of telegraphic signals which consists in impressing upon the line an electromotive force which is counter to the line current, at the instants when the circuit is opened to form the signals.

2. The method of accelerating the transmission of telegraphic signals which consists in impressing upon the line at the instants of closing the circuit in the formation of signals a momentary extra electromotive force in a direction to augment the line current.

3. The method of accelerating the transmission of telegraphic signals which consists in impressing upon the line at the instants of the opening of the circuit in the formation of signals a momentary electromotive force counter to the line current, and in impressing upon the line at the instants when the circuit is closed in the formation of signals a momentary electromotive force augmenting the line current.

4. The method of impressing a momentary

electromotive force upon the line of a telegraph system having a plurality of stations with a relay and a transmitting key at each station, which consists in employing the current during the idle period of the line between signals to accumulate a store of energy at the transmitting station, and utilizing said energy when the key of such station is closed to impress an electromotive force in the direction of the line current.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

STEPHEN D. FIELD.

Witnesses:

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