4 Sheets—Sheet 1.

T. A. EDISON.

SEXTUPLEX TELEGRAPH.

No. 453,601. Patented June 2, 1891.

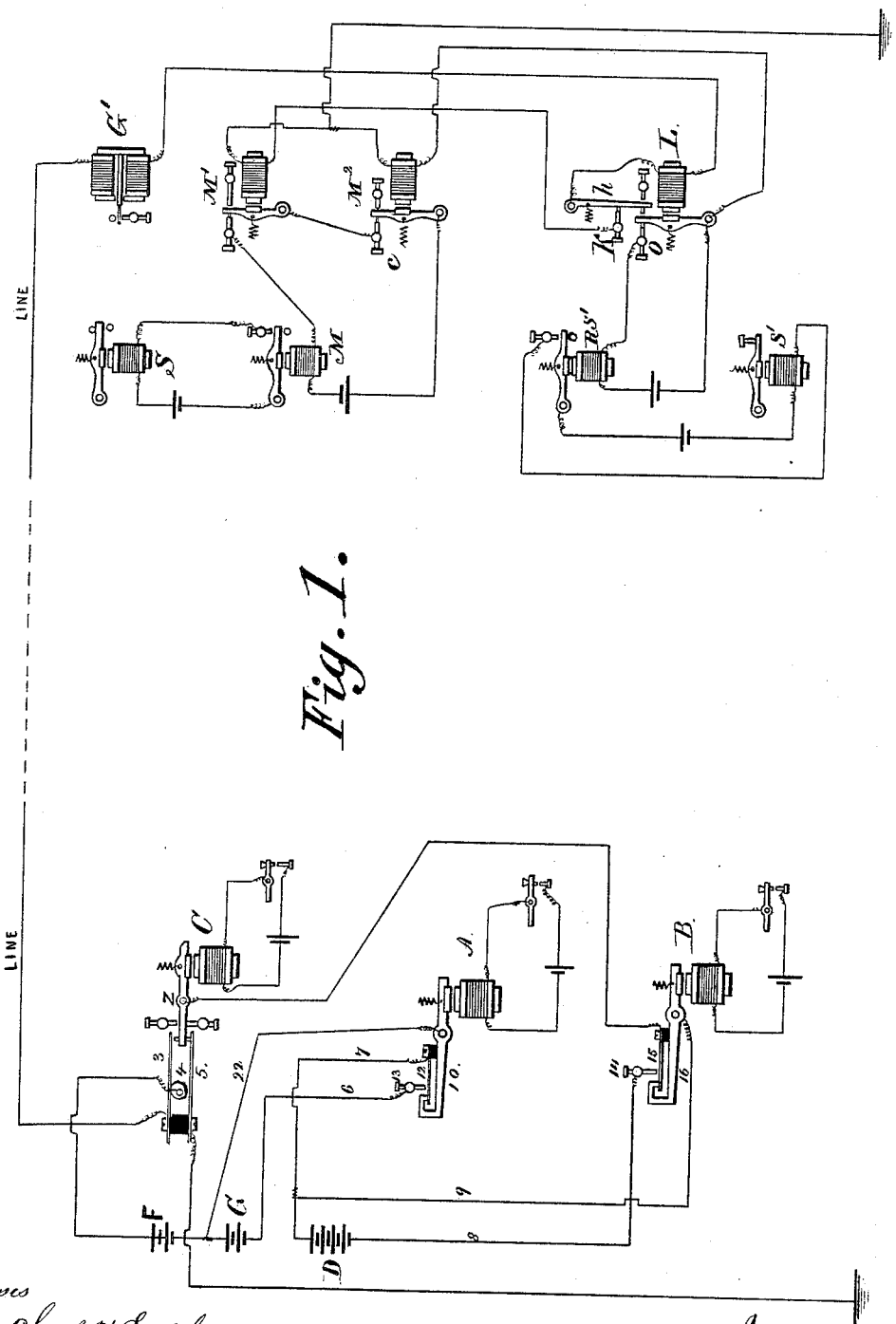

Fig. 1.

Witnesses
Chas. H. Smith
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Inventor
Thos. A. Edison.
per Lemuel W. Serrell atty.

4 Sheets—Sheet 2.

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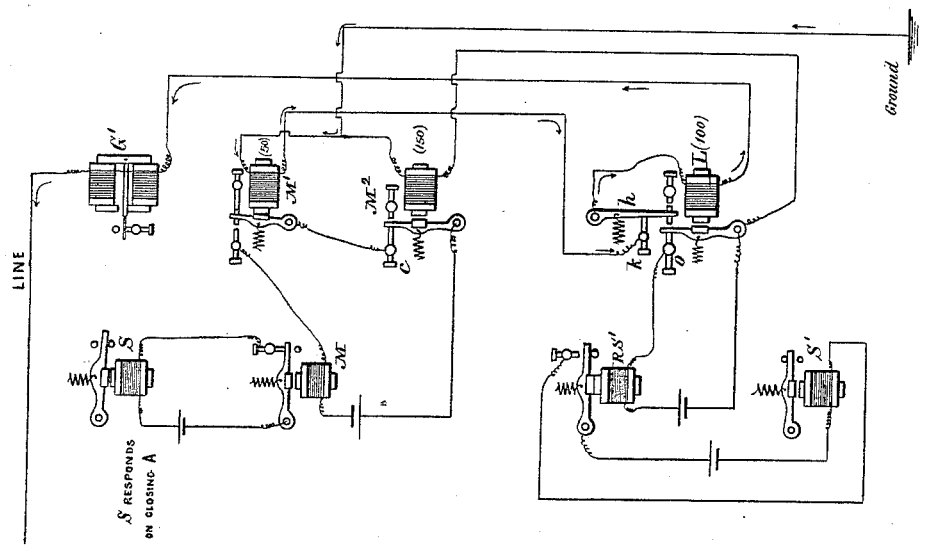
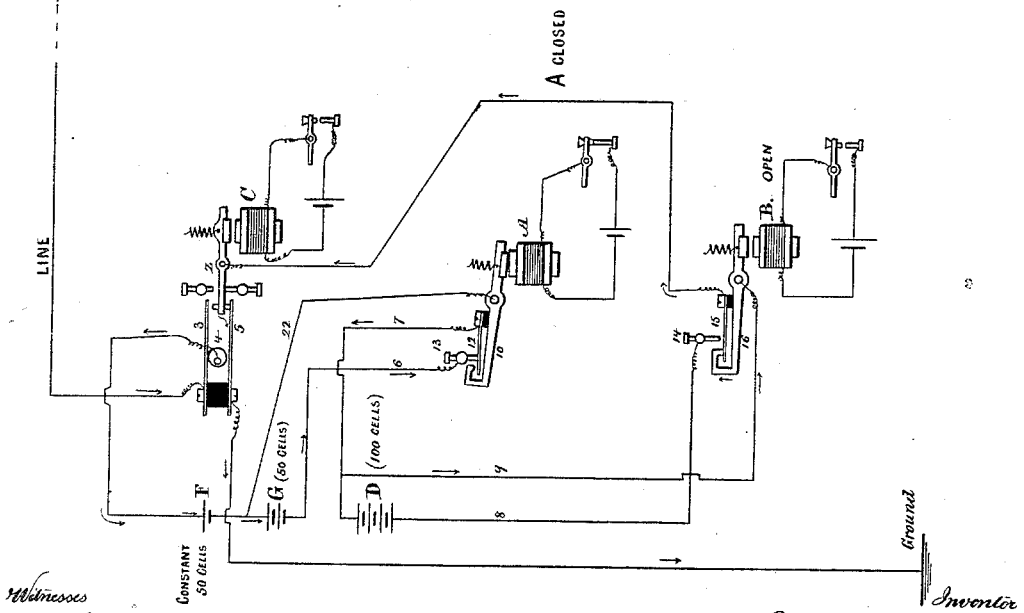


Fig. 2.



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4 Sheets—Sheet 3.

T. A. EDISON.

SEXTUPLEX TELEGRAPH.

No. 453,601. Patented June 2, 1891.

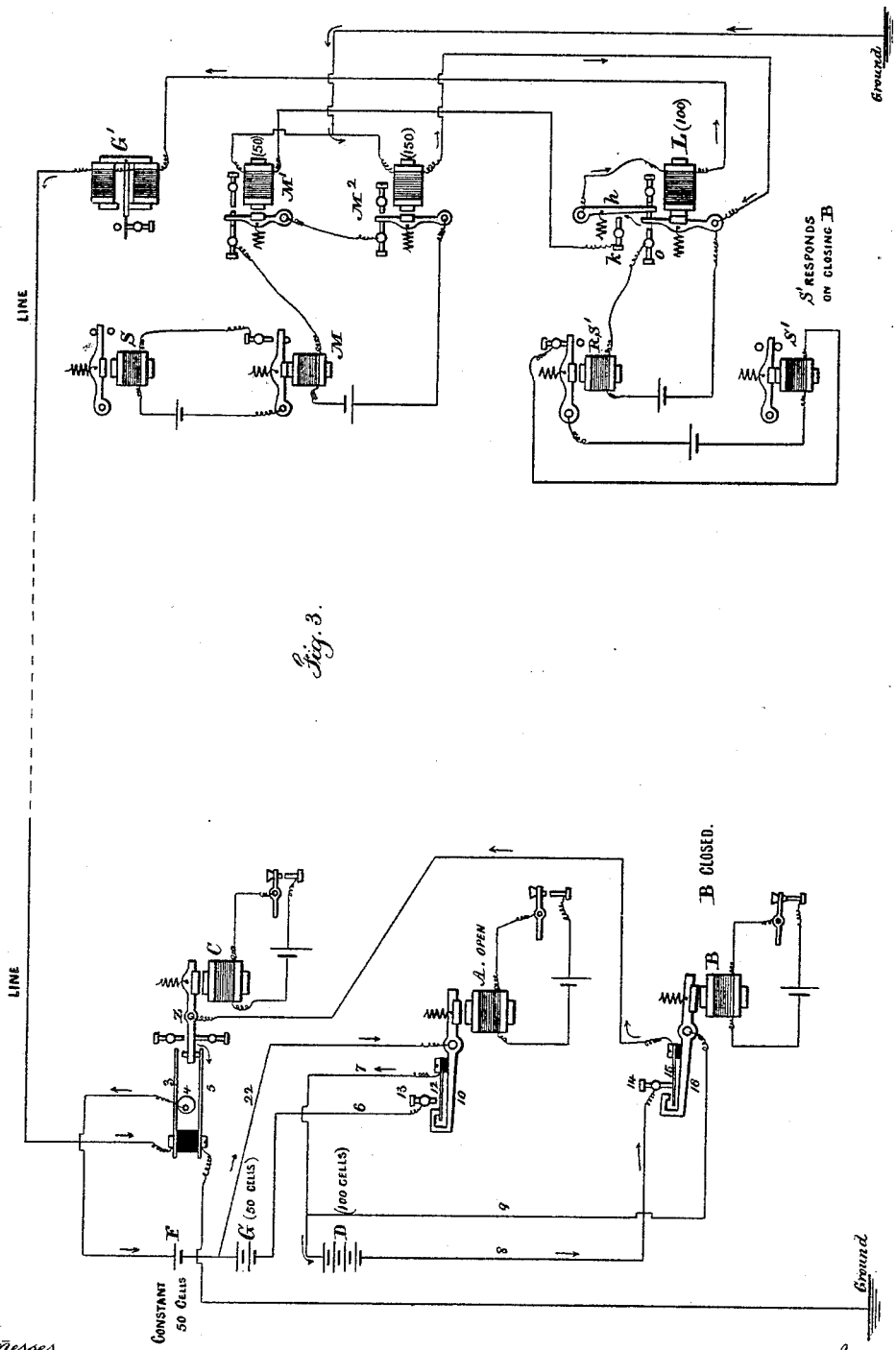

Fig. 3.

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4 Sheets—Sheet 4.

T. A. EDISON.

SEXTUPLEX TELEGRAPH.

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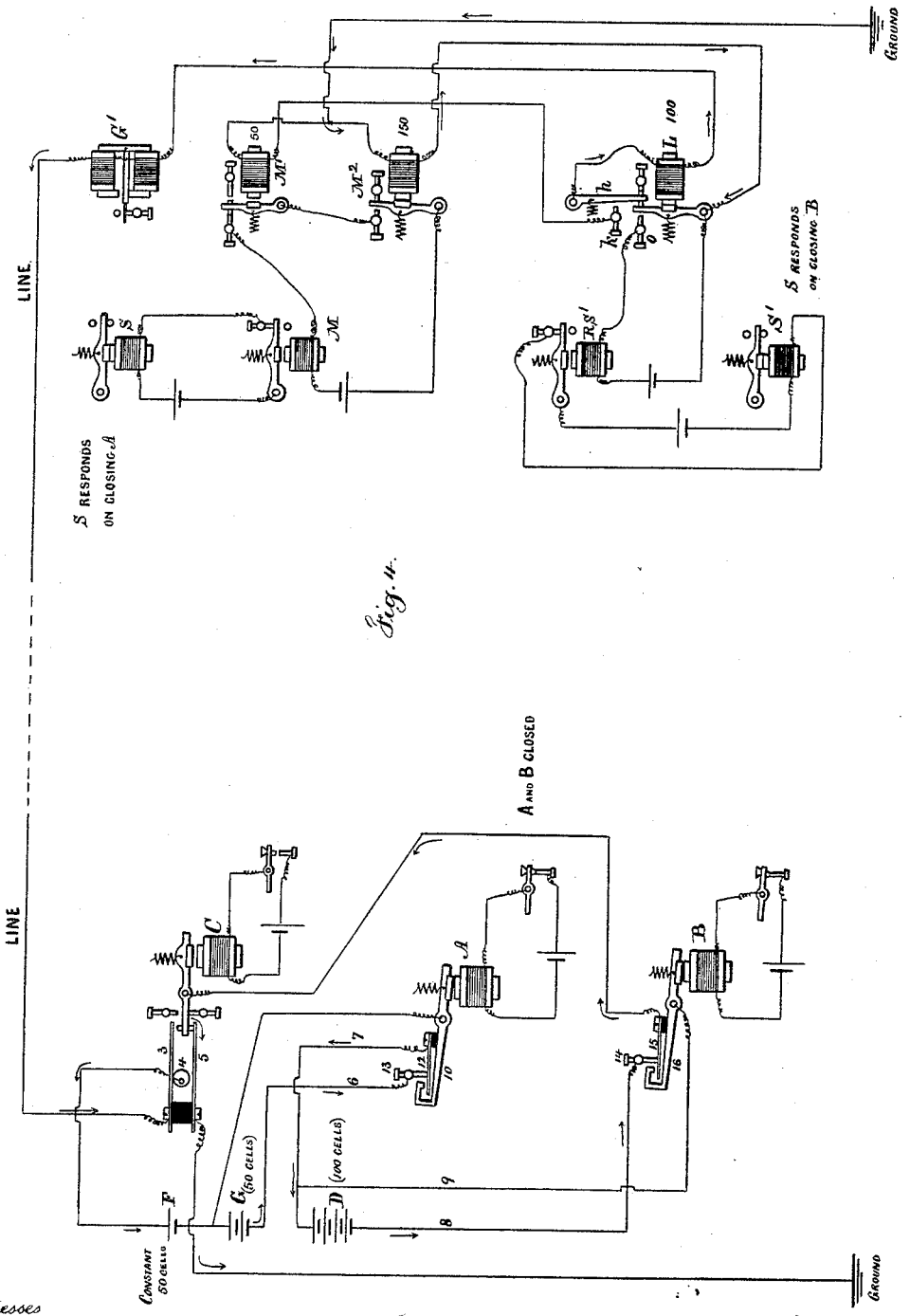

Fig. 4.

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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY, ASSIGNOR TO THE WESTERN UNION TELEGRAPH COMPANY, OF NEW YORK, N. Y.

SEXTUPLEX TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 453,601, dated June 2, 1891.

Application filed June 2, 1877. (Model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented an Improvement in Sextuplex Telegraphs, of which the following is a specification.

The object of this invention is to transmit three independent messages in the same direction over one wire at the same time.

The invention relates to the arrangement of electro-magnets and circuit connections hereinafter described, in which one responds to reversals in the direction of the flow of the current in the line and the other two sets of devices to an increase or decrease in the strength of the current independent of its direction.

In the drawings, Figure 1 is a diagram of the parts with the keys at rest. Fig. 2 shows the parts with the key A closed and B open. Fig. 3 shows the parts with key B closed and key A open, and Fig. 4 shows the parts with both keys closed.

The method of transmission is as follows:

The first message is transmitted by reversals of the polarity or direction of the current from the battery F, which is composed of fifty elements or thereabout, and this reversal of the direction of the current from F, or G and D, if they are in circuit, causes the tongue of the polarized relay G′ to be thrown to one side or the other at each reversal, and this polarized relay G′ receives the signal by any sounder or other similar instrument.

The second message is sent as follows by the transmitter B: When B is closed, the battery of one hundred cells is thrown in circuit, and this, acting upon the relay L at the distant station, causes it to leave its back point O, thus opening the repeating-sounder R S′ and closing the signaling-sounder S′. If B is now opened, the lever returns to its back point O, closing the repeating-sounder R S′ and opening the circuit of the signaling-sounder S′, and this takes place whether A is worked or not, that transmitter only putting in circuit the battery G of fifty cells, which cannot act upon L to prevent perfect signaling from B.

The third message is sent by the transmitter A, and received through the relay M′ M² and sounder S, according to the strength of the currents passing over the line. Supposing B to be open, the opening and closing signal is made by inserting and withdrawing the battery G of fifty cells, which, passing over the line, enters the lever *h* on the relay L, thence to the point K to the relay M′, and thence to the earth. The relay M′ is adjusted to respond to currents of fifty cells, the relay M² being thrown out of circuit by a want of contact of the armature-lever of L with the lever *h*. Hence its own lever rests against its back point *c*, preserving the continuity of the local circuit. Now M′ having attracted its lever, the local circuit is broken and the repeating-sounder opens and closes the reading-sounder S, thus making a closing signal, and when the transmitter A is opened the battery G is disconnected and the lever of M′ falls back and closes the repeating-sounder M, which in its turn opens the sounder S, and we have an opening signal, and the relay M′ continues as long as B is not operated to record the message; but, supposing A were closed, the lever of the relay M′ would be attracted and the local circuit broken and the sounder S closed. Then if the transmitter B is closed the battery D is thrown in circuit, thus increasing the current from fifty to one hundred and fifty. At the same time the lever of L comes in contact with the arm *h*, separates it from its point K, throwing the relay M′ out of circuit and at the same time throwing the relay M² into circuit, and it being adjusted for one hundred and fifty cells its lever will leave its back point at the same instant that the lever of M′ reaches its back point. Hence the continuity of the local circuit will still be interrupted and the sounder S will still be closed. Now if while B is closed A should open, the battery G would be thrown out of circuit, and the lever of relay M² would be drawn back by its retractile spring to its back point, thus closing the repeating-sounder and opening the reading-sounder S. Hence it does not matter whether the transmitter B is opened or closed, the signal from key A will be properly recorded upon the sounder S of M by the action of M′ if B is open and M² when B is closed or in the act of working B by both M′ and M². It is to be borne in mind that the

sounder S will not respond to the current of one hundred sent by the key B, because the armature of L moves the lever *h* and breaks the circuit to M′. Hence that cannot act, and the current in passing through L, *h*, and M^2 to ground is not strong enough to move the armature of M^2, which only responds to a current of one hundred and fifty.

I will mention that all the receiving-instruments are to be wound with double coils and worked upon the differential system when sextuple transmission is obtained, or the receiving-instruments may be placed in the bridge-wire of a "Wheatstone" balance, both systems being provided with devices for obviating or neutralizing the effect of the static charge of the line. The cam or adjuster 4 acts between the springs 3 and 5 as a circuit-preserver for either spring 3 or 5. That which is not moved from it by the reversing-lever *z* rests against it and is only lifted out of contact after a new route has been established through *z* by the end of *z* coming into contact with either 3 or 5.

I will now trace the line connections through the transmitters in their various positions. Supposing A, B, and C to be open, the line enters by the spring 3 of C, thence through the cam or adjuster 4 to the battery F, thence to the lever 10, by the wire 22 to spring 12, wire 7, wire 9, lever 16, spring 15, lever *z* of C, spring 5, and thence to the earth. On closing C the direction of the current is reversed, the earth connection enters by 5 4 to battery F, thence 22 10 12 7 9, lever 16, spring 15 to lever *z*, and thence by spring 3 to line. The two reversing-springs 5 and 3 are so arranged that there can never be a break in the continuity of the line connections while there may be in the battery-circuit. When A is closed, the line enters C at 3, and supposing that open passes to the cam 4, thence to F, to G, wire 6, to point 13, spring 12, wires 7 and 9, lever 16, spring 15, back to *z* of C, and to earth by spring 5. If at the same time B is closed, the direction is the same, except the line instead of passing *via* wire 9 to the lever 16, it passes to the battery D *via* wire 8 to the point 14, and thence by the spring 15 to the lever *z* of C to the earth.

In my applications, Nos. 138 and 139, filed simultaneously with this, and in my application, No. 142, filed August 22, 1877, instruments are shown in which three electro-magnets are used in the line at the receiving-instruments, and variations in the electric current sent from the transmitting-station are made to act in the respective receiving-instruments.

The present application (known as No. 140) relates to the peculiar relative arrangements of the electro-magnets and circuit connections as claimed herein.

I claim as my invention—

1. The relays M′ M^2, local circuit, and sounder M, in combination with the relay L, the circuit of which passes through the lever *h* and electro-magnet M′, substantially as set forth.

2. The relays M′ M^2, local circuit, and sounder M, in combination with the relay L, the circuit of which passes through the lever *h* and electro-magnet M′, the relay R S′, and circuit connections through the armature and lever *h* to the electro-magnet M^2, substantially as specified.

3. The combination, in a sextuplex telegraph, of the polarized relay G′, responding to reversals of the currents, the relays M and R S′, responding to different strengths of current, the relays M′, M^2, and L and lever *h*, and circuit connections through L and M′ or M^2, substantially as specified.

4. The combination, with two circuit-preserving keys and one reversing-key at one station, by which more or less battery-power is put to line or the polarity reversed, of the relays M′, M^2, and L and lever *h*, and circuit connections from the line passing through L, *h*, and M′, or through L, *h*, and M^2, substantially as specified.

Signed by me this 31st day of May, A. D. 1877.

THOS. A. EDISON.

Witnesses:
GEO. T. PINCKNEY,
HAROLD SERRELL.