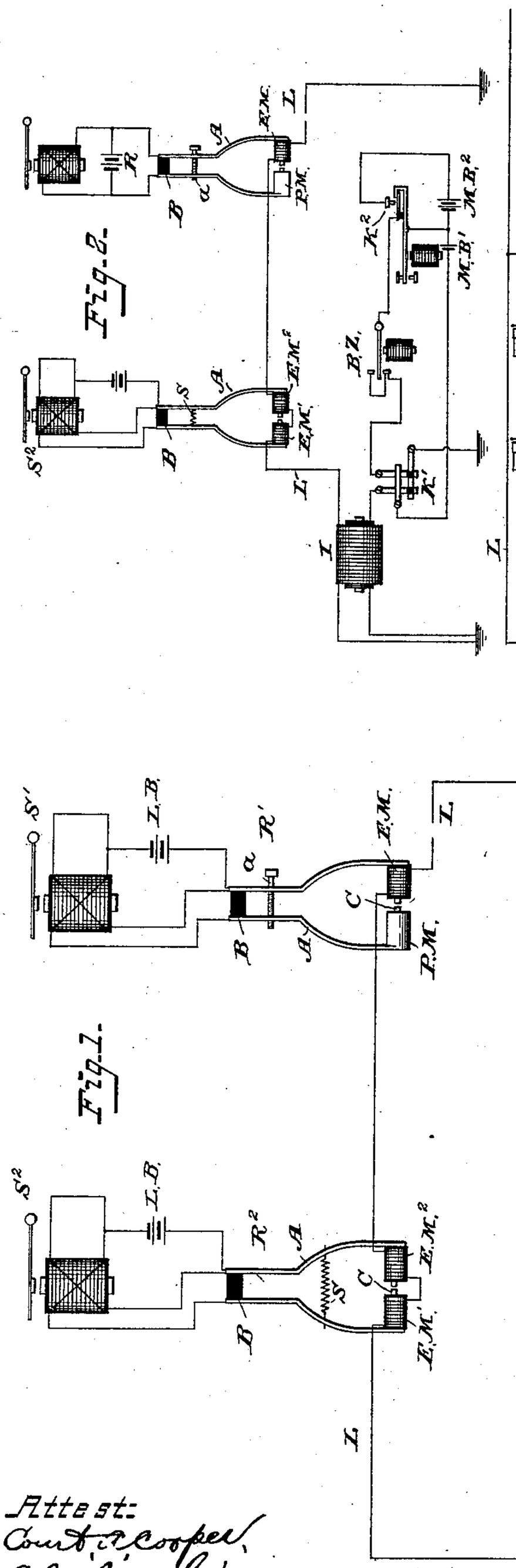
(No Model.)

C. SELDEN.

MULTIPLE TELEGRAPH SYSTEM.

No. 363,969. Patented May 31, 1887.



Attest:
Courtenay Cooper,
A. Rawlings.

Charles Selden.
Inventor.
By Foster & Freeman,
Attys.

UNITED STATES PATENT OFFICE.

CHARLES SELDEN, OF BALTIMORE, MARYLAND, ASSIGNOR TO HIMSELF, WILLIAM T. BARNARD, OF SAME PLACE, AND FRANÇOIS VAN RYSSELBERGHE, OF BRUSSELS, BELGIUM.

MULTIPLE-TELEGRAPH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 363,969, dated May 31, 1887.

Application filed April 26, 1886. Serial No. 200,194. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SELDEN, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Multiple-Telegraph Systems, of which the following is a specification.

My invention relates to a system of multiple telegraphy, and more particularly to receiving-instruments, by which the same may be operated, and has for its object to improve the construction and arrangement of telegraphic systems, whereby my invention may be used either upon a direct line-circuit, or may, by means of separators, be used upon derived circuits.

My invention consists in a receiver so constructed and arranged that it may be operated either in a direct circuit or in a derived circuit, and which will also admit of being duplexed or quadruplexed, so as to greatly increase the facilities named.

Referring to the accompanying drawings, forming part of this specification, Figure 1 is a diagrammatic arrangement of a direct-circuit system of telegraph, showing my improved receivers. Fig. 2 is a similar arrangement for an induced-current system of telegraphy. Fig. 3 is a similar view showing my improved system used as a derived or phantom circuit in connection with an ordinary galvanic Morse or other system; and Figs. 4 and 5 are diagrams showing arrangements of my devices.

The receiver R′ consists of two magnets, one, E M, being an electro-magnet, and the other, P M, being a permanent magnet; or, if desired, P M may be charged by a local battery instead of by permanent magnetism, and the effect will be the same. These magnets are placed upon springs or swinging arms A, of conducting material, the arms being supported upon a block, B, of insulating material, and the tendency of the permanent magnet is to attract the electro-magnet when there is normally no circuit upon the line. An adjusting device, as a screw, *a*, may be used to control the normal position of the magnets. The cores C of the magnets are secured to the springs or fixtures upon which the magnets are placed, and the adjacent ends of the cores are provided with platina or other suitable contact-points to form the circuit of a local battery, L B. I preferably use a local circuit, as shown, in which the sounder S′ is wound differentially, and so connected that when the points on the cores of the magnets are in contact with each other the effect of local battery L B′ is not felt upon sounder S′, for the reason that there are two paths for the passage of the current in opposite directions around the magnet of the sounder. If the local contact-points are forced apart or are set in motion, so as to increase the resistance of one of the circuits through the magnet of the sounder S′, then that magnet will be charged and the sounder will operate.

The receiver R² is constructed substantially the same as receiver R′, except in this case I prefer to employ two electro-magnets, E M′ E M², wound in such a manner that when they are simultaneously charged with a current of either polarity the tendency will be for them to repel each other, thus separating their local contact-points and causing sounder S² to respond. The cores of these magnets are normally held in contact, and this contact is regulated by a spring, S, or other means, so that when there is no circuit upon the line the spring S brings the contact-points of the magnets E M′ and E M² together, and the magnet of the sounder S² being wound in opposite directions by the two branch circuits of the local battery, a differentialized local circuit is formed and the sounder S² is not charged.

Such being the preferred construction and arrangement of the essential features of my improved receiver, it will be evident that I do not limit myself to the exact construction and arrangement shown, as these may be varied by those skilled in the art without departing from my invention. These receivers may be used either separately or in combination in many and various systems of telegraphy, and I will now more particularly describe some of the arrangements I have made.

In combining my receivers with a duplex telegraph I may employ a system in which with all keys open there is normally no circuit on the line. With one key closed a small

battery-force is on the line of a certain polarity, which affects receiver R′ and causes a signal on sounder S′, but does not cause a signal on sounder S², owing to the adjustment of the spring S. With another key I may cause a larger battery-force to pass to line, which will overcome the spring S and affect the sounder S², but not affect sounder S′, for the reason that at this time the direction of the current through the magnet E M on receiver R′ is such that the permanent magnet P M of the receiver keeps contact-points C together, and hence no signal is made on the differentially-wound sounder S′. If under these conditions the current on the line be reversed and its strength maintained, then signals are made upon both of the receivers.

It is obvious to those skilled in the art that by differentially winding the receivers R′ and R² and supplying one of the branches with the necessary and well-known means for producing electrical balances, as resistances, &c., a quadruplex telegraph will be the result.

Another arrangement of the receivers is shown in Fig. 2, wherein the current that passes to the receivers is a secondary or induced one, and in which case the key system is placed in the primary circuit of an inductorium, in which circuit there is a buzzer, B Z, which is actuated either independently of the keys, so as to keep up a continuous making and breaking of the primary circuit by a local circuit, mechanical means, or otherwise, or the buzzer may be arranged so as to respond only at such times as the keys are operated. This arrangement of devices need not be specifically described herein. Suffice it to say that the main line L forms the secondary of the inductorium I, and the primary circuit thereof contains a polarity-key, K′, with its main-line battery M B′, including the buzzer or rheotome B Z, in circuit, and a continuity-preserving key, K², with its main battery M B² also in the circuit. The action in this case, so far as the receivers are concerned, is the same as where the battery is placed direct to line, so that my receivers may be operated either by direct current from the battery or by induced currents from the inductorium, buzzer, Leyden jar, or other suitable device. This induced or secondary current circuit may be connected to any ordinary Morse or other direct-current system by means of separators, and thereby form a derived-circuit system. In other words, if a wire is being worked quadruplexed in the usual manner by means of separators, as shown in Fig. 3, another derived-circuit quadruplex system may be superposed upon the existing one, thus making the wire capable of carrying eight messages simultaneously.

Another feature of this apparatus, when arranged to work in a secondary circuit, as shown, and by means of derived circuits, is that at local stations local key systems may be employed with their inductoriums and receiving apparatus, as shown, the local arrangement being then carried to the main line by means of the derived circuit, and if the main line be worked single, or as commonly called "Morse," each way-station will thus have, in addition to the facilities which the Morse wire gives to it, two additional facilities, thus making the wire to all intent and purposes the same as two wires to way-stations and three between terminals.

It is obvious from the above that, as indicated in Fig. 4, a wire extending, say, from 1 to 2, and being worked quadruplexed between those points, may have a derived circuit extending from 3 to 4; and 1 and 2 being provided with derived circuits, as indicated in Fig. 3, they may work over the line four messages simultaneously, while at the same time 1, 2, and 3 may work upon the derived circuits simultaneously and without interference with the other Morse circuits. It is also obvious that if the direct circuit is used instead of an induced one upon the line, owing to its small current, telephones may be placed upon the same line in derived circuits and will not be affected by its action, thus admitting of utilizing the wire at one and the same time for telegraphy and telephony without interference with each other.

I have thus far shown the action to be expected when the points are separated by reason of the action of the current; but it is obvious that with a commonly-arranged local circuit and with the contact-points of the receivers normally apart, and the windings of the receiver-magnets in different directions, signals may be made by the closing of these points rather than by the opening of them, as shown.

It is also obvious that instead of using a differentialized sounder and circuit, as shown in the local, I may employ a shunted local battery, as indicated in R, Fig. 2, or may arrange so that motion on the part of the receivers will vary the resistance in the arm of a bridge, thus causing the local instrument to respond.

In case two ordinary telegraph-circuits cross each other, by the use of the separators and my induced-current system located at any two stations, as 5 6, Fig. 5, and by interposing a condenser, E, or similar separator at the junction of the two lines, the said stations 5 and 6 may communicate without interruption to the ordinary telegraphic signals.

Other modifications will suggest themselves, which need not be specified here.

What I claim, and desire to secure by Letters Patent, is—

1. A telegraph receiving-instrument consisting of two arms insulated from each other and carrying magnets at their extremities controlling a local circuit, substantially as described.

2. A telegraph receiving-instrument consisting of two arms insulated from each other, carrying magnets at their extremities, and adapted to be vibrated to control a local circuit, substantially as described.

3. A telegraph receiving-instrument consisting of two arms having magnets at their

extremities, the cores of the magnets forming contact-pieces for controlling a local circuit, substantially as described.

4. A telegraph-instrument consisting of two spring-arms carrying magnets at their extremities, said arms forming part of a local circuit containing a sounder, substantially as described.

5. A telegraph-instrument consisting of two spring-arms carrying magnets, the cores of which form contact-pieces, combined with a local circuit containing a differentially-wound sounder, substantially as described.

6. A telegraph-instrument consisting of two arms carrying magnets and contact-pieces at their ends, the said arms forming part of a local circuit, and springs for controlling the pressure of said contact-pieces, substantially as described.

7. A telegraph-instrument consisting of two spring-arms connected to an insulating-support and forming part of a local circuit, magnets upon the extremities of said arms, cores of the magnets provided with platinum contact-pieces, and means for adjusting said arms, substantially as described.

8. A telegraph-instrument consisting of two arms insulated from each other and carrying magnets at their extremities, in combination with a line-circuit passing through the coils of one or both of the said magnets, and a local circuit controlled by said arms, substantially as described.

9. The combination, with a telegraph line-circuit, of two receivers, each consisting of two arms carrying magnets controlled by said line-circuit and arranged and adjusted to be operated by varying currents, substantially as described.

10. The combination, with a telegraph line-circuit, of two receivers, each consisting of two arms forming part of a local circuit and carrying magnets at their extremities controlled by said line-circuit, one of the receivers being arranged to respond to currents of one polarity and the other to currents of strength, substantially as described.

11. The combination, with an ordinary Morse or other galvanic telegraph line-circuit, of an induced-current circuit containing receivers, each consisting of two arms carrying magnets controlled by the induced-current circuit and separators connecting said galvanic and induced-current circuits, substantially as described.

12. A receiver consisting of two magnets supported on and carried by flexible supports insulated from each other and controlling a local circuit, whereby the said local circuit may be controlled by the attraction or repulsion of the said magnets, substantially as described.

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

CHARLES SELDEN.

Witnesses:
WM. A. HARRIES,
W. C. DUVALL.