A. D. WHEELER.

FIRE ALARM INTERCOMMUNICATION SYSTEM.

APPLICATION FILED MAY 10, 1909.

952,024.

Patented Mar. 15, 1910.

6 SHEETS—SHEET 1.

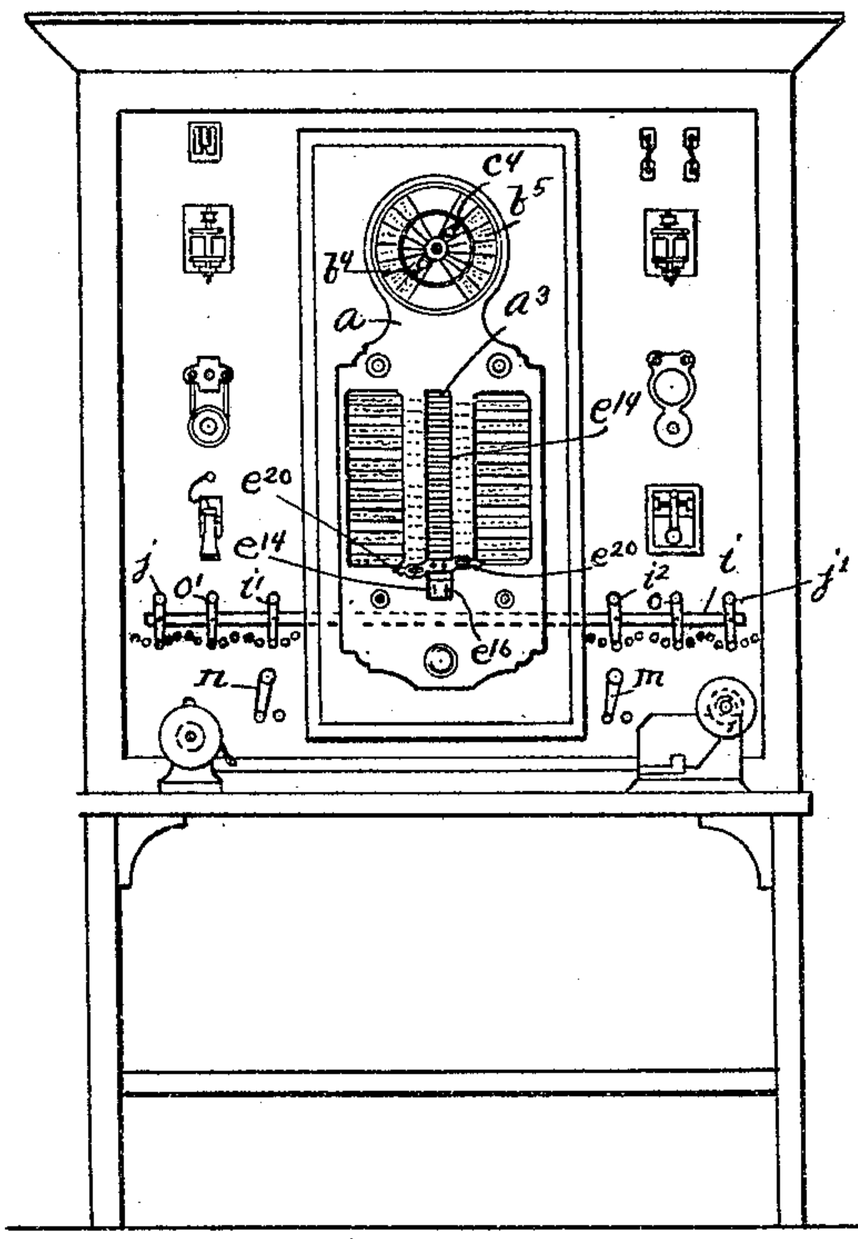

Fig. 1.

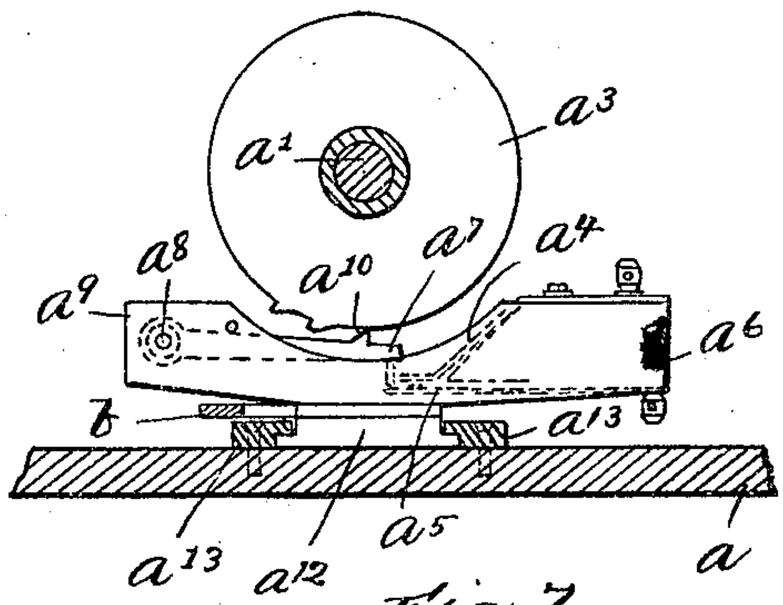

Fig. 7.

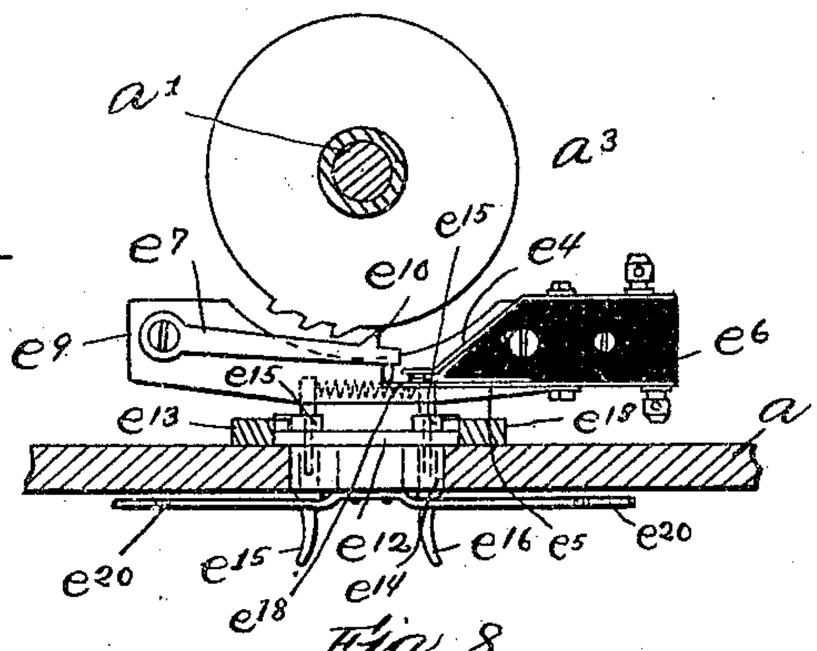

Fig. 8.

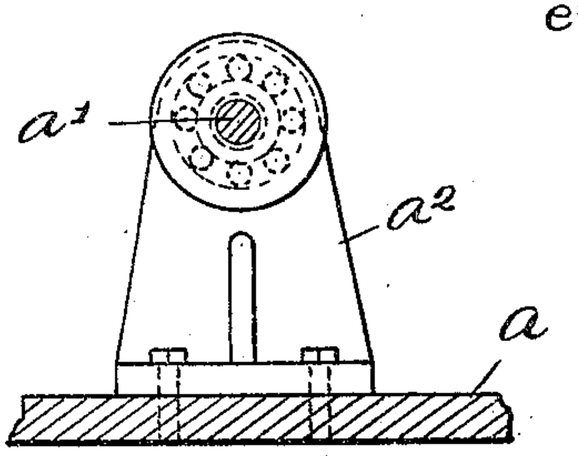

Fig. 9.

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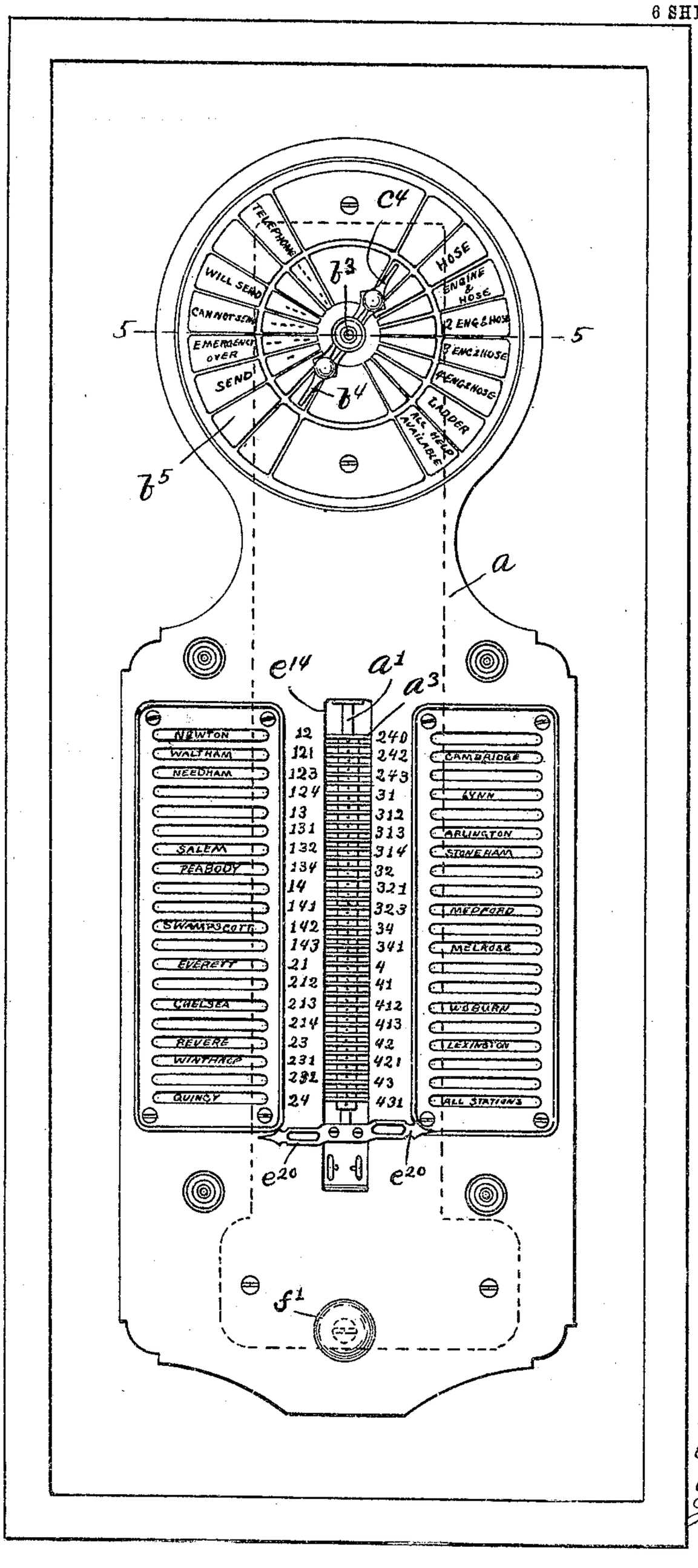

Fig. 2.

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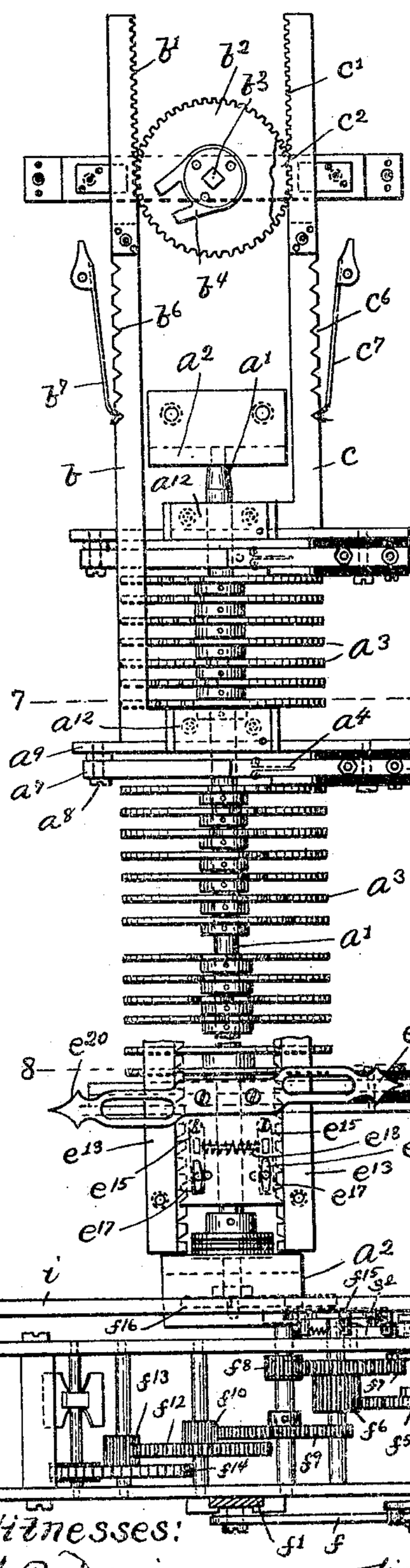

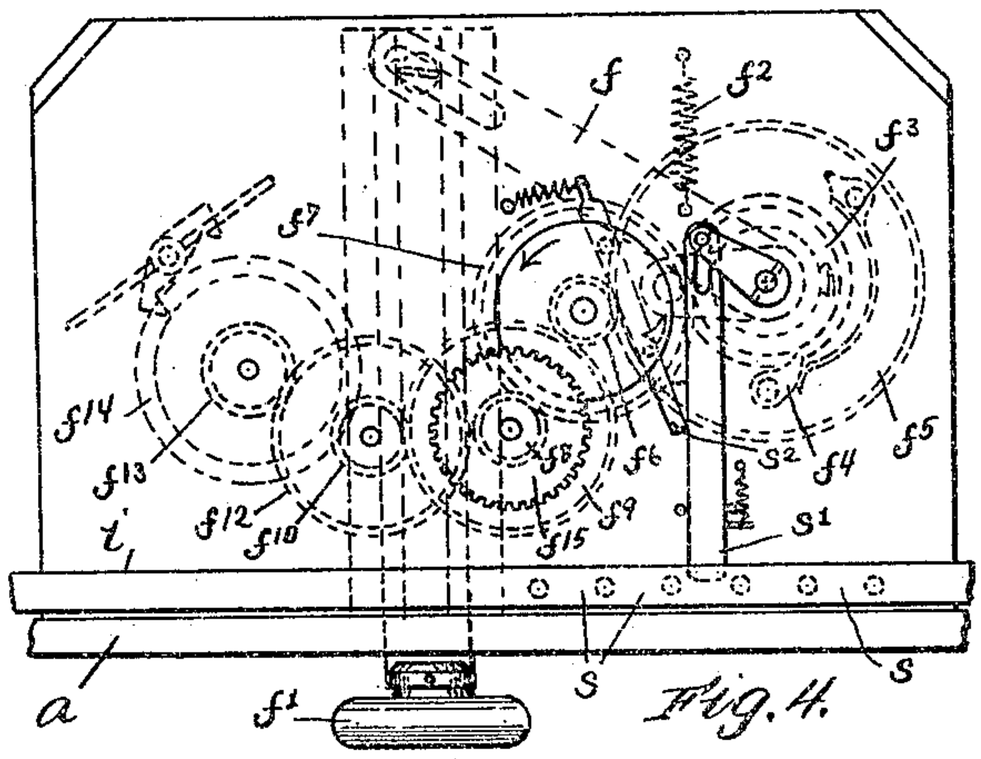

Fig. 4.

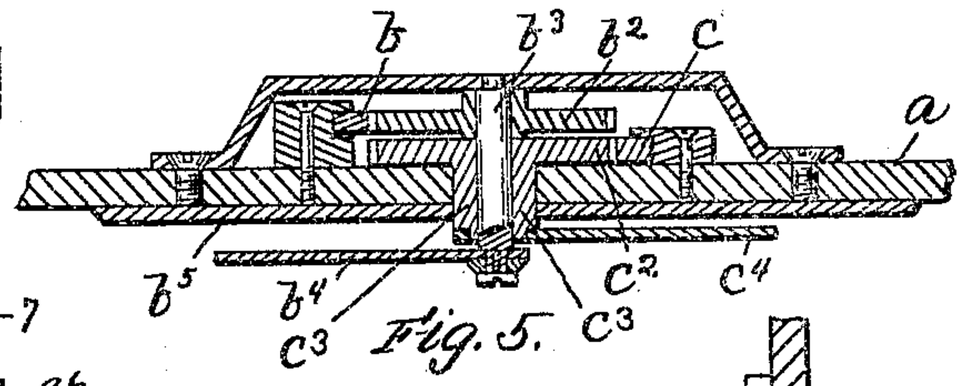

Fig. 5.

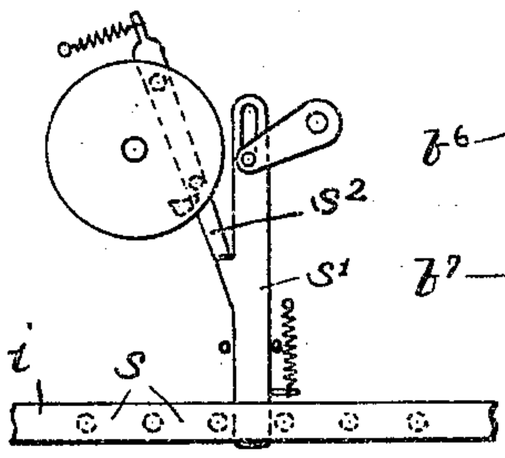

Fig. 10.

Fig. 6.

Fig. 3.

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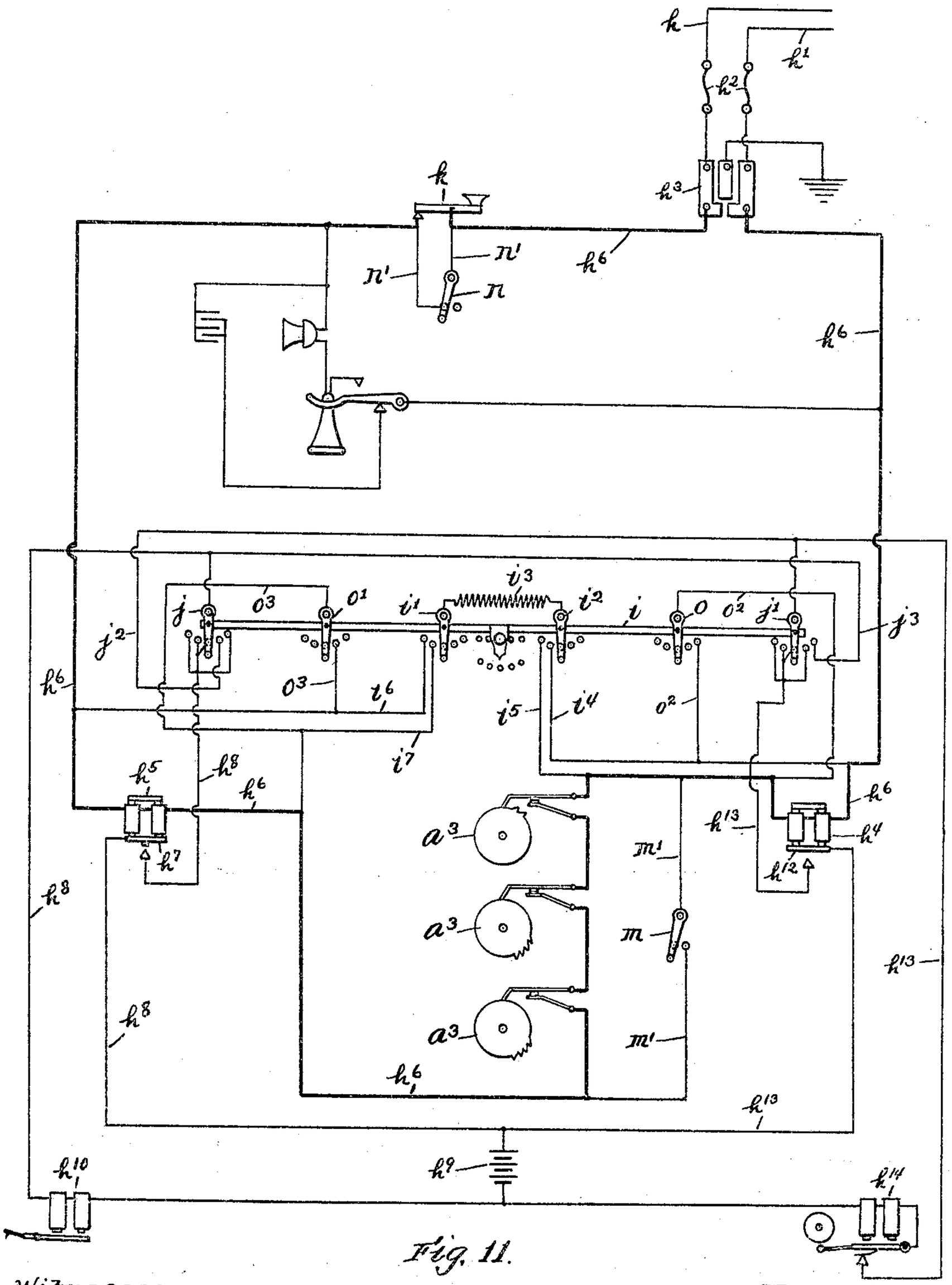

Fig. 11.

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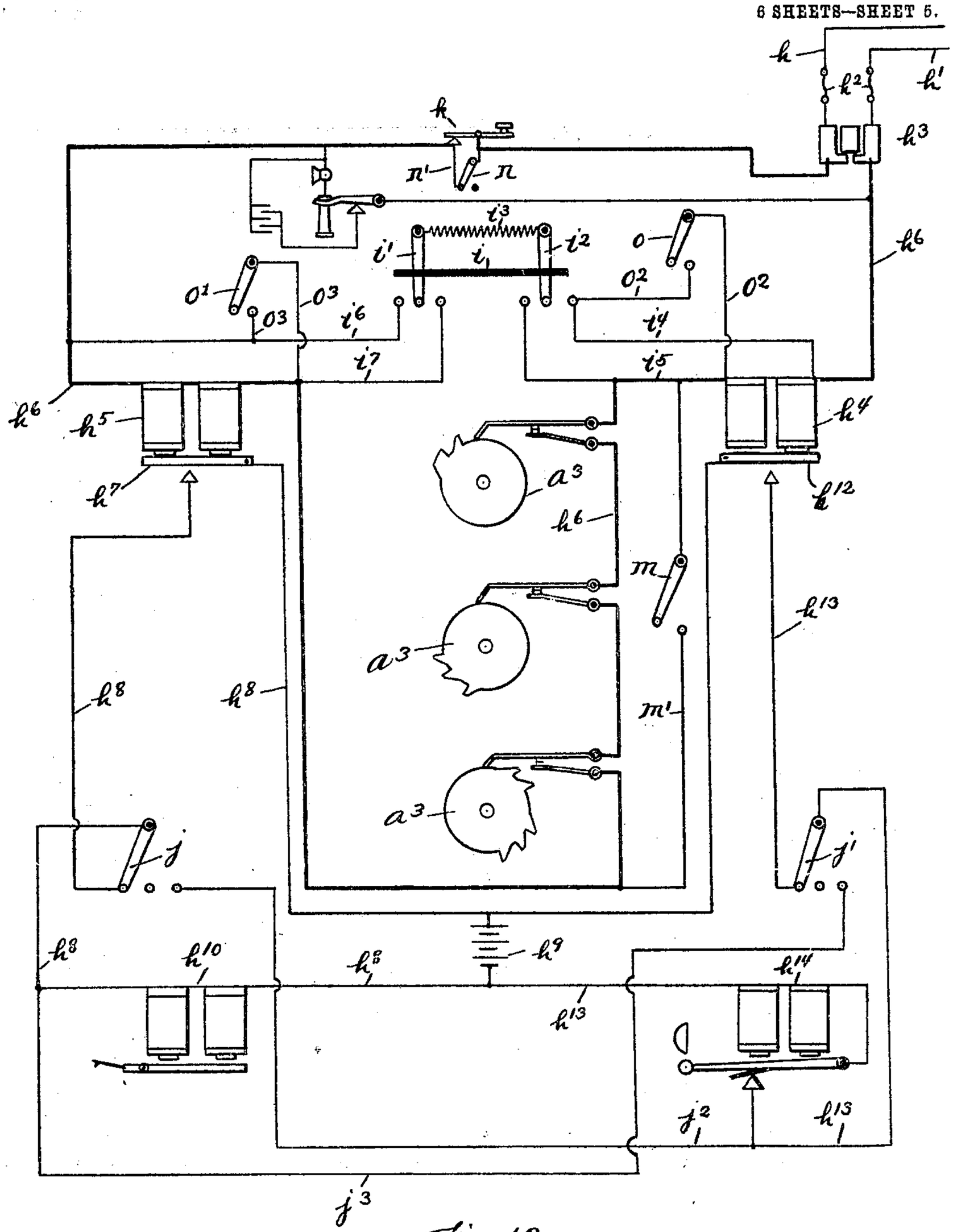

Fig. 12

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Patented Mar. 15, 1910.

6 SHEETS—SHEET 6.

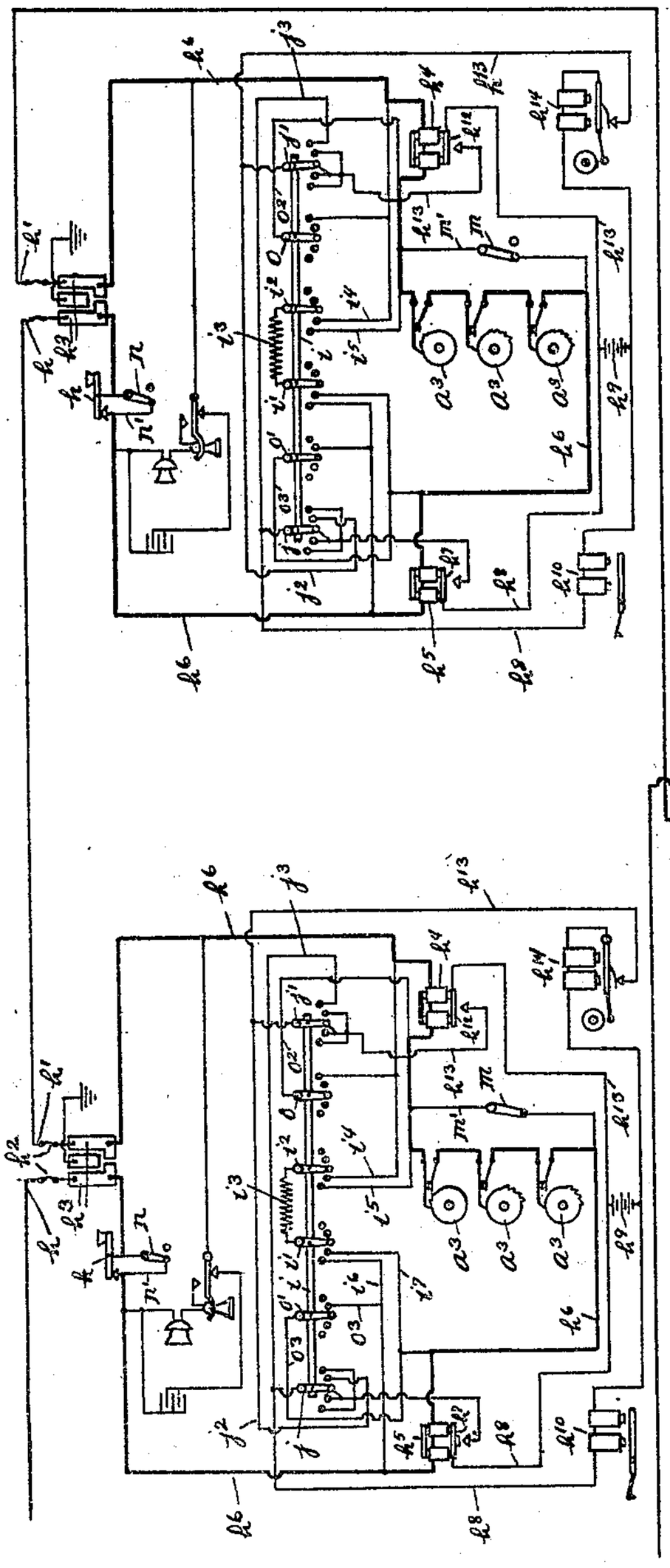

Fig. 13.

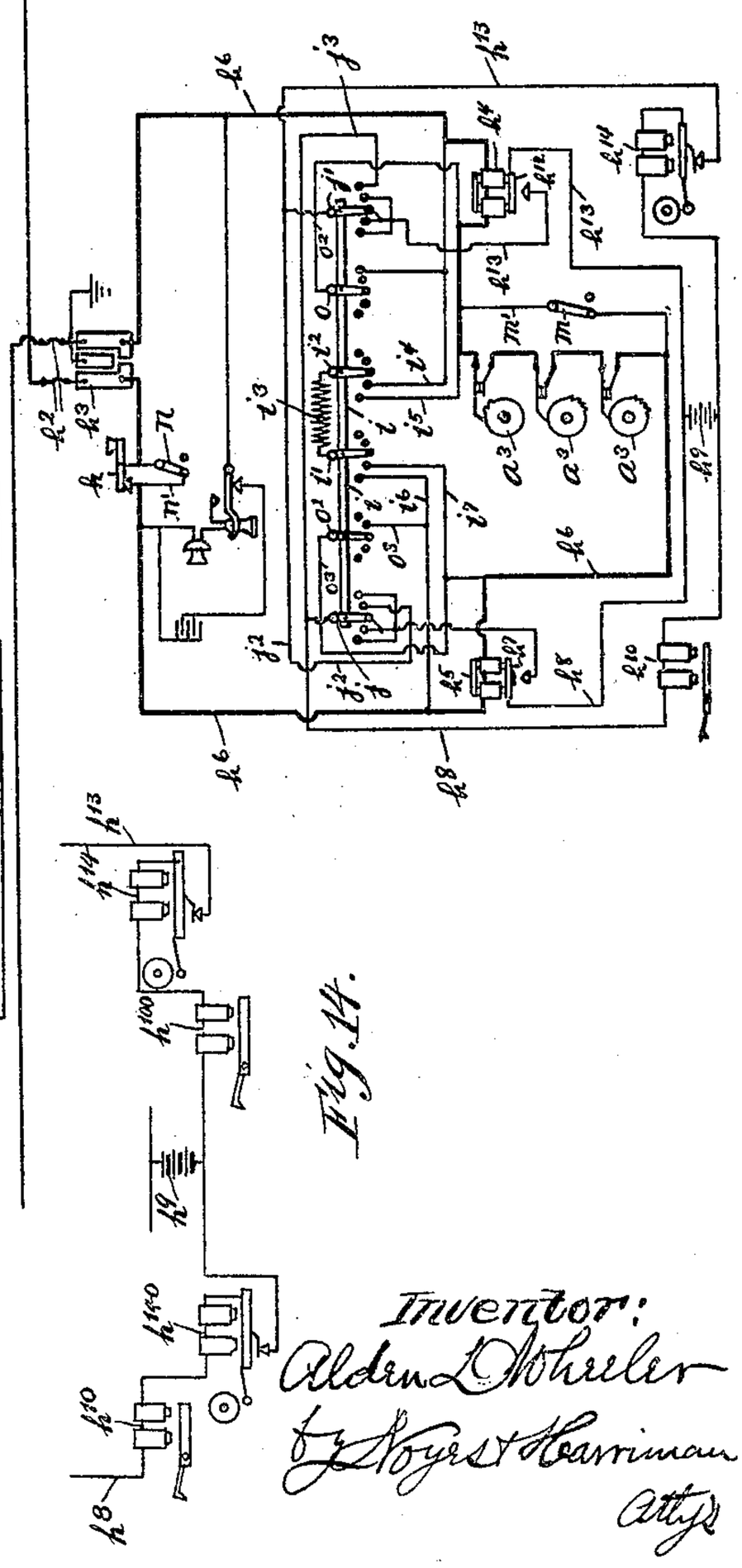

Fig. 14.

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UNITED STATES PATENT OFFICE.

ALDEN D. WHEELER, OF HYDE PARK, MASSACHUSETTS, ASSIGNOR TO THE GAMEWELL FIRE ALARM TELEGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

FIRE-ALARM INTERCOMMUNICATION SYSTEM.

952,024. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed May 10, 1909. Serial No. 495,010.

To all whom it may concern:

Be it known that I, ALDEN D. WHEELER, of Hyde Park, county of Norfolk, State of Massachusetts, have invented an Improvement in Fire-Alarm Intercommunication Systems, of which the following is a specification.

This invention relates to fire-alarm intercommunication systems especially adapted for use between several adjoining cities and towns, to transmit and receive code-signals.

At the present time most cities and towns are equipped with fire-apparatus, and many with fire-alarm apparatus, but when a great conflagration occurs in any city or town the adjoining cities and towns are called upon for assistance for the reason that the fire equipment of any one city or town is entirely inadequate to cope with such a fire. When calling for assistance the telephone is usually employed, but as no record of the call is made automatically such means for calling for assistance is decidedly objectionable. Instances are known of the fire-apparatus of an adjoining city having been called by telephone by an unauthorized person when the apparatus called for was not required, and, in fact such fire-apparatus has been called when no fire existed. Hence it is important to provide means whereby the call for the fire-apparatus of an adjoining city or town shall be under the control only of authorized persons and that permanent records shall be made.

My invention is designed to meet the requirements of such a system. It comprises several stations, located one in each city or town, all connected by an electric-circuit, and each provided with a multiple-signal-transmitting-device adapted to control the operation of said circuit and transmit code-signals, and also with a recording-instrument adapted to be operated by means controlled by said circuit and record the signals, so that all the signals transmitted from all the stations will be recorded at all the stations. Each station also has another signal-receiving instrument in addition to the aforesaid recording-instrument, which may be an electric-bell, or another recording-instrument; and separate means are employed for controlling the operation of both signal-receiving instruments, so that in case either should fail to operate the other will not be affected, and either signal-receiving instrument may be shunted for purposes of repairing or testing it without disturbing the other. Therefore one signal-receiving instrument is at all times in operative connection with the main circuit. Preferably each station also has provision for testing the multiple-signal transmitting-device and the recording instrument, by operating said transmitting-device and recording the test signal, without transmitting said signal over the main-circuit; also provision for testing the multiple-signal-transmitting-device and the other signal-receiving instrument, by operating said transmitting-device and announcing the test-signal on the bell or other signal-receiving instrument without transmitting said signal over the main-circuit; also provision for disconnecting either signal-receiving instrument from its controlling-means and connecting it with the controlling-means of the other signal-receiving-instrument, whereby either or both signal-receiving instruments may be controlled by either controlling-means; also numerous local switches for shunting or cutting out the various instruments, resulting in attaining different results. Frequently testing the apparatus at each station not only results in maintaining the apparatus at its highest efficiency, but also familiarizes the operator with the apparatus, which is important.

The invention also has for its object the construction of an improved form of multiple-signal-transmitting-device especially adapted for my newly invented system, which is imposing in general appearance, positive in action, simple in construction, and capable of transmitting all the requisite code-signals.

Figure 1 is a front elevation of one of the stations, the door of the transmitter being removed. Fig. 2 is an enlarged front view of the multiple-signal-transmitting-device, the door being removed. Fig. 3 is an enlarged detail of the multiple-signal-transmitting-device. Fig. 4 is a plan view of the motor-mechanism which may be employed to operate the multiple-signal-transmitting-device. Fig. 5 is a transverse sectional detail taken on the dotted lines 5—5 Fig. 2. Fig. 6 is a right hand side elevation of the upper end portion of the parts shown in Fig. 3. Fig. 7 is a transverse section taken

on the dotted line 7—7 Fig. 3. Fig. 8 is a transverse section taken on the dotted line 8—8 Fig. 3. Fig. 9 is a detail of the lower end-support for the shaft bearing the signal-wheels. Fig. 10 is a detail of the locking-device for the gang-switch. Fig. 11 is a diagram of the circuits and apparatus at one of the stations. Fig. 12 is a diagram showing modified arrangement of switches. Fig. 13 is a diagram of a system comprising three stations connected by an electric-circuit. Fig. 14 is a modification to be referred to.

The multiple-signal-transmitting-device which is provided at each station is arranged to transmit several code-signals to all the other stations connected with the main circuit, so that not only the station which is called upon for assistance will receive the signal but also all the other stations will be apprised of the fact. Also said multiple-signal-transmitting-device is designed and intended to serve both as a sending and a responding transmitter.

As an illustration of the code-signals which may be employed in the operation of the system, and which the multiple-signal-transmitting-device at each station is capable of transmitting, the number of the station which it is desired shall respond will be transmitted first, then the number of the station transmitting the signal, then the information which it is desired to convey, and then the apparatus which is required. As for instance, a signal may read, Newton, Boston, send, four engines and hose, would mean that Boston requests Newton to send four engines and hose. The responding-signal from Newton would be Boston, Newton, will send, four engines and hose. If Newton could not send the apparatus required the responding-signal would be changed to indicate the apparatus that could be sent, and then Boston could call upon another station for the remainder. When the signal is transmitted from Boston to Newton, and also when the responding-signal is sent from Newton to Boston, all the other stations included in the system will receive both signals and hence will be informed as to the situation.

In carrying out my invention any suitable form of multiple-signal-transmitting apparatus may be employed, but for the purpose of illustrating the invention one form of multiple-signal-transmitting device is here shown which is capable of transmitting all the sending-signals and responding-signals required.

Referring to the drawings, Fig. 2, a represents the supporting-plate for the multiple-signal-transmitting-device. At the rear side of said plate an upright shaft a' is arranged see Fig. 3, having its upper and lower end bearings supported in brackets a^2, a^2, on the plate. Said shaft has secured to it the signal-wheels a^3, of any suitable number. The signal-wheels are arranged in three groups, one above the other, there being as many signal-wheels in each group as there are code-signals to be transmitted. A circuit-controlling-device is provided for each group of signal-wheels, which is connected to a sliding-support, whereby it may be moved to coöperate with any one of the signal-wheels of its group. Said circuit-controlling devices are constructed substantially alike, and, referring to Fig. 7, wherein one of the circuit-controlling-devices is shown, a^4, a^5, represent a pair of contact-pens respectively attached to a block a^6 of insulating material, and adapted to engage each other by their inherent spring-action, to close the circuit, and to be separated by means provided for the purpose, to open the circuit. a^7 represents an operating-lever for separating said contact-pens. It is pivoted at a^8, to the plate a^9, and extends over the end of one of the contact-pens, to thereby engage said contact-pen and move it out of engagement with its fellow. It also has a tooth a^{10} which engages the periphery of the signal-wheel a^3, and hence is moved by said signal-wheel, when the latter revolves, to separate the contact-pens. It is held in engagement with the signal-wheel by the spring-action of the contact-pen which it engages, or by other means. Said plate a^9 also has attached to it the insulated block a^6, hence it supports the circuit-controlling-device. Said plate a^9 is arranged to be slid up and down to bring the operating-lever a^7 into position to engage any one of the signal-wheels of a group, and, as here shown, it is attached to a T-shaped block a^{12}, fitted to slide vertically in a correspondingly shaped recess provided in the plate a. Said recess may be formed by attaching to said plate a, a pair of guide-strips a^{13}, so shaped as to form a T-shaped recess between them. The circuit-controlling-device thus described is especially designed for the middle group of signal-wheels, and its sliding-support is attached to the lower end of an upright-bar b, moving in guideways provided for it, and said bar has on one side of its upper end portion rack-teeth b', which engage a toothed-wheel b^2, mounted on a pivot-stud b^3, see Fig. 5, which is suitably supported and which extends through a hole in the plate a and has secured to its forwardly projecting end a pointer b^4, arranged to move over an indicating-plate or dial b^5. Said indicating-plate has several spaces on one half of its face, each having marked thereon certain information as "Send", "Will send", etc.

Movement of the pointer b^4 operates to turn the toothed-wheel b^2 to move vertically

the rack-bar b, and thereby slide along the circuit-controlling-device, and the spaces on the indicating-plate are so arranged with respect to the signal-wheels of the group that as the pointer is moved from one space to the next the circuit-controlling-device will be moved from one signal-wheel to the next. The signal-wheels of the group will be cut to transmit the code-signals corresponding to the information marked on the spaces of the indicating-plate.

To assist in holding the circuit-controlling-device in different positions to correctly engage the several signal-wheels of the group the vertically movable bar b is provided with notches, as at b^6, arranged along one side it, any one of which may be engaged by a spring finger b^7.

The circuit-controlling device of the upper group of signal-wheels is constructed substantially the same as the circuit-controlling device shown in Fig. 7, and is attached to a similar sliding-support, which latter is attached to the lower end of an upright-bar c, the upper end portion of which is formed with rack-teeth c' which engage a toothed-wheel c^2, having a hub or sleeve c^3, loosely mounted on the pivot-stud b^3, and said hub or sleeve extends through a hole in the plate a and has secured to its forward end a pointer c^4, which is movable over the aforesaid indicating-plate or dial b^5, and the other half or portion of said plate or dial is provided with spaces marked to indicate the apparatus which is required, or which will be sent in response to a call, as "One engine and hose", "Two engines and hose", etc.

The spaces on the indicating-plate are arranged with respect to the signal-wheels of the uppermost group, so that as the pointer c^4 is moved over the indicating-plate from one space to the next, the circuit-controlling device carried by the bar c will be moved from one signal-wheel to the next; and the signal-wheels are cut to transmit code-signals corresponding to the indications marked on the spaces of the indicating-plate. Said bar c is adapted to be held in any predetermined position by a spring-finger c^7 engaging a notched portion c^6 of the bar.

Referring to Fig. 8, the circuit-controlling device of the lower group of signal-wheels is shown, e^4 and e^5 representing the two contact-pens, attached to block e^6 of insulating material, which is attached to a sliding supporting-plate e^9, and e^7 is an operating-lever for said contact-pens having a tooth e^{10} which engages the periphery of any one of the signal-wheels. The supporting-plate e^9 is attached to a T-shaped block e^{12}, fitted to slide in a recess on the back side of the plate a, which is formed by a pair of strips e^{13}, attached to said plate a. Said block e^{12} has a forward extension which projects through a vertical slot e^{14} in said plate a, so that the front side of the block is exposed at the front of the plate a. The vertical slot e^{14} extends the full length of the lower group of signal-wheels so that the block may be moved along the slot to carry the circuit-controlling device into position to coöperate with any one of the signal-wheels of the group. As a means for moving the block along the slot and for locking it in different positions a pair of levers e^{15} are pivotally connected at their upper ends to the inner face of the block, which extend downward short distances and have at their lower ends forwardly extended finger-pieces e^{16} which extend through slots in the block and which are accessible at the front side thereof. Said pivoted-levers e^{15} each have a tooth e^{17} adapted to engage any one of the notches in the guide-bars e^{13}, and movement of said levers toward each other, by pressure on the finger-pieces, operates to disengage the teeth from the notches, permitting the block to be moved up or down also by said finger-piece, and movement of said levers from each other operates to force the teeth thereon into engagement with the notches and thereby lock the block in any position it may be set. A spring e^{18} is interposed between the two pivoted-levers which acts to move them from each other in order that they may engage the notches when pressure on the finger-piece is relieved. One or more pointers e^{20}, two being herein shown, are attached to the front side of said block, which extend in opposite ways, and said pointers move over vertically arranged indicating-plates, arranged at opposite sides of the slot e^{14}, each said indicating-plate having the names and preferably the code-numbers of all the stations which are included in the system, with the exception of its own number. As for instance, if the station is located in the city of Boston, it will have on the indicating-plates the names and preferably the code-numbers of all the adjoining cities and towns which are connected in the system. Each pointer has a hole through it, opposite one of the rows of characters on the indicating-plates, so that the characters may be observed through said hole. The characters on the plates are so arranged with respect to the signal-wheels of the lower group that as the pointers are moved from one to the next character the circuit-controlling device will be moved from one to the next signal-wheel. Each signal-wheel of the group will be cut to transmit a code-signal representing one of the stations on the indicating-plates, and will also be cut out to transmit a number or code-signal indicating its own station. As for instance, if the station is located in Boston, and the code-number of Boston is 241, each signal-wheel of the lower group at the Boston station will have cut on it the num-

ber 241 in addition to the other code-signal.

It is designed and intended that the transmitter shall be set to transmit its sending-signal in the following order, first, the code-signal of the station wanted, followed by the code-signal of the station sending the signal, second, the information which it is desired to convey, and third, the apparatus which is required; and to transmit the responding-signal in the following order, first, the code-signal of the station wanted, followed by the code-signal of the station sending the responding-signal, second, the information which it is desired to convey, and third, the apparatus which will be sent.

If it is desired that the code-signals shall be differentiated one from another, the station wanted may be sent in dots, the station transmitting the signal in short dashes, the information which it is desired to convey in dots and the apparatus by a combination of long dashes by or in conjunction with dots and other dashes. Such dashes may be varied or omitted.

The transmitter having been "set" ready to transmit its signal to all the other stations included in the system, the motor-mechanism which is provided for rotating the shaft bearing the signal-wheels, is then operated. As here shown, said motor-mechanism consists of a spring-motor comprising a winding-arm f, see Fig. 4, adapted to be drawn forward by a pull f', and to be returned by a spring f^2, a ratchet-wheel f^3 secured to the shaft of said winding-arm, a pawl f^4 engaged by said ratchet-wheel and borne by a toothed-gear f^5, which engages a pinion f^6, secured to a shaft bearing a toothed-gear f^7, which engages a pinion f^8, secured to a shaft bearing a toothed-gear f^9, which engages a pinion f^{10} secured to a shaft bearing a toothed-gear f^{12}, which engages a pinion f^{13} secured to a shaft bearing an escape-wheel f^{14}. The shaft bearing the pinion f^8 and toothed-gear f^9 also bears a toothed-gear f^{15}, which engages a gear f^{16}, secured to the lower end of the upright shaft a'. The motor-mechanism may be operated to rotate said shaft a' one or more rounds as may be desired.

h and h' represent the two circuit-wires of the main circuit, which connect all the stations, and referring to Fig. 11, a diagram is shown of the circuit-wires and connections and instruments at one of the stations, and it will be understood that the circuit-wires and connections and instruments at all the other stations will be the same. The main circuit-wires h, h' are connected to suitable fuses h^2, and then lead to a lightning-arrester h^3 of any suitable construction.

The multiple-signal-transmitting-device is represented by the signal-wheels a^3, and the contact-pens engaging them, and they are included in the main-circuit so as to control the operation thereof; also the two relays h^4 and h^5, which are employed for controlling the branch-circuits containing signal-receiving instruments are included in the main-circuit, so as to be controlled by said main-circuit.

h^6 represents a circuit-wire leading from one side of the lightning-arrester through the relay h^4, the multiple-signal-transmitting device a^3, the relay h^5, and normally closed key k to the other side of the lightning-arrester. Thus the circuit-wire h^6 is connected with and forms a part of the main-circuit and for convenience is herein shown by a heavy line.

When the transmitter is operated both relays h^4 and h^5 at the home station, as well as at all the other stations connected with the main circuit are caused to operate. The armature h^7 of the relay h^5 is arranged to close a local branch-circuit h^8 from the battery h^9, and said branch-circuit contains a recording-instrument h^{10}, of any suitable construction, so that all the signals transmitted from all the stations will be recorded. The armature h^{12} of the relay h^4 is arranged to close a local branch-circuit h^{13}, from the battery h^9 and said branch-circuit contains an electric-bell h^{14}, of any suitable construction, so that all the signals transmitted from all the stations will be announced.

While, in the preferred form of my invention a recording-instrument and a bell are employed as the signal-receiving instruments, and are arranged to be controlled by separate means controlled by the main circuit, yet, in lieu of the bell, any other form of signal-receiving instrument may be employed, or, as shown in Fig. 14, a bell as h^{140} may be arranged in the branch circuit with the recording instrument h^{10}, and a recording instrument h^{100} arranged in the branch-circuit with the bell h^{14}.

A recording-instrument and another signal-receiving instrument controlled by separate means are employed particularly for the purpose of providing at least one signal-receiving instrument which shall be at all times in operative connection with the system, thereby enabling the other receiving-instrument to be tested or repaired.

An important addition to the apparatus is special means for testing the instruments, as it will be obvious that the apparatus is used only occasionally, but when required it must be in perfect working condition. In carrying out this part of the invention a number of switches are employed, which are connected by a bar, whereby movement of any one of the switches will operate to move the bar and the other switches connected with it, so that whatever positions the switches may occupy at least one signal-

receiving instrument will always be connected with the main-circuit, prepared to receive a signal from another station. Furthermore, said bar, or gang-switch as it may be termed, is adapted to be locked in its different positions when the signal-transmitting-device is being operated, so that it cannot be moved during the transmission of a signal.

As here shown, i represents the gang-bar, and i' and i^2, two switch-arms connected thereto, which have arranged between them a high resistance-coil i^3, and each switch-arm is adapted to engage one or the other of two live contact-points or any one of several dead contact-points. The live contact-points are connected by circuit-wires with the main circuit-wire h^6, at opposite sides of the relays h^4 and h^5. i^4, i^5 represent two circuit-wires which lead from the live contact-points of the switch-arm i^2, to the main circuit-wire h^6, at opposite sides of the relay h^4, and i^6, i^7, represent two circuit-wires which lead from the live contact-points of the switch-arm i' to the main circuit-wire h^6, at opposite sides of the relay h^5. Normally, said switch arms rest on dead contact-points, (middle position) as indicated on the drawing, but when thrown its full distance to the left on one of the live contact-points, (first position) the resistance will be arranged in parallel with the multiple-signal-transmitting-device and the relay h^5, and the operation of said transmitting-device at such time will be recorded on the tape of the recording-instrument h^{10}, but will not be transmitted over the main-circuit. At such time the relay h^4 will be in operative connection with the main-circuit, to receive any signals which may be transmitted over said circuit from another station. When said switch-arms are moved to the right onto the next live contact-points, (second position) the resistance will be arranged in parallel with the multiple-signal-transmitting-device and the relay h^4, and the operation of said transmitting-device at such time will be announced by the bell, but will not be transmitted over the main-circuit. At such time the relay h^5 will be in operative connection with the main-circuit to receive any signals which may be transmitted over said circuit from another station.

Local-switches j and j' are respectively included in the local branch-circuits h^8, and h^{13}, which are adapted to open said local-branch-circuits, and also to connect a branch-wire leading from each local branch-circuit to the other local branch-circuit, as for instance, j^2 represents a branch-wire connected with the local branch-circuit h^{13}, which is adapted to be connected by switch j with the local branch-circuit h^8, and j^3 represents a branch-wire connected with the local branch-circuit h^8, which is adapted to be connected by switch j' with the local branch-circuit h^{13}. Said switches j and j' are provided particularly for the purpose of connecting both signal-receiving-instruments in parallel, so as to be operated by one of the relays. Local-switches o and o' are also provided, one, as o, being contained in a branch circuit-wire o^2, which is connected with the circuit-wires at opposite sides of the relay h^4, and the other, as o', being contained in a branch circuit-wire o^3, which is connected with the circuit-wires at opposite sides of the relay h^5, and said switches are employed for the purpose of cutting said relays out of the main-circuit. Normally, the switches j and j' rest on live contact-points connected respectively with the local branch-circuits h^8, and h^{13}, as shown in Fig. 11, and when moved toward the left into the first position and also into the second position, they still rest on live contact-points connected with said local branch-circuits, but when moved toward the right into the fourth position the switch-arm j engages the live contact-point connected with the branch-wire j^2, but the switch-arm j' still engages the live contact-point connected with the local branch-circuit h^{13}. Normally, the switch-arms o, and o', rest on dead contact-points, but when moved into the fourth position the switch-arm o still rests on a dead contact-point but the switch-arm o' engages a live contact-point connected with the circuit-wire o^3. When the switches thus occupy the fourth position the relay h^5 is shunted out of the main-circuit, the local branch-circuit h^8 is opened at the switch j and the recording-instrument h^{10} and bell h^{14} arranged in parallel and adapted to be controlled by the relay h^4. When said switch-arms are moved into the fifth position, the switch-arm j engages the live contact-point connected with the local branch-circuit h^8, the switch-arm j' engages the live contact-point connected with the branch circuit-wire j^3, the switch-arm o' engages a dead contact-point and the switch-arm o engages a live contact-point connected with the circuit-wire o^2, and, at such time, the relay h^4 is shunted out of the main-circuit, the local branch-circuit h^{13} is opened at the switch j'; and the bell h^{14} and recording-instrument h^{10} are arranged in parallel and adapted to be controlled by the relay h^5. Thus each station is not only provided with a recording-instrument and with another signal-receiving instrument adapted to be controlled by separate means, in turn controlled by the main-circuit, but both signal-receiving instruments can be arranged to be controlled by either controlling means. The gang-switch is thus adapted to occupy five different positions, and may be secured in any of said positions. It is also desirable to lock the gang-switch in any position it

may occupy when the multiple-signal-transmitting-device is being operated, either for testing purposes or for any other purpose, and, as herein shown, the bar *i* is provided with five interdental spaces *s*, adapted to receive a locking-bar *s'*, which is moved by the pull *f'*, into engagement with said bar, and said locking-bar is adapted to be held by a detent s^2, which is subsequently moved by the transmitting-device to release the locking-bar when the transmitting device has transmitted its signal.

A local-switch *m* is connected in a branch circuit-wire *m'*, which is connected to the circuit-wires at opposite sides of the multiple-signal-transmitting-device, and said switch *m* is normally open, as shown, but when closed will shunt out said signal-transmitting-device. A local-switch *n* is contained in a branch circuit-wire *n'* connected with the main circuit-wire h^6, at opposite sides of the key *k*, which, when in closed position, as shown, closes a shunt around said key. Each station also has connected in or to the main circuit-wire h^6 suitable telephone-equipment of any suitable construction, whereby communication by telephone can be carried on between the several stations which are included in the system, and such communication will be independent of any regular telephone service.

Notwithstanding my invention is herein described as having all the signals transmitted from all the stations connected with the main-circuit received at all the stations, yet it is obvious that other apparatus may be connected with the main-circuit which will not interfere with the operation of the system as a whole.

In lieu of connecting the switch-arms to a bar, as shown in Fig. 11, they may be separately arranged on the board and independently operated, as shown in Fig. 12, wherein it will be seen that the same switch-arms are provided having the same functions, and indicated by the same reference characters.

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

1. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and also a recording-instrument and another signal-receiving-instrument adapted to be separately controlled by apparatus in the main-circuit, whereby all the signals transmitted from all the stations will be received at all the stations, substantially as described.

2. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and also a recording-instrument and a bell, adapted to be separately controlled by apparatus in the main-circuit, whereby all the signals transmitted from all the stations will be recorded and announced at all the stations, substantially as described.

3. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and also a recording-instrument and another signal-receiving instrument, adapted to be separately controlled by apparatus in the main-circuit, and means for connecting a shunt around each instrument, substantially as described.

4. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and also a recording-instrument and another signal-receiving instrument adapted to be separately controlled by apparatus in the main-circuit, and means for connecting the controlling-apparatus for each signal-receiving instrument with the other signal-receiving instrument, substantially as described.

5. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and also two independent signal-receiving-instruments, and separate means controlled by the main-circuit for controlling their operation, and means for placing both signal-receiving instruments under the control of either controlling-means, substantially as described.

6. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and also two independent signal-receiving instruments, and separate relays for operating them, connected in the main-circuit, and means for cutting out either relay and for connecting the two signal-receiving instruments in parallel and under the control of the other relay, substantially as described.

7. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and also a recording-instrument adapted to be controlled by apparatus in the main-circuit, and means for connecting a shunt around the multiple-signal-transmitting-device, leaving the recording-instrument in operative connection with the main circuit, substantially as described.

8. In a fire-alarm intercommunication system, a main-circuit connecting several sta-

tions, each station having a multiple-signal-transmiting-device for controlling the operation of the main-circuit, and also a recording-instrument and another signal-receiving instrument, adapted to be separately controlled by apparatus in the main-circuit, and means for connecting a shunt around the multiple-signal-transmitting-device and for connecting it with either one of the signal-receiving instruments, leaving the other signal-receiving instrument under the control of the main-circuit, substantially as described.

9. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and two independent signal-receiving instruments, and separate means connected in the main-circuit for operating them, switches for controlling the operation of the signal-receiving instruments and means for connecting said switches together, substantially as described.

10. In a fire-alarm intercommunication system, a main-circuit connecting several stations, each station having a multiple-signal-transmitting-device for controlling the operation of the main-circuit, and two independent signal-receiving instruments, and separate means connected in the main-circuit for operating them, switches for controlling the operation of the signal-receiving instrument and means for connecting said switches together, and means for locking said switches in whatever position they may occupy while the signal-transmitting-device is being operated, substantially as described.

11. A multiple-signal-transmitting-device consisting of a series of signal-wheels secured to a rotatable shaft, a pair of coöperating contact-pens adapted to be connected with the circuit, an insulated support therefor, a pivoted operating-lever adapted to engage any one of the signal-wheels and arranged to move one of said contact-pens with relation to the other, a sliding-carrier bearing said contact-pens, the support therefor, and the pivoted operating lever, and means for moving said sliding-carrier to move the operating-lever into engagement with any one of the signal-wheels, substantially as described.

12. A multiple-signal-transmitting-device consisting of a series of signal-wheels secured to a rotatable shaft, a circuit-controlling-device, a sliding-carrier bearing said circuit-controlling-device, whereby it is moved into engagement with any one of the signal-wheels, a rack-bar bearing said carrier, a toothed-wheel engaging said rack-bar, a pointer connected with said toothed-wheel movable over an indicating-plate, and means for holding the rack-bar in its different positions, substantially as described.

13. A multiple-signal-transmitting-device consisting of two groups of signal-wheels secured to a rotatable shaft, a circuit-controlling-device for each group, a sliding-carrier for each circuit-controlling-device, and means for moving said carriers independently of each other, substantially as described.

14. A multiple-signal-transmitting-device consisting of two groups of signal-wheels secured to a rotatable shaft, a circuit-controlling-device for each group, a sliding-carrier for each circuit-controlling-device, a rack-bar connected to each carrier, a toothed-wheel engaging each rack-bar, said toothed-wheels being arranged to revolve on the same axis, a pointer connected to each toothed-wheel, and an indicating-plate having two groups of characters thereon over which said pointers respectively move, substantially as described.

15. A multiple-signal-transmitting device, consisting of a series of signal-wheels secured to a rotatable shaft, a circuit-controlling-device adapted to be moved into engagement with any one of said signal-wheels, a sliding-carrier bearing said circuit-controlling-device, means for locking the sliding-carrier in any position it may occupy, and finger-engaging means for operating said locking-devices to release the carrier and for also moving said carrier, substantially as described.

16. A multiple-signal-transmitting-device consisting of a series of signal-wheels secured to a rotatable shaft, a circuit-controlling-device adapted to be moved into engagement with any one of said signal-wheels, a sliding-carrier bearing said circuit-controlling-device, means for moving said carrier, a pair of indicating-plates arranged side by side, a pair of pointers attached to the carrier and extended in opposite ways, which coöperate respectively with said plates, the characters on one of said plates being arranged opposite the spaces between the characters on the other plate, substantially as described.

17. A multiple-signal-transmitting-device consisting of a series of signal-wheels secured to a rotatable-shaft, a circuit-controlling-device adapted to be moved into engagement with any one of said signal-wheels, a sliding-carrier bearing said circuit-controlling-device, means for moving said carrier, an indicating-plate having two columns of indications, one being the code-signals of the other, and a pointer attached to said carrier and arranged to move over said plate, said pointer having a hole through it through which the indications of one of the columns may be observed, substantially as described.

18. A multiple-signal-transmitting-device consisting of several groups of signal-wheels secured to a single rotatable-shaft, a circuit-

wheels, a sliding-carrier for each circuit-controlling-device, means for moving each carrier independently of the others, whereby several different signals may be set for transmission, motor-mechanism for rotating said shaft and means for operating it, substantially as described.

19. A multiple-signal-transmitting-device consisting of a series of signal-wheels, two independent circuit-controlling-devices adapted to coöperate therewith, independently movable carriers for said circuit-controlling-devices, two pointers connected with said carriers, respectively, for moving them, able, substantially as described.

20. A signal-transmitting device, an actuating-lever therefor, a gang-switch, and a locking-bar operated by said actuating-lever for engaging and holding said gang-switch, substantially as described.

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

ALDEN D. WHEELER.

Witnesses:
B. J. NOYES,
L. H. HARRIMAN.