

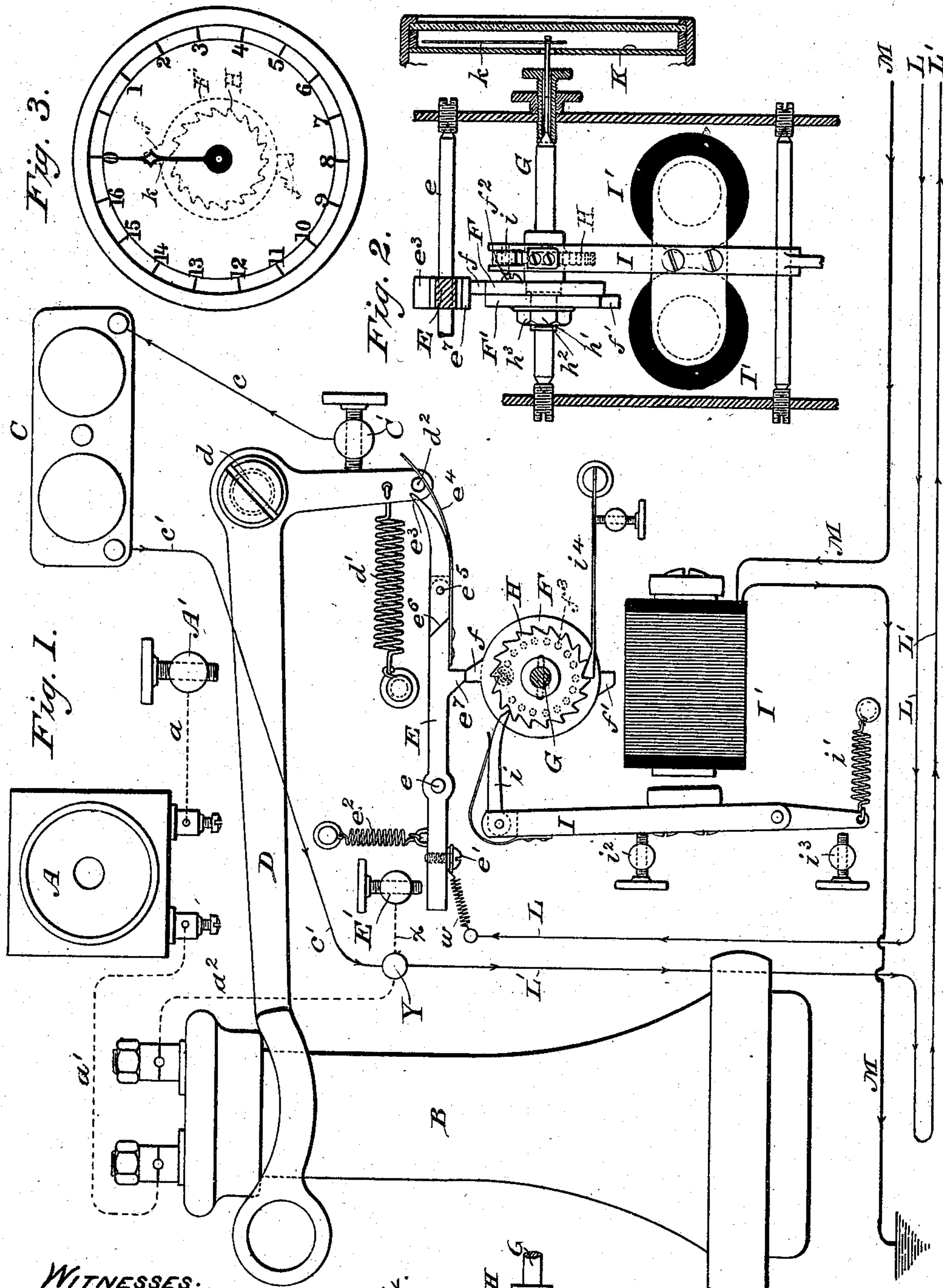
No. 840,544.

PATENTED JAN. 8, 1907.

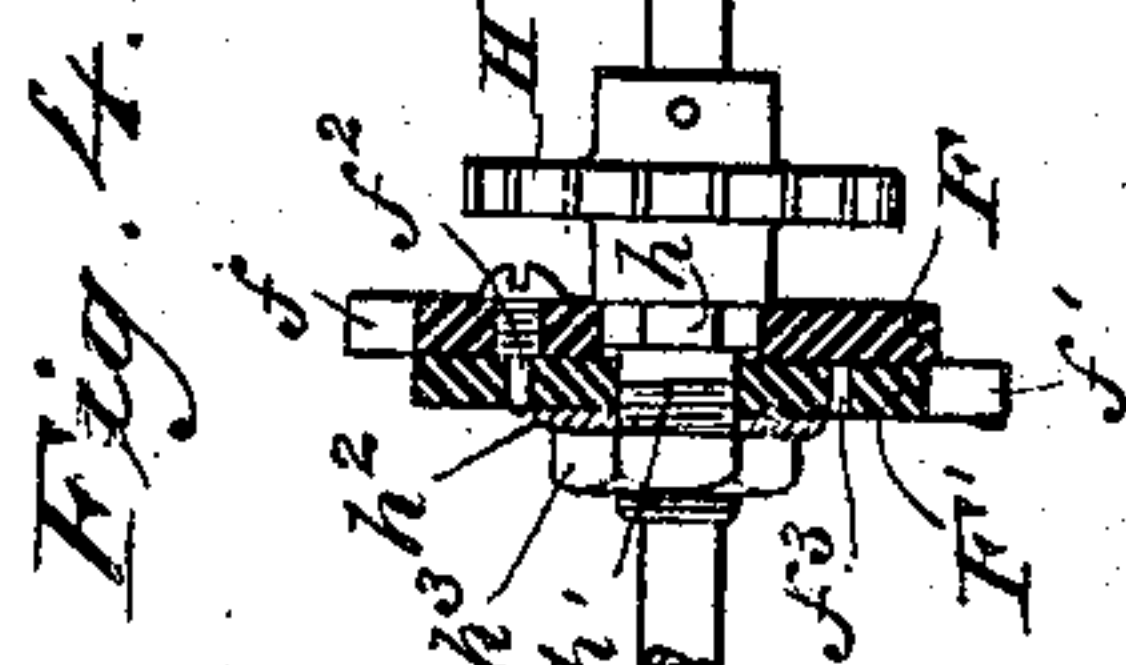
C. H. WOOD.
PARTY LINE TELEPHONE MECHANISM.

APPLICATION FILED FEB. 17, 1904.

2 SHEETS—SHEET 1.



WITNESSES:
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INVENTOR:
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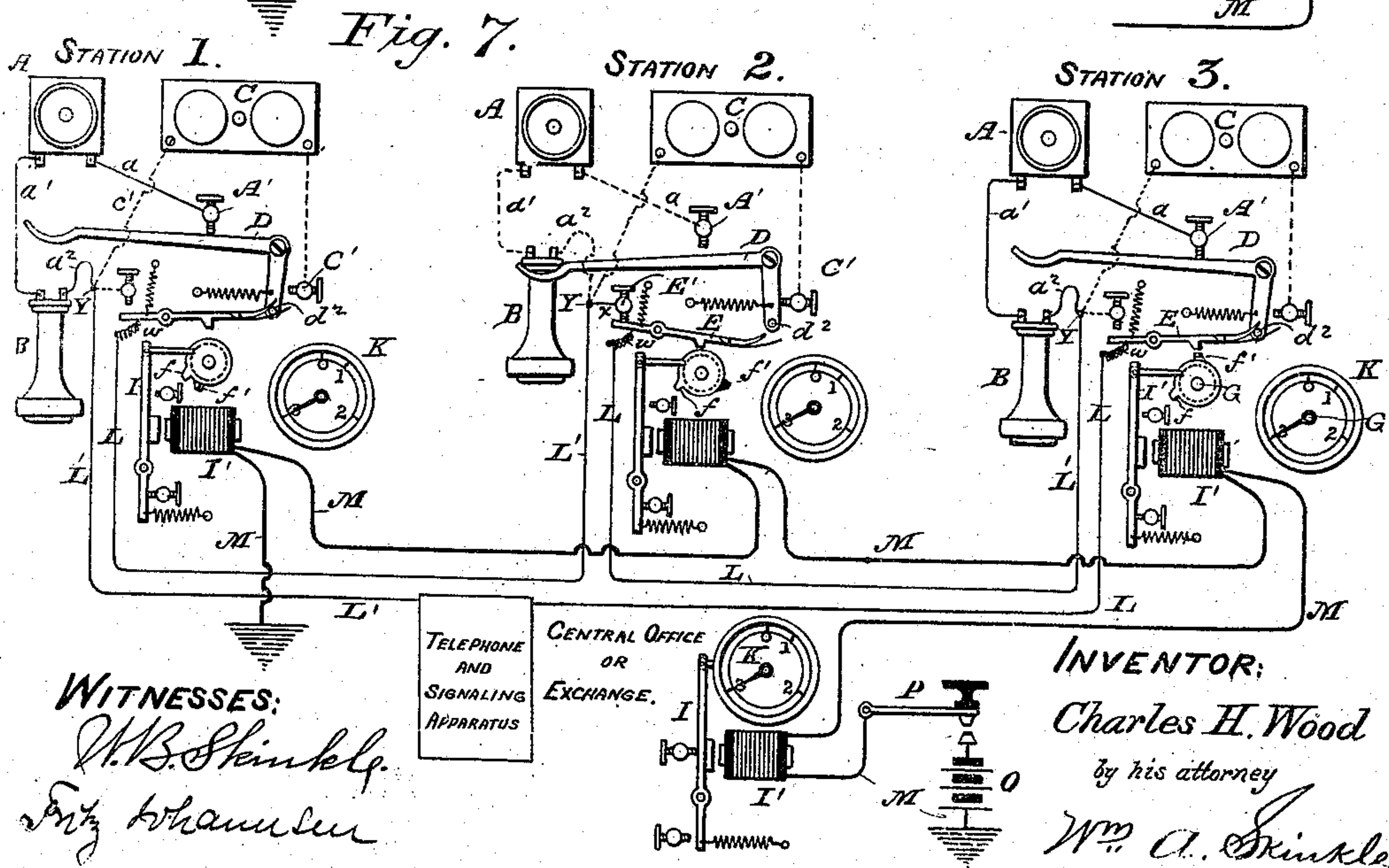
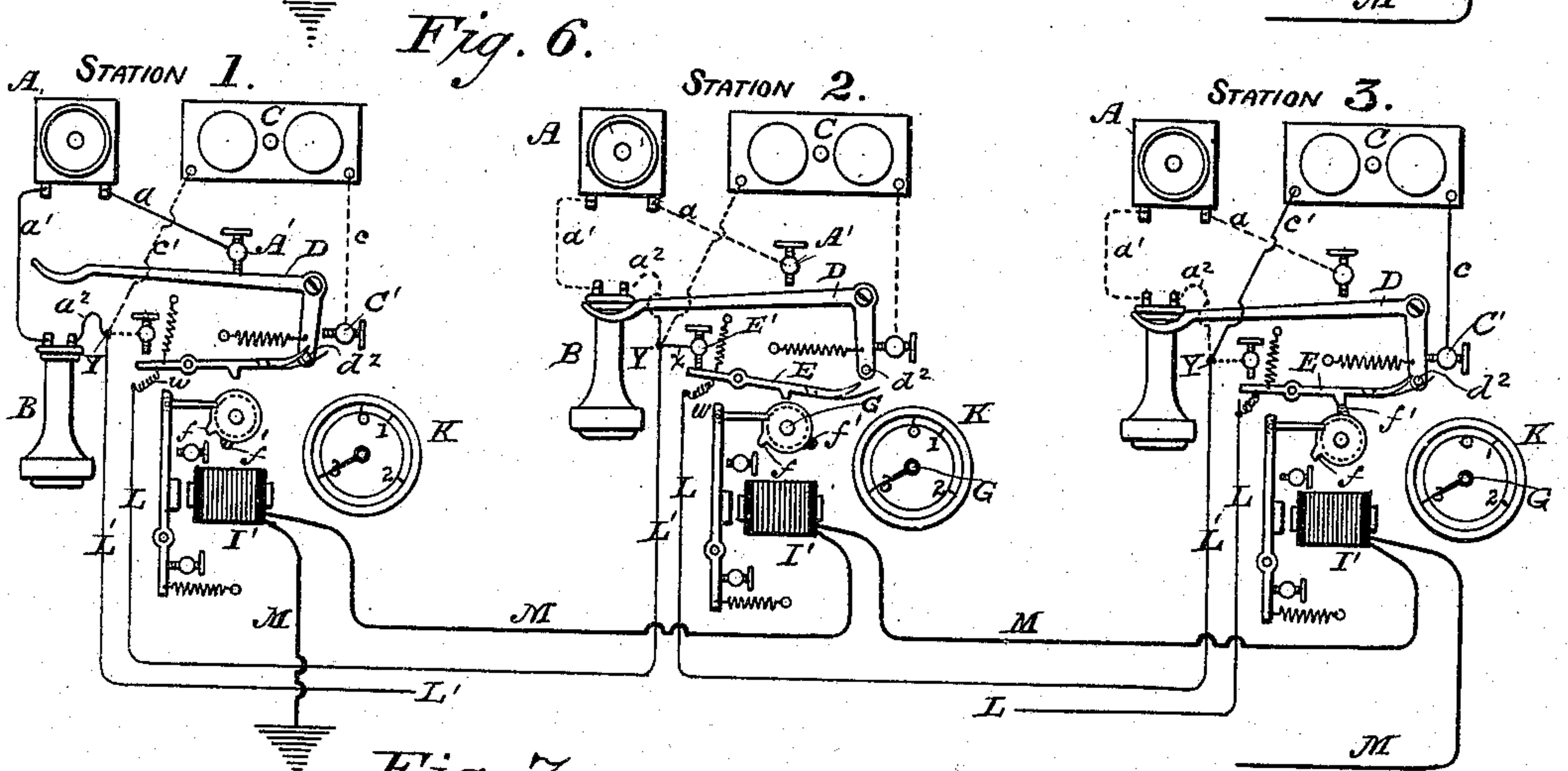
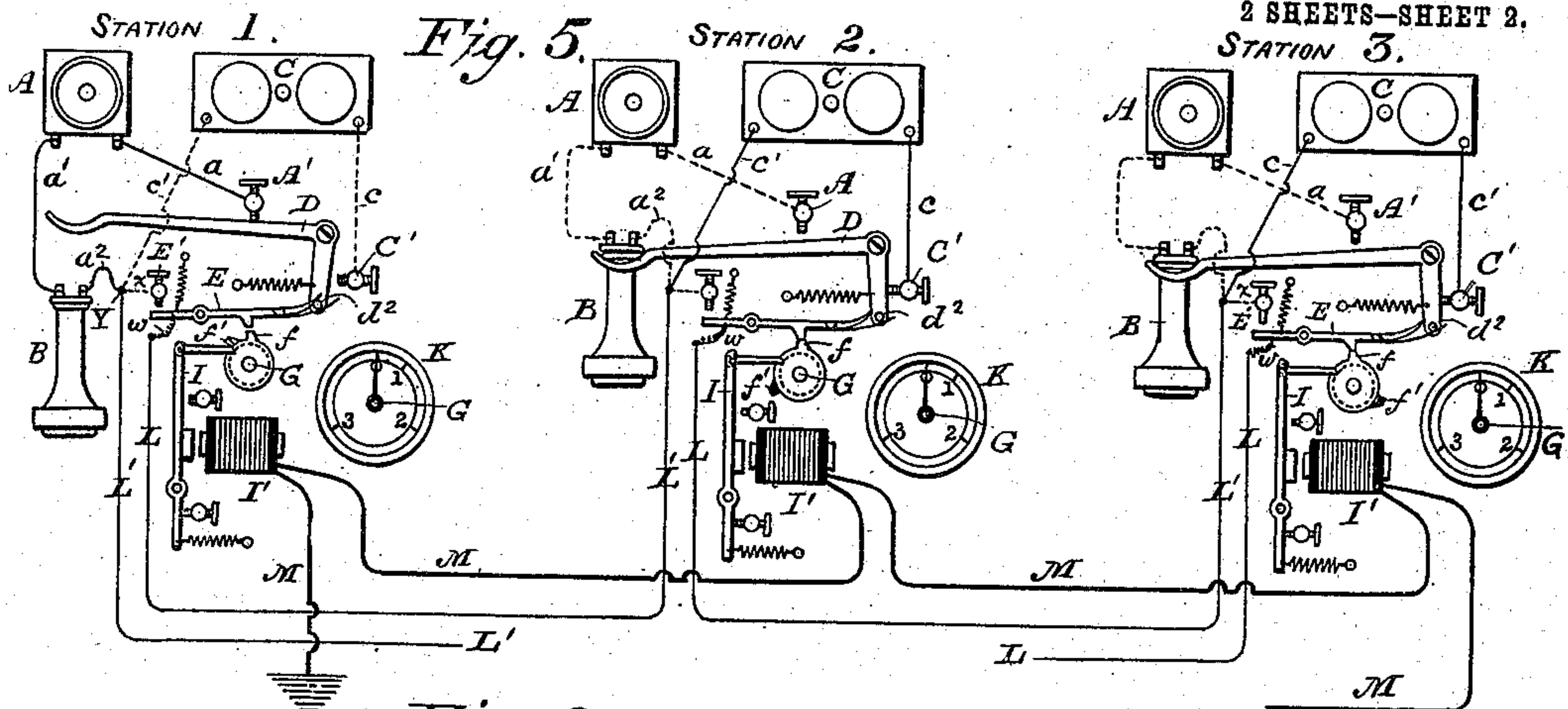
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

CHARLES H. WOOD, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-FOURTH
TO JOHN T. HOBBS, OF CLEVELAND, OHIO.

PARTY-LINE-TELEPHONE MECHANISM.

No. 840,544.

Specification of Letters Patent.

Patented Jan. 8, 1907.

Application filed February 17, 1904. Serial No. 193,962.

To all whom it may concern:

Be it known that I, CHARLES H. WOOD, a citizen of the United States residing at Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Party-Line-Telephone Mechanism, of which the following is a specification, that will enable those skilled in the art to which my invention pertains to make and use the same, reference being had to the accompanying drawings, forming a part thereof.

The objects are to provide selective mechanism, located at each subscriber's station, operated through a line-wire separate from the talking-circuit line and designed normally to insure the connection of any desired subscriber's apparatus in the talking-circuit, either upon his transmitting a call to the exchange or central office or upon being selectively called by the exchange, and to effect the disconnection of all other subscribers' stations during the continuance of a conversation, thus insuring privacy for the parties communicating, each station of course being normally connected in the talking-line when that line is not busy, so that the subscriber may be able to transmit a signal-call to the exchange.

For the purpose of illustration, in the system herein shown the subscribers' stations are connected in series upon the talking-line and a separate or selector line extends through the stations and includes at each station simple step-by-step mechanism for effecting the several circuit changes in selectively connecting and disconnecting the various subscribers' telephone-line apparatus and for controlling the lock-out mechanism. If desired, there may also be included in the step-by-step mechanism of each station an indicator for showing at all times the condition of the line. By these means only the subscribers' apparatus actually in service are connected with the talking-line during a conversation, and impedance in the talking-circuit is thereby avoided. Hence the talking-line is not materially affected by the number of stations on it. Extending, as usually a party-line does, to a central office or exchange, connections are more commonly made at this exchange between two different party-lines; but in order to simplify my drawings I have chosen to illustrate and describe the selection of a station on the same

line with the calling-station for the purpose of conversation; but should the stations to be connected be on different party-lines the principles of operation would in every instance be identical, the two lines being connected at the exchange in the usual manner.

Little change in standard apparatus either at subscribers' stations or at the exchange is demanded by my invention.

The accompanying drawings show my invention by diagrammatic views in the form now preferred by me; but changes not requiring the exercise of invention might be made therein by a skilled mechanic without departing from the spirit of my invention as set forth in the claims at the end of this specification.

In the drawings, Figure 1 is a diagrammatic view of the arrangement of the instruments at a subscriber's station. Fig. 2 is a vertical elevation, partly in section, of a portion of the instrumentalities for selecting the subscribers to be connected. Fig. 3 is a face view of the dial-indicator at each station, showing whether the line is in or out of use. Fig. 4 is a detailed sectional view of the ratchet-wheel and lifting-cams of the selecting mechanism. Figs. 5, 6, and 7 are diagrams illustrating certain conditions on a party-line, as will be hereinafter fully explained, it being understood that Figs. 5 and 6 are also provided with a central station or exchange similar to that shown in Fig. 7, this exchange being suitably equipped with any of the usual devices employed at such offices to receive from and transmit calls to subscribers' stations over the telephone-lines in the manner now practiced, my invention necessitating no change in this respect in the standard equipment of an exchange; but as my invention contemplates the use of a separate line-wire to operate the step-by-step selector mechanisms of the stations on a party-line the exchange is also provided with a battery, a key or other suitable device for sending current impulses over the selector-line, a step-by-step mechanism to be actuated by these impulses in unison with the actuation of the several similar devices at the stations, and an indicator to show the progress of movement and the condition of the line.

This invention relates more particularly to the equipment of the subscribers' stations on

a party-line than to the central station, except for the battery, key, or circuit-breaker, and step-by-step mechanism at the central station, which are in a separate line or circuit from that over which the call-signals and telephoning is done, and it is not considered necessary, therefore, to fully illustrate the telephone and signaling arrangements at the central station, as they may be of any desired form or combination that will receive a signal, visible or audible, from the subscriber who removes his receiver from the hooked lever and that will send suitable bell-calls to the subscriber who is being called for.

At each subscriber's station there is the usual telephonic transmitter A, receiver B, and call-bell C, with a hook-lever D, forked for the reception of the receiver B and pivoted at d . A spring d' acts to swing this lever when the weight of the receiver is removed from the hook. In one position this lever bears against a stop or contact-point C' , connected to the bell by wire c , and in its other position it bears against a similar contact-stop A' , connected to the telephones by the wire a . The inner depending end of the hook-lever has a side projecting stud or pin d^2 , which engages a circuit-lever E, pivoted at e . This lever is permanently connected into the telephone-circuit, which is represented by the line-wires L and L', of a full metallic circuit, the connection being made by the flexible wire w to the screw e' on the lever. A spring e^2 tends to force the long end of the lever down and its shorter end up against a contact-stop E' , which is directly connected by wire x to the binding-post Y of the line-wire L'.

At its opposite or long end the circuit-lever is forked, as shown, the prongs standing in such relation to the stud-pin d^2 of the hook-lever that it will pass into their embrace. The upper prong e^3 is curved upwardly and pointed, as shown, this point being so related to the stud-pin d^2 that the said pin in its movement will pass into contact engagement with the under side of the prong and lift the end of the circuit-lever, while if this end of the circuit-lever is lowered the point of the prong e^3 will drop past the pin d^2 . The lower prong of the fork is composed of a spring e^4 , which extends beyond the prong e^3 , curving upwardly and contacting with the pin d^2 .

The end of the circuit-lever is hinge-jointed to the main portion of the lever on the pivot e^5 with shoulder-stops e^6 , which permit downward flexure only of the point of the lever, the spring e^4 bearing against the hinged section to hold it up against the stops. This provision is made to prevent accident should a subscriber happen to have his receiver off the hook at a time when his circuit-lever is dropped to its lowest position and then raised and locked up when he replaces his receiver. In such an event the pin d^2 would

simply depress the point e^3 against the spring, pressure and ride over it to the position shown in Fig. 1. On the lower side of the circuit-lever is formed a lug e^7 , as shown, broad enough to lie across the faces of two cam-disks F and F', mounted upon a shaft G and each provided with a lug f and f' , adapted to engage the lug e^7 of the circuit-lever and raise the lever at stated intervals. On the shaft G is also a ratchet-wheel H, having any decided number of teeth proportioned to the number of subscribers, &c., on the line. These teeth are engaged by a pawl i on an armature-lever I, which is actuated by an electromagnet I' through electric impulses sent over an independent operating-wire M from the central station. A spring i' operates to draw the lever back to its normal position, and stops i^2 and i^3 regulate the length of its throw. A spring dog or pawl i^4 engages the ratchet-teeth in the manner of a drag, thus preventing the wheel either from overrunning or falling back from its true position after each impulse imparted to it by the pawl i .

At the central office and preferably also at each subscriber's station the step-by-step selection instrument is provided with a hand or pointer k , affixed to the end of the shaft G and moving around over the face of a dial K, as will be readily understood.

When the hands point to zero, the line is free and out of use; but pointing elsewhere would indicate at once to a subscriber desiring communication that the line is in use by other parties.

In Fig. 1 I have illustrated an arrangement adapted for a line having sixteen subscribers' stations, and the ratchet-wheel has therefore eighteen teeth, one for each subscriber, one for the zero-point or circuit-levers all up and one for the blank space or circuit-levers all down, except, maybe, that of the calling subscriber. Now one of the two cam-lugs f will be set the same at all stations at zero, while the other, f' , will be set away from it circumferentially a given number of teeth from two up to seventeen progressively for each station in the line, so that at no two of the stations are the lugs f' in contact with their respective circuit-levers at the same time. To carry this into effect, I prefer to mount the cam-disks F and F' on the hub of the ratchet-wheel, which is provided with hexagon or squared portion h for the zero-cam F and a cylindrical and partly screw-thread portion h' for the reception of the selecting-cam F' with its washer h^2 and clamping-nut h^3 . Each cam-disk F is provided with a fixed stud-pin f^2 and each cam-disk F' with a series of holes f^3 , corresponding to the teeth on the ratchet-wheel, so that while the disks F' may be all made alike each may be set on its stud-pin to suit the position its lug f' is to occupy in the line system. In

all these diagrams the full lines representing circuits show the closed circuits, while the dotted lines show the open or broken circuits.

In the normal position of rest the situation of the instruments in each station is shown by Fig. 1, the bell being in the telephone-wire circuit from line-wire L through wire *w*, circuit-lever E, hook-lever D, contact C', wire *c* and wire *c'*, and post Y to line-wire L', the dotted lines of the telephone-circuits being cut out.

Figs. 5, 6, and 7 are diagrams showing the positions of the station mechanisms at several stages of placing, two of the several stations on a common line in connection.

In Fig. 5 subscriber 1 has removed his receiver from the hook-lever, which engages and locks up his circuit-lever, so that he cannot be cut out of the line by the rotation of his own ratchet and cam-shaft. This movement of the hook-lever also cuts out his bell and throws his telephone instruments into the telephone-line from line-wire L through wire *w*, circuit-lever E, hook-lever D, contact A', and wires *a*, *a'*, and *a''* to the post Y and line-wire L'. This subscriber then asks "central" for subscriber No. 3 and meanwhile keeps his own receiver off the hook. Central now sends, by means of the battery O and key P, a sufficient number of current impulses over the operating-wire M to bring the cam-lug *f'* of station 3 into supporting engagement of the circuit-lever of that station, so that this lever will be raised and held up into position where its spring contacts with the pin *d''* and completes the telephone-line circuit through No. 3's bell. This situation is shown in Fig. 6, where No. 1 is locked into the telephone-circuit and No. 3 is ready for the bell-call, all the other stations having their circuit-levers down, thereby cutting out both their bell and telephone-station circuits, but closing the main-line L L' through the wire W, circuit-lever E, contact E', and wire *x* to post Y and line L'.

Fig. 7 shows the situation when No. 3 has removed his receiver from the hook-lever, his telephone instruments and those of No. 1 station and central station being the only ones in the line, all of the bells and telephones at the other stations having been cut out in such manner that none of them can get in on the line until central at the termination of service between Nos. 1 and 3 runs all of the stations back to zero.

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

1. In a subscriber's-station apparatus for multiple-station telephone system, the combination of a circuit-controlling lever or part connected in the telephone-circuit, a switch-hook coacting therewith to normally establish connection with the station apparatus, an electromagnet connected in a separate line

to be actuated from a distant station, step-by-step mechanism controlled thereby and means therein for controlling the circuit-controlling part or lever into and out of electrical connection with the switch-hook, substantially as described.

2. A selector appliance for multiple-telephone lines comprising a circuit-controlling lever or part, an electromagnet designed to be governed from a distant station and a rotatable member actuated by the electromagnet; all in combination with a switch member in the subscriber's-station apparatus for controlling the local circuits thereof, the said circuit-controlling part normally coacting therewith but adapted, under the influence of the rotatable member, to become disconnected therefrom and cut the subscriber's-station apparatus out of the telephone-circuit, substantially as described.

3. In a subscriber's-telephone-station apparatus, the combination of a switch-lever for the station-circuits, actuated in the use of the telephone, a circuit-lever connected to one station-terminal of the telephone main line and having alternative positions respectively connecting the station apparatus with the line or disconnecting and shunting it out of the line, the circuit-lever having a bifurcated end adapted to engage a member of the switch-lever between its prongs in their normal position and when the telephone is in use, but when the station apparatus is cut out of the line to lie below the path of said member on the switch-lever, substantially as set forth.

4. In a subscriber's-telephone-station apparatus, the combination of a switch-lever for the station-circuits, actuated in the use of the telephone, a circuit-lever connected to one station-terminal of the telephone main line and having alternative positions, electrical mechanism adapted to be operated from a distant station to control the positions of the circuit-lever, which, in one position is in electrical connection with the switch-lever and in the other position out of electrical connection with the switch-lever and in electrical connection with the other station-terminal of the telephone main line, substantially as described.

5. In a subscriber's-telephone-station apparatus, the combination of a switch-lever, actuated in the use of the telephone, a circuit-lever coacting therewith and having a bifurcated end adapted to engage a member of the switch-lever between its forks for the purpose described, a rotatable mechanism adapted to raise and hold the bifurcated end of the circuit-lever in contact with and proper presentation for the engaging member of the switch-lever or to drop it below the range of said member, one prong of the circuit-lever fork being constructed to yield with sufficient downward flexure to permit of the return of

the engaging member of the switch-lever to its normal position in the event of the circuit-lever being raised and locked before such return, substantially as described.

- 5 6. In a subscriber's-telephone-station apparatus, for a multiple-station party-line, the combination of a switch-lever for the station-circuits actuated in the use of the telephone, a circuit-lever connected to one station-terminal of the telephone main line and having
10 alternative electrical connection with the switch-lever or with the other station-terminal of the line, a rotatable mechanism, adapted to be electrically operated from a distant
15 station and provided with two cam-lugs

adapted to engage the circuit-lever, one of said lugs, the zero-lug, having a fixed position in the rotatable mechanism, while the other lug, the subscriber's-service lug, may be set and secured at a predetermined point 20 away from the zero-lug, substantially as described.

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

CHARLES H. WOOD.

Witnesses:

WM. A. SKINKLE,
S. C. BLAKE.