No. 664,757. Patented Dec. 25, 1900.

# U. S. JACKSON.

## TELEPHONE SERVICE APPARATUS

(Application filed June 15, 1900.)

(No Model.) 4 Sheets—Sheet 1.

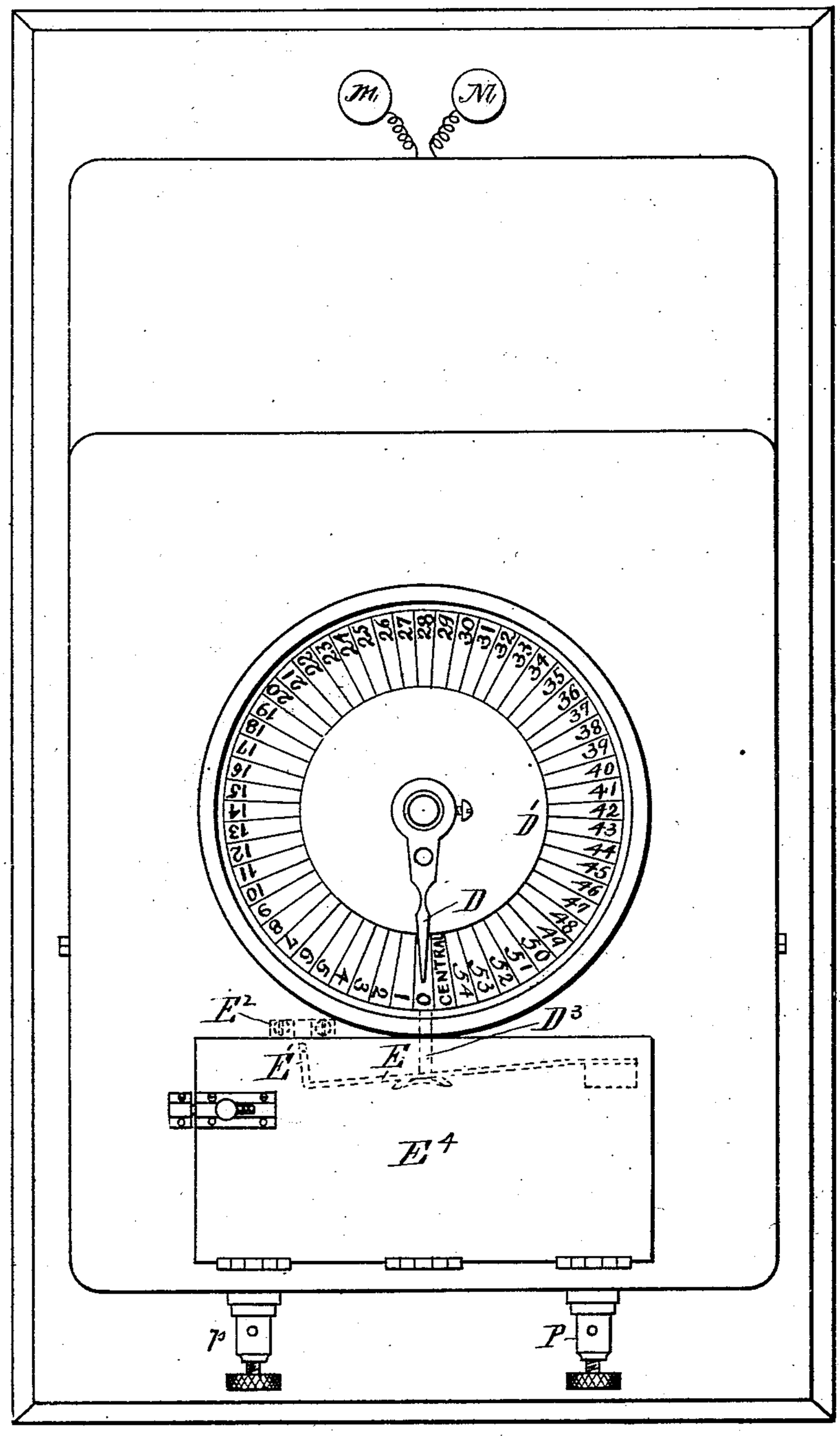


Fig. 1.

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## TELEPHONE SERVICE APPARATUS.

(Application filed June 15, 1900.)

(No Model.) 4 Sheets—Sheet 2.

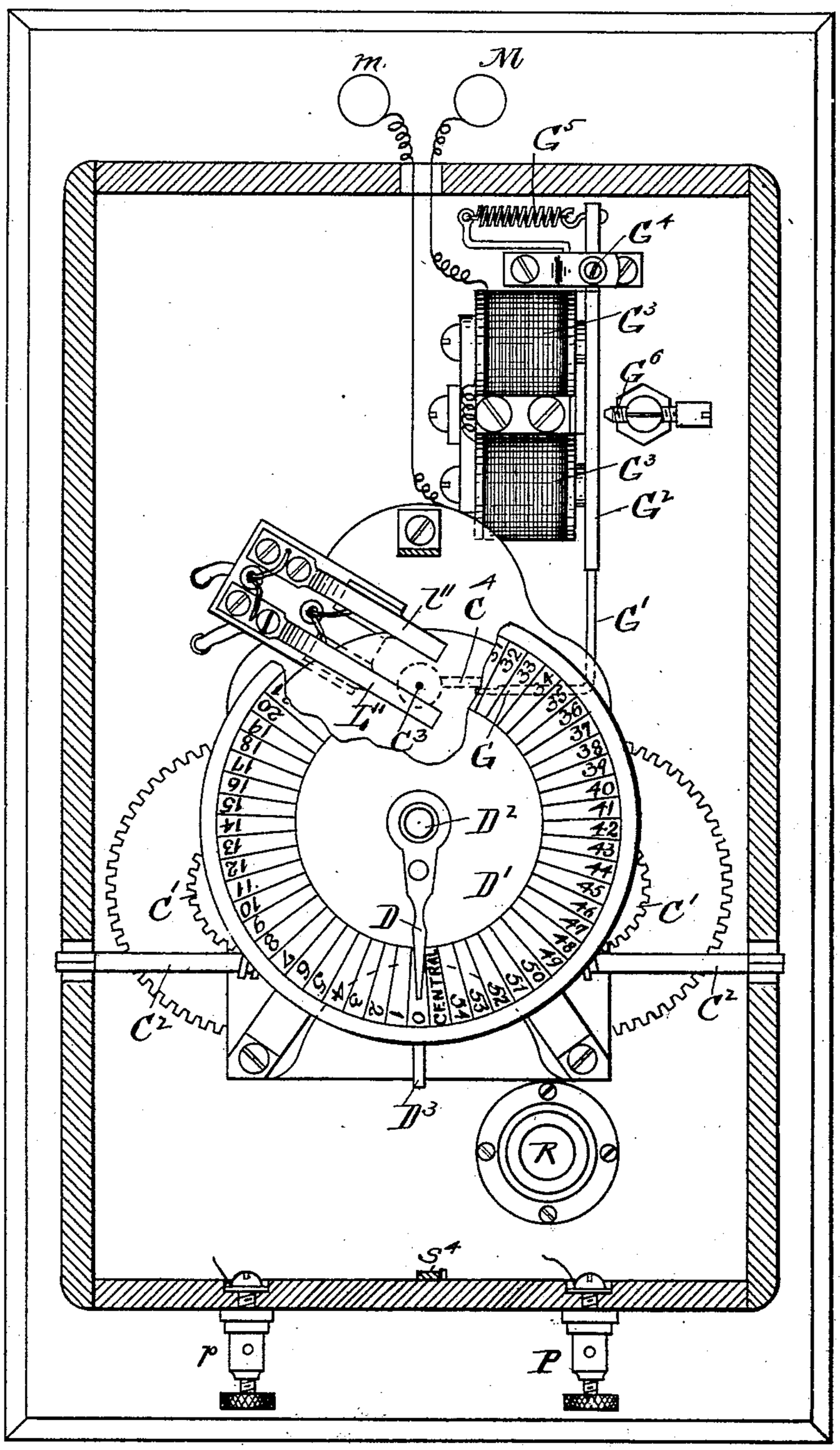


Fig. 2.

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## TELEPHONE SERVICE APPARATUS.

(Application filed June 15, 1900.)

No Model.) 4 Sheets—Sheet 3.

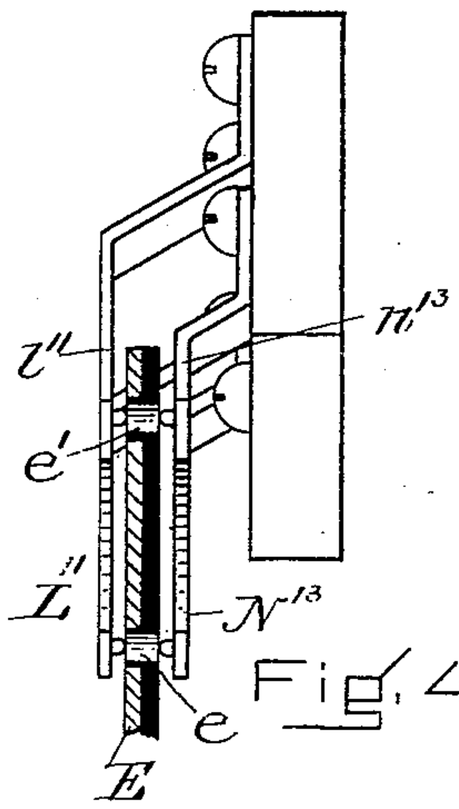


Fig. 4.

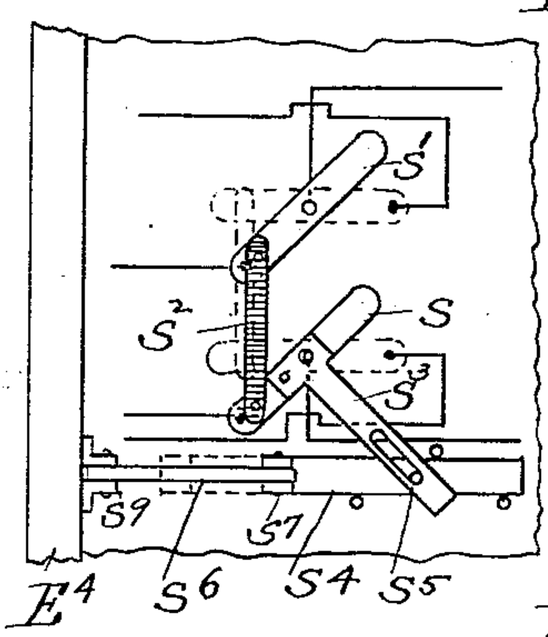


Fig. 5.

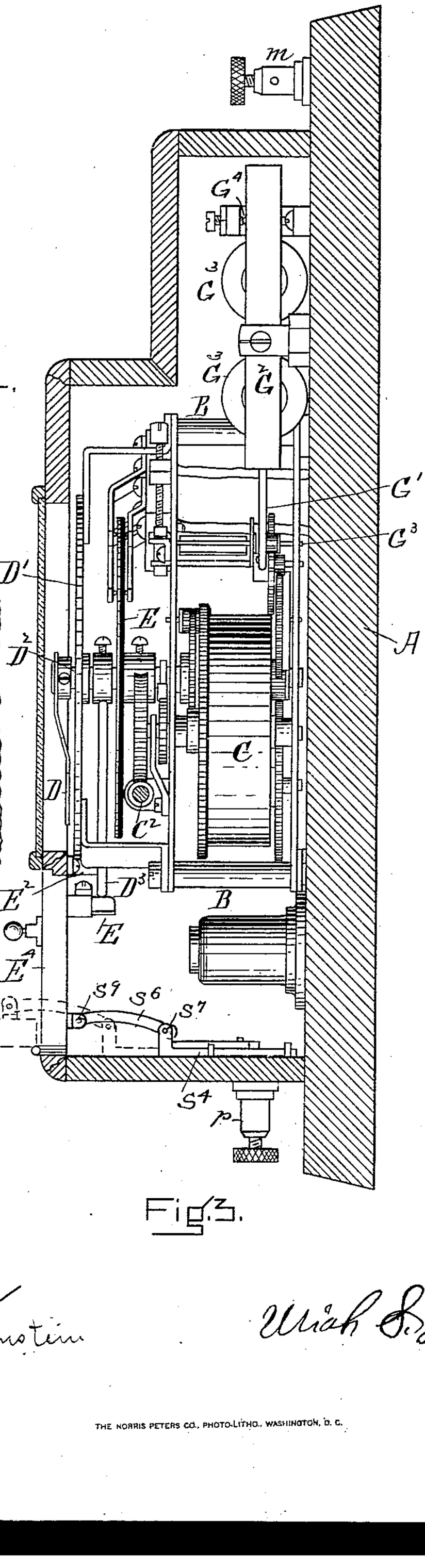


Fig. 3.

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No. 664,757. Patented Dec. 25, 1900.

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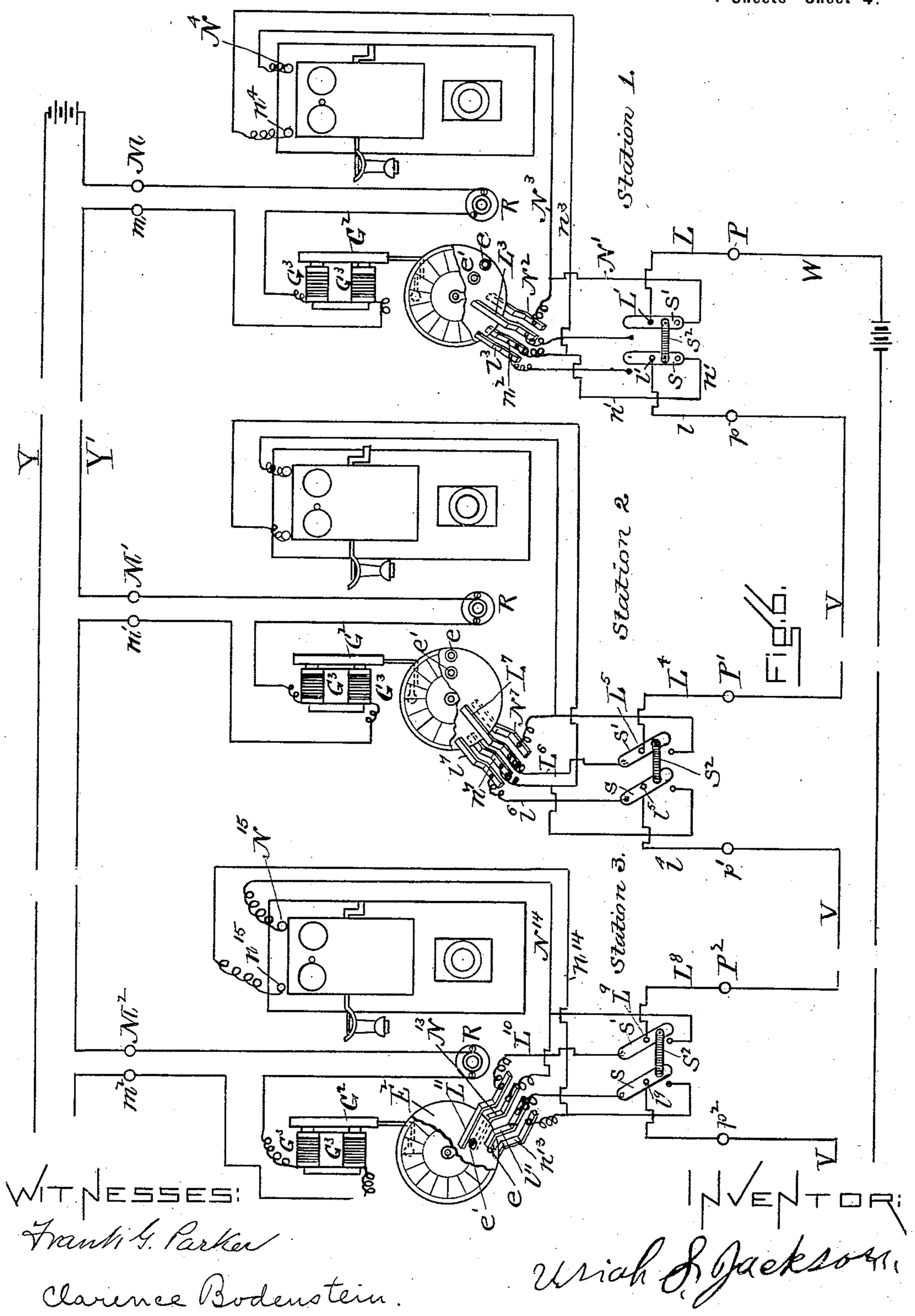
## TELEPHONE SERVICE APPARATUS.

(Application filed June 15, 1900.)

(No Model.) 4 Sheets—Sheet 4.




WITNESSES:

Frank G. Parker

Clarence Bodenstein.

INVENTOR:

Uriah S. Jackson.

# UNITED STATES PATENT OFFICE.

URIAH S. JACKSON, OF OSSIPEE, NEW HAMPSHIRE.

## TELEPHONE-SERVICE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 664,757, dated December 25, 1900.

Application filed June 15, 1900. Serial No. 20,464. (No model.)

*To all whom it may concern:*

Be it known that I, URIAH S. JACKSON, of Ossipee, in the county of Carroll and State of New Hampshire, have invented a new and useful Improvement in Telephone-Service Apparatus, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to a system of telephone-service apparatus by which a group of telephones may be connected in such a manner that it will be possible to call up but one at a time in the group, whereby there can be no interruption to the service of the two telephones in use. No third call can be made until the two in connection have finished their conversation. This object I attain by means of the apparatus herein illustrated by the accompanying drawings, in which—

Figure 1 is an elevation showing a box which includes one set of my apparatus. An indicating-dial is shown on the outside. The box is represented as closed. Fig. 2 is a front elevation of working apparatus, parts being represented as broken away. Fig. 3 is a side elevation of the apparatus, the box being represented in section; Figs. 4 and 5, details. Fig. 6 is a diagrammatical sketch illustrating the method of wiring.

In my system of apparatus there are as many of the boxes and their connections (one set of which is shown in Figs. 1, 2, and 3) as there are telephones in the group. I will now describe one of these boxes and its connections.

In the drawings, A indicates the base of the box, to which the parts of the apparatus are attached, and B B B B the metallic frame, which contains a clock-train of sufficient motive power to give motion to the rotating dial-hand D, which traverses the graduated dial D′. In the clock-train used for illustration, C represents one of two drums containing springs which are wound by the worm-gear arbors $C^2$ $C^2$, engaging with the gears C′ C′, which are attached to the spring-arbors. (Not shown.) I do not confine myself to any particular kind of clockwork, as any well-regulated self-starting works will do for the purpose of actuating the dial-hand D.

The divisions on the dial D′ correspond in number with the number of stations in the group. In this case the number is fifty-four, and in addition the word "central" occupies a division to be used for another group.

Upon the arbor $D^2$, to which the hand D is attached, I also attach an arm $D^3$, which serves to act upon a spring-latch (indicated by dotted lines E E′, Fig. 1) and throw it out of connection with the catch $E^2$, thus allowing the door $E^4$ to be opened when the hand D is on zero, as shown in Fig. 1. At any other position of the hand D or arm $D^3$ the spring-latch E E′ is free to spring into engagement with the catch $E^2$, and thus prevent the door from being opened. The object of locking the door $E^4$ except when the hands point to division 0 is that when the hands point to any other division the apparatus is in use and the opening of a door other than the one of the box in use would break the circuit.

For starting or stopping the clock-train I have the following-described device: An arm $C^4$ extends from the arbor $C^3$ of one of the wheels in the clock-train. A holding-lever G G′, Fig. 2, engages with the arm $C^4$ and holds the train whenever the said lever is in such a position as to have its bent part G in the path of motion of the arm $C^4$—that is, when the armature $G^2$ is held to the magnets $G^3$ $G^3$; but when the circuit is broken then the spring $G^5$ will throw off the armature, which is pivoted at $G^4$, thus withdrawing the part G from the path of the arm $C^4$ and allow the wheels of the clock to rotate. This rotation will continue until the circuit is closed. This will draw the armature $G^2$ to the magnets and again place the part G in the path of the arm $C^4$. The backward motion of the armature $G^2$ is limited by the adjustable stop $G^6$. The magnets $G^3$ $G^3$ $G^3$ $G^3$ are in series in closed circuit Y Y′, and the push-buttons R R are normally closed or bridged, the entire circuit being broken when any one of the buttons is pushed in. While the clock-train is in motion the hand D is traversing over the graduations on the dial D′. (See Figs. 1 and 2.) The rotating contact-disk E, Fig. 3, being mounted upon the same shaft $D^2$, is also in motion. This rotating contact-disk is made of an upper disk of metal and a lower disk of some good non-conductor, as hard rubber, for instance. Two contact-pins *e* and *e′* (see Figs.

3 and 4) are firmly attached to the contact-disk and insulated from it. Four contact spring-plates $L^{11}$ $l^{11}$ $N^{13}$ $n^{13}$ (shown enlarged in Fig. 4) are used in connection with the rotating disk E. Two ($L^{11}$ and $l^{11}$) of these contact spring-plates are above the rotating disk E and two ($N^{13}$ $n^{13}$) are below the rotating disk E.

My system requires an electric switch device at each station. The one that I now use is operated by the door of the box—that is, the opening and closing of the door will throw the switch. I will now explain the switch and its operation. (See Figs. 3 and 5.) Two switch-plates S S′ are pivoted and electrically connected by an insulated cross-link $S^2$, so that they move together. An arm $S^3$ is connected to the switch-plate S and is connected by a slot and pin $S^5$ to a sliding bar $S^4$. The bar $S^4$ is connected by a link $S^6$ and the pivots $S^7$ $S^9$ to the door $E^4$, so that any movement of the said door is communicated to the switch-plates S S′. The rotating contact-disk E, as has been explained, has extending through it two contact-pins *e e′*, insulated from the disk and from each other. These pins are placed in the same radial line and bear a prescribed relation to the hand D. This relation is different for each box or station. For instance, for station No. 1 the pins are so placed that when the hand D is at division 1 then the contact-pins *e e′* will coincide in position with the contact-plates of that box, and for station 3 the pins are so placed that they will come in contact (electrically) with the plates $L^{11}$ $N^{13}$ and $l^{11}$ $n^{13}$, as shown in Fig. 4. When the hand D stands at division 3 on the dial D′ and throughout all of the stations of a group, the contact-pins *e e′* are so placed that when the hand D stands at the division on the dial that corresponds to the number of the station then the said pins will be in electrical contact with the contact-plates of that box, and thereby will transmit current to the telephone of that station.

The use and operation may be explained as follows, referring to Fig. 6 for the system of wiring and to Figs. 3 and 5 for manipulation. We will suppose that a person at station 1 wishes to telephone to station 3, it being borne in mind that when the group is not in use all of the doors $E^4$ are closed, the switches S and S′ are open, as shown in Fig. 5 and at station 2 and 3 of Fig. 6, and the hand D stands at zero on the dial D′. Now by opening the door E of the box of station 1 the switch S S′ of that box (see Figs. 5 and 6) will be placed, as shown in Fig. 6, so as to connect the telephone of that station with the line. By pushing the button R of that station the closed circuit Y Y′, that controls the magnets $G^3$ $G^3$ of all the stations, will be interrupted and the armatures $G^2$ $G^2$ will spring back, and thus allow the clock-trains of all of the stations to act upon the hands D, setting them in motion, and this is allowed to continue until all of the hands D point to the division 3 on their respective dials. Now the user can release the button R, and thus close the circuit and arrest the further motion of the hands, and, as has been explained, when the hands D are at the division 3 the contact-pins C C′ of division 3 are in electrical contact with the contact-plates of this station—viz., $L^{11}$ $N^{13}$ and $l^{11}$ $n^{13}$. (See Fig. 6, station 3.) The circuit in the above-supposed case would be as follows: start from $N^4$, (telephone of station 1,) wire $N^3$ N′ to a switch-plate S′, pivot L′, wire L to post P, thence to line W, back on line V to post $p^2$, thence to pivot $l^9$ of switch-plate, switch-plate, contact-plate $l^{11}$, contact-pin *e*, (in rotating contact-disk $E^2$,) thence to contact-plate $n^{13}$, wire $n^{14}$ to telephone $n^{15}$, thence by $N^{15}$ and $N^{14}$ to contact-plate $N^{13}$, contact-pin *e′* (in rotating contact-disk $E^2$) to contact-plate $L^{11}$, thence by wire $L^{10}$ to switch-plate, pivot $L^9$, wire $L^8$ to post $P^2$, thence by line-wire V to post *p′*, wire $l^4$, switch-plate pivot $l^5$, switch-plate to wire $l^6$, contact-plate $l^7$, thence on metal part of the rotating disk to contact-plate $L^7$, thence by wire $L^6$ to switch-bar plate, pivot $L^5$, wire $L^4$ to post P′, thence to line V, post *p*, wire *l* to pivot *l′*, switch-plate S, wire *n′* $n^3$ to telephone $n^4$. It will be observed that in following the above circuit there is no electric connection between the two contact-plates $N^2$ and $L^3$ of station 1 nor between the contact-plate $l^3$ and $n^2$, as the insulating-disk comes between them. The same is true of the corresponding pairs of contact-plates in station 2, but not true as to station 3, as the contact-pins *e* and *e′* are in position for electric connection with the said contact-plates. It has also to be kept in mind that the two upper contact-plates $L^7$ $l^7$ of station 2 and all other intermediate stations are in metallic connection with each other through the metallic plate of the rotating contact-disks E′, &c.

In the above-described system of telephone service it will be observed that the apparatus in all the stations are identical in construction and function and so adapted to each other and to the system that any one may be called from any other and that while any two are in use there can be no interruption.

I claim—

1. In a system of telephone-service apparatus, a series of boxes each having a clock-train-operated disk and contact-pins in said disks, also contact-plates adapted to complete a telephone-circuit through said contact-pins and a magnetic device for controlling said clock-train; and a door for each of said boxes, the opening of which operates a switch whereby its connected telephone is put into the line-circuit, and the direct circuit to the said disk is cut out, substantially as and for the purpose set forth.

2. In a system of telephone-service apparatus each inclosing apparatus as described and having a door the opening of which operates a switch whereby its connected tele-

phone is put into the line-circuit, and also having an electric cut-out switch which when operated starts a clock-train in each of the boxes, whereby the door of all closed boxes are locked and whereby an index-hand and a rotating disk having contact-pins in each of the boxes of the group are made to rotate to the desired position, substantially as and for the purpose set forth.

3. In a system of telephone-service apparatus; a number of mechanisms, one for each station consisting of a clock-train-operated disk and hand, said disk having insulated contact-pins as described, the said pins having a fixed rotation to the said hand; fixed contact-plates adapted to make electrical connection with said pins and thereby close an electric telephone-circuit, substantially as and for the purpose set forth.

4. In a system of telephone-service apparatus, a rotating contact-disk having insulated contact-pins and one insulated face; contact-plates adapted to close a telephone-circuit through said disk, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 7th day of June, A. D. 1900.

URIAH S. JACKSON.

Witnesses:
FRANK G. PARKER,
CLARENCE BORDENSTEIN.