No. 673,796. Patented May 7, 1901.

U. S. JACKSON.

TELEPHONE SERVICE APPARATUS.

(Application filed Nov. 22, 1900.)

(No Model.) 5 Sheets—Sheet 1.

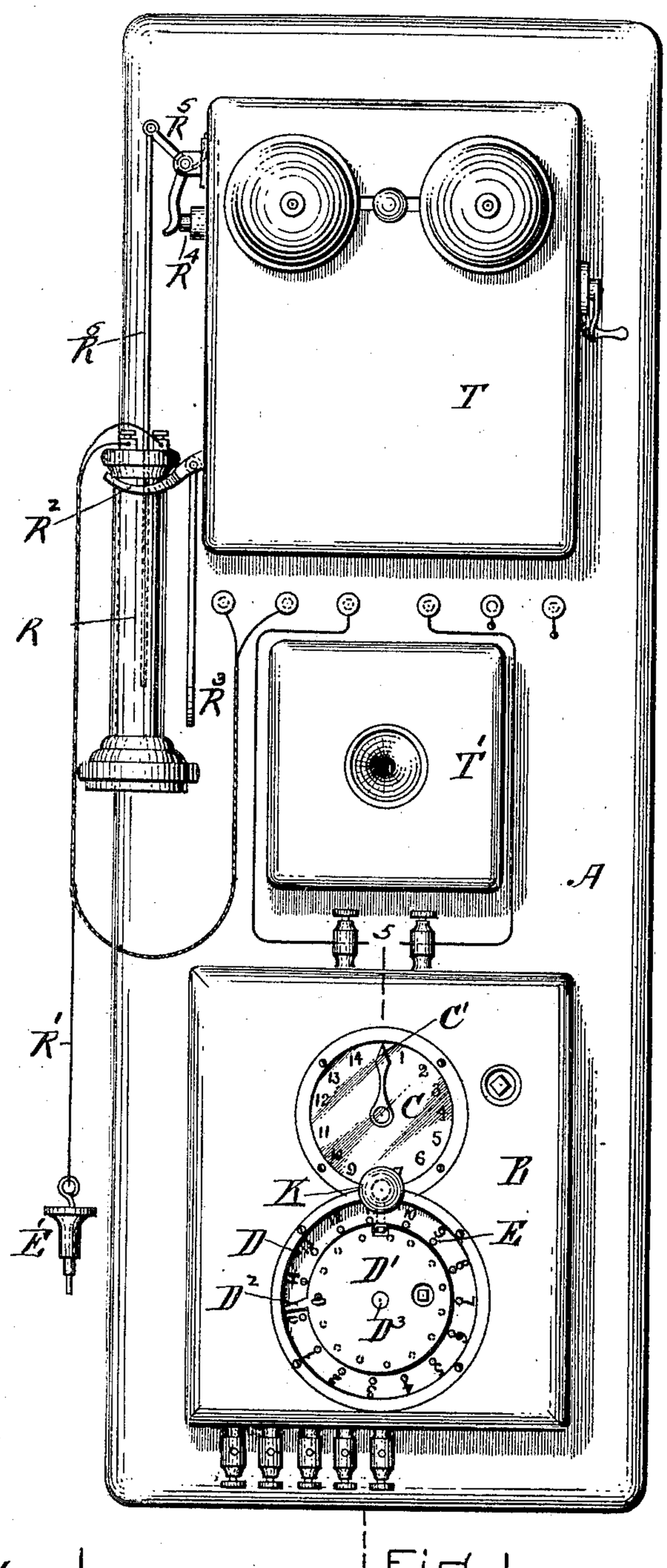

Fig. 1.

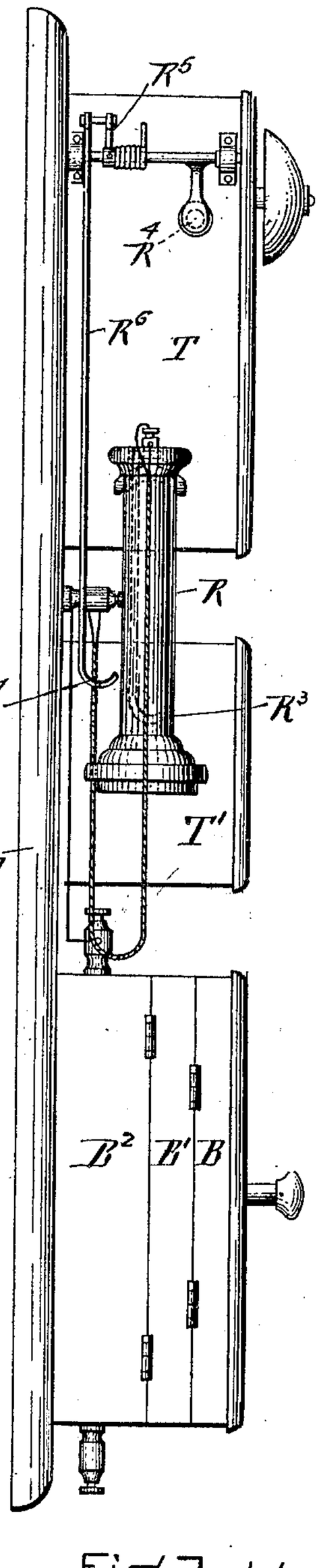

Fig. 2.

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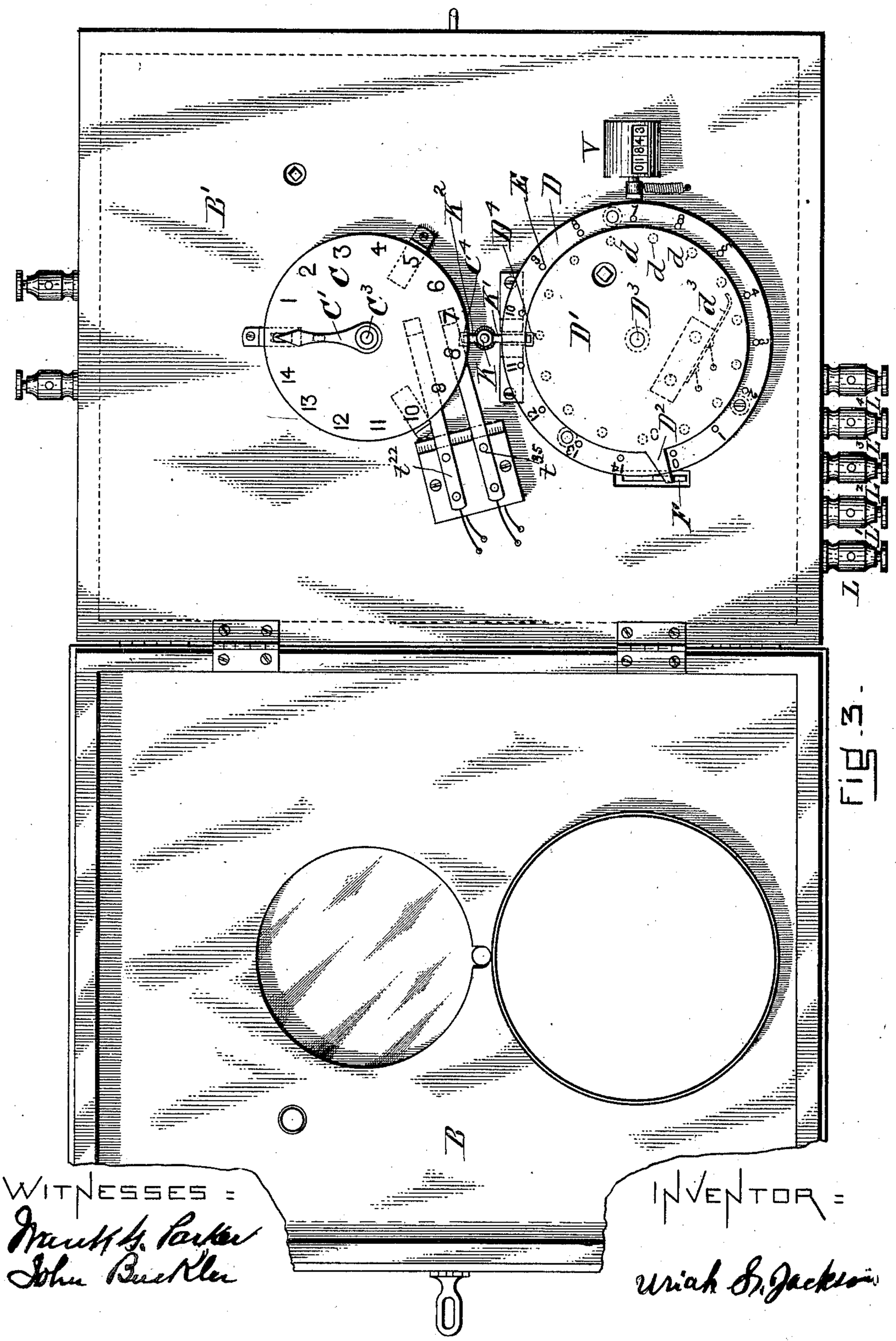

Fig. 3.

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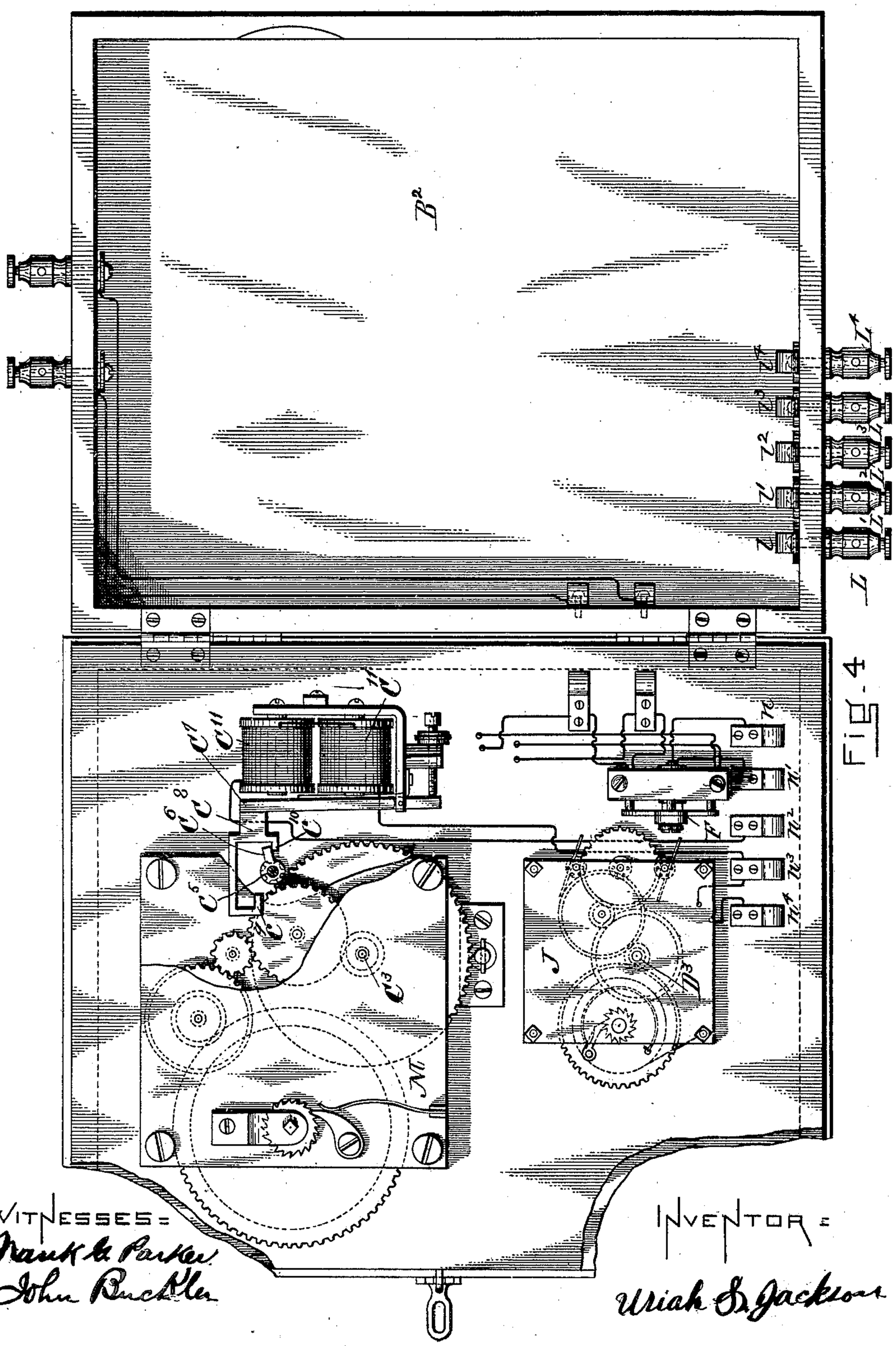

Fig. 4

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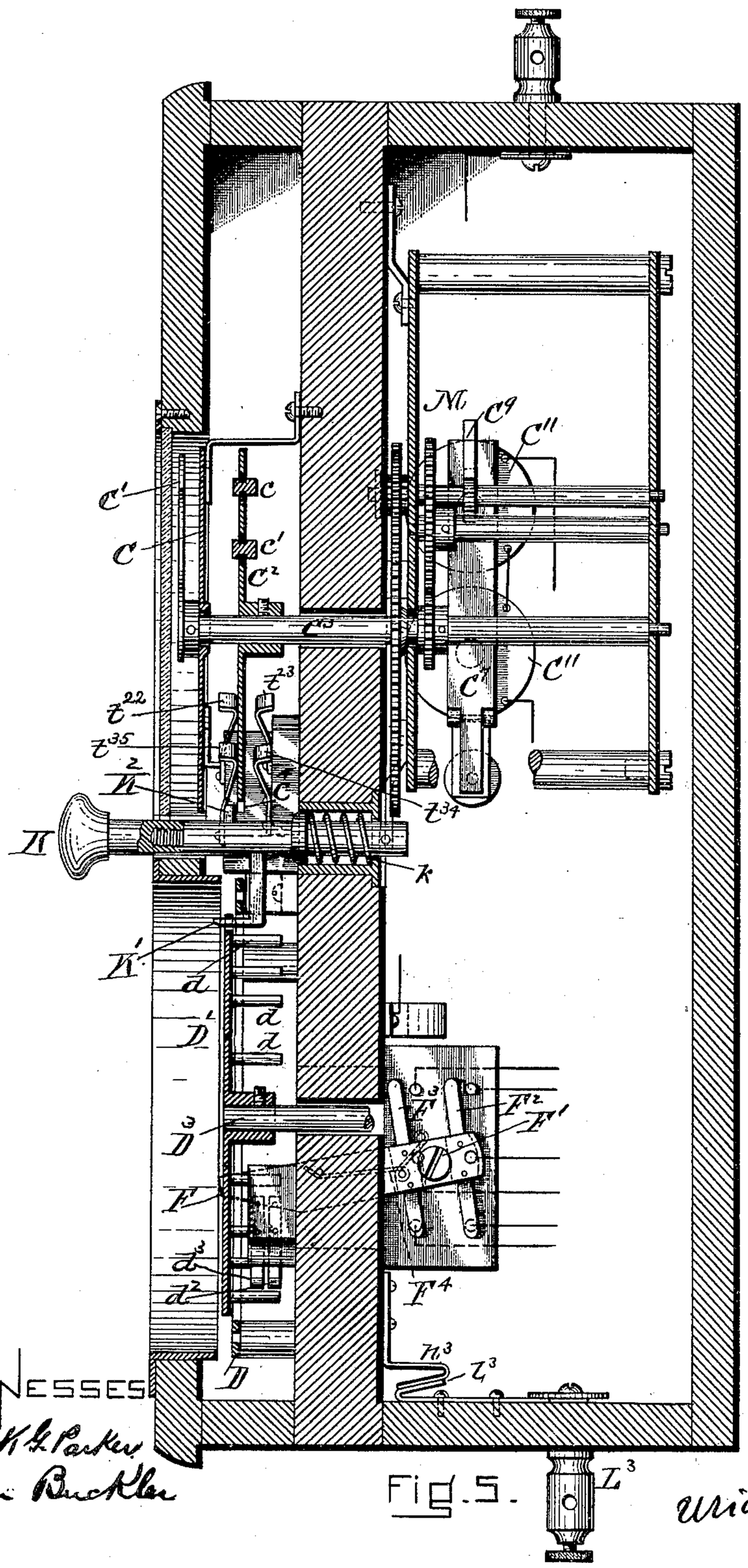

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Fig. 5.

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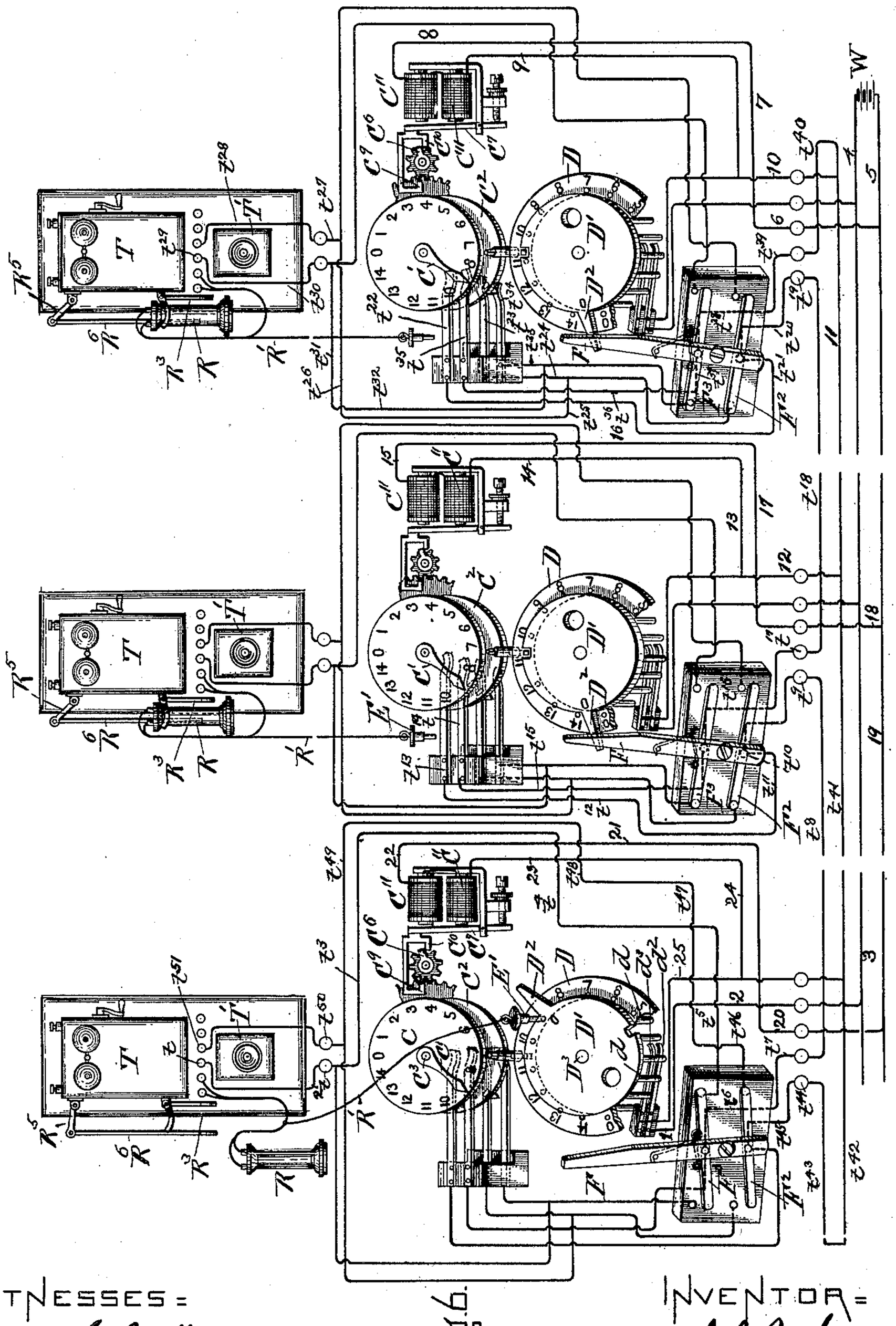

Fig. 6.

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UNITED STATES PATENT OFFICE.

URIAH S. JACKSON, OF OSSIPEE, NEW HAMPSHIRE.

TELEPHONE-SERVICE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 673,796, dated May 7, 1901.

Application filed November 22, 1900. Serial No. 37,390. (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 a Telephone-Service Apparatus, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of telephone-service apparatus in which the person using the apparatus may call up any one on the system, and in so doing cut out all of the others, so that there can be no interruption by a third party; and it consists in an arrangement of clockwork and electric devices, which may be best understood by reference to the description and drawings.

The object is to furnish an apparatus that will admit of direct use by any one in the group of users and is simple and comparatively cheap. This object I attain by use of the mechanism shown in the accompanying drawings, in which—

Figure 1 is a front elevation showing the set of instruments used at each station. Fig. 2 is a side elevation of the same. Fig. 3 is a view showing in elevation two dials and the dial-board to which they are connected. This dial-board has attached to its rear side clock-trains that operate parts connected to said dials. The cover of the case that contains the dials is represented as open and is not shown in full. Fig. 4 shows in elevation the rear side of the dial-board. Two clock-trains are shown in connection with the electrical mechanism. The rear part of the box is also shown with the binding-posts and their connections. Fig. 5 is a vertical section, enlarged, taken on line 5 5 of Fig. 1, (parts omitted.) Fig. 6 is a diagrammatical view illustrating the operation of my apparatus.

The new features of this apparatus are embodied in mechanically-operated clock-trains, their electrical coöperating devices, and the system of electrical circuits that connect the said clock-train devices with each other and with the telephone instruments.

In the drawings, Figs. 1 and 2, I have shown, mounted upon a base A a box B B′ B^2, which contains one set of my apparatus, and also on the same base a telephone instrument T′ T′ R of ordinary construction.

As the pin E′ is connected to the receiver R by a cord R′, which is made (for a purpose) so short that the said pin E′ cannot remain in the dial D when the receiver is not in use, it is obvious that the said receiver R must be taken from the receiver-holding lever R^2 before the said pin E′ can be inserted in its hole in the dial, and in thus taking the receiver R from its lever it is obvious that the said lever R^2 would fly up, and thus break the bell-circuit. To prevent this action of the lever R^2, I attach to it a hook R^3, with which one finger of the hand that takes the receiver may engage, and thus hold it and the lever R^2 down; but to ring the bell the button R^4, Fig. 1, must be pushed in. To do this, I have a bent lever R^5, with a wire R^6 suspended from it. This wire R^6 has a hook R^7 near the hook R^3, so that the same finger or another finger of the same hand that holds the receiver R may be used for drawing down this hook as well as hook R^3—that is, the operator may with one hand hold the receiver R and also hold down the lever R^2 and cause the button R^4 to be pushed in, so that he may ring the bell with his other hand.

For convenience in adjusting and repairing my apparatus the box is made of three parts—namely, a cover B, having circular openings for showing the dials, a part B′, which serves as a plate to which nearly all of the actuating parts of the mechanism are attached, and part B^2, which serves as an outer casing for protecting the clockworks and their adjuncts.

In the drawings, D represents a fixed annular dial, having upon it a series of numerals from "1" to "14" and a zero. These numerals correspond to the number of stations in the group. A pin-hole is made at each of the numerals and also at zero. The pin-hole for the numeral "9" is indicated at E, Figs. 1 and 3. The object of these holes is to receive the stop-pin E′, the function of which will be explained hereinafter.

D′ is a rotating disk operated by a clock-train J, Fig. 4, acting through the arbor D^3. The disk D′ has projecting from its under side a series of contact-pins *d d*, Figs. 3 and 5, (also shown in the diagram, Fig. 6.) Each of the contact-pins *d d* serve when in contact to connect two conductor-plates d^3 d^2, one of

which is indicated by dotted line in Fig. 3 and both in Fig. 5. The contact-plates d^2 d^3 and the pins d d serve to make an electric connection between the operating circuit and the magnets C^{11} C^{11}, Figs. 4 and 5, as will be explained in the operation. The disk D′ also has a switch-operating arm D^2, which acts upon a switch-lever F. This switch-lever F swings upon a pivot F′ and gives motion to two switch-bars F^2 and F^3, which serve to make and break electric connections in the telephone-circuit.

For holding the disk D′ in the position, as shown at Fig. 3, in which the arm D^2 is at zero and pressing the switch-lever F (see Fig. 5) over so as to close one set of telephone-lines and open another, I have a notch in the said disk at D^4, into which a stop-arm K′ on the key K enters. To allow the disk to move, the key K is pressed down by the one who desires to use the telephone. Then the disk D′ will be rotated by its clock-train and will continue to rotate until the arm D^2, starting from zero, is checked by the stop-pin E′, which is placed by the operator at the number that designates the number of the station to be called. This motion of the disk D′ will cause a number of the pins d d to come successively in contact with the contact-plates d^2 d^3, and thus cause a series of electrical actions to energize the magnets C^{11} C^{11}, and thus cause the step-by-step hand C′ to move around to the number that designates the station to be called. The switch-lever F and the connected switch-bars F^2 F^3 are thrown back into their normal position when released by the passing by of the arm D^2 by the action of a spring F^4, Fig. 5.

The key K is thrown upward by a spring k, so as to bring the stop-arm K′ into its locking position in the notch D^4 of the disk D′ and to bring the holding-arm K^2 up through the notch C^4 in the disk C^2, so that it (the arm K^2) will be above the said disk. By pushing the key down the holding-arm K^2 is carried through the notch C^4 to a position below said disk. When the key K is in its lowest position, the arm K′ releases the disk D′, leaving it free to rotate. The arm K^2 does not act as a stop for the disk C^2; but the said disk holds the arm K^2 either above or below it, as the case may be—that is, if the key is thrown up to its highest position by the spring k and the disk C^2, standing at any position in which its notch C^4 does not coincide with the arm K^2, then the said key cannot be pressed down, and consequently the disk D′ cannot be released, and if the key K is in its lowest position then the arm K^2 will rest against the under side of the disk C^2 and will hold the key down until the disk C^2 is made to rotate to its zero position—that is, until the notch C^4 coincides with the arm K^2. Then the key will be free to rise, (under the pressure of the spring k.)

One function of the disk C^2 is to control the movements of the key K—that is, the said key cannot be moved either up or down unless the notch C^4 of the disk C^2 coincides with the holding-arm K^2. This notch is so placed that when the index-hand C′ stands at "0" it (the notch) coincides with the arm K^2, and the key is freed from the holding action of the said disk.

The step-by-step dial C is fixed and has upon it numerals from "1" to "14" and a "0." These graduations correspond with those on the annular dial D, already referred to. An index-hand C′ traverses the disk C and is made to rotate by the clock-train M, Figs. 4 and 5, acting through the center arbor C^3. The movement of the hand C′ is intermittent or step by step and is regulated by a magnetic escapement device which may be explained as follows: C^{11} C^{11} are electromagnets having an armature C^7, to which an escapement having pallets C^9 C^{10} is connected by the arm C^8. The pallets C^9 C^{10} alternately check and release the tooth C^6 on the arbor C^5. The said arbor is rotated by the clock-train M. The arbor C^3, that carries the hand C′, also carries a disk C^2. This disk C^2 has insulated contact-points c c', which are preferably located immediately under the hand C′, so that their position is always indicated by the hand. The contact-plates for coöperation with the points c c' are four in number, two of which bear constantly upon the upper side of the disk, which, being metallic, forms an electrical connection for the said contact-plates. The other or lower contact-plates t^{34} t^{23} are only operative when the contact-points c c' are in a predetermined position—that is, the position for closing the telephone-circuit of the number called. For convenience the contact-points c c' are placed on the disk C^2 immediately under the index-hand C′ for all of the stations; but the contact-plates t^{22} t^{23} and t^{34} t^{35} (see, for example, Fig. 6, station No. 9) are placed in different positions for each station—that is, for station No. 7 the contact-plates are in such a position that the pins will make the contact when the hand points to the number "7," and for station No. 9 the pins will make the contact when the hand points to the number "9," and so on.

The posts L L′ L^2 L^3 L^4, Figs. 3 and 4, are for the outside wires and are electrically connected with the inside wires by the clips l l' l^2 l^3 l^4 and n n' n^2 n^3 n^4 when the box is closed.

An ordinary registering device V, Fig. 3, is so placed that at every rotation of the disk D′ its arm D^2 will record its rotation, thus automatically registering the number of times that the telephone apparatus has been used.

The disk D′ makes a complete rotation for each call—that is, a part rotation is made for the call, and then the rotation is completed by withdrawing the pin E′, so as to allow the disk D′ to assume its normal resting position. Hence for each call the arm D^2 on the said disk must come in contact with the lever of the registering device Y.

The operation of my apparatus may be ex-

plained as follows: Referring to Fig. 6, we will assume that station No. 7 wishes to call up No. 9. The user takes down the receiver R, which allows him to insert the attached pin E′ in hole No. 9 of the annular dial D, all of the apparatus being in the normal position of rest—that is, the index-hands C′ of the disks C^2 and the arms D^2 of the disks D′ are all at "0." Now by pressing the key K the arm K′, Fig. 5, will descend, and thus leave the disk D′ free to rotate under the impelling power of the clock-train J. As soon as one of the pins *d* comes in contact with the contact-plates an electric circuit is formed through all of the magnets C^{11} C^{11}, thus releasing clock-trains that operate the disks C^2 and the connected hands C′, allowing them to move one division, and as each of the pins *d d* makes a contact with the contact-plates d^2 d^3 a circuit is made and the dials C^2 and index-hands C′ will advance one step or number. This action will go on until the dials and hands have advanced step by step until the arm D^2 is stopped by the pin E′ at hole No. 9—that is, nine pins *d d* have made contacts, and thus have advanced all of the dials C^2 to the ninth position. In the ninth position, as has already been stated, the contact-points *c c′* of the dial C^2 are in electrical contact with the contact-plates t^{22} t^{23} and t^{34} t^{35} of station No. 9—that is No. 9 is put into the telephone-circuit and may be called by No. 7. The step-by-step magnetic or operating circuit is as follows: Beginning at one of the pins *d d*, station No. 7, (we will assume that it is the first one to come in contact with the plates d^2 d^3 after disk D′ has started to rotate,) the circuit will be wire 1 2 3 4, battery W, wire 5 6 7 8, magnets C^{11} C^{11} of station 9, wire 9 10 11 12 13 14, magnets C^{11} C^{11} of station 8, wire 15 16 17 18 19 20 21 22, magnets C^{11} C^{11} of station 7, wire 23 24 25, plate d^3 to pin started from. Having caused the dial of station to assume the position desired—that is, in such a position as to bring the contact-points *c c′* into electric connection with the plates t^{22} t^{23} and t^{34} t^{35}—that is, to close the telephone-circuit—the said circuit will be as follows: starting from button *t*, telephone of station No. 7, thence by wire t^2 t^3 t^4 t^5, switch-bar F^3, wire t^6 t^7 t^8, post t^9, button t^{10}, wire t^{11} t^{12}, plate t^{13}, disk C^2, plate t^{14}, wire t^{15}, switch-bar F^3, (of station 8,) wire t^{16}, post t^{17}, wire t^{18}, post t^{19}, wire t^{20}, switch-button of station 9, wire t^{21} t^{21}, contact-plate t^{22}, contact-point *c* in disk C^2, contact-plate t^{23}, wire t^{24} t^{25} t^{26} t^{27} t^{28} to telephone of station 9, (the one called,) thence back by post t^{29}, wire t^{30} t^{31} t^{32} t^{33}, plate t^{34}, point C′ of disk C^2, plate 35, wire t^{36} t^{37} to switch-button, thence by wire t^{38} t^{39} t^{40}, (wire 11,) wire t^{41} t^{42} t^{43}, post t^{44}, wire t^{45}, switch-button and switch-bar F^2, wire t^{46} t^{47} t^{48} t^{49}, post t^{50}, telephone-button t^{51} of telephone started from. As soon as the call has been made and the answer received the pin E′ is removed from the hole No. 9 and the clock-work causes the disk D′ to continue its rotation, so that the arm D^2 will be carried around until it comes in contact with and operates the switch-lever F, thus restoring the entire apparatus to its normal resting position.

I claim—

1. In a telephone-service apparatus, a telephone-receiver, a bent lever adapted to operate the "push-button" of the telephone, and said push-button; hooks hanging from said bent lever and from the receiver-lever, said hooks being adapted to be operated by the hand that takes the receiver from its lever; and a stop-pin attached to said receiver by a cord adapted to allow said stop-pin to engage with the contact-pin dial, only when the receiver is taken off from its lever, and said contact-pin dial and lever, substantially as and for the purpose set forth.

2. In a telephone-service apparatus, a rotatable disk, a clock-train adapted to operate said disk; contact-pins in said disk adapted to open and close an electric circuit, said electric circuit, adapted to operate mechanism by which an electric circuit is established between the calling-station and the called station; and said circuit between the calling and the called station, substantially as and for the purpose set forth.

3. In a telephone-service apparatus, a rotatable disk; a clock-train, operating said disk; contact-pins in said disk, adapted to open and close electric circuits as described; said electric circuits; a switch; an arm attached to said disk and adapted to hold said switch closed to one line of circuit-wires and open to another; and a spring adapted to reverse said switch when not held by said arm, substantially as and for the purpose set forth.

4. In a telephone-service apparatus, a fixed annular dial having numbered pin-holes, a stop-pin adapted to fit said pin-holes; a rotatable disk concentric with said fixed dial, and having an arm adapted to engage with said pin and hold the said disk in place, until the said pin is removed, by the operator, and contact-pins upon said disk adapted to open and close electric circuits, and said electric circuits, substantially as and for the purpose set forth.

5. In a telephone-service apparatus, a rotatable disk having contact-pins, electric circuits adapted to be opened and closed by said contact-pins and means for operating said disk; a key adapted to automatically spring into place, and hold said disk at its normal position, when not forced down by the user, said key having a holding-arm adapted to engage with a notched rotating disk and be held down or up by said disk except when said disk is in its normal resting position, its notch being then in a position to allow the said arm to pass through, as described; insulated contact-points on said notched disk adapted to engage with contact-plates and close an electric

circuit between the calling-station and the called station, substantially as and for the purpose set forth.

6. In a telephone-service apparatus, a step-by-step rotating disk having insulated points adapted to close an electric telephone-circuit connecting the calling-station with the called station; said electric telephone-circuit; mechanism for operating said rotating disk; an escapement device operated by magnets which are adapted to be energized by electric circuits, closed and opened by contact-pins on a rotating disk, and said disk and mechanism for operating the same, 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 17th day of November, A. D. 1900.

URIAH S. JACKSON.

Witnesses:
FRANK G. PARKER,
JOHN BUCKLER.