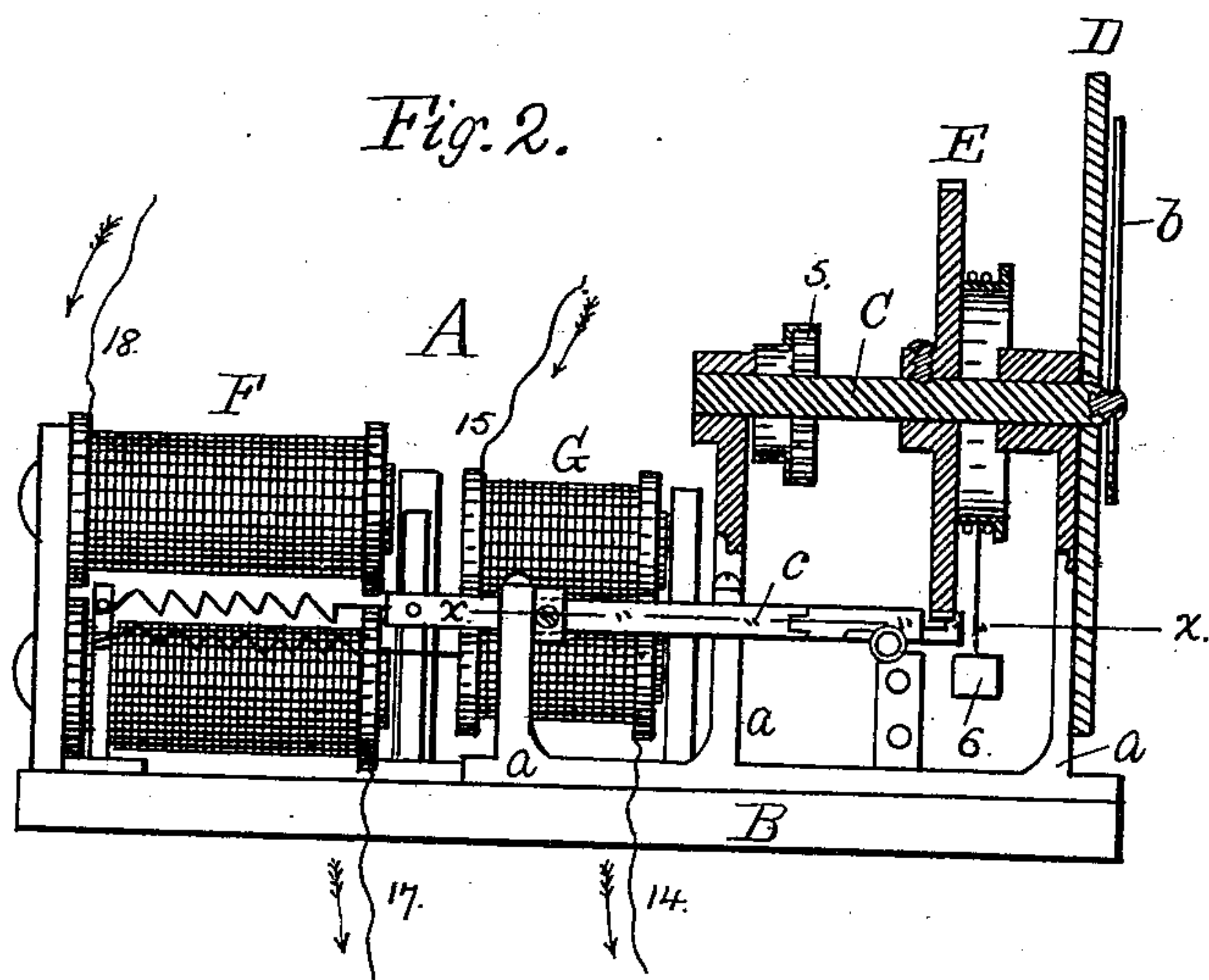
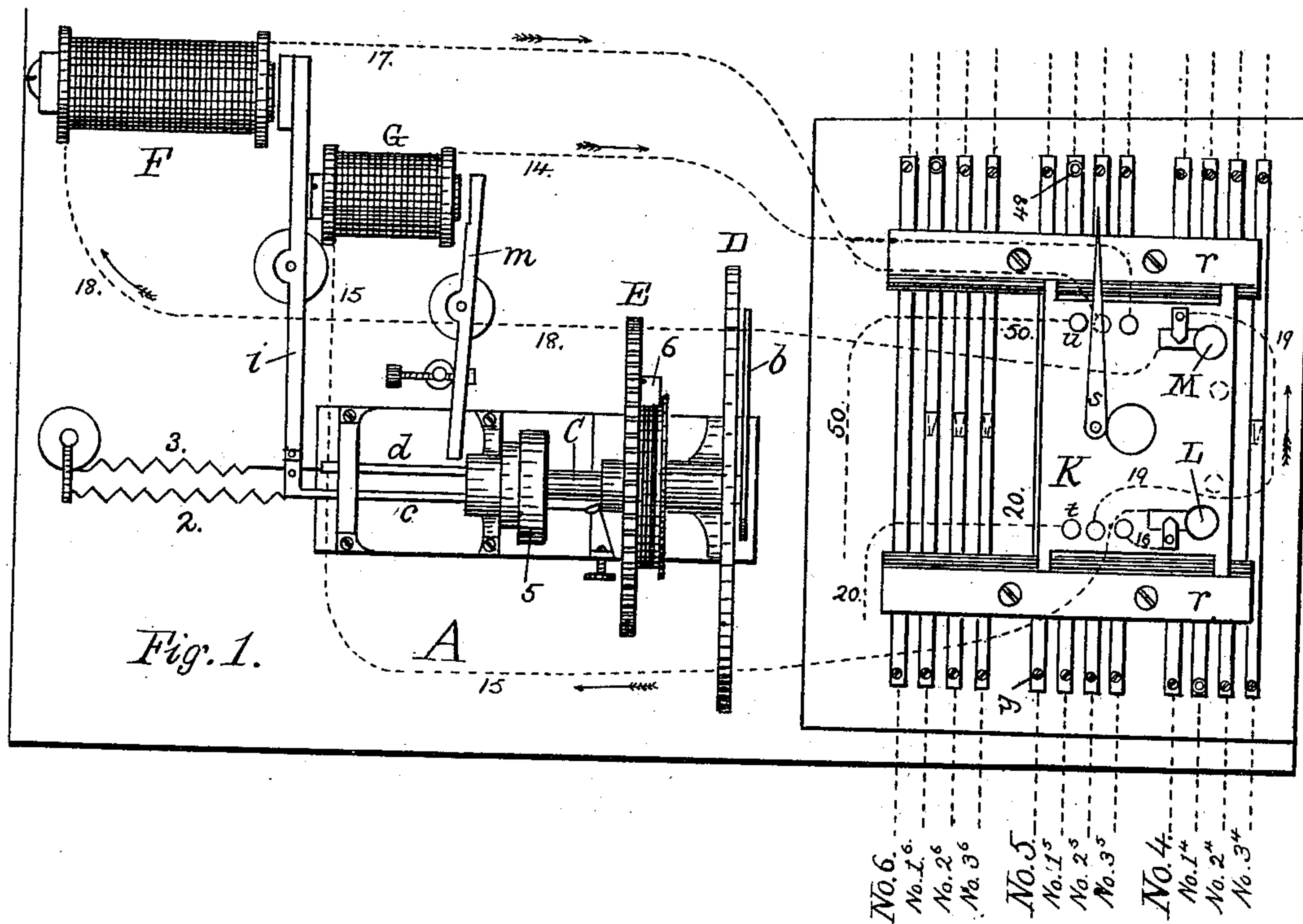


No. 335,588.

Patented Feb. 9, 1886.



Witnesses.

H. C. Long
A. F. Hayden.

Inventor.

Charles A. Jackson.

Frederick Curtis, atty.

(No Model.)

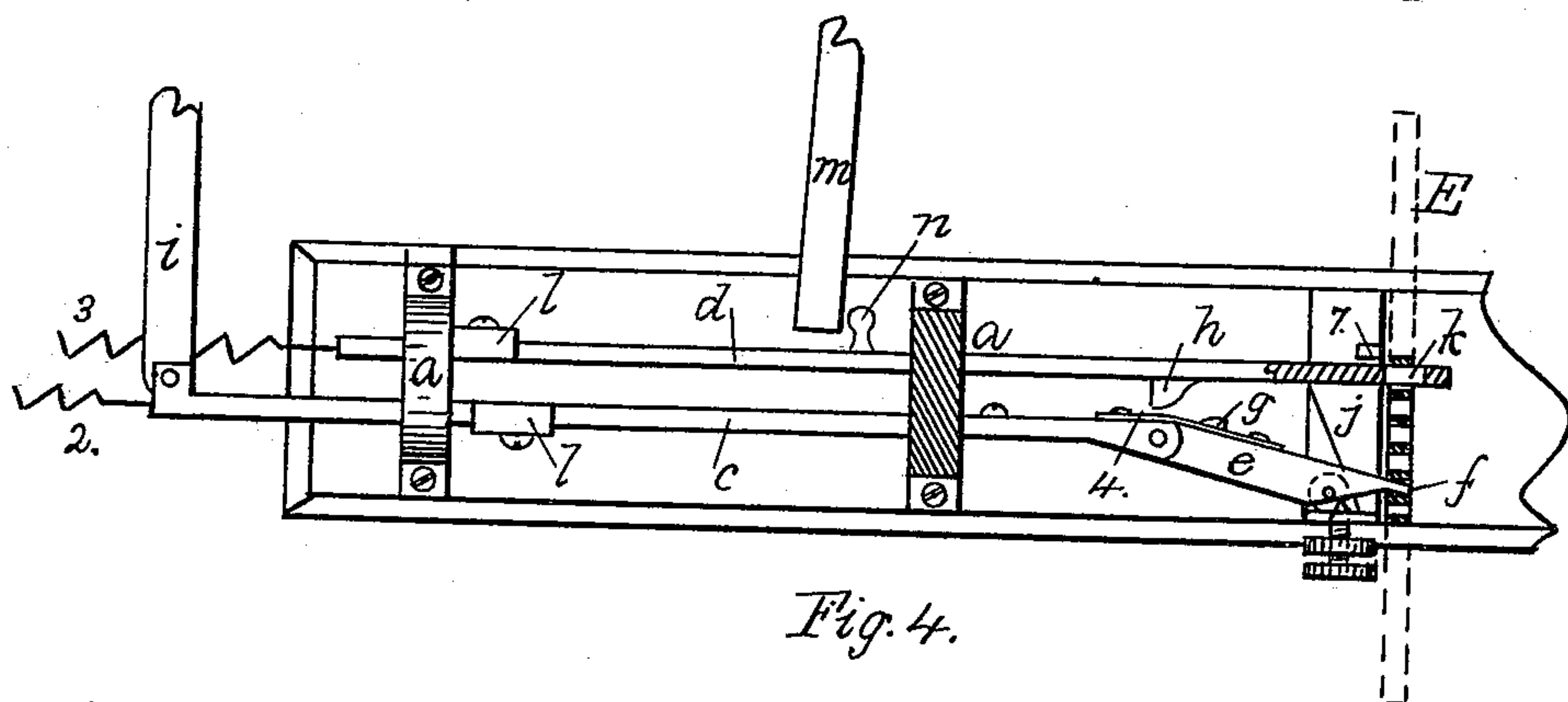
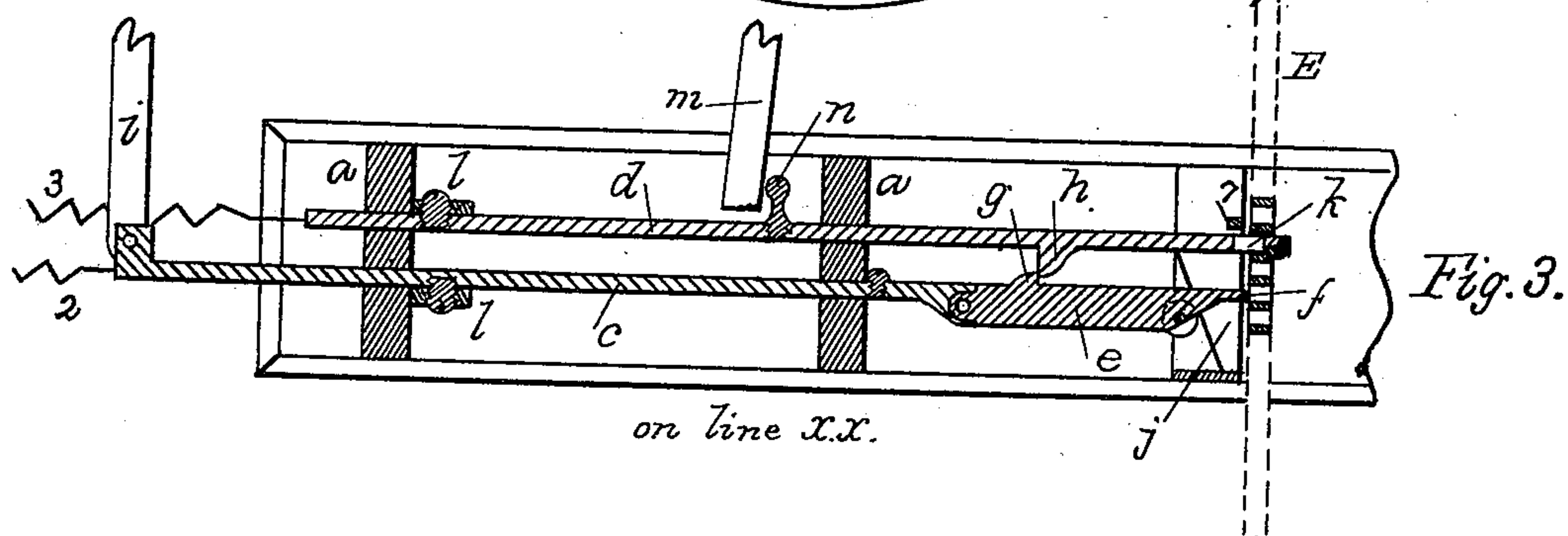
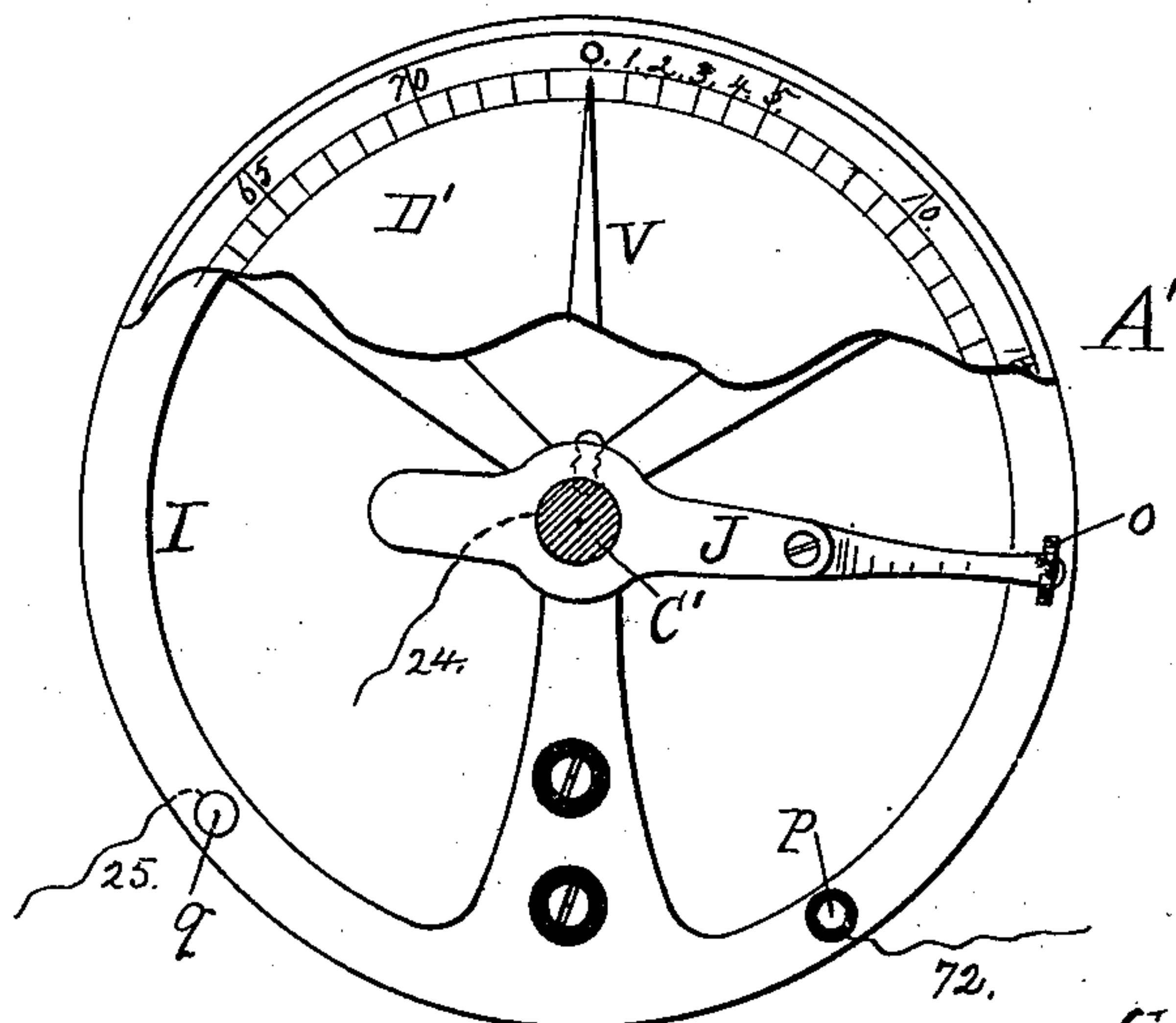
6 Sheets—Sheet 2.

C. A. JACKSON.
TELEPHONE SYSTEM.

No. 335,588.

Patented Feb. 9, 1886.

Fig. 9.



Witnesses.
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(No Model.)

C. A. JACKSON.
TELEPHONE SYSTEM.

6 Sheets—Sheet 3.

No. 335,588.

Patented Feb. 9, 1886.

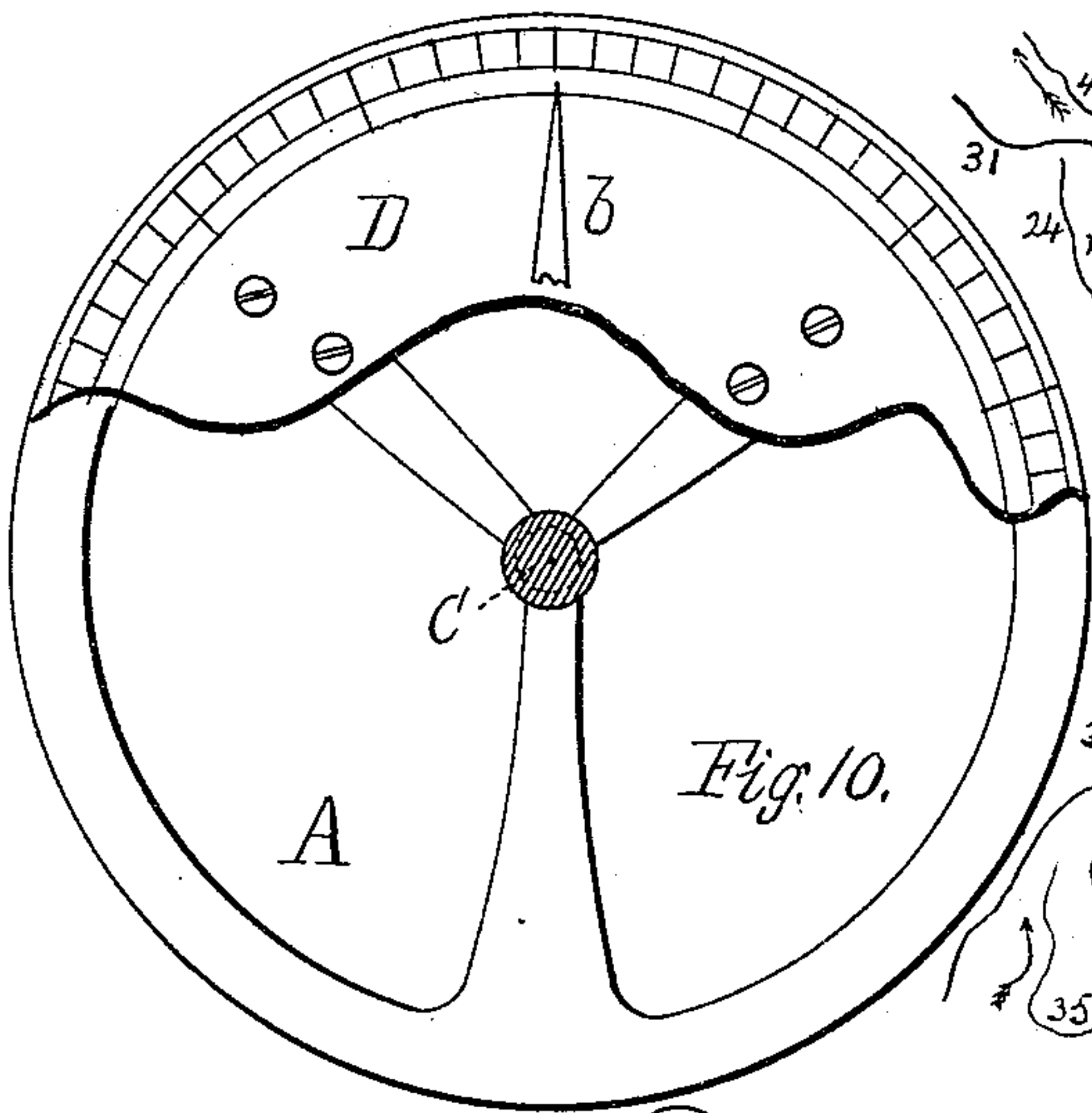


Fig. 10.

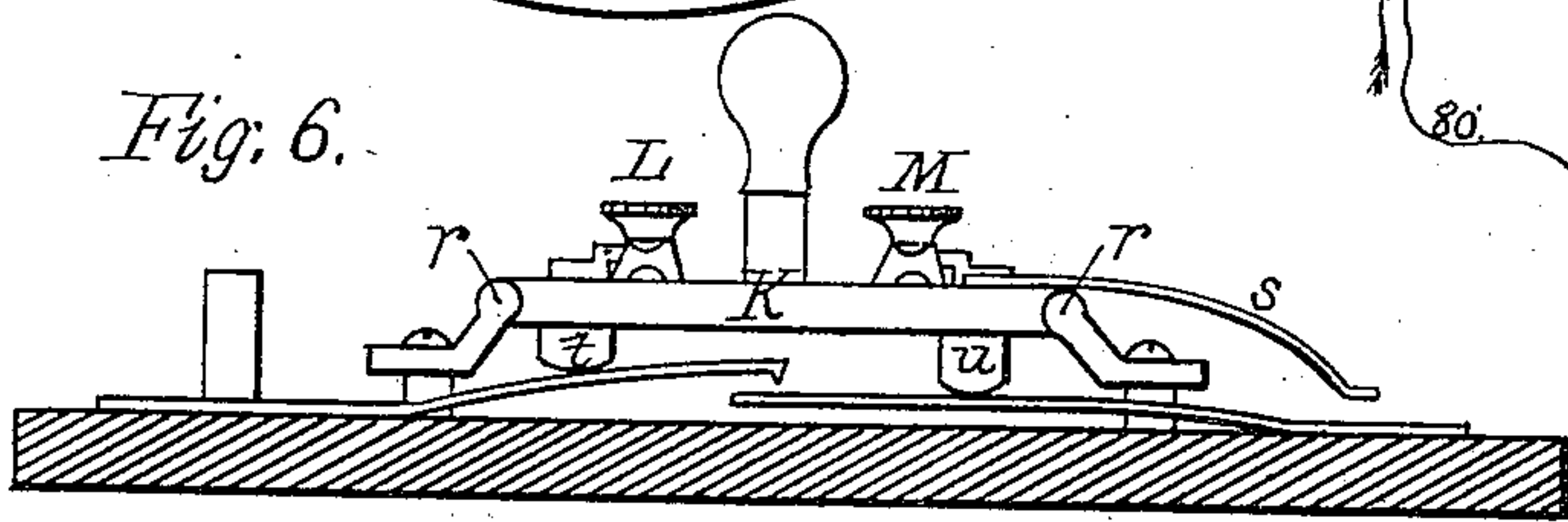


Fig. 6.

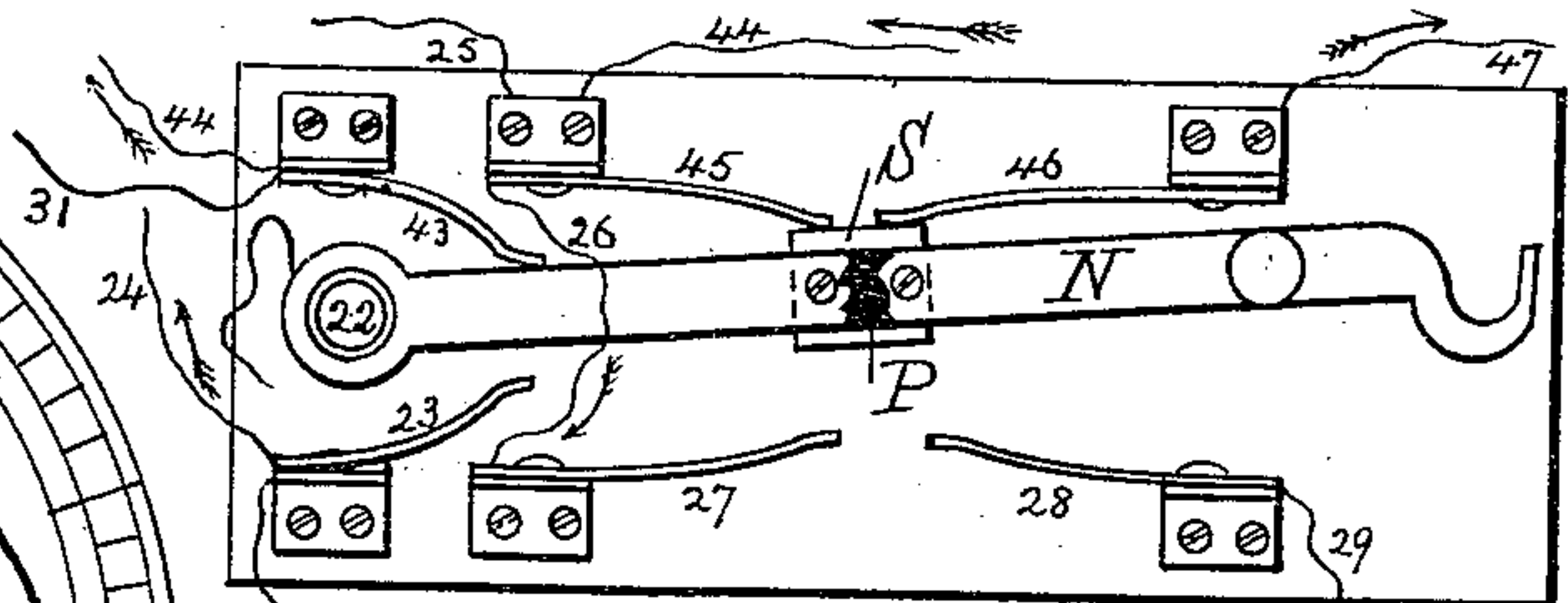


Fig. 11.

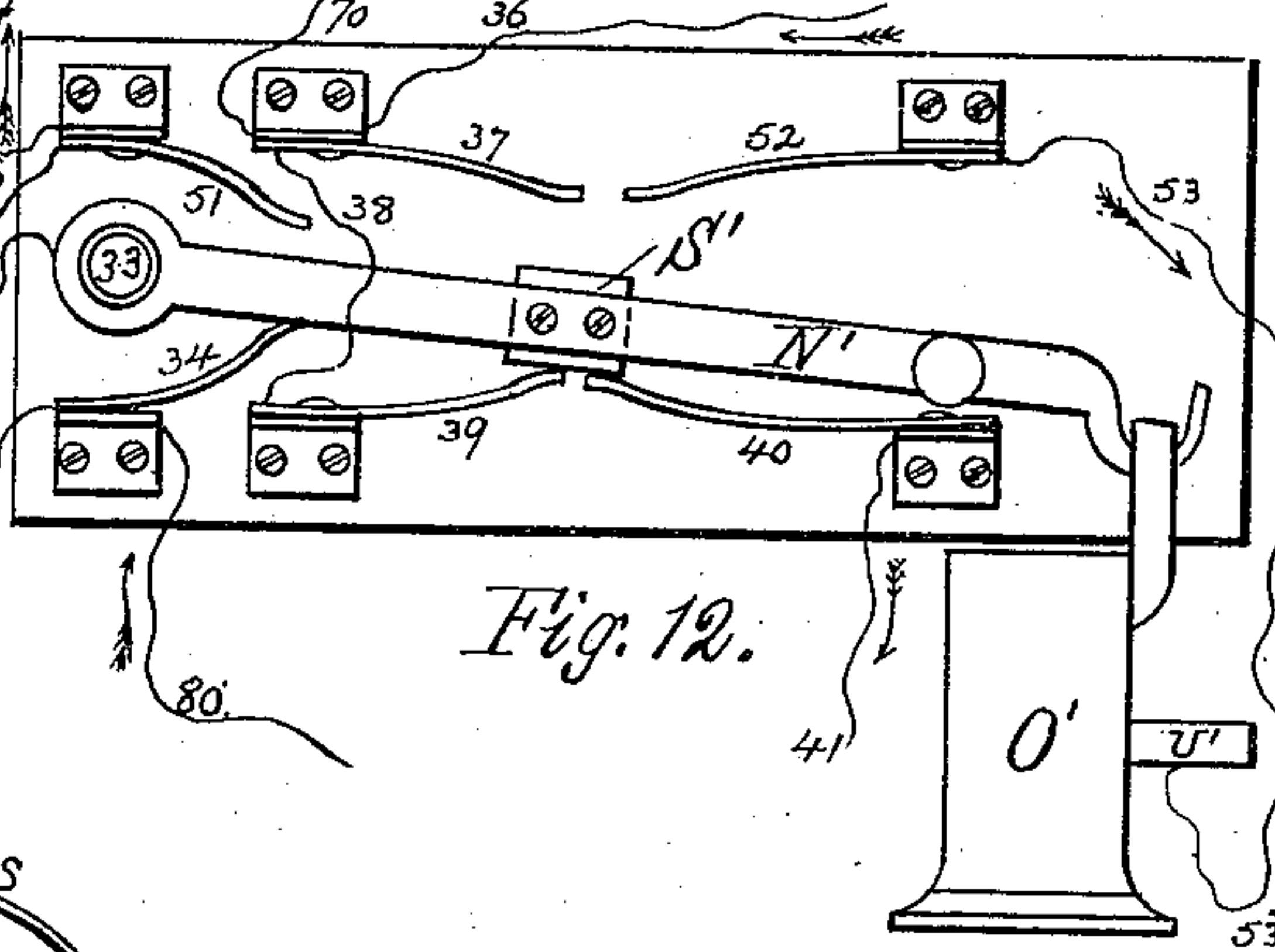


Fig. 12.

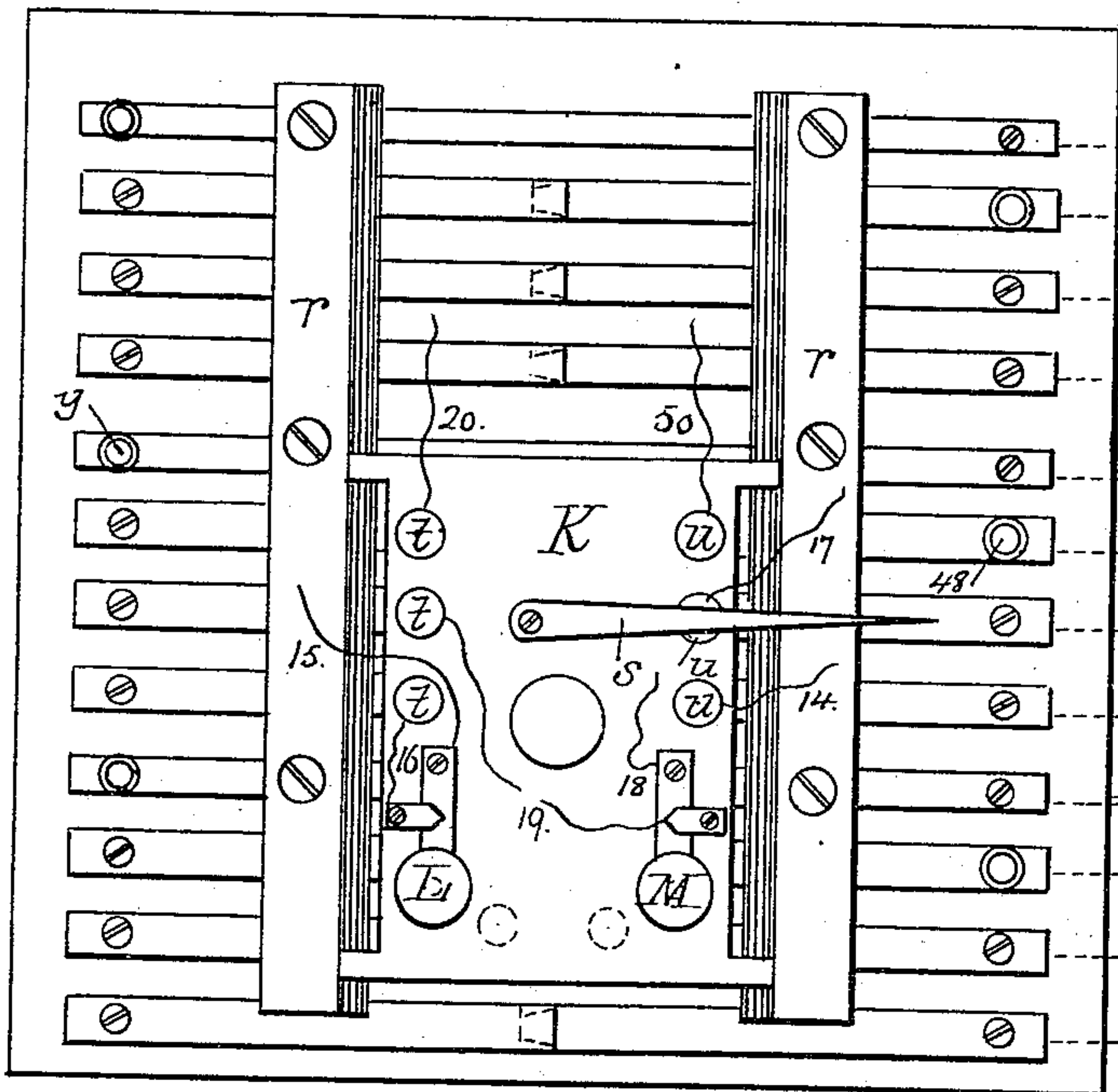


Fig. 5.

No. 6.

No. 1⁶

No. 2⁶

No. 3⁶

No. 5.

No. 1⁵

No. 2⁵

No. 3⁵

No. 4.

No. 1⁴

No. 2⁴

No. 3⁴

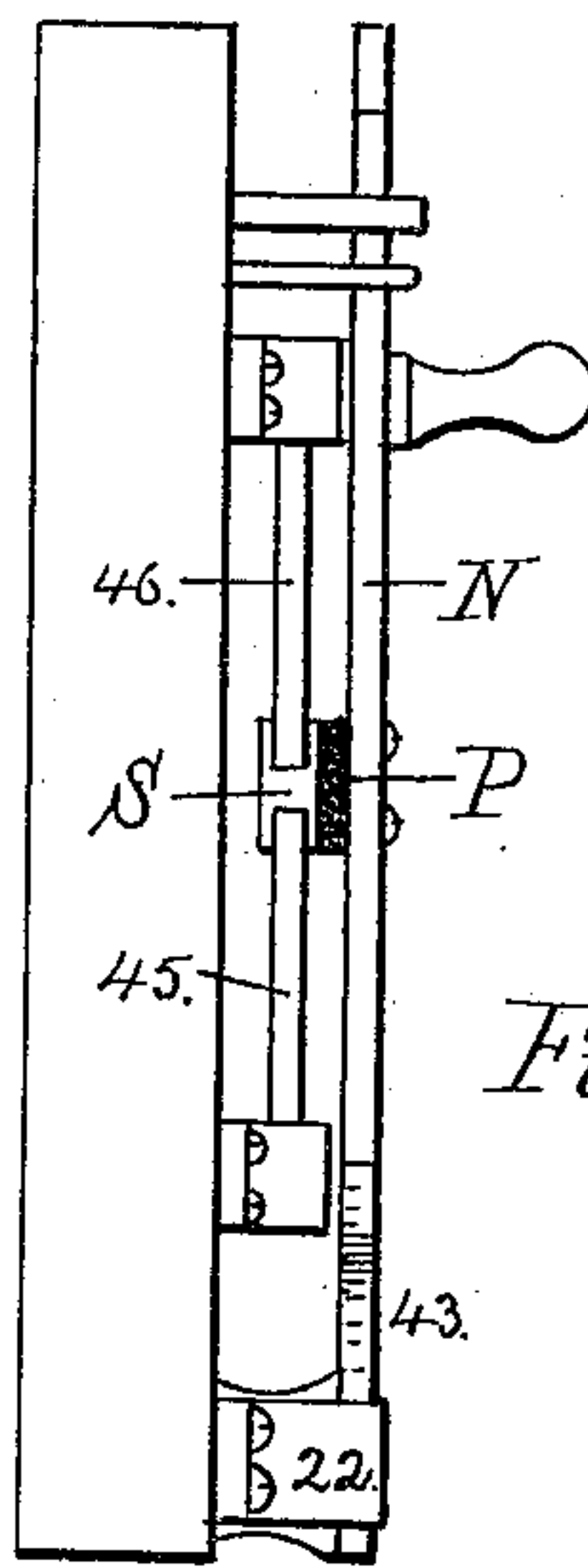


Fig. 13.

Witnesses.
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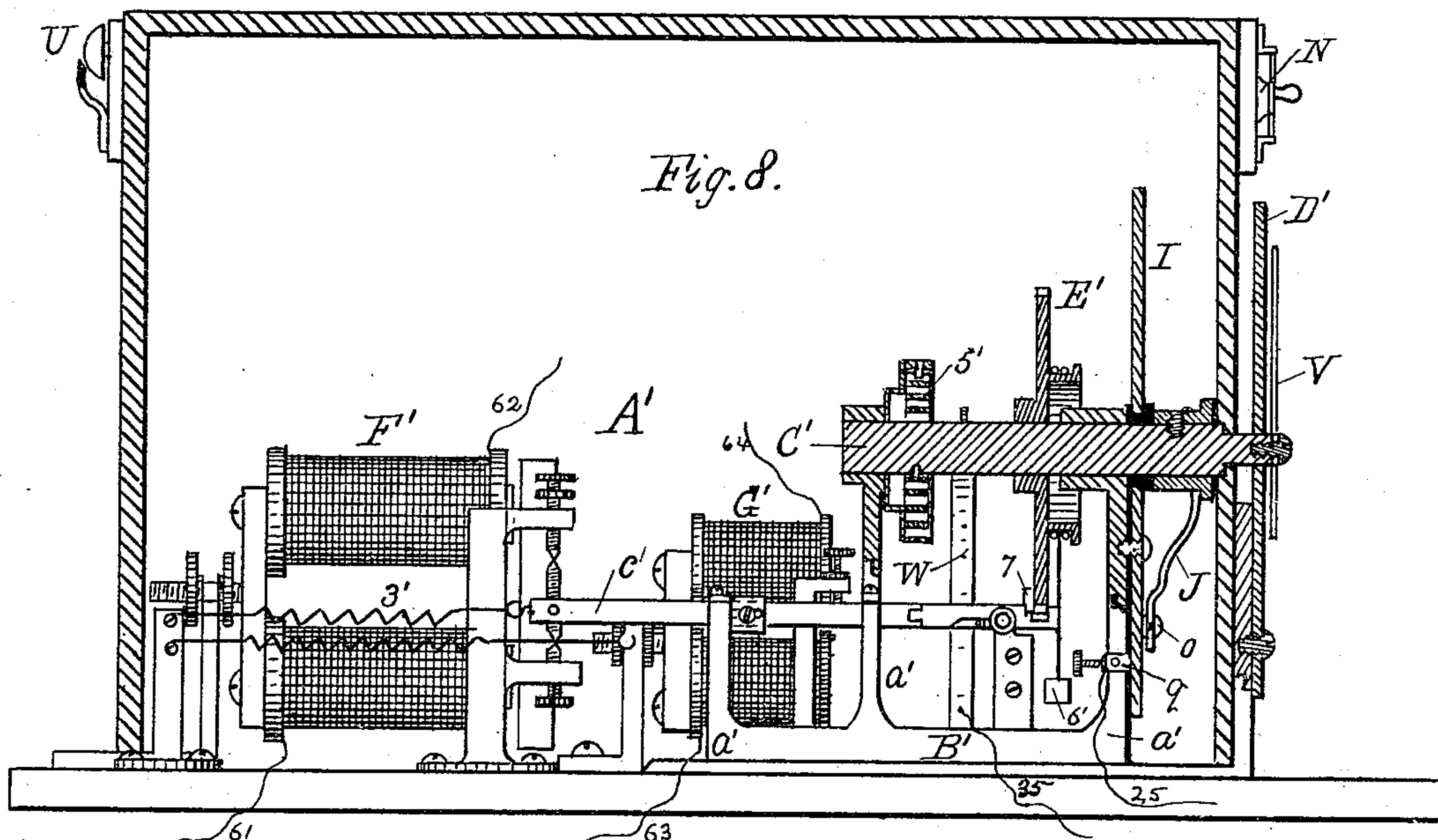
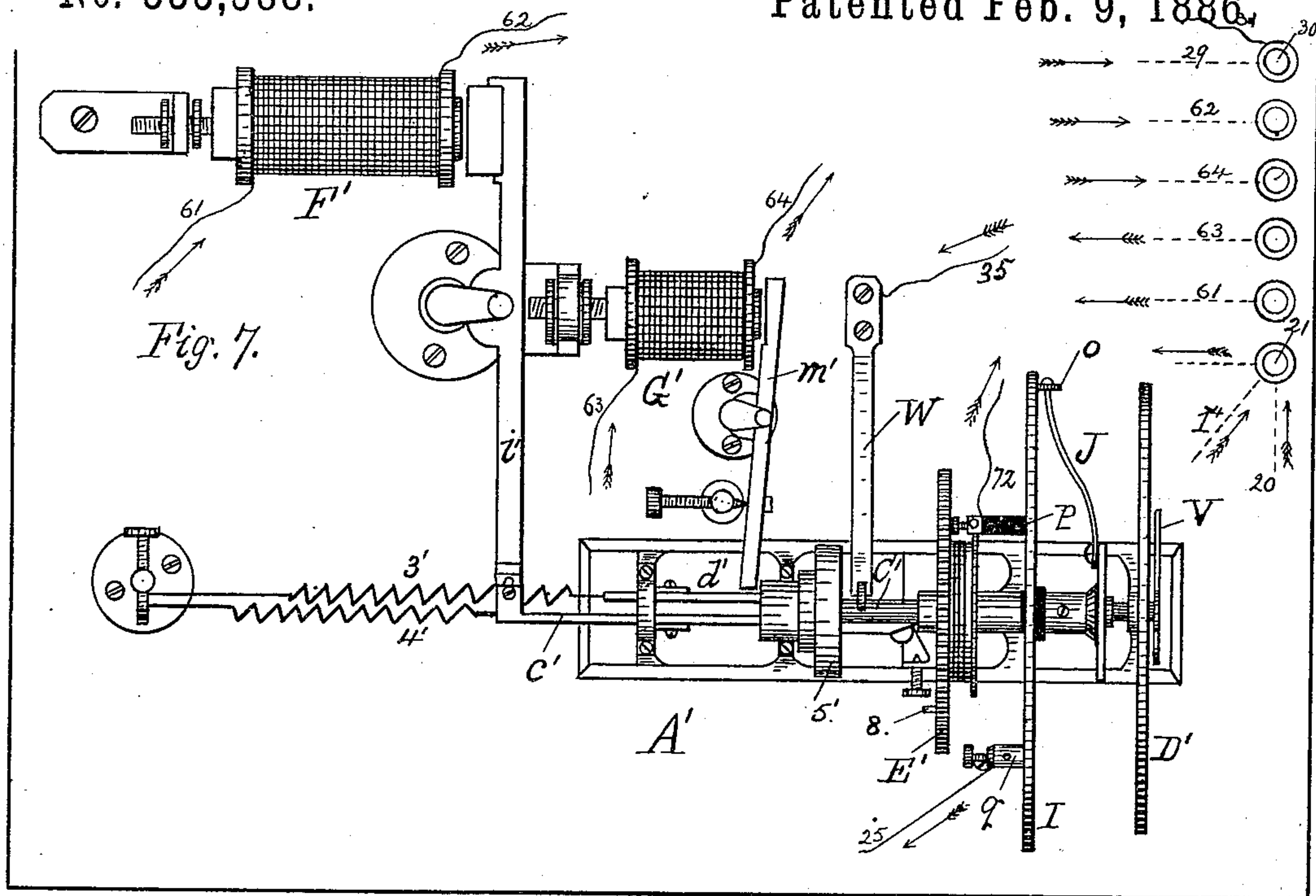
(No Model.)

6 Sheets—Sheet 4.

C. A. JACKSON.
TELEPHONE SYSTEM.

No. 335,588.

Patented Feb. 9, 1886.



Witnesses.

H. E. Long
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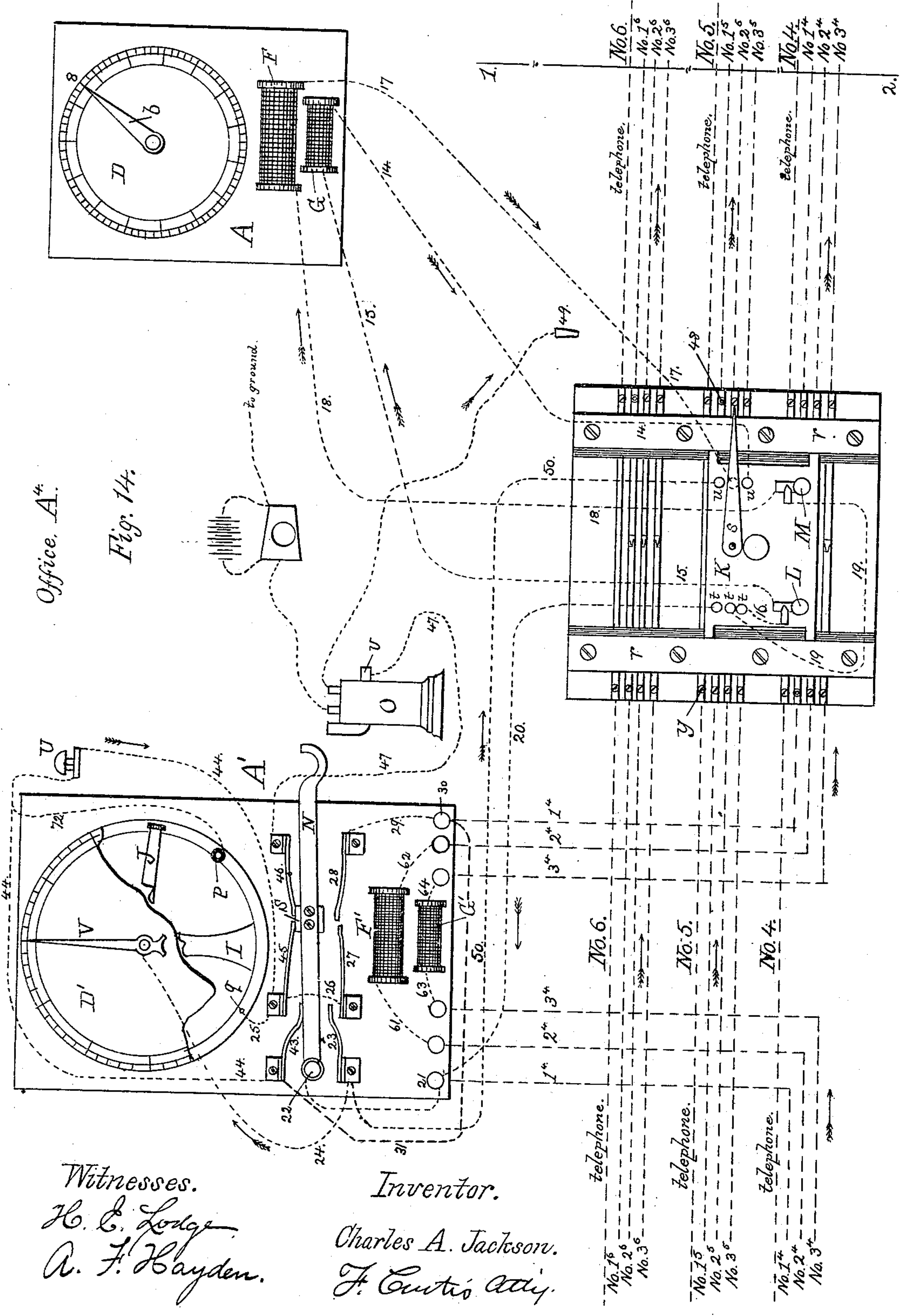
(No Model.)

C. A. JACKSON.
TELEPHONE SYSTEM.

6 Sheets—Sheet 5.

No. 335,588.

Patented Feb. 9, 1886.



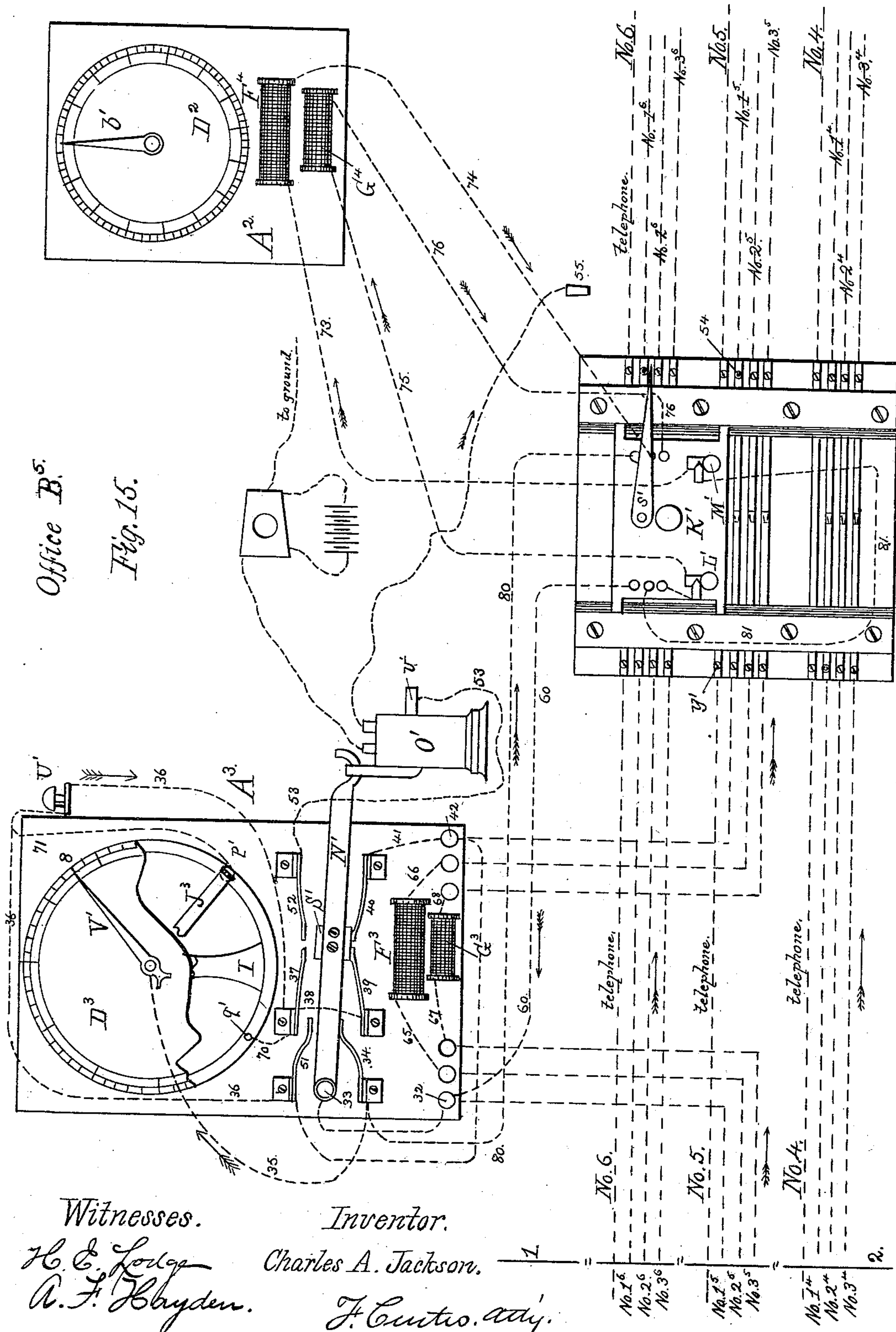
(No Model.)

C. A. JACKSON.
TELEPHONE SYSTEM.

6 Sheets—Sheet 6.

No. 335,588.

Patented Feb. 9, 1886.



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UNITED STATES PATENT OFFICE.

CHARLES ALMON JACKSON, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO
DAVID F. ROBINSON, OF SAME PLACE.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 335,588, dated February 9, 1886.

Application filed August 11, 1885. Serial No. 171,133. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ALMON JACKSON, a citizen of the United States, residing at Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Telephone Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to telephone systems; and it consists in the peculiar arrangement of the calling apparatus and the connecting-wires, by which the use of a "central office," so termed, is avoided. Each system may contain any number of subscribers, and each subscriber on his own circuit has four wires, while by means of a movable switch-board he can communicate with any other subscriber on other and different systems running through his office or building. Each subscriber is provided with an individual-call wire, with which is connected a dial and an indicator-hand moving thereon, this hand being operated at will by a call-tapper and an electro-magnet connected with the call-wire circuit. Furthermore, each subscriber is provided with a second apparatus, termed the "individual-alarm call," since by means of this instrument any subscriber is notified that communication with him is desired by some one else. Now, this call-tapper operates the indicator-dial through the same circuit which communicates with every other subscriber's individual-alarm apparatus upon each complete system; and, moreover, since the movement of the call-tapper operates the indicator-hand on the face of the call-dial and synchronously therewith the hands on the individual-alarm apparatus of all other subscribers upon that system, it is apparent that any subscriber may operate his call-tapper and watch the indicator-hand on the call-dial until it has reached the proper number belonging to the subscriber with whom he desires to communicate, when he knows that the hand upon that individual's

alarm apparatus is in the same relative position in said subscriber's office and that the latter can be rung up.

A prominent feature in my invention and the system embodied therein is contained in the apparatus termed the "call-indicator" and the "individual-alarm call," by which a synchronous and equal movement of every hand on each individual-alarm call apparatus of every subscriber on a given circuit, except the subscriber calling, is effected by the movement of the call-indicator hand of said subscriber. Thus every subscriber may switch in at option any subscriber on his own circuit, as well as those upon other circuits; and my invention further embraces apparatus by which said indicator-hand and the individual-alarm-call hands may be restored to their normal position (to zero) by any subscriber who has just made a call and has finished his conversation, or by a subscriber preparatory to making a call to ring up any one. The system, moreover, embraces a movable switch-board, whereby various lines of subscribers may readily communicate with each other as they choose or as business requires.

Further details of mechanism and the various circuits and directions of the electric currents employed will be more fully hereinafter described.

The drawings accompanying this specification represent, in Figure 1, a plan of the individual-call apparatus and movable switch-board provided for each subscriber, and Fig. 2 is a sectional elevation of the call apparatus embodying my improvements. Fig. 3 is a horizontal section, enlarged, on line *xx* of Fig. 2, of the mechanism for actuating the indicator-alarm and call-hands, and shown in an inactive position, while Fig. 4 is a similar section of the same parts in active operation. Fig. 5 is a plan of the movable switch-board, and Fig. 6 is a cross-section of the same. Fig. 7 is a plan of the individual-alarm-call apparatus, and Fig. 8 a longitudinal vertical section of the same. Fig. 9 is a front view of a portion of the individual-alarm-call dial and hand and also of the rotary switch-hand. Fig. 10 is a front elevation of a part of the individual-call dial and hand. Figs. 11 and 12 are front ele-

variations of the bell-switch lever shown in two positions simultaneously in different offices, and Fig. 13 is a plan of the same. Figs. 14 and 15 represent as a whole a diagrammatic view of the entire system between two subscribers, and show the course and change in direction of the current upon the different wires when said system is in active operation, Fig. 15 being a continuation of Fig. 14 from plane 1 2, as shown.

I will now proceed to describe the individual-call apparatus A, as shown in Figs. 1, 2, and portions in 3 and 4, which embodies a very important feature in my system. Each subscriber is provided with one of such instruments, and by means of and through which the attention of any other particular or individual subscriber is obtained without the aid of a central office. Furthermore, I start with the premise that the two keys marked L M and secured upon the movable switch-board serve to operate the individual-call hand *b*, and synchronously therewith every individual's alarm-call hand V in every subscriber's office upon that system except his own. This apparatus is composed of a base-plate, B, provided with suitable upright standards, *a a a*. This plate may be secured in any convenient part of the room or office, while upon the standards is mounted a shaft, C, which extends through two circular metal disks, D E, and has a pointer or indicator hand, *b*, secured at one end. The front plate is secured to one of the standards *a*, and is divided into a series of equal divisions, numbered according to the subscribers on that system or the subscribers upon other systems connected therewith. The second plate or disk, E, is a spur-wheel attached to the shaft C, and rotates the latter by means of the teeth cut in its periphery and adapted to engage a reciprocating arm, *c*. (See Figs. 3 and 4.) Now, since each subscriber in this system is provided with an indicator-dial, D, and hand *b*, which operates and shows the position of every subscriber's indicator-alarm hand V upon its dial, it is very necessary that the movement of every hand upon each apparatus should be synchronous, and means must be provided to insure a positive movement of all, so that if one hand on a certain dial stands upon division five every other hand in each office upon that particular circuit should likewise be in that position. To effect this, I maintain the toothed wheel E always locked, except when movement is required, and to operate said wheels positively I proceed as follows: Mounted in the standards *a a a* of the base-plate B are two rods or bars, *c d*, the active or operating ends of which are adapted to engage with the teeth of the disk E, the rod *c* being the actuating and the bar *d* the locking instrumentalities. As shown in Fig. 3, the bar *c* is provided with a pivoted arm, *e*, the nose *f* of which is adapted to enter the spaces between the teeth, while a spur, *g*, is adapted to engage a similar spur, *h*, formed on the bar *d*. Advance movement of the rod *c* is effected by

means of lever-arm *i*, actuated by the electro-magnet F and return movement by means of a spring, 2. The rotary feed motion is effected by advance of the rod *c* pressing the pivoted arm *e* against an incline or block, *j*, which causes lateral thrust of the arm and movement of the disk E one tooth. The corresponding or locking arm, *d*, is provided at its active end with a slot, *k*, of the width or somewhat wider than the thickness of the disk E; hence with the advance movement of the rod *c* simultaneous motion of the rod *d* is secured by the spur *g* engaging with it the spur *h*, and thus the slot *k* is brought to coincide with the disk and motion of the latter permitted by the continuous advance of the rod *c*, which thrusts its arm *e* laterally to advance the disk E the space of one tooth. This lateral motion has likewise disengaged the two spurs, and the rod *d*, by the action of its spring 3 at the rear, is permitted to retreat and change the position of the slot *k*, thereby locking the disk E during the inactive or retreat movement of the rod *c*, and while the arm *e* is regaining its normal position in readiness to advance and engage a second tooth. The restoration of the arm *e* to its normal position in alignment with its rod *c* is effected by means of a flat spring, 4, or other equivalent, against whose tension the arm *e* is exerted during its lateral outward thrust. Suitable stops, *ll*, limit the rods *d e* in their retreat movement. Thus it will be observed that closing of the circuit to render the magnet F active will actuate the lever *i* and advance the rod *c* and with it the rotary disk the space of one tooth. The active movement of the disk E is against the tension of a spring, 5, or weight 6; hence to release said disk in order to restore the dial-hand *b* to its normal position at zero, I employ a second electro-magnet, G, and a lever, *m*, with a pin, *n*, affixed in the rod *d*, and when the magnet is actively induced by closing the circuit with the tapper L, the lever is actuated and pressed against the pin *n* on the rod *d*. The latter is then thrust forward, advancing the slot *k* into alignment with the teeth of the disk E and unlocking the latter, which is restored to its normal position by reverse rotary movement, and carries with it the dial-hand *b*, which is secured to the extremity of the shaft C. Thus it will be seen that by interrupting the current a certain number of times the disk E will be advanced a certain number of teeth by means of the electro-magnet F, and the indicator-hand *b* will be advanced a similar number of spaces upon the dial. Return of the hand to zero upon the dial is effected by interrupting the current through the magnet G and unlocking the toothed wheel E. In order to bring the indicator-hand *b*, shaft C, and spur-wheel E back to a fixed determinate point, so that the hand shall come to rest at zero, I have secured stop-pins 7 8, one upon the frame the other on the spur-wheel E. Now, by connecting several of these instruments electrically, they will all be forced to move synchronously and through equal

spaces in a given time, and thus the position of one hand *b* in any office will insure and positively indicate the position of every hand *V* on all the individual-alarm dials connected in that particular circuit.

The above shows the mechanism by which a subscriber can operate, by means of his indicator-call apparatus *A*, the individual-alarm instrument shown at *A'* in Figs. 7 and 8.

The general arrangement and operation of parts by which the movement of the alarm-dial hand *V* is effected is the same as in the indicator-call apparatus *A* above described—that is, by an interruption of the current and movement of the hand *b*. Thus a synchronous movement of the dial-hands *V* in other subscribers' offices is effected by means of the shaft *C'*, rotated by the toothed wheel *E'*, reciprocating rods *c' d'*, and the electro-magnets *F' G'* and their levers *i' m'*—that is, the two instruments, the indicator-call *A* and the individual alarm-call *A'*, have the dial-hands *b V* operated in precisely the same manner and by similar instrumentalities; but in the individual-alarm call *A'* this apparatus is further provided with a switch-plate, *I*, and rotary switch-arm *J*. This plate is insulated from the shaft *C'*, and also from the standard to which it is secured, (see Figs. 7 and 8,) and the shunt-arm *J* is mounted upon the rotary shaft *C'* and revolves with it, while the outer end is furnished with a friction-roller, *o*, to maintain continuous metallic contact with the rim of said plate. The rim of the plate is provided with a metallic pin, *p*, which is insulated therefrom. Thus when the switch-arm *J* is in radial alignment and in contact with the pin *p*, the current passes through the shaft *C'*, arm *J*, and pin *p*, and is shunted to the bell-wire 72, while when said arm *J* is in any other position the current is passing uninterruptedly through the plate *I* and pin *q* onward by wire 25, and the bell is cut out. Now, this insulated shunt-pin *p* is differently located for each subscriber upon his particular switch-plate *I*, and bears a certain relation to the indicator alarm-hand *V*. Thus for subscriber number 2 on any given circuit, when the dial-hand *V* is upon 2 the switch-arm *J* must be over the shunt-pin *p* in order to conduct the current along a wire connecting with the bell of said subscriber. Therefore the position of the indicator call-hand *b* on the instrument *A* will give the position of the indicator alarm-hand *V* upon a certain number on every dial, and, moreover, will indicate that the bell of the subscriber having such number can be rung and the attention of the individual obtained; hence each switch-plate will be provided with a single shunt-pin, *p*; but the relative position of that point will vary from that of any other upon all switch-plates connected on that circuit or with other circuits. The movable switch board is shown in Figs. 5 and 6 as consisting of a sliding plate, *K*, mounted upon two parallel guide-rods, *rr*, and provided with a pointer, *s*, and two keys, *L M*, which are

adapted to maintain the current normally open. Metallic spring circuit-breakers *t t t u u u* are so disposed beneath the plate that three of the circuits on each system shall be opened, as shown in Fig. 6, and the currents shunted through the apparatus in the office. When the plate *K* is moved along, the spring-plates return together and the circuit is closed and continues on in a direct course.

In the switch-board herein shown I have represented three separate systems, Nos. 4, 5, and 6, massed in order to be controlled by a single switch-board, *K*, and designate the wires as follows, supposing them to belong to No. 4 system:

The numeral 4 designates the telephone-wire; No. 1^t, the bell-call; No. 2^t, the indicator call-line, and No. 3^t the circuit by which the indicator call-hand is released and restored to zero. In this nomenclature the exponents represent the systems to which the several wires belong.

Upon the front of the individual-alarm-call apparatus *A'* is secured a bell-switch lever, *N*, pivoted at one end to the box inclosing the apparatus, and at the other furnished with a hook upon which is hung the receiver *O* when not in use. The object of this arrangement in connection with a series of circuit-closers disposed above and below it is this: When the receiver is hung upon the pivoted bar *N* in any subscriber's office, his bell can be rung by others only when his indicator alarm-hand *V* is upon his especial call-number, which places the switch-arm *J* over the shunt-pin *p*, leading to the bell *U*. On the other hand, when the receiver is off and the lever is up, the bell may be immediately rung without any previous preparation, and this is especially desired when a given subscriber has made a call and is awaiting a reply through his own bell.

In Fig. 13 is shown a plan of the mechanism, in which the lever-bar *N* is provided with a piece of insulating material, *P*, which insulates the plate *S*, secured upon the inside of said arm. Furthermore, the circuit-closers are arranged in two series or planes. One set, 27 28 45 46, is in vertical alignment, and is operated by the plate *S*, while the other set is in alignment with the bar *N* and operated by contact with the latter. Thus the rise and fall of the lever *N* operates to open and close two distinct circuits. (See Figs. 11 and 12.) The levers *N N'*, &c., are adjusted to move quite stiffly, in order to remain in any desired position, either up or down, in order to change the currents when desired. The receivers *O O'*, &c., are to be hung thereon when not in use, and intended to maintain the levers depressed, which is their normal position.

The operation of ringing up under this system is effected as follows, and it is supposed that subscriber *A*⁴ on his system No. 4 is desirous of communicating with subscriber *B*⁵ on system No. 5. It is further premised that *A*⁴ has the numeral 6 as his individual-call number, and *B*⁵ has the numeral 8. The in-

dividual-call apparatus in the offices of A^4 and B^5 are designated as A and A^2 , respectively, and shown in Figs. 1 and 2, while the construction of the individual-alarm instruments, as shown at A' and A^3 in Figs. 7 and 8, are also located in the respective offices of A^4 and B^4 . I will now refer to Figs. 14 and 15, and suppose the indicator-call hands b , b' , &c., are all at zero, and likewise subscribers' individual-alarm hands V , V' , &c., are also at zero upon this circuit—that is, No. 5. Subscriber A^4 lifts the receiver O from the hook upon his switch-lever N , and, raising the latter, thereby cuts out his own bell U , and also interrupts the current along wire No. 5 when the pointer s is on circuit No. 5. It will be seen that two wires (marked 20 and 50) are permanently attached upon the movable switch-board K of A^4 to their circuit-breakers t u , and thus the current along any bell-call wire, No. 1⁵ 1⁶, &c., may be interrupted or shunted through the individual-alarm apparatus A' of subscriber A^4 at his pleasure. By the lifting of the lever N to its upper or raised position, as shown in Fig. 14, the current through No. 1⁴ is not interrupted, but continues through post 21, 22, lever N , circuit-closer 43, by wire 31 to post 30, and thence along to the next subscriber. Subscriber A^4 now moves his switch board K until the pointer s is in alignment with wire No. 2⁵, when he knows by the position of the circuit-breakers t t u u u that the currents along the wires on system No. 5 are all directed through his apparatus. Current along wire No. 1⁵ is now interrupted, if the lever N is in a raised position, since it follows wire 20, post 21, by wire to post 22, lever N , closer 43, wire 44, bell U to closer 45, insulated piece S , closer 46, wire 47 to plug v on receiver O , where it is stopped. On the other hand, in case the lever N is in its lowered or depressed position the circuit is continuous, and the current flows through wire No. 1⁵ to wire 20, post 21 to post 22, lever N , closer 23, by wire 50, thence along wire No. 1⁵ to next subscriber. This special purpose of raising the lever N and breaking the current through wire No. 1⁵, or any similar wire in any system, is to cut out the indicator switch-hand J , for unless this precaution were taken in ringing up subscriber B^5 or No. 8 every subscriber's alarm-instrument A^3 , &c., would click as his individual-switch hand J passed over its switch-pin p , and a continual and unnecessary annoyance be created. The other currents on system No. 5 continue as follows: From No. 2⁵ (see Fig. 14) through circuit-breaker t to wire 19, to call-tapper M , and when the latter is actually operated, to wire 18, electro-magnet F , and wire 17 to circuit-breaker u , out upon the continuation of wire No. 2⁵; upon wire No. 3⁵, by wire 16 to tapper L , wire 15, electro-magnet G , wire 14, to wire No. 3⁵ continued. Subscriber A^4 now operates the call-tapper M , closing the circuit eight times, the number corresponding to the individual-call number 8 of subscriber B^5 , and the apparatus

shown in Figs. 1 and 2, (marked A ,) and located with subscriber A^4 , is operated by the activity of the electro-magnet F to advance, as previously described, the indicator-hand b , and similarly and synchronously therewith by means of the apparatus A^3 , corresponding to that shown in Figs. 7 and 8, and located with B^4 and similar apparatus in other subscribers' offices, the individual-alarm indicator-hands V , V' , &c. When A^4 sees his call-indicator hand b in instrument A upon the numeral 8, as shown in Fig. 14, he stops and now knows that the hand V' on instrument A^3 in B^5 office is likewise upon a similar numeral 8, (see Fig. 15,) and that the switch-hand J^3 in instrument A^3 is now upon the shunt-pin p' and in readiness to ring bell U' of B^5 the moment A^4 closes the circuit along bell call-wire No. 1⁵. Subscriber A^4 accomplishes this by depressing the lever N , when the current along wire No. 1⁵, heretofore interrupted, passes along wire 20, post 21, to post 22, lever N , closer 23, wire 50, along wire No. 1⁵ to subscriber's office B^5 , where it enters post 32 to post 33, closer 34, wire 35 to spring-closer W , (see Figs. 7, 8, and 15,) to shaft C' , along switch-hand J^3 , pin p' , wire 71 to bell U' , which is rung, and wire 36, thence to closer 37, wire 38, closer 39, insulated block S' , closer 40, wire 41 to post 42, and onward along No. 1⁵. Subscriber A^4 has now called the attention of B^5 , who knows some other subscriber desires to communicate with him, and after A^4 has rung the bell of B^5 he again raises the lever N to switch on his bell U , and at the same time inserts the plug v upon the receiver O in the post 48 on line No. 1⁵. Similarly B^5 inserts the plug v' on his receiver O' in the post 54 on line No. 1⁵ in his office. This completes the circuit on line No. 1⁵ between A^4 and B^5 , and the lever N being in a raised position, the current passes through instrument A' in A^4 office by wire 20, post 21 to post 22, lever N , closer 43, wire 44, through the bell U to closer 45, insulated block S , closer 46, wire 47, plug v of receiver O , which is now in cup 48. Thus bell U with A^4 is rung and the latter subscriber is notified that his call has been answered by the party whom he has called, in the present instance B^5 . A^4 receiving answering call from B^5 inserts the plug 49 of his receiver in the post y on the telephone-line No. 5. Similarly B^5 inserts the plug 55 of his instrument A^3 in the cup y' on the same telephone-wire, and the two subscribers are then in communication. Providing the line No. 5 is occupied, A^4 can shift upon some other wire in order to communicate with B^5 in the manner more fully shown and detailed in Letters Patent No. 308,165, issued to myself on the 18th day of November, 1884.

The operation of restoring the individual-call hand b , which now stands on the dial D , over the numeral 8, upon the apparatus A in the office of A^4 , as well as the individual-alarm hands V' , &c., which also stand on the numeral 8 upon the dials D^3 in all the instruments similar to A^3 upon that special circuit No. 1⁵, is as

follows: A⁴, having communicated with B⁴, presses the tapper L, and by means of the current passing through the wire No. 3⁵, wire 16 by 15 to electro-magnet G, excites the latter, the current continues by wire 14 and circuit-breaker *u* to the wire No. 3⁵, and along to subscriber B⁵ and others. Upon reaching the office of B⁵ it enters instrument A³ by post to wire 67 and electro-magnet G³ and wire 68 onward along the line No. 3⁵. This activity of the magnet G in instrument A (see Figs. 1, 2, 3, and 4) has actuated the lever *m*, thrusting it against the pin *n*, and has advanced the rod *d* forward, bringing the slot *k* in alignment with the spur-wheel E, now locked, and releases it, the latter turning back to its normal position, induced by the coiled spring 5, while further rotatory movement is prevented by engagement of the stop-pins 7 and 8. Similar movement of a lever, not shown, (corresponding to *m'* in instrument A') upon the instrument A³, actuated by the magnet G³, advances the rod *d*, and the spur-wheel, locked thereby, is free to return to its normal position. Thus it will be seen that each subscriber may actuate his own individual-call instrument A and all the alarm-call instruments corresponding to A' A³, &c., upon any system; but he cannot operate his own unless he is calling an individual on his own system or circuit. On the other hand, the operation by a given subscriber of his individual-call hand, *b*, upon his own instrument A will not operate or effect the movement of any other corresponding hand, *b'*, upon an apparatus, A², in some other office. Thus, if one subscriber, B⁵, wishes to call some other, he presses his key M' the number of times corresponding to that of the individual desired, and thus actuates his own individual-call hand *b'*, and synchronously therewith the alarm-hands V' on the instruments corresponding to A' A³, &c. As regards the position of the switch-board K', the latter is shown with the pointer *s'* between two wires on system No. 6; hence all the systems are direct through B⁵ office, and it is evident that the position of said board is immaterial when B⁵ is called, since No. 5 system on which B⁵ is located is connected directly to and runs through the individual-alarm apparatus A³ belonging to the latter. Now, if B⁵ desires to call a certain individual, the position of his switch-board is material until the pointer *s'* stands upon wire No. 2 of that system, and he then can operate his individual-call apparatus A² by means of the call-tapper M and electro-magnet F⁴, and synchronously therewith the alarm apparatus of the individual to be called. Then the same co-operation of similar parts corresponding to those employed by A⁴ in ringing up B⁵ is now effected, and communication between B⁵ and said called subscriber is established.

In active use the operation of the several parts forming this system is very easily and expeditiously effected, and with but small loss

of time upon the part of both the called and the calling subscriber.

As before briefly alluded to on the preceding page as regards the operation of the individual-alarm apparatus—say A³, located in B⁵ office—it will necessarily follow that if subscriber B⁵ desires to call any person on his own system No. 5, the circuits upon the wires Nos. 2⁵ 3⁵ are closed, and the operation of the tapper M' through the electro-magnets F⁴ and F³, will operate the mechanism in instrument A³ equally well with that in A²; hence it will be observed that each subscriber will operate his own individual-alarm call apparatus A' A³, &c., only when he is operating upon his own circuit or system, otherwise he cannot operate it. Similarly the movement of the key L' will actively induce the magnets G⁴ and G³, &c., to release the spur-wheels, whereby the dial or indicator hands *b b'*, &c., V V', &c., can be restored to their normal or zero positions.

I claim—

1. The combination of a dial, an indicator-hand, a spur-wheel turning with said hand, longitudinally-movable rods for actuating and locking said wheel, and an electro-magnet for operating said rods, all constituting an individual-call indicator, with electrical connections making circuit directly between the several subscribers' stations without the intervention of a central station, and apparatus at each subscriber's station simultaneously operated by the movement of said indicator-hand, and attached devices to give corresponding indications, substantially as set forth.

2. The combination, of an indicator-finger and a spur-wheel with which it turns, with a longitudinally-movable actuating-rod for turning said wheel, a second longitudinally-movable rod for locking said wheel, an electro-magnet and springs for actuating said rods, and a series of apparatus electrically connected upon any given circuit, which are similarly and synchronously actuated by the movement of said finger in order that any subscriber may be called by any other on a different circuit, substantially as herein set forth.

3. In an individual-call-indicator apparatus, the combination, with the shaft C, hand *b*, and spur-wheel E, mounted thereupon, of the rod *c* and pivoted arm *e*, operating laterally to engage and advance the wheel by the action of the lever *i* and electro-magnet F, substantially as herein described.

4. The combination, with the locked spur-wheel E and actuating-rod *c*, pivoted arm *e*, and spur *g*, of the rod *d* and its spur *h*, adapted to engage with each other upon the advance movement of the rod *c*, induced by an electro-magnet, whereby the two rods advance simultaneously to release and advance the wheel E, substantially as and for purposes herein described.

5. The combination, with the spur-wheel E and its spring 5, shaft C, and indicator-hand

b, of the reciprocating locking-rod *d*, spur *h*, lever *m*, and electro-magnet *G*, whereby activity of the magnet actuates the lever to release and reverse the wheel by means of the spring 5 in order to restore the hand to normal or zero position, substantially as set forth.

6. In a telephonic system, the combination, with a movable switch-board and call-tapper or key operating the individual-call-indicator apparatus and located in one subscriber's office, of a series of individual-alarm-indicator apparatus electrically connected and operated similarly and synchronously upon any given circuit, by which any subscriber desired may be rung up, substantially as herein described.

7. In combination with electric conductors making a series of circuits and a movable switch-board through which they pass, an individual-call-indicator apparatus, a series of individual-alarm-indicator instruments at other stations synchronously operated by said call-indicator, a tapper on the switch-board, and additional mechanism operated thereby for restoring all the indicator-alarm hands of that system simultaneously to zero or normal, substantially as set forth.

8. The indicator-alarm apparatus as herein described, located in one subscriber's office, similarly and synchronously operated by an indicator-call instrument located in a second subscriber's office, each instrument being provided with a rotary hand, a spur-wheel, an actuating-rod with pivoted arm, an incline for forcing said arm downward, and an electro-magnet for actuating said rod, the two co-operating substantially as herein set forth, whereby the subscriber's attention may be attracted.

9. In an indicator-alarm apparatus, the combination, with the fixed dial *D'*, rotary hand *V*, and the spur-wheel *E'*, affixed to the shaft *C'*, which is operated by an electro-magnet upon a lever, *i'*, and rod *c'*, engaging with the spur-wheel, of the fixed insulated switch-plate

I and the switch-hand *J*, traveling thereon, the latter actuated by the shaft *C'*, substantially as described.

10. In combination with the individual-alarm apparatus *A'*, as herein described, the switch-lever *N*, provided with the insulated offset piece *S* and the contact-plates 23 27 28 43 45 46, arranged as stated, whereby movement of the lever effects change in two distinct circuits, substantially as and for purposes set forth.

11. The combination, with the individual-alarm apparatus *A'* and its pivoted switch-lever *N*, provided with the insulated offset *S*, of the series of circuit-closers 43 23, co-operating with the lever *N* proper, and the closers 45 46 27 28, which co-operate with the offset *S*, substantially as and for purposes herein described.

12. The combination, with the series of wires forming a series of systems, of the spring-plates and the movable switch-board *K*, having the circuit-breakers *t t t u u u*, whereby the currents from any system may be directed through the instruments *A A'* of any calling subscriber, and operating substantially as herein set forth.

13. The combination of an electro-magnet and its armature with the rotary toothed wheel *E*, the yielding actuating-rod *c*, which is connected to the aforesaid armature, the locking-bar *d*, the shaft on which said wheel is mounted, the electrical conductors making circuit through the helix of said magnet, a second magnet, conductors making circuit through the helix thereof, and an armature actuated by said second magnet and operating with relation to rod *d*, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES ALMON JACKSON.

Witnesses:

H. E. LODGE,
A. F. HAYDEN.