(No Model.)

4 Sheets—Sheet 1.

L. S. GLOVER.

INDIVIDUAL CALL APPARATUS.

No. 352,948. Patented Nov. 23, 1886.

Fig. 1.

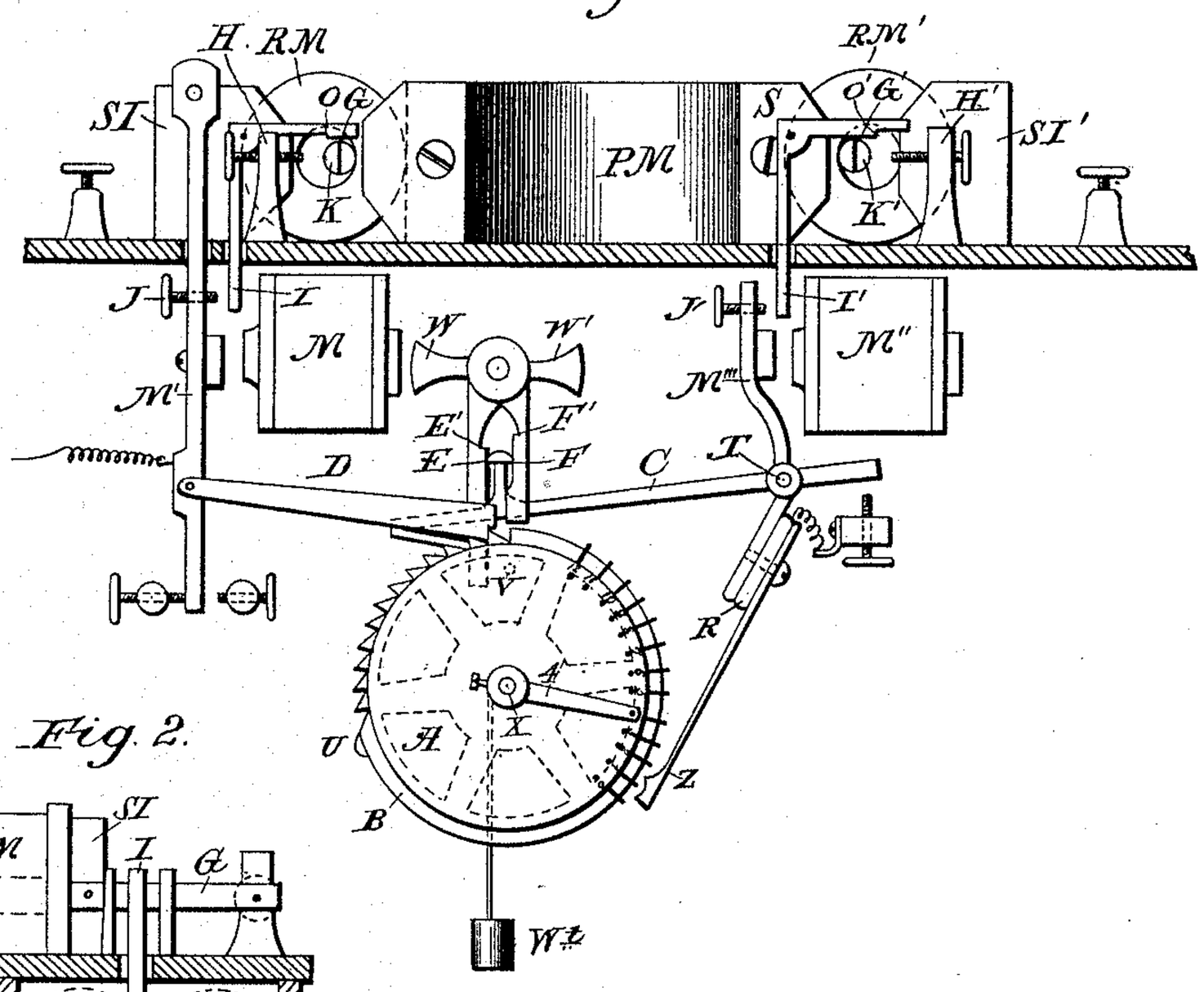


Fig. 2.

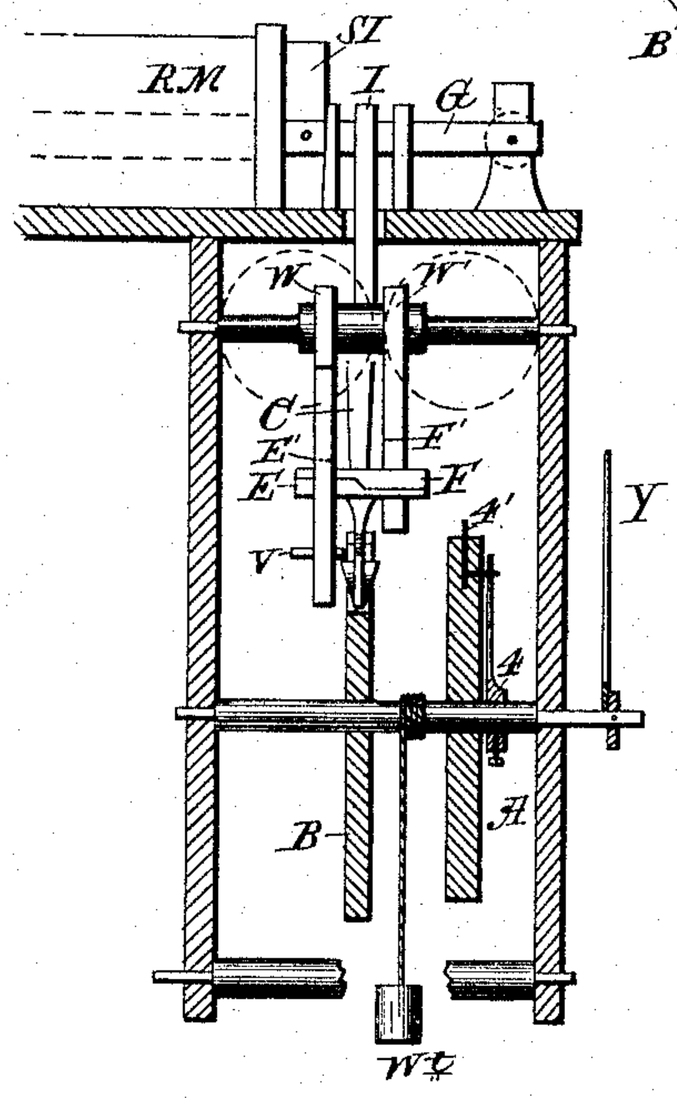
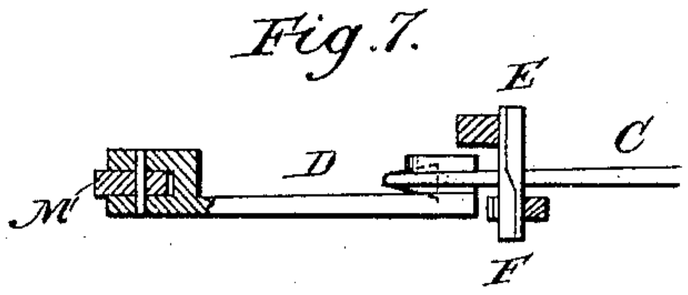


Fig. 7.



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S. H. Grimes

Inventor:
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(No Model.) 4 Sheets—Sheet 2.

L. S. GLOVER.

INDIVIDUAL CALL APPARATUS.

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Fig. 3.

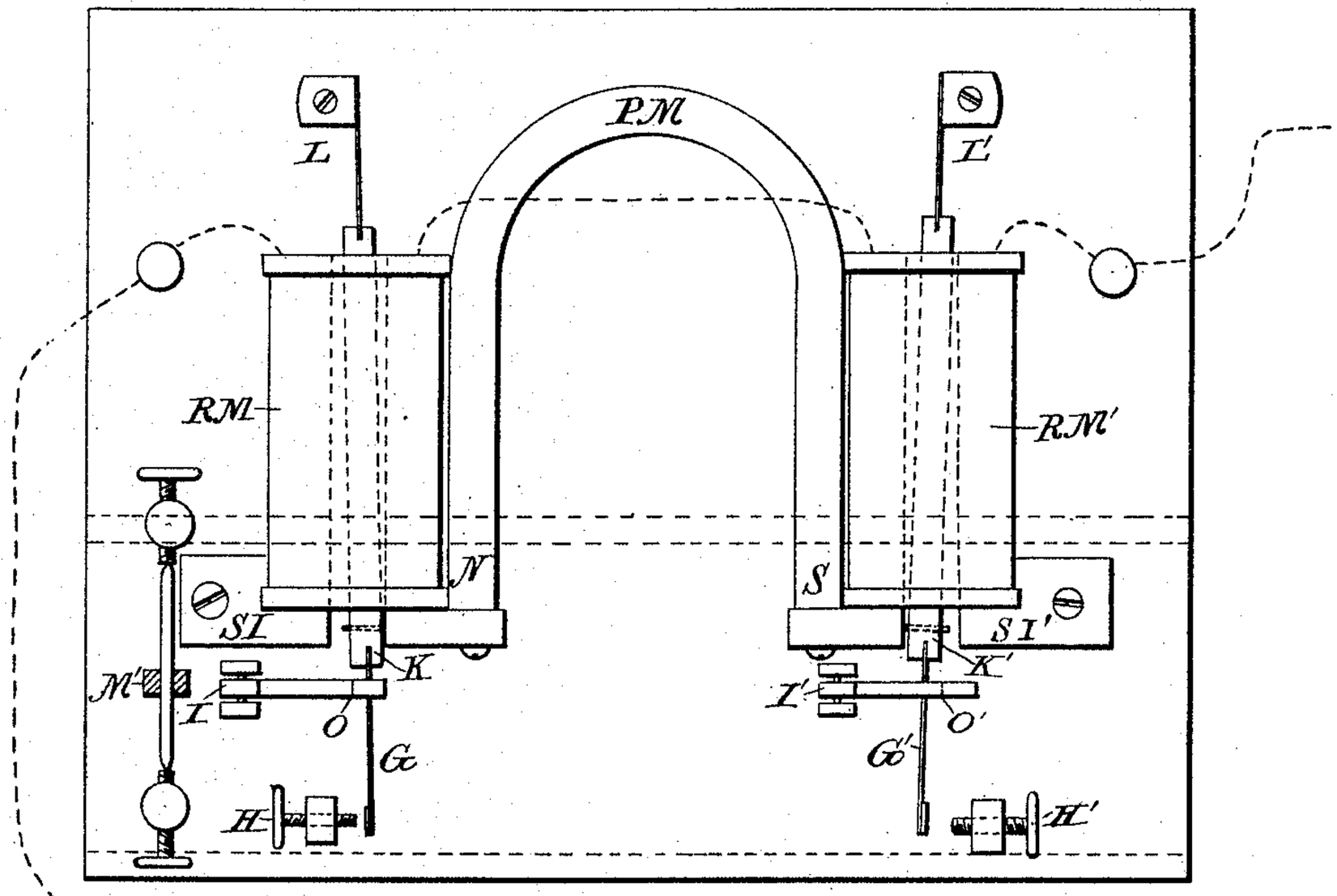
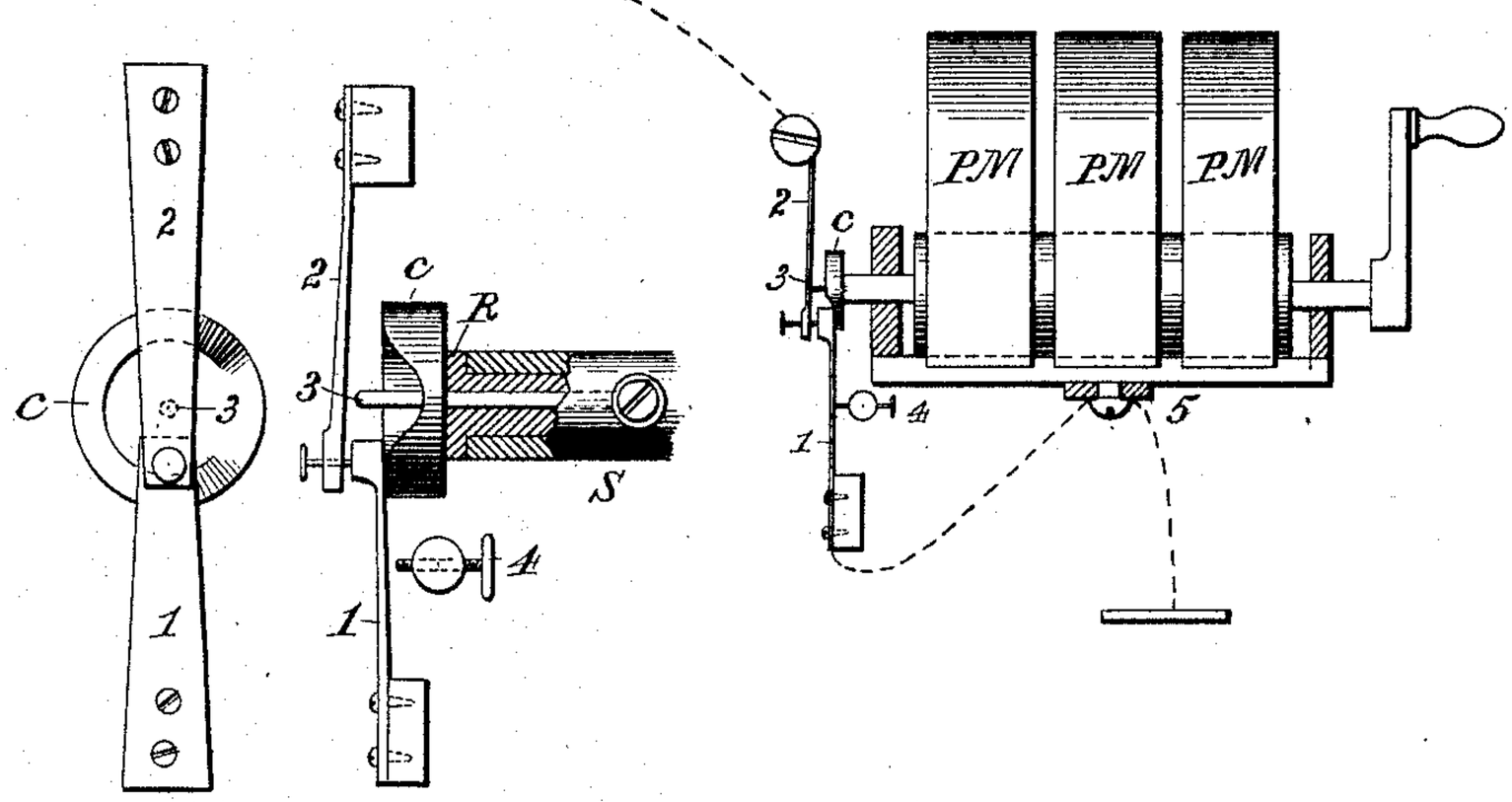


Fig. 4.



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No. 352,948. Patented Nov. 23, 1886.

Fig. 5.

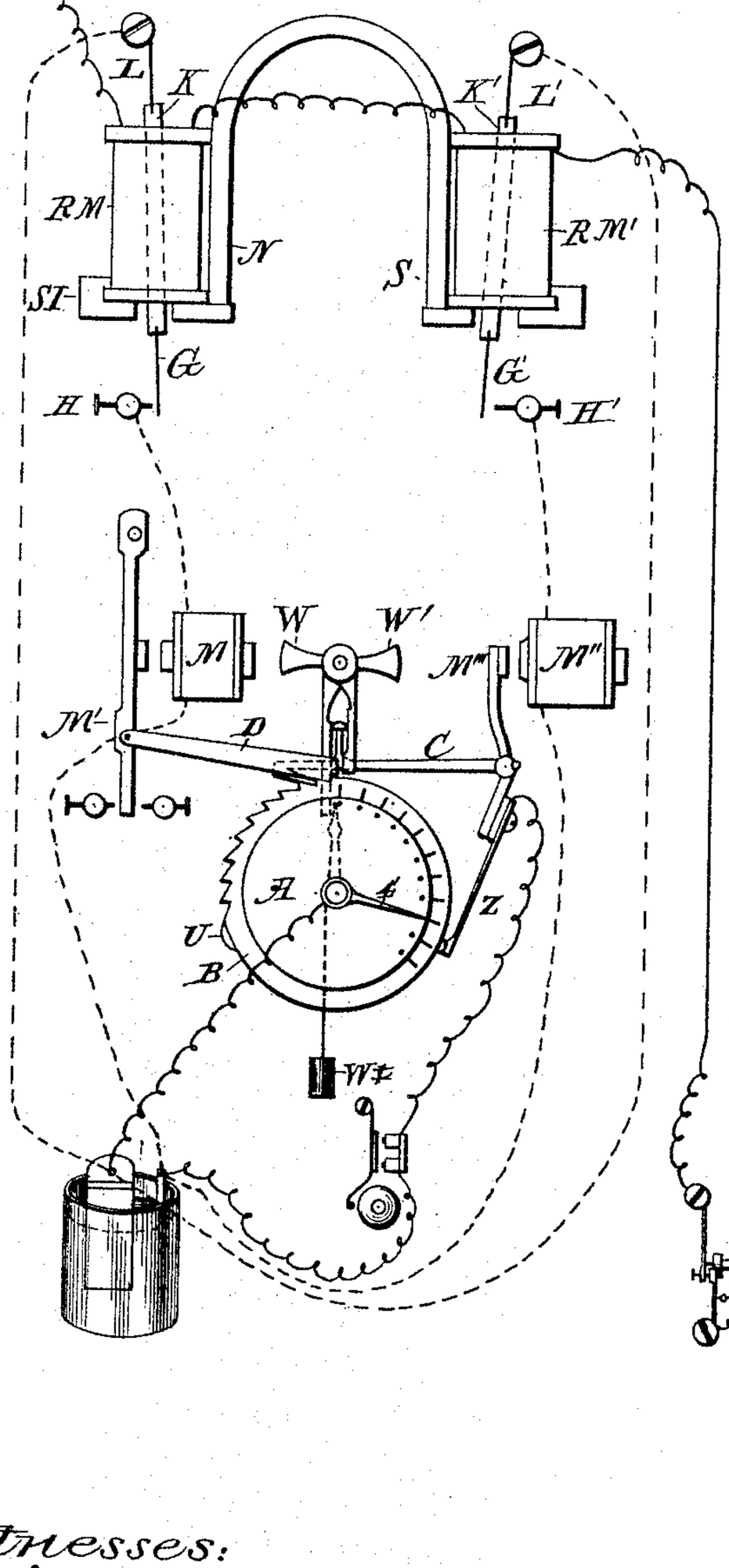
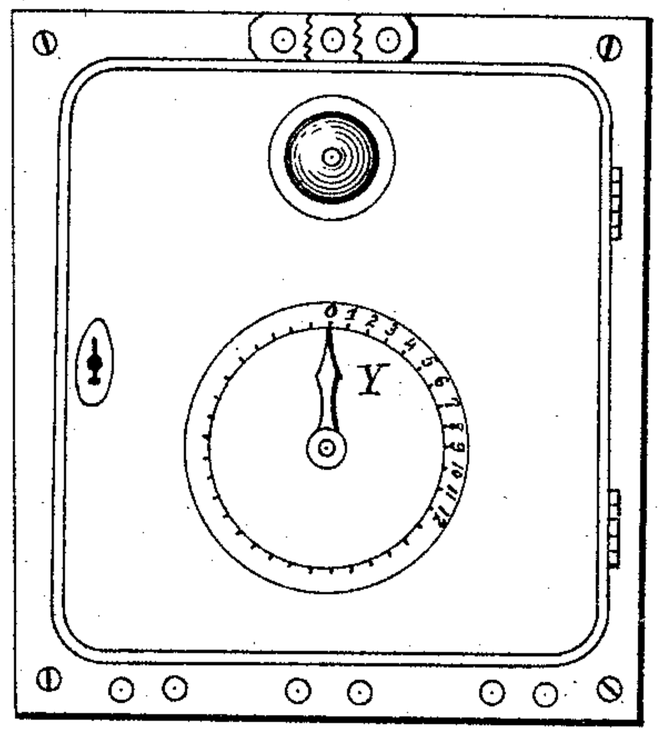


Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

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INDIVIDUAL CALL APPARATUS.

No. 352,948. Patented Nov. 23, 1886.

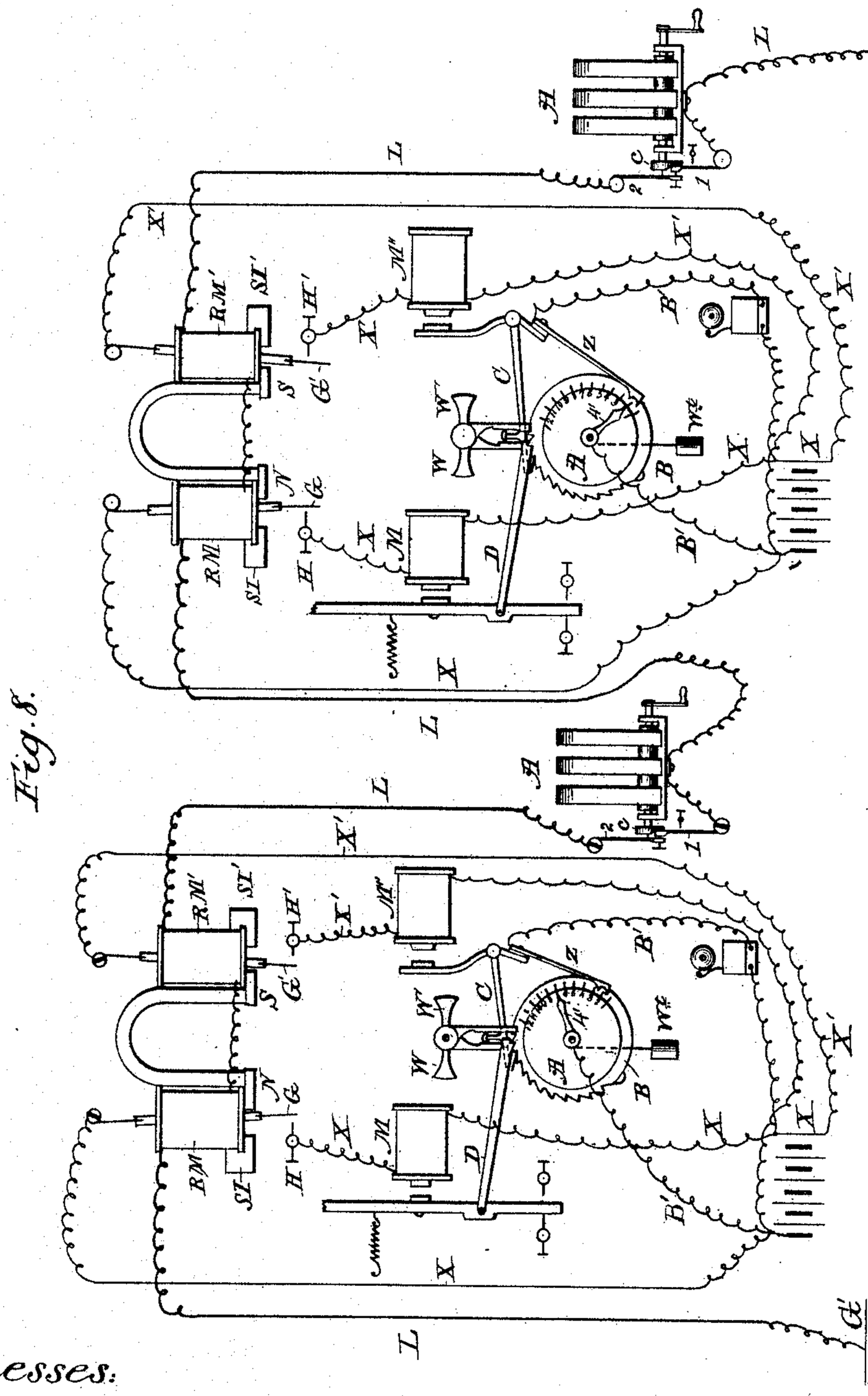

Fig. 8.

Witnesses:
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S. H. Grimes

Inventor:
Lycurgus S. Glover.

UNITED STATES PATENT OFFICE.

LYCURGUS S. GLOVER, OF MARION, KANSAS.

INDIVIDUAL CALL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 352,948, dated November 23, 1886.

Application filed March 1, 1886. Serial No. 193,647. (No model.)

To all whom it may concern:

Be itknown that I, LYCURGUS S. GLOVER, a citizen of the United States, residing at Marion, in the county of Marion and State of Kansas, have invented a new and useful Individual Call or Signaling Apparatus for Use in Telephone, Telegraph, and other Electrical Systems, of which the following is a specification.

My invention relates to improvements in signaling apparatuses actuated by currents of opposite polarity, and is designed to work with either battery, magneto, or dynamo currents.

The object of my invention is to furnish for use upon said electrical systems, particularly telephone-lines, a simple practical working apparatus by which any individual bell, call, or apparatus may be operated upon a single line-wire which is for use of a number of subscribers or stations without signaling any of the other stations or subscribers on said line. To effect this I employ a peculiar double-acting polar relay, one side actuated only by currents of electricity flowing in one direction, the other side only by currents flowing in the opposite direction, which in turn respectively closes local circuits through electro-magnets to actuate the switches of the several apparatuses, make signals, and set said apparatuses in unison, all of which I will now proceed to describe and claim; and I do hereby declare the following to be a full and clear description, that will enable any one skilled in the art to which it appertains to make and use the invention. When used on a telephone-line, the connections are made the same as for the ordinary magneto-call bells, and the bell referred to is the well-known vibrating pattern.

Referring to the accompanying drawings, Figure 1 represents a front view of the receiving apparatus with its various parts in position lettered and numbered, like letters and numbers representing like parts. Fig. 2 represents a cross-section through the center of same.

Fig. 3 represents a top view of the double-acting polar relay, which closes the two local circuits through the electro-magnets M and M″, one of which moves the pointer Y and the corresponding bell-contact. The other locks it and makes contact on any predetermined point, thereby changing the direction of the local current through the bell of any station that may be connected to said contact-point.

Fig. 4 represents a magneto-generator of the Siemens armature type, (the currents from which I prefer to use to actuate said relays,) rotated by a crank direct from the armature-shaft, having on the opposite end of said shaft a cam-shaped wheel, C, insulated from shaft S by rubber R. In center of said wheel C is the communicator-point 3, making contact with spring 2 by spring 1 dropping into recess in cam-wheel C, causing currents to flow into the main line attached to springs 1 and 2, the direction of polarity depending on the direction of the rotation of said armature. When spring 1 is in contact with C, the opposite current is shunting through it to 5, back to the armature-wire of the generator, thereby greatly strengthening the force that flows into the line at the moment spring 1 breaks contact with C. By a spring catch on the outside of the generator-case (not shown) the crank, when not revolving, is always at the bottom of its circle of rotation, thereby cutting out the armature-wire of the generator from the main circuit, allowing the impulses from the distant station to pass direct through springs 2 and 1 to the ground or next apparatus, as the case may be. Now, one quick turn of the crank to the right sends a positive impulse to line, and one quick turn to the left sends a negative impulse to line, actuating the several relays, as hereinafter described.

Fig. 5 illustrates all parts of the apparatuses placed in position to show all connections, the heavy black lines representing the main circuit and the light and dotted lines the local circuits. Fig. 6 represents the receiver complete as it appears when in the case.

Referring to Fig. 3, N S is a permanent magnet. R M and R M′ are two like coils of insulated copper wire placed one at each pole of said permanent magnet. K and K′ are two soft-iron cores attached to the springs L and L′ and adapted to vibrate within said coils R M and R M′. G and G′ are two contact-springs attached to the free ends of the said vibrating cores K and K′, and adapted to make and break contact with the screws H and H′. S I and S I′ are two stationary soft-iron armatures. I and I′ are two small retention-levers, each provided with a notch or catch, O and O′,

adapted to engage and keep springs G and G′ in contact with said screws H and H′. The permanent magnet has its poles extended, so that their attraction will normally bias the two soft-iron cores K and K′, as shown, Fig. 3. The two coils R M and R M′ are connected in the main circuit with the generator, hereinbefore described, as are also those at all stations on the line. Now, if an electrical impulse of one polarity be passed through the several relay-coils R M and R M′, the effect will be to magnetize the two cores K and K′ with poles in the same direction at all stations on the line, said cores being within the attraction of the permanent magnet. The core presenting like pole to the pole of said magnet will be repelled thereby, and by its own magnetism attracted to the soft-iron armature S I. It will be seen that this action can only take place in one of the vibrating cores at each station, and if an impulse of the opposite polarity be passed through said coils the opposite cores are vibrated in the same manner. By connecting a local circuit to the spring L and the contact-screw H and another local circuit to the opposite spring, L′, and contact-screw H′ through one or more batteries, I have two distinct normally-open local circuits, either of which may be closed at will independent of the other to operate the apparatus, hereinafter described. When one of the cores K or K′ is caused to vibrate, as above described, the effect of lever I will be to lock spring G in contact with screw H, thereby completing the local circuit through an electro-magnet, the armature of which engages the lower extension of said lever I, releasing spring G from notch O and allowing the core K to be drawn back to the permanent magnet. By this arrangement the short magneto-impulses are utilized to make said contact, and full magnetization of the electro-magnet must take place before spring G can break contact with screw H.

In Fig. 1, A is a vulcanite wheel attached to a shaft, X, carrying a pointer, Y. Attached to same shaft is a ratchet-wheel, B, actuated step by step. By pawl D, attached to armature M′ on the periphery of the vulcanite wheel A, are placed a number of contact points, 1 2 3 4, &c. They are placed at a distance from each other to correspond to the distance between the teeth on ratchet-wheel B, and also with the numbers on the outside dial-plate, so that when the pawl D moves wheel B one step forward it brings the pointer to a corresponding number on the dial and moves a pin on wheel A under a contact-spring, Z, which is insulated from the shaft T and connected through the bell to the local battery. By shifting spring 4′ on shaft X any one of the contact-points on wheel A can be connected to shaft X, thence to the other pole of said local battery.

Fig. 7 shows a top view of the driving pawl D, also of the ratchet-lever C and its extensions E and F, adapted to drop into the notches E′ and F′ in the two weighted levers W and W′ when ratchet-lever C is raised out of the notches in wheel B, as hereinbefore described.

Fig. 8 illustrates two stations on the main-line circuit and their local-circuit connections. The heavy line L represents the main circuit continuous from ground G through springs 1 and 2 of the generator A, and the relay-coils R M and R M′ of each station on the line to the opposite terminal or ground G′. X and X′ are the two normally-open local circuits through the electro-magnets M and M″, and adapted to be closed, respectively, by the action of the vibrating cores K and K′. B′ is the normally-open circuit, including the bell therein, and attached to contact-spring Z and one of the several contact-points on vulcanite wheel A, and adapted to be closed in the manner set forth.

The action of the apparatus then is as follows: One quick turn of the generator to the right sends an impulse (as before described) to line, through the several relay-coils, to cause spring G to make contact with H at all stations on the line, causing M to attract M′ by the action of the local battery, causing pawl D to move wheel B one step forward at each pulsation of the current until the pin on wheel A, representing the station to be called and with which spring 4′ is connected, comes under spring-contact Z—say 4. Then one turn of the generator to the left sends a current of opposite polarity to line through said relays, causing G′ to make contact with H′, directing the local current through M″, which will attract M‴, raising ratchet-lever C out, causing F to drop into catch F′ in W′, and raising pawl D out of the notches in wheel B, and also locking the spring Z on the contact-point 4, thereby making connections through 4′ to shaft X and ringing only the bell of the station set on that particular number. The subscriber called then turns his generator to the right, which again actuates pawl D, releasing F from F′, causing E to drop into catch E′, releasing contact-pin 4 from spring Z, stopping bell from ringing and allowing small weight W*t* to carry the pointer and wheels A and B back to O, when a pin, V, on wheel B releases E from E′, allowing pawl D and ratchet C to drop back into their respective places. It will be seen when this occurs that the pointers Y of the apparatuses at all stations on the line will stop at O, leaving them all in unison. This occurs after each and every call, and is the normal position of each apparatus on the line. It will of course be understood that, although I illustrate but one apparatus, a series of such apparatuses are to be connected together in the same line-circuit, (see Fig. 8,) and that they are identical, with the exception of the position of the connecting-spring 4′ on the vulcanite wheel A.

It will be seen by the above connections that I use only one cell of battery to work both sides of the apparatus and the call-bell, and, as the circuits are always open only when actuated by the relays, the batteries will last a long

time without attention, and also that the main circuit is continuous through each apparatus with no contact-points to corróde and cause leaks, &c., and that each subscriber has equal and complete control over the several apparatuses.

I am aware that prior to my invention individual telephone-calls have been made to work by alternating currents, polarized relays, and dial-pointers. I therefore do not claim such a combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, substantially as herein-before described, in a telephone, telegraph, or other electrical system where individual signals ôf one or more predetermined instruments is desired to the exclusion of all other signals of the same system, of a double-acting polar relay comprising a permanent magnet, N S, the coils of insulated copper wire R M and R M′, the vibrating soft-iron cores K and K′, attached to the springs L and L′, the soft-iron armatures S I and S I′, the contact-screws H and H′, and the spring-contacts G and G′, operating as and for the purpose specified.

2. In an electrical signaling apparatus, a double polar relay in a main-line circuit, said relay provided with two vibrating soft-iron cores, K and K′, each normally biased by opposite poles of a permanent magnet and adapted to vibrate, respectively, independent of each other, one only by the action of a positive impulse, and the other only by the action of a negative impulse in the said main-line circuit, the two circuit-closing springs G and G′ attached one to the free end of each of said soft-iron cores and held normally open thereby, the two normally-open circuits X and X′, including therein said circuit-closers, one for each circuit, and the contact-screws H and H′, the retention-levers I I′, adapted to engage the contact-springs G G′ when said cores are caused to vibrate, locking said springs in contact with the contact-screws H H′, a battery and an electro-magnet in each of said normally-open circuits, and an armature for each of said electro-magnets, adapted to release said springs G G′ from said levers I I′, all combined substantially as and for the purpose set forth.

3. In an electrical signaling apparatus, the combination of the ratchet-wheel B and the vulcanite wheel A, attached to the same shaft and adapted to rotate together therewith, the series of contact-points 1 2 3 4, &c., on the periphery of said wheel A, the driving-pawl D, the ratchet lever C, and its extensions E and F, the weighted catch-levers W and W′, and a normally-open electrical circuit, B, including therein a bell, the contact-spring Z, and the shifting contact-spring 4′, all co-operating as and for the purpose specified.

In testimony whereof I affix my signature to the above specifiations, this 18th day of February, 1886, in the presence of these two witnesses.

LYCURGUS S. GLOVER.

Attest:
M. L. WOOD,
S. H. GRIMES.