

No Model.

2 Sheets—Sheet 1.

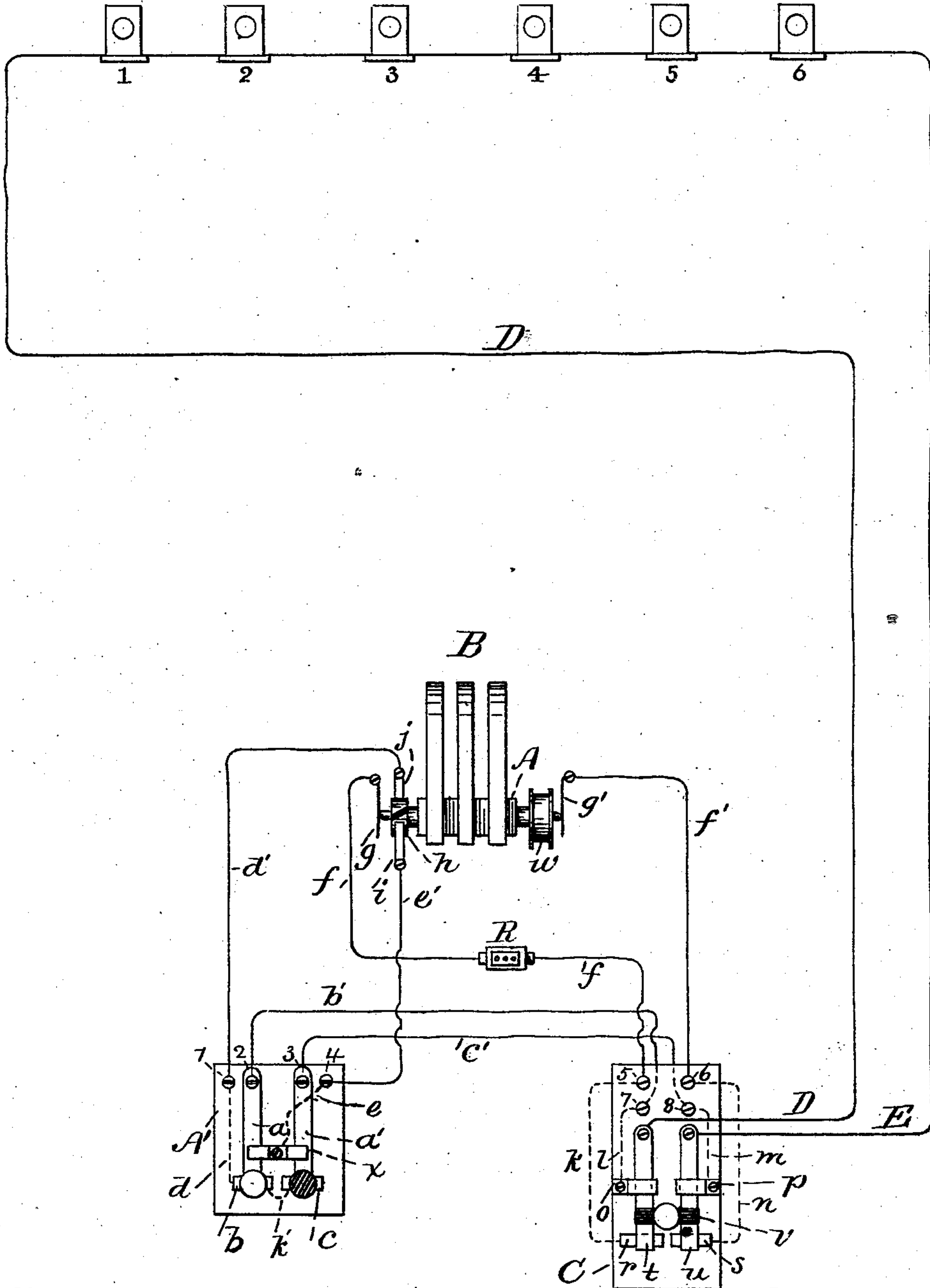
J. H. CARY.

INDIVIDUAL TELEPHONE CALL.

No. 281,614.

Patented July 17, 1883.

Fig. 1.



Witnesses.

Geo. H. Cary.
C. T. Brown

Inventor

Geo. H. Cary.

(No Model.)

2 Sheets—Sheet 2.

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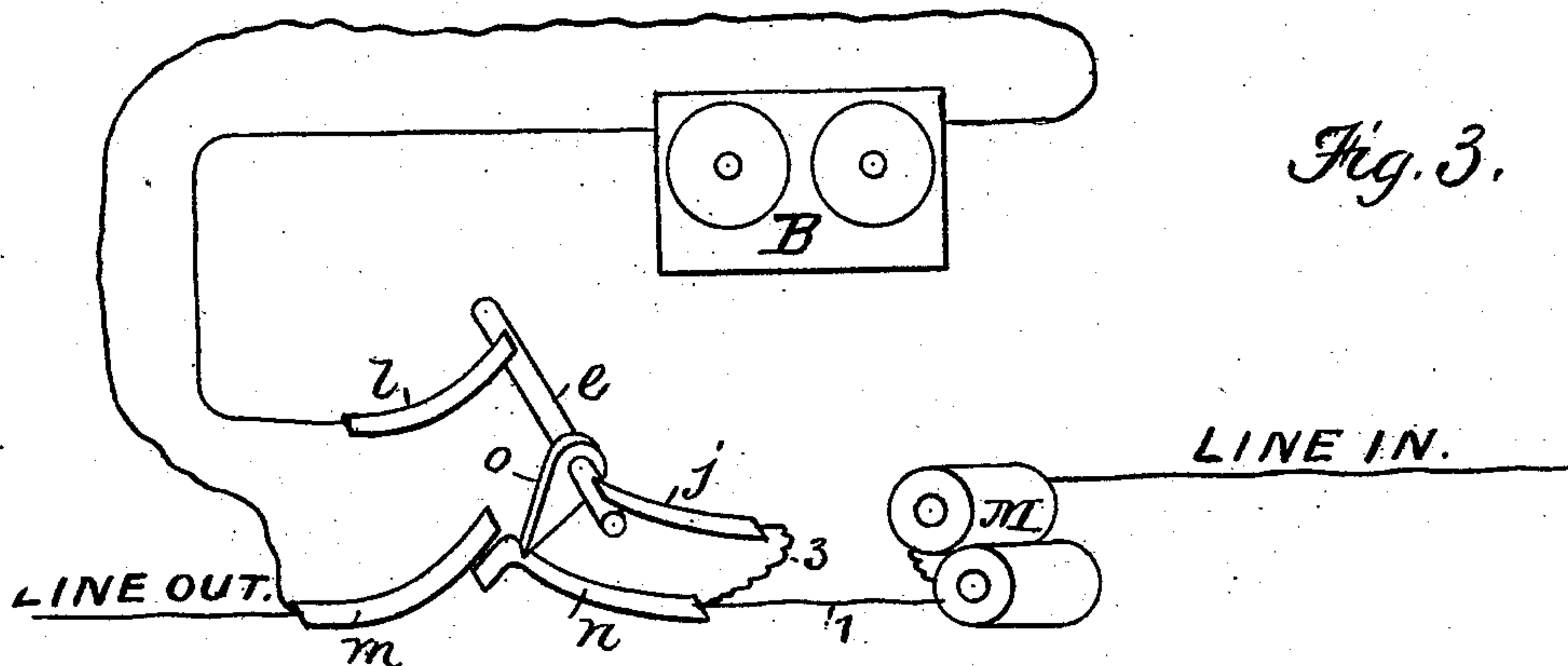


Fig. 3.

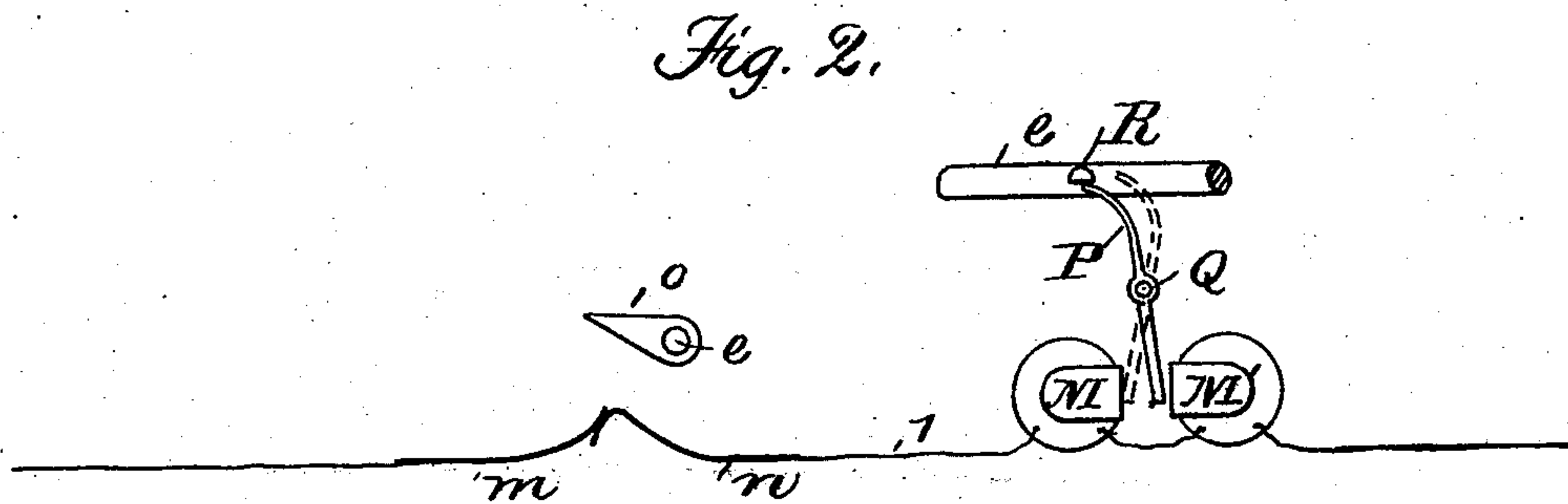


Fig. 2.

Witnesses:
C. J. Brown
A. L. White

Inventor:
James H. Cary.

UNITED STATES PATENT OFFICE.

JAMES H. CARY, OF BOSTON, ASSIGNOR TO HORACE P. TOBEY, OF
WAREHAM, MASSACHUSETTS.

INDIVIDUAL TELEPHONE-CALL.

SPECIFICATION forming part of Letters Patent No. 281,614, dated July 17, 1883.

Application filed October 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. CARY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Signaling Apparatus for Telephone-Exchange Systems, of which the following is a specification.

This invention relates to signaling apparatus for use in electrical systems, particularly to telephone systems, where a number of sub-stations are located on one line radiating from a central operating-station.

My invention has for its object to provide a new and simple system of calling any particular sub-station without signaling any other sub-station on the line; and it consists in the employment of magneto-currents varying in direction or polarity, whereby the different parts of mechanism at the sub-stations are operated to effect the desired results. I employ at the central station a magneto or dynamo machine which may be operated with keys, that the depression of one key sends a current or pulsation of one polarity to line to cause the dials or pointers of all the instruments at the several sub-stations to rotate one number or step until the number wanted is reached, and then by continuously depressing another key or keys an intermittent current or a current composed of reversals of polarity will be sent to line and ring a bell, after which a current of opposite polarity to the first used is sent to line by depressing a third key for the purpose of setting all of the instruments at unison.

In carrying out my invention, suppose that the individual signal mechanism shown and described in Letters Patent of the United States granted to me October 10, and in an application for Letters Patent for an improvement in said mechanism filed herewith, is used, said pending application showing a polarized armature (not shown in said patent) adapted to rotate between the poles of the electro-magnet, and adapted, when in one position, to arrest or prevent the rotation of the circuit closing and breaking shaft, constituting a unison device. In this case a current of one polarity will be sent to line to bring all the instruments

at the several sub-stations to unison, the currents causing the polarized armatures to move in the proper direction to arrest the pins upon their shafts, and so unison and lock them. Currents or pulsations of opposite polarity being now sent to line, the polarized armatures are attracted to the opposite pole of the electro-magnet, permitting the several shafts to rotate to the number of pulsations sent to line. When the circuit-breaker at the required station has operated to break the line and open the circuit through the bell to ground, currents of alternating or of rapidly-reversed polarity are sent from the central station to cause the bell to ring.

I may employ any bell I choose at the sub-station. Ordinarily I prefer crank magneto-bells, by which a sub-station can signal the central station. The generator at the central station, used for the purpose of signaling, may also be used in all the operations of said station requiring electric energy, all of which I will now proceed to specifically describe and claim.

In Figure 1 of the accompanying drawings I have represented the various circuits and keys required in a central station, and a metallic circuit connected to said station, having in its circuit six sub-stations. Figs. 2 and 3 are diagrams to show the circuits through an individual circuit-controlling apparatus.

In Fig. 1, B is a magneto-generator of the Siemens armature type, its armature A arranged to be rotated by the pulley *w* upon one end thereof. Upon its opposite end is the commutator *h*, against the opposite sides of which press the springs *i* and *j*. Bearing against the ends of the armature are springs *g g'*.

A' is a board, on the upper side of which are the binding-posts 1, 2, 3, and 4. Post 1 is connected by wire *d'* to commutator-spring *j* and post 4 to the other spring, *i*.

a and *a'* are strap-keys connected to posts 2 and 3, respectively. The anvil of key *a* is connected to post 1, and the anvil of key *a'* also with post 1, by a wire, *k'*. C is another board, having at its upper end the binding-posts 5, 6, 7, and 8. *t* and *u* are strap-keys connected together at their free ends by the block *v*, of in-

insulating material. Said keys normally rest against their back contacts, *o p*. Connection is made from armature-spring *g* by wire *f*, resistance *R*, to post 5 by wire *k*, to anvil *r*, and from spring *g'*, by wire *f'*, to post 6, wire *n*, to anvil *s*. From post 2 connection is made by wire *b'* to post 7, wire *l* to back contact *o*, and from post 3, by wire *c'*, to post 8, wire *m*, to back contact *p*. From the key *t* the line-wire *D* runs to the sub-stations 1, 2, 3, 4, 5, and 6, and back again, by wire *E*, to key *u*.

It is understood when a metallic circuit is not used the line-wire will be grounded at the last sub-station, and also from key *u*. In the normal condition of the apparatus, as shown in the drawings, no current goes to line. To send a negative current to line, the key *a* is pressed to make contact with the anvil *b*, the circuit being from commutator-spring *j*, wire *d'*, anvil *b*, key *a*, wires *b'* and *l*, back contact *o*, key *t*, to line *D*. To send a positive pulsation, the key *a'* is depressed, when the circuit will be from commutator-spring *i*, wires *c'* and *e*, back contact *x*, key *a*, wires *b'* and *l*, back contact *o*, key *t*, to line *D*, and back, by wire *E*, to key *u*, wires *m* and *c'*, to key *a'*, anvil *c*, wires *k'* and *d* and *d'*, commutator-spring *j*. To send an alternating current, the keys *t* and *u* are simultaneously pressed to their anvils, the circuit in this case being from spring *g*, wire *f*, resistance *R*, wires *f* and *k*, anvil *r*, key *t*, line *D* and *E*, key *u*, anvil *s*, wires *n* and *f'*, to spring *g'*. When not using a metallic circuit, the circuit would of course be grounded at key *u*.

I do not confine the use of this system to the special form of mechanism in my Letters Patent referred to, as I may apply it to any devices necessitating the operations specified.

The office of the resistance is to weaken the pulsations going to line to such an extent as not to disturb the armatures of the sub-station instruments intervening between the central station and the sub-station to be signaled. The rapid reversals employed will also tend to keep said armatures from moving, as there is not sufficient time between said reversals for the said armatures to become magnetized and demagnetized.

In Fig. 2, I have shown the connection of the parts of the circuit-controlling apparatus described in my above-named Letters Patent and pending application to illustrate the operation of bringing the said apparatus to a unison-point. When a current of a given polarity—say positive—is sent to line to bring the instruments to unison, the polarized armature *P* is attracted to the pole *M'*, as shown in full lines, causing the bent arm thereof to swing across the path of the stud *R* in the shaft *e*. When continuous pulsations are sent to line and cause the shaft *e* to rotate by means of a step-by-step movement, as shown and described in said Letters Patent and application, the stud *R* strikes against the curved end of armature *P*. This result takes place in all of the appa-

ratus at the several sub-stations, causing them to come to unison. When all the instruments are at unison, a current of opposite or negative polarity is sent to line, which releases the armature *P* and causes it to be attracted to the opposite pole of the electro-magnet *M* and make a free path for the stud *R*. Now, the requisite number of negative pulsations are sent to line to rotate the shaft *e* to break the circuit at the desired sub-station.

In Fig. 3 are shown the parts of the controlling apparatus necessary to break the circuit at a sub-station. The shaft *e* being caused to rotate as described, the circuit-breaker *o* depresses the spring *n* from its electrical connection with spring *m*, diverting the path of the electric current from line out to wire 3, spring *j*, which rests upon shaft *e*, to spring *l*, bell *B*, (which is caused to ring,) and line out or ground. To cause the bell *B* to ring it is necessary to use short quick pulsations of both polarities rapidly reversed, in order that the parts brought to the desired portions by continuous currents of opposite polarity may not be disturbed, and thus defeat the desired result. This is done while the parts of the sub-station to be signaled are in position shown in Fig. 3, in the manner previously described.

I claim—

1. The combination, substantially as hereinbefore described, in a system of individual electrical signaling, of a main-line circuit, two or more signaling-instruments adapted to respond to electric pulsations of rapidly-alternating direction included therein, a shunt or branch circuit round each of the said signaling-instruments, and an electro-mechanical circuit-changer in the main circuit, adapted to break the said shunt and introduce the signal-bell into the main circuit after the transmission of a definite number of electrical impulses, with transmitting devices at a central station, consisting of a magneto or dynamo electric generator, suitable connections from the commutator thereof to keys, whereby currents of constant direction, reversible at will, may be transmitted to line, and other connections from the generator, independent of the commutator, to other keys, whereby rapidly-alternating currents may be transmitted to line, for the purposes specified.

2. The combination, in a system of electrical signaling, of a magneto-electric or dynamo-electric generator provided with a commutator, a main-line signaling-circuit with two or more sub-stations located thereon, and suitable controlling-keys placed between the said generator and the said main line, two of which are connected with the commutator and the remaining two with the generator, independent of the said commutator, whereby when one of the commutator-keys is operated currents of a definite and constant direction are sent to line, and when the other commutator-key is operated constant currents of opposite direction are sent to line, and whereby when the

two independent keys are depressed the commutator is cut out and currents of rapidly-alternating direction are sent to line, substantially as described.

5 3. The combination, in an electric signaling-circuit, substantially as hereinbefore described, of a series of electric bells adapted to respond to rapidly-alternating currents, each of the
10 said bells normally shunted from the main circuit by short-circuiting springs, and a series of electro-mechanical circuit-changers or shunt-breakers, (one for each bell,) each consisting of
15 an electro-magnet with neutral and polarized armatures, the former actuating a ratchet-wheel shaft and cam, to open the short circuit round the signal-bell and introduce the
20 same into the line-circuit after a predetermined number of electric impulses of definite direction, and the latter adapted, after a single impulse of opposite direction, to swing into the
25 path of the unison-pin on the ratchet-shaft and form a stop or zero, at which all the instruments may be brought to unison, with a magneto-generator provided with a commutator, a

commutator and the main line, and adapted to send constant currents of given direction to hold the polarized armatures of the circuit-changers in position to lock the ratchet-shafts, a second key connected between the other side 30 of the commutator and the line, and adapted to send constant currents of opposite direction to unlock the said ratchet-shafts, and by successive impulses, differing in number for each bell, to open the shunt-circuits of the receivers 35 and introduce the said bells into the main circuit, and a third and double key connected between the generator and the main line independent of the commutator, and adapted to send rapidly-alternating currents to line, whereby 40 the bells, when brought into the main-line circuit, may be rung.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of October, A. 45 D. 1882.

JAMES H. CARY.

Witnesses:

GEO. H. CARY,
A. L. WHITE.