

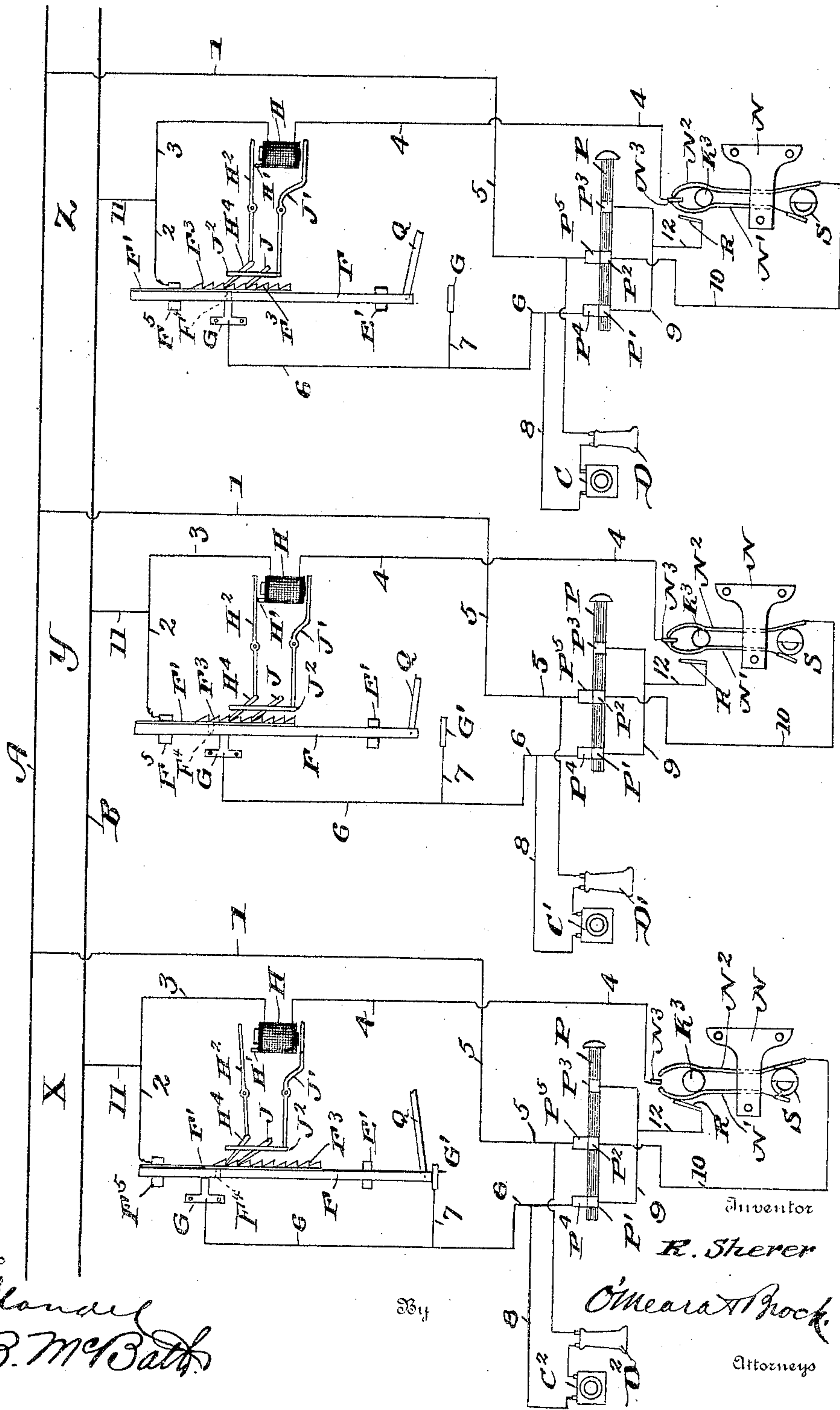
No. 813,330.

PATENTED FEB. 20, 1906.

R. SHERER.
TELEPHONE SYSTEM.
APPLICATION FILED OCT. 17, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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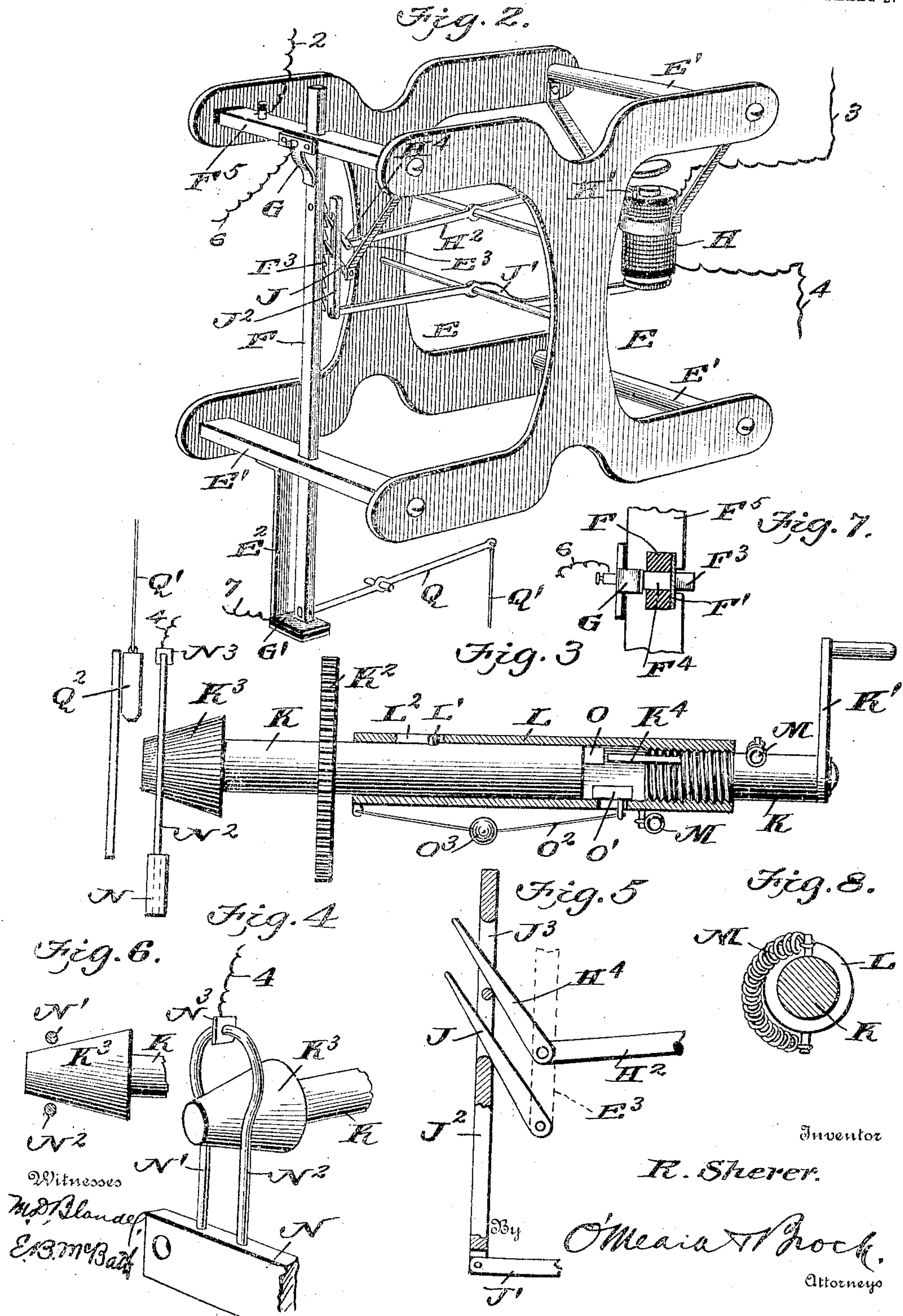
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2 SHEETS--SHEET 2.



UNITED STATES PATENT OFFICE.

RALPH SHERER, OF EATON, OHIO.

TELEPHONE SYSTEM.

No. 813,330.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed October 17, 1904. Serial No. 228,785.

To all whom it may concern:

Be it known that I, RALPH SHERER, a citizen of the United States, residing at Eaton, in the county of Preble and State of Ohio, have invented a new and useful Telephone System, of which the following is a specification.

My invention relates to a selective telephone system adapted for use on party-lines, and more especially to the means employed to cut the various telephones upon the line in and out at the will of the party using the line.

The object of the invention is to render impossible the objectionable habit of eavesdropping, either accidental or intentional. With the usual selective call system this objectionable feature of the party-line is mitigated as the bell at the station to be called only is rung, but nevertheless as long as the other receivers are not cut out any one at them could hear the conversation carried on between the calling-station and the station called. The object of my invention then is accomplished by cutting off from the main party-line all telephones on that line other than the one called and to prevent their being again placed in communication with the line until the first party has rung off.

With these objects in view my invention consists of the novel features of construction and combination of parts hereinafter set forth, pointed out in the claims, and shown in the accompanying drawings, in which—

Figure 1 is a diagrammatic plan of my invention, showing three telephones on a party-line. Fig. 2 is a perspective view of a bracket holding the toothed sliding bar, armature-levers, and magnets. Fig. 3 is a detail view, partly in section, of the generator-shaft. Fig. 4 is a detail perspective view of the conical inner end of the generator-shaft and the contact-points separated by inward movement of the said conical end. Fig. 5 is a detail view showing the construction of the slotted bar through which the pawls carried by the armature-levers work. Figs. 6, 7, and 8 are details of construction.

In the drawings, A and B represent the line-wires of a metallic circuit, though it will be obvious that my device could be used in connection with a ground return, either A or B representing ground.

C, C', and C² represent, respectively, tele-

phone-transmitters, and D, D', and D² receivers, one at each station. At each station I arrange two parallel X-shaped plates E, the arms of which are connected by rods E'. In the bracket thus formed is carried the main device for throwing the various stations into and out of communication with each other. Carried by each bracket therefrom is a vertically-movable bar F, suitably insulated from the bracket E and also from a contact-plate G, carried by an upper rod F⁵. The lower end of the bar F rests normally on a contact-plate G', which, properly insulated, is carried by a supplemental bracket or arm E². The bar F has arranged longitudinally on it a conductor portion F', which may be in the form of a metal strip if the bar F is of wood or a non-insulated portion integral with the bar if the bar is of metal, and on the portion F' are formed a plurality of rack-teeth F³. The bar F also carries a contact-plate F⁴, which is in permanent contact with the portion F', and may, if desired, be integral with it, and which is adapted by means of vertical movement of the bar to be brought into contact with the plate G. While the bars F are all of identical construction, the location on the bar of the contact-plates F⁴ with reference to the teeth F³ varies and there may be as many positions of the plates F⁴ as there are teeth on the bars and as many telephones on the party-line as teeth, each station having a bar F with a contact-plate F⁴ in a different position from any other plate F⁴ carried by a bar on that line. The bracket E also carries an electromagnet H, having at one end a diamagnetic guard H', and an armature-lever H² of soft iron is pivotally mounted intermediate its ends and is adapted to be drawn toward the upper end of the electromagnet H when the latter is energized and to be held from coming into actual contact with the magnetic pole by the guard H'. The opposite and heavier end of the armature-lever H² has pivoted to it a pawl H⁴, adapted to engage the teeth F³ and lift the bar F. The bracket E also carries an arm E³; to which is pivoted a pawl J, adapted to engage the teeth F³ and hold the bar F into the position to which it was moved by the action of the pawl H⁴. A steel armature-lever J' is pivoted intermediate its ends, and the heavier end is adapted to engage the lower pole-face of the electromagnet H when the mag-

net is energized. To the opposite and lighter end is pivoted a vertical bar J^3 , as shown at J^3 , and the pawls H^4 and J work through these slots, respectively, with a limited vertical movement sufficient in its scope to accomplish the purpose for which they are designed.

It will be understood that the bracket E and parts connected thereto may be arranged at any suitable place and either adjacent to or remote from the transmitter and receiver.

A suitable generator-bell (not shown) of any desired make is arranged as usual in the telephone box or casing. The armature-shaft of this generator is rotated in the usual manner by a gear-train, and in the drawings I show the gear-shaft K , having at its outer end a crank-handle K' , the shaft being formed in sections, as will be hereinafter explained, and carrying a gear-wheel K^2 , which meshes with the gear-wheel (not shown) driving the armature-shaft of the generator. It will be understood that the generator and bell are not claimed as a part of this invention; but the gear-shaft K is an essential feature of my device. The inner end of the generator-gear shaft K is in the form of a truncated cone K^3 . The shaft K has a sleeve L pinned to the shaft, the pin L' extending through a longitudinal slot L^2 formed in the sleeve, so that the sleeve L will have a limited longitudinal movement on the shaft K . As previously stated, the shaft K is formed in two sections, the cone K^3 and the gear-wheel K^2 being on the inner section and the handle K' being on the outer section of the shaft, the sleeve L overlapping the adjacent portions of the two sections. Adjacent its outer end the sleeve is interiorly threaded, and the rear portion of the outer section of the shaft K is threaded and works in the threaded portion of the sleeve L . This outer section carries an inwardly-projecting finger K^4 , and when the handle K' is rotated and the outer section moves inwardly in the sleeve the inner section carrying the cone is moved rearwardly, sliding in the sleeve, the pin L' and slot L^2 permitting this movement, while the inner and outer sections rotate with the sleeve as one common shaft. A spring M is carried by the sleeve L and is wound upon the sleeve when the sleeve is rotated by reason of turning of the handle K' , but as soon as the handle is released the spring rotates the sleeve and sections of the shaft in the opposite direction and the parts are returned to their normal positions. The truncated cone portion K^3 is formed or covered with some suitable insulating material, and below the same is arranged an insulated bracket N^1 which carries an upwardly-extending spring member N' , arranged on one side of the cone K^3 and curving over the same. A similar spring N^2 ,

both springs making contact with the commutator-shaft S hereinafter mentioned, is arranged upon the opposite side of the cone K^3 , and these springs are adapted to engage opposite faces of a contact-plate N^3 . It will now be obvious that as the members N' and N^2 are arranged on opposite sides of the cone K^3 and are of elastic material that rearward movement of the cone on rotation of the handle K' will force the cone farther between the said members and spring them apart, breaking contact with the plate N^3 at the calling-station only.

The outer end of the inner section of the shaft K carries a projection O , and in the sleeve L a block O' is slidably arranged, having a pin projecting through a slot in the sleeve, and a cord O^2 is connected at one end to the inner end of the sleeve L and at its opposite end to the pin of the block O' . This cord is without the sleeve L and is not drawn taut. A ball O^3 is arranged on the cord intermediate its ends and acts as a governor, drawing the block O' into engagement with the projection O , when the handle is rotated with sufficient speed to gain the required frequency of alternations of current.

A lever Q is pivoted intermediate its ends adjacent the bar F , and one end of the lever is connected to the lower end of the bar, and the opposite end of the lever is connected by a cord or wire Q' to a weight Q^2 , which weight is arranged in the casing containing the generator-shaft K and to the rear of the cone portion K^3 . As soon as the bar F is moved up one step the weight Q^2 is dropped to the rear of the cone K^3 , and it is then impossible to force the cone rearwardly between the members N' and N^2 , and the cord or wire Q' is inclosed in the casing or run through a suitable tube or pipe when the bar F is not adjacent the generator, so that the weight Q^2 cannot be lifted except by the lowering of the bar F , and it may be here stated that the bar F and bracket E may be incased in any suitable manner. I also employ a reversing-switch which may be of any desired form, but is shown as a slidable bar P , having the contact blocks P' , P^2 , and P^3 , insulated from each other and adapted to contact with the stationary contact-blocks P^4 and P^5 .

The circuits connecting these various parts are as follows: From the line-wire A a lead-wire 1 runs directly to the receiver, and a lead-wire 11 has a branch 2, which is connected to an upper guide-bracket F^5 , through which the bar F works, the circuit being formed through the upper bracket F^5 and the conductor portion F' of the bar F . The wire 11 has also a branch wire 3, which extends to the electromagnet H , and from the magnet extends a wire 4 to the contact plate or surface N^3 . The wire 1 has a tap 5 to the block P^5 . From the block P^4 a wire 6 extends to

the contact-plate G and has a tap 7 extending to the contact-plate G'. A branch wire 8 leads from the wire 6 to the transmitter. A wire 12 taps the wire 9 and extends to a suitable contact-plate R, adapted to be engaged by the spring member N' when forced by the cone K³ away from the member N².

The interior circuits of the telephone proper are the same as usual and require no description.

A wire 9 forms a connecting-loop between contact-blocks P' and P³, and from block P² a wire 10 extends to the spring member N². For convenience of description I have designated the stations as X, Y, and Z.

The operation of the parts is as follows: Assuming that station X desires to cut out station Y and communicate with station Z, Y's number being 2 and Z's being station 3, the handle K' is rotated and three rings sounded and three successive impulses of current are generated and each time the cone K³ is forced between the members N' and N², breaking circuit between wires 4 and 10. The generator-commutator is indicated at S and N', and wire 10 forms the circuit leading to and from the generator. Each impulse of the current will leave the station X through wire 12, with which N' is in contact, wire 9, blocks P' and P⁴, wires 6 and 7, contact-plate G', the conductor portion F' of the bar F, bracket F⁵, and wires 2 and 11 to wire B, and return through wire 1, tap 5, blocks P⁵ and P², and wire 10 to the generator. It will be noted that the receiver and transmitter are looped in series with each other and in parallel between the circuit-wires 1 and 6 as the circuit is above outlined through the tap 5. At the other stations the impulses will be received through the following circuit: through wires 11 3, electromagnet H, wire 4, member N², wire 10, blocks P² and P⁵, and back through wire 1. This will energize the magnet H, and at each impulse the armature-lever H² will be drawn downward, actuating the pawl H⁴, which will engage the teeth of the bar F at each of the stations Y and Z, and the bar will be lifted one step for each ring. As soon as the bars F have been lifted one step the weights Q² descend, and the generator-gear shafts K of these stations are practically locked against rotation, since rotation necessitates an inward movement of the shaft-sections. The third and last ring will bring the contact-plate F⁴ of station Z into alinement and contact with the contact-plate G of that station, while the similar plate will be out of contact at station Y. A talking-circuit is therefore formed between stations X and Z, while station Y is cut out, as it will be obvious that the bar F is lifted out of contact with plate G' and with its plate F⁴ out of contact with plate G. The talking-circuit at station X is formed through

wires 8 6 7, contact-plates G' F' F⁵, wires 2 6 5 and 11 to line, and wire 1 to or from line, depending on the direction of the current. The same circuit is formed at station Z, substituting contact-plates F⁴ and G for G'. The magnets H of stations Y and Z remain in a circuit, wires 11 3 4, member N², wires 10 and 1 through blocks P² and P⁵. When the party at station X is through, the reversing-switch P is moved, reversing the direction of the current in the usual manner, and the sudden reversal of the current causes an instantaneous motion on the part of the armature-lever J', which is conveyed to the slotted bar J² and disengages the pawl J, and as soon as the current is cut off the bars F at stations Y and Z fall by gravity and all parts resume their normal positions.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a selective telephone system, the combination with a generator-gear shaft, a movable bar having a contact-plate, means for moving the bar step by step, and means connected to the bar adapted to lock the said shaft when the bar has moved one step.

2. A selective telephone system comprising talking and ringing circuits, a plurality of movable bars having contact-plates arranged in the talking-circuit, a plurality of electromagnets arranged in the ringing-circuit, pawls actuated by said magnets adapted to lift the bars step by step, and means for cutting out the electromagnet at the calling-station.

3. A selective telephone system comprising talking and ringing circuits, a plurality of movable, toothed bars having contact-plates arranged in the talking-circuits, electromagnets arranged in the ringing-circuits, a call-bell generator, pawls adapted to engage the bar-teeth and actuated by the magnets, means for automatically cutting out the magnet at the calling-station, and means for locking the call-bell-generator shafts upon movement of the bars.

4. In a selective telephone system, a movable toothed bar, a contact upon which the bar normally rests, a contact-plate carried by the bar, a contact-plate arranged adjacent the bar adapted to be engaged by the contact-plate on the bar, the said bar forming a portion of the talking-circuit, an electromagnet in the calling-circuit, pivoted armature-levers, pawls actuated by said levers and adapted to lift the bar step by step, and means for automatically cutting the said magnet out of its own calling-circuit.

5. In a telephone system, a contact-plate, a movable bar arranged in the talking-circuit and resting on the said plate, an electromagnet, a generator-gear shaft adapted to move inward when rotated in one direction, and

having an insulated conical rear end portion,
spring members arranged on opposite sides
of said conical end and when in contact com-
pleting the circuit through the electromagnet,
5 pawls actuated by the magnet adapted to
lift the bar, and a weight connected to the
bar and adapted to be brought into align-
ment with the rear end of the generator-gear

shaft and prevent inward movement of the
same when the bar is lifted, as and for the
purpose set forth.

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Witnesses:

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