

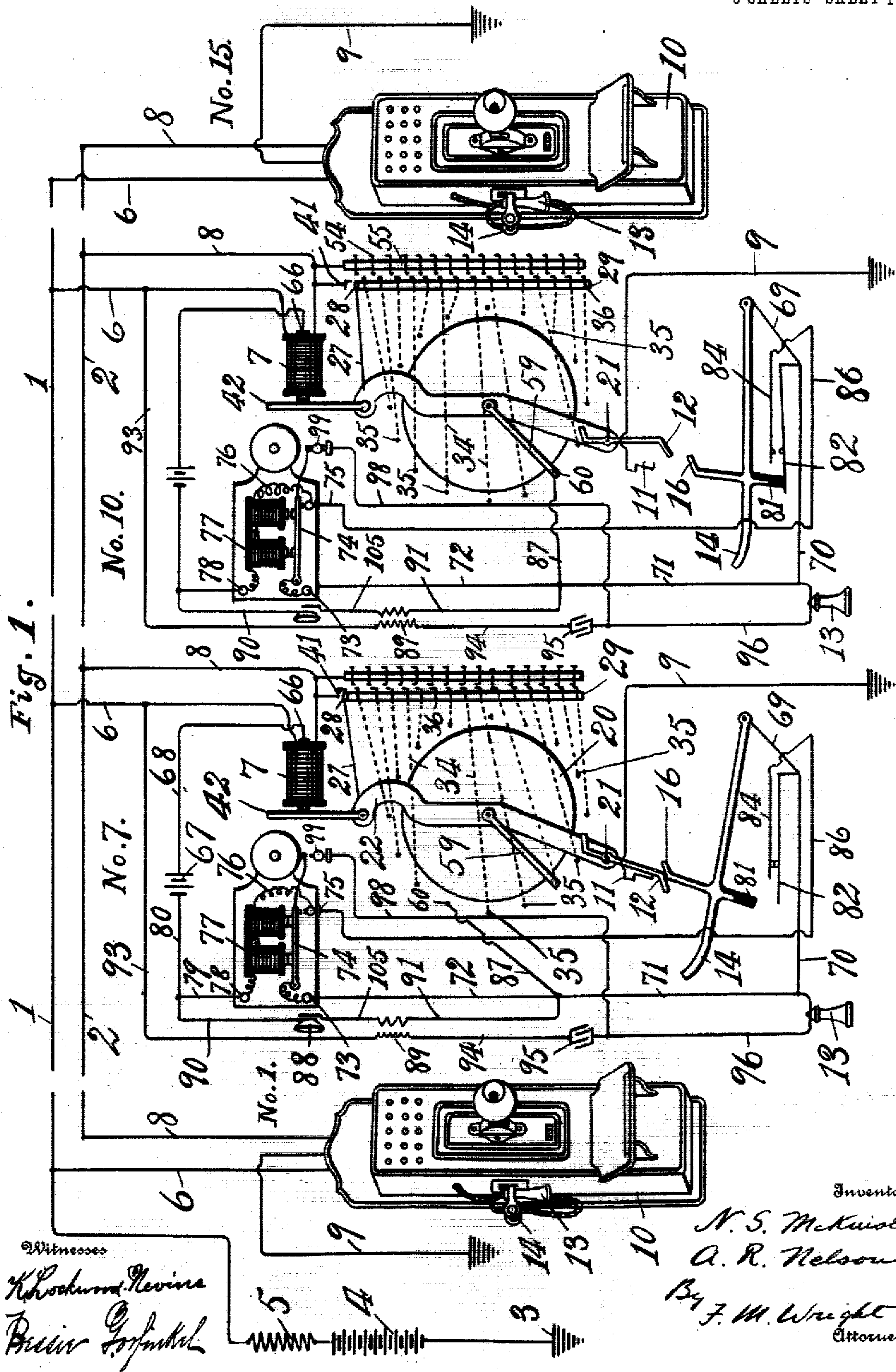
No. 820,063.

PATENTED MAY 8, 1906.

N. S. McKINSEY & A. R. NELSON.
SELECTIVE TELEPHONE SYSTEM.

APPLICATION FILED JUNE 15, 1904.

5 SHEETS—SHEET 1.



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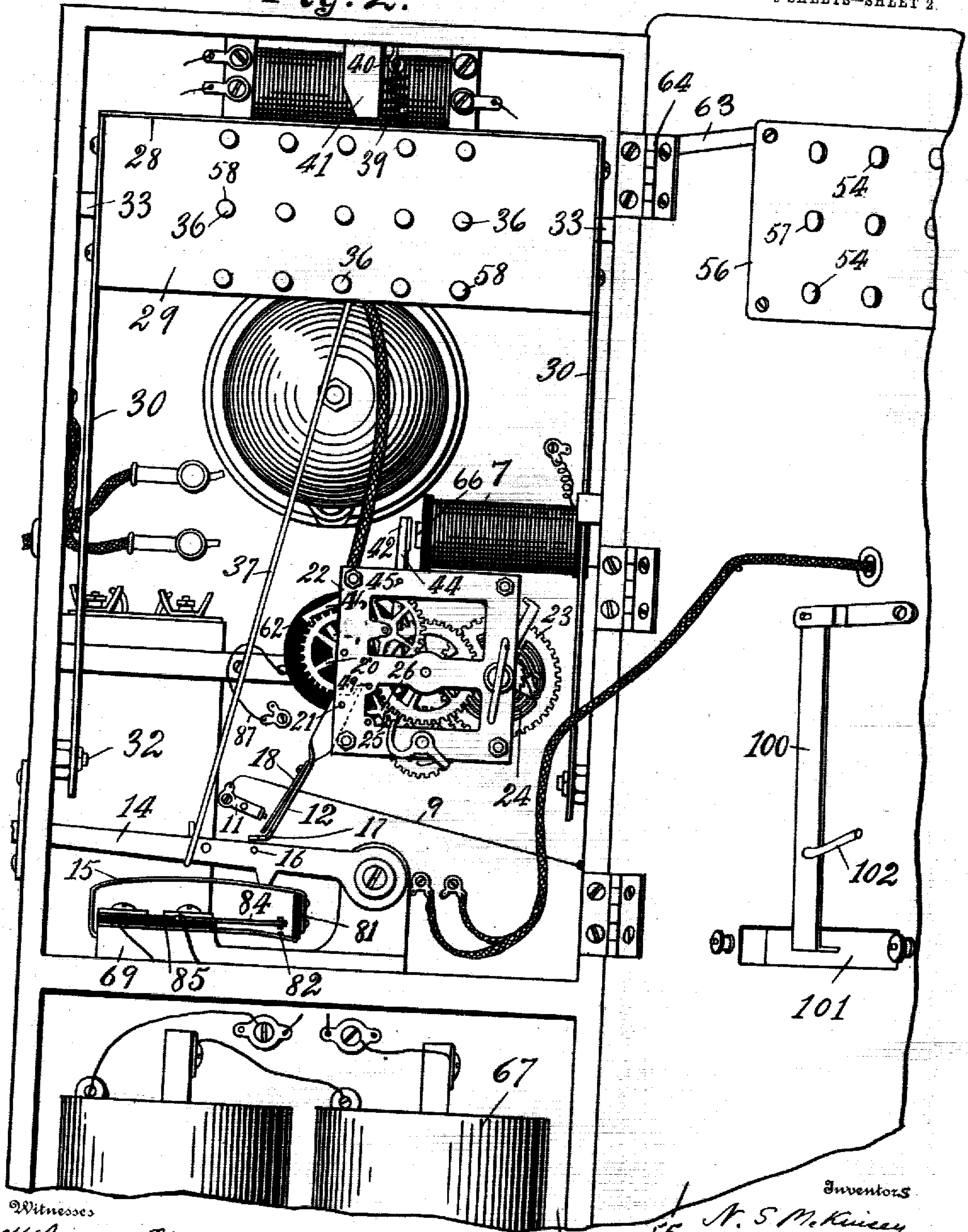
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Fig. 2.

5 SHEETS—SHEET 2.



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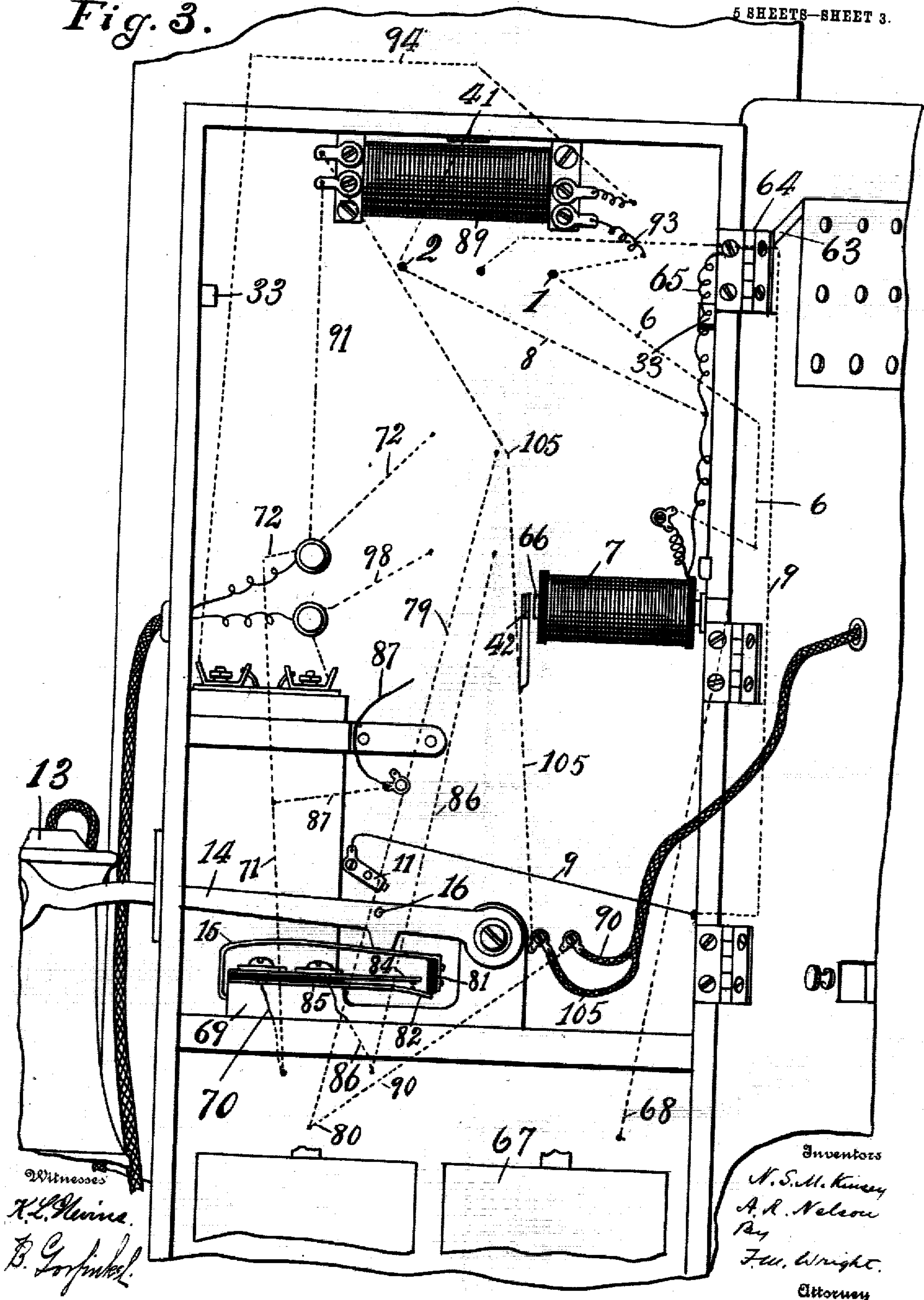
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Fig. 3.

5 SHEETS—SHEET 3.



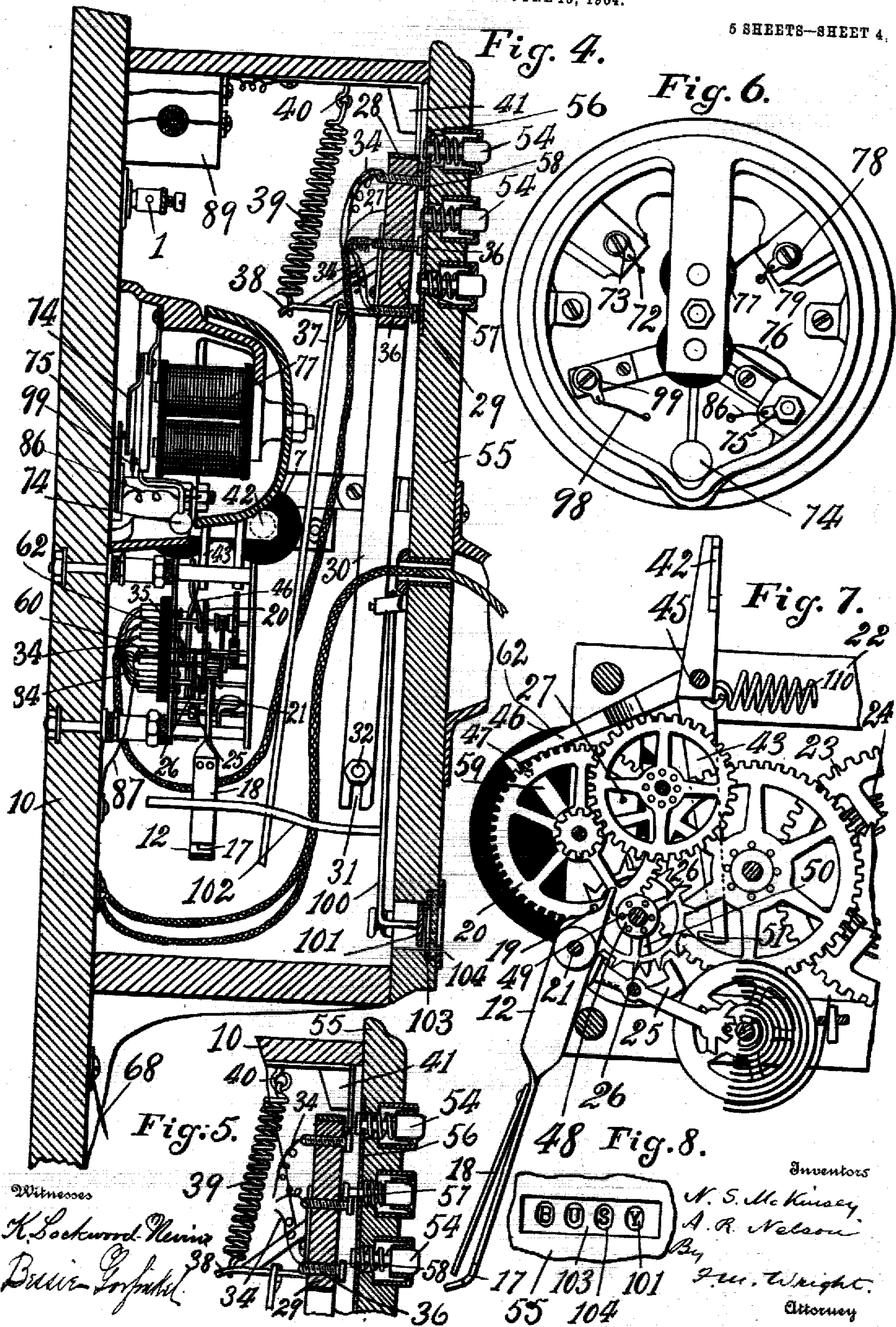
No. 820,063.

PATENTED MAY 8, 1906.

N. S. McKINSEY & A. R. NELSON.
SELECTIVE TELEPHONE SYSTEM.

APPLICATION FILED JUNE 16, 1904.

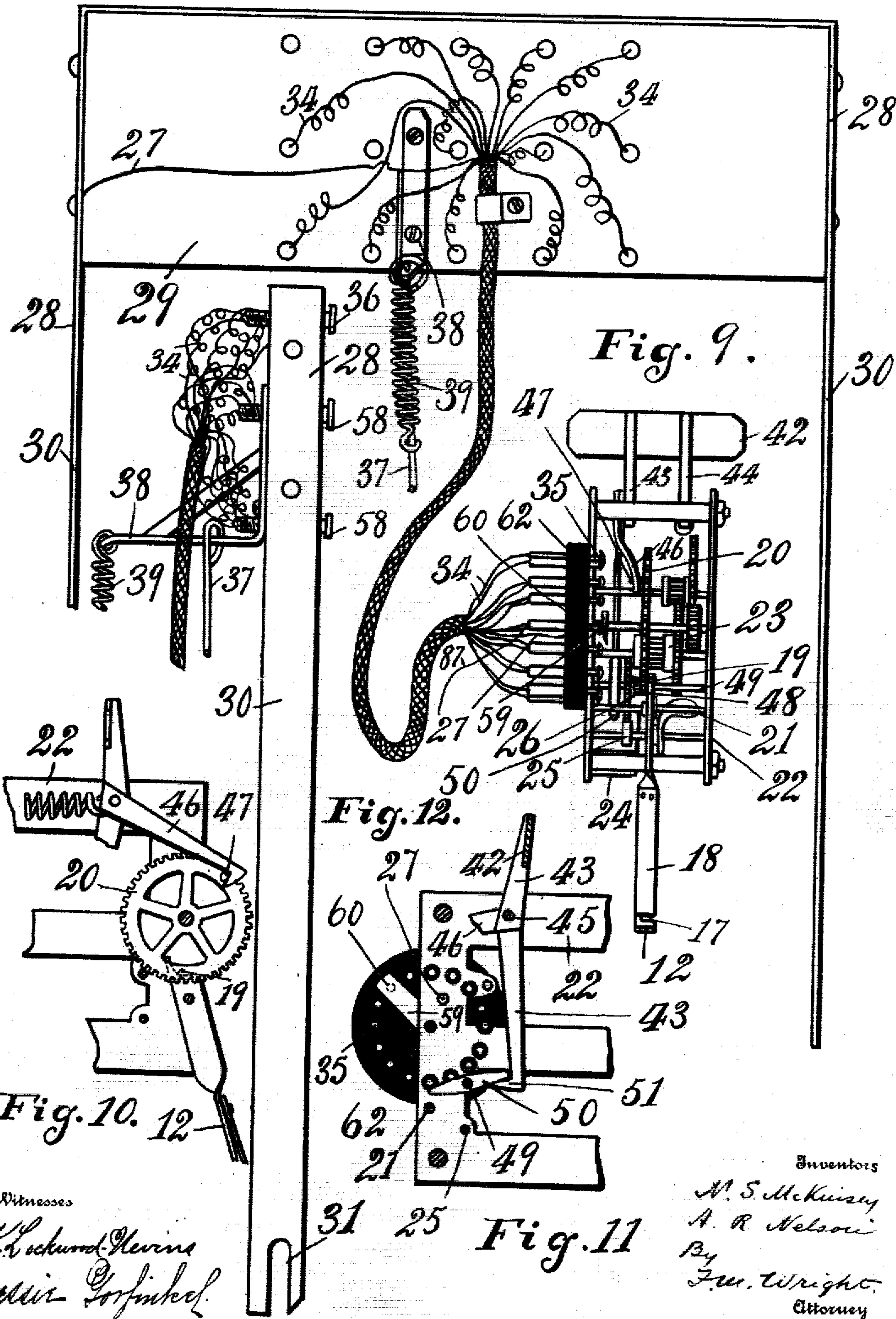
5 SHEETS—SHEET 4.



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SELECTIVE TELEPHONE SYSTEM.

APPLICATION FILED JUNE 15, 1904.

5 SHEETS—SHEET 5.



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NOBLE S. McKINSEY AND ANTON R. NELSON, OF SUSANVILLE,
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SELECTIVE TELEPHONE SYSTEM.

No. 820,063.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed June 15, 1904. Serial No. 212,848.

To all whom it may concern:

Be it known that we, NOBLE S. McKINSEY and ANTON R. NELSON, citizens of the United States, residing at Susanville, in the county of Lassen and State of California, have invented certain new and useful Improvements in Selective Telephone Systems, of which the following is a specification.

This invention relates to an improved selective telephone system, the object of the invention being to provide a system by which a considerable number of telephones can be placed on the same line, so that any party can call up any other party on the line without the aid of a central station and in which the talking shall be secret and free from interruption or intrusion by the other parties on the line.

In the accompanying drawings, Figure 1 is a diagrammatical view of the system. Fig. 2 is a broken front elevation of one of the telephones, the door being thrown open and broken away. Fig. 3 is a front elevation of the rear portion of the telephone, the main portion of the mechanism being removed and the wires at the back of the telephone being shown in dotted lines. Fig. 4 is a vertical section of the upper portion of the telephone. Fig. 5 is a detail vertical section showing the button-carrier in different position from that in Fig. 4. Fig. 6 is a front elevation showing the interior of the bell. Fig. 7 is an enlarged front elevation of the clockwork mechanism and the part immediately adjacent to the same. Fig. 8 is a front view of that portion of the door of the telephone-box which shows the "busy" indicator. Fig. 9 is a rear elevation of the button-carrier, showing also the clockwork mechanism in side elevation and showing the electrical connection between the clockwork mechanism and the button-carrier. Fig. 10 is a rear view of a portion of the line-controller and of the parts connected therewith. Fig. 11 is a front elevation showing in detail the circular series of contact-pins and the part of the clockwork mechanism connected therewith. Fig. 12 is a side view of the button-carrier.

The method of operation of the system.—The nature of the system will be best understood by considering its method of operation simultaneously with the details of construction. The following are the principal steps: Whenever the line is not in use, any sub-

scriber taking down his receiver obtains control of the line. He thereby starts synchronous clockwork mechanisms, one in each telephone, the starting of these clockwork mechanisms preventing all the other subscribers getting on the line in the same way as did the calling subscriber. These mechanisms very soon stop and are started again by the calling subscriber pressing one of a number of push-buttons, each corresponding to one of the other telephones. The clockwork mechanisms so restarted are all again arrested after they have advanced to a greater or less extent, depending upon the telephone selected. The bell-circuits in the caller's and the selected party's telephones and in no other are closed; but the caller's bell does not ring, because the removal of his receiver threw on a shunt around the hammer-contact of his bell-circuit, continuously energizing the bell-magnets. The called party's bell rings until he takes down his receiver when a similar shunt is thrown on. When the calling subscriber took down his receiver, he also threw off a shunt which normally shunted the receiver, and he thereby obtained the use of the receiver. The called party on taking down his receiver threw off a corresponding shunt in his telephone and so obtained the use of the receiver. None of the other parties can throw off the corresponding shunts in their telephones, and therefore none of them can use their receivers, also none of them can close their bell-circuit or primary talking-circuit. Hence the talking is secret and uninterrupted.

General character of the system.—The system here shown is supposed to be for a line of fifteen subscribers, although the system is adaptable for any number within reasonable limits, the mechanism of each telephone in the system being the same. For the sake of illustration in Fig. 1 the telephones of subscribers Nos. 1, 7, 10, and 15 are shown, the mechanisms of the telephones of subscribers Nos. 7 and 10 being shown diagrammatically in detail and the other telephones of the line being omitted. There are two line-wires 1 and 2, which connect all the telephones of the system. Of these the wire 1 is grounded at one end, as shown at 3, having therein a main battery 4 and a resistance 5. This resistance is greater than that of any secondary talking-circuit in the system the object being to kill

the ground to the talking-currents. At each telephone there is a bridge between the wires 1 and 2, consisting of a wire 6, magnet-coils 7, and a wire 8. Since the wire 1 is grounded, while the wire 2 is not normally grounded, and since the magnet-coils 7 are all on bridges between the wires 1 and 2, it is evident that upon grounding the wire 2 all of the magnets on these bridges will be energized. A means for grounding the wire 2 is provided at each telephone, thereby energizing all the magnets of the line. A grounded wire 9 is connected in the telephone-box 10 with a spring-contact 11, which is normally separated from a line controller or lever 12.

Taking down the receiver.—Upon any subscriber removing his receiver 13 from the automatic hook 14 said hook immediately rises under the action of a spring-plate 15, so that an arm 16, projecting rearwardly from said hook, first presses against the bent lower end of the line-controller 12, then passes into and through a recessed or cut-out portion 17 of the end of said controller, and then presses against a spring-finger 18, secured upon said controller, moving said finger upward to contact with the end of the spring-contact 11. The line-controller 12 is normally held in position to be actuated by the arm 16 by reason of a stud 19, extending forwardly from a wheel 20, hereinafter described, engaging the upper end of the controller. One break in the line from the wire 8 to the ground is thus closed. The other break is also closed as follows: The line-controller 12 is pivoted upon a horizontal shaft 21 on the frame 22 of a clockwork mechanism suitably supported within the telephone-box 10, having a train of gears 23, actuated by a mainspring 24 and controlled by an escapement 25 and escapement-wheel 26. The line from the ground therefore extends through said line-controller to said clockwork mechanism. By a wire 27 said clockwork mechanism is electrically connected with the metallic support or rim 28 of a button-carrier 29, of insulating material, as wood. Said rim is yoke-shaped, having lateral arms 30 extending down within the sides of the telephone-box, the lower ends of said arms being slotted, as shown at 31, and sliding vertically on studs 32, projecting inwardly from the sides of said box. Lateral guides 33 are also provided to guide the button-carrier in its vertical movement. It may be here stated that in addition to the wire 27, leading from the clockwork mechanism to the metallic rim of said button-carrier, there are other wires 34, fourteen in number, corresponding to the other fourteen telephones in the system and leading from contact-pins 35 to buttons 36 on the carrier, these fifteen wires being connected in a single cable. When now the receiver is taken down from the automatic hook, so that said hook rises, it releases the button-carrier, which had

been held down, with said automatic hook, by a link 37, hooked at its lower end around said automatic hook and at its upper end around a bracket 38, projecting rearwardly from the button-carrier. The button-carrier being free to rise does so under the action of a spring 39, attached to the rear end of said bracket and also to a hook 40 in the top of the telephone-box. This upward motion of the button-carrier brings its metallic rim 28 into contact with a contact-plate 41, secured to the under side of the top of the box and extending downwardly therefrom. This contact-plate is connected with the wire 8, which leads to the line-wire 2. It will thus be seen that any subscriber removing his receiver from the automatic hook will immediately connect said line-wire 2 with the ground, and since the line-wire 2 is connected with the line-wire 1 in multiple by the wires 8 and 6 and the coils 7 of a magnet in each telephone the effect of any subscriber taking down his receiver is to energize the magnet 7 in each telephone of the system, thereby drawing up its armature 42. This armature 42 is carried by the ends of arms 43 44, mounted on a rock-shaft 45, having bearings in the frame of the clockwork mechanism, and the movement of the armature swings said arms. One arm 43 has a hook 46 extending therefrom, which in the normal position of the clockwork mechanism engages a rearwardly-extending stop-pin 47 on the wheel 20 of the clockwork and prevents said wheel 20 revolving. As soon, however, as the line is closed to the ground from the main wire 2 and all the magnets are energized these hooks 46 are lifted from the stop-pins 47, and all the wheels 20 commence to revolve under the action of the mainsprings 24. However, after revolving a very short distance, the wheels stop for the following reason: Each wheel 20 gears with a pinion 48 on a shaft 49, having mounted thereon the escapement-wheel 26, the proportion of the pinion 48 to the gear-wheel 20 being such that the escapement-wheel 26 makes eight revolutions to one revolution of the wheel 20. The shaft 49 of this escapement-wheel 26 has a bar 50 secured thereon, and the ends of this bar are adapted to be engaged by a hook 51 on the lower end of the arm 43, when the magnet is energized and the upper end of said arm is drawn to the right toward said magnet. The lower end of the arm then swings to the left and the hook 51 moves into the path of the bar 50, so that as the escapement-wheel revolves one end of said bar strikes said hooked end and the wheel is arrested. It is obvious that there are sixteen equidistant points on the circumference of the wheel 20 passing any given stationary point which we may call "points of arrest," since they pass the stationary point at the times at which the ends of the bar 50 can be arrested by the hook of the lower end of the

arm 43. The stop-pin 47 is placed about half-way between two of these points of arrest, so that when the wheel has revolved through about one thirty-second of a revolution it is arrested by one end of the bar 50, impinging against the hooked end of the arm 43, the magnets still being energized.

Ring up.—In this position the wheel 20 remains until the calling subscriber selects the telephone in the system with which he wishes to communicate. This he does by pressing one of fourteen push-buttons 54 on the front of the door 55 of the telephone-box, and preferably distinguished by suitable numbers. There are fifteen buttons shown; but one of them corresponding to the number of that particular telephone is a fixed or dummy button. The buttons corresponding to the other telephones of the system are push-buttons. Each push-button 54 has a stem passing through a metallic plate 56 and a flange 57 on the inner end of the stem. When the push-button selected is pressed inward, this flange 57 presses against the wooden button-carrier 29 and pushes it inward against the action of the spring 39, which normally draws the button-carrier forward, as well as upward. This causes the metallic rim 28 of the button-carrier to slip past or behind the depending plate 41, whereupon the button-carrier, being no longer held down by said plate, rises under the action of the spring 39. The stationary buttons 36 have flanges 58 and are so located on the carrier that when the button-carrier is depressed each of them is immediately beneath a corresponding push-button 54. Therefore when any one of these push-buttons has been pushed in, causing the button-carrier to be released from the plate 41 and to spring upward, the corresponding stationary button 36 will rise up against the stem of the push-button so pushed, and its flange 58 will lock the flange 57 of the push-button and hold it against withdrawal. Contact is now broken between the button-carrier rim and the plate 41, the magnets are deenergized, the hook at the lower end of the arm 43 is withdrawn from the bar 50 by a spring 110, and the escapement-wheel 26 and the wheel 20 are free to revolve. The line to the ground, which has thus been broken by the separation of the plate 41 from the rim of the button-carrier, remains broken until a tongue 59, carried with the wheel 20, touches that one of a series of fifteen contact-pins which corresponds to the telephone selected. It was before stated that there were fourteen contact-pins 35, severally connected by wires 34 with the stationary buttons; but in addition to these fourteen there is a fifteenth contact-pin 60, similar in all respects to the others and forming one of the circular series, but which is connected by a wire 87 with the bell-circuit and primary transmitter-circuit of the telephone.

Of course the position of this pin 60 in the series will vary with the number of the telephone. These pins 35 and 60 are arranged in a circle on insulating material 62 adjacent to the tongue 59, so that said tongue passes over and contacts with each pin in succession. The end of the tongue is sloped inwardly to the rear edge, so that its advancing edge can readily pass onto or over the pin, the surface of the tongue being brought into contact with the pin and pressed firmly against the same. Now when in the calling-subscriber's telephone the tongue 59 reaches the contact-pin 35, corresponding to the telephone selected, the line from the ground is again closed. Instead of passing from the clockwork mechanism to the wire 8 by the contact of the rim of the button-carrier with the plate 41 it passes from said clockwork mechanism to said wire 8 by the following route: the tongue 59, contact-pin 35, wire 34, stationary button 36, push-button 54, plate 56, metallic strip 63, secured on the inner side of the door, upper hinge 64 for said door, and wire 65 to wire 8. The energizing of the magnets throws the hooked lower end of the arm 43 into the path of the next arriving end of the bar 50, so that before the escapement-wheel has revolved through one-half a revolution and before the wheel 20 has revolved through one-sixteenth of a revolution the said wheel is arrested. The tongue is sufficiently broad to insure the arrest of the wheel 20 before the tongue has left that contact-pin which by its contact with the tongue closed the line to the ground. The clockwork mechanism is now again at rest, and the magnets are now all energized. The energizing of the magnets of the calling-subscriber's telephone closes his bell-circuit, for the armature 42 completes the circuit by contact with the cores 66 of the magnets. This circuit is as follows: battery 67, wire 68, magnet-cores 66, armature 42, clockwork-frame 22, controlling-lever 12, arm 16, automatic hook 14, base 69, wire 70, wire 71, wire 72, binding-post 73, bell-hammer 74, contact-stop 75, wire 76, coils 77 of the bell-magnet, binding-post 78, wire 79, wire 80, battery 67. The closure of this circuit would start the bell ringing in the calling-subscriber's telephone were it not that the taking down of the receiver prevents the bell ringing for the following reason: The spring-plate 15, which presses up the automatic hook, has a piece of insulated material 81 secured thereto, which when the receiver is hung up depresses the projecting end of a spring-contact 82, which is secured to and electrically connected with the base or support 69 for said automatic hook. The depression of this spring-contact 82 normally maintains it out of contact with a second or upper spring-contact 84, separated therefrom by insulating material 85; but when the calling-

subscriber takes down his receiver these two springs 82 and 84 are thereby allowed to contact with each other. This causes the current from the battery 67 instead of passing intermittently through the hammer 74 of the bell to pass continuously through the coils of the magnet as follows: from the battery, as before, to base 69, contact 82, contact 84, wire 86, stop 75, wire 76, coils 77, and so as before to the battery. This acts as a shunt to the intermittently-closed line between the post 73 and stop 75. Said coils are therefore constantly energized, and the hammer is drawn up against the bell, which no longer rings. The bell-circuit of the called-subscriber's telephone is closed as follows: battery 67, wire 68, magnet-cores 66, armature 42, clockwork-frame 22, tongue 59, contact-pin 60, wire 87, wire 72, bell-hammer 74, and so as before to the battery. This bell rings until the called subscriber takes down his receiver, when the same shunt is thrown on energizing the bell-magnets continuously and drawing up the hammer against the bell.

The talking-circuits.—Before describing in detail the talking-circuits it may be stated that a novel principle is here introduced of placing the primary talking-circuit in multiple with the bell-circuit. The same battery 67, which provides the current for the bell-circuit, provides the current for the primary talking-circuit, the current being divided, part of it passing through the bell-magnets and part through the transmitter. For this purpose the transmitter 88, wire 105, and primary wire of the induction-coil 89 are placed between wires 90 91, connected with the wires 79 and 72. Hence the primary talking-circuits are the same as the bell-circuits with the above change, which is the same both for the calling and for the called subscribers' telephones. The secondary talking-circuit is as follows: line-wire 1, wire 6 to the calling-subscriber's telephone, wire 93, secondary wire of the induction-coil 89, wire 94, condenser 95, wire 96, receiver 13, wire 70, base 69, automatic hook 14, arm 16, line-controller 12, clockwork-frame 22, tongue 59, pin 35, wire 34, stationary button 36, push-button 54, plate 56, strip 63, hinge 64, wire 65, wire 8, line-wire 2, wire 8 of the called-subscriber's telephone, plate 41, rim 28, wire 27, clockwork-frame 22, tongue 59, contact-pin 60, wire 87, wire 71, receiver 13, wire 96, condenser 95, secondary wire of the induction-coil 89, wire 93, wire 6, line-wire 1.

The shunt for the receiver.—But while the secondary talking-circuit, as well as the primary circuits, is complete, this of itself would not allow of talking. In each telephone the receiver is normally shunted, and it is because these shunts are thrown off in the calling and called subscribers' telephones that talking is possible between them. This

shunt consists of a wire 98, leading from the wire 96 to a contact-stop 99 for the hammer. Normally the hammer rests against this stop and the shunt is on; but when the bell-circuits are closed either through the wire 87, as in the called subscriber's telephone, or through the line-controller 12, as in that of the calling subscriber, then the shunt is off and the receiver is in use. It is to be noted that the bridges of the other subscribers can also be closed at any time by taking down the receiver. Although the automatic hook does not make contact with the line-controller, yet a contact is made between the rim 28 and the plate 41, and the bridge is completed as follows: wire 6, wire 93, secondary wire of induction-coil 89, condenser 95, wire 96, receiver 13, wire 70, spring-contacts 82 84, wire 86, stop 75, wire 76, coils 77, binding-post 78, wire 79, wire 80, battery 67, wire 68, magnet-cores 66, armature 42, wire 27, rim 28, plate 41, wire 8. Nevertheless such other subscriber cannot intrude on the line for his receiver is shunted, and he cannot remove the shunt.

The control of the line.—When the calling subscriber takes his receiver down, his automatic hook moves the line-controller 12 into contact (by the spring-finger 18) with the spring-contact 11, and so it remains so long as his receiver is off the hook, thus closing one break in his line to the ground. At the same time the magnets of all the telephones are energized, the other break in his line to the ground being also closed. This starts the clockwork mechanisms of all the telephones, and the forward movement of the other wheels 43 causes all the studs 19 to pass over the controllers 12, so that said other controllers 12 are no longer held by said studs in position to be engaged by the arm 16 on the automatic hooks and to be moved up to bring the spring-finger 18 into contact with the spring-contact 11. Hence no other subscriber can make the necessary closure in the local circuit, this closure being made either through the wire 87 or through the line-controller.

Only one conversation allowed without releasing the line.—When a subscriber has obtained possession of the line and has called up one party, he cannot call up a second party without releasing the line, for the push-button corresponding to the second party will not lock with the fixed button; but the flanges will strike against each other without locking. To converse with a second party, he must release the button-carrier, and this he can only do by hanging up his receiver, whereupon the line-controller is released and the line is free. When the line is busy, the fact is indicated in each telephone in the following manner: A lever 100 is pivoted at its upper end upon the inner side of the door of the telephone-box and carries a plate 101,

having thereon the letters "B" "U" "S" "Y", spaced from each other. An arm 102 projects rearwardly from the lever 100 and is normally engaged by the line-controller 12, so that said letters are concealed behind a plate 103 in an opening in the door. Said plate 103 has openings 104, spaced from each other the width of the letters, and said letters are normally hidden behind these spaces. When the line is put into use, the levers 100 of the other telephones are no longer upheld by the controllers 12 of said telephones and drop, thus bringing said letters opposite to the openings in the plate 103, so that the word "Busy" appears thereat.

We claim—

1. A selective telephone system comprising a series of telephones, two line-wires, one connected to the ground, a resistance therein to kill the ground when the metallic talking-circuit is closed, bridges between the line-wires at the respective telephones of the system, means in each bridge for controlling its telephone, and means at each telephone for connecting the other line-wire with the ground, whereby all the bridges are placed in multiple on a circuit through the line-wires and ground, substantially as described.

2. A selective telephone system comprising a series of telephones, two line-wires, one connected to the ground, a resistance therein to kill the ground when the metallic talking-circuit is closed, bridges between the line-wires at the respective telephones of the system, means in each bridge for controlling its telephones, and means at each telephone for connecting the other line-wire with the first line-wire through the ground, whereby all the bridges are placed in multiple on a circuit through the line-wires and ground, substantially as described.

3. A selective telephone system comprising a series of telephones, two line-wires, one connected to the ground, a resistance therein to kill the ground when the metallic talking-circuit is closed, bridges between the line-wires at the respective telephones of the system, magnets in said bridges controlling the telephones, and means at each telephone for connecting the other line-wire with the first line-wire through the ground, whereby a current through the line-wires energizes all the magnets, substantially as described.

4. A selective telephone system comprising a series of telephones, two line-wires, one connected to the ground, a resistance therein to kill the ground when the metallic talking-circuit is closed, bridges between the line-wires at the respective telephones of the system, means in each bridge for controlling its telephone, a broken line at each telephone from the other line-wire to the first line-wire through the ground, and means, actuated by the removal of the receiver from the hook,

for closing a break in said line, substantially as described.

5. A selective telephone system comprising a series of telephones, two line-wires, one connected to the ground, a resistance therein to kill the ground when the metallic talking-circuit is closed, bridges between the line-wires at the respective telephones of the system, a magnet in each bridge, clockwork mechanism controlled by said magnet, a broken line at each telephone from the other line-wire to the ground, means, actuated by the removal of the receiver from the hook, for closing a break in said line, thereby controlling the magnets and starting the clockwork mechanisms, and means, operated by the initial movement of said mechanisms, for preventing the like closure in the other telephones by the removal of the receiver from the hook, substantially as described.

6. In an apparatus of the character described, a series of telephones, two line-wires, one connected to the ground, a resistance therein to kill the ground when the metallic talking-circuit is closed, bridges between the line-wires at the respective telephones of the system, means operatable at each telephone when said bridge is closed for controlling said telephone, and means at each telephone for connecting the other line-wire with the first line-wire through the ground, substantially as described.

7. In an apparatus of the character described, the combination of two line-wires, one of which is connected to the ground, a resistance therein to kill the ground when the metallic talking-circuit is closed, the other of which has a broken connection with the ground at each telephone of the system, a line-controller at each station, means operated by the release of the automatic hook for rendering said line-controller operative to close a break in the broken line to the ground, and means actuated with the closing of said break for rendering all the other line-controllers unresponsive to the corresponding automatic hooks, substantially as described.

8. A selective telephone system comprising two line-wires, bridges therebetween at the several stations to form the secondary talking-circuit, each bridge having two breaks therein, a receiver and secondary coil in each bridge, means for closing one of said breaks in any bridge by the removal of the receiver from its hook, means for closing the other break in the bridge at the calling-subscriber's station by the said removal of the receiver, and means for closing said other break at the called-subscriber's station controllable selectively from a distant station, substantially as described.

9. A selective telephone system comprising two line-wires, bridges therebetween at the several stations to form the secondary

talking-circuit, each bridge having two breaks therein, a receiver and secondary coil in each bridge, means for closing one of said breaks in any bridge by the removal of the receiver from its hook, means for closing the other break in the bridge at the calling-subscriber's station by the said removal of the receiver, and clockwork mechanism at each station, and means operated thereby and selectively
 10 controllable at the calling-subscriber's telephone, for closing said other break at the called-subscriber's station, substantially as described.

10. A selective telephone system comprising two line-wires, bridges therebetween at the several stations, an electromagnet in each bridge, a bell-ringing circuit at the bridge at each station having a break therein, and having also two parallel branches, each having a
 20 break therein, means for closing the former break by the energizing of the magnet, means for closing one of the latter breaks by the removal of the receiver from its hook, and means for closing the other of the latter
 25 breaks controllable from a distant station, substantially as described.

11. A selective telephone system comprising two line-wires, bridges therebetween at the several stations, an electromagnet in each
 30 bridge, a bell-ringing circuit at the bridge at each station having a break therein, and having also two parallel branches, each having a break therein, means for closing the former break by the energizing of the magnet, means
 35 for closing one of the latter breaks by the removal of the receiver from its hook, means, actuated by the said removal, for preventing the like closure in the other telephones of the system, and means for closing the other of
 40 the latter breaks controllable from a distant station, substantially as described.

12. A selective telephone system comprising two line-wires, bridges therebetween at the several stations, an electromagnet in each
 45 bridge, a primary talking-circuit at the bridge at each station having a break therein and having also two parallel branches, each having a break therein, means for closing the former break by the energizing of the
 50 magnet, means for closing one of the latter breaks by the removal of the receiver from its hook, and means for closing the other of the latter breaks controllable from a distant station, substantially as described.

13. A selective telephone system comprising two line-wires, bridges therebetween at the several stations, an electromagnet in each
 55 bridge, a primary talking-circuit at the bridge at each station having a break therein and having also two parallel branches, each having a break therein, means for closing the former break by the energizing of the
 60 magnet, means for closing one of the latter breaks by the removal of the receiver from its hook, means, actuated by the said removal,

for preventing the like closure in the other telephone of the system, and means for closing the other of the latter breaks controllable from a distant station, substantially
 70 as described.

14. A selective telephone system comprising two line-wires, bridges therebetween at the several stations, an electromagnet in each bridge, a primary talking-circuit at the
 75 bridge at each station having a break therein, and having also two parallel branches, each having a break therein, means for closing the former break by the energizing of the magnet, means for closing one of the latter breaks
 80 by the removal of the receiver from its hook, means for closing the other of the latter breaks controllable from a distant station, a bell-ringing circuit parallel with the primary talking-circuit and a common battery therein,
 85 and a shunt through the bell-magnet coils closed by the removal of the receiver from its hook, substantially as described.

15. In a selective telephone system, a shunt around the receiver, a circuit passing in parallel through the bell-magnet coils and
 90 the transmitter, and means for closing said circuit and opening the shunt, substantially as described.

16. A selective telephone system comprising in each telephone a button-carrier having
 95 fixed buttons thereon, one for each telephone of the system, a corresponding series of push-buttons, means whereby the pressure upon any push-button locks it to its corresponding
 100 stationary button thereby closing a break in a circuit to place the telephone on the line, and means for completing the circuit, substantially as described.

17. A selective telephone system comprising in each telephone a button-carrier having
 105 fixed buttons thereon, one for each telephone of the system, a corresponding series of push-buttons, means whereby the pressure upon any push-button locks it to its corresponding
 110 stationary button, thereby closing a break in a circuit to place the telephone on the line, and means, controlled by the pressure of the button, for subsequently completing the line through another telephone of the system,
 115 substantially as described.

18. A selective telephone system comprising in each telephone a button-carrier having
 120 fixed buttons thereon, one for each telephone of the system, a corresponding series of push-buttons, means whereby the pressure upon any push-button locks it to its corresponding
 125 stationary button thereby closing a break in a circuit to place the telephone on the line, and means, controlled by the pressure of the button, for closing in the telephone selected
 a break in the line, substantially as described.

19. A selective telephone system comprising in each telephone a button-carrier having
 130 fixed buttons thereon, one for each telephone of the system, clockwork, a rotating contact-

maker driven thereby, a series of contacts corresponding to the other telephones, and successively touched by said contact-maker, wires from said contacts to said fixed buttons, a series of push-buttons corresponding to the stationary buttons, means for contacting each push-button with its corresponding stationary button, thereby closing a break in a circuit to place the telephone on the line, and means for completing said circuit, substantially as described.

20. A selective telephone system comprising telephones each having a button-carrier with a metallic rim, buttons carried by said carrier, clockwork mechanism, contact-pins corresponding to the other telephones and to the buttons, wires from said contact-pins to the buttons, a wire from the clockwork to the button-carrier, means whereby the movement of the button-carrier closes a break in a circuit, means whereby the contacts of the device with the pins successively close circuit-breaks, and means whereby said closures control the talking-circuit, substantially as described.

21. A selective telephone system comprising two line-wires one of them connected to the ground, telephones each having clockwork mechanism, all of said mechanisms revolving synchronously, a wheel revolved by said clockwork mechanism, a stop-pin thereon, a hook engaging said stop-pin, a magnet, and an armature therefor operatively connected with said hook, a bridge between the line-wires, means for connecting the other line-wire to the ground, and means whereby the movement of the clockwork mechanism controls the talking-circuit, substantially as described.

22. A selective telephone system comprising two line-wires one of them connected to the ground, telephones each having clockwork mechanism, all of said mechanisms revolving synchronously, a wheel revolved by said clockwork mechanism, a stop-pin thereon, a hook engaging said stop-pin, a magnet, and an armature therefor operatively connected with said hook, a bridge between the line-wires, means for connecting the other line-wire to the ground, means for arresting the wheels after they have advanced a short distance, and means operatable only in the telephone in which the second line-wire was connected to the ground for restarting said wheels, substantially as described.

23. In an apparatus of the character described, a bell-circuit, a circular series of contact-pins, a wire connecting one of said pins with the bell-circuit to close the same, push-buttons, wires connecting said contact-pins with the respective push-buttons, and a re-

volving contact-maker making contact with said pins, substantially as described.

24. In an apparatus of the character described, the combination of a bell-circuit, magnets the energizing of which closes the bell-circuit, and means operated by the taking down of the receiver for preventing the bell ringing in said circuit, said means comprising a shunt through the coils of the magnet, substantially as described.

25. In an apparatus of the character described, the combination of a bell-circuit, magnets, the energizing of which closes said circuit, a receiver, an automatic hook therefor, and a shunt through the coils of the magnet, said shunt being closed by the rise of the automatic hook, substantially as described.

26. In an apparatus of the character described, the combination of two line-wires, a shunt for the receiver at each telephone in the system, means operated by the calling subscriber for opening said shunt, a series of selective devices at each telephone of the system, means operated by the calling subscriber on selecting one of said devices for opening the shunt in a selective telephone of the system, and means whereby the opening of the shunt in any other telephone is automatically prevented simultaneously with the opening of the shunt in the selected telephone, substantially as described.

27. In an apparatus of the character described, the button-carrier having a yoke-shaped rim, said rim having lateral arms suitably guided in the movement of the button-carrier, buttons carried by said carrier, and means operated by the closure of a circuit through a selected button of the series for controlling the line, substantially as described.

28. In an apparatus of the character described, the combination of the push-buttons and the flanges, the stationary buttons also having flanges, the button-carrier carrying said stationary buttons, said stationary buttons being so located with reference to the push-buttons that when any one of the latter is pushed in, and the button-carrier is moved from an inoperative to an operative position the flange of the push-button interlocks with the flange of the corresponding stationary button and prevents withdrawal of the push-button, substantially as described.

In witness whereof we have hereunto set our hands in the presence of two subscribing witnesses.

N. S. McKINSEY.
A. R. NELSON.

Witnesses:

FRANCIS M. WRIGHT,
BESSIE GORFINKEL.