R. C. M. HASTINGS.

TELEPHONE CALL SYSTEM.

APPLICATION FILED DEC. 9, 1915.

1,345,852.

Patented July 6, 1920.

2 SHEETS—SHEET 1.

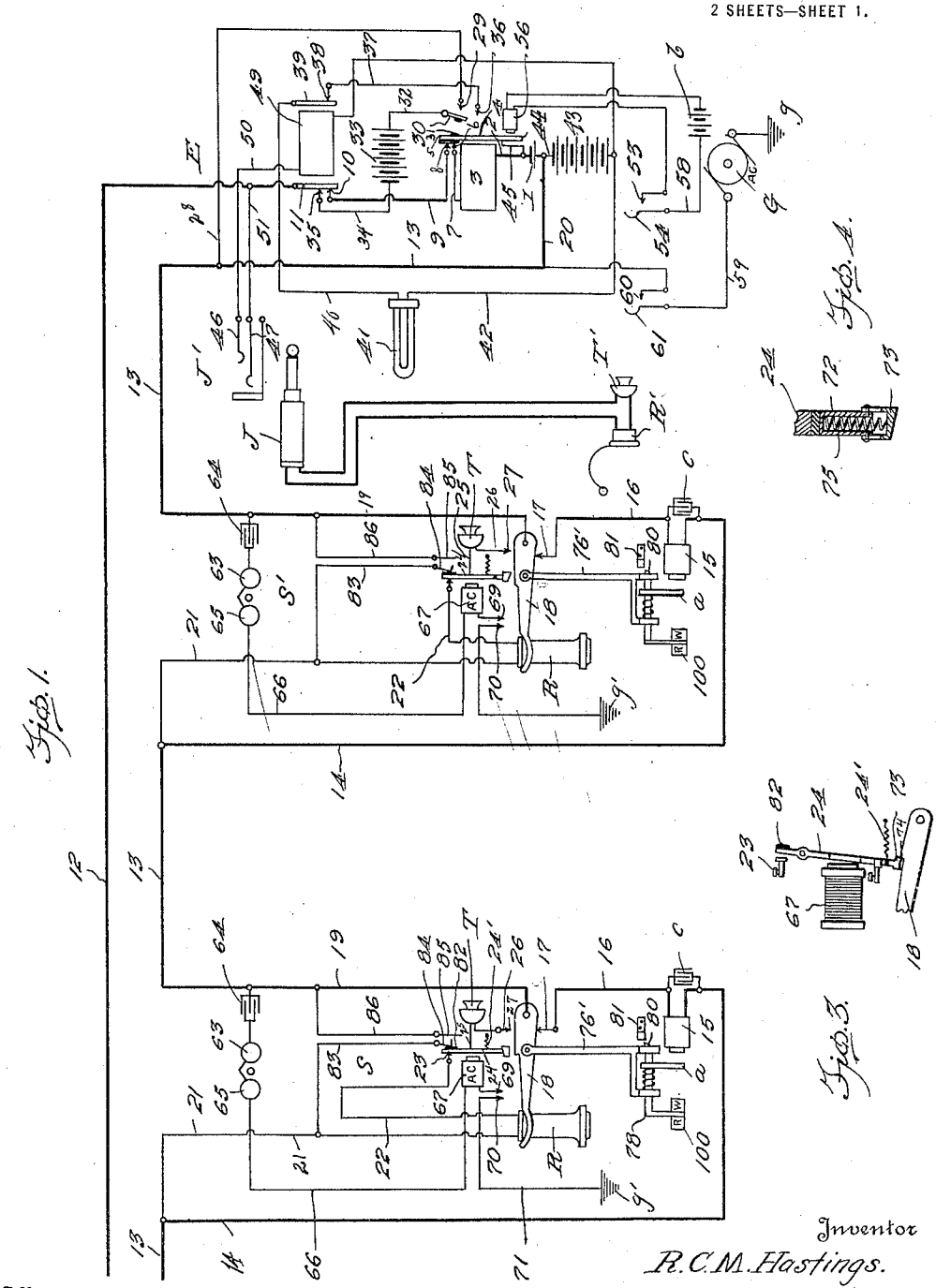


Fig. 1.

Fig. 4.

Fig. 3.

Witnesses

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M. E. Moore.

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R. C. M. Hastings.

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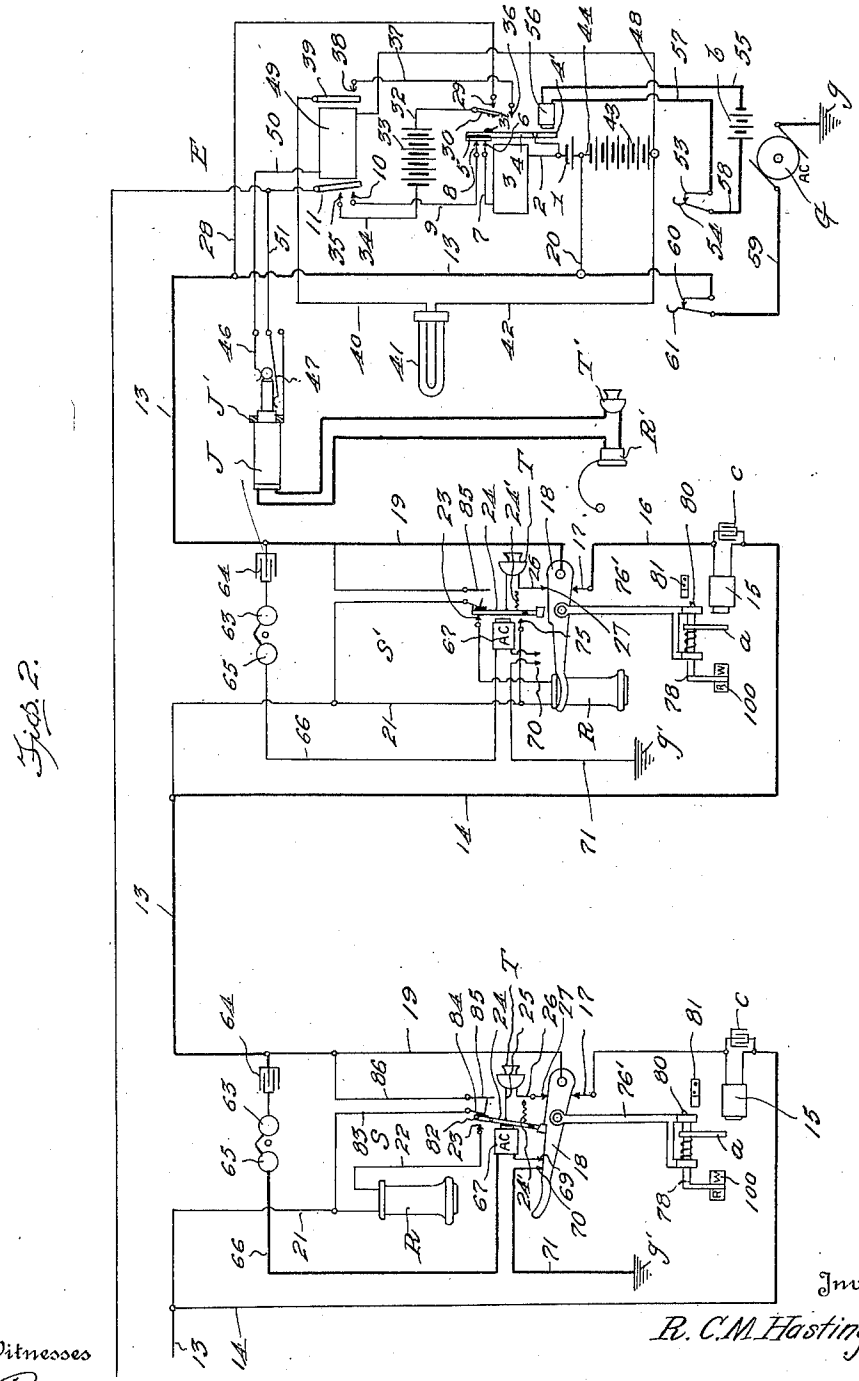


Fig. 2.

Witnesses

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UNITED STATES PATENT OFFICE.

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TELEPHONIC CALL SYSTEM.

1,345,852. Specification of Letters Patent. Patented July 6, 1920.

Application filed December 9, 1915. Serial No. 65,944.

To all whom it may concern:

Be it known that I, RUBEN C. M. HASTINGS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Telephonic Call Systems, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates to improvements in telephonic call systems, one object of the invention being the provision of a telephone system adapted to be used more particularly by telegraph companies in congested localities, such as towns and cities, and whereby the subscriber, or calling station, will be automatically, by the lifting of the receiver off the hook, connected to and signal the receiving station, the remaining substations being locked from the line until after the receiver has been restored to the hook, thus insuring an absolute private line for calling the receiving station for the delivery of messages to be transmitted by telegraph, or for calling of a messenger.

A further object of the present invention is the provision of means, whereby should the calling subscriber neglect to place the receiver upon the hook, such substation may be signaled from the receiving station by an audible alarm, the signal or audible alarm only being operable when the receiver is left off the hook and the hook elevated.

A still further object of the present invention is the provision of means for shunting a substation in which the receiver is left from the hook and where the subscriber may be absent, thus not interfering with the service to the remaining subscribers.

A still further object of the present invention is the provision of a receiver hook lock, which, due to the elevation of the hook in the calling substation and the connection of the common battery to the talking circuit, will cause the locking of all of the remaining receiver hooks, thus establishing an uninterrupted talking circuit from the calling substation to the receiving station, and guaranteeing absolute privacy until the receiver in the calling substation has been placed upon the hook, or such substation has been shunted from the line.

With the foregoing and other objects in view and which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings:—

Figure 1 is a diagrammatic view of the complete system, minus the telephone and receiver connection at the receiving station, showing in heavy lines the flow of current under normal conditions.

Fig. 2 is a similar view showing in heavy lines the flow of the signal and shunting current, when the receiver in a substation is left off the hook, and the receiving station has operated the signaling mechanism.

Figs. 3 and 4 are detail views of the mechanism for accomplishing the shunting of the calling substation when the subscriber persists in leaving the receiver off the hook or is absent after leaving the receiver off the hook.

Referring to the drawings, and more particularly to Fig. 1, the numeral 1 designates a low voltage battery employed to normally energize the series circuit of the present calling system, so that any one of the substations S or S′ can signal the receiving station E for communicating therewith.

The current in this instance will follow the heavy lines of Fig. 1, and complete the circuit; to-wit:—the battery 1, the conductor 2, the electromagnet 3, the conductor 7, the contact point 6, the bridging switch or plate 5, the contact point 8, the conductor 9, the contact point 10, the armature 11, the line conductor 12, the return line conductor 13, the conductor 14, the electromagnet 15, the conductor 16, the contact point 17, the receiver hook 18 in all substations, the conductor 19, the conductor 13, and the conductor 20.

Thus during the energization of the electromagnet 3, the armature 4 will be held in the position as shown in Fig. 1, bridging its contacts 6 and 8, so that a low voltage current is permitted to flow as indicated. This voltage is insufficient, however, to energize the electromagnet 15 of the various substations, merely being sufficient to energize the low voltage coil 3, and thus maintain the armature 4 as shown.

When the receiver, as for instance in sub-

station S, has been removed from the hook, the hook will rise and thus disengage the contact 17, so that the coil 3 will become deënergized instantly and current will flow and include the receiver R, the conductor 22, the contact 23, the armature switch 24, the conductor 25, the transmitter T in the substation S, the conductor 26, the contact point 27, the receiver hook 18, and the conductor 19, the current flowing around the substation S′ through the conductor 14, the electromagnet 15, the conductor 16, the contact point 17, and the conductor 19 of such substation to the line 13.

As soon as the armature 4 was released by the coil 3, the block of insulation 31 carried by the armature 4 engaged the switch 30 and caused it to engage the contact 29 so that the battery 33 was connected to the line, and it being of greater voltage than the battery 1, the electromagnet 15 in substation S′, was energized sufficiently to operate the armature *a* of the receiver hook lock 78, placing the bolt 80 under the lug 81, and thus locking through the rod 76′, the receiver hook 18 of the substation S′ in its lowermost position. This is accomplished in the following manner, through the circuit including the battery 33, the conductor 34, the contact 35, the armature 11, the conductors 12 and 14, the receiver hook lock actuating electromagnet 15 of substation S′, the conductor 13, the conductor 28, the contact 29, the switch 30 and the conductor 32.

At the same time that this circuit was established, the armature switch 4, engaged the contacts 36, and closed the following circuit that includes the battery 43, the conductor 44, the battery 1, the conductor 45, the switch 4, the contact 36, the conductor 37, the contact 38, the armature 39, the conductor 40, the signal lamp 41, and the conductor 42. Thus the signal lamp 41, at the receiving station was energized, and the operator was signaled at such time to indicate that a substation was calling to deliver a message.

The receiving station operator upon receiving a signal, inserted the jack plug J in the socket J′, and thus the contacts 46 and 47 were closed so that the operator's receiver R′ and the transmitter T′ were properly connected to the line for communication. This connection caused the energization of the electromagnet 49, which in turn attracted both armatures 11 and 39, disconnecting the contacts 10, 35 and 38, respectively, so that the battery 33 was disconnected from the line and the batteries 44 and 1 were disconnected from the signal lamp circuit at the receiving station.

The substation S is thus connected for telephonic communication with the receiving station through the following circuit, to-wit:—the battery 43, the conductor 48, the electromagnet 49, the conductor 50, the contact 46, the receiver and transmitter at the receiving station, the contact 47, the conductor 51, the line conductor 12, the return line conductor 13, the conductor 21 of the substation S, the receiver R, the conductor 22, the contact 23, the switch 24, the conductor 25, the transmitter T in substation S, the conductor 26, the contact 27, the elevated receiver hook 18 in substation S, the conductors 19 and 13, the conductor 14 of substation S′, the electromagnet 15 thereof, the conductor 16, the contact 17, the receiver hook 18, which is now locked in its lowermost position, the conductor 19, the return conductor 13, and the conductor 20.

Thus the batteries 33 and 43 constitute a means for energizing the electromagnets 15 in the non-calling substations, so as to properly operate the receiver locks and hold the receivers in their lowermost positions, while one of the substations is in communication with the receiving station.

When the calling substation has finished its conversation with the receiving station and has placed its receiver R upon its hook, and the operator at the receiving station has removed the jack plug from the socket, the switch 53—54 is momentarily closed, but before this was accomplished, the system returned to normal condition, except as to the armature switch 4. As soon as the switch 53—54 was closed, however, the following circuit was closed, that is the battery *b*, the conductor 55, the electromagnet 56, the conductor 57, the switch 53—54, and the conductor 58. Thus the electromagnet attracted the switch armature 4, and placed the plate 5 to bridge the contacts 6 and 8, while it opened contacts 29 and 30, and 36.

Should the subscriber at substation S, however, fail to place the receiver upon the hook, and thus leave all of the non-calling substations with their receiver hooks locked, the operator at the receiving station E, closes the switch 60—61. This switch 60—61 may be operated independently, or either simultaneously with, or shortly after the closing of the switch 53—54, it being possible to operate these when the jack plug is withdrawn from the socket.

The circuit closed when the switch 60—61 is closed, includes the ground *g*, at the receiving station, the alternating current generator G, the conductor 59, the switch 60—61, the conductor 13, the conductor 19 of the substation S′, the receiver hook 18, the contact 17, the conductor 16, the condenser *c* that is permeable to alternating, but impermeable to direct current, the conductor 14, the continuation of the line conductor 13, the condenser 64, the conductor 63, the call-alarm 65, the conductor 66, the electromagnet 67, the conductor 68, the contacts 69 and 70, which are bridged by the re-

ceiver hook 18 in substation S, the conductor 71 and the ground g'. Thus the alarm 65 in substation S is energized and will notify the subscriber thereat that the receiver is off the hook.

Simultaneously with the energization of the electromagnet 67, the armature switch 24 is moved to the position as shown in Fig. 3, and the contact at 23 is opened, while the shunting switch 84—85 is closed, the insulation button 82 carried by the switch 24 engaging and closing the switch 84—85, so that both the transmitter and receiver, and in reality the complete substation is shunted from the line. The shunting switch 84—85 is connected by the conductor 83 to the conductor 21, and by the conductor 86 to the conductor 19, such points of connection being beyond the connections of the receiver and the receiver hook to the line, but at such a position as to permit of the operation of the alarm 65, which the operator may operate at pleasure to notify the subscriber that his receiver is off the hook and that his instrument is shunted from the line.

By the construction as shown in Figs. 3 and 4, the elevated receiver hook 18 is constructed and arranged to assist in holding the switch 24 in the above position, the lower end of the switch 24 which is connected to the spring 24', being insulated from the body thereof and carries the sleeve 72, to which is slidably connected the locking member 73. This member 73 is disposed for engagement with the projection 74 of the hook 18, the spring 75 normally projecting the locking member 73 to permit the necessary sliding thereof upon the upper surface of the hook.

In this system where found desirable and necessary, condensers, induction coils and inductive resistances may be employed, while where electromagnets are shown, it may be found desirable to employ electric motors, direct current motors and alternating current motors.

Carried by and operable with the lock 78 is a visual signal 100, which when the same is in normal position with the hook not locked, will display the letter W, which indicates that the line is "not busy" or "free," while when the letter R is displayed, the line is "busy." In lieu of the letters various colors as "white" and "red" may be employed.

While herein is described the invention in detail, and is illustrated a combination embodying various features, which may at times be used to advantage, it is not the desire or intention of claimant to be limited to the particular arrangement shown, or to any arrangement embodying the various auxiliary features except as particularly pointed out in the appended claims.

At the time that the switch 60—61 was operated to shunt the substation having the receiver off the hook from the line, the operator at the receiving station E also operated the switch 53—54, which caused the deënergization of the electromagnets in all other substations, and thus released the locks so that all substations were restored, and the signals 100 indicated that the line was free.

What I claim, as new, is:—

1. In a telephonic call system, a receiving station, and a plurality of substations connected electrically for the transmission of intelligence, a receiver hook in each substation, a receiver hook locking device in each substation, means in each substation controlled by the receiver hook, whereby the elevation of the receiver hook in a calling substation will cause the operation of the locking devices in the non-calling substations to lock the receiver hooks from elevation, said receiver hook locking device constituting a rod carried by the receiver hook, and an electromagnetically and spring actuated means carried upon the lower end thereof and means in the path thereof for locking and releasing the rod.

2. In a telephonic call system, a receiving station, and a plurality of substations connected electrically for the transmission of intelligence, a receiver hook in each substation, a receiver hook locking device in each substation, means in each substation controlled by the receiver hook, whereby upon the elevation of the hook in one substation the locking devices will be operated in the other substations to hold the hooks against elevation, and means controlled from the receiving station for shunting the calling substation from the line until the receiver is placed upon the hook.

3. In a telephonic call system, a receiving station, and a plurality of substations connected electrically for the transmission of intelligence, a receiver, a transmitter and a receiver hook in each substation, a receiver hook locking device in each substation, a receiver hook controlled device in each substation for controlling the locking devices, whereby upon the elevation of the receiver hook in one substation the locking devices in all other substations are operated to lock the respective receiver hooks, said locking devices being restored when the receiver is placed upon the hook, and means at the receiving station for shunting the transmitter and receiver in the calling substation from the line when the receiver is off the hook in such calling substation.

4. In a telephonic call system, a receiving station, and a plurality of substations connected electrically for the transmission of intelligence, a receiver hook in each substation, a receiver hook locking device in each substation, means in each substation

controlled by the elevation of the receiver hook whereby the elevation of the hook in one substation causes the operation of the locking devices in the remaining substations to lock the latter receiver hooks from elevation, and means controlled from the receiving station for shunting the instrument in the calling substation from the line and locking the shunt until the receiver is placed upon the hook.

5. In a telephonic call system, a receiving station, and a plurality of substations connected electrically for the transmission of intelligence, a receiver hook in each substation, a receiver hook locking device in each substation, means in each substation controlled by the receiver hook whereby the elevation of the hook in one substation will cause the operation of the locking devices in the remaining substations to lock such hooks against elevation, a signal device in the receiving station operated simultaneously with the elevation of the hook in the calling substation, and means controlled from the receiving station for shunting the instrument in the calling substation from the line and locking the shunt until the receiver is placed upon the hook.

6. In a telephonic call system, a receiving station and a plurality of substations connected electrically for the transmission of intelligence, a signal device in each substation for calling attention to the fact that the receiver is off the hook, said signal device being operable only when the receiver is off the hook, and means mounted in the receiving station for actuating the signal device when the receiver is off the hook.

7. In a telephonic call system, a receiving station and a plurality of substations connected electrically for the transmission of intelligence, a signal device in each substation for calling attention to the fact that the receiver is off the hook, said signal device being operable only when the receiver is off the hook, a shunt connection in each substation, means in each substation operable in consonance with the signal device to shunt the substation from the line, and means mounted in the receiving station for actuating the signal device and the shunt connection when the receiver is off of the hook.

8. In a telephonic call system, a receiving station and a plurality of substations connected electrically for the transmission of intelligence, a receiver hook in each substation, a signal device in each substation for calling attention to the fact that the receiver is off the hook, said signal device being operable only when the receiver is off the hook, a shunt connection in each substation, such connection being connected to the line around the substation, means in each substation operable in consonance with the signal device to operate the shunt connection whereby the substation is shunted from the line, said means coöperating with the hook to hold the shunt connection closed as long as the hook is elevated, and means mounted in the receiving station for actuating the signal device and shunt connection operator when the receiver is off the hook.

9. In a telephonic call system, a receiving station and a plurality of substations connected electrically for the transmission of intelligence, a call signal in the receiving station, a receiver, a transmitter and a receiver hook in each substation, an electrically operated receiver hook lock to hold each receiver hook against elevation, and means disposed in each substation and operated due to the elevation of the hook in a calling substation for operating the call signal at the receiving station and the receiver hook locks in the non-calling substations, said receiver hook lock including a rod connected to the hook, a spring actuated slidable member carried thereby, a fixed member in the path thereof, and an electromagnet for actuating the sliding member in opposition to the spring.

10. In a telephonic call system, a receiving station and a plurality of substations connected electrically for the transmission of intelligence, a call signal in the receiving station, a receiver, a transmitter, and a receiver hook in each substation, an electrically operated receiver hook lock in each substation, means disposed in each substation and operated due to the elevation of the hook in a calling substation for operating the call signal and the receiver hook locks in the remaining substations, and a signaling device mounted in each substation and controlled from the receiving station, said signaling device being inoperative when the receiver is upon the hook, and operative when the receiver is off the hook and the hook is elevated, whereby a substation with the receiver off the hook may be signaled.

11. In a telephonic call system, a receiving station and a plurality of substations connected electrically for the transmission of intelligence, a transmitter, a receiver, and a receiver hook at each substation, a signal device located in the receiving station, an electrically operated receiver hook lock to hold the receiver hook in each substation, means controlled by the elevation of the receiver hook for operating the signal device at the receiving station and for operating the receiver hook locks in the remaining substations, means mounted in each substation and controlled from the receiving station for signaling a substation in which the receiver is off the hook, said signaling device being inoperative when the receiver is upon the hook, the elevation of the hook producing an operable connection with the receiving station, and means in the receiving sta-

tion for energizing the signaling device in the substation.

12. In a telephonic call system, a receiving station and a plurality of substations connected electrically for the transmission of intelligence, a receiver hook, a receiver hook locking device, and means in each substation controlled by the receiver hook, whereby the elevation of the hook in one substation will cause the operation of the locking devices in the remaining substations to lock the hooks against elevation, said locking devices each consisting of a rod carried by the hook, an electromagnetically and spring actuated means carried by the rod and in the path for locking and releasing the rod, and a signal device to indicate the position of the latter means.

13. In a telephone system, electrically connected receiving- and sub-stations; each substation including a receiver hook, a locking member bodily and movably carried by the receiver hook and having an armature, and lock operating means including an electromagnet coöperable with the said armature, said means being controlled by the elevation of the receiver hook in any substation to energize the electromagnets of the remaining substations.

14. In a telephone system, electrically connected receiving- and sub-stations, each substation including a receiver hook, a receiver, a signal operable only when the receiver hook is elevated, and means for shunting the substation when the receiver is left off of the hook.

15. In a telephone system, electrically connected receiving- and sub-stations, each substation including a receiver hook, a receiver, a transmitter, a signal operable only when the receiver hook is elevated, and means for shunting the receiver and transmitter when the receiver is left off of the hook.

16. In a telephone system, electrically connected receiving- and sub-stations, each substation including a receiver hook, a receiver, a transmitter, a signal operable only when the receiver hook is elevated, and means for shunting the instruments when the receiver is left off of the hook; and means for operating the signal and shunting means from the receiving station.

17. In a telephone system, electrically connected receiving- and sub-stations, each substation including a receiver hook, a receiver, a transmitter, a signal operable only when the receiver hook is elevated, and means for shunting the receiver and transmitter from the line and when the receiver is off of the hook, and means for simultaneously operating the signal and shunting means from the receiving station, said shunting means and the elevated receiver hook coöperating to hold the shunting means operative during the elevation of the hook.

18. In a telephone system, electrically connected receiving- and sub-stations, each sub-station including a receiver hook, a receiver, a transmitter, and means for shunting the receiver and transmitter when the receiver is left off the hook; and means for operating the shunting means from the receiving station.

In testimony whereof I affix my signature.

RUBEN C. M. HASTINGS.