

No. 661,173.

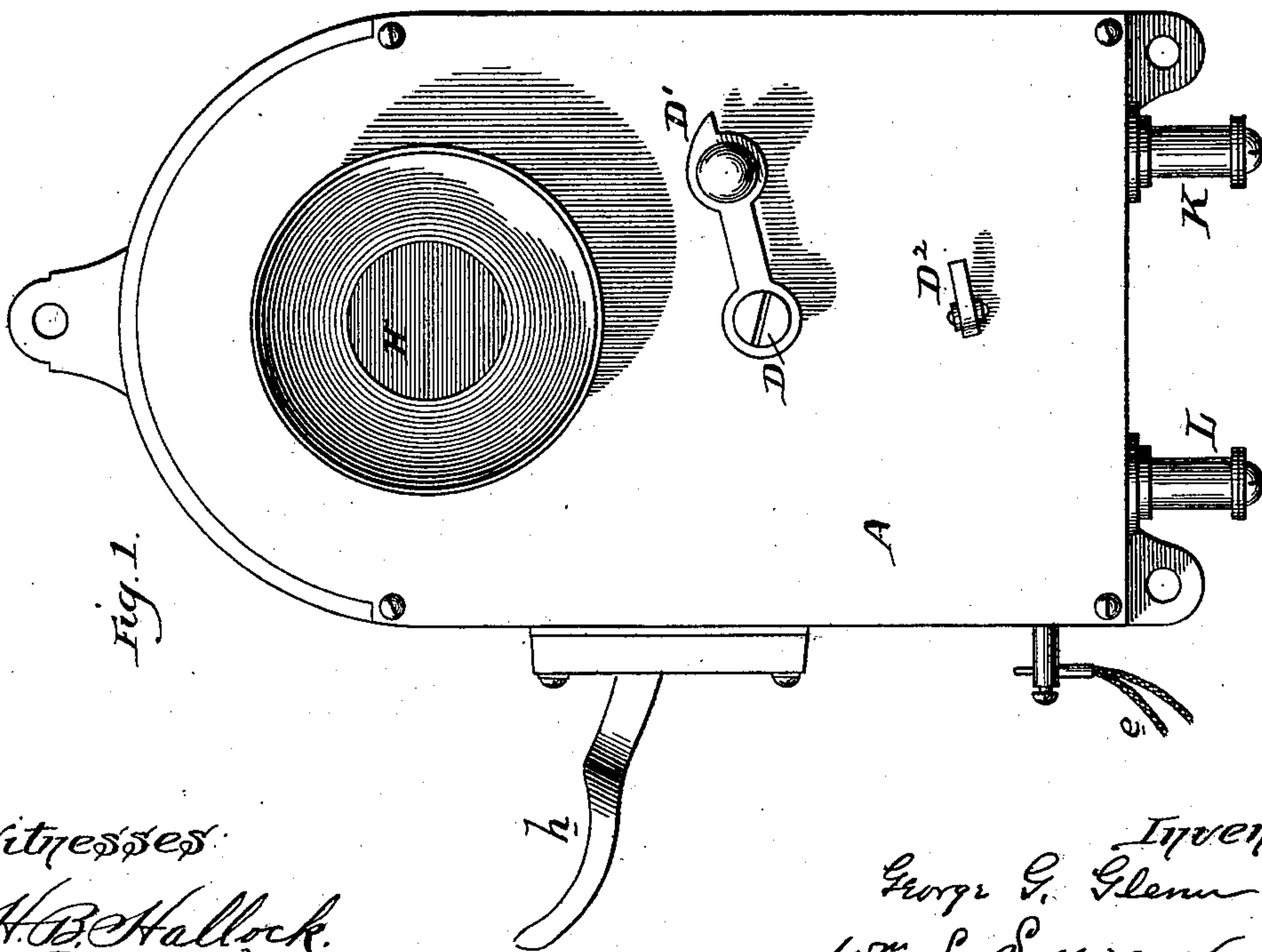
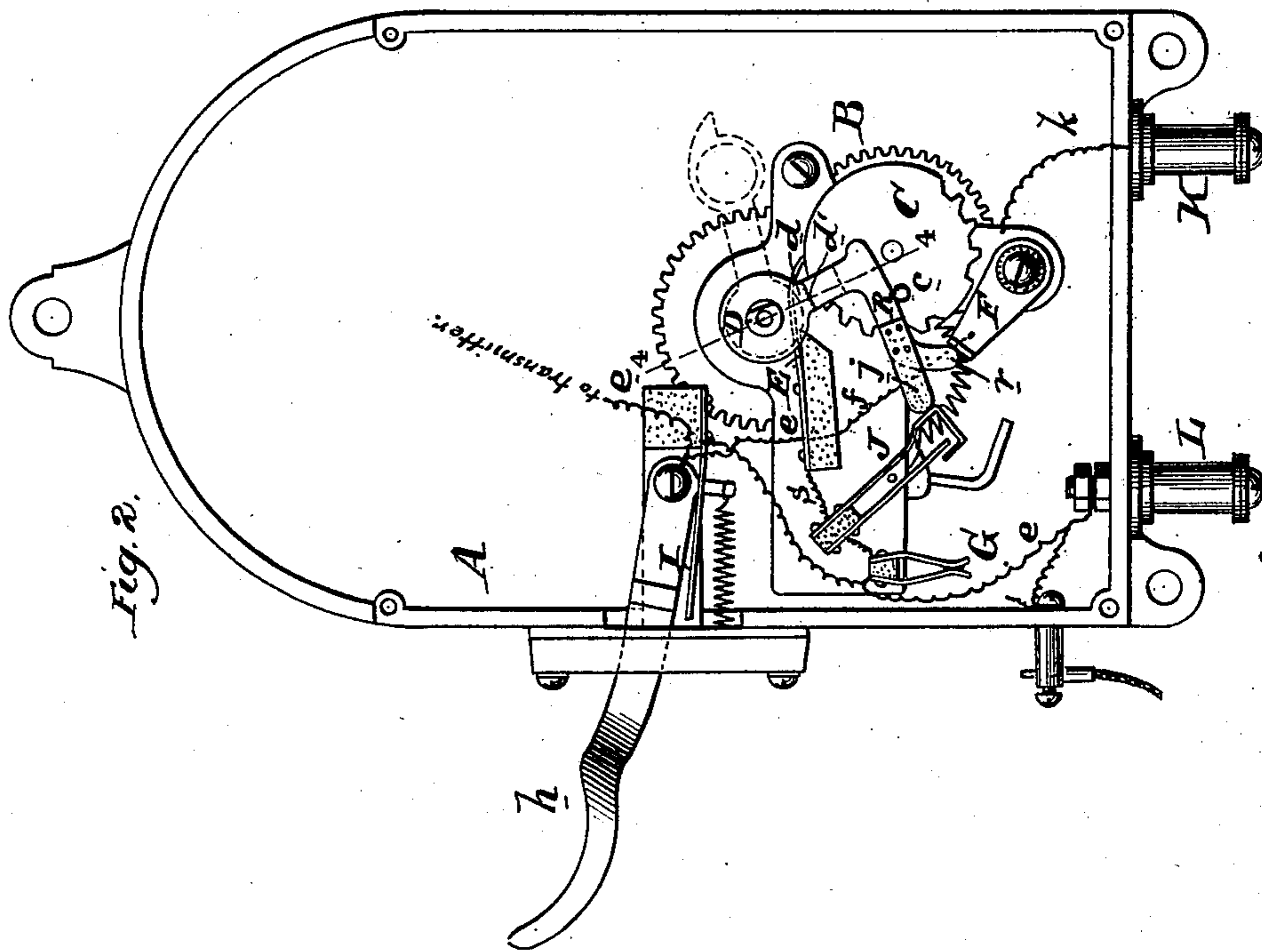
Patented Nov. 6, 1900.

G. G. GLENN & W. S. SULLIVAN.  
ELECTRIC CALL OR SIGNAL BOX.

(Application filed Apr. 20, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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H. B. Hallock.  
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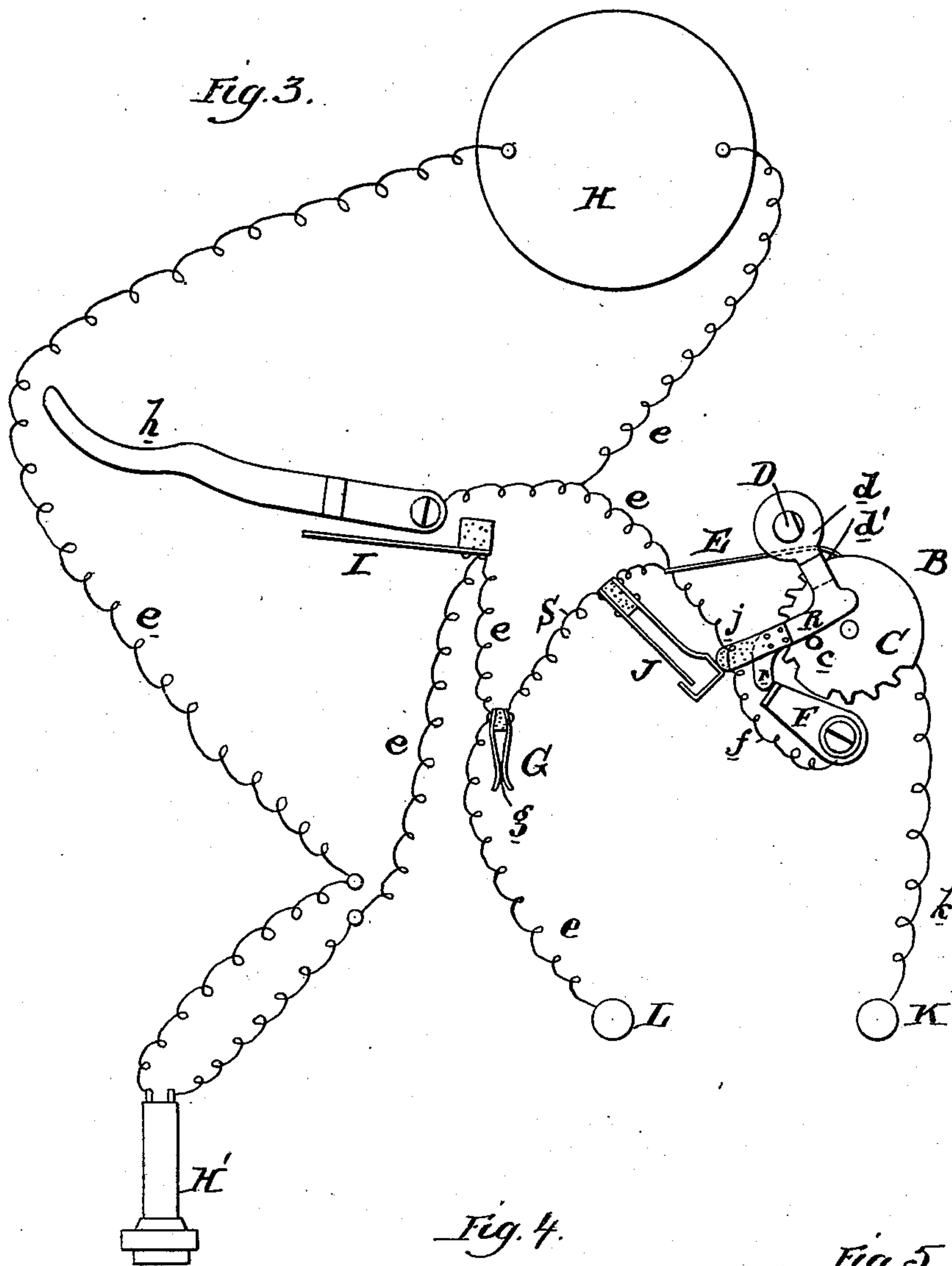
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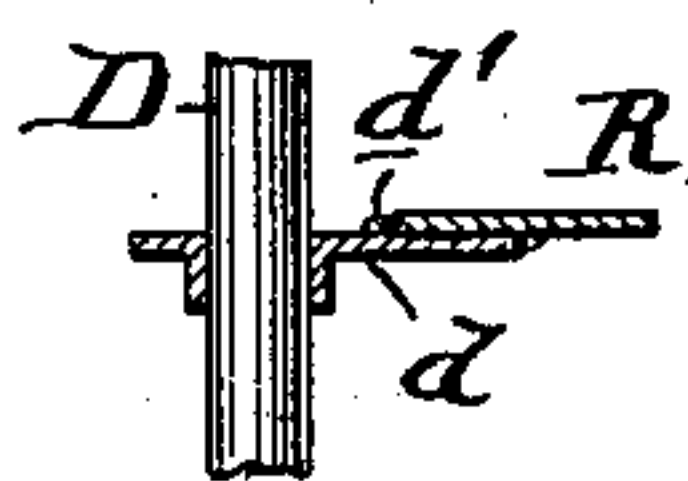
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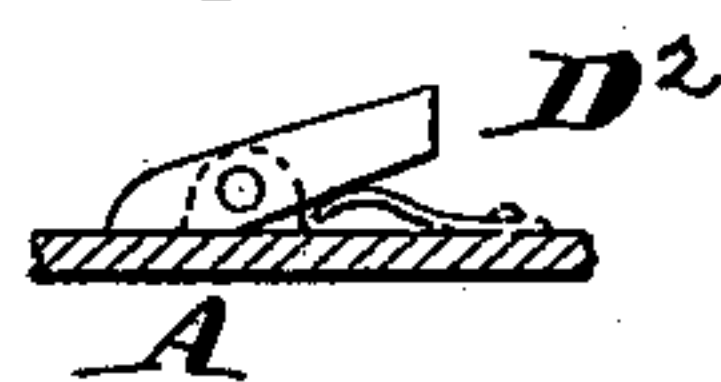
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*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

GEORGE G. GLENN AND WILLIAM S. SULLIVAN, OF PHILADELPHIA,  
PENNSYLVANIA.

## ELECTRIC CALL OR SIGNAL BOX.

SPECIFICATION forming part of Letters Patent No. 661,173, dated November 6, 1900.

Application filed April 20, 1900. Serial No. 13,566. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE G. GLENN and WILLIAM S. SULLIVAN, of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Electric Call or Signal Boxes, of which the following is a specification.

Our invention has reference to electric call or signal boxes; and it consists of the improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of our invention is to provide a suitable signal or call box adapted to be placed in offices and residences and connected by circuits with a central station which shall combine the call system, such as employed in district-messenger service, with a telephonic system and fire-alarm system, whereby the same circuits and apparatus are employed and the call system may be put into operation by manual power, and when the line returns to its normal electrical condition the telephone may be used to impart the special message, but otherwise is normally out of circuit during the sending of the call impulses. Furthermore, the said structure is so arranged that excessive heat automatically sends into the central station a series of repetitions of the call-signal without impairing the use of the telephone apparatus.

In carrying out our invention we provide a spring-actuated call mechanism in circuit with the line-wire which shall upon being put into motion produce a series of predetermined interruptions in the circuit, the spring device being wound sufficiently tight to obtain a series of revolutions of the notched signal-wheel if liberated to secure repetition of the signal, and the stop which limits its revolutions under ordinary conditions being connected by fusible solder, so as to liberate the signal-wheel in case of excessive heat due to fire. The continued revolution of the wheel will thus send in repeated signals in rapid succession. In connection with this operation of the apparatus we employ a circuit-opening switch normally held in a closed condition by fusible solder, but opened under spring action by the application of heat, the object of

which is to prevent short-circuiting of the telephonic apparatus where the fire-signal is automatically sent in to the central station. Combined with this structure is a telephone receiver and transmitter of low resistance connected in series with each other and with the signal device and provided with a spring-switch adapted to be held closed by the weight of the receiver, so that normally the receiver and transmitter are short-circuited, so as to leave the line-circuit with as little resistance and self-inductive devices as possible, as is desirable on account of there being usually a large number of the signaling devices in series in the same circuit. In addition to the spring-actuated switch operated by the weight of the receiver we prefer an additional shunting-switch, which closes the line-circuit and shunts the receiver and transmitter when the signal-lever is moved by hand, said switch being to prevent the heavy interrupted line-currents being forced through the sensitive transmitter when sending the signal, even though the operator inadvertently had the receiver off the spring-switch. This precaution is twofold—first, it keeps an abnormal resistance out of the line, and, secondly, it prevents the large current being sent with strong impulses through the powdered carbon of the transmitter, and thus obviates the danger of solidifying or packing it. The currents in systems of this character are quite considerable in amperage, and these, if interrupted through the magnets of the telephone-receiver and the receiving-machine at the central station, would produce extra currents having sufficiently-increased tension to cause an excessive flow through the transmitter and would soon injure them; but by employing the additional shunting-switch such a condition cannot occur. This same precaution guards the transmitters from the interposition of the extra electromagnetic devices of other subscribers in the line whose receivers were accidentally omitted to be hung up, so that the possible saving from this extra current might be far greater than the trouble which would result from the extra current due to a single instrument. Our invention comprehends these various features separately and combined, as will be more fully



understood by reference to the accompanying drawings, in which—

Figure 1 is an elevation of our improved signal-box. Fig. 2 is an elevation of the same with the cover and transmitter removed. Fig. 3 is a diagram illustrating various circuits. Fig. 4 is a section on line 4-4 of Fig. 2; and Fig. 5 is a sectional elevation of a portion of the case, showing the crank-stop.

A is the box or case and is provided with a spring-actuated clockwork B, of usual construction, such as employed in call-boxes. This clockwork is provided with a circuit-interrupter wheel C, having notches upon its periphery, which notches in passing under a contact-finger E interrupt the circuit for the purpose of imparting definite signals over the line to the receiving instrument at the central station. The interrupter-wheel C is provided with a pin *c*, which normally rests against a stop-arm R. This arm in our improved apparatus is connected to an arm *d* on the power-spindle D of the clockwork by a fusible soldered joint *d'*. The free end of the arm R under normal conditions rests against an insulated abutment F. One of the binding-posts K, connecting with the line, is electrically connected with the clockwork B by a wire *k*. The current so led to the clockwork passes through the interrupting-wheel C and thence by the spring-contact E to the circuit *e*, leading to the telephone-transmitter H, the said circuit *e* also including the telephone-receiver H' in series with the transmitter and finally connecting with the other binding-post L, leading to the line. The circuit *e* between the transmitter and the interrupter is connected with the spring-switch *h*, which normally supports the receiver. The circuit *e* between the receiver and the binding-post L is connected with the spring-contact I, which is adapted to coact with the switch *h*, so as to short-circuit the line and put the transmitter and receiver into a shunted circuit when the receiver is normally hung on the switch and out of use.

J is an additional shunting-switch in a shunt-circuit S around the telephone instruments and the spring-switch device *h* I. The shunt-switch J normally closes the circuit S when left to itself, but is held open when the instrument is at rest or when the telephone apparatus is in use. It will be seen that the stop-arm R is provided with a projection *j*, of insulating material, which presses upon the shunt-switch J and keeps it open. When the shaft D is turned to put the interrupter-wheel C in rotation, the projection *j* liberates the shunt-switch J and closes the shunt-circuit S. When the shaft D is then liberated, the interrupter-wheel C rotates and sends a series of interrupted currents over the line, said currents passing through the shunt-circuits S and making it impossible for said currents to be forced through the transmitter and receiver, even though the receiver should be carelessly or accidentally removed from

the switch *h*. The average person who would use an instrument of this kind would be apt to take the receiver down simultaneously with pulling the hand-crank D' to start the interrupter-wheel C, and if this were done without the use of the shunting-switch J the heavy current of the line would be interrupted through the delicate carbon-powder of the transmitter H and these impulses would be increased by the extra current due to the electromagnet of the telephone-receiver and the receiving instrument at the central station. The shunting-switch absolutely prevents such a condition occurring. As soon as the signal is sent the end *r* of the arm R rests against the insulated stop F, and this insures a good electrical connection from the circuit *e* to the clockwork, as said insulated stop F is connected with the circuit *e* at the spring contact-finger E by the wire *f*. This circuit is broken whenever the interrupting-wheel C is in operation.

G is a switch in the shunt-circuit S, normally closed by fusible metal *g*, with which the free ends of the spring-fingers are held together. In case of sufficient heat to melt the fusible solder-joint *d'*, so as to cause the arm R to be liberated, and thus put the interrupter-wheel into continuous rotation, the fusible switch G will open and therefore automatically open the shunt-circuit S at the same time that the shunt-switch J closes the circuit due to the removal of the arm R, which formerly kept it open. In this manner the fire-signal is sent into the central station and the telephonic apparatus is still maintained in operative condition, so that if an opportunity permits its use it will be found in proper electrical connection for transmitting instructions or information. It will be understood, of course, that in this case the switch *h* I will maintain the telephonic instruments in shunted relation, so that the impulses due to the interrupter-wheel will not be sent over the transmitter; but even if the receiver were off the arm of the switch *h* this abnormal condition would only occur so very seldom that no excessive precaution is necessary to guard against it. Under ordinary conditions of operation the crank D' is turned down until it strikes the stop D<sup>2</sup>, and this starts the clockwork sufficiently to enable the interrupter-wheel to make one revolution. If, however, the arm R is separated from the shaft D by the melting of the fusible-solder connection, then the crank D' is allowed to rotate to the left as long as the spring of the clockwork will cause it to rotate. The arm D' will pass over the stop D<sup>2</sup>, depressing it against spring action, and said stop will under these conditions offer no obstruction to the free revolution of the crank. If desired, the solder *g* of the circuit-opening switch G may be fusible only at a higher temperature than the fusible soldered joint *d'*, so that the fire-signal may first be sent into the central station automatically with the shunt-circuit S intact,



and as the temperature increases the switch G may open to permanently open the shunt-circuit S. This would then leave the telephone apparatus in operative condition if the surrounding temperature could be reduced sufficiently to use the telephone. However, we do not consider that it is necessary to make the switch G open materially after the operation of the fire-signal, as ample practical results will be secured by allowing it to open at the same time.

While we prefer the construction shown, we do not limit ourselves to the minor details, as these may be modified without departing from the essential features of the invention.

What we claim as new, and desire to secure by Letters Patent, is as follows:

1. In a call or signal box, the combination of a circuit-interrupting wheel, a spring-actuated clockwork to rotate it a number of times, a stop for normally preventing the circuit-interrupting wheel making more than one revolution held in place by fusible solder whereby under the application of excessive heat it will fall away and the circuit-interrupting wheel may make a series of revolutions, and an electric circuit including the circuit-interrupting wheel for transmitting signals to a distant place.

2. In a call or signal box, the combination of a circuit-interrupting wheel, a spring-actuated clockwork to rotate it a number of times, a stop for normally preventing the circuit-interrupting wheel making more than one revolution held in place by fusible solder whereby under the application of excessive heat it will fall away and the circuit-interrupting wheel may make a series of revolutions, a telephone in series circuit with the circuit-interrupting wheel, a shunting-circuit for short-circuiting the telephone, and means for closing the telephone-shunting circuit so that when the circuit-interrupting wheel is in operation the current impulses may be shunted around the telephone.

3. In a call or signal box, the combination of a circuit-interrupting wheel and contact, a spring-actuated clockwork to rotate it a number of times, a stop for normally preventing the circuit-interrupting wheel making more than one revolution held in place by fusible solder whereby under the application of excessive heat it will fall away and the circuit-interrupting wheel may make a series of revolutions, a telephone in series circuit with the circuit-interrupting wheel, a shunting-circuit for short-circuiting the telephone, means for closing the telephone-shunting circuit so that when the circuit-interrupting wheel is in operation the current impulses may be shunted around the telephone, and a fusible circuit-interrupting switch for opening the shunting-circuit in case of excessive heat.

4. In a call or signal box, the combination of a circuit-interrupting wheel, a spring-actuated clockwork to rotate it a number of times, a stop for normally preventing the circuit-interrupting wheel making more than

one revolution held in place by fusible solder whereby under the application of excessive heat it will fall away and the circuit-interrupting wheel may make a series of revolutions, an electric circuit including the circuit-interrupting wheel for transmitting signals to a distant place, a telephone transmitter and receiver in series with each other and with the circuit-interrupting wheel, a short-circuiting switch operated by the weight of the receiver to short-circuit the telephone receiver and transmitter, and automatic means operating in parallel with the short-circuiting switch for shunting the telephone instruments when the circuit-interrupting wheel is in operation.

5. In a call or signal box, the combination of an electric circuit adapted for connection with a line-circuit, a spring-actuated circuit-interrupter for said circuit, a telephone-receiver of low resistance and transmitter in said electric circuit and in series with each other and with the interrupter, and a short-circuiting or shunting switch for short-circuiting the electric circuit around the receiver and transmitter so that the circuit-interrupter may be operated without causing interrupted currents to flow through the receiver and transmitter.

6. In a call or signal box, the combination of an electric circuit adapted for connection with a line-circuit, a spring-actuated circuit-interrupter for said circuit, a hand-operated device for winding up the spring-power of the interrupter and liberating the interrupter-wheel, a telephone-receiver of low resistance and transmitter in said electric circuit and in series with each other and with the interrupter, and a short-circuiting switch controlled by the hand-operated winding device for short-circuiting the electric circuit around the receiver and transmitter so that the circuit-interrupter may be operated without causing interrupted currents to flow through the receiver and transmitter.

7. In a call or signal box, the combination of an electric circuit adapted for connection with a line-circuit, a spring-actuated circuit-interrupter for said circuit, a telephone-receiver of low resistance and transmitter in said electric circuit and in series with each other and with the interrupter, a short-circuiting switch for short-circuiting the electric circuit around the receiver and transmitter so that the circuit-interrupter may be operated without causing interrupted currents to flow through the receiver and transmitter, and means operating under the application of heat for causing the interrupter to continue to operate beyond normal operations without interfering with the short-circuited conditions of the telephone receiver and transmitter and without interfering with their proper use in series with the interrupter when it has ceased to operate.

8. In a call or signal box, the combination of an electric circuit adapted for connection



with a line-circuit, a spring-actuated circuit-interrupter for said circuit, a hand-operated device for winding up the spring-power of the interrupter and liberating the interrupter-wheel, a telephone-receiver of low resistance and transmitter in said electric circuit and in series with each other and with the interrupter, a short-circuiting switch controlled by the hand-operated winding device for short-circuiting the electric circuit around the receiver and transmitter so that the circuit-interrupter may be operated without causing interrupted currents to flow through the receiver and transmitter, a short-circuiting switch controlled by the hand-operated device for short-circuiting the interrupter when not operating to maintain a good electric circuit when the telephone receiver and transmitter are in operative circuit.

20 9. In a call or signal box, the combination of an electric circuit adapted for connection with a line-circuit, a spring-actuated circuit-

interrupter for said circuit, a telephone-receiver of low resistance and transmitter in said electric circuit and in series with each other and with the interrupter, a short-circuiting switch for short-circuiting the electric circuit around the receiver and transmitter so that the circuit-interrupter may be operated without causing interrupted currents to flow through the receiver and transmitter, a short-circuiting switch controlled by the hand-operated device for short-circuiting the interrupter when not operating to maintain a good electric circuit when the telephone receiver and transmitter are in operative circuit.

In testimony of which invention we have hereunto set our hands.

GEO. G. GLENN.  
WM. S. SULLIVAN.

Witnesses:

J. W. KENWORTHY,  
R. M. HUNTER.