Sept. 1, 1925. 1,551,722

F. H. N. WOHLERS

TELEPHONE SIGNAL DEVICE

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Fig. 1.

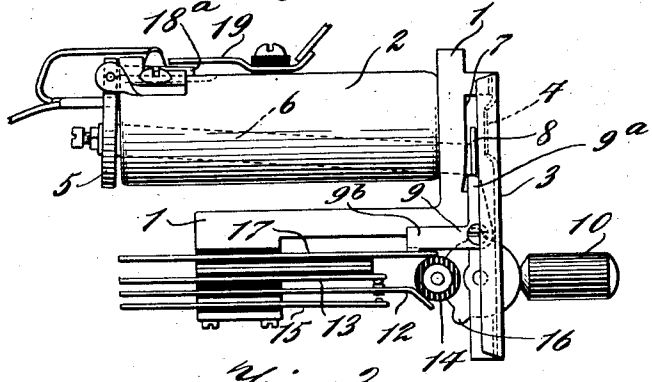


Fig. 2.

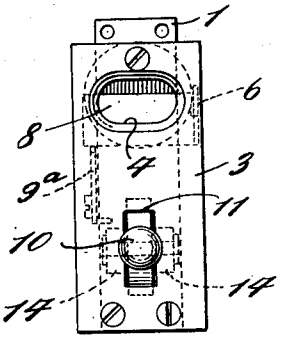


Fig. 3.

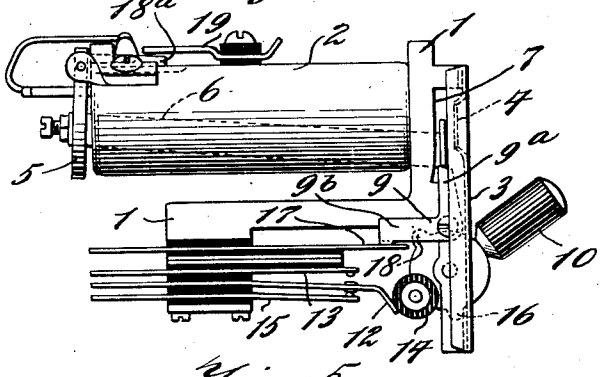


Fig. 4.

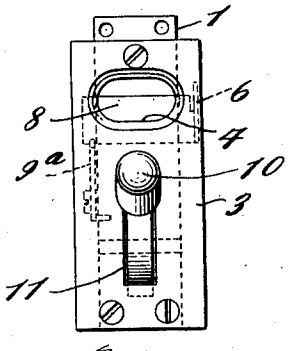


Fig. 5.

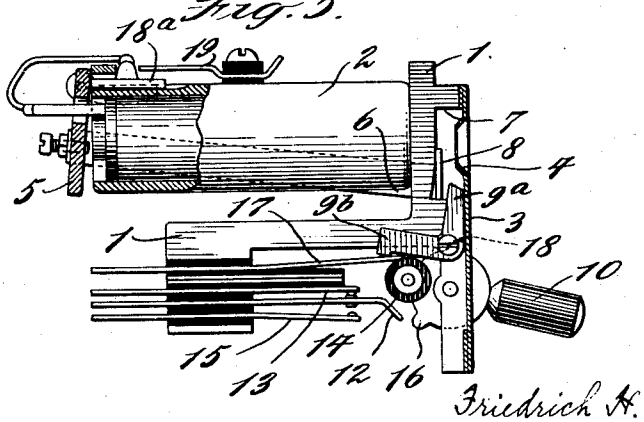
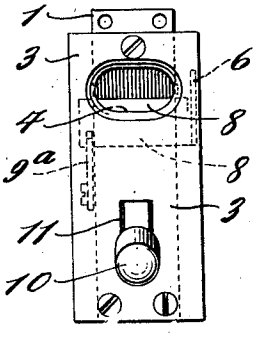


Fig. 6.



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TELEPHONE SIGNAL DEVICE

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Fig. 7.

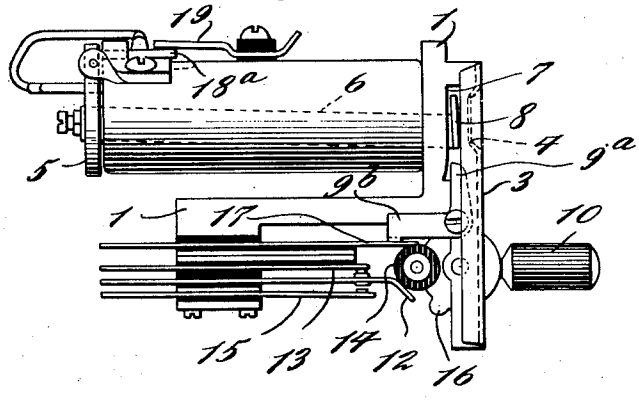


Fig. 8.

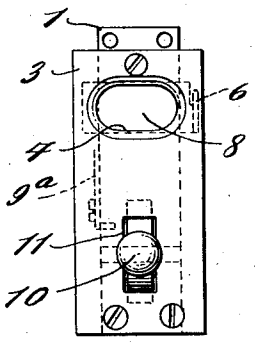
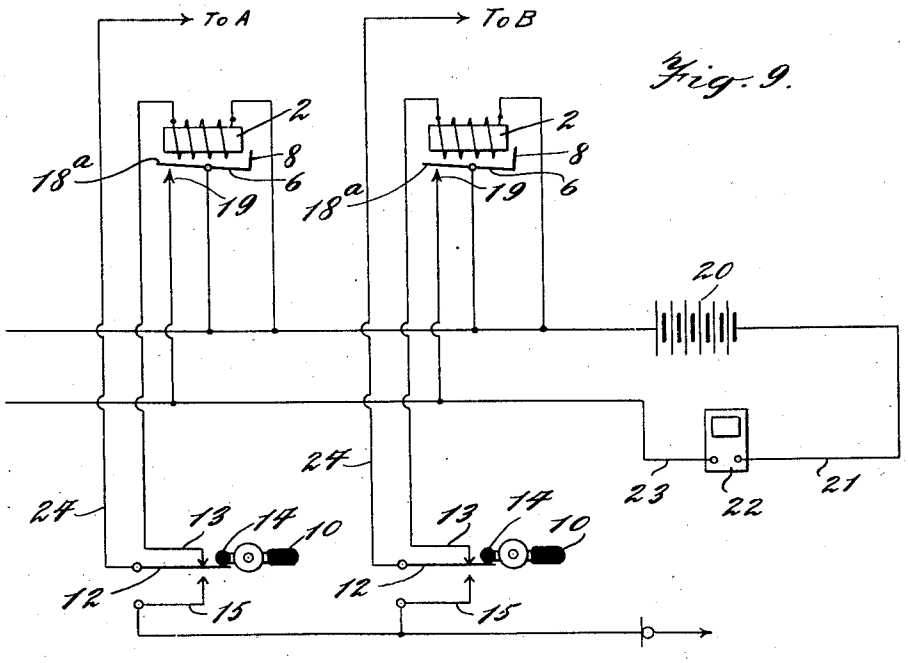


Fig. 9.



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Patented Sept. 1, 1925. 1,551,722

UNITED STATES PATENT OFFICE.

FRIEDRICH H. N. WOHLERS, OF JAMAICA, NEW YORK, ASSIGNOR TO DICTOGRAPH PRODUCTS CORPORATION, A CORPORATION OF VIRGINIA.

TELEPHONE SIGNAL DEVICE.

Application filed April 14, 1921. Serial No. 461,282.

To all whom it may concern:

Be it known that I, FRIEDRICH H. N. WOHLERS, a citizen of the United States, residing at Jamaica, in the county of Queens and State of New York, have invented certain new and useful Improvements in Telephone Signal Devices, of which the following is a full, clear and exact description.

This invention relates to signal devices, particularly of the type employed in connection with intercommunicating telephones. In various telephone and similar systems, certain stations may be provided with a plurality of visual signal devices, each corresponding to a different distant station, and with a buzzer or audible signal device and circuit which may be controlled singly or in common by all of the visual signal devices, to be rendered active whenever any visual signal device is shifted to a full indicating position. This shifting of the device is usually accomplished by means of an electromagnet which is energized by the closing of a circuit thereto from the corresponding distant station. The circuit of the electromagnet is opened to permit of the return of the visual signal to its normal position whenever the calling party discontinues the calling attempt or the called party connects his instruments with the calling party. It often happens that the party at the called station is absent at the time the call is made and upon his return desires to know whether or not attempts to communicate with him have been made during his absence, and if so, the identification of the calling station. It has been proposed to furnish such a notification of unanswered calls by locking the visual indicators, when operated during a call, in their call indicating position, but where audible signals are controlled thereby and considerable delay occurs in the return of the called party the audible signal batteries soon run down and have to be replaced. The continued operation of the audible signal is also often objectionable to other nearby parties.

An object of the invention is to provide a switchboard construction for intercommunicating telephone systems which will visually and audibly indicate all calls and identify the calling station, which will indicate to the called party that an ineffectual attempt to communicate with him has been made by another station, and identify that station, which will accomplish these results with a minimum of deterioration of batteries or consumption of energy, and in which the indicator will be automatically restored to normal non-indicating position by the act of calling the prior calling station from the prior called station. A further object is to provide a construction of this kind and for this purpose which is simple, efficient, reliable, inexpensive, and easily installed on existing switchboards with a minimum of changes in existing constructions. Other objects and advantages will be apparent from the following descriptions, and the novel features of my invention will be particularly pointed out in the claims.

In carrying my invention into practice I may provide a latch for each visual indicator for automatically preventing its complete return to non-indicating position, at the cessation of an unanswered call from a distant station, but permitting a return sufficient to open the circuit of the audible signal device, and also indicate by its position that an unanswered call was received. The latch is arranged to be operated to release the visual indicator upon an operation of the switch during the completion or breaking of the connections incident to the answering of the call, or during a special releasing operation.

In the accompanying drawings:

Fig. 1 is a side elevation of a switch board unit constructed in accordance with my invention with the visual indicator in one indicating position;

Fig. 2 is a front elevation of the same;

Fig. 3 is a side elevation of the same with some of the parts in positions different from those of Fig. 1;

Fig. 4 is a front elevation of the same;

Fig. 5 is a side elevation of the same with some of the parts in a still different position;

Fig. 6 is a front elevation of the same;

Fig. 7 is a side elevation of the same showing the positions of the parts during the receipt of a call;

Fig. 8 is front elevation of the same, and

Fig. 9 is a wiring diagram.

In the illustrated embodiment, a frame unit 1 of a switchboard carries upon its rear side an electromagnet or relay 2, and upon

its front side a face plate 3, the plate having an observation window 4 therein. The electromagnet is included in a circuit from a distant station which may form part of an intercommunicating telephone system. For an example of such a system reference is made to U. S. Patent No. 1,160,125 for a complete explanation of the circuits and system which may be employed.

Upon the rear end of the electromagnet is mounted a pivoted armature 5, which is responsive to the influence of the electromagnet. The armature carries a rigid arm 6, extending from one side thereof and along one side of the electromagnet toward the face plate 3. The frame 1 is provided on the side abutting the face plate and opposite the window with a slot 7 into which the free end 8 of the arm is turned to form an indicating element. When the electromagnet is deenergized the indicating arm normally lies at the bottom of the slot and holds the armature away from the electromagnet as illustrated in Figs. 5 and 6. When the electromagnet is energized, the armature will be attracted and carry the indicating end 8 of arm 6 toward the top of the slot and behind the window as illustrated in Figs. 7 and 8, which position of the arm 6 represents the full indicating position and visually notifies the attendant at that station that a certain station is calling. If the call is unanswered, a discontinuance of the call causes a deenergization of the electromagnet 2 and the arm 6 falls. A bell crank pawl 9, pivoted to the frame unit 1, is normally urged by gravity or a suitable spring to rotation in a direction to bring one of its arms 9^a below the indicating arm 8. The arm 9^a is normally held by the arm 8 at one side thereof when arm 8 is in its lower non-indicating position. Upward movement of the arm 8 during a call releases the pawl automatically and permits it to move to bring the arm 9^a beneath the arm 8. When the arm 8 falls it engages the end of the pawl and is held in an intermediate indicating position as illustrated in Figs. 1 to 4.

A switch key 10 is pivoted in the frame unit and extends through an aperture 11 in the face plate for manual operation. A spring strip contact 12 is normally in contact with a spring contact 13 for controlling the circuit to the electromagnet but is shiftable by one of the cam rollers 14 on an extension of the key out of engagement therewith and into engagement with a spring contact strip 15 controlling the talking circuit whenever the key is moved upwardly. The free end of strip 12 is offset tangentially of a cam roller so that when the key is shifted upwardly, the strip 12 will be locked in engagement with strip 15 and will yieldingly hold the key in upper position as limited by a lug 16 of the key which engages with the face plate. Spring strips 17 extending over the cam rollers yieldingly limit downward movement of the key beyond its normal or straight out position, while a second lug 18 on the key by its engagement with the face plate limits downward movement of the key. The strips 12 and 17 engage on opposite sides of the cam rollers 14, when the key is in normal straight out position and yieldingly resist movement of the key in either direction. The arm 9^b of the pawl extends over one of the strips 17 and is in contact therewith when the pawl is released by the arm 8. The arm 9^b is preferably made heavier than arm 9^a so that the pawl when free tends to rotate into latching position, with arm 9^b against its co-operating strip 17. A spring could be provided to assist this movement, if desired, but I have found that the action of gravity is ordinarily sufficient. Limited downward movement of the key beyond normal position, as illustrated in Figs. 5 and 6 will force the free end of one of the strips 17 upwardly and through it carry the pawl to a position in which it releases the indicating arm. An arm 18^a on the armature is adapted to move into engagement with a spring contact 19 carried by and insulated from the electromagnet when the armature has shifted the indicator to approximately its full indicating position. A battery 20 is connected by wire 21 to a buzzer, or other suitable audible signal device 22. The buzzer is connected by a wire 23 with each of the contacts 19 carried by the electromagnets or relays 2, so that each pair of contacts 18^a and 19 may complete the circuit through the bell independently of the others. The contacts 19 are so disposed relative to arms 18^a that when the arm 8 is held in an intermediate indicating position the contacts 18^a and 19 of the corresponding electromagnet will be in an open circuit condition. The audible signal circuit is diagrammatically illustrated in Fig. 9, in which only portions of the other circuits are shown, the complete circuits being illustrated and described in the U. S. Patent No. 1,160,125.

In use let it be assumed that a call is received at the station C through a wire 24 from a distant station A, the key 10 at station C being in normal position. The calling circuit includes contact strips 12 and 13 and electromagnet 2 corresponding to station A. The energization of this electromagnet 2 moves its indicator to full indicating position and through contacts 18^a and 19 closes the audible signal circuit to audibly call attention to the fact that another station is calling, the identification of the calling station being given by the raised indicating arm 8 corresponding to that station.

When a key 10 at station C corresponding to the visual signal then effective is operated

upwardly from the Fig. 1 to the Fig. 3 position, the strip 12 will be separated from contact with strip 13 to open the circuit through the energized electromagnet 2 permitting the indicator to fall, and connect the wire 24 instead to the talking circuit with the distant station. The visual signal arm 8 thereupon drops but is held in an intermediate position by the pawl or lever 9 which moved beneath the arm 8 when the latter was moved to its full indicating position by the energized electromagnet. In this intermediate position the contacts 18ª and 19 are separated and the buzzer circuit is open. During the return movement of the key to its normal straight out position at the conclusion of the conversation, the spring strip 12 usually imparts enough energy to the key to carry it against the upper strips 17 and shift pawl 9 to release the arm. The arm then drops to the bottom of the slot 7 which is its normal position, as illustrated in Figs. 5 and 6. If the return of the key fails to release the arm 8 from the pawl, the key can be slightly depressed as illustrated in Figs. 5 and 6 to force the pawl clockwise and release the arm 8. The spring strip 17 will then return the key to normal straight out position when released.

If the call from station A is unanswered, the disconnection at station A at the abandonment of the call will open the circuit to the energized electromagnet 2 and permit the indicator arm 8 to fall. The pawl 9 will prevent a complete return of the arm 8 but will allow it to return far enough to open the audible signal circuit, by separating the contacts 18ª and 19. There will be no circuit flowing through the system and the intermediate position of the indicator arm 8 will visually indicate that an unanswered call was received. The operation of the key 10 in calling station A to answer the call will cause a complete release and return of the arm 8 as before. The pawl 9 drops back at one side of the arm 8 when the latter is released, so as to be ready to move beneath the arm when another call is received.

It will be obvious that various changes in the details and arrangements herein described and illustrated for the purpose of explaining the principle of the invention, may be made within the principle and scope of the invention.

I claim:

1. A switchboard construction comprising an indicator movable between two indicating positions, remotely operable means for actuating the indicator from one position to the other, means adapted to automatically prevent complete return of the indicator to initial position, but permit return to an intermediate indicating position, a switch device and means operative by the switch device upon an operation thereof for releasing the indicator to permit of its complete return to its initial position.

2. A switchboard construction comprising a remotely operable indicating device having an element movable between two indicating positions and normally maintained in one of the positions, a latch device held in effective position by the element and upon movement of the element to the other of its said positions automatically released for movements to a position to latch the element against complete return to its normal position but permitting a return to an intermediate indicating position; a switch device, and means operable by the switch device as the latter is operated for releasing the element to permit of its complete return.

3. A switch board construction comprising an electromagnet normally included in a telephone circuit, an armature for the electromagnet and operable thereby, a visual indicator operable by the armature between two extreme indicating positions, an audible signal rendered active by the visual indicator when the latter has been shifted to one of its extreme positions by the energization of the electromagnet, a device for preventing complete return of the indicator upon deenergization of the electromagnet but permitting return to an intermediate indicating position in which the audible signal is inactive, a switch device for disconnecting the electromagnet from the circuit and operable upon said device to release the visual indicator and permit it to return completely to its other extreme indicating position.

4. A switchboard construction comprising an indicating member operable between two extreme indicating positions, means controlled from a telephone system for causing movement of the member from one of said positions to the other upon the receipt of a call from a station corresponding to said member, an audible signal device rendered active by movement of the member to said other position, means operative upon a movement of the member from said one position to the other for preventing complete return of the member upon a cessation of the call but permitting a partial return sufficient to render inactive the audible signal device, a switch device for affecting the circuit to said station, and operative to release the member and permit it to make a complete return to said one position.

5. A switchboard construction comprising an indicating member operable between two extreme indicating positions, means controlled from a telephone system for causing movement of the member from one of said positions to the other upon the receipt of a call from a station corresponding to said member, spring contact strips, a switch

key held in normal position by said strips, a pivoted pawl biased to rotation in one direction against one of the strips to bring an arm beneath the indicating member for preventing a complete return of the latter to said one position but permitting a partial return, said pawl being operable to release the member for complete return movement to said one position through the operation of the key to flex the strip that is engaged by the pawl.

6. A switchboard construction comprising a frame unit, a face plate having a window therein carried by the unit, means carried by the frame responsive to an incoming call from a distant station for indicating the existence of the call including a member movable behind the window from a normal position to another position when a call is being received and tending to return to normal position when the call ceases, an audible signal device controlled by the member and rendered active when the latter is in said another position, switch mechanism for controlling a circuit to said distant station, a pawl pivoted to the frame and biassed to rotate to bring an arm thereof beneath the member when it moves from normal position to the other position and limit its return movement to an intermediate position in which the audible device is inactive when the call ceases, and switch mechanism controlling a circuit to said distant station operable to shift the pawl to release the member for complete return to normal position.

In witness whereof, I hereunto subscribe my signature.

FRIEDRICH H. N. WOHLERS.