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F. ARNOLD

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TELEPHONE

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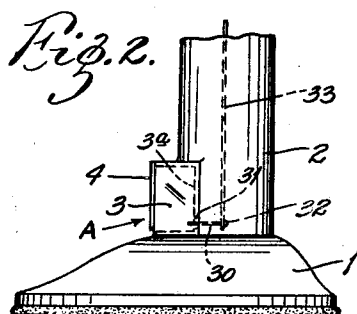
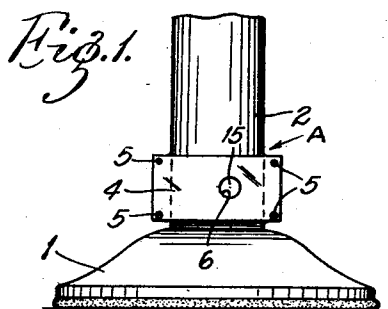


Fig. 3.

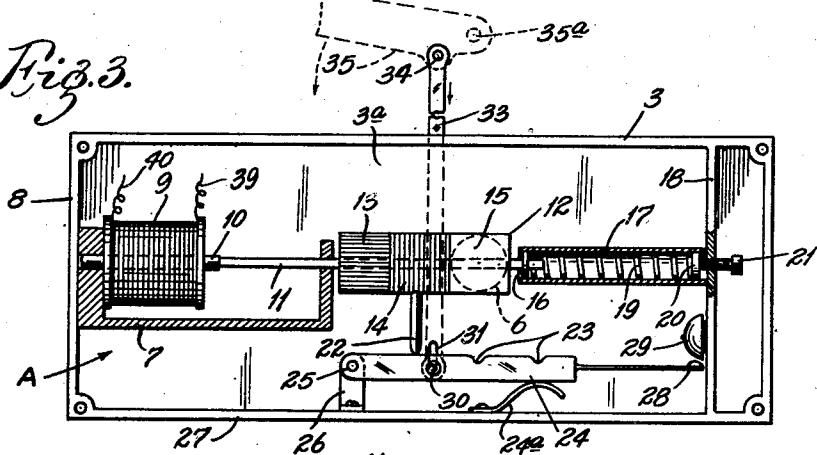
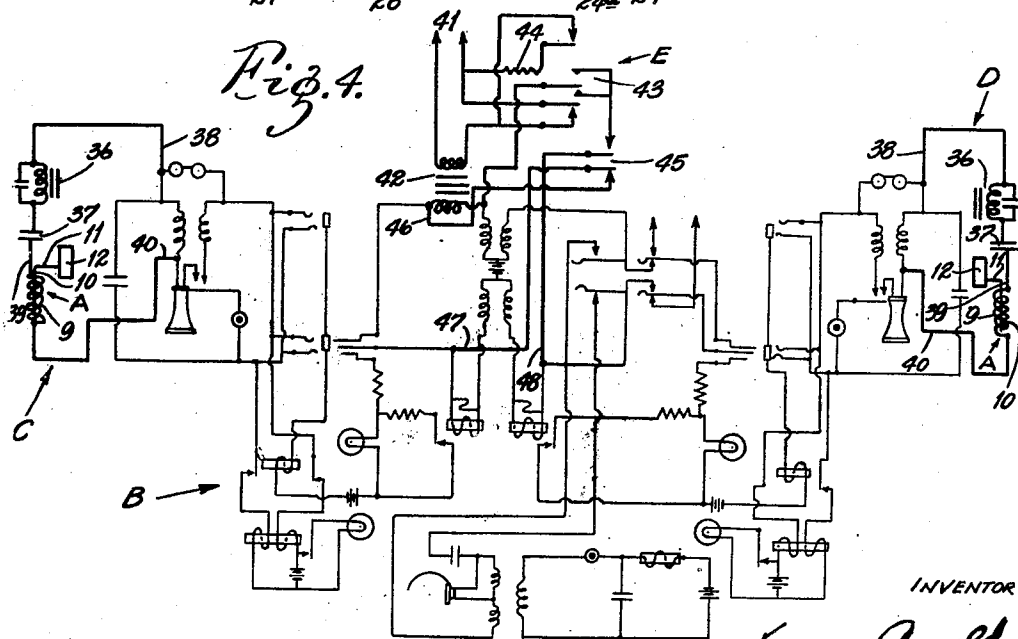


Fig. 4.



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TELEPHONE

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My invention relates to improvements in telephones.

One object of my invention is to provide an electrical hook-up or electrical circuit which can be connected with and to the present telephone circuit or electrical hook-up so that a warning or signal can be given to a person engaged in conversation on the telephone to let that person so talking over the telephone know that a third person is attempting to call him.

Another object of my invention is to provide a signal or warning device which can be installed on a telephone which will indicate or warn a person using the telephone that a third person is calling him.

A further object of my invention is to provide a signal or warning device which can be installed on a telephone which will indicate to the person using the telephone or inform him that a long distance call is awaiting him.

The telephone circuit or hook-up at present does not provide any means or method of informing a person engaged in talking over a telephone that some other person is trying to reach him. The third person who tries to communicate with a person so engaged in talking over a telephone receives a buzz through his receiver which informs him that the person called is busy. The call may be of vital importance to the person engaged in conversation over the phone, yet he is unaware that some third party is attempting to reach him. A long distance call may be made and the same held up for a long time due to the fact that the person for whom it is intended cannot be informed because he is engaged in talking over his telephone.

My invention will remedy these deficiencies and defects. It will provide the means of signaling or warning the person engaged in conversation over the telephone that a local or long distance call is awaiting him. After he is so warned, he of course then has the option of quickly ending his present conversation or continuing with it. If he decides upon the latter, the person attempting to communicate with him will receive the present busy signal and have to call again if he so desires.

My invention consists of a simple electrical device which is easily attached to the present telephone. The electrical hook-up and wires now used will, in addition to their regular uses, suffice to produce the result so desired and generally described above.

The foregoing and other objects of my invention will be made manifest in the following de-

tailed description, and specifically pointed out in the appended claims.

Reference is made to the accompanying drawing for an illustrative embodiment of the invention.

Figure 1 is a front elevation of the lower portion of the telephone embodying my invention.

Figure 2 is a side elevation of the lower portion of the telephone embodying my invention.

Figure 3 is an enlarged front elevation, with the cover removed, of the casing enclosing the operating parts of the invention, portions thereof being shown in section, and the receiver hook being shown diagrammatically.

Figure 4 is a wiring diagram of the central telephone exchange showing two receivers and the wiring diagram of my invention attached to the receivers and the wiring diagram of the hook-up or circuit in the central exchange which sets the operating parts of my invention in operation.

Referring to the accompanying drawing, in Figure 1, the call waiting indicator A is shown attached to the lower portion of a telephone. The circular opening in the cover of the indicator 6 allows the person using the telephone to see what color is showing. The removable cover 4 is held in place by the screws 5 which are countersunk in the removable cover 4.

The call waiting indicator A, in Figure 2, has a pivot pin 30 extending through a vertical slot 31 in the rear wall 3a of the casing 3 which is attached or pivoted at 32 to the lower end of the arm 33. The lower arm 33, in Figure 3, is pivotally connected at 34 to the receiver hook 35 of the telephone shown diagrammatically. The receiver hook 35 is pivotally fixed at 35a, in Figure 3, shown diagrammatically.

The casing 3 as shown in Figures 1 and 2 is integral with the base of telephone 1 and upright standard 2; however, this casing 3 may be attached or fastened to another part of a telephone by means of a bracket or other device as desired.

The call waiting indicator A in Figure 3 is composed of a solenoid or wire coil having a core 10. This wire coil 9 receives an electrical charge or impulse through the wires 39 and 40 which are attached to the receiver circuit of both C and D shown in Figure 4. In Figure 3, the call indicator A is enclosed by the casing 3. The wire coil 9 is supported by the U shaped bracket 7 through which the rod 11 extending through and from the core 10 is allowed to move. The plate 12 is affixed by solder or other means to the rod 11

11 and is divided into three portions, the surfaces of which are colored blue 13, red 14, and white 15. These colors can be seen through the opening in the cover 6 or the call waiting indicator A and shown by dotted lines in Figure 3.

When the rod 11, in Figure 3, is expelled from the wire coil 9, the collar 16 attached to the other end of the rod 11 compresses the spring 19 contained in the tube 17. This spring may be adjusted by turning the screw 21 which is adjustable. The collar 20 on the screw 21 holds the spring in place.

The wire coil 9, when sufficiently charged by electricity, will expel the rod 11 so that the red surface 14 of the plate 12 will occupy the same position in reference to the opening in the cover 6 as the white surface 15 now does as shown in Figure 3. At the same time, the finger 22 which is attached to the plate 12 moves along the bar 24 until it is caught in the notch 23 which catches the finger 22 when the bar 24 is forced upward by the pressure of the leaf spring 24a. The bar 24 has two notches 23 and is pivoted at 25 to a bracket 26 fixed to the bottom wall 27. The opposite end of the bar 24 has a hammer 28 which strikes the bell 29 fixed to the integral partition 18 of the call waiting indicator A in Figure 3. Each time the bar 24 moves upward, the hammer 28 strikes the bell 29.

The wire coil 9, when given an additional charge or charges, will expel the rod 11 so that the blue surface of plate 12 is in the place of the white surface 15. The finger 22 then slides along the bar 24 past the first notch to the second notch 23 and at the same time the bell 29 is struck twice by the hammer 28 which is caused to move up and down two times by the pressure of the leaf spring 24a against the bar 24.

When the person using the telephone has finished and hangs the receiver upon the hook 35, the arm 33 is forced downward and the pivot pin 30 forces the bar 24 downward releasing the finger 22 from the notch 23. The spring 19 then presses the collar 16 and the rod 11 back into its original position. The plate 12, then assumes its original position and the white surface 15 can be seen through the cover opening 6.

In Figure 4 is shown the exchange telephone circuit. This circuit is old and for that reason not described in detail. When a third party attempts to call either C or D, these parties or either of them can be signalled or warned by their call waiting indicators A which will be set in operation by the waiting call key 43. The waiting call key circuit E in Figure 4 receives its AC source at 41 which is sent through the resistor 44 to the key 43. If the call is a local call and the color red of call waiting indicator so designates a local call, the operator at the central station will press the key 43 upward, and if the call is distant and the color blue of call waiting indicator so designates a distant call, the operator at the central station will press the key 43 downward, and at the same time the operator will press the selector key 45 upward if the third party is trying to call receiver C and downward if the third party is trying to call receiver D.

When the waiting call key 43 is pressed upward, an A. C. current of 5000 c. p. s. (or the desired frequency) from the source 41 (in Figure 4) will flow into the primary circuit of the repeating coil 42. This introduces an A. C. voltage in the secondary circuit of the repeating coil 42 which in turn will be transferred to receiver

C (if the third party is trying to call C) by means of the telephone lines, two in number.

The filter units 36 are tuned to a certain desired frequency and the blocking condensers 37 prevent any D. C. current from getting into the circuit. The filter unit 36, the blocking condenser 37, and the call waiting indicator A as shown in Figure 4 are all tuned to the frequencies generated at the central office. Because of this, when the current reaches them, the call waiting indicator A will respond to this A. C. signal and, as shown in Figure 3, the rod 11 will push the plate 12 so that the red surface 14 will be seen through the opening of the cover 6. At the same time an extra contact on waiting call key 43 shorts out the telephone lines going to receiver circuit D through the use of selector key 45.

In Figure 4, the wires 46, 47, 48 connect the waiting call key circuit to the regular exchange circuit B. The wires 38, 39, and 40 in C and D connect the call waiting indicator mechanism to the receivers C and D.

If a third party wishes to call D or C to inform them that a long distance call is awaiting the one or the other, the waiting call key 43 will be pressed downward which will send the proper frequency of A. C. current into the primary circuit of repeating coil 41 which will introduce an A. C. voltage in the secondary circuit of 41 which in turn will be transferred to receiver C if the central operator wishes the receiver C to be notified and/or to receiver D if he should be informed. Which ever receiver is to be informed, the other will not know of the signal because the lines to his telephone are shorted out by the proper regulation of the selector key 45 by the operator.

The foregoing specifications describe how a person engaged in conversation with another person over a telephone can be notified that a local or long distance call is awaiting him. Of course, the person can disregard the notification and the party trying to reach him after a reasonable length of time will receive the busy signal; however, the person engaged in conversation is duly notified and can use his own discretion in the matter. Various changes may be made in the shape of the call waiting indicator, the colors used, and sounding device and the other details of construction in all its phases as so indicated in the foregoing specifications without departing from the spirit or scope of the invention as defined by the appended claims.

A buzzer, lighting system, electric eye, movable external devices and/or any other type or kind of signal may be used in place of the color plate and bell herein described, all without departing from the scope of the invention. The call waiting indicator can be adopted and used and applied on any system whether automatic or operated by human operators. In the event the call waiting indicator is applied to an automatic system of telephone exchange, the same result can be obtained by the use of a time switch affixed to a contact of the relay switch which sets off busy signal. The time switch will prevent the busy signal from being given for 15 seconds or any other specified period of time, and at the same time will press the waiting call key 43 and the selector key 45 as shown in Figure 4 so that the proper notification will be given to the proper party as described above.

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

1. The combination, with a telephone hook, of a call waiting indicator comprising a solenoid coil, a rod adapted to be expelled by the coil so that an indicator thereto attached will move to a desired position, a spring to press the said rod back into its original position after the coil has expelled it and which at the same time allows a finger attached to the rod to slide into notches located on a bar below from which a hammer extends which, when allowed to move upward, will strike a bell; the said bar assuming its original position when the arm of the telephone hook is brought down.

2. The combination with a telephone having a hook, a call-waiting indicator comprising a solenoid coil, a rod adapted to be shifted by the coil, an indicator operatively associated with the rod and adapted to be shifted thereby to indicating position, means normally urging the indicator toward inactive position, an audible signal device, actuating means for operating the same, including a shiftable member provided with a notch, a projection carried by said rod and adapted to engage said notch when the rod is moved as aforesaid in order to actuate said audible signal device, and means operatively associated with the telephone hook to detach said audible signal device when the hook is depressed.

3. The combination, with a telephone system, including a transmitter-receiver station adapted to be connected with another transmitter-receiver station of the system, of a waiting call keying circuit comprising a repeating coil, waiting call key and selector key operatively associated with said system and adapted to transfer an operating impulse upon receiving a call for said transmitter-receiver station when connected with another station of the system, and call-waiting indicator means comprising a solenoid coil energized in response to the transfer of said impulse in said circuit, a shiftable colored plate and a bell-ringing device operatively associated with the coil and adapted to be actuated when the same is energized to give a visual and an audible indication that a call is awaiting connection.

4. The combination, with a telephone system, including a transmitter-receiver station adapted to be connected with another transmitter-receiver station of the system, of a waiting call keying circuit comprising a repeating coil, waiting call key and selector key operatively associated with said system and adapted to transfer an oper-

ating impulse upon receiving a call for said transmitter-receiver station when connected with another station of the system, and call-waiting indicator means comprising a solenoid coil energized in response to the transfer of said impulse in said circuit, indicator means shiftable when the coil is energized to indicate that a call is waiting connection, and audible attention attracting means operable contemporaneously with the indicator.

5. The combination, with a telephone system, including a transmitter-receiver station adapted to be connected with another transmitter-receiver station of the system, of a waiting call keying circuit comprising a repeating coil, waiting call key and selector key operatively associated with said system and adapted to transfer an operating impulse upon receiving a call for said transmitter-receiver station when connected with another station of the system, and call-waiting indicator means comprising a solenoid coil energized in response to the transfer of said impulse in said circuit and a colored plate shiftable when the coil is energized to indicate that a call is waiting connection.

6. The combination, with a telephone system, including a transmitter-receiver station adapted to be connected with another transmitter-receiver station of the system, of a waiting call keying circuit comprising a repeating coil, waiting call key and selector key operatively associated with said system and adapted to transfer an operating impulse upon receiving a call for said transmitter-receiver station when connected with another station of the system, and call-waiting indicator means comprising a solenoid coil energized in response to the transfer of said impulse in said circuit, and indicating means actuated by said solenoid coil when energized.

7. The combination, with a telephone system, including a transmitter-receiver station adapted to be connected with another transmitter-receiver station of the system, of a waiting call indicator circuit comprising a solenoid coil at the transmitter-receiver station, means including selector mechanism and a waiting call key operatively associated with and adapted to energize said solenoid coil whenever a call for the transmitter-receiver station is received while the same is connected with another station, and means shiftable to call indicating position when said coil is energized.

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