Oct. 28, 1924. 1,513,069

R. REINBOLD

TELEPHONE RECEIVER HOOK LIFTING DEVICE

Filed June 24, 1922

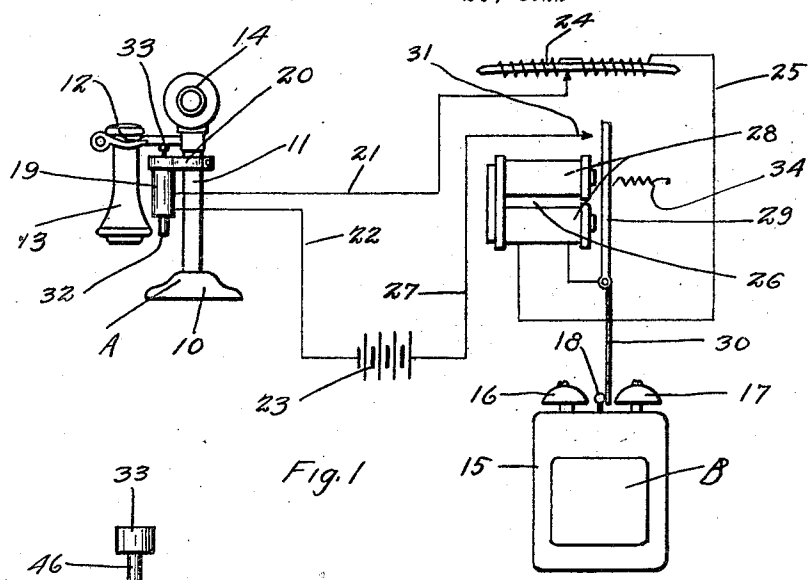


Fig. 1

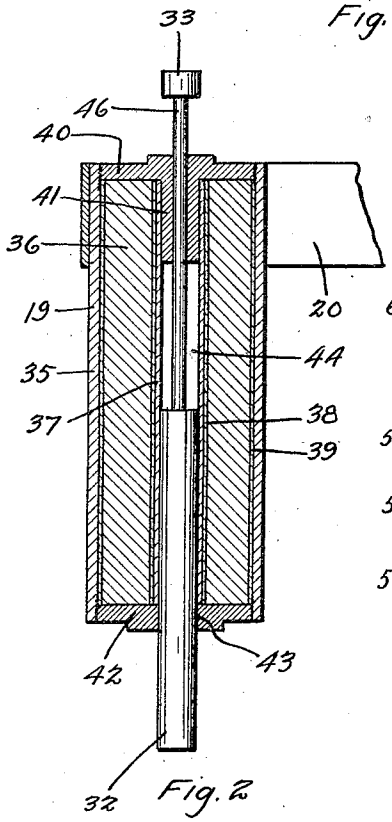


Fig. 2

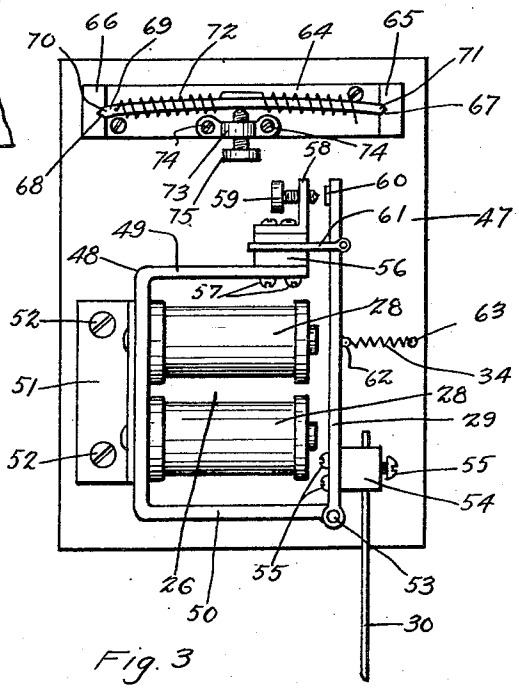


Fig. 3

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ROBERT REINBOLD, OF ST. PAUL, MINNESOTA.

TELEPHONE-RECEIVER-HOOK-LIFTING DEVICE.

Application filed June 24, 1922. Serial No. 570,564.

To all whom it may concern:

Be it known that I, ROBERT REINBOLD, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Improvement in Telephone-Receiver-Hook-Lifting Devices, of which the following is a specification.

My invention relates to telephone receiver hook lifting devices and has for its object to provide a device which will automatically lift the receiver hook of a telephone for a certain length of time, upon calling on the telephone from an outside station.

Another object is to provide a relay, adapted to be closed by the actuation of the hammer of a telephone bell, which relay is adapted to connect with a lifting magnet, positioned under the telephone receiver hook, so that when the telephone bell is sounded, the said magnet will automatically raise the hook.

A still further object is to arrange said relay so that the circuit controlling said lifting magnet will be maintained closed by means of said relay upon actuation of the same.

Another object is to provide a timed controlled circuit breaker, interposed in the line controlling said lifting magnet which automatically breaks the circuit, after a predetermined time, to lower the receiver hook and reset the mechanism in normal position.

The full objects and advantages will appear in the detailed description of my invention and partly pointed out in my claims.

In the drawings illustrating my invention in one form,

Figure 1, is a wire diagram, showing the installation of my invention.

Figure 2 is a longitudinal sectional view of the lifting magnet connected with my invention.

Figure 3 is an enlarged detailed view of the relay or time controlled circuit breaker, employed with my invention.

In conjunction with unattended electrical sub-stations, it is very frequently desirable to listen in on the telephone installed therein, from a central office or a place remote therefrom, to ascertain if the machinery is running properly and to determine if any of the alarm signals connected with such a place have been actuated. My invention permits of calling such stations through the telephone companies central station, in the ordinary manner and of automatically raising the receiver hook at the sub-station, upon the sounding of the telephone bell at the sub-station, which permits of listening in on the telephone for a predetermined time, to permit of determining the running condition of the machinery etc., at the sub-station.

In the drawings, I have shown my invention as applied to an ordinary desk telephone A, such as is ordinarily furnished by the telephone company, which comprises a base 10, having an upright 11, secured thereto, said upright having pivotally connected to its upper portion, a receiver hook 12. At the top of the upright 11, a transmitter 14 is provided. In conjunction with the telephone A, I have shown a bell box B, comprising a casing 15 to which is attached two bells 16 and 17, adapted to be operated by a bell hammer 18 in the usual manner. My invention is set into operation by means of the hammer 18 of the bell box B, which raises the receiver 12 of telephone B, in a manner now to be described.

Upon the upright 11 of the telephone A, I provide a lifting magnet 19 which is connected to the neck 19 of said telephone, by means of a clamp 20. This magnet is connected by leads 21 and 22 to a battery 23 and a time controlled circuit breaker 24. A conductor 25, connects the time control circuit breaker 24 with a relay 26, while a conductor 27 connects the other side of the battery 23 with the said relay, so that all of said magnet, circuit breaker, relay and battery are connected in series, as will be noted in Figure 1. Relay 26 consists of two electro-magnets 27 and an armature 29 adapted to be attracted thereby. This armature has connected to it, a depending arm 30 which is so positioned as to lie in the path of movement of the hammer 18 of bell box B.

The operation of the device is as follows: When the telephone is called by a central station, in the usual manner, the bell B is operated, which causes the hammer 18 to be set into vibration. This hammer immediately engages the lower end of the arm 30, which causes the armature 29 to make contact with the contact member shown at 31 and connected to the conductor 27. As soon as this contact has been made, the magnets 28 are energized, which causes the armature

27 to be attracted thereby, so as to maintain the circuit through a contact 31, closed when the hammer 18 stops vibrating. At the same time, the magnet 19 is energized, which magnet is provided with a plunger 32 having an engaging head 33, attached thereto. When the said magnet is energized, plunger 32 is drawn within the said magnet and the head 33, caused to engage the underside of receiver hook 12, so as to lift the same and permit listening in on the telephone. After the telephone receiver hook 12, has been raised for a predetermined time, the time controlled circuit breaker 24, comes into operation to break the circuit, which demagnetizes the magnets 19 and 28, permitting the receiver hook 12 to descend and the armature 29 to be withdrawn from the magnets 28, by means of a spring 34, so as to reset the device in normal position.

The construction of the lifting magnet 19 is shown in detail in Figure 2.

The device consists of a tubular iron casing 35, within which is positioned a hollow coil of wire 36, wound on a brass tube 37 and insulated from both of said tubes, by means of insulating sleeves 38 and 39. At the top of the tube 35 is provided a circular iron head 40, screwable into the same, which has a neck 41 issuing downwardly into the tube 37, for a short distance. At the other end of tube 35, a similar head 35 is provided which lies flush with the end of the tube 37 and which is formed with a bore 43 of the same diameter as the internal bore 44 or tube 37. The clamp 20, previously referred to is rigidly secured to the upper portion of the tube 35 and serves for holding the device securely in place, upon the upright 11 of the telephone A. Within the bore 44 of tube 37 and the bore 43 of the head 42, is slidably mounted the plunger 32 previously referred to, which is constructed of iron and of a length great enough to reach from the exterior of head 42 to the bottom of the neck 14. To this plunger is attached a spindle 46 which carries the lifting head 33 for raising receiver hook 12. When the circuit is closed thru the coil 36, a magnetic field is set up, which causes the plunger 32 to be drawn into the bore 34, so as to reduce the resistance of the magnetic circuit, thereby raising the head 33 to lift the receiver hook 12, as previously described.

The relay 26 of my invention is shown in detail in Figure 3 and is mounted on an insulating base 47. The magnets 28 which are of usual construction, are attached to a U-shaped iron yoke 48 which has outwardly extending legs 49 and 50. An angular bracket 51 also attached to the yoke 48, serves to hold the entire relay magnet 36 attached to the base 47, by means of screws 52. Upon the extreme end of the leg 50 is provided a hinge 53 to which is pivotally connected the armature 29. This armature is so positioned so as to be attracted by the said electro-magnets when the same are energized. At the lower end of the armature 29, near the hinge 53, I attach an insulation block 54 by means of screws 55. Through this block, passes the arm 30 which is held in place by means of a set screw 55. At the extreme end of the leg 45, I provide an insulating block 56 which is attached thereto, by means of screws 57. On this block is mounted a bracket 58 in which is screwed a contact screw 59, adapted to engage a contact 60 on armature 59, when said armature has been moved to the magnet 28, engaging the extreme end of the arm 30. A keeper 61 attached to the armature 29 is adapted to engage the insulating block 56 so as to prevent the armature 29 from being withdrawn too great a distance from the magnet 28 of the contact screw 59. Spring 34 is connected at one end to a lug 62, secured to armature 59 and at its other end to a pin 63, issuing upwardly from base 47.

When the arm 30 is moved between hammer 18, armature 29 is moved so as to make contact with the contact 60 and the contact screw 59. This closes the circuit through the magnet 20 and the magnet 19, setting the device in operation as previously described.

When the circuit is broken by the time controlled circuit breaker which will presently be described in detail, the armature 29 is reset into its normal position by spring 34, which opens the circuit through the contact 60 and the contact screw 59, until the device is again set into operation.

The time controlled circuit breaker of my invention is mounted on the base 47 together with the relay 26. This device consists of a base 64 formed at its ends with two upstanding lugs 65 and 66. On these two lugs are formed with oppositely facing U-shaped notches 67 and 68, between which is mounted a thermo bar 69 formed with V-shaped ends 70 and 71, adapted to fit into the notches 68 and 67 respectively, to hold said bar into rigid position between the said lugs 65 and 66. The bar 69 is formed of a length slightly greater than the distance between the notches 67 and 68, so that when the bar is placed between the lugs 65 and 66, the same occupies a slightly arcaded position. Upon the bar 69, I wind a heating element 72, which may consist of a coil of suitable resistance wire. This coil is electrically insulated from the bar 69 excepting at its end, where the same is electrically connected thereto. The other end of said coil connects with the conductor 25, leading to the relay 26. The bar 69 is preferably formed of a suitable metal, having a high coefficient of expansion, whereas the base 64 is formed of porcelain or any other similar insulating material, having a low coeffi-

cient of expansion. A lug 73 is secured to the base 64 by means of screws 74. This lug has screwed into it a contact screw 75, which engages the center of the bar 69. When the current is passed through the coil 72, the same becomes heated and the heat is transmitted to bar 69 which causes the said bar to expand relative to the base 64 and assume a position more arcuated with reference to screw 75. This brings the center of the bar to break contact at that point. By adjusting the screw 75, the time elapsing from the closing of the circuit through the coil 72 and of opening the same may be varied at will.

The advantages of my invention are manifest. The device may be installed on an existing telephone, without interfering with or requiring any alteration or changes in the telephone. The device is exceedingly simple and positive in operation and automatically operates to lift the receiver hook whenever the telephone is called, so that the operation of the power plant and sub-station may be ascertained without visiting the plant.

In accordance with the patent statutes, I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims.

I claim:

1. In combination with the receiver hook and bell hammer of a telephone, a magnet for raising said receiver, a relay having an armature positioned above said bell hammer, a depending arm secured to said armature having its lowermost end positioned in the path of travel of said bell hammer, a contact associated with said armature, adapted to become inclosed upon engagement of said bell hammer with said arm, a circuit connecting said relay contact and magnet, whereby said circuit becomes maintained upon the actuation of said armature by said bell hammer and time controlled means for opening said circuit.

2. In combination with the receiver hook and bell hammer of a telephone, a magnet for raising said receiver, a circuit for operating said magnet, a switch normally holding said circuit open, means operated by the bell hammer for closing said switch and maintaining said circuit closed and heating controlled means for breaking said circuit to release said maintaining means after the lapse of a predetermined period of time.

3. In combination with the receiver hook and bell hammer of a telephone, a magnet for raising said receiver, a circuit for controlling said magnet, a relay interposed in said circuit and positioned above said bell hammer, said relay having an armature, a slender depending arm secured to said armature and extending downwardly to said bell hammer, said arm being adapted to move in the same direction as said bell hammer and having its end interposed in the path of travel thereof, a fixed contact adapted to be engaged by said armature and to become closed upon engagement of said bell hammer with said arm, said contact and relay being connected in said circuit and adapted to close and maintain said circuit upon actuation of said armature and time controlled means for opening said circuit and releasing said armature.

4. In combination with the receiver hook and bell hammer of a telephone, a magnet for raising said receiver, a normally open circuit for operating said magnet, means operated by said bell hammer for closing said circuit, means for maintaining said circuit closed, a thermostatic bar, a coil wound upon said bar and insulated therefrom, said coil being connected thereto at one end, a contact adapted to be engaged by said bar, said contact and other end of said coil being connected in said line, being adapted to become heated upon closure of said circuit and to expand said bar so as to break said circuit after a predetermined lapse of time.

5. In combination with the receiver hook and bell hammer of a telephone, a lifting magnet for raising said receiver, a circuit for controlling said lifting magnet, a contact member for closing said circuit, means for actuating said contact member operable by said bell hammer for causing the current to energize said lifting magnet, means for maintaining said circuit closed upon momentary closure of said contact member and time controlled means for re-opening said circuit to reset the switches in normal position.

6. In combination with the receiver hook and bell hammer of a telephone, a lifting magnet for raising said receiver, a relay, having an armature, an arm secured to said armature, and adapted to be engaged by said bell hammer, a contact member on said armature, adapted to be closed upon movement of said arm, a circuit connecting said lifting magnet to said relay and a time controlled switch positioned in said circuit.

ROBERT REINBOLD.