Oct. 11, 1938. C. E. J. MODJESKI 2,132,488

TELEPHONE SIGNAL

Filed Nov. 14, 1933 2 Sheets-Sheet 1

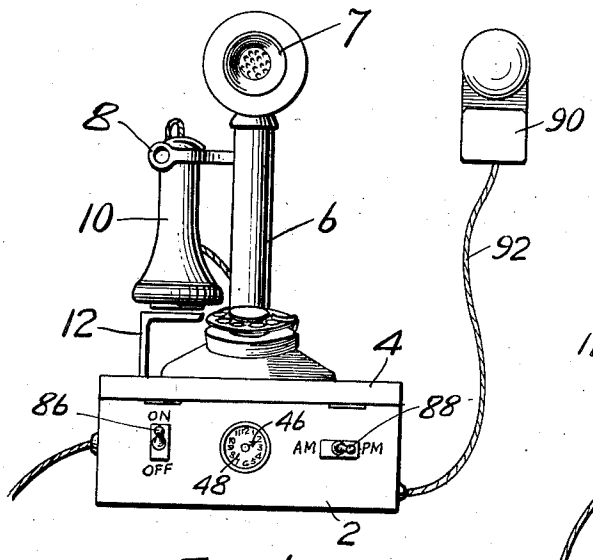


FIG. 1.

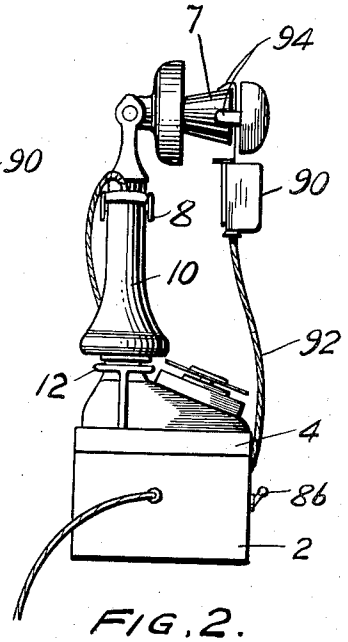


FIG. 2.

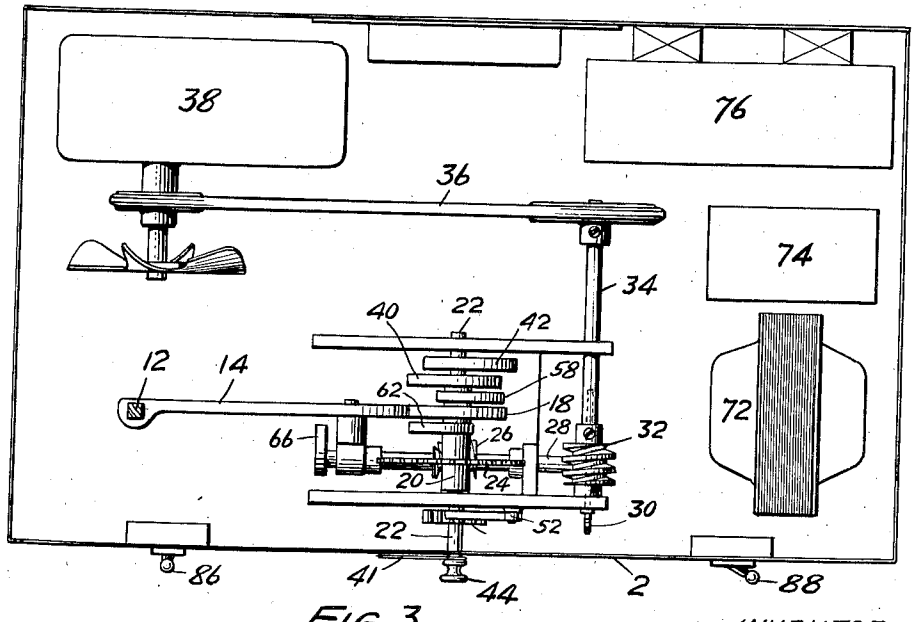


FIG. 3.

WITNESS:

Robt. R. Mitchell.

INVENTOR

Charles E. J. Modjeski

BY

Busser & Harding

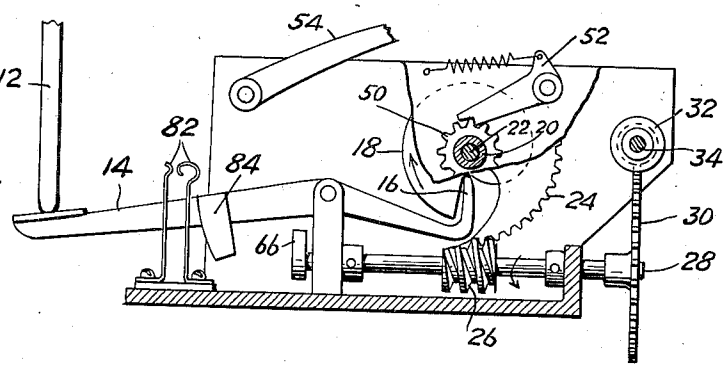
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TELEPHONE SIGNAL

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FIG. 4.



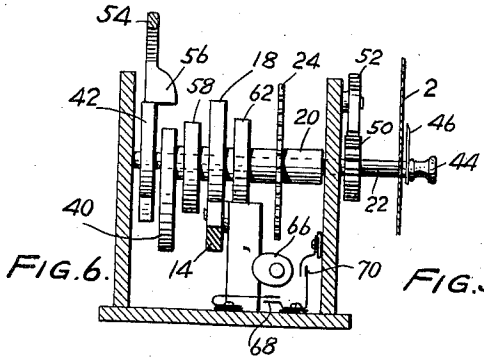
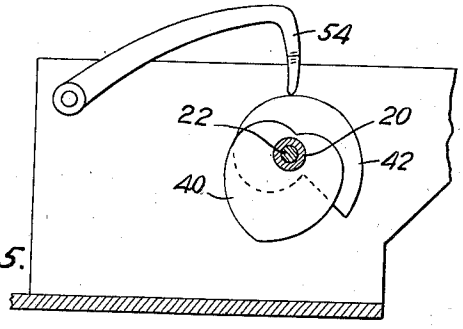


FIG. 6.

FIG. 5.



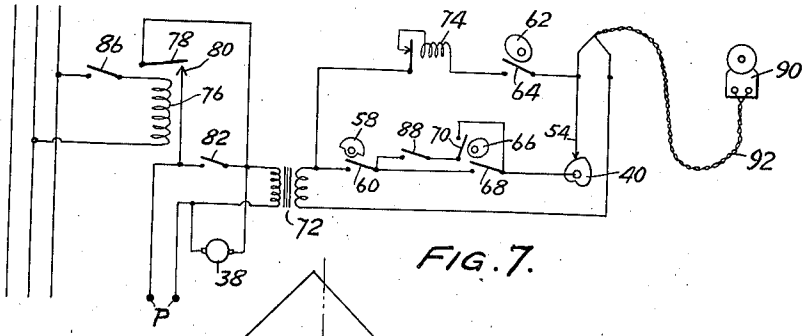


FIG. 7.

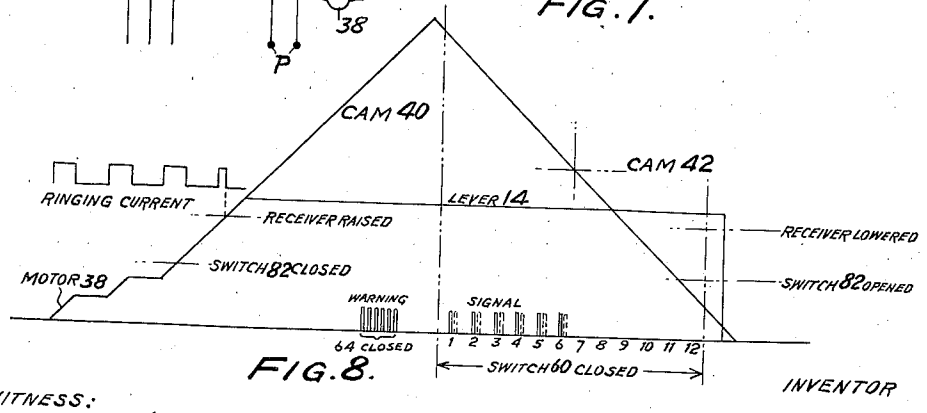


FIG. 8.

WITNESS:

Robt. P. Kitchel.

INVENTOR

Charles E. J. Modjeski

BY

Bussey & Harding

ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,132,488

TELEPHONE SIGNAL

Charles E. J. Modjeski, Philadelphia, Pa.

Application November 14, 1933, Serial No. 697,906

7 Claims. (Cl. 179—89)

This invention relates to an automatic means adapted to be associated with a telephone for indicating, for example, the time of return of the party being called to the one who is making the call.

In the usual use of the telephone, if the called party is absent the one who is doing the calling is unable to determine whether the one called will return in a few minutes or only after a considerable period. If the caller desires to get in touch with the other part as soon as possible, this necessitates the annoying procedure of calling at relatively short intervals to determine whether or not the party called has returned.

It is the object of the present invention to provide means for indicating the time of return of the called party in the absence of any person at the called station.

More specifically, it is the object of the invention to provide a device which may be associated with the present types of telephones without any objectionable interference with other connections. The arrangement is such that the telephone can be used in the conventional manner and the automatic response device put into operation at will without making any but the simplest adjustments by proper positioning of switches.

Detailed objects of the invention relating to features of construction and operation, and the scope of the invention in the matter of substitution of equivalents for those specifically disclosed, will be apparent from the following description read in conjunction with the accompanying drawings, in which:

Fig. 1 is a front elevation of the device associated with the usual upright telephone;

Fig. 2 is a side elevation of the same;

Fig. 3 is a diagrammatic plan view of the interior of the mechanism illustrating in a general way the association of the mechanical parts;

Fig. 4 is an elevation partly in section showing certain of the mechanical parts;

Fig. 5 is a vertical section showing details of control elements;

Fig. 6 is a vertical section showing other details;

Fig. 7 is a wiring diagram illustrating the connections between various parts of the apparatus; and

Fig. 8 is a view showing graphically the time relationships of operations of the various parts.

In the specific modification illustrated in this case, the mechanical parts of the device are contained within a housing 2, which may be provided with a hinged cover such as is indicated at 4, whereby access may be had to the enclosed mechanism. The cover 4 may provide a stand for a telephone 6 which is illustrated as of the usual upright type containing a transmitter 7 supported upon a suitable standard and an arm 8 supporting the receiver 10, the weight of the receiver 10 being adapted to hold the arm 8 in a lowered position interrupting the receiver and transmitter circuit.

In order that the device may become effective, the receiver 10 must be lifted so as to close the transmitter circuit. This is accomplished by means of a vertically slidable member 12 underlying the receiver 10 and engaged by the end of a lever 14, indicated in Fig. 4. The lever 14 is provided with a cam follower end 16 arranged to engage the periphery of a cam 18 of the type illustrated in Fig. 4. The cam 18, along with other parts of the mechanism hereinafter described, is carried by a sleeve 20 journalled upon a shaft 22 having its bearings in a suitable housing which provides support for the various mechanical elements as well as various electrical contacts. To the sleeve 20 there is affixed a wheel 24 driven by a worm 26 mounted upon a shaft 28 which in turn is driven from the shaft 34 by a worm 32, a wheel 30 providing a reduction arrangement. The shaft 34 is driven by a spring belt 36 from a motor 38. As a result of the double reduction gearing involving the two worm drives, the shaft 28 is rotated at a moderate speed whereas the sleeve 20 is rotated quite slowly. The ratio may be such that the shaft 28 may make about twenty-five rotations to a single rotation of the sleeve 20.

The sleeve 20 carries a heart-shaped cam 40 at the rear end thereof. This heart-shaped cam is of conducting material. Immediately behind the cam 40 is a cam 42 of insulating material carried by the shaft 22. This cam 42 is adjustable by rotation of the shaft 22 through the medium of a knob 44 located at the front of the housing 2 and provided with a pointer 46 cooperating with a dial 48 on which are inscribed hours from one to twelve, as indicated in Fig. 1. The shaft 20 is fitted with a gear wheel 50 having twelve teeth between which may engage a spring-pressed detent 52 which serves to locate the shaft 20 in definite positions corresponding to the hours on the dial 48.

A conducting arm 54, insulated from the supporting means, is provided with an enlarged following edge indicated at 56, extending so as to be engageable by both the insulated cam 42 and the

conducting cam 40. The purpose of this arrangement will be made clear hereafter in the description of the operation.

Also mounted on the sleeve 20 is a cam 58 which may be of insulating material and whose shape is as indicated most clearly in the wiring diagram of Fig. 7. This cam serves to engage the movable switch member 60, closing the circuit indicated in Fig. 7 through approximately one-half a revolution of the sleeve 20.

Another cam 62, which may also be of insulating material, is carried by the sleeve 20 and is adapted to engage and close a switch 64 after a suitable small interval of the operation of the shaft 28. The function of this will also be brought out in the description of the operation.

A cam 66 carried by the shaft 28 is adapted to successively close switches 68 and 70, which are arranged as indicated in Figs. 6 and 7. The time occurring between the closings of the two switches is preferably of the order of one-fourth of a rotation of the shaft 28, whereby pairs of signals are produced, as indicated hereafter.

Initiation of operation of the device is effected by means of the operation of a relay coil 76 located across the bell-ringing lines of the telephone. A switch 36 located in series with the coil 76 is adapted to render operative or inoperative, as desired, the signalling mechanism. The relay coil 76 serves to attract an armature 78 arranged to close a contact at 80 and thereby energize the motor 38 from the power supply line indicated at P in Fig. 7. A switch 82 is in parallel with the contact at 80 and is preferably of the form illustrated in Fig. 4, comprising two elements which are pressed together by a cam 84 carried by the arm 14. In parallel with the motor 38 there is the primary of a step-down transformer indicated at 72, which furnishes low voltage alternating current supply for the signalling parts of the mechanism. These include among other elements, a buzzer, indicated at 74, whose function will be hereafter described, and a bell, indicated at 90, connected to the apparatus by a flexible cord 92 and provided with prongs or hooks 94 whereby it may be supported upon the mouthpiece of the transmitter. The bell 90 is preferably of the well-known single stroke variety adapted to sound only once upon each energization of a solenoid contained therein. This is preferable to an arrangement in which an intermittent make and break is automatically effected and a rapid succession of strokes produced upon continued external closure of the solenoid circuit.

It will be noted from Fig. 1 that the switch 36 is manually operable at the front of the device. There is also provided at the front of the device a switch 88 whose position in the wiring diagram is indicated in Fig. 7 as in series with the cam-actuated switch 70.

No attempt has been made to indicate in the mechanical figures the electrical connections, since these, together with the necessity for insulation in suitable places, will be obvious upon inspection of the wiring diagram of Fig. 7, in which there is illustrated the electrical connections of the various parts.

Referring particularly to Figs. 7 and 8, and also to the remaining figures showing the mechanical details, the operation of the device can be made clear. Suppose, for example, that it is desired to indicate to a caller that the telephone owner will be available at 6 p. m. Under such circumstances, the cam 42 would be rotated by manipulation of the knob 44 until the pointer 46 was directed towards the "6" of the dial 48. Under such conditions, the arm 54 would rest upon a certain intermediate portion of the face of the cam 62 between its lowest and highest portions. The switch 36 would then be thrown to the "on" position, that is, closed position, and the switch 88 would be thrown to the "p. m." position, which corresponds to its closed position. The bell 90 would then be hung upon the mouthpiece of the transmitter, as indicated in Fig. 2. The terminals indicated at P must, of course, be connected to the local power supply which, in the case of the circuit illustrated, would be alternating.

Upon receipt of a call, the bell-ringing circuit of the telephone would be energized to sound the usual call bell in conventional fashion. The relay 76 connected across the bell-ringing circuit would then attract the armature 78 during the period of flow of current in the ringing circuit and would then release it. Upon closure at 78 and 80, the motor circuit is energized. Accordingly, the shaft 28 and the sleeve 20 are rotated. If, during this period, switches 68 and 70 close, nothing will occur, due to the fact that the switch 60 remains open. As the cam 18 revolves, lever 14 is rocked, raising the member 12 and also moving the cam 84 up towards position to engage the contacts 82. The ringing current may cease to flow before the switch 82 is closed. Under such conditions, the armature 78 is released and the motor stops. The progress of the motor is indicated by the upwardly sloping lines in Fig. 8. The stopping of the motor is indicated by the interruption of the upwardly extending lines when the ringing current ceases. This action may be repeated for several rings. Eventually, however, the cam 84 will cause closure of the circuit at the contacts 82, which are shunted across the contact 80 and consequently, from then on, during the remainder of the cycle, the motor and transformer 72 will remain energized. The progress of the motor at the time switch 82 is closed is indicated in Fig. 8. The motor then continues to run and the bell may continue to ring until the lever 14 is rocked to such extent that, by reason of the rise of the receiver 16, the bell ringing circuit is opened and the transmitter circuit closed. This position is indicated in Fig. 8 at "receiver raised". It will be noted that this occasions an interruption of the ringing current. The motor will then continue to run, further raising lever 14 until it reaches its maximum position, determined by the contour of the cam 18, which is such as to keep the receiver in its maximum raised position. As the motor continues to run, the cam 40 will engage the contact lever 54, raising it off the insulated cam 42. In spite of the contact here made, which is indicated at 54 in Fig. 7, the bell 90 is not energized inasmuch as the switch 60 still remains open.

Before the high point of the cam 40 passes follower 54, the cam 62 will close the switch 64 for a short period. By using the buzzer indicated at 74, the circuit through the bell 90 will be repeatedly and rapidly made and broken, giving rise to a series of closely spaced strokes serving as a signal to the caller to be ready to count the indicating strokes. Before the high point of the cam 40 passes the follower 54, the switch 64 is opened so as not to interfere with the signal strokes.

As the high point of the cam 40 passes the follower 54, the switch 60 is closed by the cam 58. The period of closure of this switch is indi-

cated in Fig. 8 and is preferably approximately one-half the full operating cycle. After the switch **60** is closed, as the cam **66** rotates, it will successively close the switches **68** and **70**. The closure of the switch **70** follows the momentary closure of the switch **68** by about one-fourth of the revolution of the shaft **28**, whereas the next closure of the switch **68** occurs only after approximately another three-fourths of a revolution. As a result, upon each revolution of the shaft **28**, a double signal is heard, as indicated in Fig. 8. This double signal is, of course, due to the fact that the switch **88** has been thrown to the "p. m." position. If a designation of an "a. m." time is desired, then the switch **88** is opened and only a single stroke of the bell occurs upon each revolution.

As the rotation of the cam **40** proceeds, the lever **54** is lowered until it engages the cam **42**, whose height in the path of the lever was preliminarily adjusted. When the drop of the lever **54** is interrupted by the insulated cam, contact between **40** and this lever is broken, and consequently the bell circuit is open. The number of strokes of the bell will accordingly depend upon the period between the closure of the switch **60** and the contact of the lever **54** with the insulated cam **42**. In the present instance, having set the cam **42** to the position "6", there will be six double strokes of the bell occurring if a "p. m." hour is to be designated, or six single strokes if an "a. m." hour is to be designated. After the interruption of the signal strokes, the motor continues to drive the sleeve **20** until eventually the follower end **16** of the lever **14** drops off the face of cam **18**, thus lowering the receiver and opening the switch **82**. All of the parts are then in their initial position ready for operation as soon as another call is received.

The cams **40** and **42** are, of course, designed so that when the lowest portion of **42** is below the follower lever **54**, twelve single or double strokes of the bell may occur. Possibility of this is indicated in Fig. 8.

It will be observed that the invention in the embodiment illustrated does not in any way interfere with the normal telephone arrangement except by the connection to the bell ringing circuit. This may be effected in any convenient fashion and is, of course, a very simple connection. To avoid complication, it is desirable that the signal be made in an audible fashion so as to be picked up by the transmitter. It is, however, possible to connect suitable signalling means into the telephone circuit so that the party calling may determine the hour of return by, for example, counting a series of clicks resulting from the make and break of the telephone circuit.

The preliminary warning signal may be dispensed with or other preliminary signalling means employed, such means, for example, being mechanical instead of the electrical arrangement illustrated at **74**. The bell, of course, need not be of the single stroke variety, but may be replaced by a buzzer or bell giving a series of sounds of any desired frequency.

In the application of the invention to the hand type of telephone, the equivalent of the lever **14** will, of course, be used to raise the switch plunger upon which the combined transmitter and receiver rests. In such application of the invention, the bell is preferably contained within the supporting housing such as **2**, there being provided a suitable grill-covered opening in such housing below the normal position of the transmitter end of the telephone and above the bell or other signalling device.

The fact that the ringing circuit is not interfered with is of importance since, if the apparatus is set while the called party is present, he will be notified of the incoming call by the usual ringing of the bell and may answer in the conventional fashion even though the apparatus may be set in operation. The fact of its operation will, of course, serve as a notification to open the switch **86** if he intends to remain within reach of the telephone.

It will be obvious that various changes may be made in the embodiment of the invention without departing from the spirit thereof as defined in the following claims.

What I claim and desire to protect by Letters Patent is:

1. A telephone answering device comprising means for producing a predetermined succession of signals, and means actuated by an incoming call for putting said telephone in condition to transmit said signals and for initiating operation of the first means, said signal producing means including means for periodically opening and closing a circuit during a cycle of operation to produce signals, and means for adjusting the length of the portion of the cycle during which the circuit is operative.

2. A telephone answering device comprising means for producing a predetermined succession of signals, and means actuated by an incoming call for putting said telephone in condition to transmit said signals and for initiating operation of the first means, said signal producing means including means for periodically opening and closing a circuit during a cycle of operation to produce signals, means for modifying the character of the opening and closing of the circuit characterizing each signal, and means for adjusting the length of the portion of the cycle during which the circuit is operative.

3. A telephone answering device for use in conjunction with a telephone comprising means for producing successive signals indicating hours, means for adjusting the number of such signals produced in a single operation, adjustable means for indicating during each operation whether the hour indicated is a. m. or p. m., and means actuated by an incoming call for putting said telephone in condition to transmit said signals and for initiating operation of the first means.

4. A telephone answering device for use in conjunction with a telephone lifting of the receiver of which places it in transmitting condition, comprising means for producing audible successive signals in the vicinity of the telephone, means movable in conjunction with an indicator for adjusting the number of such signals produced in a single operation, and means actuated by an incoming call for lifting the receiver and for initiating operation of the first means.

5. A telephone answering device comprising means for producing successive signals, means for adjusting the number of said signals to indicate an hour and for modifying the character of each of such signals to indicate whether the hour is a. m. or p. m., and means actuated by an incoming call for putting said telephone in condition to transmit said signals and for initiating operation of the first means.

6. In combination with a telephone having a transmitter normally disconnected from its line so as not to be in condition to transmit sound signals, an answering device comprising an elec-

tromechanical sound producing means, means for intermittently controlling the circuit of said sound producing means to produce successive sound signals in the air in the vicinity of said transmitter, means for adjusting the number of such signals produced in a single operation, and means actuated by an incoming call to said telephone for connecting said transmitter to the line to put it in condition to receive and transmit said sound signals and for initiating operation of the sound producing means.

7. In combination with a telephone having a transmitter normally disconnected from its line so as not to be in condition to transmit sound signals and an associated call bell in a bell ringing circuit, an answering device comprising an electromechanical sound producing means, means for intermittently controlling the circuit of said sound producing means to produce successive sound signals in the air in the vicinity of said transmitter, means for adjusting the number of such signals produced in a single operation, and means actuated by energization of said bell ringing circuit for connecting said transmitter to the line to put it in condition to receive and transmit said sound signals and for initiating operation of the sound producing means, said last named means being arranged so as not to interfere with the ringing of the call bell until the telephone is put in condition to transmit said signals.

CHARLES E. J. MODJESKI.