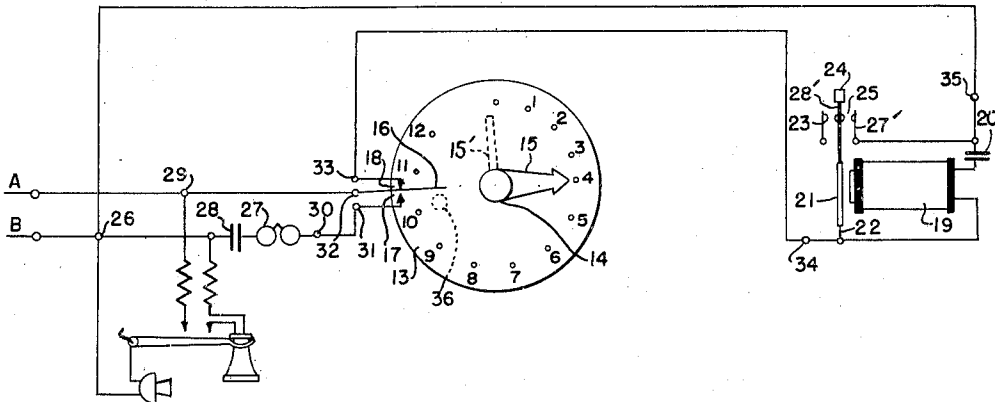


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TIMER FOR SWITCHING FROM SIGNALING DEVICE  
TO THE SUBSCRIBER'S RINGER AFTER  
SELECTABLE PREDETERMINED TIME  
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## TIMER FOR SWITCHING FROM SIGNALING DEVICE TO THE SUBSCRIBER'S RINGER AFTER SELECTABLE PREDETERMINED TIME

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1 Claim. (Cl. 179-84)

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The present invention relates to telephone systems in general, but is concerned more particularly with automatic telephone systems for giving telephone service to small and large communities.

The principal object of the invention is to provide means whereby a telephone subscriber, desiring freedom for a period of time from the annoyance of incoming calls, can temporarily silence the ringer of his telephone.

Another object of this invention is to provide means for automatically reconnecting, after a predetermined period of time, the ringer of a telephone line which has been temporarily silenced.

Another object of this invention is to provide means whereby a subscriber, who calls another subscriber whose ringer has been temporarily silenced, will receive a distinctive signal to acquaint him of the fact.

It is customary in automatic and common battery telephone systems to make use of a set of signals, with which the calling subscribers very quickly become familiar, to indicate the progress of their call through the equipment. Amongst these familiar signals are the "dial tone" and the "ring-back-signal."

The device of this invention will give a distinctive signal to a calling subscriber to advise him that the ringer of the line he has called, has been temporarily silenced; also the device of this invention will be a factor, wherever it is introduced, in reducing the number of lost calls. "Lost calls" are calls which, for one reason or another, are abandoned by the calling subscriber before connection is actually established with the wanted subscriber. Should a calling party hear the "busy tone" he understands that he must experience a little delay and make a second call after a reasonable period of elapsed time. Should he hear the "ring-back tone" without having an answer he can also draw a definite conclusion. However if a subscriber decided to silence his ringer for a period of time by disconnecting same from the telephone line, the calling subscriber would obtain no satisfaction whatever and a number of attempts would be made to establish the desired connection, all of which calls would be lost. The device of this invention would furnish a distinctive signal to indicate to the calling subscriber that

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the wanted party's ringer had been temporarily silenced.

This invention, in the specific form which has been chosen for the illustration herein, contemplates a device which would be connected with the subscriber's line on the premises where the telephone instrument is located, and is suitable for connection to a common battery system either manual or automatic.

It comprises a timer and an answer back device consisting of a condenser and a suitable relay wired and connected into the circuit of the telephone, preferably near the telephone, to enable the subscriber to temporarily disconnect his telephone ringer from the line during a period of time when said subscriber will not be available to answer incoming calls. When an incoming call comes to the premises where the answer back device of this invention has been switched into the circuit, the calling subscriber will not receive the "busy signal" or the "ring-back-tone," but an entirely different and distinctive signal which is designed to indicate to the calling subscriber that the ringer of the line he has called has been temporarily silenced.

The subscriber who wishes to temporarily silence his ringer, simply turns a knob on the face of the device to set a pointer to indicate a period of time and by this operation he has wound the timing means sufficiently to operate the timer for the period of time which is indicated by the position of the pointer. He has also disconnected his ringer and cut into the telephone circuit the relay and condenser of the device, and will hold the ringer disconnected from the telephone line and hold the device connected to the line for the period of time indicated by the pointer, for example, fifteen minutes, thirty minutes or up to any predetermined time interval within the capacity of the particular device.

When a call comes to a line where the device has been set to any advanced position away from its normal or home position, the device will function in response to the ringing current from the central office to, first bridge the line momentarily for the purpose of operating, in the telephone office, the well known "ring-cut-off" relay to remove the ringing current from the line and second, to give to the calling line a distinctive signal, which the calling party recognizes as indicating

the temporarily silenced ringer condition. Thus any subscriber whose telephone line has been equipped with the device of this invention may, whenever occasion necessitates, absent himself from his telephone for a pre-determined period of time with the assurance that all calling subscribers during said period will have the satisfaction of receiving a distinctive signal to inform him that the ringer of the telephone to which he desires a connection has been temporarily silenced.

The timer means is similar to the ordinary clock movement with certain electrical contacts added. After the knob has been turned until the pointer is resting opposite the number representing the time period which has been chosen and the knob released, the pointer commences its return journey under the control of an escapement mechanism and will come to rest on the home position at the end of the period of time selected. During the time the pointer is returning from its set position to its home position, ringing signals will be received in the device of this invention, but when the pointer reaches the home position the device will be disconnected from the telephone line, the ringer will be connected therewith and the telephone functions in a normal manner.

This invention is illustrated in the accompanying drawing which consists of 1 figure on 1 sheet. At the left are shown the conventional symbols used to represent a telephone instrument circuit and the points marked A and B represent the terminals of the line from the telephone office. The ordinary telephone circuit has been slightly altered to include the wiring for the device of this invention, which comprises a timing means and apparatus for producing a temporarily silenced ringer signal. Points 29 and 30 would ordinarily be joined permanently, however in this instance, point 30 is wired to point 31 which is one terminal of the device and the circuit passes through contact 17 in the timer and via point 32 which is another terminal of the device back to point 29 in the telephone instrument. Also connections have been made from point 26 in the telephone to point 35 in the device and from point 33, which is one of the contacts in the timer, to point 34 which is wired to the relay 19 and the relay armature 21.

The front 13 of the device is represented by a circle including 12 arbitrarily marked points numbered from 1 to 12 inclusive. The space between 1 and 2, 2 and 3, 3 and 4, etc., are arranged to represent time, for example the space could represent 5 minutes. There is a pointer 15, the clockwise movement of which is controlled manually by turning the knob 14. The return movement of the pointer from any point 1 to 12, on which the pointer has been set, back to normal or home position which is represented by stop 36, is controlled by the well known clock type escapement principle, powered by a coiled spring, similar to the main spring of a clock. Should the pointer be turned clockwise, say to position represented by the numeral 1 and then released, it would travel back to its home position in say, five minutes. Again, when the pointer is set to the position marked 4 and then released it would return to the home position in 20 minutes, that is it would travel over 4 spaces of 5 minutes each. It will be noted that when the knob 14 is turned manually clockwise, the spring 16 is released by arm 15' and moves upwards to close contact 18 and at the same time to open contact 17. This

has the effect of disconnecting the telephone ringer from the A side of the line and connecting this line conductor to one side of the relay 19 through contact 18. The relay 19 and condenser 20 are now in series across the line A and B. After the time interval has elapsed and pointer 15 has returned to its home position, spring 16 will be moved downwards by arm 15', contact 17 will be closed after which contact 18 will be opened. The relay 19 is equipped with a weighted spring armature 21, held in place by a suitable tuned reed 22. The ringing current from the telephone office will cause relay 19 to attract its armature 21 closing contact 25, which places a short circuit across the conductors A and B. Relay 19 is of the slow-to-release type, the armature 21 remains attracted and holds the short across the telephone line a sufficient length of time to cause the operation of the well known "ring-cut-off" relay in the telephone office, thus removing the ringing current from the line. When the ringing current is cut off, armature 21 is released and it swings away from spring 27' opening contact 25, however it does not stop at the center point between springs 27' and 23, instead it swings to the left of center, carrying with it spring 23, a considerable distance beyond its normal position. Due to the action of the reed 22 in its effort to restore armature 21 to a neutral position and the effect of the weight 24 near the end of spring 28', the armature will continue to vibrate back and forth a considerable length of time. The telephone line circuit at the moment is being fed from the central office with positive and negative battery, with a relay 19 in series with condenser 20 across the line instead of the regular telephone ringer. The succession of short circuits across this line at contact 25 caused by the vibration of the weighted spring armature 21 produces a distinctive signal audible to the calling subscriber and which he recognizes as the "temporary-silenced-ringer" signal. Upon hearing this signal the calling subscriber would restore his receiver at once, as would be the case on hearing the "busy signal," but in this instance the calling subscriber would not repeat his call as quickly as he would on hearing the "busy signal," for the reason that a "temporary-silenced-ringer" condition would be for a much longer period of time than a busy line condition and the calling subscriber would use his own judgment as to what interval of time he should allow to elapse before making a second attempt to connect with the wanted subscriber.

Having described the invention and what is considered new and desired to be protected by Letters Patent is set forth in the following claim.

What is claimed is:

1. In a telephone system, a subscriber's line equipped with an audible ringer and a timing mechanism, an arm in said mechanism having a normal position and a plurality of different time delay positions representing progressively greater time delay periods, said arm manually movable from its normal position to select any desired one of said time delay positions, timing means in said mechanism for automatically returning said arm to its normal position in response to the manual movement of said arm to a selected time delay position, said timing means requiring a time duration equal to the said selected time delay position to return said arm to its normal position, a circuit normally connecting said ringer across said line during the time said arm is in

normal position and said circuit being opened in response to the movement of said arm from its normal position and for a duration of time corresponding to said selected time delay position to disconnect said ringer during the time said arm is returning to its normal position, a signalling device normally disconnected from said line, circuit means for operatively connecting said device to said line during the time said arm is out of its normal position, said device being operated in response to incoming signals to said line in case said arm is out of its normal position, and tone generating means operated by said device for transmitting a tone back over said line to the calling party.

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### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

Number	Name	Date
598,172	Barron -----	Feb. 1, 1898
1,103,288	Hill -----	July 14, 1914
1,506,125	Keddy -----	Aug. 26, 1924
1,722,447	Weyler -----	July 30, 1929
1,864,119	Braun -----	June 21, 1932
1,894,611	Lippstadt -----	Jan. 17, 1933
1,932,774	Fowler -----	Oct. 31, 1933