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TIMING MECHANISM

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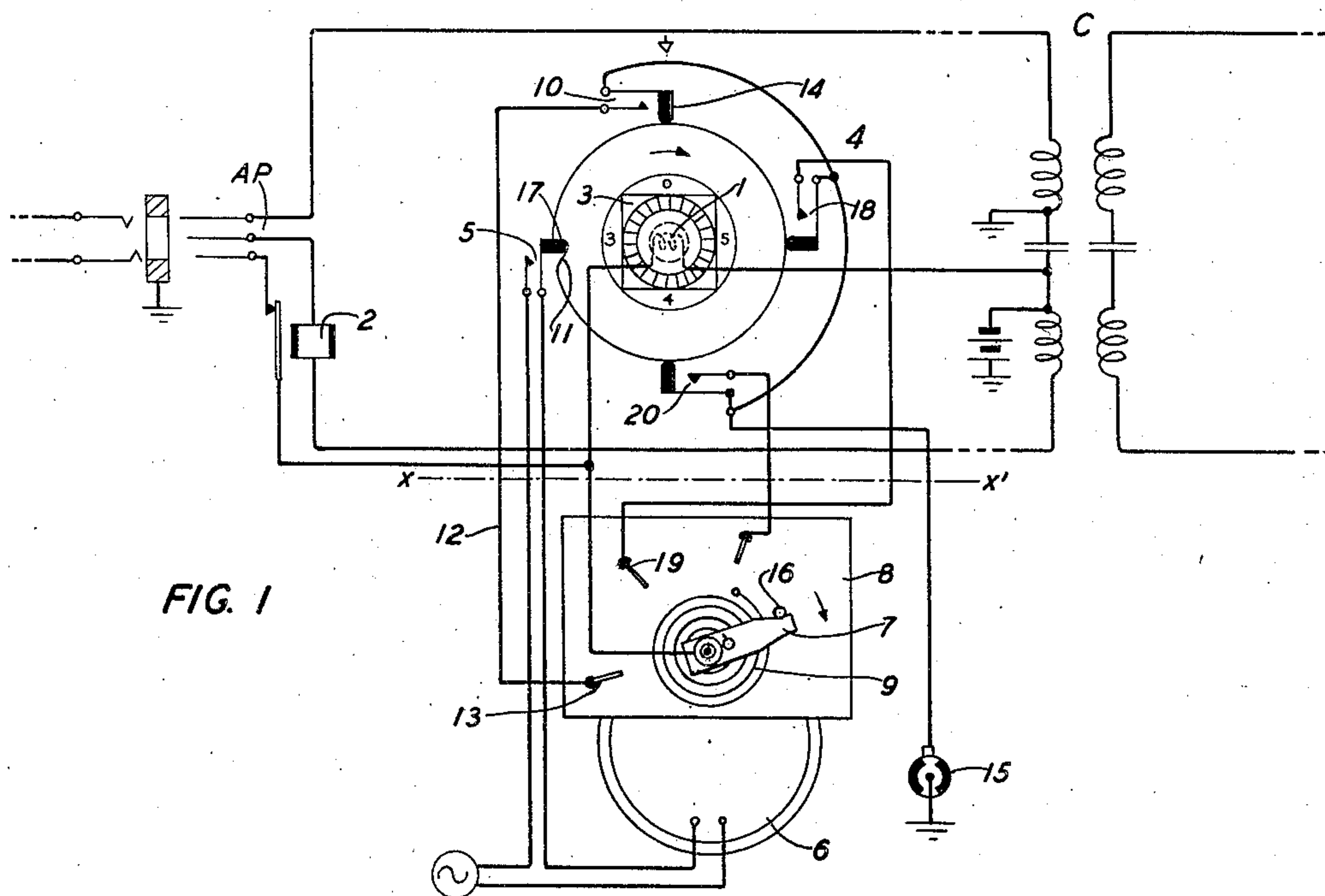


FIG. 1

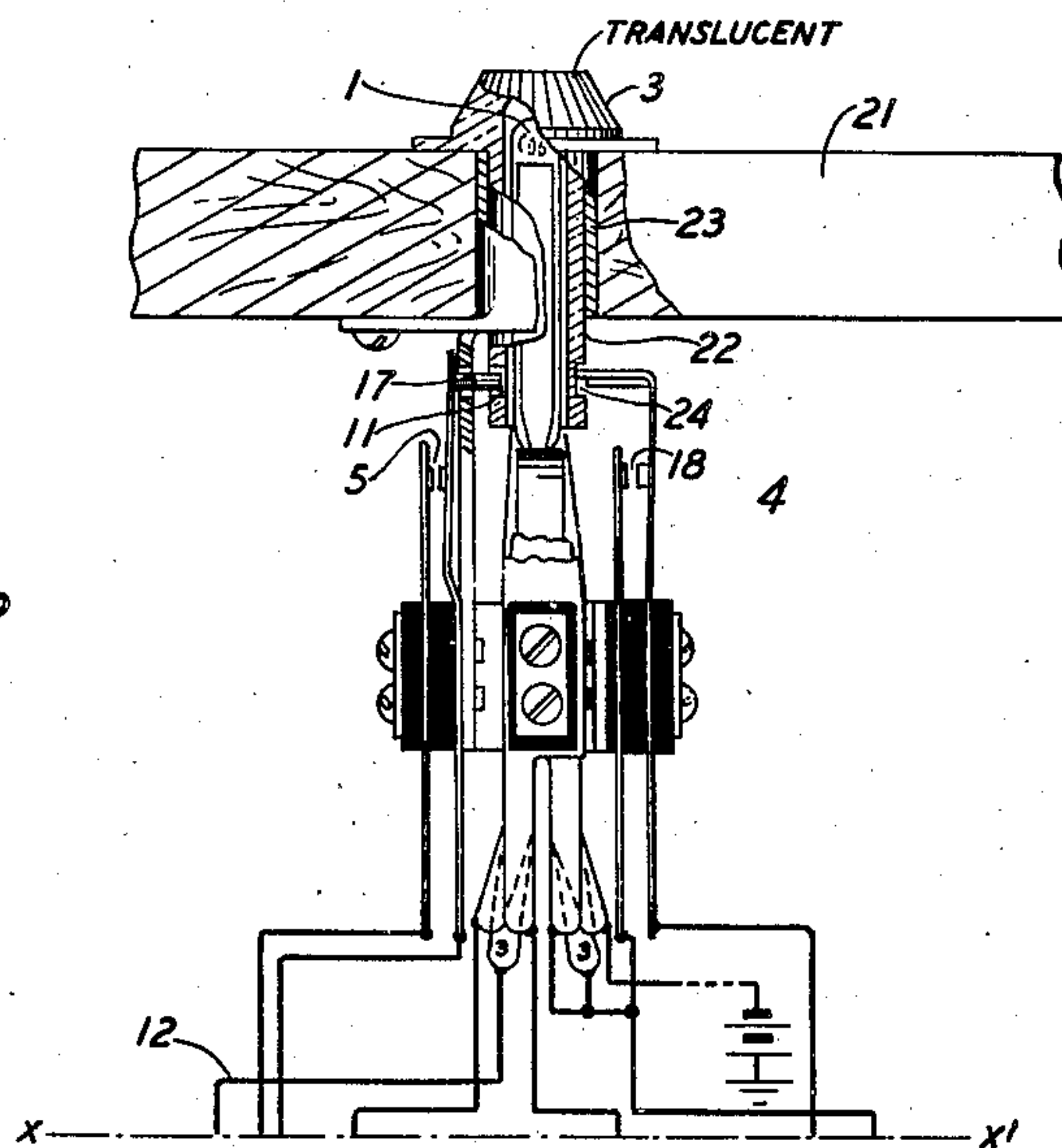


FIG. 2

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TIMING MECHANISM

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3 Claims. (Cl. 179—7.1)

This invention relates to timing mechanisms and particularly to arrangements of this character for measuring and indicating telephone conversation time intervals.

It has heretofore been suggested to measure the lapse of a predetermined time interval beginning with the start of a telephone conversation and, at the end of the interval, to give the operator a signal in order that she may take any desired steps such as to collect an additional coin in case the conversation is to be continued, or to request the parties to the connection that they terminate their conversation promptly as other calls are waiting for one or both of the connected lines. Such arrangements, however, have usually involved complicated structures and switching apparatus and an object of the present invention is therefore to provide an efficient and relatively simple indicating arrangement for systems of the above character. One feature of the invention whereby this object is attained resides in employing the regularly provided answering or rear supervisory lamp of a cord pair as the elapsed time signal device, which lamp is caused to flash when the conversation has been in progress a predetermined interval of time.

Another feature resides in the provision of means whereby the time interval between the start of the conversation and the flashing signal is manually adjustable under control of the operator.

The invention will be understood from the following description and the accompanying drawing, Fig. 1, of which is a schematic showing of the timing arrangement associated with one end of a switchboard operator's cord circuit and Fig. 2 shows one form of a manual switching device which may be used for selectively determining the time interval between the start of conversation and the start of the flashing signal which device is adapted to be mounted in the switchboard key shelf in the space commonly occupied by the answering cord supervisory lamp and includes as part of its assembly said supervisory lamp.

In Fig. 1, the answering end of a cord C is shown having a supervisory lamp 1 in its sleeve circuit under control of a supervisory relay 2 which is in series with the ring conductor of the cord, the operations and functions of which are well known, i. e., when the answering plug 18 is inserted in a calling line, the supervisory relay 2 operates, thereby opening at its contacts the circuit for lamp 1 which therefore remains

dark, but when the calling subscriber replaces his receiver on the switchhook, relay 2 releases thereby completing a circuit to light lamp 1 in an obvious circuit thus indicating to the operator that the subscriber on the calling line has hung up. It will therefore be observed that during the progress of a conversation, the answering supervisory lamp 1 is dark and may be used for some other signaling purpose, such as a flashing signal to indicate the expiration of a predetermined conversation interval so long as its ability to perform its normal supervisory function is not disturbed.

To enable the lamp 1 to function as a timing signal as well as a supervisory signal, it is mounted in the turn button 3 of a switch 4, which button may be of some translucent or light transmitting plastic material. When the button 3 is moved off-normal in a clockwise direction, the contacts springs 5 are immediately closed, thus completing an energizing circuit for an alternating current motor 6 of the so-called synchronous type commonly used in electric clocks which motor, in operating, through a system of gears, drives a brush 7 of a switch 8 also in a clockwise direction against the action of a spring 9, at a predetermined slow rate of speed which in practice may be at the rate of one revolution in six minutes.

Let it be assumed, for example, that it is desired that the lamp 1 start flashing when a conversation has been in progress over the cord C for a period of three minutes. To condition the arrangement of the present invention to cause the lamp to commence flashing at the conclusion of this time interval, the operator, upon noting that both subscribers to the connection have their receivers off the hook, i. e., that a conversational connection has been established, will rotate the button 3 of switch 4 associated with the answering supervisory lamp 1 involved in this connection, one quarter turn to the right. As before mentioned, as soon as the switch 4 is moved off-normal, contacts 5 are closed and the motor starts to drive switch 8 and when the switch 4 is advanced to the three minute position, the projection 14 on the upper spring of contact pair 10 drops into a notch 11 of the switch, thereby permitting contacts 10 to close, thus connecting interrupted ground from interrupter 15 over contacts 10 and conductor 12 to the three minute contact 13 of switch 8. Brush 7 of this switch continues to rotate under the driving force of the motor 6 and when it has moved through an angle of approximately 180

degrees, it reaches contact 13 thereby completing a circuit in series with interrupter 15 to flash the supervisory lamp 1 at some suitable rate, 120 times a minute for example. The face of brush 7 is of sufficient width so that it will be in engagement with the contact 13 for an appreciable interval of time, 20 seconds for example, during its movement after which it will pass off this contact, thus stopping the flashing lamp. The brush, however, will continue to move until it abuts stop member 16 thus stalling the motor. When the operator notes the flashing lamp, she may ask the connected parties to discontinue their conversation and when the connection is taken down the operator may rotate the button 3 around to its normal or resting position, whereupon the projection 17 will drop into notch 11, thus opening the circuit of motor 6 at contacts 5 whereupon the brush 7 will rotate in a counter-clockwise direction under force of the spring 9 until it comes to rest against the lower side of stop member 16.

If a longer conversation interval, such as four minutes, is to be allowed, the button 3 will be rotated to its four minute position, whereupon contacts 18 will be closed, thus grounding contact 19 of switch 8. This contact is so positioned that a four minute interval elapses before brush 7 reaches it and the lamp is flashed. In like manner, a five minute interval is provided for by means of contacts 20 which are closed by rotating button 3 to the third or five minute position. It will be understood that other intermediate time intervals can be obtained by the proper location of contact springs on the switch 4 and the contacts of the switch 8. If longer or shorter intervals than those mentioned are desired, the speed of rotation of brush 7 can be adjusted by regulating the speed of motor 6 or changing the ratio of the gears between the motor shaft and the driving shaft of the brush 7.

Fig. 2 shows one form of a combined supervisory lamp housing and manually controlled switch for selectively determining the elapsed time interval before the supervisory lamp starts flashing which structure is adapted to be mounted in the key shelf 21 of an operator's switchboard in the location usually occupied by the supervisory lamp alone. This lamp 1 serves both as a supervisory signal and also to indicate the termination of a preselected time interval and is mounted within the switch operating button 3 which preferably may be of some translucent or

light transmitting material. The button 3 has a tubular extension 22 journaled in a bushing 23 mounted in the key shelf 21. A guide channel 24 is cut in the tubular extension 22 and an opening 11 is provided therein sufficiently deep so that when it is opposite any one of the contact spring projections such as 17, 14, etc., the respective contacts will be closed. It will be understood that Fig. 2 may be substituted for that portion of Fig. 1 above the horizontal broken line X, X'.

What is claimed is:

1. In a timing device for telephone switchboards, in combination, a cord circuit having a supervisory signal device associated therewith, a manually operable selective switch associated with said signal devices and adapted to close any one of a plurality of associated contacts depending upon its selective setting, a second switch adapted to successively close a plurality of associated contacts corresponding to the contacts of said manual switch, a motor for driving said second switch at a known constant rate of speed, means responsive to an "off normal" operation of said selective switch for causing said motor to drive said second switch, means interconnecting the respective contacts of said two switches, and means for energizing said supervisory signal when said second switch closes its contact connected to the closed contact of the manually operated switch.

2. In an operator's telephone switchboard, subscribers' lines terminating thereat, cords for interconnecting said lines, a supervisory lamp associated with each cord and adapted to light when the respective cord is connected to a line and the associated subscriber's telephone is on the switchhook, and darkened when the telephone is taken for use, and means including a manual switch individual to and associated with each lamp adapted to be selectively actuated following the darkening of the lamp for causing it to flash when a predetermined interval of time has elapsed following the selective actuation of said manual switch.

3. An arrangement in accordance with claim 2, characterized in this, that said associated manual switch and lamp are assembled as individual switch and lamp units and located in the switchboard key shelf in the same location as the supervisory lamp alone.

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