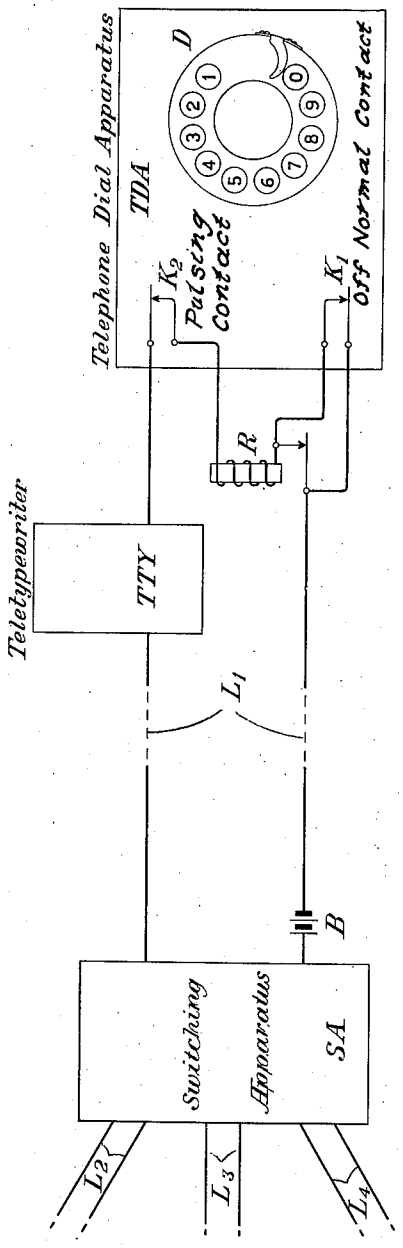
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DIAL CONTROLLED SIGNALING SYSTEM

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INVENTOR
J. T. Neiswinter
BY Jefferson Ehrlich
ATTORNEY

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DIAL CONTROLLED SIGNALING SYSTEM

James T. Neiswinter, South Orange, N. J., assignor to American Telephone and Telegraph Company, a corporation of New York

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This invention relates to signaling systems and more particularly to dial operated signaling systems.

In prior signaling systems, such as telegraph systems, it has been the practice to use a manually controlled device such as a key to interrupt a circuit for the purpose of transmitting a marking or spacing pulse to a distant point. A long pulse could be obtained, for example, by holding the key closed for a long period of time and a shorter pulse obtained by holding the key closed for a briefer interval of time. In either case the length of the pulse was dependent upon the judgment and skill of the operator. Accuracy in the timing of the pulses was therefore difficult to obtain.

According to the present invention it is proposed to provide a pulsing system for signaling apparatus in which the lengths of the pulses are more accurately determined. To accomplish this end, a dial of the type generally employed in the telephone plant is used together with a relay the winding of which is connected in series with the signaling line, the relay being maintained normally operated. The armature and contact of the relay are so connected as to provide a circuit in shunt with the so-called "off-normal" contacts of the dial. In the proposed arrangement the dial may then be rotated by hand in a clockwise direction and then released to rotate in a counter-clockwise direction, thereby producing a pulse of a length which is proportional to the number dialed. The pulse produced by dialing the digit 2 will be longer than that obtained by dialing digit 1, the pulse obtained by dialing digit 3 will be longer than that obtained by dialing digit 2 and so on, the longest pulse being obtained by dialing the digit 0.

This invention will be better understood from the more detailed description hereinafter following when read in connection with the accompanying drawing showing one embodiment of the invention merely for the purpose of illustration.

Referring to the drawing the telephone dial apparatus TDA—which may be, for example, a standard telephone dial—includes the usual rotary dial element D, the "off-normal" contacts K_1 and the pulsing contacts K_2. Other portions of the dial apparatus such as the governor, etc., which are not required for an understanding of the invention are not shown. The contacts K_1 and K_2 are connected in series with the winding of a relay R. This series circuit is connected to a line L_1 through a teletypewriter apparatus TTY, the line L_1 extending to a distant station which may include, for example, a switching apparatus SA controlled by the pulses produced by the dial apparatus TDA. The switching apparatus SA may be employed to connect line L_1 to anyone of a plurality of lines L_2—L_4 so that teletypewriter signals may be transmitted in both directions between the teletypewriter TTY and the teletypewriter apparatus (not shown) connected to the selected line.

It will be observed that when the dial D is in its normal position as shown in the drawing, current flows from battery B over line L_1 and through the winding of relay R, the completed circuit including battery B, the lower conductor of line L_1, the off-normal contacts K_1, the winding of relay R, the pulsing contacts K_2, the teletypewriter TTY, the upper conductor of line L_1 and the apparatus SA. This current is sufficient to maintain relay R in an operated condition. When relay R is so operated, its armature and make contact provide a circuit in shunt with the off-normal contacts K_1. Hence when dial D is rotated in a clockwise direction, the off-normal contacts K_1 will be opened, but the circuit from battery B to the winding of relay R will be held closed through the parallel circuit completed through the armature and make contact of relay R. The contacts K_1 are held opened at all times when the dial D is not in the normal position shown in the drawing, but relay R will remain operated until the pulsing contacts K_2 become opened.

Upon the release of dial D by the operator, the dial D will then rotate in a counter-clockwise direction in the usual manner, thereby causing the pulsing contacts K_2 to open and close repeatedly. The number of times that contacts K_2 are opened and closed depends directly upon the number dialed. Upon the first opening of contacts K_2, the circuit interconnecting battery B with the winding of relay R will be opened and therefore relay R will release. The release of relay R removes the parallel path previously established by its armature and contact around the off-normal contacts K_2. Hence the line L_1 will become opened immediately after dial D is released and thus a spacing pulse will be transmitted over line L_1 to the apparatus SA.

The line L_1 will remain open until the dial D returns to its normal position shown in the drawing. When the dial D reaches its normal position, contacts K_1 will then become closed and contacts K_2 will cease to open and therefore the

latter contacts will remain closed. The winding of relay R will then become re-energized, re-establishing a parallel path around the contacts K_1. Consequently, the line L_1 will become closed.

The length of the spacing signal sent by dial D over the two-wire line L_1 to the distant apparatus SA is measured by the time interval between the instant when the dial D is released to rotate in a counter-clockwise direction and the instant when dial D finally reaches its normal position. This period of time is determined only by the number dialed. It does not depend on the discretion or judgment of the operator. The length of the spacing signal will then be accurately timed and the same signal may be repeated as often as desired.

It will be clear that the dial D may be operated to provide any desired number of accurately timed spacing pulses or signals of any desired lengths all interspersed with marking pulses or signals. These different pulses may be transmitted to control, for example, switching apparatus SA which may be of the type disclosed in my copending applications, Serial Nos. 373,573 and 373,574, filed January 8, 1941. In these copending applications, the received pulses are employed to select any one of a plurality of different lines such as L_2—L_4 for the transmission of teletypewriter or other signals thereover. The teletypewriter TTY may then be employed for the transmission of signals to and the reception of signals from the distant station.

It will be understood, of course, that the apparatus SA may be any well-known telegraph or other translating device which is suitable to respond to pulses of current received over line L_1.

The dial-controlled spacing pulses obtained by operating a dial such as D may be made longer than those possible with a teletypewriter character. This permits the use of slower acting relays and less critical timing circuits at the switching apparatus SA. Moreover, the possibility of false operation is reduced.

While this invention has been shown and described in a particular arrangement merely for the purpose of illustration, it will be understood that the general principles of this invention may be applied to other and widely varied organizations without departing from the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. Apparatus for producing pulses of current comprising a dial-operated device having off-normal contacts and pulsing contacts, a normally operated relay having its winding in series with both of said contacts, the armature of said relay being connected so as to provide a path in parallel with said off-normal contacts, and means for rotating said dial device to release said relay for a period of time which is determined by the number dialed.

2. Apparatus for producing pulses of current comprising a rotary device, first and second contacts controlled by said rotary device, a normally operated relay having its winding connected in series with both said first and second contacts, the armature of said relay being connected so as to provide a path in parallel to said first contact, said first contact being open when said rotary device is not in its normal position, said rotary device including means whereby said second contact will be successively opened and closed when said rotary device is rotated in a predetermined direction, and means for rotating said rotary device to release said relay for a period of time which is determined by the angle through which said rotary device is rotated.

3. Apparatus for producing pulses of current comprising a rotary device, a first contact which is open when said device is not in its normal position, said rotary device including a second contact and means whereby said second contact is successively opened and closed when said device is rotated in a predetermined direction, the number of times said second contact is opened and closed depending on the angle through which said device is rotated in said predetermined direction, a normally operated relay having its winding connected in series with both said first and second contacts, the armature of said relay and its contact being connected so as to provide a path in parallel with said first contact, and means for rotating said device in said predetermined direction to release said relay for a period of time which corresponds to the angle through which said device is rotated.

4. Apparatus for producing pulses of current for transmission over a two-wire line, comprising a telephone dial having off-normal contacts and pulsing contacts, a normally operated relay having its winding connected in series with both of said contacts and said line, the armature and contact of said relay being connected so as to provide a path in parallel with said off-normal contacts, and means for rotating said dial to release said relay to establish a pulse of a length which is dependent upon the number dialed by said dial.

JAMES T. NEISWINTER.