

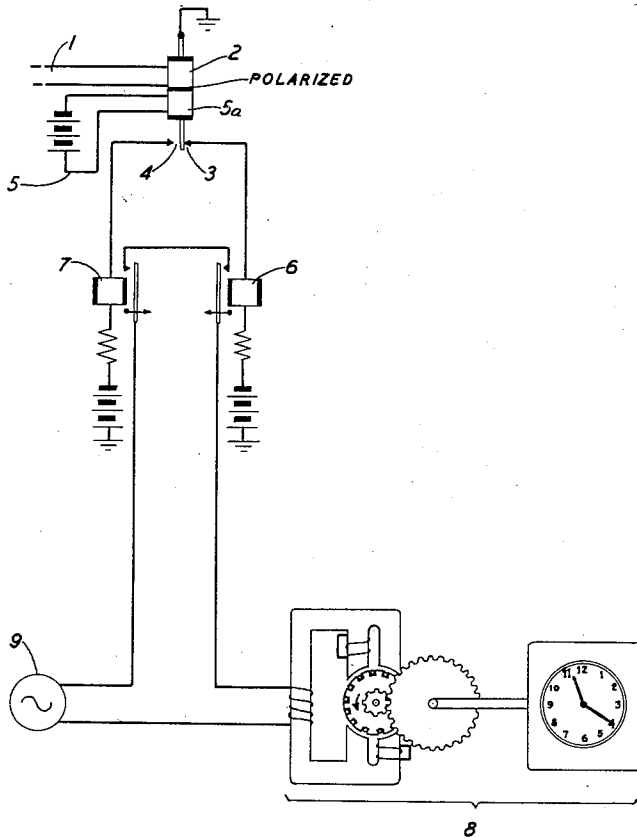
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TIMING DEVICE FOR TELEGRAPH CIRCUIT

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TIMING DEVICE FOR TELEGRAPH CIRCUIT

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This invention relates to timing devices for telegraph circuits.

An object of the invention is to provide an integrating timing device which sums or integrates and indicates the total elapsed time during which a channel of telegraphic transmission is operated. In the case of a channel of telegraphic transmission which has a normal or marking condition and a spacing condition, the channel is not considered to be in operation when it remains marking for a substantial length of time or when it remains spacing for a substantial length of time. Thus, for example, if a customer pays for a circuit upon the basis of length of time used, he would have to subtract from the total time not only the time in which the channel remains marking but also the time in which it remains spacing. Thus, for example, it might remain spacing during times when the channel is electrically open, grounded or otherwise inoperative. The arrangement of the invention may, of course, be employed for other useful purposes than charging a customer, for example, it might be used for supervisory purposes in checking the extent of use of the channel of transmission of any kind of an impulse transmission system or for other purposes. Thus in the case of several channels of communication connecting the same two points, information might be gained by making use of the invention as to the desirability or necessity of furnishing additional channels or removing from service those which are furnished, especially if the information as to the total use of each channel were supplemented by other information indicating what portion of the time each particular channel has been found to be operable and available for use. This arrangement may also be used to record the approximate number of characters transmitted knowing the time of operation and the speed of transmission, when automatic transmission is employed.

The invention may be further explained in connection with the accompanying drawing in which the sole figure is a diagrammatic indication of a circuit arrangement comprising an exemplary embodiment of the invention.

Let it be assumed that it is desired to integrate the time of operation of any telegraph channel 1 which is indicated as incoming and outgoing line conductors including a relay 2 which may be of the polarized, unpolarized or of any other suitable type depending on the type of telegraph channel or path in which the relay is connected. In an open and closed telegraph

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path the relay 2 could be an ordinary unpolarized relay or a polarized relay equipped with a second winding for biasing current approximately has the value of the line current as shown in the figure; in a telegraph path transmitting polar signals the relay 2 could be a polar relay; in a path in which marking or spacing conditions are represented by groups of alternating current waves the relay could be an alternating current relay; furthermore, the relay could be controlled by the output path of a discharge tube relay having an input circuit shunted across the line and of a potential operated type which would abstract but a small amount of power from the telegraph channel. Specifically, it may be assumed in the disclosed embodiment that the telegraph line is a loop traversed by current pulses representing marking conditions and little or no current representing space conditions and that the marking conditions cause the relay 2 to maintain its contact 3 closed and that the relay responds to spacing conditions by closing the contact 4 under the control of a local biasing circuit 5 acting upon a winding 5a. A slow release relay 6 is connected in circuit with a local battery when the contact 3 is closed and a slow release relay 7 is connected in circuit with the same or another local battery when the contact 4 is closed. If telegraph transmission is taking place, the contacts 3 and 4 will be closed alternately in fairly rapid succession, the degree of rapidity depending largely upon the type of telegraph code used in transmission. If we assume that the start-stop five-unit printer code transmitted from an automatic sender working at about 360 code combinations per minute is employed, the maximum time during which either the contacts 3 or 4 remain closed will be not over about $\frac{1}{6}$ of a second except in the case of break signals which are ordinarily not transmitted by an automatic transmitter but may upon occasion be transmitted by a supplemental key, or in the case of a keyboard transmitter, by means of a break key attached to the machine. If it be assumed that the contact 3 is closed in the idle marking condition of the circuit, then the relay 6 will be energized and when transmission begins each spacing impulse will close the contact 4 and cause the relay 7 to be energized. If each of these relays is of a type which requires more than $\frac{1}{2}$ second to release their armatures from their front contacts, a path will be closed continuously during the transmission from an alternating current supply source 9 through the

front contact of relay 7 and the front contact of relay 6 to a self-starting electric device 8 which may be similar to a self-starting electric clock well known in the art and commonly sold under the trade-mark "Telechron" or any other electrically driven time integrating and indicating device operated by a self-starting motor. For signal counting the device 8 may have its face calibrated in numbers of characters. Any time the circuit or channel 1 remains in marking condition continuously for more than about $\frac{1}{2}$ second, relay 6 will be released and stop the operation of the device 8 and any time the channel 1 remains in spacing condition or open or grounded or discontinuous for more than about $\frac{1}{2}$ second, the relay 7 will release its armature and the device 8 will stop operating. Pauses in transmission for small fractions of a second may stop the operation of the device 8 and individual line hits may cause the device 8 to operate for periods of time of the order of a fraction of a second when no intelligence transmission has occurred; moreover, break signals may stop the operation of the device 8 for a period of time equal to the duration of the break signal less about $\frac{1}{2}$ second. Break signals are relatively infrequent on most telegraphic circuits but in any case the total effect of break signals and other similar non-transmission conditions upon the device 8 will be too small to prevent the obtaining of a reasonably accurate record, particularly as the effects produced by some of these conditions will be of a kind to record too much time upon the device 8, and the effects produced by other conditions will be of a nature to cause too little time to be recorded on the device 8, in consequence of which they will in part neutralize one another.

It is understood that the telegraph channel 1 may comprise or include in addition to the relay 2 one or more or any number, within practical limits, of transmitters or transmitting keys and receiving or repeating relays or equivalent elements. Such devices are well known in the

art and, consequently, are well understood without illustration in the drawing.

What is claimed is:

1. An arrangement for indicating the time during which a telegraph channel of transmission is used for transmission by means of a code which in normal transmission changes from one condition to another in the maximum of a given time which comprises two electric circuit closing contacts, instrumentalities so associated with the channel of transmission and said contacts that they close and maintain said contacts closed during normal use of the channel of transmission and a time integrating device associated with a source of operating potential through said contacts in such manner that it operates when both contacts are closed to integrate and indicate elapsed integrated time and ceases to operate when either of said contacts is open.
2. A telegraph channel for carrying intelligence in the form of telegraphically coded impulses, means in said channel responding to changes of impulse condition, a time integrating device associated with said means by means whereby the time integrating device indicates the sum of the time the telegraph channel is actually transmitting normal telegraphic impulses separately from the time the channel stands idle whether in marking or spacing condition, said last named means including slow acting means, and a synchronous self-starting motor driven clock controlled by said slow acting means.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,241,258	Gardner et al.	May 6, 1941