May 30, 1939. H. O. PETERSON 2,160,083

IDLE TIME KEYING

Original Filed Dec. 23, 1933

Fig. 1

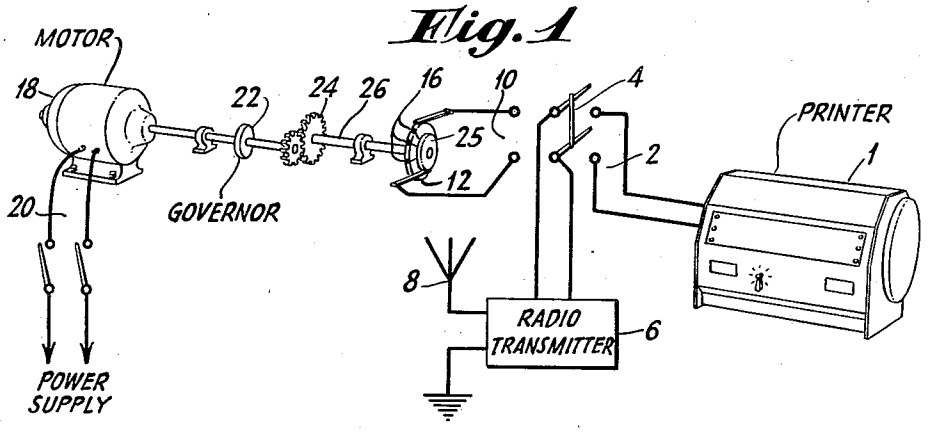


Fig. 2

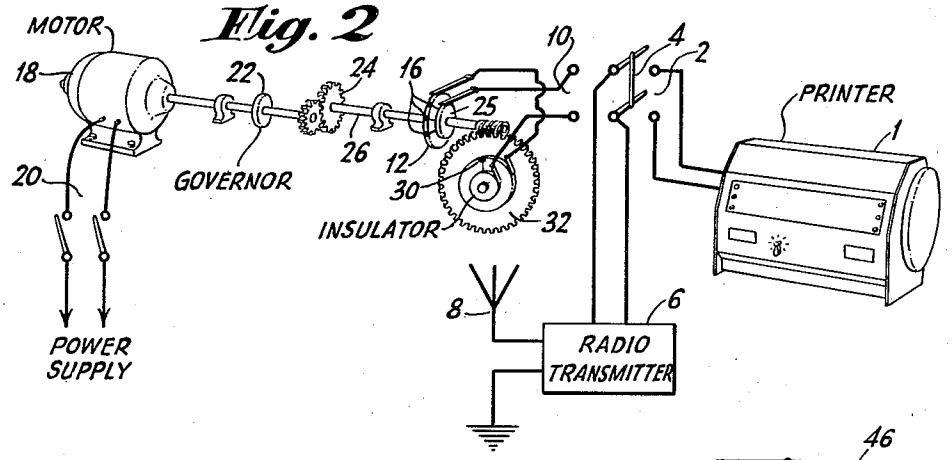
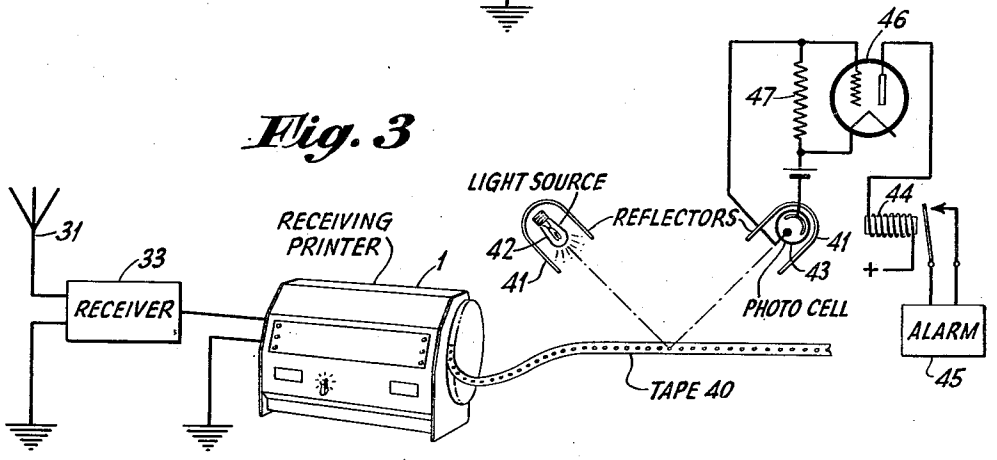


Fig. 3



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IDLE TIME KEYING

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Original application December 23, 1933, Serial No. 703,783, now Patent No. 2,055,985, dated September 25, 1936. Divided and this application March 26, 1937, Serial No. 133,136

2 Claims. (Cl. 178—66)

This invention relates to idle time keying circuits for use with prir ting telegraph apparatus on radio circuits and is a division of my United States application Serial No. 703,783, filed December 23, 1933, now United States Patent No. 2,055,985 granted September 25, 1936, and relates also to features disclosed but not claimed specifically in a divisional application thereof, Serial No. 38,725, filed August 31, 1935.

In communication by radio it is frequently necessary, in order to maintain circuit contact, for the attendant at the receiving station to check the tuning adjustment of the receiver with the transmitter. When message signals are being sent over the radio channel it is the practice to utilize these same signals for the supervision of the circuit, but during idle periods it is customary to transmit frequent test signals to maintain a continuous assurance that the overall circuit is functioning; otherwise, some adjustment of either the transmitter or receiver might change during the idle period, a condition which might consequently result in no response at the receiver when the transmitter resumes operation.

Heretofore, in the use of automatic Morse code telegraph transmitters, it has been customary to send V's, dots, ABC's or call letters at spaced intervals during idle periods. Such procedure, however, has not proven convenient on printer circuits; consequently, it has been the practice to use reversed keying. In this type of operation, the marking impulses appear as spaces on the transmitted signal. Thus, a steady dash will be sent during the intervals between transmissions. While the radiation of a steady dash between transmission proves to be a very effective way of maintaining circuit contact, it has been found to constitute a continuous dissipation of power and wear and tear on transmitter tubes.

It is the primary object of the present invention to provide means whereby circuit contact may be maintained without such objectionable dissipation of power and wear on transmitting equipment.

According to the present invention, it is proposed to transmit letters from the printer equipment at even intervals at a rate of approximately twenty-four letters per minute, a number which it is found maintains satisfactory contact over the circuit. The keying is arranged so that the transmitter radiates energy only during the marking impulses from the printer. Since the full speed transmission rate for a typical printer is three hundred and seventy-two letters per minute, and since each letter does not constitute 100% marking impulse, it will be seen that a considerable saving of power and tube life may be obtained by the use of a device for sending a reduced number of letters, let us say, approximately twenty-four spaced letters per minute. The number of these spaced letters per minute may, of course, be varied to suit circuit conditions and in some cases the number may be considerably reduced.

The purposes of the invention are accomplished, in accordance with one embodiment as disclosed by cases Serial Numbers 703,783 and 38,725 above mentioned, by the provision of automatic contactor apparatus for causing the transmission of the test letters, while, in another embodiment apparatus is connected to the mechanical or the electromechanical parts of the printer itself whereby the desired letters are transmitted by the automatic operation of the clutch lever or the "trip-off pawl" of the mechanism. In a third embodiment, the transmitter message channel is connected to switching mechanism which may then associate the channel either with the printer or with a generator of impulses, this generator being any suitable device such as a commutator rotating at a desired velocity and having segments of desired length. Other embodiments of this portion of the system will readily suggest themselves from a reading of the specification.

In connection with systems of this nature it is desirable that some indication of a change in the conditions of signal transmission should be ascertainable at the receiver points without continued observation thereof.

Accordingly, the present divisional application is directed primarily to that portion of the system disclosed by the parent application wherein an indicator arrangement in the form of a photoelectric scanning device is utilized, at the receiver end for actuating an alarm whenever signals are received which correspond to letters other than the desired and predetermined test letter.

The invention is described in more detail in the accompanying specification which is accompanied by drawings wherein Figs. 1 and 2 schematically illustrate different embodiments of the invention, as utilized for the transmission of the signals, and Fig. 3 shows an alarm device of the above described character at the receiver end of the system for attracting the attention of the attendant whenever the test letter is not correctly received.

Referring first to Fig. 1 for an understanding of the nature of the transmission, there is shown a standard printer 1 in circuit with a line 2 extending by way of a double pole, double-throw

switch 4 to a radio transmitter 6 arranged to radiate energy over an antenna 8. The switch 4 also cooperates with a second line 10 to connect the radio 6, 8 to an idle time keying device comprising a commutator 12 having a continuous ring 14 on which one brush bears, and segments 16 on which the other brush bears. The brushes are connected to the line 10. A motor 18, driven by energy from line 20, operates through reduction gearing 22, 24 and a shaft 26 to drive the segment wheel 12.

The rotating commutator 12 having the conducting rig 14 connected to segments 16, which are of proper length so as to give a normal test signal during idle periods, for operation of the receiving printer at the other end of the circuit, is driven at the desired speed by the motor 18. In operation it is necessary to control accurately the velocity of the commutator and this is accomplished by the provision of a governor 22, or by making motor 10 a synchronous motor operating on suitably regulated alternating current. The double-throw, double-pole switch 4 serves to connect the radio transmitter with either the printer or the idle time test character commutator, as desired.

In the drawing, the segments 16 are shown occupying a small percentage of the total commutator periphery. If desired, these segments may be spread out over a large portion of the circumference and made to operate the outgoing control circuit 10 through this character forming commutator 12 in series with another commutator operating at very slow speed and bearing a contact segment covering a small portion of its total circumference. This second contact wheel may be geared to the shaft 26 driving the character forming commutator 12 through additional reducing gear of such value that the circuit to the transmitter is established only once during a predetermined number of revolutions of the contact forming commutator 12. Thus, it is possible to send the test letter at proper speed to operate a receiving printer, but at spaced intervals on the order of approximately two seconds between each transmission of the test signal. Such an arrangement is shown in Fig. 2 where the length of the segment 30 on the second contact wheel 32 corresponds to one full revolution of segment wheel 12. The operation of this circuit, it is thought, will be obvious from mere inspection of the drawing. It will be appreciated that this character forming commutator might be driven by means other than a rotating motor. It could, for instance, be driven by an oscillating type of contactor such as that which is found in the dialing mechanism of the unit in the base of a common automatic telephone. If such mechanism were used, an electromagnetic device could be caused to dial this mechanism at spaced intervals. The dialing mechanism is provided with a governor and could be caused to send a predetermined group of marking impulses at proper speed for operating the printer at the receiving end of the circuit.

By Fig. 3, the receiver end of the system is shown in more detail. In this receiver system, the signals transmitted from the transmitting means 6 (Figs. 1 or 2) are received upon the receiving antenna 31 by a radio link or upon an equivalent wire line receiver for a wire line link between receiver and transmitter. The signals received upon the antenna 31 are then suitably amplified in the receiver and amplifier device 33. The output signal energy from the receiver amplifier device 33 then actuates the receiver printer device 1. This receiver printer device produces as is known a tape record 40 which is a printed duplicate of the signals transmitted from the radio transmitter 6 and its antenna 8.

In the form in which the device has been shown in Fig. 3 for receiving signals, there has been illustrated a photoelectric scanning device for automatically actuating an alarm upon the receipt of incorrect test letters. Assuming, for the purpose of illustration, that the test character sent out from the transmitter is the punctuation mark period or the equivalent thereof, this mark will be placed upon the receiver tape 40 by the receiver printer 1, with desired spacings in order to control the alarm system, light from a source 42 provided with suitable reflectors 41 for directing the path thereof and with the aid of optical systems where desired, is projected upon the tape record 40 which bears the string of black dots representing the periods. The light reflected from the tape is directed upon a suitable photo well 43 with which is also provided a reflector 41 for collecting the reflected light from the tape. In accordance with the current flowing in the photo well, there is actuated an amplifier 46 whose output current is determined by the voltage drop taking place across the resistor 47 connected in the input circuit of the amplifier, which voltage drop varies in accordance with the output energy from the photo well 43.

When other characters than the desired marking period are received upon the tape, it can be appreciated that, due to the blackness of the representation less light from the source 42 will be reflected from the tape 40 to reach the photo well 43, and hence the output current from the amplifier 46 will be decreased so that the current flowing through the relay 44 will be reduced and the relay armature will fall back to close the circuit operating the alarm 45. The alarm 45 may be of any desired type and character such as an audible or visual indicating device.

I claim:

1. In combination, a printer, tape having letters printed thereon by said printer, said printer being operated by signals received from an external source, a light source positioned immediately adjacent said printer for illuminating said type, a photo-cell arranged to receive the reflected illumination from said light source, an electron discharge device amplifier in circuit with said photocell and arranged to pass current upon the receipt of said photocell of a predetermined amount of reflected illumination from said tape, an output circuit for said discharge device including a relay, an indicator, said relay being arranged to actuate said indicator when said photocell receives less than said predetermined amount of reflected illumination, whereby correct operation of said printer and contact of said printer with said external source of signals may be observed.

2. In an alarm system for indicating the termination of testing periods, means for receiving and printing indications of a predetermined test character, said means comprising a printer and means to produce therefrom a tape record of the signal characters, means positioned immediately adjacent said printer for illuminating the tape record of the photo-sensitive means for collecting the light reflected from the tape record, an electronic discharge device connected to receive the output energy from the photoelectric means, a relay system connected in the output circuit of

the electronic discharge device and an indicator device arranged to be actuated in accordance with the operation of the relay device, said relay being connected so as to cause actuation of the indicator device at time periods when the output energy from the photo-sensitive means is less than a predetermined value, whereby correct operation of said printer and contact of said printer with said external source of signals may be observed.

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