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TELETYPEWRITER CONTROL SYSTEM

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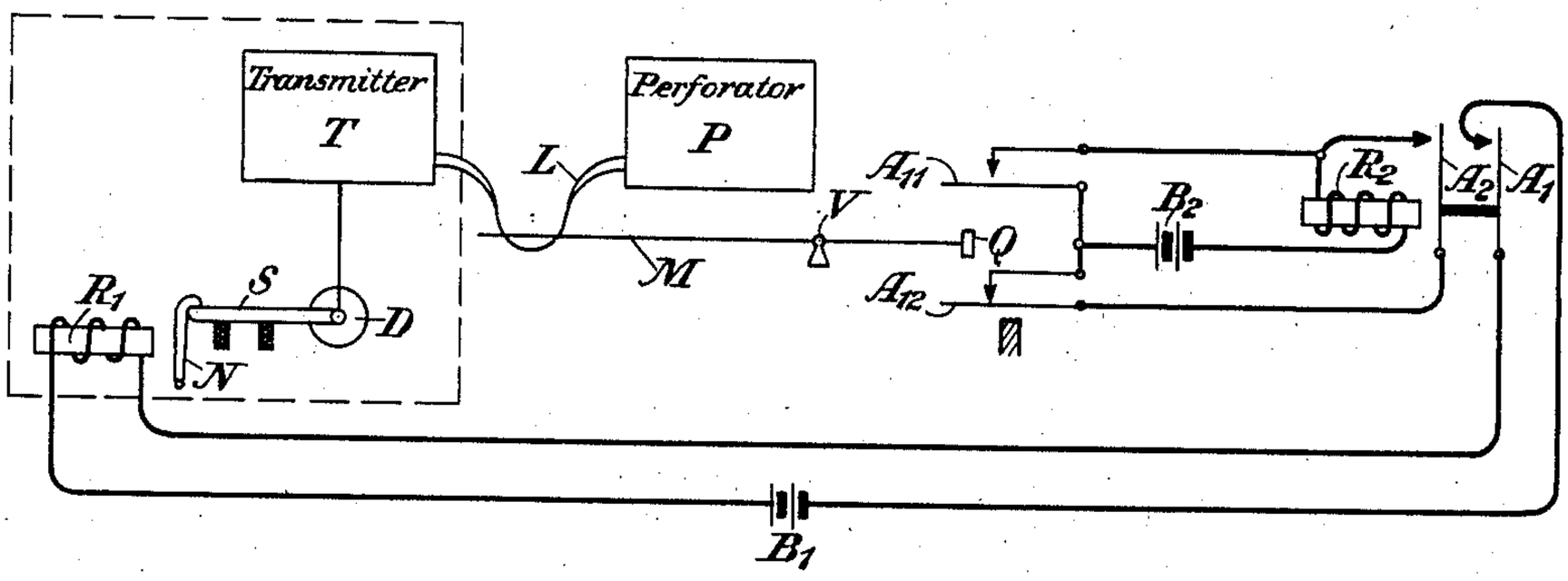

Fig. 1

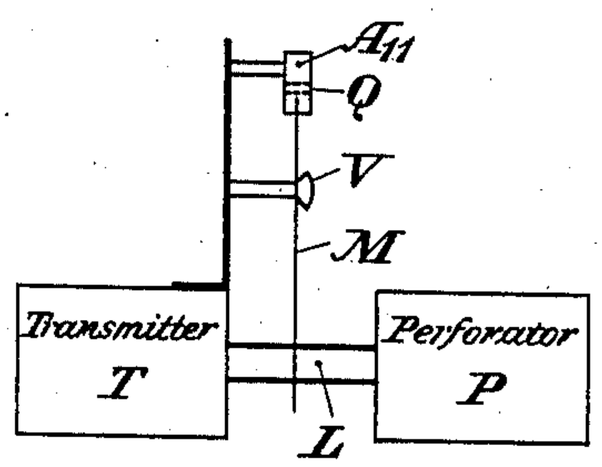

Fig. 2

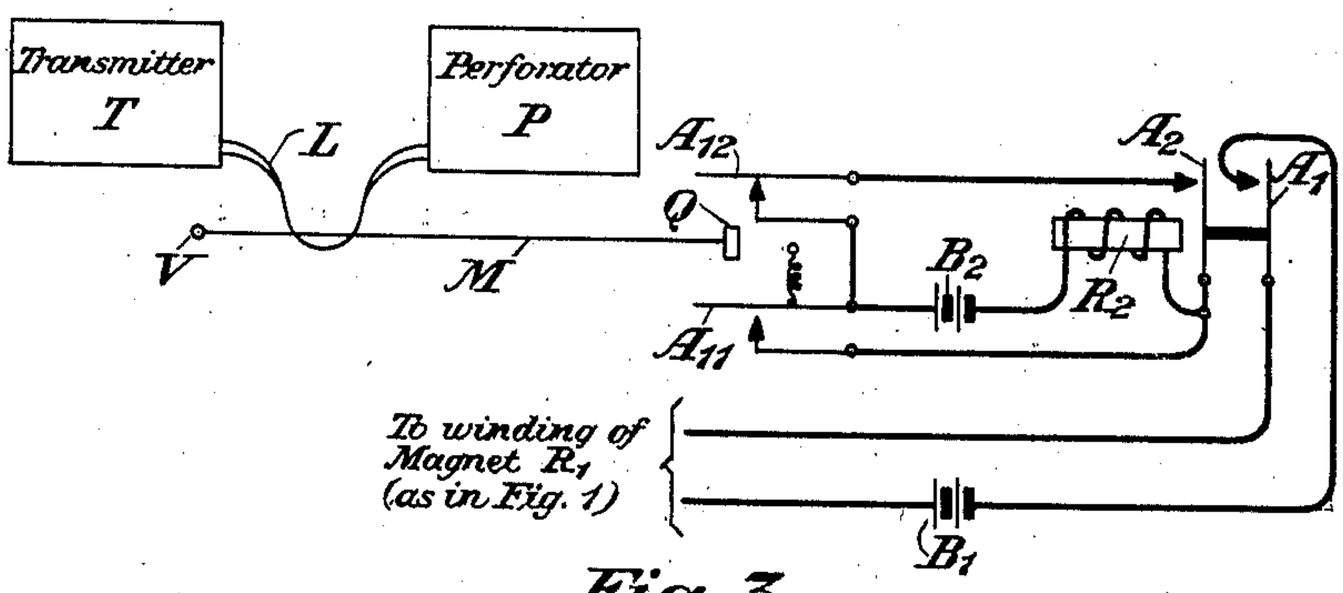

Fig. 3

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TELETYPEWRITER CONTROL SYSTEM

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7 Claims. (Cl. 178—17)

This invention relates to teletypewriter systems and especially to transmitters of such systems which are adaptable for use with tape perforators or reperforators of well-known type.

As is well known in teletypewriter systems, signals are prepared by operating a keyboard tape perforator which converts the signals into corresponding perforations of the tape. The tape perforations are then re-converted into pulses of current by the transmitter of the system, and these pulses are then delivered to a distant point by means of a wire or radio circuit and the signals are there reproduced. In many cases the transmitter of such systems operating continuously is capable of transmitting from more tape than is usually made available by the operation of the perforator. In other cases the speed of the perforating mechanism is slower than the speed of the transmitter, and as a result of either condition, the transmitter is usually started and stopped at intervals. The tape fed from the perforator to the transmitter must not be allowed to become taut in order to avoid its becoming torn. On the other hand, the transmitter must be operated with as few interruptions as possible so as to reduce the noise and the wear on its parts.

This invention provides an improved arrangement for controlling the transmitter of a teletypewriter system according to the length of tape between the perforator and the transmitter. The invention, together with its objects and features, will be better understood from the detailed description hereinafter following when read in connection with the accompanying drawing in which Figure 1 shows one arrangement for controlling the transmitter of a teletypewriter system in accordance with the length of the loop of tape between the perforator and the transmitter of the system, Fig. 2 shows in plan view the general relationship between the perforated tape and the lever which actuates the starting mechanism of the transmitter, and Fig. 3 illustrates a modification of the lever control mechanism of Figs. 1 and 2.

Referring to Fig. 1 of the drawing, part of a perforator (or reperforator) is shown schematically and designated P, this perforator feeding paper or other tape L to a transmitter T. As is well understood, the perforator P may be controlled from a keyboard similar to that of an ordinary typewriter (not shown) or it may be electrically operated, the perforator (or reperforator) acting to punch holes in the tape L in accordance with the signals or characters to be transmitted. The perforated tape is then supplied to the transmitter T which converts the perforations in the tape L into pulses of current which may then be conveyed to a distant point where the pulses of current will be reproduced into the original signals or characters. In this specification and claims the word "perforator" will be used to refer either to the manually operated tape punching device or the electrically operated device, both of which are well known.

The transmitter T acts upon the tape L only when a brush arm S—which is coupled to the driving shaft of a motor D by a friction clutch—is started in rotation. The transmitter ceases to function immediately after the brush arm S ceases to rotate. The arm S is normally prevented from rotating when it is in engagement with a notched armature N, the armature N being controlled by a starting magnet R_1. The winding of the starting magnet R_1 is connected in series with a source of potential B_1 and the outer armature A_1 of relay R_2 and its associated contact. The winding of the relay R_2 may be energized from a source of potential B_2 when the bar or lever A_{11} is caused to close its associated contact in response to the upward motion of a device Q. When the relay R_2 is operated, it will be locked in its operated condition as long as a lower bar or lever A_{12} remains closed against its associated contact. The locking circuit includes source B_2, the winding of relay R_2, armature A_2 and its contact, and bar A_{12} and its contact. The bars or levers A_{11} and A_{12} are shown in their normal positions in Fig. 1 and they may be held in these positions normally by means of springs (not shown) or if desired these bars or levers may be made of any well known spring material such as phosphor bronze.

It will be observed that the element Q may be moved between the two bars or levers A_{11} and A_{12}. The device Q is affixed to one end of a lever M which is pivoted at V. The lever M rests continuously against the loop of tape L fed from the perforator P to the transmitter T. As the length of the loop of tape L changes from time to time, the element Q will be moved up or down between two extreme positions which are determined by the bars A_{11} and A_{12}. When the perforating apparatus P and the transmitting apparatus T are both in a non-operating condition, the lever M will remain stationary, and it may maintain any position between its two extremes determined by bars A_{11} and A_{12}, its position depending merely upon the length of tape L which remains between perforator P and transmitter T. The lever M

will retain that position until either the perforator P, or the transmitter T again begins to operate.

The operation of the arrangement shown in Fig. 1 is as follows: Assume first that the perforator P is in operation and that the transmitter T is in a non-operating condition. As the loop of tape L increases in size due to the operation of perforator P, the lever M will be swung counter-clockwise about its pivot V, and in due course the element Q will cause the bar A_{11} to close its contact. The relay R_2 will then be operated, causing its two armatures A_1 and A_2 to close their associated contacts. The relay R_2 will also be locked in its operated condition because the bar A_{12} which is normally against its contact has completed the locking circuit for the relay R_2. At the same time the armature A_1 of relay R_2 will act to close the circuit of the starting magnet R_1, and the latter magnet will then attract its armature N and release the arm S which controls the motor mechanism D. The motor mechanism D will then begin to rotate and hence the transmitter T will draw up the tape L and convert the perforations of the tape L into corresponding pulses of current for transmission to a distant point.

As the transmitter T continues to operate, the length of the loop of tape L will become reduced. The loop L will be reduced in length even though the perforator P continues to operate and supply additional tape. This is so because the transmitter T operates on the tape at a greater speed than the perforator P can feed tape into the loop. As the loop is further reduced in size, the lever M—which rests upon the tape L—will move in a clockwise direction about its pivot V toward the movable bar A_{12}. Although the main circuit of the winding of relay R_2 is open at the contact of bar A_{11}, the locking circuit of relay R_2, which includes the lower bar A_{12} and its contact, will maintain the relay R_2 in its operated condition. Hence the relay R_2 as well as the starting magnet R_1 will remain operated. The motor mechanism D will continue in rotation and the transmitter T will continue to draw upon the tape L and reduce its length.

When the loop of tape has been reduced in size to such an extent that the element Q at the right-hand terminal of the lever M presses against the movable bar A_{12} and opens its contact, the relay R_2 will then release. The release of the armature A_1 of relay R_2 will then cause the magnet R_1 to be released and, as is well understood in the art, the motor mechanism D will then cease rotating upon the engagement of the stop arm S by the notch affixed to the armature N of magnet R_1. Upon the cessation of the motor device D the transmitter T will then become unoperated.

If the perforator P is then further operated, the loop of tape L will be increased in length, and hence the armature M will be rotated in a counter-clockwise direction so as to allow the bar A_{12} again to close its associated contact. However, the relay R_2 will remain unoperated, and therefore the starting magnet R_1 will also remain unoperated. As the length of tape increases to such an extent that the element Q presses against the bar A_{11} and closes its contact, the relay R_2 will be reoperated and the steps already described will be repeated as before.

Fig. 2 shows a plan view of part of the arrangement of Fig. 1. This illustrates the relative position of the lever M with respect to the tape L. It will be noted that the lever is at right angles to the tape and rests on the tape at all times. The lever M moves about pivot V but always in a direction at right angles to the tape. Although the lever M is shown and described as in contact with the tape L in the plane of the tape for all positions of the lever M, such an arrangement is not indispensable. Any other contact between the lever M and tape L will be sufficient to carry out this invention.

Fig. 3 shows a modification of the tape lever mechanism M of Figs. 1 and 2. Here the lever M is pivoted at V which is at the left extremity of the lever. When the tape L has been increased to a predetermined length, the device Q will close the contact of the bar A_{11} and cause the operation of relay R_2. The relay R_2 will then be locked in its operated condition through the normally closed contact of the bar A_{12}. The main operating circuit of relay R_2 will be opened, however, soon after the device Q recedes from armature A_{11}, but the relay R_2 nevertheless will remain operated until the device Q subsequently opens the locking circuit at the contact of the bar A_{12}. This locking circuit will become opened only when the tape L has become reduced in size to a predetermined length.

It will be observed that the transmitter T will be operated immediately after the relay R_2 becomes operated, and that the transmitter will remain operated during the entire interval during which the relay R_2 remains operated. The relay R_2 will become released just as soon as the tape L becomes reduced to a predetermined length. Thus if the perforator operates continuously, the transmitter T will operate during intervals determined by the time required for the device Q to move from bar A_{11} to bar A_{12}. This interval may be readily controlled, as for example, by changing the spacing between the bars A_{11} and A_{12}, or by changing the position of the pivot V, or the proportions of the lever M, etc. The transmitter will be re-started only after the contact of bar A_{11} is reclosed.

It will be understood that other modifications of the arrangements of Figs. 1 and 3 may be employed if desired. For example, the lever M of Fig. 1 may be arranged so that it is pivoted at the right-hand side of device Q rather than on its left-hand side as shown. When so pivoted, the operation of the apparatus will be understood by those skilled in the art without further explanation.

This invention is intended to provide intermittent free running intervals or periods of the transmitter T in cases where the free running speed of the transmitter is faster than that of the perforator P supplying tape to the transmitter. This will avoid the necessity for the transmitter stopping and starting in connection with each character. However, the transmitter T will start and stop according to this invention but at much wider time intervals. This will reduce the possibility of transmission errors sent from the transmitter to the distant apparatus.

While this invention has been shown and described in certain particular arrangements 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. In a teletypewriter system, the combination of a perforator arranged to deliver tape, a trans-

mitter arranged to receive said tape, said transmitter being located in close proximity to said transmitter so that a loop is formed in said tape, a lever continuously resting freely in said loop and responding to the changes of length of tape in said loop, two contacts on opposite sides of said lever, means responsive to the closure of one of said contacts by said lever to start said transmitter, means responsive to the closure of the other of said contacts by said lever to stop said transmitter, means to prevent the release of said starting means until the latter contact is subsequently closed, and means to re-start said transmitter only when said first-mentioned contact is closed.

2. In a teletypewriter system, the combination of a perforator arranged to deliver tape, a transmitter arranged to receive said tape, said perforator being located in close proximity to said transmitter so that there is a loop in the tape, means for operating said transmitter when said loop exceeds a predetermined length and to stop the operation of said transmitter when said loop reaches a second smaller but predetermined length, said means including a lever which fully rests continuously in the loop of said tape, means to start said transmitter when said lever reaches a predetermined height, and means to stop said transmitter only when said lever reaches a second but different predetermined height, and means to re-start said transmitter only when said lever reaches the first predetermined height.

3. In a teletypewriter system, a perforator to deliver tape, a transmitter to receive said tape, a loop being formed in said tape between said perforator and said transmitter, a lever continually resting freely in the loop of said tape and positioned between first and second contacts, means responsive to the rotation of said lever in one direction through a predetermined angle to close said first contact to start said transmitter, means responsive to the rotation of said lever in the opposite direction through a predetermined angle to close said second contact to stop the operation of said transmitter, and means to re-start said transmitter only when said lever subsequently closes said first contact.

4. In a teletypewriter system, a perforator arranged to deliver tape, a transmitter arranged to receive said tape, a loop being formed in said tape between said perforator and said transmitter, first and second contacts, means controlled by the first contact to start the transmitter, means controlled by the second contact to stop the transmitter, said transmitter being stopped only in response to the closure of said second contact, means responsive to the increase in the length of said loop to a predetermined size to close the first contact, and means responsive to the reduction in the length of said loop to a second predetermined size to close the second contact, said transmitter being re-started only upon the closure of said first contact.

5. In a teletypewriter system, a perforator arranged to deliver tape, a transmitter arranged to receive said tape, a loop being formed in the tape delivered by said perforator to said transmitter, first and second contacts, a relay controlled by said contacts, means for operating said relay when the first contact is closed, means for locking said relay in operated condition when said second contact is closed, said relay controlling said transmitter, a lever resting freely in the loop of said tape and movable between said first and second contacts, said lever closing the first contact when the loop of tape is extended and reaches a predetermined length, said lever opening said second contact when said loop of tape is reduced in size to a predetermined length.

6. In a teletypewriter system, a first device for delivering tape, a second device for receiving said tape, a loop being formed in the tape between said devices, a lever resting freely in the loop of said tape, two movable arms on opposite sides of said lever, a relay controlled by said arms, means responsive to the rotation of said lever in one direction to contact one of the arms to operate said relay, the other arm being arranged to lock said relay in operated condition, means responsive to the rotation of said lever in the opposite direction to contact said other arm to release said relay, and means interconnecting said relay with said second device to actuate the second device so as to receive more tape.

7. In a teletypewriter system, a perforator arranged to deliver tape at a predetermined speed, a transmitter arranged to receive said tape at a higher speed, a loop being formed in the tape intermediate of said perforator and said transmitter, a lever resting freely in the loop of said tape, first and second contacts on opposite sides of said lever, a relay, means responsive to the closure of the first contact by said lever to operate said relay, the second contact normally locking the relay in operated condition, means responsive to the closure of the second contact by said lever to open the locking circuit of said relay, and means responsive to the operation of said relay to operate said transmitter and to stop said transmitter in response to the release of said relay.

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