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TAPE FEED SUPPRESSOR

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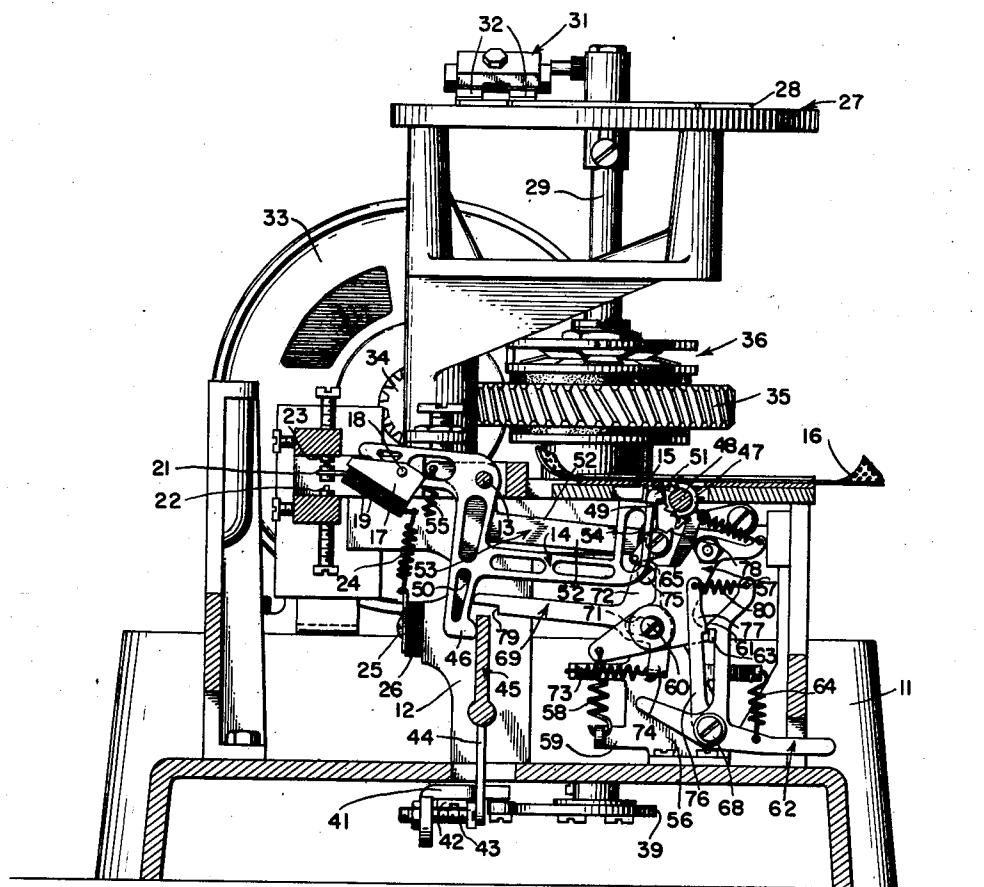


FIG. 1

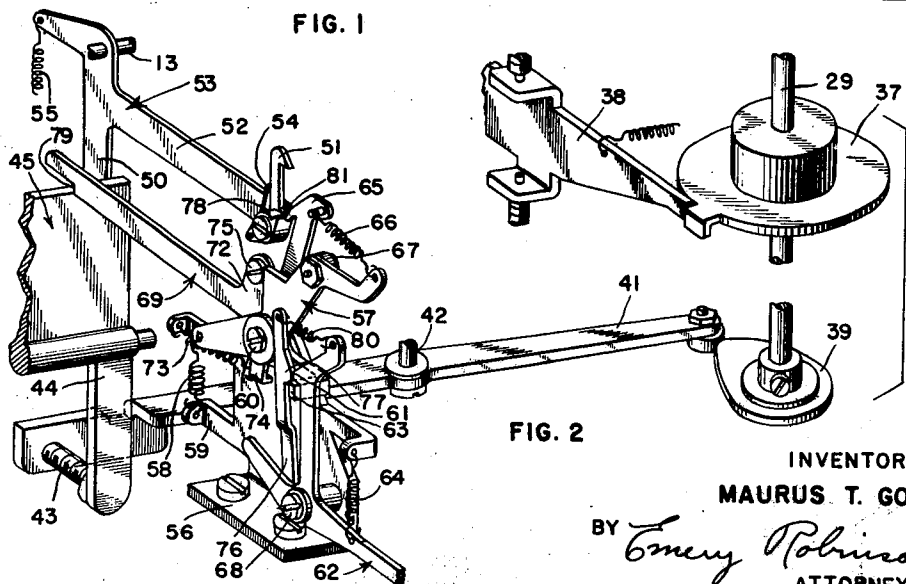


FIG. 2

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TAPE FEED SUPPRESSOR

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This invention relates to telegraph systems and apparatus and more particularly to tape controlled transmitting devices and apparatus for suppressing the tap feeding operation of such devices.

Signaling systems are desirable wherein it is required that messages be rendered unintelligible to persons unauthorized to receive them. Sur-reptitious interception of messages may be accomplished, for example, in the case of wire communications by tapping signal wires, and in radio communication by means of receiving apparatuses tuned to the proper frequencies.

A signaling system, disclosed in U. S. Patent No. 1,310,719, issued to Gilbert S. Vernam, shows a method of enciphering the message to be transmitted, which consists in transmitting over the line for each character of the message a set of impulses which represents the combination of the true message impulses with a second set of impulses arbitrarily chosen and changing for each character transmitted.

Such a result has been obtained by perforating the true message on a record tape, perforating a similar tape with a random arrangement of characters, running the two tapes in synchronism through two tape transmitters which jointly control the transmission of impulses to the line, or the energization of the electromagnetic punch selecting members of a local perforator which perforates a third tape with an unintelligible sequence of characters representing a combination of the message tape and the key code tape. This unintelligible or enciphered message is then transmitted over the line and may be recorded by any suitable receiving device.

For deciphering such a message it is essential that the receiving station be provided with a duplicate of the transmitting station's key code tape. The key code tape is fed through a tape transmitter at such a speed that the character impulses of the key code tape are combined synchronously with the character impulses of the message to exert a joint control on the selecting mechanism of a local printer, resulting in the printing of the original message in deciphered form. For example, if the first character of the key code to be combined with the first character of the true message is the letter "A," the first character of the key code at the receiving station to be combined with the enciphered message would also have to be the letter "A" in order to decipher the first character of the message.

In a system of this character where radio transmission is used, static is interpreted as a start

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signal by the receiving station, thus causing the key code tape to advance one step. This may occur more than once before a message is to be received. When an enciphered message is received, the character impulses of the key code will not combine with the enciphered message character impulses in the same sequence that the character impulses of the key code at the transmitting station combined with the character impulses of the true message, thus making it impossible to decipher the message.

Therefore, the primary object of this invention is to provide manual means for suppressing the feeding operation of the key code tape transmitter until the character impulses of the key code tape and the character impulses of the enciphered message are in synchronism so that the incoming message may be deciphered.

Another object of this invention is to provide a nonrepeat lever so that the operator can only suppress one tape feeding operation for each manipulation of the tape feed suppressing means, thus precluding the operator from inadvertently retarding the key code tape more than necessary to bring it back into synchronism with the enciphered message.

Although it has been set forth how the tape feed suppressor embodying the present invention can be used as a synchronizing means in a secret signaling system, it is to be understood that its use is not limited to such extent. For example, the present invention could be used as a means for repeating signal impulses recorded in a record tape.

The apparatus embodying the present invention in general consists of a manually operated trip-off lever which, when operated, unlatches a pivoted member, allowing it to rotate in a counter-clockwise direction under the urging of its associated spring until a pawl secured thereto is in latching engagement with the tape feed lever in its lowermost position, thus precluding said tape feed lever from rising to engage the next tooth of the tape feed ratchet.

As the pivoted member is rotated, it also rotates a reset lever into the path of the operating ball. At the end of the instant cycle of operation of the tape transmitter, the operating ball is rotated in a clockwise direction, thereby moving the reset lever which in turn rotates the pivoted member until it is again blocked by the trip-off lever and the aforementioned pawl is out of engagement with the tape feed lever. A nonrepeat lever is provided to ascertain that only one tape feed sup-

pression operation is performed for each operation of the trip-off lever.

A more complete understanding of the foregoing and other objects and features of the present invention may be had from the following description when taken in conjunction with the accompanying drawing, wherein like reference characters designate similar parts throughout the several views, and in which,

Fig. 1 is a front sectional view of a tape transmitter with the apparatus embodying the present invention attached thereto, and

Fig. 2 is a perspective view of the apparatus embodying the present invention with only those parts of the tape transmitter necessary to show the operation of the tape feed suppressor shown.

Having reference to Fig. 1, the structure embodying the present invention comprises a base casting 11 of a telegraph apparatus such as a tape transmitter, which supports a pair of side frames 12, only one of which is shown, which frames afford end support to a pivot shaft 13, upon which is mounted pivotally a set of five feeler levers 14. A sensing pin 15 is carried upon the uppermost extremity of each one of the feeler levers 14 and is of sufficient length so as to extend through the perforations in the record tape 16 when its associated feeler lever 14 is in its extreme counterclockwise position. An individual contact carrying block 17 secured at 18, each upon an associated one of the feeler levers 14, carries between the insulation plates 19 a contactor strip 21 upon whose extremity there is provided a double surfaced contact point that may engage with one or the other of a pair of opposed contact screws 22 or 23.

A spring 24 individual to each contactor and feeler lever assembly is preferably soldered to its associated contactor 21 and is secured to an individual contact plate 25 mounted, along with other and similar contact plates 25, upon an insulation terminal block 26 which is secured to side frames 12. To these plates 25 there may be secured the impulse channel wires which communicate with a signal distributor apparatus, such as a rotary segmented distributor 27 commonly used in telegraph systems.

The distributor 27 consists of a segmented distributor ring 28 which consists of seven segments, five of which are character signal segments which are connected by means of conductors to plates 25, each individual to its associated feeler lever 14, and the remaining two segments are the conventional stop and start segments and are arranged similar to the standard five unit Baudot code start-stop sequence. A distributor shaft 29 carries a brush arm 31 which supports a pair of brushes 32 that connect the segmented ring aforementioned with a solid ring (not shown) inside and concentric therewith. The inner solid ring is connected to a transmission line so that when any potential is applied upon any of the segments, it is conducted over the brushes 32, through the inner ring, and over the outgoing line.

Power is derived from a motor 33 which drives a pinion 34 cooperating with a gear 35, and through a friction clutch 36 drives the shaft 29. The shaft 29 is restrained in a start-stop manner by a stop cam 37 (Fig. 2) and a stop arm 38 controlled by an electromagnet (not shown), the arm 38 operating to release shaft 29 when the magnet is energized.

Secured to the lower extremity of shaft 29 is a cam 39 (Figs. 1 and 2) which controls the oscillation of a rocker arm 41 pivoted at 42. Located

at the leftward extremity of rocker arm 41, as seen in Fig. 2 is an adjustment screw 43 which cooperates with an extension finger 44 of an operating bail 45 which is mounted pivotally between side frames 12 (Fig. 1). Thus, it may be seen that for each revolution of shaft 29, due to the rocker arm 41 cooperating with the cam 39, Figs. 1 and 2, the operating bail 45 is rotated in a clockwise direction to its extreme clockwise position and returned to its normal position as seen in Fig. 1.

The individual springs 24 exert a counterclockwise force upon the contact levers 14 tending to maintain the levers 14 in contactual engagement with bail 45. When the operating bail is in its counterclockwise position, as shown in Fig. 1, all of the levers 14 are so disposed that their contactor tongues 21 engage the uppermost ones of the contact screws 23 and their sensing pins 15 are retracted so as not to engage the perforated tape 16.

On the other hand, when the bail 45 is in its extreme clockwise position, the several feeler levers 14 will respond to the urging of their individual springs 24 and will extend or attempt to extend their sensing pins 15 upwardly through the tape 16. When a transverse row of perforations in the tape is presented opposite the alignment of pins 15, the absence of a perforation prevents its associated lever 14 from rotating beyond that point at which it engages the tape, thereby precluding its contactor 21 from engaging the lowermost contact screw 22. When a perforation is presented opposite any pin 15, the pin is permitted to enter such perforation and the associated lever 14 continues to rotate until its contactor 21 is in engagement with the lowermost contact screw 22. The contact screws 22 and 23 are respectively connected to various sources of current supply such as positive and negative current, or current and no current, in a manner well known in the art, so that the conventional marking and spacing signals may be transmitted to the distributor 27, as previously described.

The tape 16 is fed leftwardly as viewed in Fig. 1 through the engagement of feed perforations in the tape 16 with a sprocket wheel 47 having spaced pin teeth, and carried upon a sprocket feed shaft 48 which is rotated in a counterclockwise direction in a step-by-step manner when the detented ratchet wheel 49 integrally associated therewith has its teeth successively engaged by a reciprocating pawl 51.

The feed pawl 51 is secured pivotally to the rightward extremity of arm 52 of the feed lever 53 and is urged in a clockwise direction by a flat spring 54. The feed lever 53 is mounted pivotally on shaft 13 and is urged in a counterclockwise direction by a spring 55 until the arm 50 (Fig. 2) is in abutment with the operating bail 45 in a manner similar to the feeler levers 14. When the operating bail 45 is moved to its clockwise position, the feed lever 53 is permitted to rotate in a counterclockwise direction, thereby raising the feed pawl 51 so it can engage the succeeding tooth of the ratchet wheel 49. As the operating bail 45 is returned to its normal position, Fig. 1, the feed pawl 51, through the engagement of the feed lever 53 with the operating bail 45, is lowered, thereby advancing the ratchet 49 the space of one tooth and feeding the tape the distance necessary to bring the next transverse row of perforations in alignment with the sensing pins 15 to be probed thereby.

A bracket 56, Figs. 1 and 2, is secured to base casting 11 and pivotally supports member 57 by

means of a stud 60. The member 57 is urged in a counterclockwise direction by a spring 58 which is secured to an extension 59 of the bracket 56. The member 57, through its projection 63, is restrained in its extreme clockwise position by a shoulder 61 of a manual tape feed suppressor trip-off lever 62, secured pivotally to the bracket 56 by a stud 68 and urged in a counterclockwise direction by a spring 64 secured to a projection of the bracket 56. Also mounted pivotally on stud 60 is a pawl 65 which is biased in a clockwise direction by a spring 66 and normally abuts against a stop member 67 secured to the member 57.

A reset lever 69 having a slotted portion 71, shown in dotted outline in Fig. 1, is mounted slidably on pivot stud 60 and is urged in a clockwise direction by a spring 73 secured to bracket 56 and engaging a downwardly extending projection 74 of the reset lever 69. An eccentric adjusting screw 75 is secured to an upwardly extending portion 72 of the lever 69 and abuts against the leading vertical edge of the member 57 to limit the clockwise rotation of the reset lever.

A nonrepeat lever 76 secured pivotally to bracket 56 by the stud 68 is biased in a clockwise direction by a spring 80, secured to the trip-off lever 62, and has a shouldered portion 77 which normally confronts the shouldered portion 61 of the lever 62. It is observed that shoulders 61 and 77 are not in direct horizontal alignment, but that shoulder 61 is slightly higher than shoulder 77. The purpose of this arrangement will be more clearly shown in the operational description which will follow hereinafter.

Assume the tape transmitter to be operating under normal conditions with the start magnet (not shown) energized so that the stop arm 38 (Fig. 2) is disengaged from stop cam 37 thereby permitting shaft 29 to rotate. As previously mentioned, rocker arm 41 oscillates, thus oscillating the operating bail 45 which intermittently raises the sensing pins 15 of the feeler levers 14 (Fig. 1) so they may probe the tape 16, and also raises the feed pawl 51 so it may engage the succeeding tooth of the feed ratchet 49 to advance the tape 16.

If for some reason the operator or attendant desires to suppress the tape feeding for one cycle of operation, the operator depresses the trip-off lever 62 (Figs. 1 and 2) thus rotating it in a clockwise direction until the shoulder 61 thereon is no longer blocking the projection 63 of the member 57, thereby allowing the member 57 to rotate in a counterclockwise direction under the urging of its associated spring 58. As the member 57 is rotated, stop member 67 thereon urges the pawl 65 in a counterclockwise direction until it abuts against the member 78 secured to the rightward extremity of the arm 52 of the feed lever 53. During the immediate cycle of operation, as the operating bail 45 is rotated clockwise, the feed lever 53 is urged in a counterclockwise direction by its associated spring 55 until it is restrained by means of the pawl 65 latching the member 78. It may be seen in Fig. 1 that although the feed lever 53 will rotate to some extent with the pawl 65 latching the member 78, it will not rotate sufficiently to permit the feed pawl to engage the succeeding tooth of the feed ratchet 49, thereby suppressing the tape feed function, and thus causing the sensing pins 15 to probe the same transverse row of code perforations a second time.

When the member 57 is rotated in a counterclockwise direction, its leftward vertical edge engages the screw 75 to rotate the reset lever 69 in a

counterclockwise direction so that the shoulder 79 is in the path of the operating bail 45. As the operating bail 45 rotates in a clockwise direction, it engages the shoulder 79 of the reset lever 69 which, through the instrumentality of the slot 71 (Fig. 1) is moved rightwardly causing the screw 75 (Figs. 1 and 2) mounted thereon to rotate the member 57 in a clockwise direction until the projection 63 is latched in its inoperative position by either the trip-off lever 62 or the nonrepeat lever 76, which together comprise a double trip-off latch.

It is to be noted that the reset lever 69 is operated simultaneously with the counterclockwise rotation of the feed lever 53. Thus, the member 78 is provided with a tooth-like portion 81, and the latching portion of the pawl 65 is substantially hook shaped so that member 78 and pawl 65 cannot disengage until the feed pawl 51 is in its lowermost position even though the member 57 carrying stop member 67 is rotated to its latched position before the operating bail 45 restores the tape feed lever 53 to its normal position.

It is also to be noted that although the operator may depress the trip-off lever 62 for a longer time than is necessary to complete one cycle of operation, the nonrepeat lever 76, biased in a clockwise direction by the spring 80 will latch the projection 63 when the member 57 is restored to its inoperative position as previously described. The member 57 will remain latched by the nonrepeat lever 76 until the operator releases the trip-off lever 62. When the trip-off lever 62 is released the shoulder 61 thereon abuts the shoulder 77 of the lever 76, thereby moving the shoulder 77 out of the path of the projection 63 of the member 57 which is latched by the shoulder 61 of the lever 62.

As previously mentioned, the shoulder 61 of the lever 62 is slightly higher than the shoulder 77 of the lever 76 so that when the operator depresses the trip-off lever 62 to release the member 57, the shoulder 77 of the lever 76 will be lower than the upper surface of the projection 63, thereby precluding it from latching the projection 63 until the member 57 is restored to its unoperative position at the end of the cycle of operation.

Although a specific embodiment of the invention has been disclosed in the drawings and described in the specification, it is to be understood that the invention is not limited to such specific embodiment but may be modified and rearranged without departing from the spirit and scope of the invention.

What is claimed is:

1. In a record reader for telegraphic transmitting devices, a record feeding mechanism comprising a cyclically moving member, means for actuating said member subsequent to each reading of the record, and means comprising a double trip-off latch cooperable with said cyclically moving member to invariably defer the actuation of said feeding mechanism for a time period of one cycle.

2. In combination, a telegraphic tape transmitter comprising continuously cyclically operable driving means, means for sensing a telegraphic tape, said driving means actuating said sensing means, a tape advancing mechanism, said driving means also actuating said tape advancing mechanism subsequent to each reading of said tape, and means comprising a double trip-off latch cooperable with said cyclically operable driving means for invariably suppressing the

operation of said tape advancing mechanism for a time period of one cycle.

3. In combination, a telegraphic tape transmitter comprising a continuously cyclically operable member, means for sensing a telegraphic tape, said sensing means actuated by said operable member, a tape advancing means comprising a cyclically moving member and tape advancing instrumentalities, said tape advancing means actuated by said cyclically operable member in timed relation with said sensing means, a manually controlled instrumentality, means initiated by said manually controlled instrumentality to suppress the operation of said tape advancing means by engaging said cyclically moving member, a member controlled by the third recited means cooperable with said cyclically op-

erable member to disengage said third recited means from said cyclically moving member, and means to latch said third recited means after one cycle of operation of said operable means.

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