

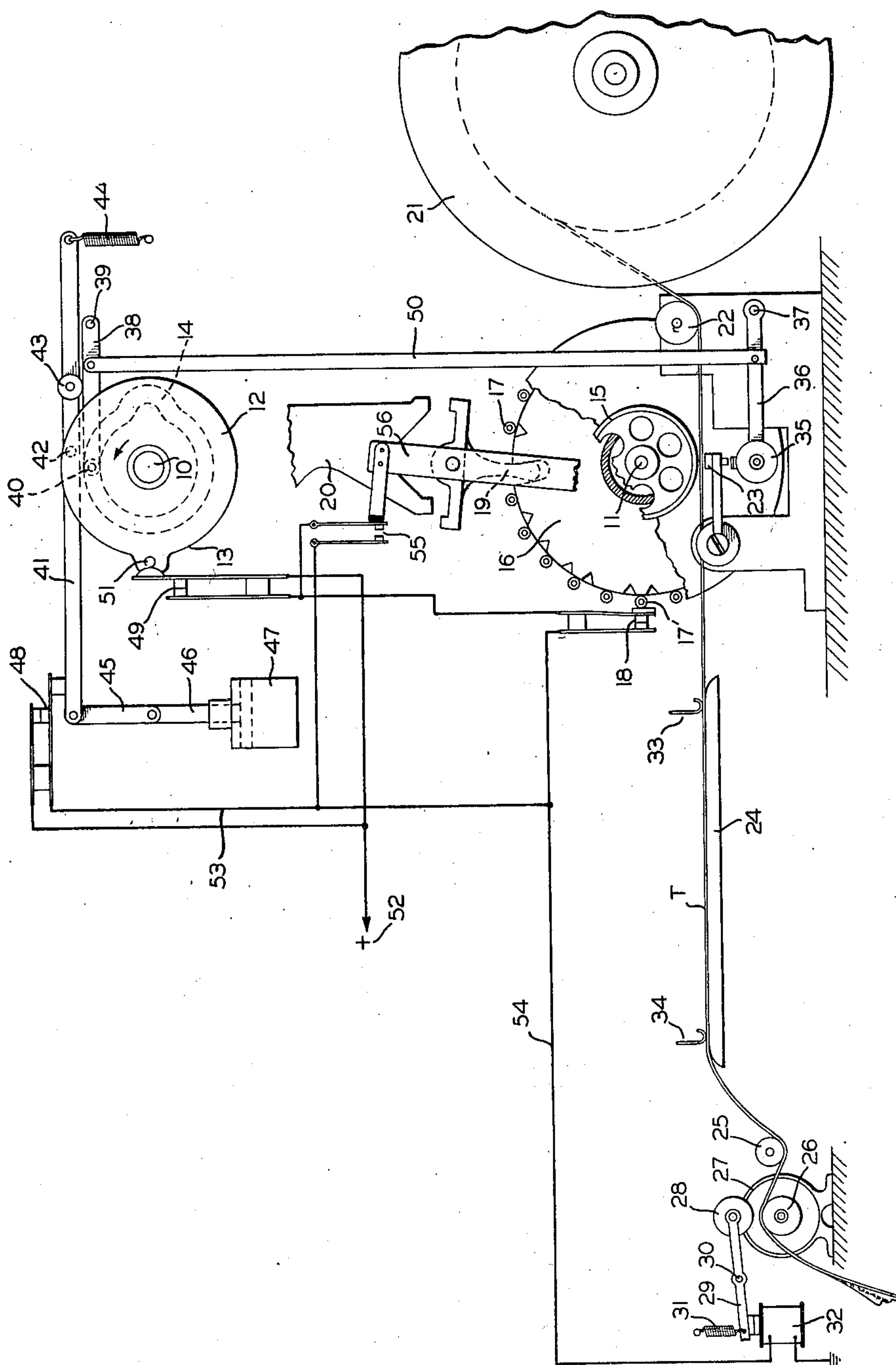
Sept. 30, 1941.

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2,257,191

TAPE PULLER FOR PROJECTORS

Filed March 29, 1934



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2,257,191

TAPE PULLER FOR PROJECTORS

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Application March 29, 1934, Serial No. 718,044

12 Claims. (Cl. 178—42)

This invention relates to telegraph printing and projecting systems in which information, such as stock quotations, printed upon a tape are projected upon a screen for observation. More particularly the invention relates to means for controlling the movement of the tape through the field of the projector.

One of the fundamental requirements of ticker tape projectors, in order to enable the projected quotations easily readable, is that movement of the tape through the field of the projector be smooth and uniform. The usual printers employed for printing stock quotations, however, eject the tape intermittently, as each character is printed, and in order to absorb this intermittent motion of the tape it has been usual to permit a loop of tape to accumulate between the ticker and the projector, with the tape puller disposed at the opposite side of the projector to draw the tape more or less continuously through the projector, the tape being stopped only when the loop decreases to a predetermined minimum size.

While this method of operation, if properly conducted results in a smooth movement of the tape, it has the disadvantage of producing a considerable lag between the printing of a quotation and its appearance on the screen, due to an appreciable length of tape in the loop between the printer and the projector. If the transmission of quotations is interrupted at any time, the tape puller may continue to operate until the loop is somewhat decreased in size but there is always a number of quotations on a tape which cannot be projected until the ticker again resumes operation. In some cases the delay in presenting these quotations upon the screen may be very considerable.

In the transmission of stock quotations, the quotations are perforated in the tape at the transmitting station and transmitted automatically over the ticker lines by means of standard forms of tape transmitters. If the market is active, the perforating proceeds substantially continuously and the corresponding signals are transmitted at a uniform rate over the lines with but few interruptions. In a slow market, while there may be more frequent interruptions in the transmission, the signals are ordinarily transmitted in groups, each group comprising a number of whole quotations. The rate of transmission of the signals of each group, however, proceeds at a uniform rate, usually about five hundred characters per minute, independently of the length or number of quotations in the group. If the

perforating operator becomes even with the market or for any other reason stops perforating for a short interval, the procedure is to conclude the group of quotations previously perforated with a number of figure dots, the purpose of these signals being to space the tape out of the printer sufficiently to enable the last quotation to be entirely visible at the printer.

We take advantage of these characteristics of the transmitted signals to control the movement of the tape through the projector in a novel manner, one of the objects being to entirely eliminate the use of a tape loop and thereby avoid the time lag between the printing and the projecting of the quotations, incident to the use of such a loop.

Another object is to provide an even and uniform movement of the tape across the field to the projector.

Another object is to enable the last quotation preceding an interruption in the transmission of signals to be projected without delay.

A still further object is to provide a device capable of distinguishing between the short interruptions in the operation of the printer occurring in the normal operation of the tape transmitter and the longer intervals produced by the perforating operator between successive groups or strings of quotations.

Other objects and advantages of the invention will hereinafter appear.

In accordance with our invention we start the movement of the tape when the first character of a string of quotations is received and maintain the movement thereof continuous as long as the successive characters are received without interruption, the tape passing directly from the ticker to the projector without an intermediate loop. By placing the outlet of the ticker close to the inlet of the projector, there will be but a short length of tape therebetween and each quotation will appear on the screen with negligible delay. The elimination of the tape loop without the resulting jumpiness of the projected images is made possible by feeding the tape in a continuous manner from the printer, printing being effected on the fly in place of the usual practice in which the tape stops during the printing stroke. For this purpose the usual tape feed is entirely eliminated from the printer and the tape drawn past the type wheel by a tape feed mechanism disposed at the opposite side of the projector from the printer.

The movement of the tape is made uniform and continuous as long as the printer continues

to operate in response to a group or string of quotations. If the operation of the printer is interrupted momentarily in the middle of a quotation, which occurs only occasionally, the tape is stopped until printing is resumed, but upon cessation of signals for a longer period, due to the perforating operator ceasing to perforate the tape for a more or less extended period and preceding which figure dot signals are perforated in the tape, the mechanism responds to these signals to continuously advance the last quotation into the field of the projector after which the tape is stopped until the printer again resumes operation.

The invention will be more fully understood by reference to the accompanying drawing in which the single figure is a diagrammatic view of a tape printing apparatus and tape pulling mechanism embodying the present invention.

The type of tape printer with which the invention is shown is that popularly known as a high speed stock ticker having the commercial designation "Ticker 5A", the details of construction of which are shown in U. S. patent to Morton, et al, No. 1,821,110, granted September 1, 1931. Only such parts of the printer mechanism are shown as are necessary for an understanding of the present invention.

Referring to the drawing, the printer employs two parallel shafts 10 and 11, the former carrying the selecting cam drum (not shown), and an operating cam 12, having an external cam face 13 and an internal cam track 14. The shaft 11 carries the type wheel 15 and surrounding the shaft is a series of five notched code disks 16, one only of which is shown, with which an annular group of type wheel stop bars 17 cooperate. The stop bars are normally held in an outward position by the periphery of the disks 16 but in each combination in which the disks may be set the notches of all of the disks will be aligned opposite one of the stop bars to permit the stop bar to move radially inward. These stop bars determine the printing position of the type wheel. Adjacent one of the stop bars 17', which corresponds to the figure dot selection, is a pair of contacts 18 normally held closed by the bar 17' except when the same moves into the aligned notches of the disks at which time the contacts 18 open. The disks 16 are selectively positioned by means of transfer levers 19 cooperating with a set of selector levers 20, positioned by the selector cam (not shown) on the shaft 10.

The tape T is drawn from a reel 21 beneath an idler roller 22 and thence between the type wheel 15 and the printing platen 23. From this point it passes from the printer and across a support 24, where it may be directly observed or projected on a suitable screen. From the support 24 the tape passes beneath a guide roller 25 and over the tape feed roller 26 which is driven by a suitable motor 27 through reduction gearing at a low speed. A pressure roller 28 carried by a lever 29, pivoted at point 30, is urged into contact with the roller 26 by means of a spring 31 but is adapted to be held out of contact therewith by an electro magnet 32. A pair of J-springs 33 and 34 maintain the tape taut across the support 24 and prevent the movement thereof by the feed roller 26 when the roller 28 is not in engagement therewith.

Printing is effected by means of a hammer 35 carried on a lever 36 pivoted at 37 and operated by means of a press lever 38 pivoted at 39 and having a roller 40 engaging in the track cam 14.

We have shown levers 36 and 38 connected by a link 50 for simplicity of illustration, although the actual connections therebetween are more involved. Disposed above the press lever 38 is a lever 41, pivoted at 42 and carrying a roller 43 adapted to be engaged by the lever 38 as it rises, to rock the lever 41 against the action of a spring 44. At its opposite end the lever 41 is connected through a link 45 to the stem 46 of a dash pot 47. A pair of contacts 48 is disposed above the lever 41 in such position as to be closed thereby when the left end of the lever is in its uppermost position, but to be opened whenever this end of the lever moves downward. Another pair of contacts 49 are arranged to be engaged by a pin 51 projecting from the face of the operating cam 12 so as to be closed whenever the cam is in the stop position, as shown.

The magnet 32 is adapted to be energized from a source of potential 52 over a circuit extending from the source 52 through the contacts 48 and conductors 53 and 54. A parallel circuit may also be established from source 52 through contacts 49 and 18 and the conductor 54 to the magnet 32.

A fourth pair of contacts 55 are arranged to be closed by the shift lever 56 of the printer when in letters case position but to be open in the figure case position. The shift lever 56 in printers of the type shown is operated by the sixth impulse added to the code group through one of the transfer levers 19.

The operation of the mechanism just described is as follows: With the printer at rest the cam 12 is in the position shown, thereby causing contacts 48 and 49 to be closed. The stop bar 17' with which the contacts 18 cooperate corresponds to the figures dot selection and unless the last signal received selected this stop bar the contacts 18 will also be closed. Under these conditions the magnet 32 will be energized over both of the circuits traced. If it is assumed that a string of quotations are received on the printer, the first character signal of the group will start the printer into operation. The cam 12 makes one revolution for each character received and upon the beginning of its movement in the direction of the arrow the contacts 49 are opened interrupting one of the parallel circuits to the magnet 32. Shortly thereafter the cam track 14 raises the press lever 38 which effects printing of a previously selected character. At the same time the right end of lever 41 is raised lowering the piston of the dash pot and thereby permitting contacts 48 to open. With contacts 48 and 49 both open, the circuit to magnet 32 is interrupted and the pressure roller 28 is brought into engagement with the feed roller 26 thereby causing the tape to be drawn at a slow rate from the reel 21 beneath the type wheel 15. It should be noted that there is no paper feed mechanism in the printer itself, the entire movement of the tape being caused by the feed roller 26. As each successive character is printed the press lever 38 moves the piston of the dash pot to its lowermost position. The piston is slowly raised between printing strokes by the spring 44 but as long as successive characters are received in continuous succession it does not reach its upper position and therefore contacts 48 remain open. Contacts 49 close momentarily during each revolution of the operating cam 12 but their period of closure is insufficient to effect energization of the magnet 32. Consequently the pressure roller 28 remains in continuous engagement with the

feed roller 26 and the tape moves continuously across the support 24. Printing is effected on the tape while the same is in motion but since the movement is slow and the printing stroke very fast a clear impression is produced.

If it is assumed now that a momentary interruption occurs in the operation of the printer, as for instance due to the operation of the auto-control lever of the tape transmitter, the printer will be brought to rest in the position shown, thereby closing contacts 49 and completing a circuit through this contact and normally closed contact 18 to the magnet 32 to stop the tape feed. If this interruption continues for a sufficient period the piston of the dash pot will rise to its uppermost position closing contacts 48 and establishing a second circuit to the magnet 32. Upon resumption of transmission the cam 12 again rotates, first to open contact 49 and then contact 48 to again interrupt the circuit of the magnet 32 and permit the tape feed to continue.

As previously stated, when the transmitting operator completes a string of quotations she terminates the same with a number of figure dots. Whenever this point in the transmission is reached the printer stops with the stop bar 17' in selected position and consequently with the contacts 18 and 55 open. It will be evident therefore that the closing of contacts 49 upon the stopping of the printer does not complete the circuit to the magnet 32 and consequently the feeding of the tape does not immediately cease but continues until the dash pot 46 reaches its upper position to close contacts 48. The timing of the dash pot is such as to enable a sufficient amount of tape to be drawn from the reel 21 following the stopping of the printer in figures dot position, before the stopping of the tape, to enable the last printed quotation to be drawn on to the support 24 so as to appear upon the screen of the projector.

The stop bar 17' in addition to controlling the printing of the figures dot, also controls the printing of a character in the letters shift position of the type wheel. The purpose of contact 55 is to prevent the continued feeding out of the tape whenever the printer is stopped with the stop bar 17' selected, with the printer in the letter case position. When this does occur contact 55 will be closed, due to the shift lever 56 being in the letters shift position and consequently a circuit for the feed control magnet 32 will be completed from battery 52 through contacts 49 and 55 in series and by conductor 54 to the winding of magnet 32. The magnet 32 will, therefore, be energized and the tape arrested immediately upon the stopping of the printer with the last selection a letter character, even though the selection involves the operation of the stop bar 17' and consequent opening of contact 18.

It will be noted that we have produced a tape pulling mechanism in which the movement of the tape is extremely uniform during the reception of a group of quotations and in which there is no tape loop provided between the printer and the projector. Furthermore, at the conclusion of a group of quotations the last quotation is not held between the printer and the field of the projector but is fed directly in the position to be projected. However, any other interruptions from the transmission which are ordinarily of very slight duration, do not cause this automatic feeding out of the tape but hold it stationary until printing is resumed.

It is to be understood, of course, that the invention is susceptible to various modifications and

may be embodied in different forms. Therefore, we do not desire to be limited to the particular details of construction shown and described.

We claim:

1. In combination, a recorder for stock quotations or other messages, a support, a tape feeding mechanism for advancing the tape across said support, means for stopping the movement of said tape across said support upon interruption of the operation of said printer and means responsive to predetermined selective operation of said recorder for delaying the stopping of the tape until the last quotation or message recorded prior to said interruption has been advanced on to said support.

2. In combination, a tape reel, a support, a recorder responsive to equal length letter codes disposed between said tape reel and support, a tape puller disposed on the opposite side of said support from said recorder, and serving to draw said tape directly from said reel, past said recorder and across said support in a continuous movement, said recorder being arranged to record characters on said tape without interruption in the movement thereof, and selective means responsive to a predetermined selective operation of said recorder preceding a cessation of operation, for arresting the movement of the tape a predetermined time after the cessation of the operation of the recorder.

3. In combination, a recorder, a tape feeding device for advancing tape beyond said recorder for observation in a continuous and uniform movement during the printing of successive characters, means for normally arresting the movement of the tape upon cessation of the operation of the recorder and means responsive to a predetermined selective operation of said recorder preceding a cessation of operation, for advancing the last printed character a predetermined distance beyond said recorder.

4. In combination, a tape recorder, a support, a tape pulling mechanism for advancing the tape from the recording position of the recorder to and across said support, said tape pulling mechanism being operative upon predetermined selective operation of said recorder, preceding an interruption in the operation thereof, for advancing the last recorded character on to said support, timing means comprising a dash pot, means for operating the movable element of said dash pot into operated position upon each cycle of operation of said recorder, the period of movement of said movable element from operated back to normal position, being not less than the time required for the tape pulling mechanism to advance the tape from recording position on to said support, said element in its normal position acting to render the tape pulling mechanism ineffective to advance the tape.

5. In combination, a support, a data recording device located at one side of said support and having a tape supply, a tape pulling device located at the opposite side of said support and constituting the sole means for feeding the tape from said supply, means for operating said tape pulling means continuously during a continuous succession of cycles of operation of said recording device whereby said tape is drawn in a continuous movement through said data recording device and across said support during said continuous succession of cycles of operation of the data recording device, means for stopping the movement of the tape upon interruption of the

operation of the data recording device and means for delaying the stopping of the tape until the last printed character has been advanced onto said support.

6. In combination, a support, a data recording device located at one side of said support and having a tape supply, a tape pulling device located at the opposite side of said support and constituting the sole means for feeding the tape from said supply, means for operating said tape pulling means continuously during a continuous succession of cycles of operation of said recording device whereby said tape is drawn in a continuous movement through said data recording device and across said support during said continuous succession of cycles of operation of the data recording device, means for stopping the movement of the tape upon interruption of the operation of the data recording device and means responsive to a predetermined selective operation of said data recording device to advance the last printed character preceding such interruption, onto said support.

7. In combination, a tape recorder, a support, a tape pulling mechanism for advancing tape across said support, means for normally arresting the tape upon cessation of operation of said recorder, means responsive to a predetermined selective operation of said recorder preceding a cessation of operation, for delaying the operation of said arresting means and timing means for determining the duration of said delay.

8. In combination, a message recorder, a support, a tape feeding mechanism for advancing tape across said support, means for arresting the tape upon each interruption in the operation of said recorder, and means responsive to a predetermined selective operation of said recorder preceding a cessation of operation, for delaying the operation of said arresting means upon interruptions occurring only between complete messages.

9. In combination, a message recorder operable in regular recurring cycles to record successive characters on a movable tape, means for moving said tape through the recorder, means for arresting the tape upon a cessation of the regular cyclic operation of the recorder and means responsive to a predetermined selective operation of said recorder preceding a cessation of operation, for retarding the operation of said arresting means upon a cessation of the cyclic operation of the recorder occurring only between successive messages.

10. In combination, a recorder including means for printing messages on a tape, a tape feeding device for advancing tape beyond said recorder for observation in a continuous and uniform movement during the printing of successive characters, means for normally arresting the movement of the tape upon cessation of the operation of the recorder and means responsive to a selective operation of said recorder preceding a cessation of operation, for advancing the last printed character a predetermined distance beyond said recorder.

11. In combination, a tape recorder, means comprising a field of vision beyond said recorder, a tape pulling mechanism for advancing the tape from the recording position of the recorder to and across said field of vision, said tape pulling mechanism being operative upon selective operation of said recorder, preceding an interruption in the operation thereof, for advancing the last recorded character into said field of vision, timing means comprising a movable element, means for operating said movable element into operative position upon each cycle of said recorder, the period of movement of said movable element from operative back to normal position being not less than the time required for the tape pulling mechanism to advance the tape from recording position into said field of vision, said element in its normal position acting to render the tape pulling mechanism ineffective to advance the tape.

12. In combination, a telegraph recorder responsive to incoming signals for recording messages on a tape, means comprising a support to which said recorded tape passes from the recorder, tape feeding mechanism for advancing the tape from the recording position to said support, means for arresting said advancement of the recorded tape past the recording position immediately after cessation of the recording operation of the recorder between successive characters of a predetermined group of characters of a message, and means operable upon the cessation of the recording operation of the recorder following the recording of the last character of said predetermined group of characters of a message for preventing said immediate cessation and for causing the continued advancement of said recorded tape from the recording position to said support to cause the last character of said predetermined group to be advanced to said support without delay incident to said last named cessation of the recording operation.

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