March 1, 1932. D. F. NEWMAN 1,847,663

DEVICE FOR SYNCHRONIZING TICKER TAPE PULLERS

Filed Jan. 2, 1929 3 Sheets-Sheet 1

Fig. 1.

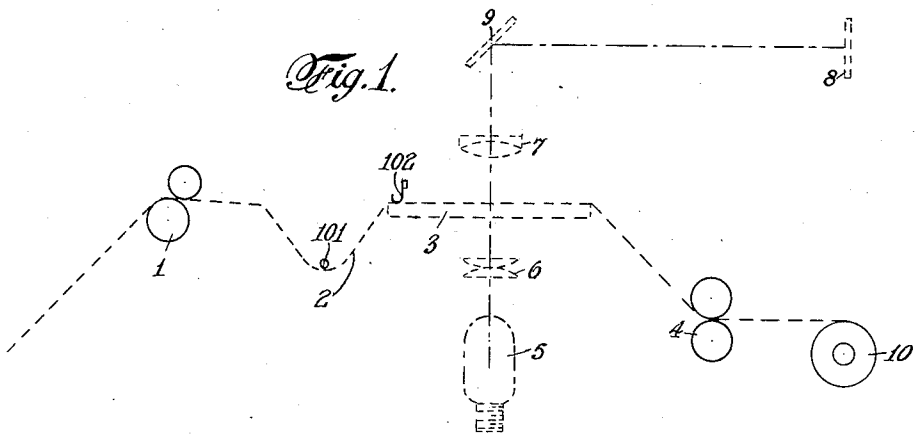
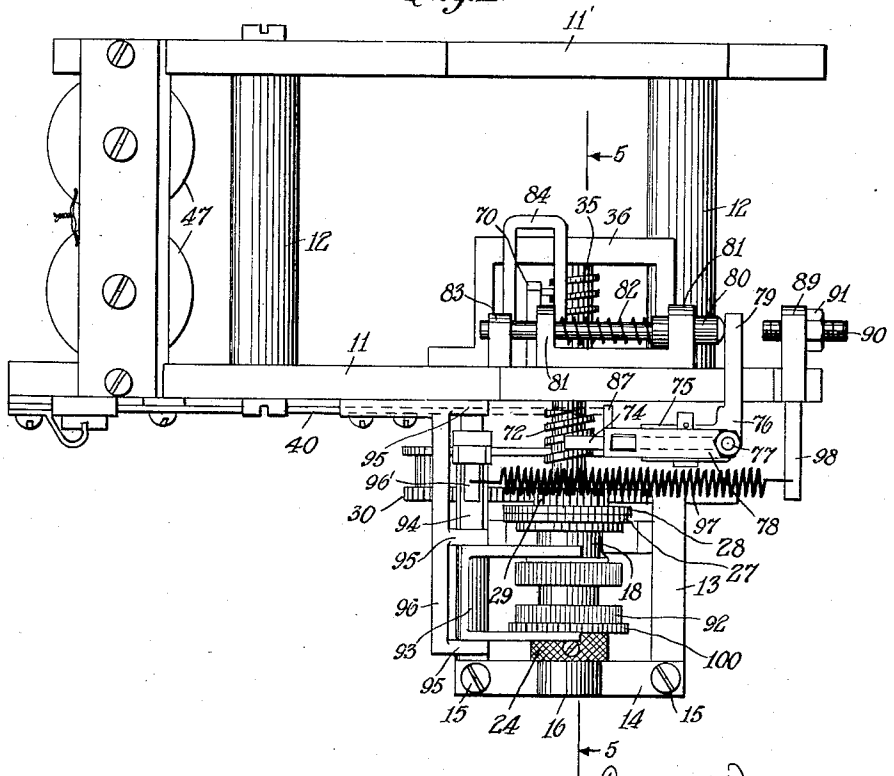


Fig. 2.



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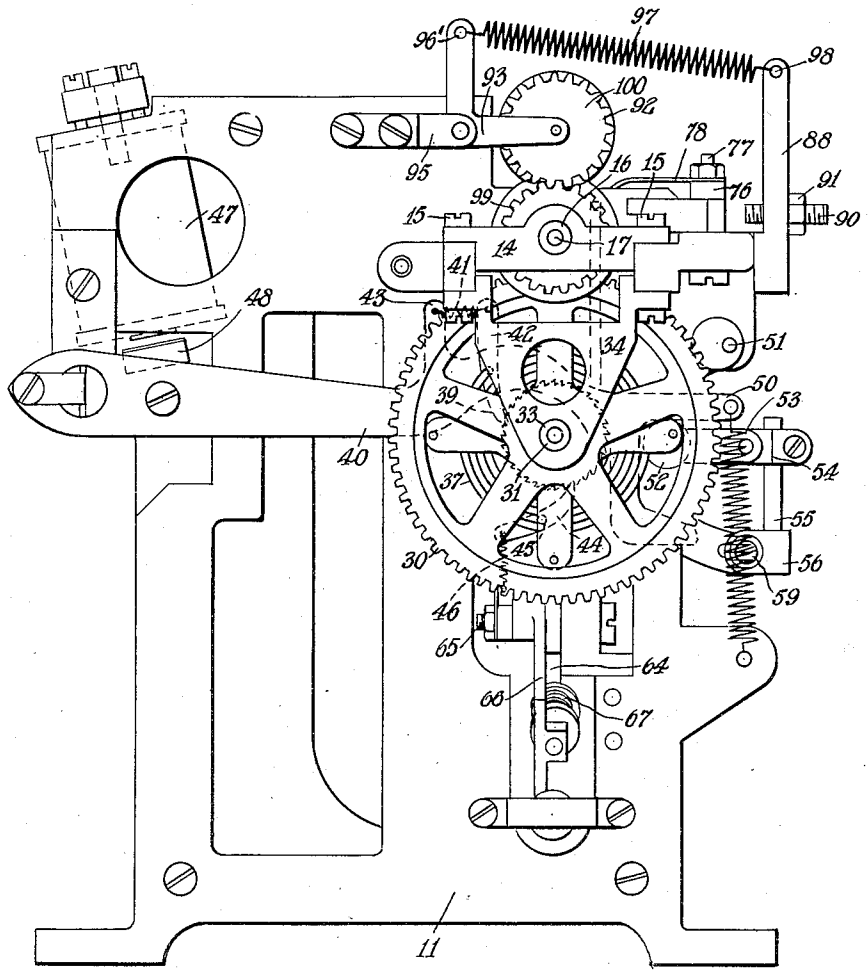
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DEVICE FOR SYNCHRONIZING TICKER TAPE PULLERS

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Fig. 3.



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DEVICE FOR SYNCHRONIZING TICKER TAPE PULLERS

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Fig. 5.

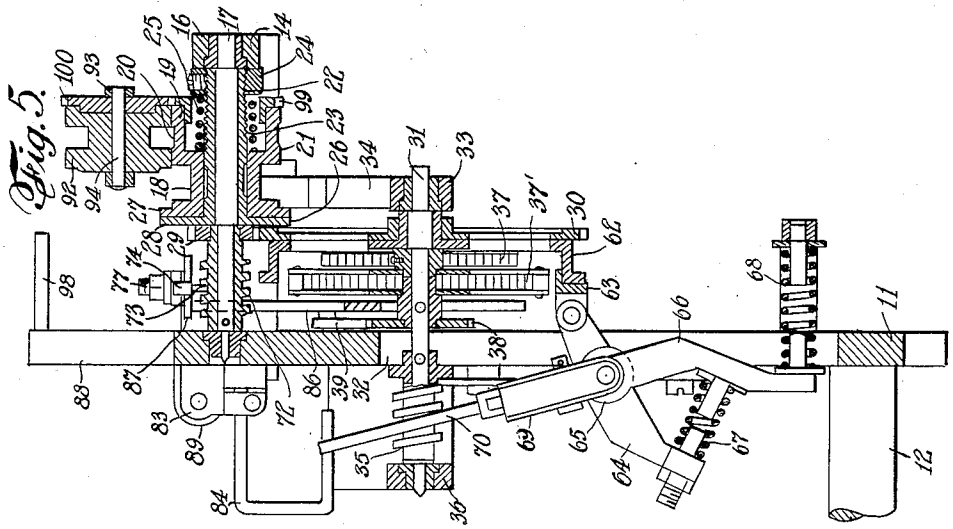
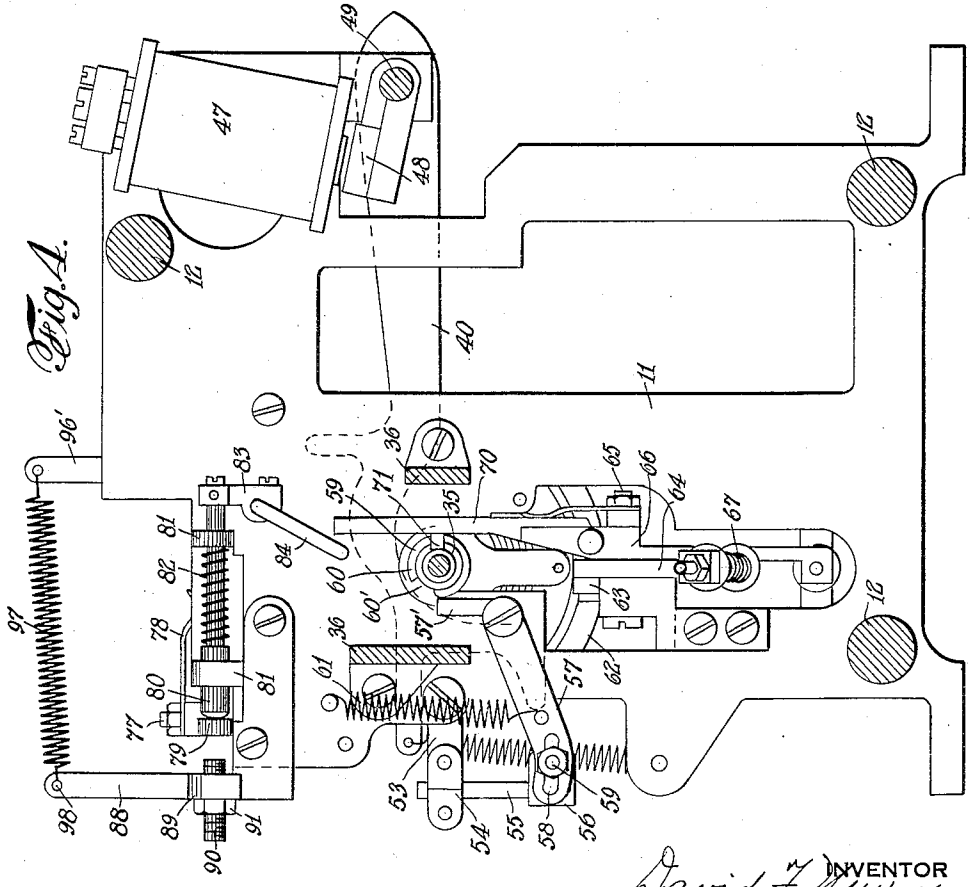


Fig. 4.



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UNITED STATES PATENT OFFICE

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DEVICE FOR SYNCHRONIZING TICKER TAPE PULLERS

Application filed January 2, 1929. Serial No. 329,900.

This invention relates to ticker tape pullers and more especially to devices for synchronizing tape pullers.

It has become the practice to project the data printed on tapes by tickers and other data-recording devices on to screens whereby the data may be viewed by a number of spectators. Various apparatus have been devised to attain this object. These apparatus usually consisted of a puller mechanism controlled by the variations in a loop formed between the ticker mechanism and the projection device. Specifically, the tape puller was controlled by a contact member carried on a lever riding on the loop and closing a circuit when the loop increased to a certain predetermined size. When the tension of the tape increased and the loop decreased in size, the lever member riding thereon was raised whereby the circuit controlling the tape puller was opened, thus stopping the feeding of the tape through the projection system. This condition existed until the tape became slack and the size of the loop increased sufficiently to allow the contact to close the circuit whereby the tape puller was rendered operative.

I have found that I can control the feeding of the tape through a data-recording projection system irrespective of the loop and through the ticker mechanism itself.

It is, therefore, an object of this invention to provide a mechanism for feeding a tape intermittently ejected from a ticker or other data-recording means through a projection system, the feeding means being controlled by the ticker or data-recording means.

Another object of this invention is to provide a safety device which will function when the tape has become taut or the tension thereof increased.

Additional objects will appear from the following description, appended claims and accompanying drawings in which:

Figure 1 is a diagrammatic sketch illustrating the arrangement of the ticker projection system and feeding means.

Figure 2 is a top plan view of the device constituting this invention.

Figure 3 illustrates a front view of the device.

Figure 4 illustrates a rear view of the device having a portion of the frame removed.

Figure 5 is a sectional view taken on lines 5—5 of Figure 2.

Referring to the drawings wherein like reference numerals designate like parts, the reference numeral 1 designates a ticker mechanism adapted to intermittently eject a tape therefrom. Preferably, the tape is ejected in such a manner that a loop 2 is formed from whence it is drawn across the projection table 3 by the tape puller 4. When in position on the projection table 3 which may be any suitable transparent support or skeleton frame, the data on the tape is projected by means of a projection system comprising a lamp 5, lenses 6 and 7 on to a screen 8. If necessary, mirrors 9 may be used to change the direction of the beam of light carrying the projected data to the screen. If desired, a tape-winding mechanism 10 may be used to wind up the tape after it has traversed the system.

The mechanism constituting this invention comprises a frame having upright members 11 and 11′ joined together by cross pieces 12 and constituting a support for a tape pulling mechanism. Suitably secured to the upright 11 is a frame having lateral projecting members 13 and a horizontal member 14 removably secured by screws 15 to the ends thereof. The horizontal member is provided with a bearing 16 in which one end of a shaft 17 is journaled, the other end of said shaft being journaled or supported in upright 11. Loosely mounted on the shaft 17 is a pulling roller 18 having a laterally extending flange portion 19. This flange portion is preferably grooved as indicated at 20, the portions 21 adjacent the groove being knurled, roughened or otherwise suitably treated whereby it may more effectively bite or grip the tape being fed thereover.

The roller 18 may be mounted on the shaft 17 in various ways. For reasons which will hereafter become apparent, I prefer to mount the roller 18 on a sleeve 22 disposed on the shaft 17, said sleeve having a threaded portion 23 on which a disc or small roller 24 is

screwed. A spring 25 is disposed between the shoulder 26 of the roller 18 and the side of the roller 24, whereby the roller 18 is continually urged rearwardly and a flange 27 thereof engages a flange 28 of the sleeve 22 and forming a friction drive. In this manner, rotation of sleeve 22 obtained from shaft 17, is transmitted to roller 18. The rotation of shaft 17 is obtained from a gear 29, securely fastened to shaft 17, and meshing with a gear 30 loosely mounted on a shaft 31. This shaft extends through an opening 32 in the upright 11 and has one end thereof journaled in a bearing 33 formed in a bracket 34 suspended from the lateral members 13. The other end of the shaft 31, provided with a spirally grooved or threaded portion 35, is journaled in a bracket 36 secured to the upright 11 in any suitable manner.

Rotation of the gear 30 is obtained from the shaft 31 by means of coil spring 37, one end of which is suitably secured to the shaft 31, the other end being secured in some suitable manner to the gear 30 or parts securely fastened thereto. In this manner the rotation of the shaft 31 is transmitted through the spring 37 to the gear 30 which in turn transmits motion to the gear 29, thence to the roller 18. Instead of employing one spring any desired number may be used. In the drawings there is illustrated two springs 37 and 37′, the latter being mounted in a spider on the shaft 31; or, if desired, a gear arrangement may be used.

Securely fastened on the shaft 31 is a ratchet wheel 38 through which movement of the shaft 31 is obtained. Rotation of the ratchet wheel 38 is obtained through a pawl 39 pivotally mounted on an arm 40 and maintained in engaging position with the ratchet wheel by means of a spring 41 connected to the end 42 of the pawl 39 and to an extension 43 of the arm 40. Another pawl 44 pivotally mounted on the upright 11 at 45 is maintained in locking position by means of a spring 46, the ends of which are connected to the pawl 44 and frame 11.

As above stated, the rotation of the shaft 31 is obtained through the pawl 39 acting on the ratchet wheel 38. The movement of the pawl 39 is obtained by causing the arm 40 to reciprocate up and down whereby the pawl 39 disengages and engages the ratchet wheel 38, causing the latter to be rotated. This rotation, as above explained, is transmitted to the roller 18.

The arm 40 is reciprocated up and down, said reciprocation being controlled by some part of the ticker mechanism such as the printing and/or feeding mechanism thereof. Various means may be used to obtain this motion. In the modification illustrated in the drawings, the reciprocation is controlled by the ticker press arm in the following manner: To the ticker press arm is attached a contact member which makes and breaks a circuit including the solenoids 47. This closing of the circuit causes the solenoids 47 to attract a member 48 which is secured to a shaft 49 on which the arm 40 is mounted thus imparting rocking movement to the shaft and reciprocating the arm 40 up and down.

The apparatus defined above is constructed so that it will operate as near in synchronism with the ticker as possible. Preferably it is desired to operate the tape puller at a speed slightly greater than the ticker mechanism. Since all tickers do not operate at exactly the same speed, means are provided to adjust the feeding mechanism of the tape puller to obtain the desired results. With this in view, arm 40 is provided with an extension 50, the movement of which is limited by stops 51 and 52. The stop 51 is eccentric in shape or eccentrically mounted whereby it may be adjusted to control the limit of the upward travel of the extension 50. Also, the stroke of the arm may be varied by adjusting the stop 52. This stop is also eccentric in shape or eccentrically mounted and it may be positioned as hereafter described. The stop 52 is carried on a link 53 which is connected to a lug 54 slidably mounted on a vertical pin 55. At its bottom portion, the pin 55 carries a lug 56 which is connected to a link 57 pivotally mounted on the upright 11. Thus by moving the pin and lugs up or down, the movement thereof is transmitted to the stop 52 through link 53 and the stop adjusted as desired. To increase the range of adjustment, link 57 is provided with a slot 58 in which a pin 59 extending through the lug 56 is adapted to be adjusted to any suitable position, thus increasing or decreasing the length of link 57.

In the operation of a ticker it frequently happens that one or more teeth are missed whereby a greater length of tape is ejected. To make the feeding device take care of this, I form a link 57′ on link 57 and make it cooperate with a disc 60 mounted on the shaft 31. This disc has a notch 60′ therein, which link 57′ enters during each revolution and due to the spring 61 normally urging link 57 upward, stop 52 is automatically moved, permitting the stroke of arm 40 to be increased. Instead of the notched disc, any other suitable means, such as a cam, may be used.

Thus by adjusting the stops 51 and 52, the arm 40 may travel a greater or smaller distance whereby the ratchet wheel 38 is given a greater or smaller movement.

The gear 30 is securely fastened to a brake drum 62 cooperating with a brake 63. In operation of the device, the brake 63 at the beginning is in contact with the brake drum 62. As the ticker functions and operation of the device continues, the brake 63 is grad-

ually released. The brake 63 is mounted on a lever or link 64 pivotally mounted at 65 on the arm 66. By means of springs 67 and 68 cooperating with the ends of link 64 and arm 66 respectively, the brake 63 is normally urged in a forward direction to engage the brake drum 62. The arm 66 is provided with a bifurcated end 69 in which is resiliently mounted the arm 70 provided with a projection 71 and adapted to coperate with the thread or spiral grooved portion 35 of the shaft 31. By this means, as the shaft 31 rotates, the arm 70 is advanced outwardly, thus releasing the brake.

In the drawings I have illustrated one brake engaging the side of the brake drum. It is to be understood that a plurality of brakes may be used and that the brake may be made to cooperate with the brake drum at any desired point or place. Or if desired, the brake may be made to directly cooperate with the shaft.

In the operation of mechanisms of this nature it is found that very often the tension of the tape increases. In other words, the feeding mechanism has taken up all the tape that the ticker has ejected and the tape is placed under tension. When this occurs, that is, when the tension of the tape has increased and the brake 63 has been released, rotation of the gear 30 is transmitted to the gear 29 and thence to the shaft 17. Due to the mounting of the roller 18 on the shaft 17, the tension of the tape is sufficient to overcome the friction between flanges 27 and 28 necessary to drive the roller 18, thus rendering the roller 18 inoperative. Accordingly, the feeding of the tape is momentarily stopped. When this occurs, it is desirable to apply the brake and prevent the spring from rotating the above-mentioned parts. To attain this result the shaft 17 is provided with a threaded or grooved portion 72 with which a projection 73 of the arm 74 is adapted to cooperate. The arm 74 is pivotally fastened in a bifurcated member 75 of a bell crank lever 76 pivotally secured at 77 on the frame. A leaf spring 78 normally urges the arm 74 downward whereby the projection 73 is maintained in the groove 68. Cooperating with the arm 79 of the bell crank lever is a mechanism adapted to engage the arm 70 whereby it is operated to close the brake. This mechanism comprises a member 80 slidably mounted in lugs 81 secured on the upright 11. Disposed between the lugs 81 of the bracket is a spring 82 which constantly forces and maintains the member 80 in contact with the arm 79 of the bell crank 76. Pivotally secured to the other end of the member 80 is a support 83 in which an arm 84, bent in the form illustrated, is pivotally and slidably mounted. The arm 84 is adapted to be engaged by the arm 70. Thus, when the tension of the tape has increased and the feed roller 18 is inoperative due to the rotation of the shaft 17, the arm 74 advances over the grooved or threaded portion 72. By this action the bell crank lever 76 forces the arm 84 through the cooperating part 80 to engage the arm 70 and cause the latter to momentarily disengage itself from the grooved portion 35. Due to the springs 67 and 68, the arm 70 is caused to snap back to its original position and apply the brake 63. At this stage, the arm 74 is at the forward end of the threaded portion of the shaft 17 and the arm 70 is at the forward end of the threaded or grooved portion 35.

Secured to the arm 40 is an arm 86 having a horizontal portion 87 which is adapted to reciprocate the arm 74. When the arm 74 is at the forward end of the grooved portion 72 and the ticker begins to operate, the arm 86 raises arm 74 and, due to the force applied by the member 80 to the link 79 of the bell crank lever 76, the arm 74 is forced back to its normal position on the threaded portion 35.

The time at which the arm 84 causes the arm 70 to snap back into position to apply the brake may be set and predetermined. To this effect, there is mounted on the frame a vertical support 88 having a lug 89 thereon. Disposed through this lug is a screw 90 which is adapted to be moved inwardly or outwardly, thus limiting the advance of the member 80 by the spring 82 which in turn moves the link 79 of the bell crank lever 76. A nut 91 is provided to lock screw 90 in the desired position.

In order to increase the biting action of the feed roller 18 on the tape, there may be provided, if desired, a grooved roller 92 mounted in cooperative relationship with said roller 18. This roller may be mounted in any suitable manner. In the drawings I have shown it mounted in a bracket 93 pivotally mounted on a shaft 94 carried in lugs 95 of a support 96 suitably secured to the main frame 11. In order to constantly maintain the roller 92 in contact with the roller 18, a pin 96′ is secured to the shaft 94. To the end of this pin one end of the spring 97 is secured, the other end of the spring being secured to a pin 98 on the upwardly extending support 88. If desired, the rotation of roller 18 may be transmitted to roller 92 by gears 99 and 100.

In the operation of the device, the tape is intermittently ejected from the ticker mechanism. Preferably it passes beneath a fixed guide 101 whereby a loop is formed. From the loop the tape is drawn by the feeding mechanism through the projection position, whereby the data on the tape is projected on to the screen 8. If desired, means 102 may be provided at the forward end of the support or table in order to maintain the tape in contact with the projection table. This

means may be of any desired type. I have found a J-spring or even a resiliently mounted roller, engaging the tape at the center and/or marginal edges, the tension thereof being insufficient to prevent the tape from being pulled thereunder produces satisfactory results. As the ticker mechanism operates, the arm 40 reciprocates up and down. At the beginning of the operation, the brake 63 is in applied position, thus preventing the shaft 31 from rotating. During the operation of the ticker, the arm 70 advances on the threaded portion 35, whereby the brake 63 is gradually released, whereupon rotation of the feeding means is obtained.

Since the arm 74 is reciprocated up and down by the arm 86, it maintains its normal position, that is to say, it does not advance on the threaded portion 72. When all the ejected tape has been fed through the apparatus and the tension of the tape increases to such an extent that its resistance to the roller 18 is greater than that necessary to drive it through the friction drive, the roller 18 is rendered inoperative. The shaft 17, however, is rotated and the arm 74 is caused to advance when the ticker is at rest over the grooved portion 68. As the arm 74 advances, the link 79 of the bell crank 76 moves inwardly, this motion being transmitted to the arm 84.

This operation continues until the arm 84 disengages the arm 70 from the threaded portion 35 and due to the springs 67 and 68, the arm 70 is caused to snap back whereby the brake 63 is applied. At this point the arm 74 is at the forward extreme end of the threaded portion 72. Upon the beginning of the operation of the ticker, the arm 74 is raised by the arm 86 and due to the tension exerted by spring 82 on the bell crank lever 76, it is brought back to its original position. This cycle is continuously repeated.

Since it is apparent that various changes may be made in the above described details without departing from the nature of the invention, I do not limit myself to these specific details, except as set forth in the appended claims.

I claim:

1. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, said feeding means being controlled by said ticker independently of any loop in the tape, and means to render said feeding means ineffective when the tension of the tape increases.

2. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, and a brake mechanism cooperating with said feeding means and adapted to be released by the operation of said ticker independently of any loop in the tape.

3. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, a brake mechanism cooperating with said feeding means and adapted to be released by the operation of said ticker independently of any loop in the tape, and means to apply said brake mechanism.

4. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, said feeding means controlled by said ticker independently of any loop in the tape, and means to adjust and vary the rate of feeding.

5. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, means to predetermine the rate of feeding, and means to vary the rate of feeding to take care of tape ejected due to slippage or missing of parts of the ticker mechanism.

6. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, a brake mechanism controlling said feeding means, means controlled by the ticker to release said brake, and means to apply the brake when the ticker is at rest.

7. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, said means including a pulling roller, an arm adapted to be reciprocated by said ticker, and means for transmitting the movement of said arm to drive said pulling roller.

8. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, said means including a pulling roller, a brake mechanism, an arm adapted to be reciprocated by said ticker, and means for transmitting the movement of said arm to drive said pulling roller and release said brake mechanism.

9. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, said means including a pulling roller, an arm adapted to be reciprocated by said ticker, means for transmitting the movement of said arm to drive said pulling roller, and means limiting the movement of said arm whereby the rate of feeding may be controlled.

10. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, said means including a pulling roller, an arm adapted to be reciprocated by said ticker, means for transmitting the movement of said arm to drive said pulling roller, and means limiting the movement of said arm whereby the rate of feeding may be controlled, said last named means comprising adjustable stops.

11. In combination, a ticker adapted to in-

termittently eject a tape therefrom, means to feed said tape through a projection system, said means including a pulling roller, an arm adapted to be reciprocated by said ticker, means for transmitting the movement of said arm to drive said pulling roller, and means limiting the movement of said arm whereby the rate of feeding may be controlled, said last named means comprising eccentrically adjustably mounted stops.

12. In combination, a ticker adapted to intermittently eject a ticker tape therefrom, means to feed said tape through a projection system, said means including a shaft and a pulling roller mounted thereon, a brake mechanism cooperating with said feeding means, means controlled by the said ticker to release said brake, and means controlled by said shaft to apply said brake when the ticker is at rest.

13. In combination, a ticker adapted to intermittently eject a tape therefrom, means to feed said tape through a projection system, said means including a pulling roller loosely mounted on a shaft whereby it may be rendered inoperative when the tension of the tape increases, a brake mechanism cooperating with said feeding means, means controlled by said ticker to release said brake, and means controlled by said shaft to apply said brake when the pulling roller is rendered inoperative.

14. In combination, a device for forming indicia on a tape, means for moving said tape through a projection field, and electromagnetic mechanism actuated by said device for operating said means, said means moving tape during a period of non-operation of said device and said electromagnetic mechanism.

15. In combination, a device for forming indicia on a tape, means comprising a spring motor for moving said tape through a projection field, and electromagnetic mechanism actuated by said device for operating said means, said means moving tape during a period of non-operation of said device and said electromagnetic mechanism.

16. In combination, a device for forming indicia on a tape, means for moving said tape through a projection field, mechanism for operating said means, said means moving tape during a period of non-operation of said mechanism, and means for automatically discontinuing operation of said first named means.

17. In combination, a device for forming indicia on a tape, means for moving said tape through a projection field, electromagnetic mechanism actuated by said device for operating said means, said means moving tape during a period of non-operation of said device and said electromagnetic mechanism, and means for automatically discontinuing operation of said first named means after a predetermined period.

18. In combination, a device for forming indicia on a tape, means comprising a spring motor for moving said tape through a projection field, electromagnetic mechanism actuated by said device for winding said motor, said means moving tape during a period of non-operation of said device and said electromagnetic mechanism, and braking means automatically operable to discontinue operation of said first named means.

19. In combination, a device for forming indicia on a tape, means for moving said tape through a projection field, said means being operated by said device, and means for discontinuing tape movement of said means upon attainment of predetermined tension by said tape.

20. In combination, a device for forming indicia on a tape, means comprising a spring motor for moving said tape through a projection field, electromagnetic mechanism actuated by said device for winding said motor, and clutch mechanism for discontinuing tape movement of said means upon attainment of predetermined tension by said tape.

In testimony whereof, I have affixed my signature to this specification.

DAVID F. NEWMAN.

CERTIFICATE OF CORRECTION.

Patent No. 1,847,663. March 1, 1932.

DAVID F. NEWMAN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, lines 80 and 89, claims 19 and 20, respectively, for "of" read by; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 12th day of July, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.