Jan. 31, 1939. A. D. EITZEN 2,145,251

TAPE PULLING DEVICE

Original Filed Dec. 9, 1933 3 Sheets-Sheet 1

Fig. 1

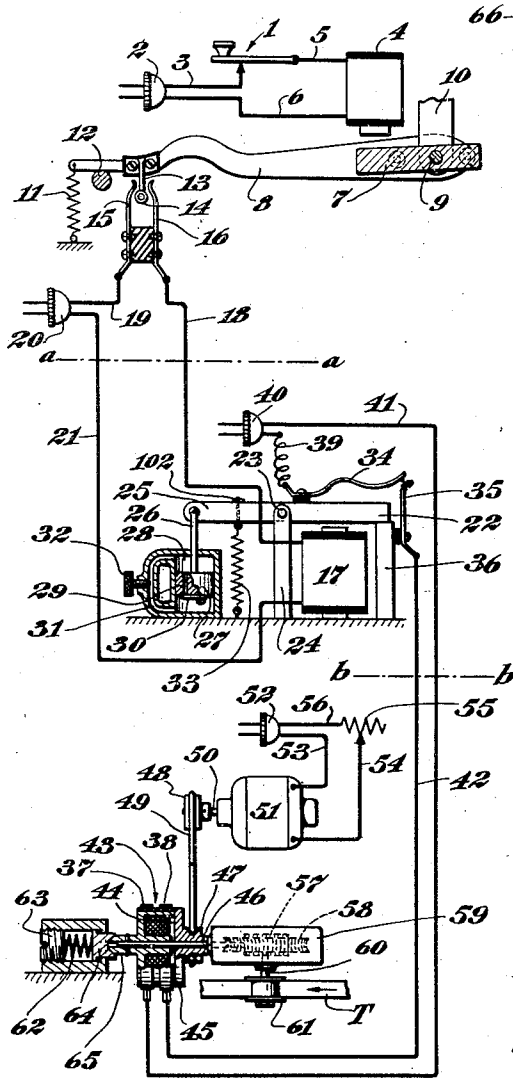


Fig. 2

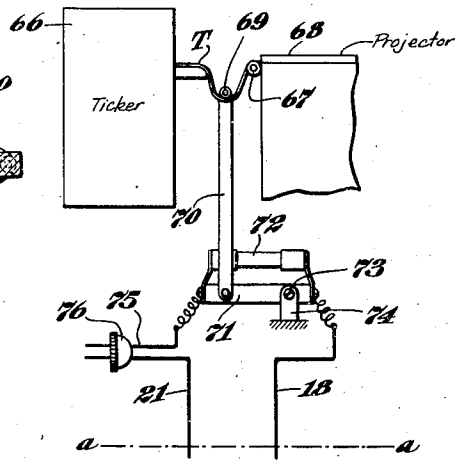
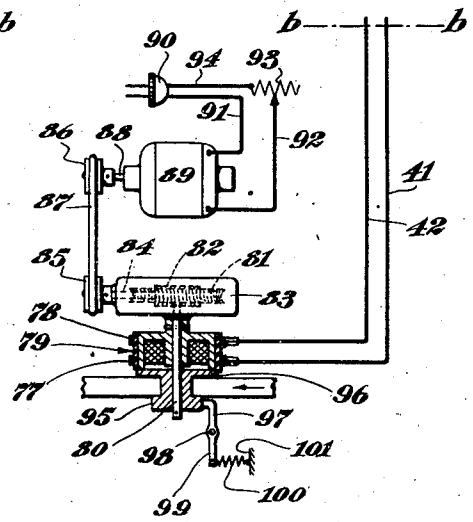


Fig. 3



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Fig. 4

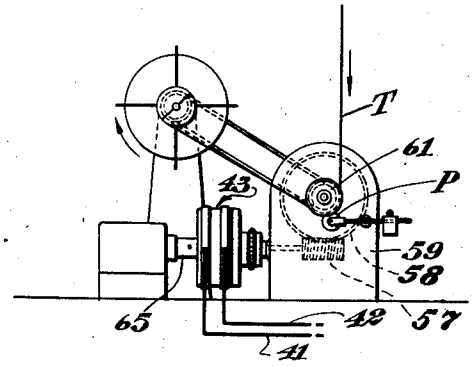
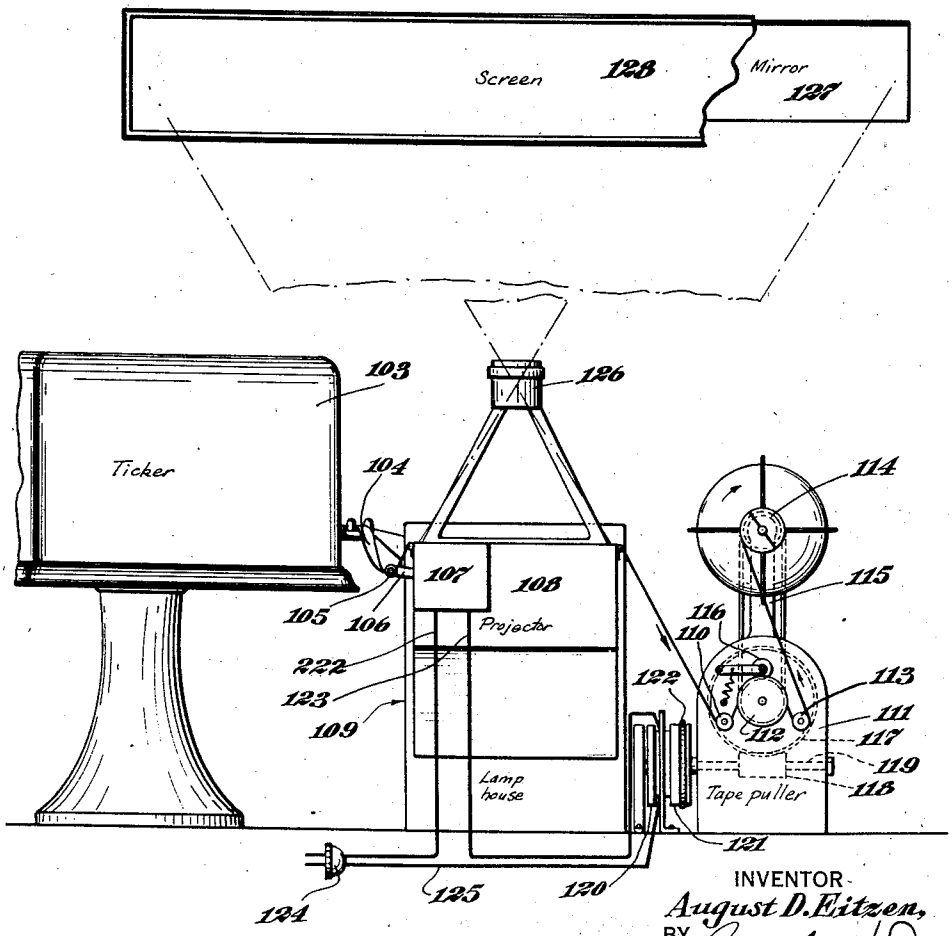


Fig. 5



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Fig. 6

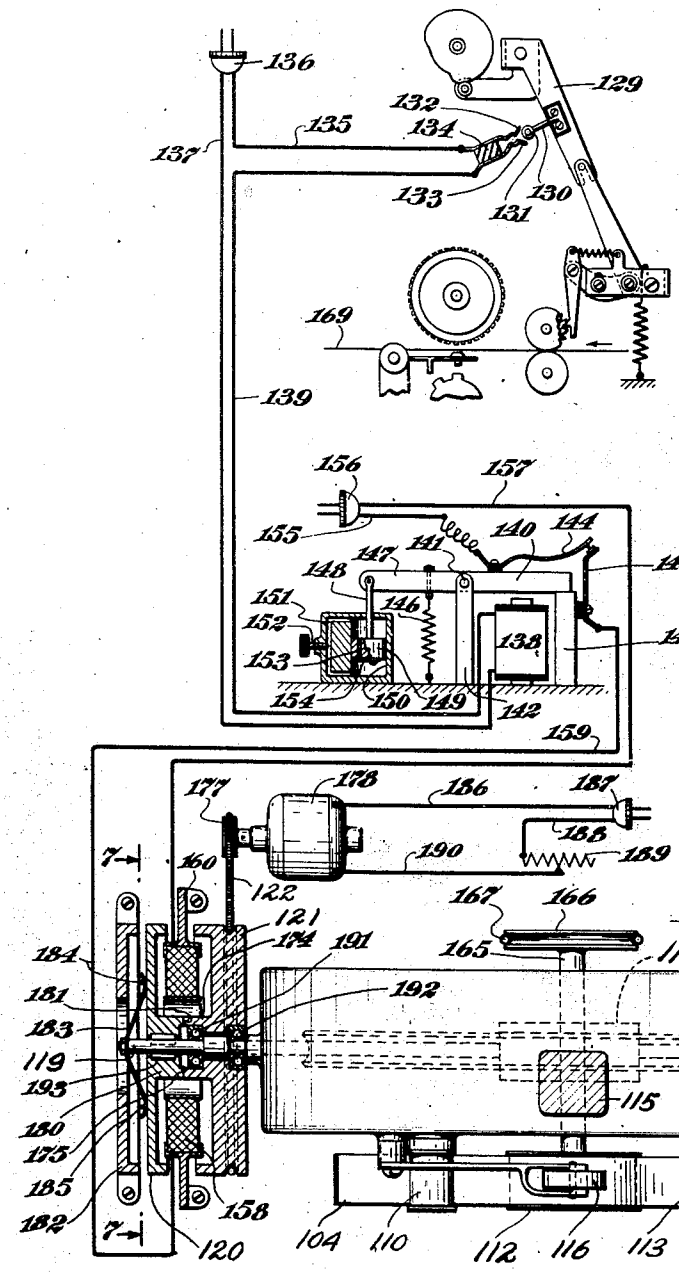
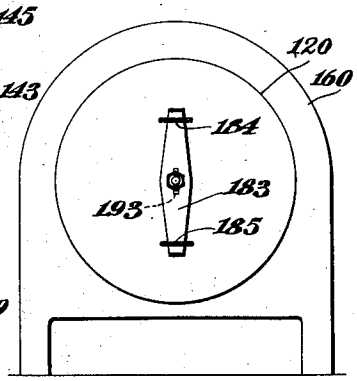


Fig. 7



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UNITED STATES PATENT OFFICE

2,145,251

TAPE PULLING DEVICE

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Application December 9, 1933, Serial No. 701,615
Renewed May 17, 1938

14 Claims. (Cl. 271—2.3)

This invention relates to tape pulling devices in general and more especially to tape pulling devices which are electrically or magnetically controlled.

Among the objects of the present invention it is aimed to provide an improved tape pulling device including a tape pulling roller, an electric motor, and a magnetic clutch for connecting the tape pulling roller to the electric motor.

This application constitutes in part a continuation of my application for patent, Serial No. 329,028, filed December 28, 1928, Patent No. 1,978,421, dated October 30, 1934.

These and other features, capabilities and advantages of the invention will appear from the subjoined detail description of specific embodiments thereof, illustrated in the accompanying drawings in which

Figure 1 is a diagrammatic view of one embodiment in which the switch for the magnetic clutch is controlled by the presser or feed arm of the ticker;

Fig. 2 is a diagrammatic view of a portion of another embodiment in which the switch for the magnetic clutch is controlled by the loop formed in the tape between the ticker and the projector;

Fig. 3 is a portion of still another embodiment showing another relation of the several connecting elements between the electric motor and magnetic clutch;

Fig. 4 is a front elevation of the pulling device illustrated in Fig. 1;

Fig. 5 is a front elevation partly broken away of another embodiment made according to the present invention;

Fig. 6 is an enlarged plan view partly in section of the pulling mechanism shown of still another embodiment with the electric conductors and associated parts shown more or less diagrammatically; and

Fig. 7 is a section on the line 7—7 of Fig. 6.

In the embodiment illustrated in Fig. 1, the switch 1 of the ticker is connected to the outlet plug 2 representing a source of telegraphic impulses by means of the electric conductor 3 and is connected to the magnet 4 of the ticker by the electric conductor 5. The magnet 4 is connected by the conductor 6 to the outlet plug 2. It is to be understood, however, that the aforesaid electric connections are merely illustrative of the relation of the main ticker switch or system and the ticker magnets in general.

The magnet 4 when energized is adapted to attract the armature 7 of the presser arm 8, which is mounted to pivot about the pin 9 extending through the bracket 10. The presser arm 8, as illustrated, is preferably provided with a spring 11 which normally urges the free end of the presser arm 8 into engagement with the stop pin 12. The presser arm 8, in the present instance, is provided with a contact pin 13 having a contact head 14 formed at the end thereof to reciprocate between the contact blades 15 and 16 and engage the projecting ends of these blades 15 and 16 when the presser arm 8 is raised by means of the magnet 4. When so raised, the magnet 17 is energized due to the fact that the contact blades 16 is connected to the magnet 17 by the electric conductor 18 and that the contact blade 15 is connected to the magnet 17 by means of the conductor 19, the source of current supply by way of the outlet plug 20 and electric conductor 21.

The magnet 17 when energized attracts the armature 22 which is pivotally connected at 23 to the standard 24. The armature 22 is provided with an extension 25 which is pivotally connected by means of the link 26 to the piston 27 slidably mounted in the cylinder 28. The cylinder 28 is adapted to be supplied with oil which passes downward from the upper end of the cylinder 28 to the lower end of the cylinder 28 through the passage 29 formed in the piston 27, but is prevented from passing through the passage 29 in an upward direction from the lower end of the cylinder 28 into the upper end of the cylinder 28.

When the piston 27 moves downwardly, the check valve 30 obstructs the passage of the oil up through the passage 29 and compels the same to pass through the restricted passage 31 from the lower end of the cylinder 28 into the upper end of the cylinder 28. The restricted passage 31 is provided with a set screw 32 to regulate the passage of oil through the passage 31. The extension 25 of the armature 22 is also provided with a spring 33 normally to retain the piston 27 in the lower end of the cylinder 28 and the armature 22 separated from the magnet 17. Preferably the tension of the spring 33 is made adjustable by the adjustment screw 102.

The armature 22 is provided with a yieldable contact spring 34 adapted to engage the contact plate 35 secured to the side of the bracket 36. The contact plates 34 and 35 are connected to the contact rings 37 and 38 respectively, the contact spring 34 being connected to the contact ring 37 by means of the conductor 39, the source of current supply by way of the outlet plug 40 and conductor 41, and the contact plate 35 being connected to the contact ring 38 by means of

the conductor 42. The rings 37 and 38 constitute parts of the magnet 43 which is adapted to cooperate with the face 44 of the clutch disk 45 freely mounted on the shaft 46.

The disk 45 has secured thereto the pulley 47 which is connected to the pulley 48 by the belt 49. The pulley 48 is mounted on the shaft 50 of the motor 51. The motor 51 is connected to the outlet plug 52 by means of the conductor 53 connected to one of the blades of the plug 52 and by means of the conductor 54, variable resistance 55 and conductor 56 connected to the other blade of the plug 52.

The shaft 46 is fixedly connected to the magnet 43 and has secured thereto the worm 57 in mesh with the worm wheel 58 mounted in the housing 59. The worm wheel 58 is mounted on the shaft 60 which has secured thereto the tape drawing roller 61 maintained in engagement with the tape T by the pressure roller P, see Fig. 4. Resiliently to anchor the magnet 43 against coasting when de-energized, the spring 62 is provided which is compressed between the screw member 63 and the abutment 64 which engages the end of the hub 65 of the magnet 43. The tension of the spring 62 is not sufficient to lock the magnet against rotation when energized.

In the embodiment illustrated in Fig. 2, the portion of the embodiment illustrated in Fig. 1 above the line *a*—*a* is replaced by a loop controlled mechanism in which the tape T travels from the ticker 66 to the idler 67, and from the idler 67 to the projecting station or projector 68. Between the ticker 66 and the idler 67 the tape cooperates with the finger 69 at the upper end of the link 70 pivotally connected at its lower end to the platform 71 of the mercury switch 72. The platform 71 is pivotally connected to rock about the pin 73 on the standard 74. The mercury switch 72 is connected by the conductor 75 to the outlet plug 76, which outlet plug 76 is connected by the conductor 21, illustrated in Fig. 1, to magnet 17. The other end of the mercury switch 72 is connected by the conductor 18, illustrated in Fig. 1, to the magnet 17.

In Fig. 3 there is illustrated another embodiment of the portion of the embodiment illustrated below the line *b*—*b* of Fig. 1. In the embodiment illustrated in Fig. 3, the conductors 41 and 42 are likewise connected to a magnetic clutch, in this case being connected to the contact rings 77 and 78 respectively of the magnet 79 which is fixedly mounted on the shaft 80. The shaft 80 has fixed thereon the worm wheel 81 in mesh with the worm 82 in the housing 83. The shaft 84 of the worm 82 has fixed thereon the pulley 85 which is connected to the pulley 86 by the belt 87. The pulley 86 is connected to the shaft 88 of the motor 89. The motor 89 has one of its leads connected to the outlet plug 90 by means of the conductor 91 and its other lead connected by the conductor 92, resistance 93 and conductor 94 to the outlet plug 90. On the shaft 80, there is freely mounted the tape drawing roller 95 which has a clutch disk 96 formed thereon for engagement by the magnet 79. For normally restraining the disk 96 from rotation by the magnet 79, the roller 95 is retarded by the lever 97 fulcrumed at 98. The arm 99 of the lever 97 is connected by the spring 100 to the abutment 101 resiliently to restrain the disk 96 from rotation by the magnet 79.

With the embodiment illustrated in Fig. 2, the operation of the ticker forms slack in the tape T to permit the link 70 to descend and rock the mercury switch 72 to close the switch and energize the magnet 17 to attract the armature 22 in turn to cause the contact arm 34 to engage the contact arm 35. Thereupon, when the ticker stops and the roller 61 of the embodiment illustrated in Fig. 1 continues to draw the tape T across the projector 68, it will take up the slack in the tape T at the finger 69 and thereby raise the link 70 to rock the mercury switch 72 to open the circuit. When so opened, the magnet 17 will be de-energized, but before the contact 34 disengages the contact 35, a short period of delay will ensue as a result of the slow motion device including the piston 27 operating in the cylinder 28, such delay being sufficient to prevent the separation of the friction disk 45 from the magnet 43 if the interruption of the ticker were only momentary. As a result, it is obvious that the interruption in the movement of the tape will be considerably reduced and the movement of the tape only interrupted when the ticker is arrested for an extended period of time.

With the embodiment illustrated in Fig. 3, the magnetic clutch is interposed between the reduction gearing and the tape pulling roller 95. Ordinarily, it is preferred that the movement of the tape start gradually and come to rest gradually, in which case the portion of the embodiment shown below the line *b*—*b* of Fig. 1 should be used where the reduction gearing is interposed between the magnet and the tape drawing roller, and consequently is effective due to its inertia to extend the period of acceleration when starting and the period of retardation when stopping. On the other hand, there are instances where the period of acceleration and retardation must be reduced to a minimum in which case the embodiment illustrated in Fig. 3 would of course be preferred.

In the embodiment illustrated in Fig. 5, there is illustrated a ticker 103 of the high speed type from which the tape 104 is discharged and initially passes under the finger or roller 105 of the switch arm 106 operatively mounted in the switch box 107. The tape then passes across the light aperture formed on top of the extension 108 of the lamp housing 109 and then passes down under the idler 110 rotatably mounted on the housing 111 and from the idler 110 passes up across the upper surface of the tape pulling roller 112 and then down under the idler 113 and from there to the rewind reel 114 journaled in the upper end of the bracket 115 extending upwardly from the housing 111. The tape 104 is maintained in driving engagement with the tape pulling roller 112 by the pressure roller 116.

For driving the tape pulling roller 112, there is provided the worm wheel 117 fixed in the housing 111 to rotate with the pulling roller 112 and in mesh with the worm 118 mounted on the shaft 119. The shaft 119 has slidably fixed thereon to rotate therewith the outer clutch member 120. On the shaft 119, there is freely rotatable the sheave 121 which is connected by the belt 122 with the sheave 177 of the motor 178. The sheave 121 constitutes another clutch member to cooperate with the clutch member 120.

The operative relation of the clutch members 120 and 121 with the electric motor 178 and with the pulling roller 112 is substantially identical with that disclosed in the embodiment illustrated in Fig. 6 and will be described more in detail when describing the embodiment of Fig. 6. Suffice it to say for the present that the electric switch in the switch box 107 is connected to the conductors 222 and 123. The conductor 222 is connected

to the outlet plug 124. The conductor 123 and the other conductor 125 connected with the outlet plug 124 are connected to the magnet 158 interposed between the clutch members 120 and 121. This magnet and its relation to the clutch members 120 and 121 will be described more in detail in connection with the embodiment illustrated in Fig. 6. In operation, when the ticker operates, the tape 104 will be discharged to form a loop and permit the arm 106 to descend and thereby close the switch in turn to cause the clutches 120 and 121 to cooperate to drivingly connect the shaft 119 with the driving motor 178. In turn when the ticker comes to rest, the tapepulling roller 112 will continue to advance the tape and thereby dissipate the loop formed by the arm 106 to raise the arm 106 and cause the switch to open and thereby de-energize the magnet 158 for the clutch members 120 and 121.

In this embodiment in the usual way, the light rays will be directed upwardly through the tape disposed at the light aperture with the printed side of the tape facing downwardly, and then project the image impressed light beam to the objective lens unit contained in the housing 126 and from there be projected onto the mirror 127 and ultimately appear on the screen 128 in upright readable position.

In the embodiment illustrated in Fig. 6, there is also used a high speed ticker in which advantage is taken of the movement of the bell crank bail 129 of the high speed ticker when the operation of the ticker is started to initiate the operation of the tape pulling roller. This bell crank bail 129 is in the present instance provided with an insulated bracket 130 having a conductive finger 131 at its free end positioned to engage the switch blades 132 and 133 formed on the block 134. The switch blade 132 in the present instance is connected by the conductor 135 with one side of the outlet plug 136 to a suitable source of current supply. The outlet plug 136 is in turn connected by the conductor 137 with the magnet 138 similar to the magnet 17 in the embodiment of Fig. 1.

The switch blade 133 is connected by the conductor 139 to the other end of the winding of the magnet 138. The magnet 138 constitutes a part of a slow opening and fast closing device such as that illustrated in the embodiment of Fig. 1, it being positioned to attract the armature 140 pivotally mounted at 141 on the standard 142 and limited in its downward movement by the standard 143.

The armature 140 is provided with a flexible contact blade 144 to engage the flexible contact blade 145 when the armature 140 is attracted by the magnet 138 into its lowermost position. For maintaining the contact blades 144 and 145 separated, the armature 140 is provided with a spring 146 which connects the arm portion 147 spaced from the magnet with a suitable abutment. The free end of the arm portion 147 is connected by the link 148 with a piston 149 mounted in the cylinder 150.

The cylinder 150 is filled with oil or other suitable liquid. The upper end of the cylinder is connected with the lower end of the cylinder by a narrow passageway 151. For regulating the flow through the narrow passageway 151 there is preferably provided an adjusting screw 152. The piston 149 is provided with a narrow passageway 153 having a check valve 154 secured to its lower end. As a result of the aforesaid, when the piston 149 is caused to ascend upon the descent of the armature 140, the check valve 154 will be free to permit the fairly rapid movement of the oil from the upper portion of the cylinder to the lower portion of the cylinder 150. On the other hand, when the magnet 138 is de-energized and the spring 146 acts upon the arm portion 147 to lower the latter, the check valve 154 will obstruct the passage of the liquid through the passageway 153 and cause the same to move through the passageway 151 and thereby retard the downward movement of the arm portion 147.

Due to the flexure of the contact blades 144 and 145, it will be necessary for the arm portion 147 to descend considerably more than half way before the blades 144 and 145 will separate. In view of the foregoing, it will thus appear that the interval between two succeeding sets of impulses required for transmitting two succeeding letters of a word will not be sufficient to cause the contact blades 144 and 145 to be separated and this slow motion device is also so adjusted that it will require for such separation more than the interval between the last letter of a preceding word and the first letter of a succeeding word of a message. In other words, when the magnet 138 has once been energized by the start of the ticker, even though it is de-energized by the momentary separation of the blades 132 and 133 from the contact arm 131 by the interruption in impulse transmission between two succeeding words, this momentary interruption will not be sufficient to separate the contact blades 144 and 145, and break the motor circuit.

The contact blade 144 is connected by the conductor 155 with one side of the outlet plug 156. The other conductor 157 instead of the conductor 123 of the embodiment of Fig. 5 of the outlet plug 156 is connected to one end of the winding of the magnetic coil 158. The other end of the winding of this magnetic coil 158 is connected by the conductor 159 instead of the conductor 125 of the embodiment of Fig. 5 with the contact blade 145. The magnetic coil 158 is supported by a suitable bracket 160.

Through the magnetic coil 158 extends the shaft 119 journaled in the housing 111. The shaft 119 has fixed thereon the worm 118 in mesh with the worm wheel 117. The worm wheel 117 is fixed on the shaft 165 journaled in the housing 111. To one end of the shaft 165, there is fixed the sheave 166 connected by a belt 167 with the sheave of the rewind reel not shown in Fig. 6, such for instance as the reel 114 illustrated in Fig. 5. The other end of the shaft 165 has mounted thereon the tape pulling roller 112. The tape 104 after its discharge by the ticker crosses the light aperture, the same as in Fig. 5, in the present embodiment and will pass under the idler 110 and then over the tape pulling roller 112 and then under the idler 113 and thereupon pass upwardly to the rewind reel, such for instance as the rewind reel 114 illustrated in Fig. 5. The tape is maintained in driving engagement with the pulling roller 112 by the pressure roller 116. Rotatably mounted on the shaft 119 is mounted the sheave 121 having a hub 174 centrally disposed of the magnetic coil 158 having a clutch face 175 on the free end of said hub 174. The sheave 121 is connected by the belt 122 with the sheave 177 mounted on the shaft of the motor 178. Fixed to rotate with, but slidable on, the shaft 119, there is secured the disk 120 having a hub 180 disposed centrally of the magnetic coil 158 and having at its free end a clutch face 181 disposed to frictionally engage

the clutch face 175 when the magnetic coil 158 attracts the disk 120.

Adjacent the end of the shaft 119, there is located the bracket 182 clearing the shaft 119 and serving as a brake for the same. The end of tne shaft 119 has secured thereon the flat spring member 183 with its ends extending under the straps 184 and 185, see Fig. 7, formed on the outer face of the disk 120. The spring 183 cooperates with the end of the shaft 119 and the straps 184 and 185 normally to maintain the disk 120 and therefore the clutch face 181 out of clutching engagement with the clutch face 175 of the sheave 121.

The embodiment illustrated in Fig. 5 is equipped with a driving connection substantially identical to that interposed between the motor 178 and the pulling roller 112 of the embodiment illustrated in Fig. 6. With both of the embodiments illustrated in Figs. 5 and 6, a magnetic coil is energized acting as part of a magnetic clutch to cause the reduction gearing of the tape pulling roller to be connected to a continuously operating motor.

In the embodiment of Fig. 5, the magnetic coil is energized by a circuit including an electric switch associated with the switch arm 106 when the loop under the finger 105 is large enough to permit the switch arm 106 to drop into circuit closing position and in the embodiment illustrated in Fig. 6, the magnetic coil 158 is energized when the switch blades 144 and 145 engage due to the actuation of the bell crank bail 129.

The motor 178 is for the purpose of this invention continuously operating, it being associated with an independent electric circuit, to wit that defined by the conductor 186, a source of electric supply by way of the outlet plug 187, the conductor 188, the resistance 189 and the conductor 190. In both embodiments, the sheave 121, see particularly Fig. 6, is preferably provided with friction reducing bearings such as the bearings 191 and 192 and the disk 120 is slidably mounted on the shaft 119 but connected by the key 193 to rotate with the shaft 119. In this way, when the current to the magnetic coil 158 is de-energized the motor 178 will continue to rotate the sheave 121 although independent of the shaft 119 at this time, and the disk 120 and tape pulling roller 112 due to their connection with the shaft 119 and associated parts will immediately come to rest until the magnetic coil 158 will again be energized.

With the latter embodiment where the coil 158 is stationary, it will be seen that no provision need be made for collector rings, brushes and the like, such as required with the embodiment illustrated in Fig. 1.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention as set forth in the appended claims.

I claim:

1. The combination with a tape puller, of a continuously operating motor, a driven shaft operatively connected to actuate said tape puller, a sheave rotatably mounted on said shaft and operatively connected to be rotated by said motor, a clutch having a clutch face fixed to rotate with said driven shaft, a magnetic coil associated with said clutch and sheave for attracting said clutch and sheave to clutchingly engage one another when said coil is energized, and means for controlling said coil as tape is ejected for advancement by said tape puller, said driven shaft and tape puller being free to come to rest under their own momentum when said coil is de-energized.

2. The combination with a tape puller, of a continuously operating motor, a metallic clutch member operatively connected to rotate with said motor, a second metallic clutch member fixed to rotate with said tape puller, a magnetic coil operatively associated with said clutch members to attract said clutch members to clutchingly engage one another when said coil is energized, and means for controlling said coil as tape is ejected for advancement by said tape puller, said second clutch member and tape puller being free to come to rest under their own momentum when said coil is de-energized.

3. A clutch device for drivingly connecting the driven shaft of a tape puller with the drive shaft of a continuously operating motor including a sheave rotatably mounted on said driven shaft and drivingly connected to said motor, a metallic clutch disc fixed to rotate with but slidably mounted on said driven shaft, a spring connecting said driven shaft to said disc and normally maintaining said disc out of clutching engagement with said sheave, a magnetic coil interposed between said disc and said sheave to enable said disc to clutchingly engage said sheave when said coil is energized, and means for controlling said coil as tape is ejected for advancement by the tape puller, said driven shaft being free gradually to come to rest when said coil is de-energized.

4. A clutch device for drivingly connecting the driven shaft of a tape puller with the drive shaft of a continuously operating motor, including a sheave rotatably mounted on said driven shaft and drivingly connected to said motor, a metallic clutch disc fixed to rotate with but slidably mounted on said driven shaft, said sheave and disc each having a hub mounted on said shaft adjacent to one another, means connecting said driven shaft to said disc for normally maintaining said disc out of clutching engagement with said sheave, a magnetic coil independent of but encircling the hubs of said sheave and disc to enable said disc to clutchingly engage said sheave when said coil is energized, and means for controlling said coil as tape is ejected for advancement by the tape puller, said driven shaft being free gradually to come to rest when said coil is de-energized.

5. A clutch device for drivingly connecting the driven shaft of a tape puller with the drive shaft of a continuously operating motor, including a sheave rotatably mounted on said driven shaft and drivingly connected to said motor, a metallic clutch disc fixed to rotate with said driven shaft, said sheave and disc each having a hub mounted on said driven shaft adjacent to one another, a magnetic coil independent of but encircling the hubs of said sheave and disc to cause said disc to clutchingly engage said sheave when said coil is energized, and means for controlling said coil as tape is ejected for advancement by the tape puller, said driven shaft being free gradually to come to rest when said coil is de-energized.

6. The combination with a tape puller, of a continuously operating motor, a driven shaft drivingly connected to said tape puller, a sheave rotatably mounted on said shaft and drivingly connected to said motor, a clutch having a clutch face fixed to rotate with said driven shaft, a magnetic coil interposed between said clutch and said sheave to cause said clutch face to clutchingly engage said sheave when said coil is ener-

gized, and means for energizing said coil as tape is ejected for advancement by said tape puller, said driven shaft being free gradually to come to rest when said coil is de-energized.

7. A tape pulling mechanism operable to come to rest when the supply of tape thereto is interrupted comprising a tape puller, a continuously operating motor, a metallic clutch member operatively connected to rotate with said motor, a second metallic clutch member operatively connected to rotate with said tape puller and rotatable independently of said motor, a pivotally mounted bracket in engagement with the tape and normally deflecting the tape, and an electromagnet circuit including a magnetic coil and an electric switch operatively associated with said bracket, said coil being operatively associated with said clutch members when energized to attract said clutch members to clutchingly engage one another to rotate with one another, said bracket when rocked by the tension in the tape resulting when the supply of tape is interrupted to actuate said electric switch to open the electromagnet circuit of said coil in turn to de-energize said coil in turn to release said tape puller to come to rest of its own accord.

8. A tape pulling mechanism operable to come to rest when the supply of tape thereto is interrupted comprising a tape puller, a continuously operating motor having a drive shaft rotatable independently of said drive shaft, a driven shaft, a sheave rotatably mounted on said driven shaft and drivingly connected to said drive shaft, a metallic clutch member fixed to rotate with said driven shaft, a second metallic clutch member fixed to rotate with said sheave, a pivotally mounted bracket in engagement with the tape and responsive to deflections in the tape, and an electromagnet circuit including an electromagnet and an electric switch operatively associated with said bracket, said electromagnet being interposed between said clutch members to electro-magnetically attract said clutch members to engage one another to rotate with one another when said electromagnet is energized, said bracket when rocked by the tension in the tape resulting when the supply of tape is interrupted to actuate said electric switch to open the electromagnet circuit in turn to de-energize said electromagnet to release said driven shaft.

9. In a data recording projection system, means to maintain smooth and feed a tape through said system, said means including a tape pulling device at the discharge end of said projection system, an electric motor, a rotatable clutch disc operatively connected to said electric motor, a magnetic clutch, means for operatively connecting said magnetic clutch to said tape pulling device, and means for energizing said magnetic clutch to clutchingly engage said clutch disc as the tape is ejected from a data recording device.

10. In a data recording projection system, means to maintain smooth and feed a tape through said system, said means including a tape pulling device to pull the tape from the discharge end of said system, an actuating device, a metallic clutch disc operatively connected to said actuating device, a magnetic clutch operatively connected to said pulling device, and means for energizing said magnetic clutch to clutchingly engage said clutch disc as the tape is ejected from a data recording device.

11. In a data recording projection system including a projection field, a tape drawing means for maintaining the tape smooth while it is being drawn through said projection field, said tape drawing means including a tape drawing roller beyond the discharge end of said projection field, an actuating device, a magnetic clutch for connecting said drawing roller with said actuating device, and means responsive to deflections in the tape in advance of said projection field as it is fed to said projection field for electrically connecting said magnetic clutch to actuate said drawing roller.

12. In a data recording projection system including a projection field, a tape pulling device adapted for pulling a tape through said projection field as the said tape is fed to said projection field beyond the discharge end of said projection field, an electric motor, a reduction gearing operatively connected to said tape pulling device, a magnetic clutch operatively connected to connect said electric motor to said reduction gearing when energized, and means responsive to deflections in the tape in advance of said projection field for electrically connecting said magnetic clutch to actuate said drawing roller.

13. In a data recording projection system including a projection field, the combination including a tape pulling roller for pulling a tape through said projection field as it is fed thereto disposed beyond the discharge end of said projection field, a driven shaft, a driven sheave rotatably mounted on said shaft, an electric motor operatively connected to said sheave, a magnetic clutch disc fixed to rotate with said sheave, a reduction gearing operatively connected to said tape pulling roller and said driven shaft, a rotatable magnetic clutch fixed to said driven shaft to cooperate with said disc when energized to connect said sheave to said driven shaft, and means responsive to deflections in the tape in advance of said projection field as it is fed to said projection field for electrically controlling said magnetic clutch to said clutch disc.

14. In a data recording projection system including a projection field, the combination of means for drawing the tape through said projection field from the discharge end thereof, said means including a driven shaft, a tape pulling roller freely mounted on said shaft, a magnetic clutch disc fixed to said roller, a magnetic clutch fixed to said shaft, and means responsive to deflections in the tape in advance of said projection field as the tape is fed thereto to clutchingly engage said clutch disc and thereby actuate said tape pulling roller.

AUGUST D. EITZEN.