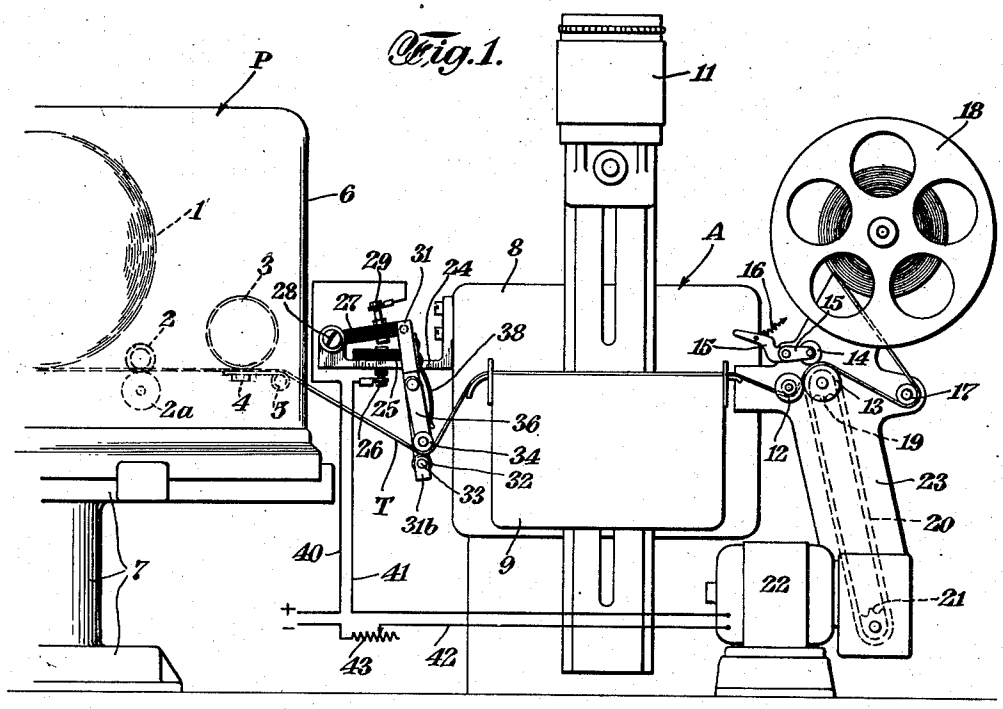
July 23, 1940. D. F. NEWMAN 2,208,946

TAPE CONTROLLING ARRANGEMENT

Original Filed Dec. 13, 1935 2 Sheets-Sheet 1

Fig. 1.



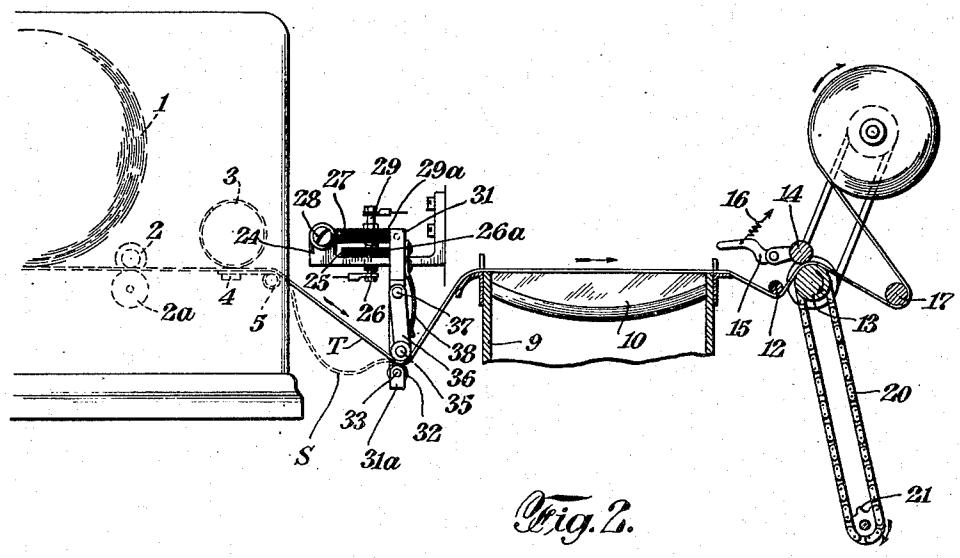


Fig. 2.

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Fig. 3.

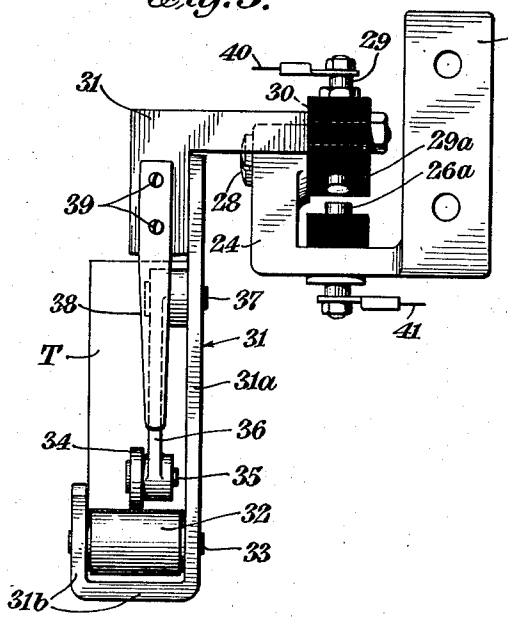
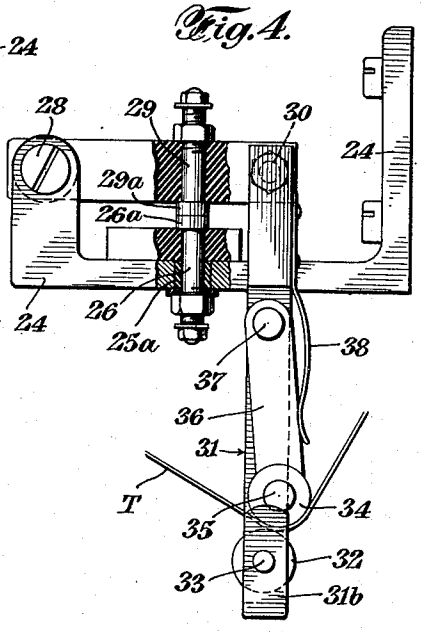


Fig. 4.



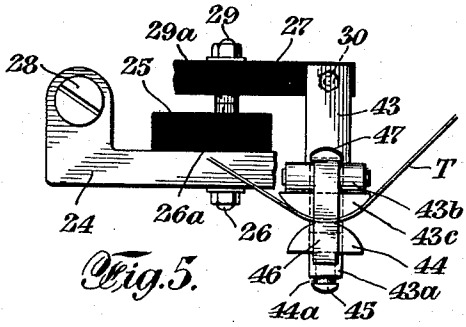


Fig. 5.

Fig. 6.

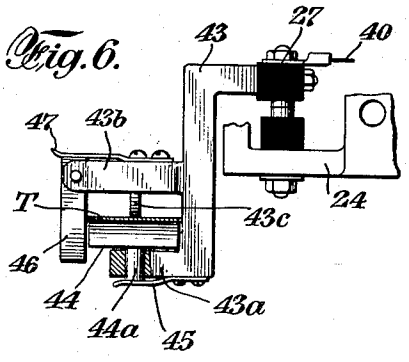
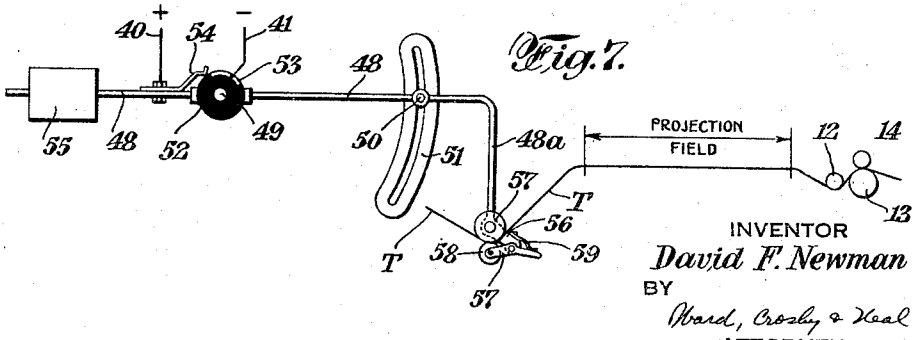


Fig. 7.



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TAPE CONTROLLING ARRANGEMENT

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Application December 13, 1935, Serial No. 54,261
Renewed December 15, 1939

5 Claims. (Cl. 271—2.3)

My invention relates to arrangements for controlling a character-bearing tape for movement through a projection field.

My invention has particular reference to an arrangement wherein the aforesaid tape is moved through the projection field in response to operation of a suitable motor, the latter being controlled by a movable device engaging the tape adjacent the entrance to the projection field and said movable device constantly gripping the tape so as to prevent transmission into the projection field of tape vibrations such, for example, as those produced by the mechanism which prints the tape characters.

Further objects, advantages and features of my invention will become apparent from the following detailed description.

My invention resides in the tape-controlling arrangements, features, combinations and arrangements of parts of the character hereinafter described and claimed.

For an understanding of my invention and for an illustration of some of the forms thereof, reference is to be had to the accompanying drawings, in which:

Figure 1 is a front elevational view of a tape-controlling arrangement as constructed in accordance with my invention;

Fig. 2 is a front elevational view, showing the arrangement of Fig. 1 with some of the parts in different positions, respectively, and with other parts omitted;

Fig. 3 is an enlarged side elevational view of a tape-gripping device as constructed in accordance with my invention;

Fig. 4 is a front elevational view, partly in section, of the device shown in Fig. 3;

Fig. 5 is a front elevational view showing a modified form of tape-gripping device;

Fig. 6 is a side elevational view, partly in section, of the device shown in Fig. 5; and

Fig. 7 is a schematic view of another tape-controlling arrangement as constructed in accordance with my invention.

Referring to Figs. 1, 2, 3 and 4, P represents a suitable printing device such, for example, as a ticker mechanism of the type which prints characters representative of stock quotations lengthwise on a narrow tape T, such tape being opaque if desired although, as herein shown, said tape T is formed from transparent or translucent material such as is suitable for "through" projection. The ticker mechanism P may be of a conventional type and, if so, a roll 1 of the tape T is provided, a pair of spaced rollers 2, 2a feeding and ejecting the tape T from the ticker mechanism in a direction from left to right, Figs. 1 and 2, these rollers moving the tape along a path disposed closely adjacent the type wheel 3 with which the usual platen or hammer 4 coacts to effect the printing operation, the tape T finally engaging and passing over the guide surface 5 and then passing beyond the housing 6 of the ticker mechanism, this housing 6, if desired, being mounted upon any suitable support 7.

After the tape T leaves the ticker mechanism P, it is drawn through a suitable projection device A whereby images of the tape characters are projected onto any suitable screen, not shown. The projection device A may be of conventional form if desired, and, as herein shown, said device A comprises a rear lamp housing 8 and a front lens housing 9, the projection light beam being produced by a source of light, not shown, and said projecting light beam, in suitable manner, being caused to pass upwardly through a condensing lens 10 disposed at the top of the lens housing 9, Fig. 2, then through the projection field which, as herein shown although not necessarily, is defined by an open rectangular aperture formed at the top of the supplementary housing 9. After the projecting light beam leaves said tape section at the aforesaid projection aperture, it travels vertically through the objective lens at 11 and then, usually, passes into engagement with one or more mirrors before engaging the projection screen, not shown. It will be understood that the "means" defining the projection field may be omitted, if desired. If so, the projection field may be considered in its optical sense as in the plane which is at right angles to the longitudinal axis of the objective lens 11, this plane being in focus with said objective lens.

The tape T may be pulled or drawn through the projection field in any suitable manner. Thus, for example, said tape T may be passed beneath a roll 12 or other guiding surface, the latter being positioned at or below the horizontal plane of the aforesaid rectangular aperture at the top of the housing 9. Thereafter, the tape T passes over a pulling roll 13 with the upper surface of which said tape is held in engagement by an idler roll 14 mounted on a lever 15, the latter being biased in a clockwise direction, Fig. 1, by a suitable spring 16. After the tape passes beyond the pulling roll 13, it preferably engages a guiding surface such as an idler roll 17 and then passes upwardly to a suitable reel 18.

The aforesaid pulling roll 13 may be operated in any suitable manner. Thus, for example, as indicated in Fig. 1, the operating shaft for said pulling roll 13 carries a suitable pinion 19 with which an endless sprocket chain 20 engages, this chain being operated by a pinion 21 which is rotated at suitable speed by an electric motor 22.

As herein shown although not necessarily, the above described rolls 12, 13, 14, 17, the reel 18 and associated parts are carried by a supporting bracket 23 which, if desired, may be secured in suitable manner to the aforesaid housing 8.

The reel 18 serves in the customary manner for the reception of the tape which is wound thereupon. This reel 18 may be operated in any suitable manner and, to this end, an endless spring belt may be engaged with pulleys carried, respectively, by the shaft of said reel 18 and the common shaft for the roller 13 and pinion 19. Therefore, as will readily be understood by those skilled in the art, the motor 22 furnishes power for operating the reel 18.

As herein illustrated, the tape loop formed between the printing mechanism P and the projection device A is utilized for the purpose of controlling operation of the tape-pulling motor 22. To this end, in the example shown, there is provided a metallic bracket 24 which is suitably secured, for example, to the lamp housing 8. Carried by and fixed to the bracket 24 is an insulating member 25 which supports an electrical terminal 26, this terminal comprising a contact member 26*a* disposed on the upper face of said insulating member 25, the terminal 26 being insulated from the bracket 24 by the insulating sleeve 25*a*, Fig. 4. Disposed adjacent the fixed insulating member 25 is a movable insulating member 27 pivoted at 28 on an upper extension of the bracket 24. The insulating member 27 carries an electrical terminal 29 terminating in a lower contact member 29*a* coactable with the aforsaid contact member 26*a*. As will readily be understood, the member 27 insulates the terminal 26 and its contact member 29*a* from the bracket 24.

Suitably secured to the free end of the insulating member 27, as by a bolt 30, is an angular structure 31 which comprises a depending member 31*a* terminating, at its lower end, in a channel section 31*b* in which a roller 32 is mounted for free rotatable movement on a horizontal axis defined by a supporting pin 33. As shown, the interior transverse dimension of the channel section 31*b* is slightly greater than the width of the tape T and, in generally the same manner, the length of the roller 32 is substantially the same as the tape width. Coactable with the roller 32 is a second roller 34 mounted for free rotatable movement on a horizontal axis defined by a pin 35 having a bearing at the lower end of a lever 36 which is pivoted at 37 on an upper section of the aforesaid member 31*a*, the lever 36 being suitably biased in a clockwise direction, as by the leaf spring 38, one end of which is suitably fixed to said member 31 at 39.

As appears from a consideration of Figs. 1 and 2, the above described insulating member 27, structure 31 and associated parts form a lever arrangement which is controlled by the tape, said lever arrangement, in turn, controlling operation of the motor 22. To this end, one side of a suitable source of electrical current, not shown, is connected to a conductor 40 which leads to the aforesaid terminal 29 of the movable insulating member 27. Connected to the terminal 26 of the fixed insulating member 25 is a conductor 41 which leads to one terminal of the motor 22, the other terminal of which has connected thereto a conductor 42 which preferably includes a variable resistance 43, said conductor 42 leading back to the aforesaid source of electrical current.

In accordance with the invention, the rollers 32 and 34 are disposed in the path of the tape T as the latter emerges from the ticker mechanism P, said rollers 32 and 34 having their longitudinal axes disposed substantially at right angles to the path of the tape. As shown in Figs. 1–4 inclusive, the tape T is adapted to rest upon the upper surface of the roller 32 and, when said tape is to be thus disposed, the lever 36 may be swung aside in a counterclockwise direction, Figs. 1, 2 and 4, to permit entry of the tape within the channel section 31*b* so that it can be seated upon the roller 32. As soon as the foregoing has been accomplished, the lever may be released so that it returns to the position shown on the drawings under the influence of the spring 38.

As illustrated, the length of the lever 36 is such that the roller 34 engages the roller 32 slightly below the top and at one side thereof. Accordingly, as will be understood, rotation of the rollers 32 and 34 is frictionally impeded to some extent and, therefore, said rollers serve to grip the tape for the useful purpose hereinafter noted.

When the various parts of the disclosed apparatus are positioned as illustrated in Fig. 1, the tape loop is relatively short and, accordingly, the lever arrangement comprising the insulating member 27 and angular structure 31 is held by the tape in such elevated position that the contact members 26*a*, 29*a* are open whereby the operating circuit of the motor 22 is open. Therefore, under these conditions, the motor 22 is nonoperative and the tape T remains stationary in the projection field.

When operation of the ticker mechanism P is initiated, the tape T is ejected therefrom in the usual manner and, as a result, the lever arrangement comprising the insulating member 27 and angular structure 31 descends under the influence of gravity until the contact member 29*a* comes into engagement with the contact member 26*a*. When this occurs, the circuit through the motor 22 is closed and, as a result, the pulling roll 13 is rotated in a clockwise direction, Fig. 2, to cause the tape T to be drawn through its projection field. This operation continues as long as the ticker mechanism P ejects the tape at a rate sufficiently fast to maintain the tape loop long enough to permit the contact members 26*a* and 29*a* to remain in engagement. When operation of the ticker mechanism P is discontinued, the motor 22 continues to pull the tape until the tape loop is shortened sufficiently to cause the aforesaid lever arrangement to be moved into substantially the position shown in Fig. 1. When this occurs, the circuit of the motor 22 is opened and the tape-pulling operation is discontinued.

It is well understood in the art that ticker tape of the character herein discussed is ejected from ticker mechanism such as the printing device P in a pulsating, jerky manner. Further, if the projection operation is to proceed in a satisfactory manner, it is understood that such jerky movements should not be present in any tape section while the latter is in the projection field.

An arrangement of the character described above is highly advantageous in use because the

rollers 32 and 34 positively grip the tape T and prevent the transmission into the projection field of pulsations which, if present therein, would produce irregular, jerky tape movements such as would cause the projection of the tape character images to be objectionable. Furthermore, the rollers 32 and 34 function to apply a braking or dragging effect to the tape and, therefore, the pulling roller 13 maintains the tape taut as it extends across or through the projection field. Accordingly, with an arrangement of the character described, the tape is so controlled that the projection of the images is effected from a taut tape section which is moved through the projection field in a regular, even manner. The resultant projection, therefore, is highly satisfactory, this result being attained even though there is no means between the rollers 32, 34 and the projection field for applying a retarding force to the tape.

As clearly appears, the contact members 26a, 29a form a mechanical stop which prevents further movement of the lever arrangement comprising the insulating member 25 and the angular structure 31 in a clockwise direction beyond the position shown in Fig. 2. Therefore, if the ticker mechanism P should eject tape at a rate faster than the tape is drawn through the projection field by the motor 22, a slack tape section such, for example, as shown at S, Fig. 2, would be formed between the rollers 32, 34 and the ticker mechanism P. However, due to the presence and function of said rollers 32, 34 this slack tape section S is confined substantially to the position illustrated in Fig. 2 and, accordingly, the tape section in the projection field remains taut so as to insure satisfactory projection of the character images. As will readily be understood, if operation of the ticker mechanism P is discontinued, while a slack tape section S is in existence, the motor 22 continues to pull the tape through the projection field until said slack has been removed and the tape loop shortened sufficiently to separate the contact members 26a, 29a.

In operation, the motor 22 should pull tape through the projection field at a rate slightly faster than the rate at which tape is ejected from the ticker mechanism P. When the contact members 26a, 29a come into engagement to start the motor 22, further movement of the aforesaid lever arrangement comprising the insulating member 27 and angular structure 31 in a clockwise direction, Fig. 2, is discontinued. However, a short interval of time elapses after engagement of said contact members 26a, 29a before full speed operation of the motor 22 is effected and, in this interval, some slack in the tape is necessarily formed. This, however, is not objectionable since the rollers 32, 34 prevent the formation of slack in that tape section occupying the projection field.

With all lever arrangements, or equivalent, a stop of some character should be provided to limit descending movement thereof. However, a stop is not absolutely necessary since, depending upon the position of the pivot for the lever, for example, the lever arrangement may be free from any control by a stop or the like. Even so, the roller arrangement 32, 34 of my invention, or the equivalent thereof, operates in a satisfactory manner to prevent the establishment in the projection field of jerky movements of the tape.

If a stop is used, it shall be understood that the same need not necessarily be formed by the electrical contact members as disclosed herein. As well as disclosed in Fig. 7, there may be provided some stop arrangement which comes into operation after the control lever has descended lower than the position occupied thereby while in circuit-closing position, such circuit being closed, if desired, by a mercury switch or the like.

Thus, the invention may be exemplified by arrangements which include stop or non-stop devices for the control lever as desired. In either case, a certain amount of slack is formed at times between said control lever and the ticker mechanism and, as stated above, it is characteristic of my invention that a roller arrangement or the like is provided on the control lever to prevent such slack in the tape from causing objectionable tape vibrations in the projection field.

It shall be distinctly understood that my invention is not to be limited to the use of a roller arrangement such as described above for preventing transmission of tape vibrations into the projection field. Thus, Figs. 5 and 6 are illustrative of an alternative arrangement which comprises the insulating members 25 and 27, the latter having an angular structure 43 depending therefrom in lieu of the above described angular structure 31. This structure 43, at the lower end thereof, terminates in a lateral section 43a having a vertical passage in which the shank 44a of a member 44 is slidably received, this member being biased in an upward direction by a spring 45. Extending from the structure 43 above the lower end thereof is a lateral section 43b having a fixed depending rib section 43c centrally disposed with respect to the member 44 which is disposed therebeneath. Pivoted to the end of the lateral section 43b is a bar 46 having an upper horizontal surface which is engaged by a leaf spring 47 so as to normally remain in vertical position as shown in Fig. 6.

As clearly appears, the rib section 43c and the member 44 are curved, preferably in a symmetrical manner and in the direction of tape travel, so that said rib section 43c forms a seat against which the tape is held by the spring-biased member 44. The lower end of the structure 43 and the bar 46, on their adjacent interior surfaces, define a guiding channel through which the tape passes in a longitudinal direction. Hence, the transverse distance between said surfaces should be slightly greater than the width of the tape. When the bar 46 is swung to a horizontal position against the pressure of spring 47, the tape T may readily be threaded between the rib section 43c and the member 44. In as simple a manner, the bar 46 may be returned to its vertical position and so held by the spring 47.

As will readily be understood, the member 44, under the influence of the spring 45, holds the tape T against the fixed rib section 43c. Longitudinal movement of the tape T along its path is frictionally impeded, therefore, with the result that the arrangement of Figs. 5 and 6 necessarily prevents the passage of tape vibrations into the projection field.

In the form of the invention illustrated in Fig. 7, a lever 48 is mounted for pivotal movement on a horizontal member 49, said lever 48 carrying a lateral member 50 which is received in the arcuate slot of a stop member 51 supported in a suitable manner. Carried by the member 49 is a stationary disk 52 formed from insulating material and having a conductive segment 53 secured in the periphery thereof, said segment 53 having the aforesaid conductor 41 connected thereto. Carried by the lever 48 is a conductive

contact member 54 which is coactable with the aforesaid conductive segment 53, the contact member 54 having the aforesaid conductor 49 connected thereto. A balancing weight 55 may be carried by the lever 48, this weight being so positioned, however, that said lever 48 tends to swing in a clockwise direction, Fig. 7.

The lever 48 terminates in an angular end 48a to which is secured a tape-retarding arrangement of any suitable character. For example, said angular lever end 48a may carry a supporting frame 56 having a roller 57 rotatably mounted thereon. The frame 56 also carries a lever 57 to which a second roller 58 is rotatably secured, the lever 57 and roller 58 being biased in a clockwise direction, Fig. 7, by a spring 59.

It will be understood that the tape T may be disposed between the rollers 57 and 58 as shown in Fig. 7 and that said rollers 57, 58 operate in generally the same way as the other tape-retarding arrangements to prevent transmission into the projection field of vibrations which would impair the projection of images. Furthermore, the lever 48 of Fig. 7, with the segment 53 and the contact member 54, operates in generally the same manner as hereinbefore described to control operation of the tape-pulling motor.

As illustrated, the member 44 and the rib section 43c are of relatively narrow width. The roller 57, likewise, is of substantially the same narrow width. These parts are given such narrow dimensions for the following reason: Said parts contact with the top surface of the tape T which, as understood in the art, exhibits two spaced rows of characters extending longitudinally of the tape, and it is necessary that the contact be with the tape between the two rows of characters if smudging is to be prevented.

Although the control operations on the tape T and the tape-pulling motor has been described in connection with various lever arrangements, it shall be understood that the invention is not to be so limited. As well, for example, such control operations may be effected by reciprocatory members rather than true levers.

While the invention has been described with respect to certain particular preferred examples which give satisfactory results, it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a system of the character described, the combination with a projection field, tape-pulling means adjacent the exit end of said projection field, a motor for operating said tape-pulling means, a movable device between a printing mechanism and said projection field, tape-gripping means carried by said movable device, said tape-gripping means comprising members adapted to engage the respective opposite sides of the tape, said tape, between said tape-gripping means and said tape-pulling means being free from any braking effect acting to retard movement thereof, said members, when the tape is slack in the region between said printing mechanism and said projection field and likewise when the tape is taut in said region, cooperating with said tape-pulling means to hold the tape taut across said projection field and substantially prevent transmission into said projection field of tape vibrations produced by said printing mechanism, and means whereby said movable device controls the operation of said motor.

2. In a system of the character described, the combination with a projection field, tape-pulling means adjacent the exit end of said projection field, a motor for operating said tape-pulling means, a movable device between a printing mechanism and said projection field, tape-gripping means carried by said movable device, said tape-gripping means comprising rollers adapted to engage the respective opposite sides of the tape, means for biasing one of said rollers toward the other roller, said tape, between said tape-gripping means and said tape-pulling means being free from any braking effect acting to retard movement thereof, said rollers, when the tape is slack in the region between said printing mechanism and said projection field and likewise when the tape is taut in said region, cooperating with said tape-pulling means to hold the tape taut across said projection field and substantially prevent transmission into said projection field of tape vibrations produced by said printing mechanism, and means whereby said movable device controls the operation of said motor.

3. In a system of the character described, the combination with a projection field, tape-pulling means adjacent the exit end of said projection field, a motor for operating said tape-pulling means, a movable device between a printing mechanism and said projection field, tape-gripping means carried by said movable device, said tape-gripping means comprising members adapted to engage the respective opposite sides of the tape, said tape, between said tape-gripping means and said tape-pulling means being free from any braking effect acting to retard movement thereof, said members, when the tape is slack in the region between said printing mechanism and said projection field and likewise when the tape is taut in said region, cooperating with said tape-pulling means to hold the tape taut across said projection field and substantially prevent transmission into said projection field of tape vibrations produced by said printing mechanism, and means whereby said movable device controls the operation of said motor, said last named means comprising fixed and movable contact members operative, when in engagement, to prevent movement of said movable device.

4. In a system of the character described, the combination with a projection field, tape-pulling means adjacent the exit end of said projection field, a motor for operating said tape-pulling means, means forming a control circuit for said motor, a lever disposed at the entrance side of said projection field and extending generally in the longitudinal direction thereof, a horizontal member on which said lever is pivoted intermediate the ends thereof, means on that section of said lever which is at the side of said horizontal member toward the projection field for engaging the top surface of the tape to form a loop therein, and means on that section of said lever which is at the side of said horizontal member remote from said projection field for operating said control circuit.

5. In a system of the character described, the combination with a projection field, tape-pulling means adjacent the exit end of said projection field, a motor for operating said tape-pulling means, means forming a control circuit for

said motor, a lever disposed at the entrance side of said projection field and extending generally in the longitudinal direction thereof, a horizontal member on which said lever is pivoted intermediate the ends thereof, a member disposed in a vertical plane and having an arcuate slot therein, a lateral member carried by said lever and extending into said arcuate slot, means on that section of said lever which is at the side of said horizontal member toward the projection field for engaging the top surface of the tape to form a loop therein, and means on that section of said lever which is at the side of said horizontal member remote from said projection field for operating said control circuit.

DAVID F. NEWMAN.