

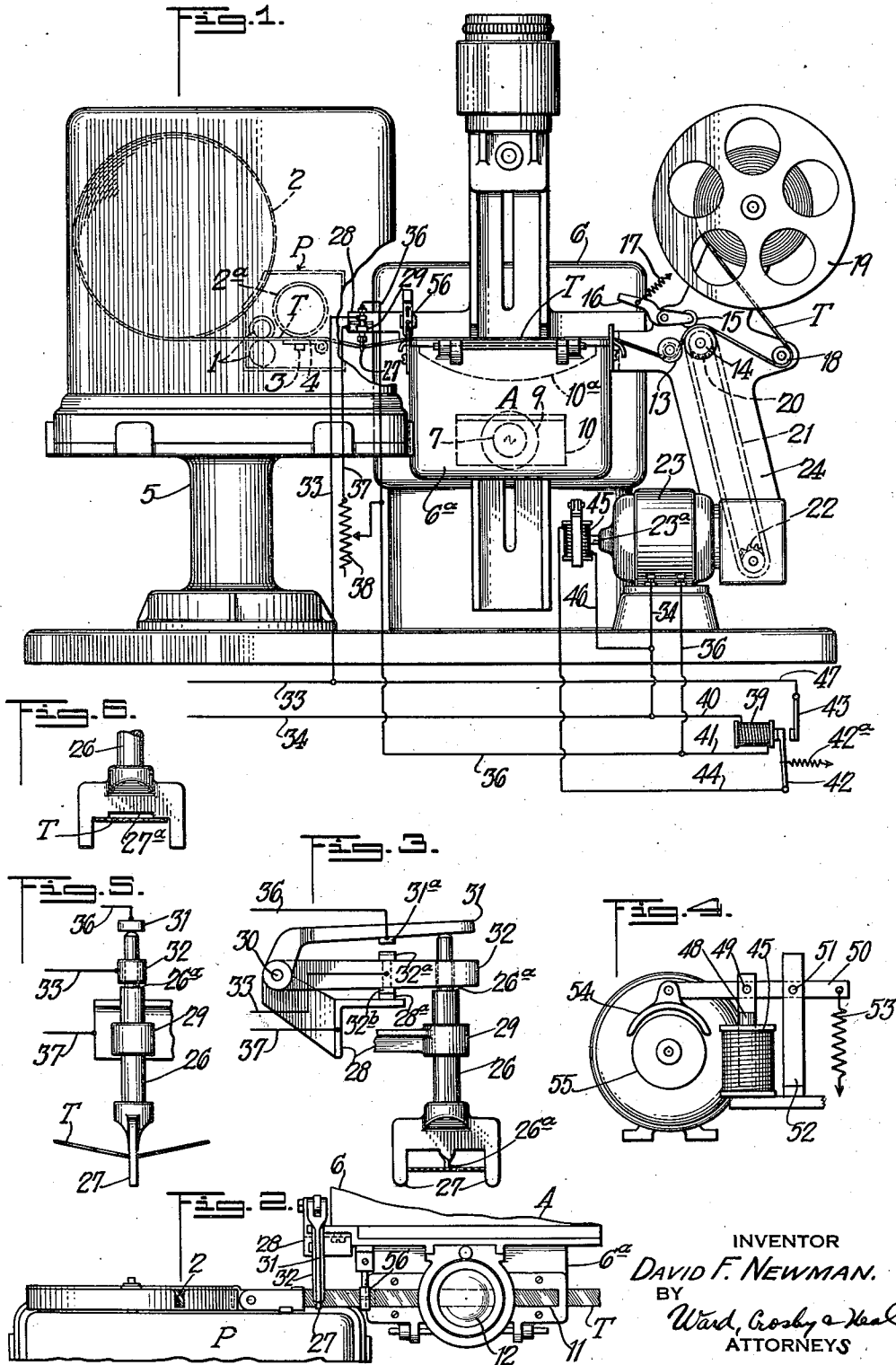
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TAPE CONTROLLING ARRANGEMENT

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TAPE-CONTROLLING ARRANGEMENT

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

My invention relates more particularly to a control arrangement operated by a tape loop positioned at the entrance to the projection field, such tape loop being operative for the intended purpose even though it is of minimum depth or length whereby, as a result, the projection device may be positioned much closer to the printing device than has been customary with respect to prior art arrangements of this general character.

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

My invention resides in the tape-controlling arrangements, combinations and improvements 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 drawing, in which:

Figure 1 is an elevational view, partly schematic, of a tape-controlling arrangement as constructed in accordance with my invention;

Fig. 2 is a fragmentary plan view of the tape-controlling arrangement shown in Fig. 1;

Fig. 3 is an elevational view showing switch mechanism as constructed in accordance with my invention;

Fig. 4 is an elevational view showing a brake mechanism;

Fig. 5 is an elevational view showing the switch mechanism of Fig. 3; and

Fig. 6 is an elevational view showing a modification of the tape-engaging member illustrated in Figs. 3 and 5.

Referring to the drawing, P represents a suitable printing device such, for example, as a ticker mechanism of the type utilizable for printing two spaced rows or a single row of characters lengthwise on a narrow tape T, such tape being opaque if desired although, in the form of the invention herein illustrated, said tape T is of the transparent or translucent type and, therefore, adapted for "through" projection. As herein shown although not necessarily, the ticker mechanism comprises a pair of spaced rollers 1, 1 which serve to feed and eject the tape T from the ticker mechanism in a direction from left to right, Fig. 1, these rollers causing the tape to move from the roll 2 of blank tape and then past the type wheel 2a with which the usual platen or hammer 3 contacts to effect the printing operation, the tape

finally moving over the guide surface 4 and then passing beyond the housing of the ticker mechanism, this housing being mounted upon any suitable support 5.

After the tape T leaves the ticker mechanism P, it is drawn through a projection device A whereby images of the tape characters are projected onto any suitable screen, not shown. This projection device A may be of any suitable character and, by way of example, is shown herein as comprising a housing 6 adapted to contain the projection lamp 7, its reflector and one or more condensing lenses 9, one of which is shown in Fig. 1. In the example shown, the projecting light beam passes horizontally from the projection lamp 7 and engages a mirror 10, or other suitable light-reflector, said mirror 10 causing the projecting light beam to pass upwardly through a condensing lens 10a and then through the projection field which, as herein illustrated although not necessarily, is defined by a rectangular aperture 11 formed in the top plate of a supplementary housing 6a disposed at the front of the aforesaid housing 6. After the projecting light beam leaves the tape section at the aperture 11, said light beam travels vertically through the objective lens at 12 and then, preferably, is reflected by one or more mirrors so as to pass into engagement with the projection screen. It shall 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 12, this plane being in focus with said objective lens.

The aforesaid tape T may be pulled or drawn through the projection field 11 by an arrangement of any suitable character. Thus, for example and as herein shown, said tape T may be passed beneath a roll 13 or other guiding surface, this roll being disposed below the horizontal plane of the projection field. Thereafter, the tape T passes over a pulling roll 14, the tape being held in engagement with the upper surface of said pulling roll 14 by an idler roll 15 mounted on a lever 16 which is biased in clockwise direction, Fig. 1, by a spring 17. After the tape passes beyond the pulling roll 14, it may be deflected by an idler roll 18, or other guiding surface, and then passed upwardly so as to be wound upon a suitable reel 19.

The aforesaid pulling roll 14 may be operated in any suitable manner. Thus, for example, the operating shaft for said pulling roll 14 may carry

a suitable pinion 20 with which an endless sprocket chain 21 engages, said chain 21 being operated by a pinion 22 which is rotatable at suitable speed by an electric motor 23.

As herein shown, a support 24 carries the above described rolls 13, 14 and 18, the lever 16, the reel 19 and the various associated parts. This support 24 may be of any suitable character and it may be mounted in any suitable manner. Thus, if desired, said support 24 may be secured in suitable manner to a part of the housing 6.

The reel 19 may be operated in any suitable manner such, for example, as is well known in the art. Thus, the motor 23 may furnish the power for driving the reel 19, the latter, preferably, being rotated by a conventional spring belt of the endless type, the latter engaging pulleys carried, respectively, by the shaft of the reel 19 and the shaft of the pulling roll 14.

As shown in Figs. 1 and 2, the projection device A is spaced from the printing device P in such manner that a section of the tape T constantly extends between these two devices and, as hereinafter described, forms a tape loop having more or less length or extent. Adapted to engage and to be controlled in position by this tape loop is a movable member 26, the operative end 26a of which preferably contacts with the tape between the above noted two rows of tape characters as illustrated in Fig. 3. If desired, a U-shaped member 27 may be carried near the operative end of the member 26, the transverse interior dimension of this member 27 being such that the tape is guided thereby as indicated in Fig. 3. In the event that there is a single row of characters extending longitudinally of the tape, the operative end 26a of the member 26 may be omitted and the member 27 shaped as indicated at 27a, Fig. 6, so as to straddle the single row of tape characters and avoid smudging of the ink forming said tape characters.

Suitably supported, for example, by the aforesaid lamp housing 6 is a fixed structure 28 adapted in part to form a bearing at 29 for the upper shank section of said movable member 26, said fixed structure 28, in the form of the invention herein shown, being formed from electricity-conducting material. Pivoted at 30 to said fixed structure 28 is an upper arm 31 and a lower arm 32, said upper arm 31 being adapted to rest upon the extreme upper end of the movable member 26 and said lower arm 32 comprising a vertical passage through which freely extends the upper part of the upper shank section of said movable member 26, the latter comprising a shoulder 26a upon which said lower arm 32 is adapted to rest.

Extending from a suitable source of current, not shown, are a pair of conductors 33 and 34, the conductor 34, as shown, leading to one terminal of the aforesaid electric motor 23 and the other conductor 33 leading to and being connected to the aforesaid lower arm 32 and its contacts 32a, 32b. Connected to a contact 31a forming a part of the aforesaid upper arm 31 is a conductor 36 which leads to the other terminal of the aforesaid motor 23. Connected to the fixed structure 28 and its contact 28a is a conductor 37 which leads to and is connected to the aforesaid conductor 36, the conductor 37 including a resistance unit 38 which, preferably, is of the variable type as shown.

As illustrated in Fig. 1, a relay 39 has conductors 40 and 41 connected to the respective terminals of its winding, said conductors 40, 41

leading to and being connected to the aforesaid conductors 34 and 36, respectively. Coactable with the relay 39 is a movable armature 42 and a fixed armature 43, the armature 42 having connected thereto a conductor 44 which leads to and is connected to one terminal of an electromagnetic winding 45, the other terminal of this winding being connected by a conductor 46, to the aforesaid conductor 34. The other armature 43 of the relay 39 has connected thereto a conductor 47 which leads to and is connected to the aforesaid conductor 33.

As shown in Figs. 1 and 4, the aforesaid electromagnetic winding 45 is utilized to operate an armature 48 pivoted at 49 to a bar 50 which, in turn, is pivoted at 51 to a suitable support 52, the bar 50 being suitably biased in a clockwise direction, Fig. 4, as by a spring 53. The end of the bar 50 remote from the spring 53 carries a pivoted brake shoe 54 which coacts with a drum 55 secured to and rotatable with the armature shaft 23a of the aforesaid motor 23.

In operation, the printing device P, the projection device A and the tape-pulling mechanism are suitably disposed as indicated in Fig. 2 so as to form a straight-line path for the tape T which issues from said printing device in flatwise relation and, while maintained in the same relation, is drawn through the projection field of said projection device A and then wound upon the reel 19. In connection with the described movement of the tape through said projection field, it will be noted that a suitable device such, for example, as a J-spring or, as shown, a vertical slidable weight 56 is disposed at the entrance to said projection field, said weight 56 engaging the tape so as to prevent tape pulsations set up by the printing device from reaching the projection field.

During those periods when the printing device P is not operating, the tape loop at the entrance to the projection field is at its minimum length and, as a result, the member 26 is in its uppermost position. When thus positioned, said member 26 holds the upper arm 31 in its uppermost position so that the contact 31a is separated from the contact 32a of the arm 32. As the same time, the shoulder 26a of said member 26 holds the lower arm 32 in its elevated position and, accordingly, the contact 32b is separated from the contact 28a. It results, therefore, that the conductors 36, 33 are open-circuited at the respective contacts 31a, 32a and, accordingly, the motor 23 is non-operative.

While the circuit of the motor 23 thus remains open, the winding of the relay 39 is open at the respective contacts 31a, 32a and also at the respective contacts 32b, 28a. When this relay coil is deenergized, the armature 42 thereof is held, by the spring 42a, in its position toward the right so as to be in engagement with the armature 43. Accordingly, current is supplied to the electromagnetic winding 45 over a circuit which extends from one terminal of the source of current by way of the conductor 33, conductor 47, armature 43, armature 42, conductor 44, electromagnetic winding 45, conductor 46, and thence back to the other terminal of the source of current by way of the conductor 34. As a result, therefore, the electromagnetic winding 45 holds its armature 48 in its lowermost position, Fig. 4, whereby the brake shoe 54 is held in clamping relation with respect to the brake drum 55.

If the printing device P starts to operate

while the motor 23 remains deenergized and while the electromagnetic winding 45 is energized as described above, the tape loop at the entrance to the projection field starts to increase in length and, when sufficiently increased in length, the member 26 moves to a lower position so that the contact 32b comes into engagement with the contact 28a, the contact 31a remaining out of engagement with the contact 32a. When this happens, a circuit through the motor 23 is completed from one terminal of the source of current by way of the conductor 33, lower arm 32, contact 32b, contact 28a, fixed structure 28, conductor 37, resistance unit 38, conductor 36, the winding of motor 23, and thence back to the other terminal of said source of current by way of the conductor 34. Simultaneously with the completion of the motor circuit just described, a circuit through the relay 39 is completed from one terminal of the source of current by way of the conductor 33, lower arm 32, contact 32a, contact 28a, fixed structure 28, conductor 37, resistance unit 38, conductor 36, conductor 41, the winding of relay 39, conductor 40, and thence back to the other terminal of said source of current by way of the conductor 34. When the relay 39 is thus energized, the movable armature 42 thereof is moved to the position shown in Fig. 1, and, in so doing, the circuit through the electromagnetic winding 45 is opened at the gap thus created between said movable armature 42 and said fixed armature 43. When the electromagnetic winding 45 is thus deenergized, the spring 53 becomes effective to swing the bar 50 in a clockwise direction, Fig. 4, to thereby release the brake shoe 54 from the brake drum 55. This releasing action occurs simultaneously with the energization of the motor 23 and, accordingly, the latter becomes effective to draw the tape T from left to right, Fig. 1, through the projection field, the tape being wound upon the reel 19.

In the event that the speed of the motor 23 as thus energized is insufficient to draw the tape from the aforesaid tape loop as fast as the tape is delivered to said loop by the printing device P, the member 26 descends to a greater extent than as hereinbefore described and, in so doing, the resistance unit 38 is eliminated from the operating circuit of the motor 23 with consequent establishment of a new motor circuit. This new circuit for said motor 23 extends from one terminal of the source of current by way of the conductor 33, lower arm 32, contact 32a, contact 31a, conductor 36, the winding of motor 23, and thence back to the other terminal of said source of current by way of conductor 34. With the resistance unit 38 thus eliminated from its circuit, the motor 23 speeds up and, as hereinafter described, draws the tape from the aforesaid tape loop at a rate somewhat faster than the rate at which tape is delivered thereto by the printing device P.

When operation of the printing device P is discontinued, the motor 23 continues to operate until the tape loop has shortened to such extent that the member 26 has been moved to its uppermost position. At this time, as previously stated, the conductors 36, 33 are open-circuited and, therefore, operation of the motor is discontinued. Further, when the described circuit arrangement exists, the brake shoe 54 is held, by the winding 45, in clamping relation with respect to the brake drum 55.

The motor control arrangement including the

circuit and brake features as herein described is utilizable particularly, although not necessarily, with a variable speed motor such, for example, as a direct current motor having a series field winding. With such an arrangement, it becomes practical to position the printing device P and the projection device A in such close relation with respect to each other, Figs. 1 and 2, that the length of the tape loop between these two devices is much shorter than exists in prior art projection arrangements of the general character herein described.

Thus, with respect to commercial projection arrangements wherein a tape such as the herein described tape T is fed from a printing device corresponding with the herein described device P to and through a projection device corresponding with the herein described device A, it has been observed that the tape loop existing between the printing wheel of the printing device and the entrance to the projection field has, for different machines, a length varying between 5 inches and 7½ inches when the tape-drawing motor is not operating, and a length varying between 6½ inches and 8½ inches when the motor is drawing tape through the projection field.

In contradistinction, by my invention, the tape loop existing between the printing wheel of the printing device and the entrance to the projection field has, for different machines, a length varying between 1 inch and 3½ inches when the tape-drawing motor 23 is not operating, and a length varying between 1¼ inches and 3¾ inches when the motor is drawing tape through the projection field. It shall be understood, however, that my invention is not to be limited to the exact tape loop dimensions just specified.

It follows, therefore, in accordance with my invention, that the controlling tape loop is substantially shorter at all times than is the corresponding tape loop of commercial devices as at present used. This is highly advantageous. In this connection and as well understood in the art, it is noted that operation of printing mechanisms of the character herein referred to often ceases, for one reason or another, for a few seconds or for greater intervals of time. Each time that this happens, there is a length of tape between the printer mechanism and the projector which bears a number of characters and the images of these characters are not projected until operation of the tape-drawing motor is again initiated in response to renewed operation of said printer mechanism. The delayed projection of these character images may result disadvantageously by reason of the fact that they may convey important information. In accordance with my invention, by reason of the shoe tape loop which continuously exists between the printer mechanism and the projector, the chance that there may be a delay in the projection of character images conveying important information is greatly reduced. This is highly advantageous and desirable.

The herein described printing device P may be either of the constant speed or variable speed type. As stated, the motor 23 may be of the variable speed type. Experience has demonstrated that, when using such a variable speed motor, the two-speed control mechanism in combination with the brake device gives satisfactory results. That is, a tape loop of the specified desirable minimum dimensions may be employed and, even so, there is little or no chance that

the tape will be broken, torn, or improperly pulled through the printer.

It shall be understood that my invention is not to be limited to a control such as is imposed by a member 26, or equivalent, which rides upon the tape. As well, there may be utilized suction control such, for example, as of the general character disclosed in Curtis Patent No. 2,028,146.

It shall also be understood that movement of the tape through the projection field may be effected otherwise than as herein described. Thus, in lieu of a tape-pulling arrangement at the exit end of the projection field, there may be utilized a pair of tape-moving rollers of the character disclosed in my pending application Serial No. 37,501, filed August 23, 1935.

While the invention has been described with respect to a certain particular preferred example which gives 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 combination, a motor, means operated by said motor for drawing a tape through a projection field after passage thereof from a printing mechanism, means for changing the speed of operation of said drawing means to thereby cause the tape to be drawn through said projection field at different rates of speed, said last named means comprising a movable member operated by a tape loop positioned between said printing mechanism and said projection field, and means for overcoming the inertia of said drawing means and discontinuing the operation thereof substantially in an instantaneous manner, the tape loop being short when operation of said drawing means is discontinued and the inertia-overcoming means serving to prevent the tape from being damaged or improperly pulled through the printing mechanism.

2. In combination, a motor, means operated by said motor for drawing a tape through a projection field after passage thereof from a printing mechanism, means for changing the speed of operation of said drawing means to thereby cause the tape to be drawn through said projection field at different rates of speed, said last named means comprising a movable member operated by a tape loop positioned between said printing mechanism and said projection field, said last named means further comprising a plurality of switch contacts adapted to be moved upwardly by said movable member in response to shortening of said tape loop, and means for overcoming the inertia of said drawing means and discontinuing the operation thereof substantially in an instantaneous manner, the tape loop being short when operation of said drawing means is discontinued and the inertia-overcoming means

serving to prevent the tape from being damaged or improperly pulled through the printing mechanism.

3. In combination, a motor, means operated by said motor for drawing a tape through a projection field after passage thereof from a printing mechanism, means for changing the speed of operation of said drawing means to thereby cause the tape to be drawn through said projection field at different rates of speed, said last named means comprising a movable member operated by a loop in the tape, means whereby said tape loop renders said motor effective or ineffective to draw the tape through said projection field, brake means cooperative with said motor, and means for causing said brake means to discontinue the operation of said motor substantially in an instantaneous manner, the tape loop being short when the motor is rendered ineffective to draw the tape and said brake means serving to prevent the tape from being damaged or improperly pulled through the printing mechanism.

4. In combination, a motor, means operated by said motor for drawing a tape through a projection field after passage thereof from a printing mechanism, means for changing the speed of operation of said drawing means to thereby cause the tape to be drawn through said projection field at different rates of speed, said last named means comprising a movable member operated by a loop in the tape, means whereby said tape loop renders said motor effective or ineffective to draw the tape through said projection field, brake means cooperative with said motor, and means controlled by said tape loop for causing said brake means to discontinue the operation of said motor substantially in an instantaneous manner, the tape loop being short when the motor is rendered ineffective to draw the tape and said brake means serving to prevent the tape from being damaged or improperly pulled through the printing mechanism.

5. In combination, a motor, means operated by the armature of said motor for drawing a tape through a projection field after passage thereof from a printing mechanism, means for changing the speed of operation of said drawing means to thereby cause the tape to be drawn through said projection field at different rates of speed, said last named means comprising a movable member operated by a loop in the tape positioned between said printing mechanism and said projection field, means whereby said tape loop renders said motor effective or ineffective to draw the tape through said projection field, brake means cooperative with said motor armature, and means for causing said brake means to discontinue the rotation of said motor armature substantially in an instantaneous manner, the tape loop being short when the motor is rendered ineffective to draw the tape and said brake means serving to prevent the tape from being damaged or improperly pulled through the printing mechanism.

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