July 7, 1942. B. KAHN 2,288,716

TAPE CONTROLLING MEANS

Filed Aug. 2, 1939

Fig. 1.

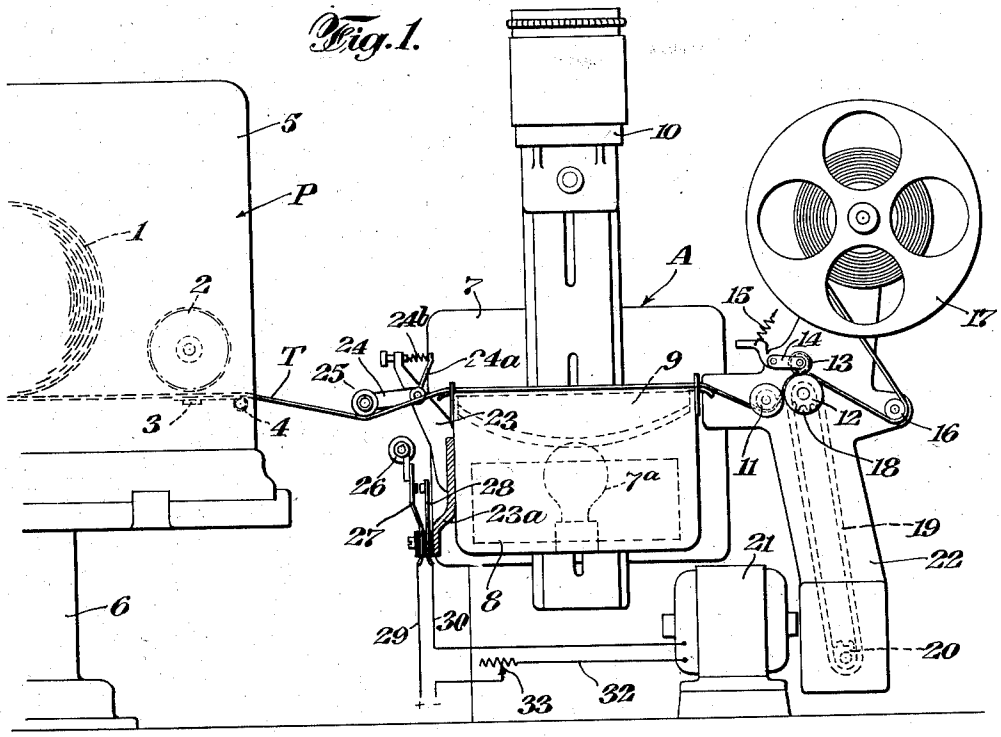


Fig. 2.

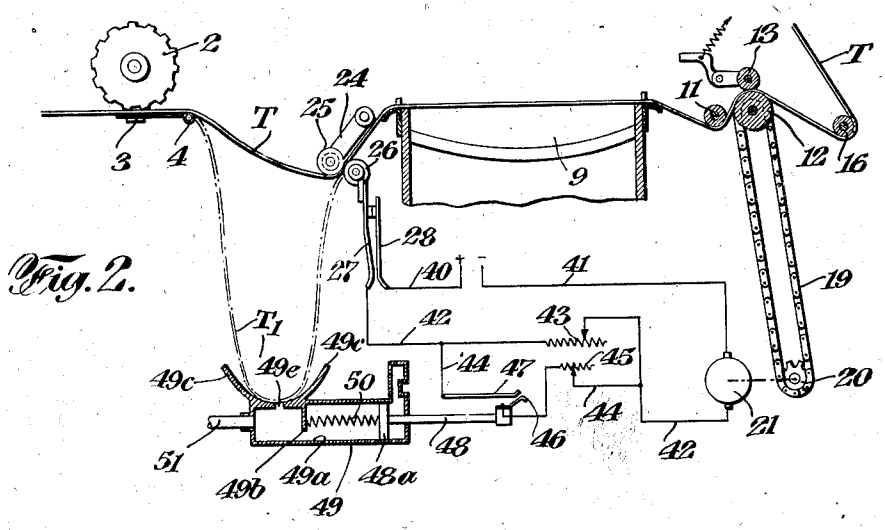
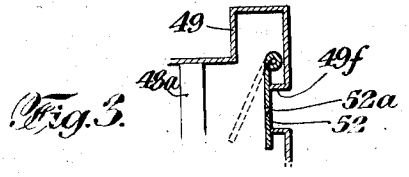


Fig. 3.



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TAPE-CONTROLLING MEANS

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4 Claims. (Cl. 271—2.3)

My invention relates to an arrangement or means for controlling a character-bearing tape for movement through a projection field.

My invention relates to an arrangement wherein a tape of the character described is moved through a projection field in response to operation of a motor, this motor being controlled by mechanism utilizable for preventing 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 characteristics of my invention will become apparent from the following detailed description.

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

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

Figure 1 is a front elevational view showing the tape-controlling means of my invention;

Fig. 2 is a fragmentary front elevational view showing features of the invention; and

Fig. 3 is an enlarged vertical sectional view, partly in elevation, illustrating a part of the suction housing of Fig. 2.

Referring to the drawing, P represents a suitable printing device such, for example, as the well known Western Union ticker mechanism utilizable for printing characters representative of stock quotations 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 formed from transparent or translucent material such as is suitable for "through" projection. As illustrated, although not necessarily, the ticker mechanism P is of a conventional constant speed type and, therefore, it comprises a roll 1 of the tape T, a pair of spaced rollers, not shown, being utilized to feed and eject said 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 which is disposed closely adjacent the type wheel 2 with which the usual platen or hammer 3 coacts to effect the printing operation, the tape T finally engaging and passing over a guide surface 4 and then passing beyond the housing 5 of the ticker mechanism, this housing 5, if desired, being mounted upon any suitable support 6.

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 any suitable type such as is well known in the art. As herein shown, this projection device A comprises a rear lamp housing 7 and a front lens housing 8, the projection light beam being produced by a source of light 7a and said projecting light beam, in suitable manner, being caused to pass upwardly through a condensing lens 9, Fig. 2, which is disposed at the top of the lens housing 8, said projecting light beam then passing upwardly through the projection field which may be an open rectangular aperture formed, as well understood in the art, at the top of the lens housing 8. After the projecting light beam leaves that section of the tape which is at the aforesaid projection field, it travels vertically through the objective lens 10 and then, usually, is reflected by one or more mirrors before coming into engagement with 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 11, or equivalent, the latter being positioned at or below the horizontal level of the projection field. Thereafter, the tape T passes over a pulling roll 12 with the upper surface of which said tape is held in engagement by an idler roll 13 mounted on a lever 14, the latter being biased in a clockwise direction, Fig. 1, by a suitable spring 15. After the tape passes beyond the pulling roll 12, it preferably engages a guiding surface such as an idler roll 16, or equivalent, and then passes upwardly to a suitable reel 17.

The aforesaid pulling roll 12 may be operated in any suitable manner. To this end, if desired, the operating shaft for said pulling roll 12 may carry a suitable sprocket wheel 18 with which an endless sprocket chain 19 engages, this chain being operated by a sprocket wheel 20 which, through suitable gear mechanism, not shown, is rotated at suitable speed by an electrical motor 21.

As herein shown, although not necessarily, the above described rolls 11, 12, 13, 16, the reel 17 together with the parts associated therewith are carried by a supporting bracket 22 which may

be supported in the position shown by any suitable arrangement.

The reel 17 is utilizable in the customary manner for supporting the tape in roll form after said tape has been passed through the projection field. The reel 17 may be operated in any suitable manner and, to this end, an endless spring belt, not shown, may be engaged with pulleys carried, respectively, by the shaft of the reel 17 and the common shaft for the roller 12 and sprocket wheel 18. Accordingly, as well understood in the art, the motor 21 furnishes power for operating the pulling roll 12 and the reel 17.

In the form of the invention herein shown, the tape loop formed between the printing mechanism P and the projection device A is utilized for controlling operation of the aforesaid motor 21. To this end, in the example shown, there may be provided a bracket 23 suitably secured, for example, to the lens housing 8, this bracket 23, in freely oscillatable fashion, pivotally supporting a lever 24 which carries a roller 25 at its free end, said lever 24, in the example shown, comprising an extension 24*a* to which one end of a spring 24*b* is secured, the other end of said spring 24*b* being suitably secured to the upper end of the bracket 23.

In accordance with the invention, the roller 25 is adapted to coact with a roller 26 fixed to the upper end of a switch contact member 27 coactable with and normally spaced from a second switch contact member 28, these contact members being supported, in suitable insulated relation, on a section 23*a* of the aforesaid bracket 23, for example. Connected to contact members 27 and 28 are the respective conductors 29 and 30, the conductor 29 leading to one terminal of a suitable source of electrical energy and the conductor 30 leading to one terminal of the aforesaid motor 21, the other terminal of which has connected thereto a conductor 32 leading to the other terminal of said source of electrical energy, the conductor 32 preferably including a variable resistance unit 33. Any other suitable circuit may be employed.

As my invention is shown in Fig. 1, it may be assumed that the operating means of the ticker mechanism P is non-operative and that, at this time, the motor 21 is not energized. When operation of the ticker mechanism P is initiated, the tape T is ejected therefrom in a direction from left to right whereby the length of the tape loop between said ticker mechanism and the entrance to the projection field lengthens. As a result, the lever 24, under the influence of the spring 24*b*, moves in a counter-clockwise direction, the roller 25 remaining constantly in engagement with the tape and maintaining the same taut. During continued operation of the ticker mechanism P, the roller 25 engages the roller 26 to thereby move the contact member 27 toward and into engagement with the contact member 28. When this happens, the circuit through the motor 21 is closed, said motor becoming operative to actuate the roll 12 to thereby cause the tape to be drawn through the projection field in a direction from left to right, Fig. 1. This tape-drawing operation continues until operation of the ticker mechanism P is discontinued whereupon, during continued operation of the motor 21, the tape loop between said ticker mechanism and the projection field is shortened until, against the action of the spring 24*b*, the roller 25 is disengaged from the roller 26 with consequent opening of the motor circuit, the armature of the motor coasting to a stationary position to thereby still further shorten the tape loop so that, finally, the lever 24 takes a position such as illustrated in Fig. 1, for example.

In view of the foregoing, it will be understood that the lever 24 and roller 25 cooperate, in a highly advantageous manner, with the roller 26 and switch contact members 27, 28 to control the operation of the motor 21. Further and of importance, the arrangement just referred to has the added function of largely or substantially preventing transmission into the projection field of vibrations set up in the tape by operation of the ticker mechanism P. Thus, the spring 24*b* constantly biases the lever 24 in a counter-clockwise direction, Fig. 1, with the result that the roller 25, under pressure, is constantly in engagement with the tape T. Therefore, prior to the time that the roller 25 engages the roller 26, the tape loop between the ticker mechanism P and the projection field is constantly maintained taut.

When the tape loop between the ticker mechanism P and the projection field has become so long that the spring 24*b* holds the roller 25 in engagement with the roller 26 to close the described switch contacts, the tape T is gripped under pressure by said rollers 25, 26. Therefore, under this condition, said rollers last named prevent transmission into the projection field of any vibrations set up in the tape by the ticker mechanism and this still holds even though the ticker mechanism ejects the tape at a faster rate than it is taken up by the motor 21 with resultant formation of a free or slack loop at the left of the engaged rollers 25 and 26, for example, as shown in Fig. 2.

Accordingly, with an arrangement of the character described, it is unnecessary to use the prior art J-spring which, as well known, comprises a spring or weight engaging the tape at the entrance to the projection field to prevent tape impulses from entering said projection field.

Although the described arrangement comprising the spring 24*b*, lever 24, rollers 25 and 26, and switch contact members 27, 28 have been described as having the two functions discussed above, it shall be understood that the invention is not to be thus limited. Thus, for example, said described arrangement may be used solely for preventing transmission of undesired tape impulses into the projection field, the motor 21 being controlled by any other suitable mechanism.

Inasmuch as the ticker mechanism P prints the tape characters with ink which does not dry prior to the time that the tape reaches the roller 25, it will be understood that this roller should be provided with spaced, peripheral ribs which engage the tape between the rows of printed characters, the channels formed between pairs of said ribs overlying the rows of inked characters to thereby prevent smudging.

I have hereinbefore pointed out that my invention contemplates the use of a tape-drawing motor which may draw the tape through the projection field at a rate somewhat slower than that at which the tape is ejected by the ticker mechanism. Ordinarily, it is undesirable for such a condition long to exist because, if so, the tape loop between the ticker mechanism and the projection field may become so extended as to de-

lay projection of the characters to an undesired extent.

In order to overcome this objection, I may provide an arrangement such as illustrated in Fig. 2 for increasing the speed of the tape-drawing motor in the event that an unduly long tape loop develops at the entrance to the projection field. Thus, as shown in said Fig. 2, the hereinbefore described switch contact member **28** may have connected thereto a conductor **40** which leads to one terminal of a suitable source of electrical energy, the other terminal of which has connected thereto a conductor **41** leading to one terminal of the aforesaid motor **21**. The other terminal of the motor **21** has connected thereto a conductor **42** which includes a resistance unit **43**, preferably variable, and leads to the aforesaid switch contact member **27**. Connected in shunt relation across the resistance unit **43** is a conductor **44** which includes a resistance unit **45**, preferably variable, and a pair of switch contact members **46** and **47**.

In accordance with the invention, the contact member **46** is carried by a rod **48** which extends through and is slidably mounted in the end wall of a housing **49**, said rod **48**, interiorly of said housing **49**, carrying a head **48***a* slidable, in sealed relation, in a passage **49***a* of the housing **49**, the rod **48** together with its head **48***a* being biased from left to right by a spring **50**, one end of which engages the head **48***a* and the other end of which engages an interior flange **49***b* of the housing **49**.

The housing **49** has communicating therewith a conduit **51** which leads to a suction pump, not shown, serving to withdraw air from said housing **49**. Formed on the top wall of the housing **49** is a pocket or depression defined by upstanding extensions **49***c* of said housing **49**, the bottom of this pocket communicating with the interior of the housing by way of a passage **49***e*.

The conduit **51** and passage **49***e* are on one side of the plunger **48**. On the other side thereof, the housing **49** should comprise an air inlet and an air vent. To this end, as shown in Fig. 3, the housing end wall may be provided with a flanged opening **49***f* against which a pivoted plate **52** is adapted to be disposed in sealed relation, the plate **52** having a small orifice **52***a* communicating with the interior of said housing **49**.

The operation of the form of my invention as disclosed in Figs. 2 and 3 is as follows:

Normally, when the tape is taut between the projection field and the ticker mechanism P or, if slack, when the slack loop has insufficient length to extend downwardly into the pocket formed by the housing extensions **49***c*, closure of the switch contact members **27** and **28** closes the circuit of the motor **21** through the resistance unit **43**. The contact members **46**, **47** are open at this time and the resistance unit **45** is open-circuited by reason of the fact that the suction pump is drawing air from the atmosphere through the passage **49***e* whereby the rod **48** and head **48***a* are in the position shown in Fig. 2.

In the event that the slack tape loop becomes sufficiently long as shown at T1, Fig. 2, to reach downwardly into the aforesaid pocket as shown in Fig. 2, the passage **49***e* is closed by the tape and the vacuum pump creates a vacuum condition in that area of the housing **49** to the left of the head **48***a*. When this happens, the rod **48** and its head **48***a* move from right to left against the action of the spring **50**, this movement being facilitated by reason of the fact that air passes into that area of the housing at the right of the head **48***a* by way of the opening **49***f*, the plate **52** opening in response to the suction effect to permit such flow of air.

The described movement of the rod **48** closes the contact member **46** onto the contact member **47** and thereby places the resistance unit **45** in parallel relation with respect to the resistance unit **43**, both resistance units being now in the motor circuit. With a motor of the proper character, this action serves to increase the speed thereof.

The arrangement is such that, when the motor **21** speeds up, the slack tape loop is shortened and, when sufficiently shortened, the passage **49***e* is again opened to the atmosphere whereupon the rod **48** and head **48***a* move from left to right, Fig. 2, under the influence of the spring **50** to thereby open the contact members **46**, **47** and reduce the speed of the motor **21**. During the movement of the rod **48** and head **48***a*, air escapes to the atmosphere by way of the vent opening **52***a*.

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. A device coactable with a character-bearing tape during passage thereof from a printing mechanism to a projection field, said device comprising a member adapted to be engaged by the lower surface of the tape, a movable structure having a tape-engaging member, and means for biasing said tape-engaging member toward and into pressure-applying relations with respect to said first named member whereby opposite surfaces of said tape are held in engagement with the respective members, said biasing means holding said tape-engaging member constantly in engagement with the upper surface of said tape and maintaining it either in a position where it is spaced from said first named member or in said pressure-applying relation with respect thereto whereby tape vibrations are prevented from entering the projection field.

2. A device coactable with a character-bearing tape during passage thereof from a printing mechanism to a projection field, said device comprising a roller adapted to be engaged by the lower surface of the tape, a lever having a tape-engaging roller, and a spring for biasing said tape-engaging roller toward and into pressure-applying relation with respect to said first named roller whereby opposite surfaces of said tape are held in engagement with the respective members. said spring holding said tape-engaging roller constantly in engagement with the upper surface of said tape and maintaining it either in a position where it is spaced from said first named roller or in said pressure-applying relation with respect thereto whereby tape vibrations are prevented from entering the projection field.

3. In a system of the character described, the combination with a projection field, means for drawing a character-bearing tape through said projection field, tape-engaging means between said projection field and a printing mechanism

for preventing the entrance of tape vibrations into the projection field, said tape-engaging means comprising members adapted to engage the respective opposite sides of the tape, means whereby said tape-engaging means controls said drawing means, said tape between said tape-engaging means and said drawing means being free from any braking effect acting to retard movement thereof, said tape-engaging means, 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 drawing 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 for increasing the speed of said drawing means in the event that a slack tape loop forms between said tape-engaging means and said printing mechanism.

4. In a system of the character described, the combination with a projection field, means comprising an electrical motor for drawing a character-bearing tape through said projection field, tape-engaging means between said projection field and a printing mechanism for preventing the entrance of tape vibrations into the projection field, means whereby said tape-engaging means controls said drawing means, said tape between said tape-engaging means and said drawing means being free from any braking effect acting to retard movement thereof, said tape-engaging means, 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 drawing 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 for increasing the speed of said drawing means in the event that a slack tape loop forms between said tape-engaging means and said printing mechanism, said speed increasing means being controlled by said slack tape loop and serving to alter the operating characteristics of the motor circuit.

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