

June 9, 1936.

K. L. CURTIS

2,043,239

CONTROL SYSTEM PARTICULARLY FOR AN INDICIA BEARING WEB

Original Filed June 4, 1929 3 Sheets-Sheet 1

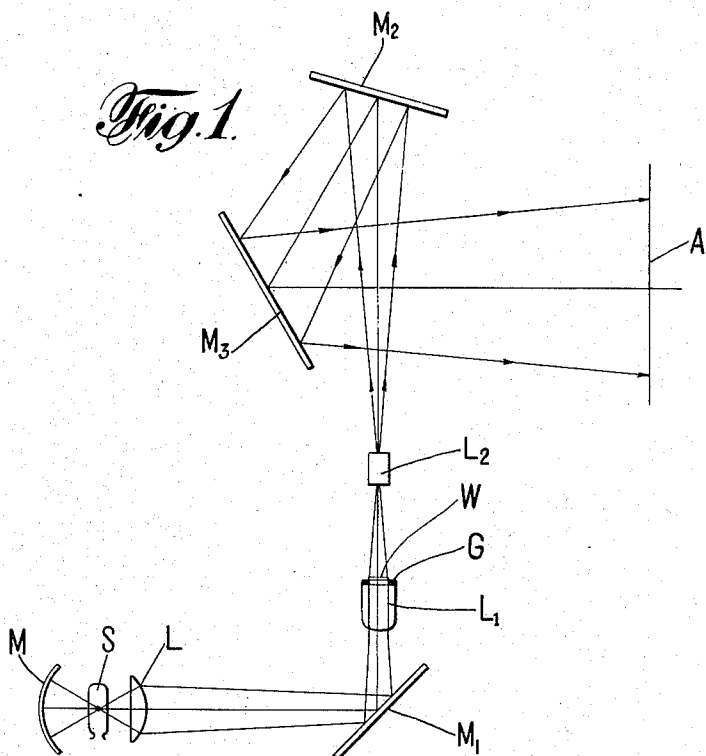


Fig. 2

W

ADN	SHU	N	TG	KN	UAF	HHN	GM	UNC-N	WXY	AS
27 $\frac{1}{2}$	2 $\frac{3}{4}$	62 $\frac{1}{8}$	5 $\frac{1}{4}$	77 $\frac{1}{2}$	2 $\frac{87}{8}$	3.42	3.42	2.81	83 $\frac{1}{8}$	32

Fig. 3.

A a

N	TG	KN	UAF	HHN	GM
5.51 $\frac{3}{4}$	77 $\frac{1}{2}$	2 $\frac{87}{8}$	3.42	3.42	2.81

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Fig. 4.

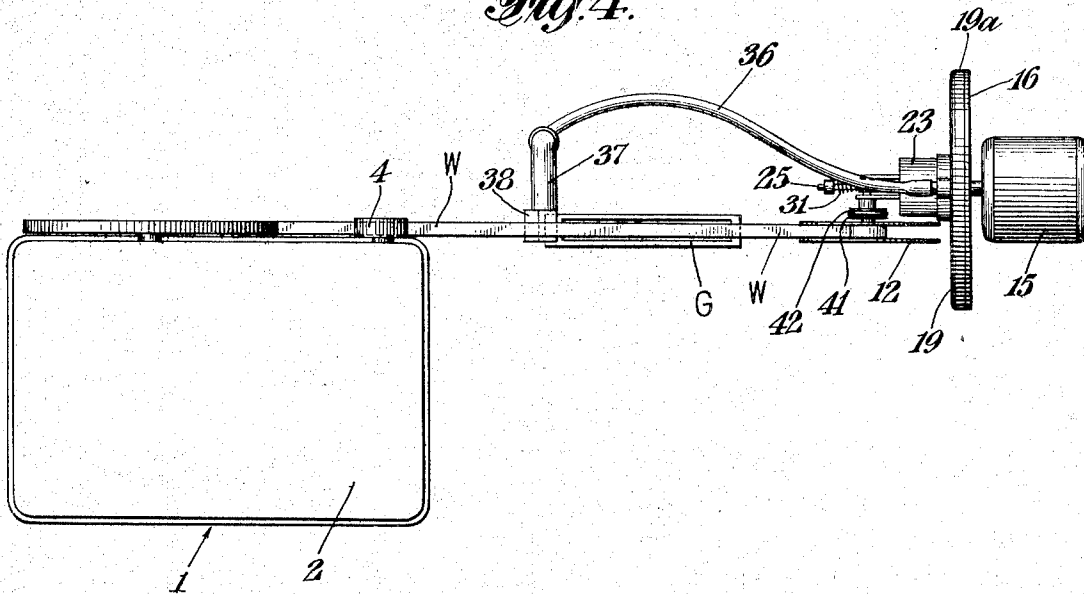
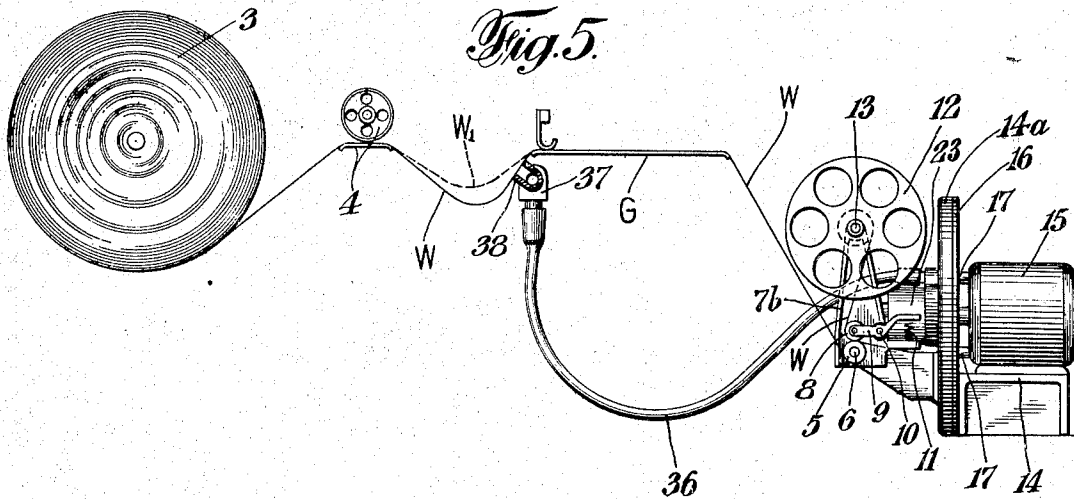


Fig. 5.



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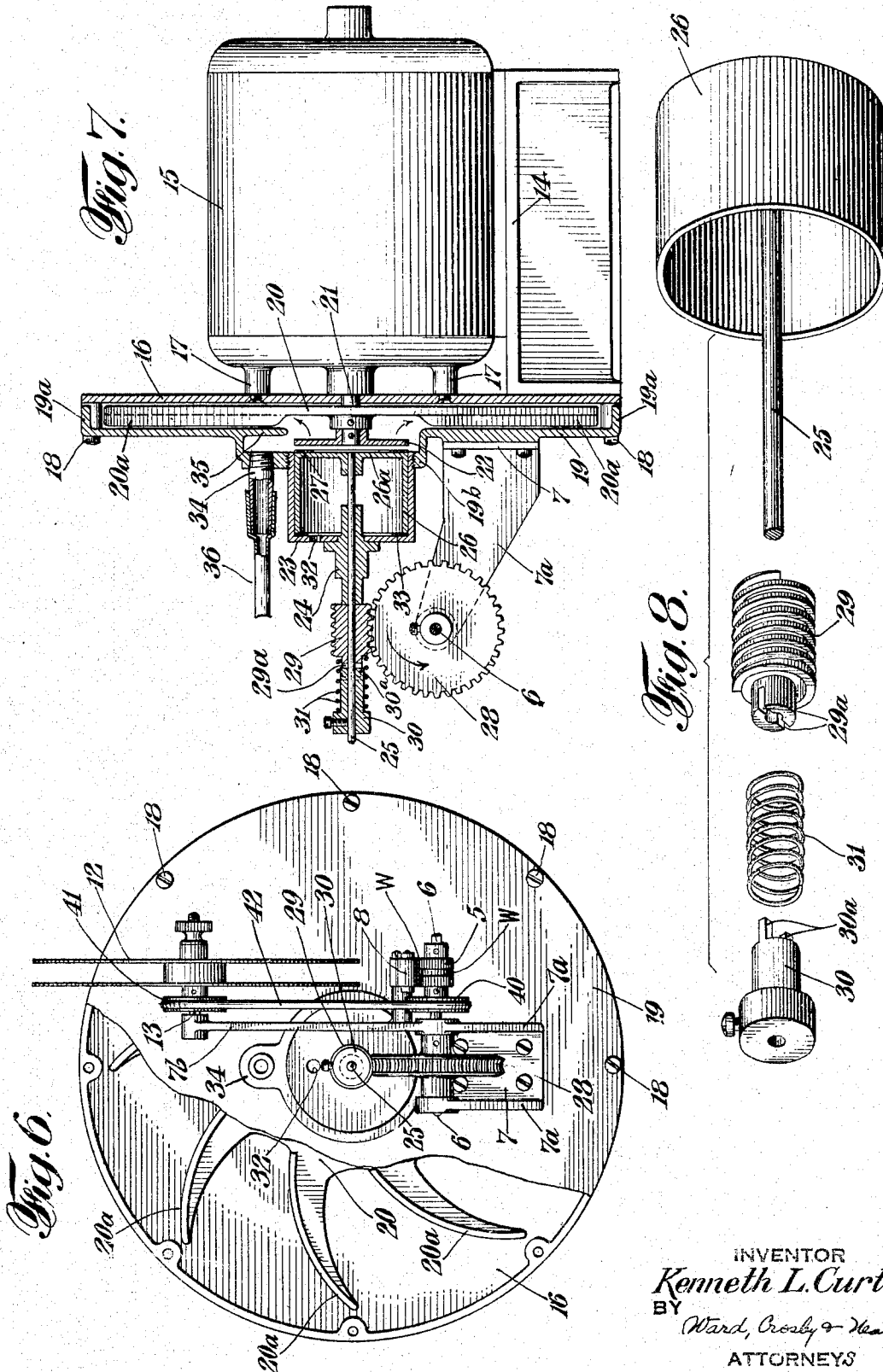
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CONTROL SYSTEM PARTICULARLY FOR AN INDICIA BEARING WEB

Original Filed June 4, 1929 3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,043,239

CONTROL SYSTEM PARTICULARLY FOR
AN INDICIA-BEARING WEB

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Trans-Lux Daylight Picture Screen Corpora-
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ware

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13 Claims. (Cl. 271—2.3)

My invention relates to a fluid pressure control system for, and method of moving an indicia-bearing web through a projection field.

My invention, in one of its prominent phases, involves an arrangement for moving an indicia-bearing tape or web through or with respect to a projection field, such movement, in the appended claims, being described generically as "through the projection field."

My invention provides a control system of simple, economic and practical character for performing the objects of my invention.

Further advantages, objects and characteristics of my invention will become apparent from the following description taken in connection with the accompanying drawings.

My invention resides in the control system, methods, apparatus and features of construction of the character hereinafter described and claimed.

For an illustration of one use to which the invention is especially adapted, and an illustration of one form of control system constructed in accordance with my invention, reference is to be had to the accompanying drawings, in which:

Figure 1 is a diagrammatic view of a projection system;

Fig. 2 is a plan view of an indicia-bearing web which when in a proper position causes indicia images as shown on the screen of Fig. 3;

Fig. 3 is a front elevational view of the screen shown in Fig. 1;

Fig. 4 is a plan view of mechanism utilizable in accordance with my invention;

Fig. 5 is a side elevational view of the mechanism shown in Fig. 4;

Fig. 6 is an enlarged, end elevational view, partly broken away, of a part of the mechanism shown in Figs. 4 and 5;

Fig. 7 is an enlarged, side elevational view, partly in vertical section, of a part of the mechanism shown in Figs. 4 and 5; and

Fig. 8 is a perspective view illustrating parts of my mechanism.

Referring to Fig. 1, there is illustrated a suitable source of light S herein shown as an incandescent lamp having the usual glass bulb enclosing a filament of any suitable character. A suitable condenser lens L positioned adjacent the source of light S receives light directly therefrom and indirectly from a reflector or mirror M coacting with said source of light S, the light traversing said lens L and, in the example shown, passing along substantially a horizontal path into engagement with a mirror M1, or equivalent. From

the latter, the light passes upwardly, substantially in a vertical direction, through a suitable lens L1, a frame or guide member G, a member W, and an objective or projection lens L2. From lens L2, in the example shown, the light passes to angularly related mirrors M2 and M3, the latter reflecting the light for passage into engagement with a suitable screen A preferably of translucent material and adapted, therefore, for "through" projection, namely, wherein an observer or audience are at that side of the screen A opposite the mirror system comprising the mirrors M2 and M3.

In the application of my invention herein illustrated and described, the member W is a tape or web, Fig. 2, of the character utilized in connection with ordinary "stock ticker" mechanism which prints characters thereon indicative of stock quotations. As hereinafter more particularly described, the web W moves over the guide G, the latter defining the projection field traversed by light to effect the display on the screen A of images of the aforesaid characters, the images moving as the web moves, each image appearing, for example, at the left of screen A, Fig. 3, moving thereacross and vanishing from view at the right.

In accordance with my invention, the web W is so controlled that the aforesaid images move across the screen A, Fig. 3, at a desired rate of speed. At times, they may remain stationary but, when they move, the movement is smooth and steady, and not jerky.

Referring to Figs. 4 and 5, there is illustrated ticker mechanism 1. This mechanism may be of any suitable character and is herein generally shown as comprising a casing 2 forming an enclosure or housing for suitable actuating mechanism, not shown. Disposed at one side of the casing 2 is a reel 3 rotatably mounted and having the blank web wound thereupon. From the reel 3, the web W extends into coacting relation with suitable mechanism 4 utilizable for printing the aforesaid characters thereon. From the printing mechanism 4, the web W extends over and is supported by the aforesaid guide G which, in the example shown and as illustrated particularly in Fig. 4, forms an elongated light-passing passage of suitable length. Disposed above the guide G, there may be a suitable J spring of any suitable character as now known to the art and frictionally coacting with the web as it passes along said guide.

From the guide G, the web W extends to and partly around a drum 5 rotatable with a

shaft 6 suitably journaled in spaced, parallel arms 7a of a frame 7 supported as hereinafter described. Preferably, the face of drum 5 is serrated or roughened as indicated in Fig. 6 and coacting therewith, to grip the web W, is a roller 8 carried by a lever 9 mounted on a member 10 projecting laterally from an extension 7b of the aforesaid frame 7, said lever 9 being suitably biased in a counter-clockwise direction, as by a spring 11. From the web-gripping structure comprising the drum 5 and roller 8, the web W extends to a reel 12 rotatable on a shaft 13 journaled in the upper end of extension 7b of frame 7.

Disposed upon a suitable base or support 14 is a suitable motive device 15 herein shown as an electric motor. In the example shown, a plate 16 is secured to members 17 projecting from one end of said motor 15. Suitably secured to the plate 16, as by bolts or screws 18, is a member 19 having a flanged or angularly projecting end 19a whereby the members 16 and 19 are spaced apart to form a chamber closed except as hereinafter described. As illustrated in Figs. 6 and 7, the aforesaid frame 7 is suitably secured to the outer surface of member 19.

Disposed within the chamber formed by members 16, 19 and flange 19a of the latter is a rotatable structure 20 comprising curved propeller blades 20a, said blades 20a, as shown in Fig. 7, having a width only slightly less than the chamber receiving the same. The rotatable structure 20 is mounted on and rotatable with the shaft 21 of the aforesaid motor 15. Shaft 21 of motor 15 also carries a member or disk 22 which is suitably secured thereto for rotatable movement therewith.

As illustrated in Fig. 7, member 19 may comprise an offset enlarged section 19b having an opening in which, preferably, is threaded one end of a cup-shaped member 23, one wall of which carries an elongated member 24 having an opening in which a shaft or rod 25 is slidably received. Shaft 25 extends within the member 23 and carries a second cup-shaped member 26, the circular side wall structure of which nicely fits, in freely slidable relation, within the circular side wall structure of member 23. The cup-shaped member 26 comprises a wall 26a movable toward and from the disk 22, as hereinafter described. Wall 26a and disk 22 constitute coacting clutch elements and, if desired, one of them, as wall 26a, may carry a facing surface or ring 27 of leather, or the like.

The aforesaid shaft 6, between the arms 7a, 7a of frame 7, has a gear 28 pinned or otherwise suitably secured thereto for movement therewith. Gear 28 is rotatively associated with the aforesaid shaft 25 in any suitable manner. To this end, a worm gear 29 is disposed on the shaft 25 and in meshing relation with the gear 28. Worm gear 29 comprises a bifurcated end portion 29a within which is received the finger portion 30a of sleeve 30 pinned, or otherwise suitably fixed to the aforesaid shaft 25. A spiral spring 31 is disposed between shoulders formed, respectively, on the worm gear 29 and sleeve 30.

The end of sleeve 30 forms a stop for worm gear 29 to maintain the latter substantially in the position illustrated in Fig. 7. This action is effected because worm gear 29 rotates in but one direction, counter-clockwise as the parts are shown in Fig. 7, and, due to the relation of the worm gear teeth and the teeth of gear 28, said

worm gear 29 tends to move from left to right, Fig. 7 whenever it is rotated. The finger portion 30a remains constantly within the bifurcated end portion 29a so that sleeve 30 is always related, in driving relation, to the drum 29. However, spring 31 is effective, unless overcome as hereinafter described, to maintain sleeve 30, shaft 25, and cup-shaped member 26 in the position illustrated in Fig. 7 to cause wall 26a of member 26 to be spaced from disk 22.

As illustrated in Fig. 7, the end of the cup-shaped member 26 removed from the wall 26a is open, the interior of said member 26 being placed in communication with the atmosphere, preferably, through an opening 32 in the cup-shaped member 23. If desired, a cushioning washer 33 of rubber, or equivalent, may be interposed between otherwise contacting surfaces of the members 23 and 26.

A nipple 34 communicates with the chamber 20 formed by members 16, 19 and flange 19a and, if desired, a baffle plate 35 may be disposed within said chamber opposite the opening of nipple 34. Carried by nipple 34 is one end of a conduit-forming member 36, preferably a rubber tube, which extends to a suitably supported conduit 37 positioned adjacent that end of guide G nearest the aforesaid printing mechanism. Conduit 37 terminates in a port 38 open at its end and presenting a flat surface with which the web W slidably engages since the open end of port 38 is closed at times, by the web W as hereinafter described. When the web W traverses a guide G, horizontally disposed as illustrated, the opening through port 38 should be angularly related to a horizontal plane, as illustrated, for example, in Fig. 5.

As illustrated particularly in Fig. 6, the aforesaid shaft 6 has a pulley 40 secured thereto for rotation therewith, said pulley 40 and a second pulley 41 disposed on the reel shaft 13 receiving an endless belt 42 by which motion is transmitted to the reel 12 from shaft 6.

The operation is as follows:

The motor 15 is placed in operation and, in the example shown, it operates continuously as long as the projection system is to function. In response to operation of the motor 15, the rotatable structure 20 causes air to be drawn from the atmosphere through port 38, said air passing first through the conduits 37 and 36, and then through the nipple 34 into the chamber comprising members 16, 19 and flange 19a. Said chamber is open to the atmosphere through very small openings suitably opening therein. Preferably, said openings are formed by inserting spaced paper washers or shims between member 16 and flange 19a. Through these openings, the aforesaid air passes to the atmosphere. So long as the port 38 is open at its end or unobstructed, air passes into the aforesaid chamber along the path described above and is expelled from said chamber through the openings between the flange 19a and member 16. While the mechanism operates in the manner just described, the cup-shaped member 26 remains in the position illustrated in Fig. 7 under the influence of spring 31. At this time, disk 22 is disengaged from wall 26a of member 26 and, consequently, the cup-shaped member 26, shaft 25 and drum 29 remain stationary. As a result, gear 28 likewise remains stationary as do the web feeding and winding structure comprising the drum 5 and reel 12.

When the ticker mechanism is placed in operation, the same functions, as well understood in

the art, to periodically advance the printed web W from the printing mechanism 4 in a jerky or step-by-step manner. At this time, there is no movement of the web W along the guide G provided that said web is not immediately adjacent or contacting with the flat face of the port 38. Accordingly, the web W forms a loop which progressively becomes deeper and deeper and eventually attains a configuration such as illustrated, for example, by the full line of Fig. 5 where said web W overlies the opening of port 38 and substantially closes the same because formed of substantially non-porous material.

When the port 38 is closed as just described, a partial vacuum results within the chamber formed by members 16, 19 and flange 19a. This partial vacuum is formed quickly and, when formed, causes movement of the cup-shaped member 26 in a direction from left to right, Fig. 7, against the action of spring 31. This action occurs because one side of wall 26a of the cup-shaped member 26 is exposed to the atmosphere through opening 32; accordingly, when the pressure on the other side of wall 26a is decreased, movement of the cup-shaped member 26 occurs as just described. In response to such movement of the cup-shaped member 26, the wall 26a thereof comes into engagement with the constantly rotating disk 22 to thereby frictionally unite or connect member 26 to said disk 22. In this manner, rotation of shaft 25 and worm gear 29 is initiated, rotation of the latter being imparted to the gear 28 and shaft 6, the cup-shaped member 26 rotating within the similar member 23. In response to such rotation of shaft 6, the drum 5 is operated to cause movement of the web W from left to right, Figs. 4 and 5, across the guide G, said web sliding freely across the flat face of port 38. Simultaneously, reel 12 is rotated to wind the web W thereon as it passes beyond said drum 5.

Operation of the drum 5 and reel 12 continues so long as the port 38 is closed by web W and said port 38 thus remains closed so long as said web is moved by drum 5 at substantially the same rate as said web passes from the printing mechanism 4. Should operation of the printing mechanism be temporarily discontinued, as it often is, the drum 5 continues to move the web across the guide G until the aforesaid loop has been reduced sufficiently to uncover the port 38 as shown, for example, in dotted lines at W1, Fig. 5. When the port is uncovered, the pressure within the aforesaid chamber comprising the members 16, 19 and flange 19a abruptly increases and becomes approximately that of the atmosphere. Accordingly, the pressures on opposite sides of the wall 26a become substantially balanced and, as a result, spring 31 moves the cup-shaped member 26 into the position shown in Fig. 7 to thereby disconnect wall 26a from disk 22 and to discontinue rotation of the drum 5 and reel 12, the ring 33, or equivalent, exercising a braking action on said member 26.

Due to the operation last named, movement of the web W across the guide G is discontinued until the printing mechanism 4 has again operated sufficiently to cause the web to cover the port 38 whereupon the operation described above is repeated.

The drum 5 should be designed to move the web W at a rate of speed which is slightly higher than the average rate at which the web issues from the printing mechanism 4 when the latter operates at maximum speed. Ordinarily, how-

ever, said printing mechanism 4 does not operate at the maximum speed and, during short periods, operation may be entirely suspended. Particularly in the latter case, movement of web W along the guide G ceases after said web has been moved from the port 38.

It may happen that the respective speeds of operation are such that the drum 5 tends to move the web W at a rate of speed only slightly higher than the rate at which said web W issues from the printing mechanism 4. Under such circumstances, the web W opens the port 38 to some extent and, as a result, the rotating cup-shaped member 26 moves into or toward the position shown in Fig. 7. Accordingly, the shaft 25, worm gear 29, gear 28, shaft 6 and drum 5 slow down. If the respective rates of speed are as described immediately above, the resultant decreased speed of web movement across the guide G almost immediately permits the web loop to be deepened sufficiently to cover the port 38. As a result, the member 26 moves from left to right, Fig. 7, into engagement with disk 22 before rotation thereof has entirely ceased and before movement of the web along guide G has entirely ceased. However, it shall be understood that the braking action of ring 33 may be such as is suitable or desirable, and, further, the operation may be such that the web W is moved a substantial distance from the port 38 when the clutch mechanism is opened.

As stated above, when the printing operation is suspended for a fraction of a minute, as it often is, or for more than a fraction of a minute, the drum 5 continues to operate until the port 38 is uncovered whereupon rotation thereof is discontinued. When this happens, said drum 5 does not again operate until the port 38 has been again covered by the web W in response to renewed operation of the printing mechanism 4.

The rotatable structure 20 comprising the propeller blades 20a should be so designed and the combined area of the openings between the flange 19a and member 16 should bear such ratio to the area of the passage in port 38 that, with the latter open, air passes along the path defined above without substantial change or lowering of pressure in the chamber defined by members 16, 19 and flange 19a. At the same time the arrangement should be such that, when the port 38 is closed by the web, the air pressure within the aforesaid chamber becomes sufficiently low within the proper time to cause the described movement of the cup-shaped member 26. Furthermore, the arrangement should be such that the suction effect on the web W at the flat face of port 38 is not sufficiently great to damage the web material, to draw the same into the passage of said port 38, or to impede, to an unwarranted degree, movement of said web along the flat face of said port 38.

Although my invention has been illustrated and described in connection with a tape or web on which characters are printed, it shall be understood that my invention is not to be so limited. Thus, said characters may be formed on a tape or web otherwise than by a printing operation. Furthermore, the tape or web may bear other representations, figures, or the like, besides numbers and letters, all of which, in the appended claims are generically termed "indicia". Still further, a suitable surface or member other than a tape or web bearing indicia may be utilized in accordance with my invention, and said tape, web, surface or member may be utilized

otherwise, if desired, than by passage of a light beam therethrough. Thus, for example, the projection may be such as is known to the art as opaque or light-reflecting projection.

5 It will be observed that among other advantages, the invention permits of the use of a single continuously running motor or motive device not requiring automatic control contacts, and it acts to draw air through the port 38 and to operate 10 the drum 5 and reel 12. The invention thus reduces cost of construction and maintenance besides insuring the desired control of the web. As stated, the organization comprising said motor involves clutch mechanism comprising the 15 disk 22 and wall 26a of cup-shaped member 26. It should be clearly understood that clutch mechanism such as shown or an equivalent thereof may be utilized otherwise than as herein illustrated. Thus, for example, the lever 9 may be 20 suitably moved, in a clockwise direction, Fig. 5, in response to change of air pressure as effected by the web W at port 38, when it is desired to discontinue movement of the web along the guide G.

25 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 30 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 the art of controlling movement of an indicia-bearing web movable at a non-uniform rate prior to passage thereof through a projection field, the method which comprises producing 40 by a continuously operating motive device a suction effect varying in accordance with the non-uniform rate of web movement, and utilizing said motive device to move said web through said projection field in accordance with said suction effect.

2. In a system for controlling movement of an indicia-bearing web, the combination with a motive device, mechanism operated by said motive 50 device for moving said web through a projection field, and pneumatically actuated clutch means for connecting or disconnecting said mechanism to or from said motive device, of means operated by said motive device for passing air through a conduit, said web being movable to a position for 55 checking the passage of air through said conduit to thereby control said clutch means to connect said mechanism to said motive device.

3. In a system for controlling movement of an indicia-bearing web, the combination with a motive device, mechanism operated by said motive 60 device for moving said web through a projection field, and pneumatically actuated clutch means for connecting or disconnecting said mechanism to or from said motive device, of means operated 65 by said motive device for passing air through a conduit by suction, said web being movable to a position for checking the passage of air from the atmosphere into said conduit to thereby control said clutch means to connect said mechanism to 70 said motive device.

4. In a system for controlling movement of an indicia-bearing web, the combination with a motive device, mechanism operated by said motive 75 device for moving said web through a projection field, and clutch means for connecting or dis-

connecting said mechanism to or from said motive device, said clutch means comprising coacting members biased apart, of means operated by said motive device for passing air through a conduit, said web being movable to a position for check- 5 ing the passage of air through said conduit to thereby effect engagement between said coacting members of said clutch means.

5. In a system of the character described, a motive device, mechanism operated by said motive 10 device for moving a web through a projection field, clutch means, and pneumatic control means actuating said clutch means to connect or disconnect said mechanism to or from said motive device, said pneumatic control means having a 15 port opening in the path traversed by said web, said web cooperating with said port opening to control said pneumatic control means.

6. In a system of the character described, a motor, and suction-controlled mechanism for 20 causing said motor to pull a character-bearing tape through a projection field in accordance with change in configuration of a tape loop at the entrance to said projection field, said mechanism comprising a housing having a suction 25 port adapted to be more or less covered by an adjacent section of the tape loop, means for withdrawing air from said housing, a cylinder, a conduit connecting said housing and cylinder, and a piston movable in said cylinder in response to 30 change in coverage of said suction port by the adjacent tape section.

7. In a system of the character described, a motor, tape-pulling means, and suction-controlled mechanism for causing said motor to pull 35 a character-bearing tape through a projection field in accordance with change in configuration of a tape loop at the entrance to said projection field, said mechanism comprising a housing having a suction port adapted to be more or less 40 covered by an adjacent section of the tape loop, means for withdrawing air from said housing, a cylinder, a conduit connecting said housing and cylinder, and a piston movable in said cylinder in response to change in coverage of said suction 45 port by the adjacent tape section, said piston serving as a clutch element for connecting said tape-pulling means to said motor.

8. In a system of the character described, a motor, mechanism operated by said motor, clutch 50 means, pneumatic control means actuating said clutch means to connect or disconnect said mechanism to or from said motor, and means comprising said motor for operating said pneumatic control means. 55

9. In a system of the character described, a motor, mechanism operated by said motor, clutch means, said clutch means comprising a chamber and a member freely slidable therein, said member being coactable with a constantly rotating 60 member operated by said motor, pneumatic control means actuating said clutch means to connect or disconnect said mechanism to or from said motor, and means comprising said motor for 65 operating said pneumatic control means.

10. In a system of the character described, a motor, mechanism operated by said motor, clutch means, said clutch means comprising a chamber and a member freely slidable therein, said member being coactable with a constantly rotating 70 member operated by said motor, and pneumatic control means actuating said clutch means to connect or disconnect said mechanism to or from said motor, said pneumatic control means 75

comprising a chamber receiving a fan rotor operated by said motor.

11. In a system of the character described, a motor, mechanism operated by said motor, clutch means, said clutch means comprising a chamber and a member freely slidable therein, said member being coactable with a constantly rotating member operated by said motor, and pneumatic control means actuating said clutch means to connect or disconnect said mechanism to or from said motor, said pneumatic control means comprising a chamber receiving a fan rotor operated by said motor, said pneumatic control means further comprising a conduit for admitting air to said chamber.

12. In a system of the character described, a motor, mechanism operated by said motor, clutch means, said clutch means comprising a chamber and a member freely slidable therein, said member being coactable with a constantly rotating member operated by said motor, pneumatic control means actuating said clutch means to connect or disconnect said mechanism to or from said motor, said pneumatic control means com-

prising a chamber receiving a fan rotor operated by said motor, said pneumatic control means further comprising a conduit for admitting air to said chamber at a varying rate, and tape-controlling means for varying the rate at which air passes through said conduit.

13. In a system of the character described, a motor, mechanism operated by said motor for pulling a tape through a projection field, clutch means, said clutch means comprising a chamber and a member freely slidable therein, said member being coactable with a constantly rotating member operated by said motor, pneumatic control means actuating said clutch means to connect or disconnect said mechanism to or from said motor, said pneumatic control means comprising a chamber receiving a fan rotor operated by said motor, said pneumatic control means further comprising a conduit for admitting air to said chamber, and means controlled by said tape for varying the rate at which air passes through said conduit.

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