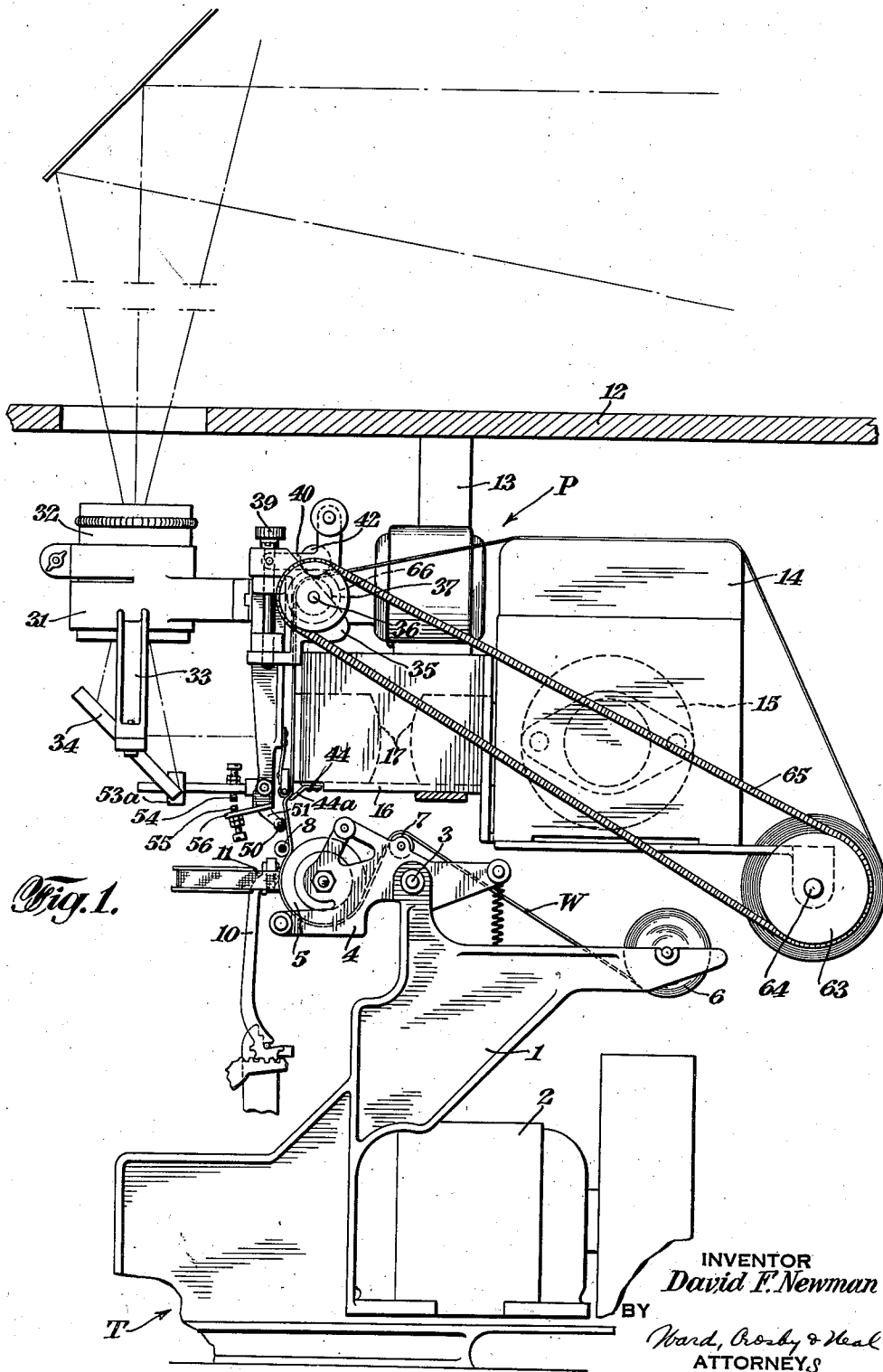


May 30, 1939.

D. F. NEWMAN
METHOD OF AND APPARATUS FOR CONTROLLING
MOVEMENT OF A CHARACTER-BEARING WEB
Filed Sept. 19, 1936

2,160,530

4 Sheets-Sheet 1



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2,160,530

4 Sheets-Sheet 2

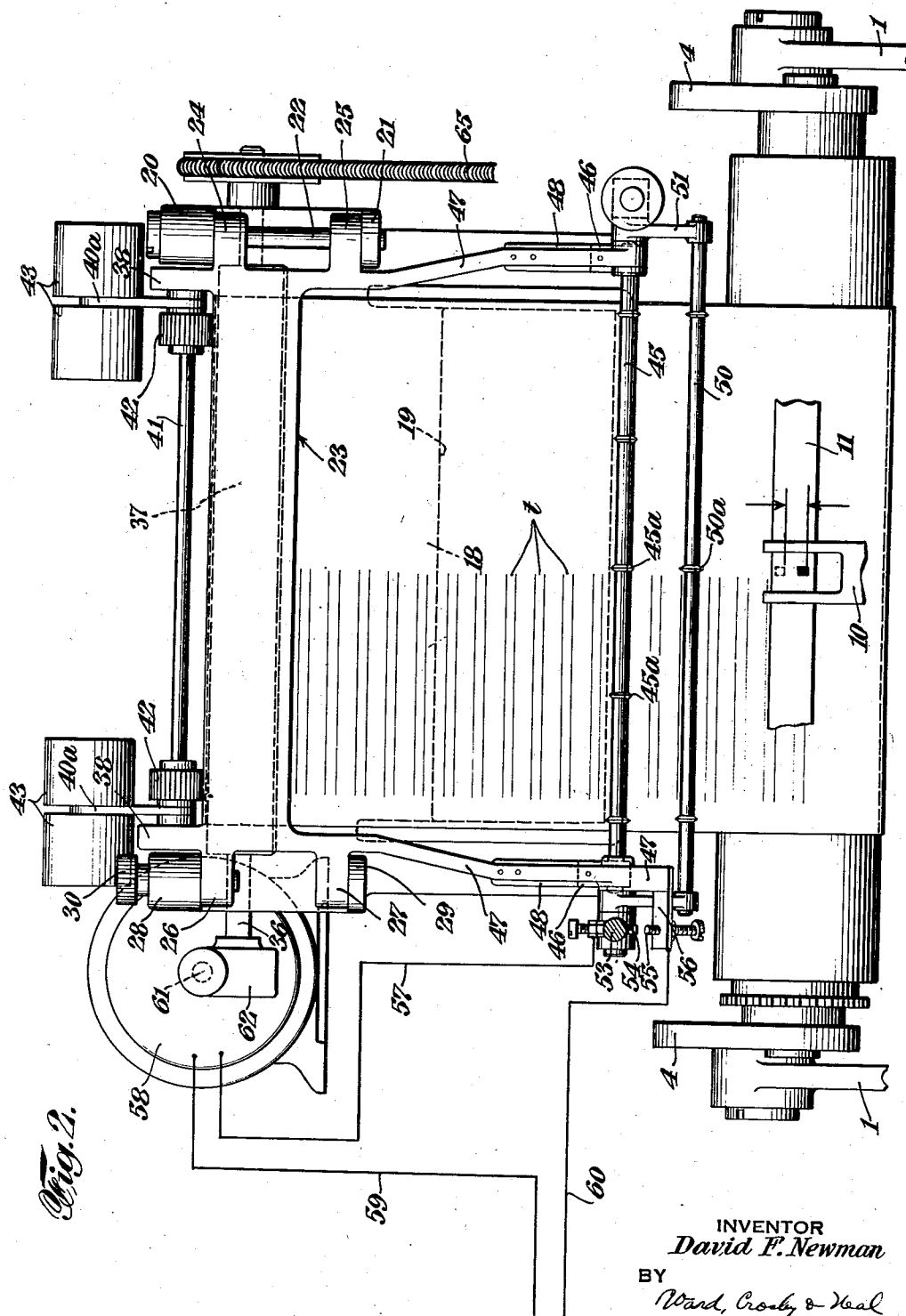


Fig. 2.

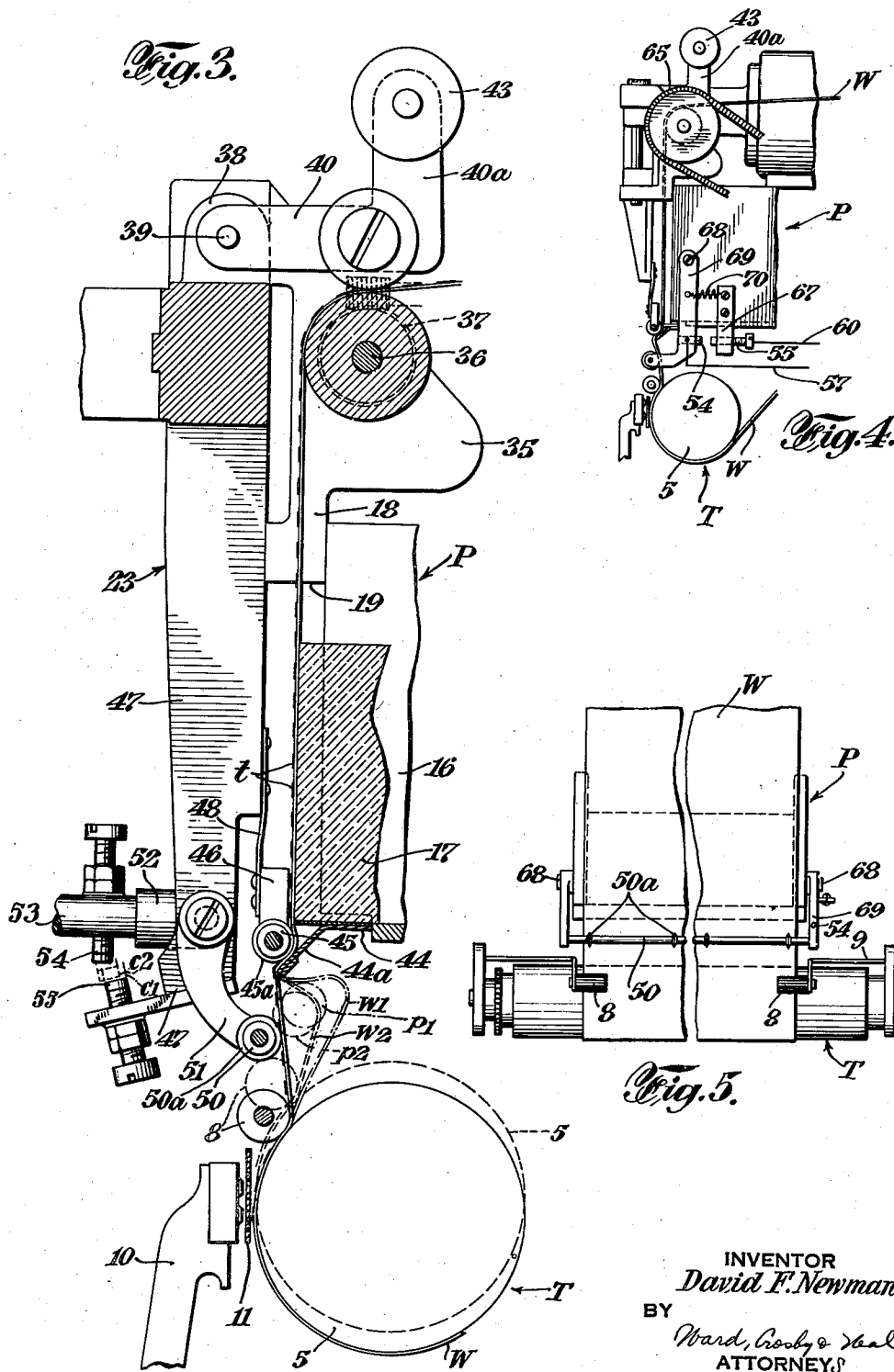
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

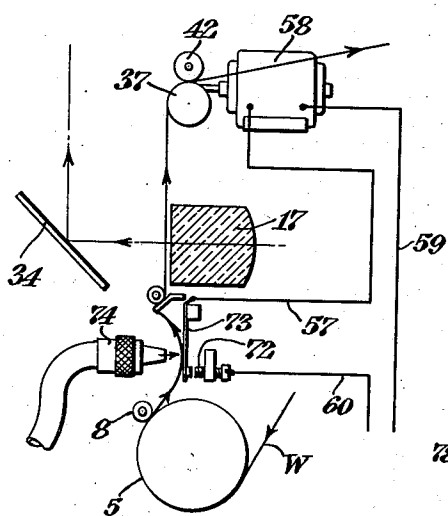


Fig. 6.

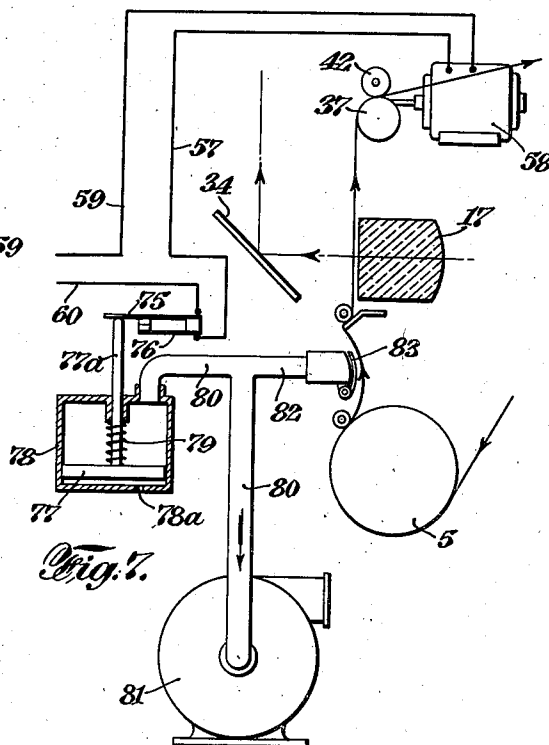


Fig. 7.

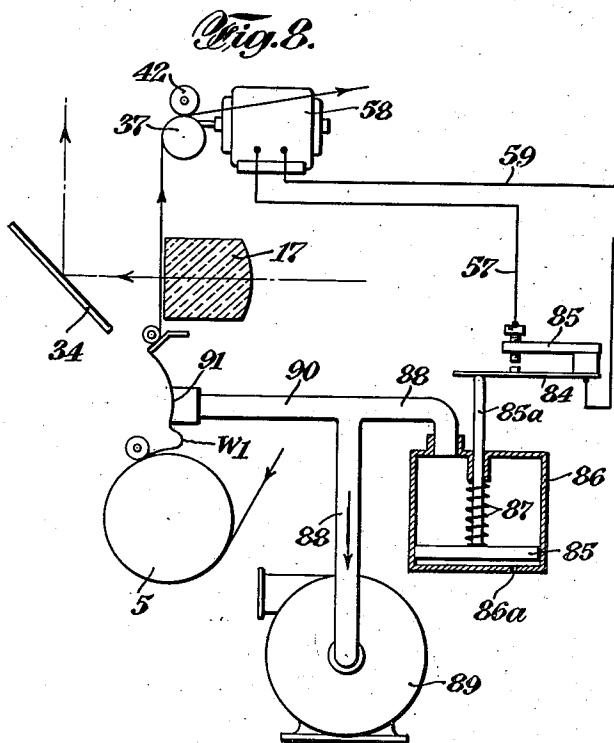


Fig. 8.

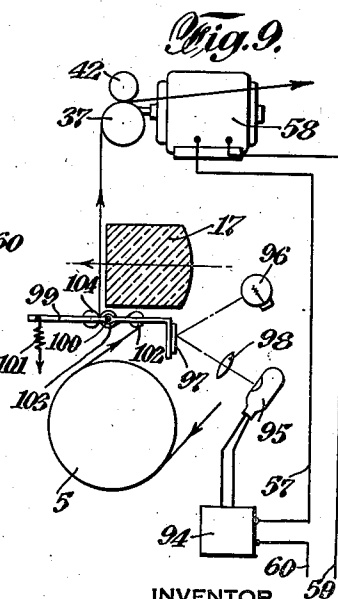


Fig. 9.

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UNITED STATES PATENT OFFICE

2,160,530

METHOD OF AND APPARATUS FOR
CONTROLLING MOVEMENT OF A CHARACTER-BEARING WEB

David F. Newman, Rockville Centre, N. Y., assignor to Trans-Lux Corporation, a corporation of Delaware

Application September 19, 1936, Serial No. 101,644

13 Claims. (Cl. 178—42)

My invention relates to a method of and apparatus for controlling movement of a web upon which transverse rows of characters have been typed or printed in line formation.

5 My invention has further reference to a system or arrangement for moving a transversely typed or printed web through a projection field, or equivalent, at relatively slow speed compared with the speed at which said web is moved with respect to a typing or printing station.

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

15 My invention resides in the method, apparatus, combinations and arrangements of the character hereinafter described and claimed.

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

20 Figure 1 is a side elevational view, partly in section and with parts omitted, showing the combined typing-projecting arrangement of my invention;

25 Figure 2 is a front elevational view, partly in section and with parts omitted, of the arrangement shown in Fig. 1;

30 Figure 3 is an enlarged elevational view showing associated parts of the mechanism of Figs. 1 and 2;

Figure 4 is a side elevational view, with parts omitted, of a modification of the invention;

35 Figure 5 is a front elevational view of the arrangement shown in Fig. 4; and

Figures 6, 7, 8 and 9 are schematic views disclosing various arrangements for controlling a web for movement through a projection field.

Referring to the drawings, I have illustrated a suitable projector P and a character forming device T, the latter being of any desired type and, as herein shown, although not necessarily, being exemplified by a typewriter or typing device such as is manufactured by the Teletype Corporation of Chicago, Illinois and which is operable under electrical control from a central station.

45 A typing device T of the character noted is well known in the art. An explanation of many of the details of such device is not required in connection with the description of the present invention and, hence, reference will be had only to certain parts which cooperate more or less closely with the projector P.

Thus, as shown, the typing device T comprises a frame formed by spaced side members 1, 1, this

frame having the usual operating motor 2 associated therewith.

Pivoted at 3 on the respective side members 1, 1 are the arms 4, 4, which are suitably connected together by transverse tie members so as to be oscillatable together as a unit. Rotatably mounted in the forward portions of the arms 4, 4, is the platen 5.

Rotatably mounted in the rear sections of the respective side members 1, 1 or in other suitable location is a roll 6 which serves as the source of supply for a wide web W which, as shown in Fig. 1, extends toward the front of the typing device and, in so doing, passes over the upper surface of a compensating or equalizing idler roll 7, said web W then passing around the lower surface of the platen 5 with which it is held in feeding engagement by the usual lower roller arrangement, not shown. If desired, as shown particularly in Fig. 5, a pair of suitably positioned rollers 8, 8, or equivalent, may be utilized for holding the web snugly against the upper outer surface of the platen 5, these rollers being mounted on the respective levers 9 which are suitably pivoted to the respective arms 4.

25 This typing device T includes a bank of typing keys which move transversely with respect to the web W as the typing operation proceeds. In Fig. 1, one of these keys 10 is shown, said key coacting with an inking ribbon 11 to thrust the same against the web W as it rests on the platen 5 to thereby type a character on said web W, the lines of such characters being shown at t.

30 In the form of the invention herein disclosed, although not necessarily, the projector P is disposed interiorly of a cabinet of which the top wall is shown at 12 in Fig. 1, said projector P being maintained in fixed or other proper position relative to the typing device T by a suitable bracket arrangement 13 or equivalent, attached to said cabinet in suitable manner, and the typing device T being movable at will with respect to the projector so as to be positioned exteriorly of the cabinet for periodic inspection and maintenance.

45 As herein disclosed, the projector P comprises a lamp housing 14 having therein a suitable lamp 15 adapted to project a light beam from right to left, Fig. 1, through a housing 16 for a condenser lens assembly 17. A plate 18 is secured to the front of this condenser housing and said plate has a rectangular opening 19 which serves as the projection aperture or projection field for defining a section of the web W for projection purposes.

55

Extending laterally from the plate 18 are a pair of spaced ears 20, 21, Fig. 2, through which extends a pin 22 serving as the pivotal support for a frame 23 having, at one side thereof, ears 24, 25 interleaving with the aforesaid ears 20, 21. At its other side, the frame 23 comprises a pair of ears 26, 27 which interleave with a set of ears 28, 29 projecting laterally from the plate 18. As shown in Fig. 2, a pin 30 coacts with the ears 26, 28 to hold the frame 23 in closed position as illustrated.

In Fig. 1, a bracket ring 31 is shown as secured to the aforesaid frame 23, this ring 31 serving as a support for an objective lens 32 having its longitudinal axis positioned vertically. Depending from the ring 31 are a pair of arms 33 which support an inclined mirror 34 disposed in alinement with the aforesaid projection aperture 19.

The aforesaid aperture plate 18, at opposite respective sides thereof, comprises the rearwardly extending ears 35, Fig. 1, these ears containing bearings for the shaft 36 of a roller 37 having a length at least as great as the width of the web W, the peripheral surface of this roller 37 being corrugated and said roller being rotated in the manner hereinafter described.

The aforesaid frame 23, adjacent the respective opposite sides thereof, comprises the upwardly extending ears 38 each of which carries a transverse support 39, or equivalent, Fig. 3, and each support 39 pivotally supporting an arm 40, these arms 40 forming the support for a transverse rod 41, Fig. 2, which, adjacent each end thereof, has a roller 42 freely rotatable thereon, these rollers being corrugated peripherally and being suitably restrained so as to be incapable of any substantial movement longitudinally of said rod 41. As indicated, the arms 40 comprise the respective upwardly extending sections 40a to which sets of weights 43 are secured, these weights serving to positively bias the arms 40 and rollers 42 in a clockwise direction, Fig. 1, so that said rollers 42 are utilizable in a web-feeding manner as hereinafter described.

As shown in Figs. 1 and 3, the bottom wall of the lens housing 16 has secured thereto in suitable manner a plate 44 terminating in an inclined section 44a. Disposed adjacent this inclined section 44a is a horizontal shaft 45, the opposite ends of which are mounted in bearings formed by blocks 46. As clearly illustrated in Fig. 2, the aforesaid frame 23, at opposite sides thereof, comprises the respective depending sections 47 to each of which a leaf spring 48 or equivalent is secured, these leaf springs 48 being secured to the respective blocks 46 whereby the latter together with the shaft 45 are biased in a direction from left to right, Fig. 3. As shown in Fig. 2, the shaft 45 comprises a plurality of spaced, peripheral surfaces 45a which, preferably, are edged as shown.

Coactable with the web section disposed at any particular time between the platen 5 of the typing mechanism T and the bottom of the projection field is a control rod, member, or equivalent 50 which extends transversely of said web, this member 50 preferably comprising a plurality of peripheral, edged surfaces 50a which engage the web W in the manner hereinafter described. Secured in fixed relation to each end of the member 50 is an arm 51, and each arm 51 is pivoted to a member extending laterally from the

lower end of each of the aforesaid depending sections 47 of the frame 23.

Secured to and movable with that arm 51 at the left as shown in Fig. 3 is a member 52 having projecting therefrom an electricity-insulating arm 53 which carries an electrical contact 54, said arm 53, if desired, carrying a biasing weight 53a, Fig. 1. Coactable with this movable contact 54 is a fixed electrical contact 55 carried by an electricity-insulating arm 56 fixed to the lower section of the adjacent frame section 47.

As shown in Fig. 2, the movable contact 54 has connected thereto a conductor 57 which leads to one terminal of an electrical motor 58 supported in fixed position adjacent the end of shaft 36 in any suitable manner. The other terminal of this motor has connected thereto a conductor 59 which leads to one terminal of any suitable source of current supply, not shown, the other terminal of which has connected thereto a conductor 60 which leads to and is connected to the aforesaid fixed contact 55.

The armature shaft 61 of the aforesaid motor 58 is connected to the shaft 36 of the roller 37 through suitable speed-reducing gearing contained in a gear box 62, Fig. 2.

The operation is as follows:

For purposes of explanation, it may be assumed that the web W has been threaded through the typing device T in the manner well understood in the art but that, as yet, said web has not been positioned operatively with respect to the projector P.

Under these circumstances, the assembly comprising the rod 41, rollers 42 and weights 43 are swung counter-clockwise from the position thereof shown in Fig. 1 and then the pin 30 is withdrawn from the position thereof as shown in Fig. 2 whereupon the frame 23 is swung to open position on the pin 22 as an axis. Thereupon, an extended section of the web W is obtained from the typing device T and then, while maintained taut, the web is placed in operative relation with respect to the projection field 19 of the projector P. Thus, in the arrangement shown although not necessarily, the web W is extended above the platen 5, one transverse surface of the web engaging the inclined section 44a of the plate 44 while a transverse surface further along the web is disposed upon the aforesaid corrugated surface of the roller 37 beyond which the web extends in a direction from left to right, for example, as shown in Fig. 1.

Upon completion of the foregoing, the frame 23 is returned to the position thereof as shown and the pin 30 is restored to its operative position as illustrated in Fig. 2 to thereby positively lock said frame 23 in its operative position. As a result, the edged surfaces 45a of the shaft 45 are moved into engagement with one transverse surface of the web W to thereby hold said web in engagement with the inclined section 44a of the plate 44, the springs 48 serving, in an obvious manner, to maintain this transverse gripping of the web. With the web W still maintained taut and in vertical position as shown, the assembly comprising the rod 41, rollers 42 and weights 43 are swung clockwise to the position shown in Fig. 1 whereby said rollers 42 hold the web in drawing or moving relation with respect to the roller 37.

As a result of the foregoing, it results that a taut section of the web W is maintained between the platen rollers 8, 9 and the transversely gripped web section as effected by the edged surfaces 45a of the shaft 45 in conjunction with the

inclined section 44a of the plate 44 all as shown by the full lines in Fig. 3.

This taut web section last named is engaged by the edged surfaces 50a of the aforesaid control member 50 with the result that the assembly comprising the control member 50, arms 51, member 52, arm 53 and movable contact 54 are held, against the force of gravity tending to swing them in a counter-clockwise direction, Figs. 1 and 3, in a position such as shown by the full lines in Fig. 3. When said assembly is thus positioned, the movable contact 54 is spaced from the fixed contact 55 and the circuit of the motor 58 is open. It results, therefore, that the roller 37 is stationary and, likewise, the web section in the projection field 19 is stationary when the control member 50 is positioned as above described.

At this time, the typing device T may be placed in operation to type either an entire or partial line of characters *t* transversely of the web W. At the conclusion of this typing operation, the typing device T, under operator control, is actuated to impart a step of rotative movement to the platen 5, in a clockwise direction, Figs. 1 and 3.

When this is done, a slack section is formed in the web between the platen 5 and the member 44 with the result that the member 50, under the influence of gravity, moves to the position thereof such as shown in Fig. 3 at *p1*, the web W assuming the slack section position thereof shown at *w1*. As a result, the movable contact 54 takes a position as shown at *c1* wherein said movable contact 54 is in contacting position with the contact 55 to close the circuit of the motor 58 and effect movement of the roller 37 in a clockwise direction, Figs. 1 and 3, whereby the web W is drawn through the projection field by reason of the fact that the rollers 42 hold the web in clutching engagement with said roller 37.

In accordance with the invention, the gear ratio between the armature shaft 61 and the shaft 36 of roller 37 is such that the web W is drawn through the projection field 19 at a speed which is a fraction of the speed at which the web is moved when the platen 5 is rotated in the manner described above. In other words, the roller 37 moves the web through said projection field at such slow speed that some or a large part of the next succeeding full line has been typed before movement of the web through the projection field is discontinued.

As rotation of the roller 37 continues, the aforesaid slack section *w1* of the web W is taken up and, in a short time, the web comes into engagement with the control member 50 and, as tautening of the web continues, said control member 50 is moved in a clockwise direction, Fig. 3, from the position thereof shown at *p1*, this movement of the control member being accompanied by similar clockwise movement, Fig. 3, of the assembly comprising the arms 51, member 52, arm 53 and movable contact 54. When the movable contact 54 leaves the fixed contact 55, the circuit of the motor 58 is opened and the latter becomes non-operative as regards drawing of the web W through the projection field.

This completes a cycle of operation. Meanwhile, a part or nearly all of the next succeeding full line has been typed. At the conclusion of such line-typing operation, the platen 5 is again given a step of rotative movement and the operations described above are repeated. In this way, the slack web section *w1* is formed at the conclusion of each line-typing operation and this

results in the successive slow movements of the web through the projection field 19.

As well understood in the art, the oscillatable arms 4, 4 of the typing device T, under operator control, may be swung in a clockwise direction, Fig. 1, to position the platen 5 in an upper case position, as shown by the broken lines in Fig. 3, so that an upper case character may be typed.

Assuming that the web W, between the platen 5 and the plate 44 is taut as shown in Fig. 1 and that the platen 5 is then moved to upper case position, a slack section is formed in the web between the platen 5 and the member 44 with the result that the control member 50 is permitted to move to such a position thereof as is shown in Fig. 3 at *p2*, the web W assuming the position shown at *w2*. As a result, the movable contact 54 takes a position as indicated at *c2* but, as shown, this is not a contacting position with the contact 55, Fig. 3. Therefore, when the platen 5 is moved to an upper case position as just described, the motor 58 remains non-energized and, consequently, there is no movement of the web W through the projection field at that time.

However, in the event that the web W is not taut between the platen 5 and the plate 44, there is produced, when said platen 5 is moved to upper case position, a slack web section of sufficient length to permit the movable contact 54 to come into engagement with the fixed contact 55 whereby the motor 58 is energized to cause the web W to be drawn through the projection field. This energization, usually, is only for a short period of time compared to that occurring after a line spacing operation. In actual operation, there may be a plurality of such short motor energizations responsive, respectively, to a plurality of movements of the platen 5 to upper case position. However, if there should be numerous movements of the platen 5 to upper case position during the typing of a single line, the web W, eventually, between the platen 5 and plate 44 necessarily becomes more or less taut substantially as shown in Fig. 1. When this happens, any succeeding movement of the platen 5 to upper case position during the typing of said last named line is ineffective as regards closure of the contacts 54, 55 and operation of the motor 58.

It will be understood, as indicated in Fig. 2, that a plurality of typed lines are disposed within the borders of the projection aperture 19. In a gradual manner and under the control of the member 50, as hereinbefore described, these typed lines are moved upwardly so that, in slow succession, they enter said projection aperture 19 at the lower side thereof and pass therefrom at the upper side thereof.

In the form of the invention herein illustrated, the web W is formed from cellophane, glassine paper, or equivalent so as to be properly transparent for rear projection purposes. Accordingly, the projecting light beam passes from right to left, Fig. 1, through the aperture 19 and the web section framed thereby, said light beam engaging the mirror 34 and being deflected upwardly so as to pass through the objective lens 32 from which said light beam passes in any suitable manner to any suitable screen, not shown.

This screen exhibits images of the typed lines of information as the latter are framed by the projection aperture 19. As hereinbefore stated, the typed lines move at a slow rate of speed through the projection field and, therefore, the images of such typed lines, as they appear on the projection screen, move at a corresponding slow

rate of speed. This slow movement of the line images contrasts decidedly with the quick movement of corresponding line images in prior art devices wherein the printed lines are moved through the projection field at the same high speed as said lines are ejected from the printing device. The slow movement of the line images in accordance with my invention is desirable, compared with the aforesaid prior art quick movement, by reason of the fact that the spectators grouped about the screen are enabled to read and analyze the news without undue concentration, eye strain, or nervous shock.

The web W may be disposed of in any suitable manner after it passes beyond the hereinbefore described drawing means comprising the roller 37 and associated rollers 42. Thus, for example, said web W may be passed through a slot formed in the top wall 12 of the cabinet for the projector. Or, as shown, said web W may be wound upon a reel 63 rotatably mounted on a shaft 64 supported by an extension of the lamp housing 14. Utilizable for rotating this reel 63 is a spring belt 65 which is operated by a pulley 66 carried by the aforesaid shaft 36 which supports the roller 37. With an arrangement of this character, the belt 65 tends to rotate the reel 63 at a speed somewhat faster than the web is supplied thereto. Therefore, the web remains taut but fracture thereof is prevented by reason of the fact that the belt 65 readily slips by reason of its spring configuration.

It is well understood in the art that the space between lines typed by the aforesaid typing device T may vary within certain limits. For a given setting of the switch contacts 54, 55 and for a specified space between adjacent typed lines, a step of rotative movement of the platen 5 as described above results in the production of a slack web section such, for example, as shown at w1 in Fig. 3. Under different circumstances, the space between adjacent typed lines may be such that each step of rotative movement of the platen 5 results in the production of a slack web section substantially longer than as shown at w1. Or, the space between adjacent typed lines may be so close that, unless the contacts are reset to conform to the new spacing, two or more steps of rotative movement are required in order to produce a slack web of sufficient length to permit closure of the switch contacts 54, 55.

In commercial practice, the web W has been drawn through a projection field 19 at a rate varying between four and eight inches per minute. As will be understood, the difference in rate depends principally upon the frequency of operation of the line-spacing mechanism of the typing device T together with the distance between typed lines. In accordance with the invention, it appears that gradually accelerating arrangements for drawing the web up to a maximum rate of eight lineal inches per minute are entirely satisfactory. However, it shall be distinctly understood that my invention is not to be limited to web-drawing speeds as just noted since, if desired, such speeds may be greater or less as desired while still remaining within the purview of the invention.

It is well known that typing devices T as herein disclosed are often operated to produce several line spaces in quick succession. When this happens, the slack web section between the platen 5 and the lower edge of the projection field is substantially longer than as shown in Fig. 3 at w1. However, the speed of the motor 58, al-

though slow compared with prior art arrangements, is sufficient to cause said slack web section last named to be taken up without undue delay.

In the form of the invention shown in Figs. 4 and 5, a member 67 is secured in fixed position to one wall of the condenser housing, this member carrying the fixed contact 55. Pivoted on an axis 68 to the respective opposite walls of said condenser housing are the members 69 which support a control member 50 of the character hereinbefore described, this pivoted assembly being biased in a counter-clockwise direction, Fig. 4, by a spring 70, Fig. 4. The movable contact 54 is secured to that member 69 which is adjacent the member 67, the contacts 54 and 55 having the respective conductors 57 and 60 secured thereto.

With the parts positioned as shown in Fig. 4, it will be understood that the formation of the aforesaid slack web section by rotative operation of the platen 5 permits the spring 70 to move the pivoted assembly comprising the members 69 and 50 in a counter-clockwise direction, Fig. 4, to cause engagement between the fixed contact 55 and the movable contact 54 whereby the motor 58 is energized to effect movement of the web through the projection field in the manner hereinbefore described. In this and other respects, the aforesaid pivoted assembly operates in substantially the same manner for control purposes as above described in connection with Figs. 1, 2 and 3.

The main difference between the pivoted control arrangement of Figs. 1, 2, 3 and the one of Figs. 4 and 5 resides in the fact that the former is pivoted to the frame 23 whereas the latter is pivoted to the condenser housing. The former, then, is moved to one side when the frame 23 is opened. The latter, however, remains in position substantially as shown in Fig. 4 when the frame 23 is opened and, therefore, it becomes necessary to thread the web behind the control member 50. This is not the case with the construction of Figs. 1, 2 and 3 because the control member 50 is positioned at one side when the web is threaded and said control member is closed upon the web when the frame 23 is moved to closed position.

In view of the description hereinbefore given, it becomes obvious that the control member 50, whether supported as in Figs. 1, 2, 3 or as in Figs. 4 and 5, is a mechanically supported movable control member which is biased in one direction and restrained by the web, when the latter is taut, to prevent operation of the motor 58, said control member 50 moving in response to its biasing force, when the slack web section is produced, to close the contacts of the disclosed electrical circuit and to effect operation of the motor 58. Although this is a present preferred control arrangement, it shall be understood that the invention is not to be thus limited.

Thus, referring to the modified control arrangement of Fig. 6, there is shown a fixed contact 72 to which the aforesaid conductor 60 is connected, this fixed contact 72 having coactable therewith a movable contact 73 positioned either horizontally or vertically which contact, inherently, is biased to open position with respect to said fixed contact 72. This electrical contact arrangement is disposed in the area at one side of the web W between the platen 5 and the projection field. Disposed in the same area at the other side of said web W is a conduit 74 from the nozzle of which a stream of air is forced under pressure by any suitable pump, not shown.

The arrangement of the parts shown in Fig. 6 is such that production of the hereinbefore described slack web section *w1* in response to a step of rotative movement of the platen 5 permits the stream of air issuing from the conduit 74 to move the web W into engagement with the movable contact 73 whereby the latter is closed upon the fixed contact 72, this causing resultant operation of the motor 58. As the aforesaid slack web section is taken up by operation of said motor, the web W recedes from the movable contact 73 and then acts in barrier-fashion to prevent the stream of air issuing from said conduit 74 from holding the movable contact 73 closed upon the contact 72. When this happens, the contact 73 opens and operation of the motor 58 is discontinued whereupon the web section in the projection field 19 becomes stationary in approximately the position shown by the full lines in Fig. 6.

Referring to the modified control arrangement of Fig. 7, there is shown a movable contact 75 to which the aforesaid conductor 60 is secured, this movable contact 75 having a fixed contact 76 coactable therewith, said fixed contact 76 being connected to the aforesaid conductor 57. Coactable with the movable contact 75 is the stem 77a of a plunger 77 mounted for reciprocatory movement in an air chamber 78 having a passage 78a in the bottom wall thereof, said plunger 77 being biased in a downward direction by a helical spring 79. Communicating with the chamber 78 above the plunger 77 is a conduit 80 which leads to a suitable air exhausting pump 81 utilizable for moving air through the conduit in the direction of the arrow shown thereon. Connected in branching relation to the conduit 80 is a conduit 82 having a pivoted closure plate 83 disposed at the otherwise open end thereof, said pivoted closure plate 83 being biased to open position and being disposed in the area at one side of the web W between the platen 5 and the projection field.

When the hereinbefore described slack web section *w1* exists after a step of rotative movement of the platen 5, the pivoted closure plate 83 freely remains in open position. Accordingly, the pump 81 draws air from the atmosphere through the conduits 82 and 80, but little or no air is withdrawn from the chamber 78 by way of the conduit 80 connected thereto. Since a partial vacuum is not produced above the plunger 77, the contact 75 remains closed upon the contacts 76 and, when these contacts are closed, the motor 58 operates to draw the web W through the projection field 19 in the slow manner hereinbefore described. Eventually, the slack web section *w1* is taken up by operation of the motor 58 and, when this happens, the web mechanically engages the pivoted closure plate 83 to thereby close the open end of conduit 82. Thereafter, the pump 81 draws air from the chamber 78 by way of the conduit 80 and the resultant partial vacuum causes the plunger 77 to rise against the action of spring 79, the stem 77a separating the movable contact 75 from the fixed contact 76, this operation resulting in deenergization of the motor 58 whereby the web W becomes stationary in the projection field 19.

In the modified form of control arrangement of Fig. 8, the aforesaid conductor 60 is connected to a movable contact 84 coactable with a fixed contact 85 having connected thereto the conductor 57 which leads to one terminal of the electric motor 58. Coactable with the movable contact 84 is a stem 85a of a plunger 85 mounted

for reciprocatory movement in an air chamber 86 having an air passage 86a in the lower wall thereof, said plunger 85 being biased in a downward direction by a helical spring 87. Communicating with the chamber 86 is a conduit 88 which leads to a suitable air exhausting pump 89 utilizable for moving air through said conduit in the direction of the arrow shown thereon. Branching from and connected to the conduit 88 is a conduit 90 having an open port 91 disposed in the area at one side of the web W between the platen 5 and the projection field.

When the hereinbefore described slack web section *w1* exists with the arrangement of Fig. 8 after a step of rotative movement of the platen 5, the port 91 is closed by said web section *w1*. As a result, the pump 89 creates a partial vacuum in the chamber 86 and the plunger 85 rises with resultant closure of the contact 84 upon the contact 85. The motor 58 is thereby energized to draw the web W slowly through the projection field, this operation continuing until the slack web section *w1* becomes nearly taut. At this time, the web W moves from the port 91 and the latter opens. Air is now drawn from the atmosphere by way of conduits 90 and 88. Little or no air is drawn from the chamber 86 at this time, and, therefore, the plunger 85 returns to the position shown. Consequently, the motor 58 is deenergized and the web becomes stationary in the projection field.

In the modified control arrangement of Fig. 9, the above described conductors 60 and 57 are connected to the output terminals of an amplifier 94 of the type operable by a photo-electrical cell 95 which receives a beam of light from a suitable lamp 96, the beam of light being deflected by a mirror 97 and condensed by a lens 98.

The mirror 97 is mounted in the path of said light beam on a lever 99 pivoted at 100 in the area between the platen 5 and the projection field, said lever 99 being suitably biased in a counter-clockwise direction by a spring 101. Extending laterally from the lever 99 are a plurality of idler rollers 102, 103 and 104, these rollers coacting with the web W in the manner shown in Fig. 9.

When a long web section exists in the arrangement of Fig. 9 after a step of rotative movement of the platen 5, the lever 99 is in substantially the position shown. As a result, the amplifier 94 is energized and the circuit of the motor 58 is closed to thereby cause the web to be drawn through the projection field. This operation continues until the aforesaid long web section shortens to cause clockwise movement of the lever 99, Fig. 9, whereby the passage of the light beam 95 to the photo-electric cell is discontinued with consequent deenergization of the motor 58 and discontinuation of the web movement through the projection field.

The use of the herein described edged surfaces 45a and 50a is desirable because these surfaces necessarily coact with the freshly inked surface of the web and, because edged, they prevent any substantial amount of smudging. As will be understood, the edged surfaces 45a constitute a means for retarding movement of the web whereby the web section in the projection field is maintained taut and plane.

Although I have described arrangements of a particular type for drawing the web W through the projection field and for retarding the passage of said web through said projection field, it shall

be understood that the invention is not to be thus limited. Obviously, other equivalent arrangements may be utilized as desired.

Although I have shown the typing device T as positioned in a certain relation with respect to the projector P, it shall be understood that this relation may be departed from in such manner as may be found desirable and necessary. Thus, for example, this relation may be different in the sense that the platen 5 is substantially further to the left than as shown in Fig. 3.

While I have described my invention in connection with a typewriter T, it shall be understood that the invention is not to be thus limited. Thus, for example, there may be substituted for said typewriter T a Dow-Jones, Burry or other printing device, the web-ejecting mechanisms of which serve to move the web toward the herein described control member 50, or equivalent.

As stated, the cooperative contacts, such as the contacts 54 and 55, of the control mechanism may be attached to the frame 23, Figs. 1, 2 and 3, or to the condenser housing 16, Figs. 4 and 5, and it will be obvious, if desired, that one of these contacts may be attached to said frame 23 and that the other contact may be attached to said condenser housing 16.

In this specification and in the appended claims, the references to "typing", "typing device", or equivalent shall be understood as generically comprehending any equivalent thereof such, for example, as a Dow-Jones or Burry printer or the like, a telautograph, etc.

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. The method of controlling movement of a web, which comprises typing all or a part of a line of information transversely of said web, feeding the web a line space at the conclusion of the line-typing operation, and moving the typed web toward or in a projection field during the period required for typing at least a substantial part of the succeeding line of information transversely on said web.

2. The method of controlling movement of a web, which comprises typing at least a substantial part of a line of information transversely of a web section while the latter is stationary, and, while said web section remains stationary, moving another section of said web through a projection field.

3. The method of controlling movement of a web, which comprises typing at least a substantial part of a line of information transversely of a web section while the latter is stationary, feeding said web a line space at the conclusion of the line-typing operation to thereby produce slack in the web, and, under control of the slack web section, moving another section of said web through a projection field simultaneously while at least a substantial part of another line of information is being typed on said web.

4. The method of controlling movement of a web, which comprises typing at least a substantial part of a line of information transversely of a web section while the latter is stationary,

feeding said web a line space at the conclusion of the line-typing operation to thereby produce slack in the web, and, under control of the slack web section, moving another section of said web through a projection field at the same time that the web is at rest in the typing position.

5. In combination, a device for typing characters in line formation transversely of a web, means for feeding said web a line space at the conclusion of a line-typing operation, means for moving the typed web through a projection field after operation of said feeding means, and means for operating said moving means to move the typed web through said projection field during the period required for typing at least a substantial part of the succeeding line of information.

6. In combination, a device for typing characters in line formation transversely of a web, means for feeding said web a line space at the conclusion of each line-typing operation, means for drawing the typed web through a projection field after each operation of said feeding means, and means for operating said drawing means at a speed which is only fractionally as great as the speed of operation of said feeding means.

7. In combination, a device for typing characters in line formation transversely of a web, means for feeding said web a line space at the conclusion of each line-typing operation, means for drawing the typed web through a projection field after each operation of said feeding means, means for operating said last named means at slow speed to draw the typed web through said projection field, and means for operating said first named means, when feeding said web, at a speed many times as fast as the speed of said drawing means.

8. In combination, a device for typing characters in line formation transversely on one section of a web while the latter is held stationary, means for drawing another section of a web through a projection field, and means for operating said drawing means while said first named web section remains stationary at said typing device.

9. In combination, a device for typing characters in line formation transversely of one section of a web while the latter is held stationary, means for drawing another section of a web through a projection field, and means for operating said drawing means while said first named web section remains stationary at said typing device and during operation of the latter.

10. In combination, a device for typing characters in line formation transversely of a web, means for feeding said web a line space at the conclusion of each line-typing operation, means for drawing the typed web through a projection field after each operation of said feeding means, means for operating said drawing means to move the typed web through said projection field during the period required for typing at least a substantial part of the succeeding line of information, and means controlled by a section of said web for controlling said operating means.

11. In combination, a device for typing characters in line formation transversely of a web, means for feeding said web a line space at the conclusion of each line-typing operation, means for drawing the typed web through a projection field after each operation of said feeding means, means for operating said drawing means to move the typed web through said projection field during the period required for typing at least a sub-

stantial part of the succeeding line of information, and means controlled by a section of said web for controlling said operating means, said web section being disposed between said typing device and said projection field and said web section being produced by operation of said feeding means.

12. In combination, a device for typing characters transversely of a web, said device having lower and upper case positions, means for feeding the web a line space at the conclusion of each line-typing operation, means for drawing the typed web through a projection field, means for operating said drawing means upon movement of said device to upper case position provided that said feeding means had caused a slack web section to exist between said device and said projection field when said device was in lower case position.

13. In combination, a device for typing characters transversely of a web, said device having lower and upper case positions, means for feeding the web a line space at the conclusion of each line typing operation, means for drawing the typed web through a projection field, means for operating said drawing means upon movement of said device to upper case position provided that said feeding means had caused a slack web section to exist between said device and said projection field when said device was in lower case position, said operating means being ineffective upon movement of said device to upper case position provided that said feeding means had caused a taut web section to exist between said device and said projection field when said device was in lower case position.

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