July 7, 1942. A. H. BLOHM Re. 22,129

WEB FEEDING MECHANISM

Original Filed March 8, 1930 3 Sheets-Sheet 1

Fig. 1.

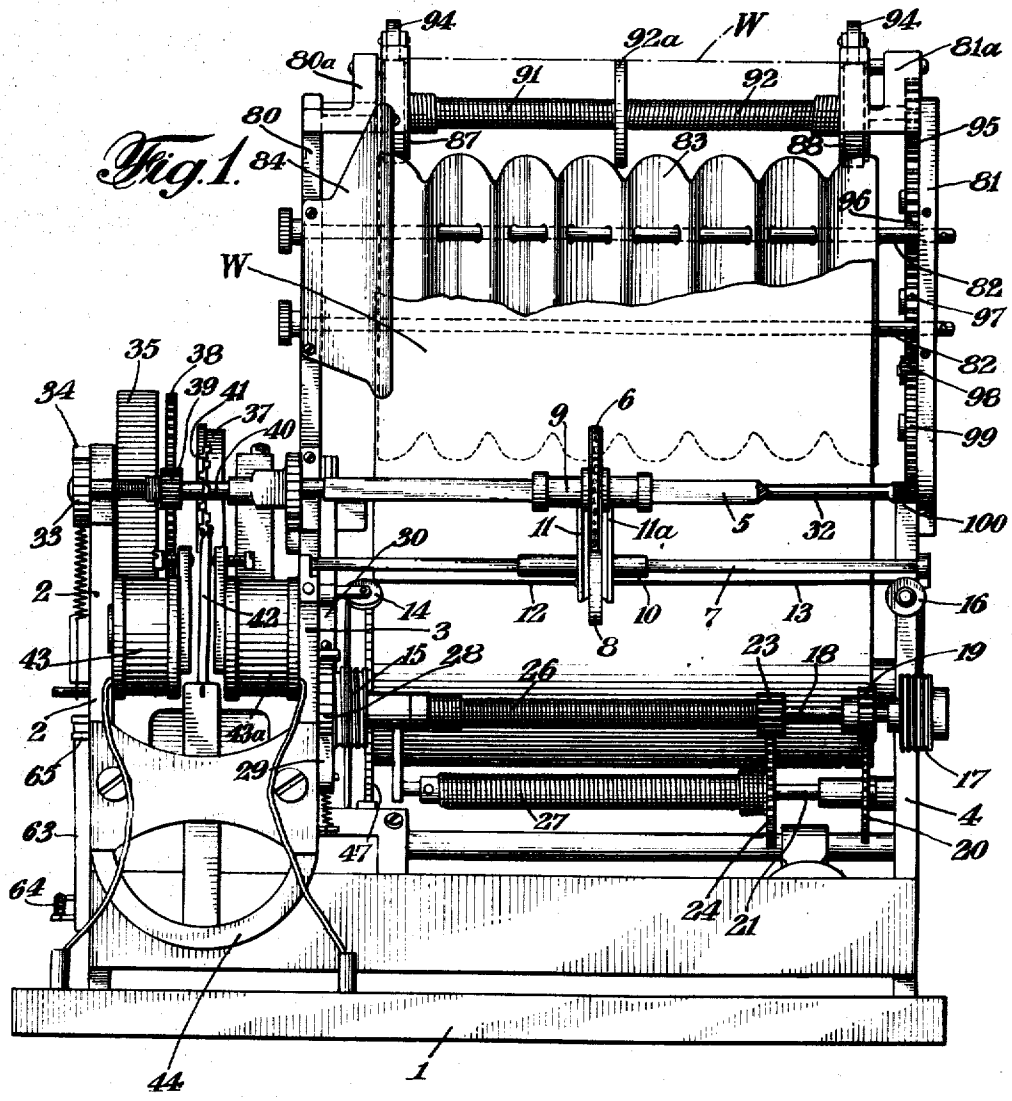
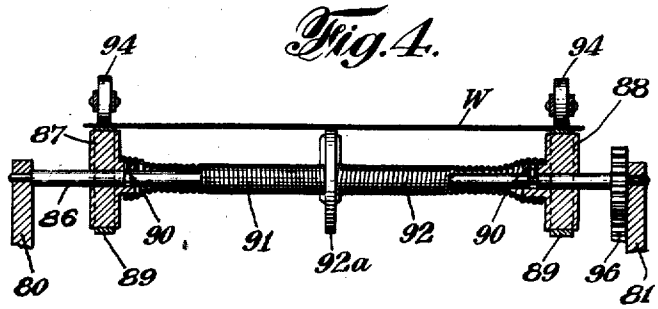


Fig. 4.



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WEB FEEDING MECHANISM

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Fig. 2.

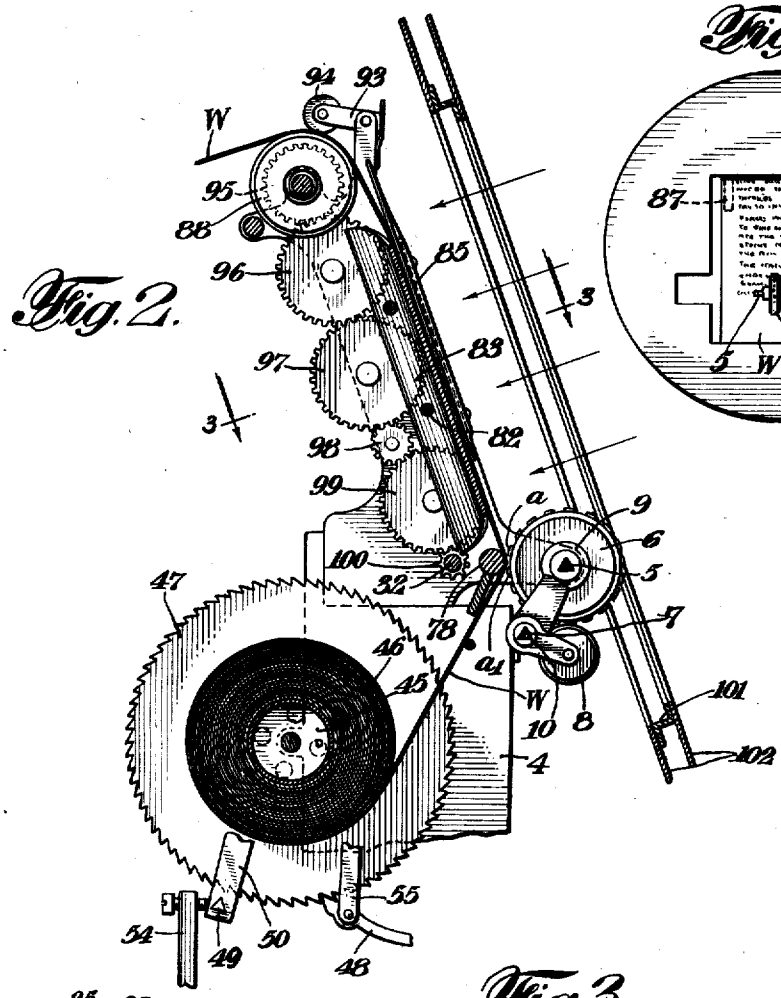

Fig. 7.

Fig. 3.

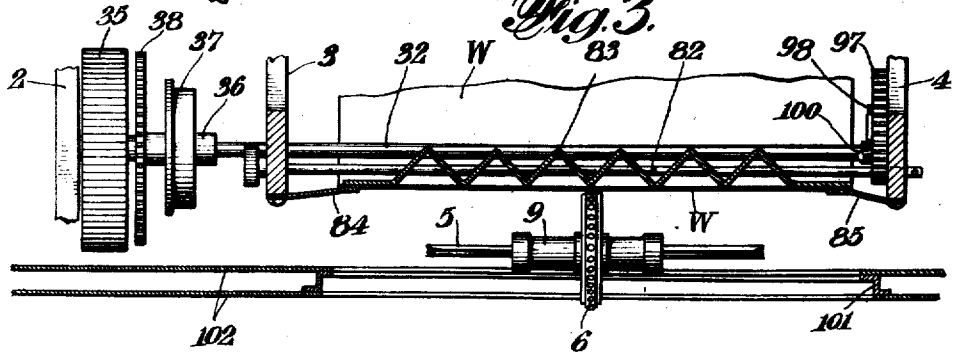

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Fig. 5.

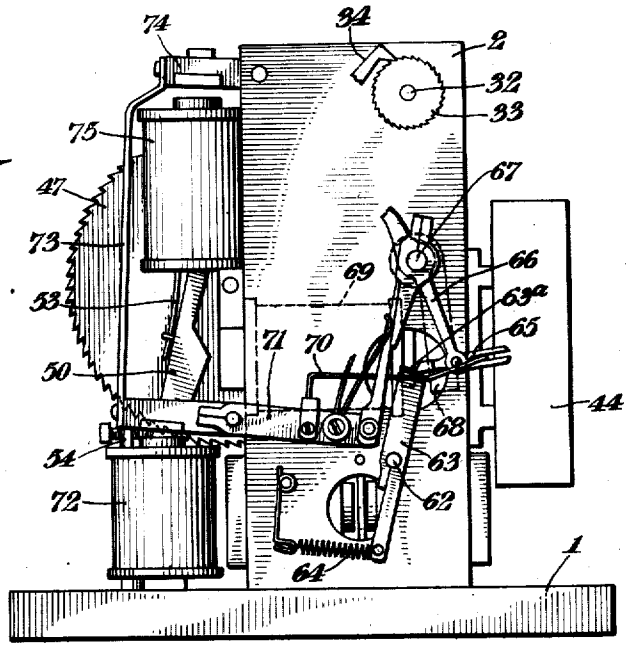
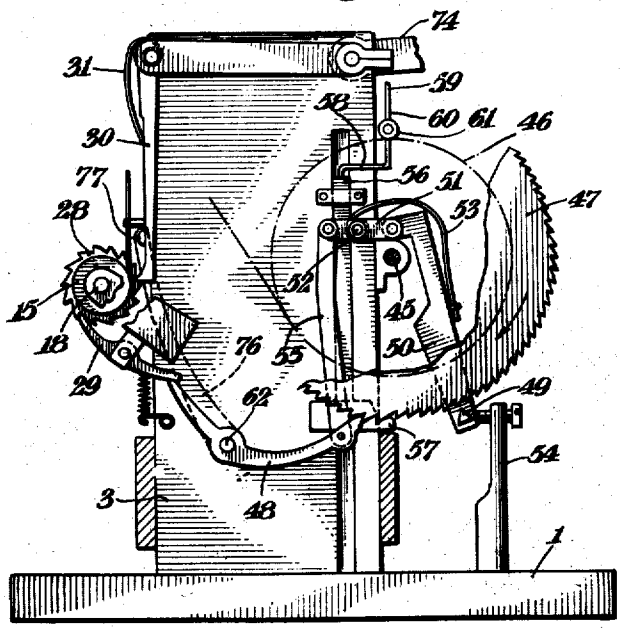


Fig. 6.



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UNITED STATES PATENT OFFICE

22,129

WEB FEEDING MECHANISM

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Original No. 2,098,940, dated November 16, 1937, Serial No. 434,272, March 8, 1930. Application for reissue September 20, 1939, Serial No. 295,808

5 Claims. (Cl. 178—24)

My invention relates to web feeding mechanism particularly such as is utilizable for feeding a character-bearing web or tape through a projection field or with respect to a picture aperture.

It is an object of the invention to provide an apparatus of this type and which will embody structurally and functionally improved features over apparatus of similar character as heretofore constructed.

It is a further object of the invention to provide a web feeding mechanism by means of which the web will be efficiently and precisely moved through the projection field and so that a satisfactory indicia-presenting image will be projected upon the screen or other surface with which the present mechanism is combined.

An additional object is that of furnishing an apparatus of this character and which will embody relatively few and rugged parts capable of being readily assembled and serviced and, when so assembled, operating over long periods of time with freedom from all difficulties.

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

Figure 1 is a front elevational view of apparatus constructed in accordance with my invention;

Fig. 2 is a vertical sectional view, partly in elevation, of a part of the apparatus shown in Fig. 1;

Fig. 3 is a horizontal sectional view, partly in plan, and is taken on the line 3—3 of Fig. 2 looking in the direction of the arrows;

Fig. 4 is a vertical sectional view, partly in elevation, of the upper part of the apparatus shown in Fig. 1;

Fig. 5 is a side elevational view of certain control mechanism;

Fig. 6 is a side elevational view, partly broken away, of other control mechanism; and

Fig. 7 is an elevational view, reduced in scale and with parts omitted, and looking in the general direction of the arrows shown in Fig. 2.

Referring to Fig. 1, 1 represents a suitable base from which the spaced plates 2, 3, and 4 extend upwardly. A shaft 5 journaled in the plates 3 and 4 carries a printing wheel 6 having characters distributed peripherally thereof. A guide member 7 carried by said plates 3 and 4 is positioned to one side of a roller 8 which receives ink from any suitable source, not shown, and transfers the same to the printing wheel 6. Rotatable with the wheel 6 is a sleeve 9 freely slidable on the shaft 5 while a second sleeve 10 is freely slidable on the guide member 7. These sleeves are connected for movement as a unit by a frame comprising the members 11 and 11a which have side-by-side extensions forming a bearing for the aforesaid roller 8, as shown in Fig. 2. The sleeve 9 forms a splined connection with the shaft 5 which is triangular whereby the wheel 6 is rotatable with said shaft while at the same time freely movable along the same in an axial direction.

Connected to opposite sides of the frame are flexible elements 12 and 13. The flexible element 12 extends into coacting relation with a pulley 14 and then to a drum 15 to which it is connected, said drum 15 having a peripherally formed spiral groove. The flexible element 13 extends into coacting relation with a pulley 16 and then to a drum 17 to which it is connected, said drum 17 also having a peripherally formed spiral groove. The spiral grooves on the drums 15 and 17 are adapted for the reception of the respective flexible elements 12 and 13 upon which they wind in opposite directions so that one winds up as the other winds off.

The drums 15 and 17 are rotatable with a shaft 18 mounted in bearings in the plates 3 and 4, said shaft 18 having rotatable therewith a pinion 19 which meshes with a gear 20 carried by a shaft 21 also mounted in bearings in the plates 3 and 4. The shaft 18 carries a pinion 23 which meshes with a gear 24 carried by the shaft 21. Springs 26 and 27 are coiled about the respective shafts 18 and 21. The arrangement of these springs is such that rotation of the shaft 18 in one direction causes the springs to be wound; said springs thereby tending to rotate the shaft 18 in the opposite direction.

The shaft 18 carries a ratchet wheel 28 with which coacts a holding pawl 29 pivoted to the plate 3, as shown in Figs. 1 and 6. An actuating pawl 30 also coacts with the ratchet wheel 28 by a spring 31 which biases said pawl 30 in a clockwise direction as viewed in Fig. 6. The pawl 30 is actuated as hereinafter described.

Rotatable in bearings in the plates 2, 3, and 4 is a drive shaft 32 carrying, exteriorly of the plate 2, a ratchet wheel 33, Fig. 5, with which a pawl 34 coacts. The shaft 32 carries a fly wheel 35 and a sleeve 36 freely rotatable thereon, the sleeve having a housing 37 and a gear 38 movable therewith. The housing 37 contains a coiled leaf spring, one end of which is connected there-

to and the other end of which is connected to the shaft **32**.

The gear **38** meshes with a gear **39** rotatable with a shaft **40** disposed between the plates **2** and **3** and in alinement with the aforesaid shaft **5** to which it is rotatably connected. Rotatable with the shaft **40** is a scape-wheel **41** with which coacts the end of an armature **42** actuatable by the coils **43**, **43***a* which are associated with the magnet **44**.

Rotatable in bearings in the plates **3** and **4** is a shaft **45** adapted to receive a cylinder upon which has been wound a web of paper or the like, the paper roll being indicated at **46** in Fig. 6 and being disposed at one side of an end plate **47** carried by the end of the shaft **45** and rotatable therewith.

The end plate **47** is notched on its periphery as shown in Fig. 6 and coactable therewith is a pivoted pawl **48** and a pawl element **49**. The latter is carried by a lever **50** pivoted on a member **51** in turn pivoted at **52** on the side plate **3**. The lever **50** is biased in a counter-clockwise direction by a spring **53**, movement in such direction being limited by a stop member **54** upstanding from the base **1**. Pivoted to that end of member **51** removed from lever **50** is one end of a link **55**, the other end of which is pivoted to the aforesaid pawl **48**.

Slidable vertically along the plate **3** is a member **56** carrying at its lower end, a member **57** which forms a stop limiting clockwise movement of the lever **50**. The member **56** is disposed beyond the end plate **47** and, at its upper end, carries a member **58** which comprises an angular section **59** extending above the paper roll **46** and terminating in a downwardly extending section **60** carrying a roller **61** coactable with said paper roll **46**.

The aforesaid pawl **48** is carried by and oscillatory with a shaft **62** journaled for movement in the plates **2** and **3**. As shown in Fig. 5, the shaft **62** extends beyond the plate **2** and there carries a lever **63** which is movable therewith and biased in a clockwise direction by a spring **64**. The lever **63** has a nose **63***a* with which is coactable a pawl **65** pivoted on the end of a lever **66** carried by and oscillatory with a shaft **67** also extending between the plates **2** and **3**, where it carries an armature **68** coactable with an electromagnet coil **69**.

The end of the aforesaid pawl **65** is bifurcated for the slidable reception of one end of a member **70** carried by the pivoted armature **71** of an electromagnet coil **72**. As shown in Fig. 5, the armature **71** is connected by a member **73** with the pivoted armature **74** of another electromagnet coil **75**.

Again referring to Fig. 6, the pawl **48**, at the end thereof removed from the plate **47**, is shown as coactable with the otherwise free end of the holding pawl **29**. Between the plates **2** and **3**, the shaft **62** carries a lever **76** which is oscillatory therewith and, at its free end, has a lateral extension **77** coactable with the actuating pawl **30**, as hereinafter described.

As illustrated in Fig. 2, the web W from the paper roll **46** passes along a path which extends closely adjacent the printing wheel **6** where it bends around a platen **78**, the web W being maintained taut as hereinafter described.

Mechanism of the type heretofore described is well known to the printing telegraph art as a Burry printer and is substantially the same as that described and illustrated in U. S. Letters patent to Burry, 680,693, August 20, 1901, to which reference may be had for a more complete disclosure of the printing mechanism and the operating mechanism therefor.

Assuming that the spring in the housing **37** is energized, the operator, in response to successive energization of the coils **43** and **43***a*, may vibrate the armature **42** to an extent permitting rotative movement of the printing wheel **6** until the character which is to be printed is either in position *a* or position a_1, Fig. 2. Rotative movement of the printing wheel **6** thus occurs because the spring in housing **37** imparts rotative movement to the gears **38**, **39**, shaft **40**, the scape-wheel **41** and shafts **40** and **5** when the armature **42** is vibrated as stated above, the number of half-cycles made by said armature **42** determining the position to be taken by the scape-wheel **41** and the printing wheel **6**.

After the character to be printed has been brought to either position *a* or a_1 as stated above, an operation is performed by suitable mechanism, not shown, whereby the printing wheel **6** is moved slightly in one direction or the other to position said character in printing position and to temporarily lock said wheel **6** in its last named position.

Thereafter, by suitable mechanism, the platen **78** is quickly moved from left to right, as Fig. 2, to press a section of the web W against that character now in printing position, the platen **78** immediately returning to the position shown in Fig. 2.

Immediately after this operation, the actuating pawl **30** is moved downwardly, to rotate the ratchet wheel **28** and shaft **18** one step in a clockwise direction as viewed in Fig. 6. As a result, the drums **15** and **17** are similarly rotated, the former paying out the flexible element **12** and the latter taking up the flexible element **13**. Accordingly, the printing wheel **6** is moved one step from left to right, as in Fig. 1, into position laterally of the web W where the next character is to be printed. In response to the aforesaid rotation of shaft **18**, the springs **26** and **27** are somewhat energized but they are ineffective to rotate the shaft **18** in reverse direction at this time due to the action of holding pawl **29** on ratchet wheel **28**.

The operation described above is repeated successively, characters on the printing wheel **6** being selected as desired to print a line or a part of a line of information. When the printing wheel **6** has reached the limit of its path of movement to the right, as in Fig. 1, or some intermediate position and it is desired to return the same to the limit of its path of movement to the left, Fig. 1, the initial position of the printing wheel **6**, the following operations are performed:

After the last letter has been printed, the circuit through the magnets **43**, **43***a* is broken and, in response to a suitable operation, the parts exteriorly of the plate **2** come to the position shown in Fig. 5. In response to energization of the magnet **69**, the armature **68** is attracted whereby the shaft **67** is rotated clockwise, to similarly move the lever **66** and to cause the pawl **65**, by engagement with the nose **63***a*, to rock the lever **63** in a counter-clockwise direction, whereby the shaft **62** is rotated in the same direction.

In response to such rotation of the shaft **62**, the lever **76** and pawl **48** are swung in a clockwise direction, as in Fig. 6, the lever **76** disengaging the actuating pawl **30** from the ratchet wheel **28** and the pawl **48** disengaging the pawl **29** from said ratchet wheel. The latter and the shaft **18** are then free to rotate in a counter-clockwise

direction, Fig. 6, which they immediately do under the influence of the springs **26** and **27**. These, during movements of the printing wheel **6** from left to right, Fig. 1, have had progressively increasing amounts of energy stored therein. Rotation of the shaft **18** as last described imparts similar rotative movement to the drums **15** and **17**, the former taking up its flexible element **12** and the latter paying out its flexible element **13**. Due to such movement of the flexible elements **12** and **13**, the printing wheel **6** is returned to the left or initial position.

As a further result of the last described rotation of shaft **62** which, as stated, swings the pawl **48** in a clockwise direction, Fig. 6, the end of said pawl **48** is removed from engagement with the teeth on the periphery of plate **47** and, through the link **55**, the member **51** is swung in a counterclockwise direction, whereby the pawl **49** of lever **50** is moved into engagement with the toothed periphery of plate **47**. The result effected by this operation will be hereinafter described.

In accordance with my invention, the web W is moved through a projection field or zone, or with respect to a picture aperture where a light beam coacts therewith to produce on a suitable screen images of the characters on that section of the web within said projection field or picture aperture. Further in accordance with my invention, suitable mechanism is provided immediately adjacent that side of the projection field or picture aperture removed from the printing wheel **6** for imparting a step of movement to the web W each time that said printing wheel returns to its initial position. Such mechanism may assume any one of a variety of forms, one only of which is herein illustrated and described for purposes of explanation of my invention.

Referring to Fig. 1, the plates **3** and **4** are shown, respectively, as having supplementary plates or members **80** and **81** secured thereto in any suitable manner and upstanding therefrom. Extending through said plates are spaced tie rods **82** supporting a web-backing plate **83** which, if desired but not necessarily, may be corrugated or undulating as illustrated. Carried by the respective plates **80** and **81** are the sheet-like members **84** and **85** which extend toward each other and are formed, preferably, of resilient material so that they are inherently biased toward the backing plate **83**.

Rotatably mounted in the aforesaid plates **80** and **81** immediately adjacent the top thereof is a shaft **86** which carries the web-feeding rollers **87** and **88** spaced a distance slightly less than the width of the web and each of which, on its outer peripheral surface, may carry a ring **89** of relatively soft material, as soft rubber or the like. As illustrated particularly in Fig. 4, the rollers **87** and **88** are so connected to the shaft **86** that they are freely rotatable thereon but incapable of movement longitudinal thereof. This result is obtained, in the example shown, by the provision of the roller-carrying pins **90** which enter peripheral slots provided respectively therefor in the shaft **86**.

Oppositely coiled on the shaft **86** are a pair of spiral spring structures **91** and **92**, adjacent ends of said spring structures **91** and **92** being suitably secured to the shaft **86** adjacent its center, as by connection to a disk **92***a* carried by and rotatable with said shaft **86**. The other end of spring structure **91** is suitably connected to the hub of roller **87** and the other end of spring structure **92** is similarly connected to the hub of roller **88**.

The plates **80** and **81** may carry, respectively, the extensions **80***a* and **81***a* which extend toward each other, each pivotally supporting an arm **93** carrying an idler roller **94**, the idler rollers **94** overlying the respective rollers **87** and **88** and being suitably biased toward the latter.

In accordance with my invention, the web W is extended immediately adjacent one side of the backing plate **83**, opposite edges of said web being disposed between said backing plate and the sheet-like members **84** and **85**, Fig. 3. Beyond the backing plate **83**, the web W extends over the feed rollers **87** and **88** and is firmly held in engagement therewith by the biased idler rollers **94** shown in Figs. 2 and 4.

As shown in Figs. 1, 2, and 4, the shaft **86**, adjacent the plate **81**, carries a gear **95** which meshes with the end gear **96** of a gear train comprising the gears **97**, **98**, and **99**, said gears **96**, **97**, **98**, and **99** being suitably mounted for free rotatable movement on the plate **81**. The gear **99** meshes with a pinion **100** secured to and rotatable with the drive shaft **32**.

During operation of the printing mechanism, the pawl **34**, Fig. 5, intermittently operates the ratchet wheel **33** whereby the shaft **32** partakes of similar rotative movement. Due to such movement of the shaft **32**, the spring in the housing **37** is also wound. Due also to such movement of the shaft **32**, the gear train comprising the gears **100**, **99**, **98**, **97**, **96**, and **95** are actuated to intermittently rotate the shaft **86**. The shaft **32**, or equivalent thereof, is a source of power by which rotation of the printing wheel **6** and movement of the web W is effected.

In accordance with my invention, the web W is extended through the projection zone or field as shown particularly in Fig. 2, the idler rollers **94** clamping adjacent sections of the web against the feed rollers **87** and **88**. In this position, the web remains stationary while the printing wheel **6** starts from its initial position at the left, Fig. 1, and moves to the right to print all or a part of a line of characters. At this time, also, the roll of paper **45** is maintained stationary due to coaction of the pawl **48** with the plate **47** as shown in Fig. 6.

As the printing wheel **6** moves further and further to the right, as in Fig. 1, the shaft **32** is rotated, due to the above described action of pawl **34**, and, due to the gear train, the shaft **86** is also rotated. However, movement of the feed rollers **87** and **88** does not occur at this time because movement of the paper roll **45** is prevented as just stated and, therefore, the web W remains stationary. Since the web is stationary, the feed rollers **87** and **88** also remain stationary since they are clamped to said web by the idler rollers **94**.

Therefore, the shaft **86** rotates while the feed rollers **87** and **88** remain stationary and, as a result, the springs **91** and **92** are wound. Eventually, when the shaft **62** is actuated, to cause the printing wheel **6** to return to its initial position, the pawl **48** is disengaged from the plate **47** all as hereinbefore described. The roll of paper **45** is now freed from restraint and, accordingly, the springs **91** and **92** become effective to rotate the feed rollers **87** and **88** whereby the web is moved by said feed rollers **87** and **88** through the projection field or zone, and with respect to and by the printing wheel **6**.

Such movement of the web W may be limited in any suitable manner. As shown, although not necessarily, the pawl **49** moves into engagement

with the plate **47** at the time of disengagement therefrom of the pawl **48**. Accordingly when the paper roll **46** and the plate **47** move in a clockwise direction, Fig. 6, under the influence of the feed rollers **87** and **88**, the pawl **49** and lever **50** move therewith, the latter soon coming into contact with the member **57** and discontinuing movement of the paper roll **46** and the web W, the latter now being in its next projecting position.

The member **57** is adjustable vertically under the influence of roller **61** to position said member **57** in different vertical positions in accordance with the diameter of the paper roll **46**. As a result, the spacing between adjacent lines of printed matter on the web is rendered independent of the diameter of the paper roll.

After the action described above has been accomplished, the magnet **69** is released whereby the shaft **62** rotates counter-clockwise, as in Fig. 6, and the parts come into the normal position shown and the next line of information may be printed on the web W.

As shown particularly in Figs. 2 and 7, the web W is moved through the projection field or zone by apparatus constructed and arranged in accordance with my invention. While in such zone, light or a light beam coacts substantially with a section of the web W which may be defined or framed by an aperture **101** of a plate structure **102**. This as disclosed in my copending application Ser. No. 434,273, filed March 8, 1930 may be the wall of a lamp housing, images of the characters on said web section being projected onto a suitable screen.

As illustrated, the web-feeding mechanism, i. e. the rollers **87** and **88**, in the example shown, (although this arrangement may be varied as desired) are positioned at the side of the projection zone opposite the printing wheel **6** which, as shown but by no means necessarily, is positioned within said zone. But one device or mechanism, namely, the rollers **87** and **88**, in the example shown, is utilized for moving or feeding the web W through the projection zone, and with respect to and by the printing wheel **6**. This web feeding mechanism, as herein illustrated and described, is under the control of the operator and is intermittently operated by control of the same mechanism that returns the printing wheel **6** to its initial position. Such control of the web W is highly desirable and, to a marked extent, is more advantageous than arrangements of the prior art wherein a plurality of independent devices are utilized for feeding the web, one of said devices ejecting the web from the printing mechanism and the other of said devices moving the web through the projection zone.

Although my invention has been illustrated and described in connection with a projection system of the "reflecting" character, it shall be understood that the invention is not to be so limited since, as well, it is applicable to projection systems of the "through" type wherein the light beam passes from the source of light through the web and then to the eyes of the audience.

It shall be understood that the arrangement herein illustrated for imparting movement to the web is one only of many suitable arrangements which may be utilized and that my invention, particularly as regards the herein described gear train is not to be limited to the disclosed arrangement.

Still further, it shall be understood that my invention is not to be limited to printing mechanisms of the type herein illustrated, i. e., a Burry printer since certain broad and important features of my invention are applicable to other types of printing mechanisms such, for example, as those known to the art as Dow-Jones printers.

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

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

1. In a bulletin printing apparatus, a telegraph printer adapted to print transversely of a web, a web take-up mechanism, a panel extending between said printer and take-up mechanism and means for maintaining said web continuously in contact with said panel as it passes from the printer to the take-up mechanism.

2. In a bulletin printing apparatus, a telegraph printer adapted to print transversely of a web, a panel extending upwardly from said printer and separately driven take-up means acting at opposite margins of the web to draw the same upwardly across the panel and for applying a continuous tension thereto in order to maintain the web in contact with the panel.

3. In a bulletin printing apparatus, a telegraph printer adapted to print transversely of a web, a panel extending upwardly from said printer and separately driven take-up means acting at opposite margins of the web to draw the same upwardly across the panel and for applying a continuous tension thereto in order to maintain the web in contact with the panel, said take-up means being resilient whereby the web is rendered yieldable during the printing stroke.

4. In a bulletin printing apparatus, a telegraph printer adapted to print transversely of a web, a platen for said printer across which the web passes, a panel extending upwardly from said printer and separately driven take-up means acting at opposite margins of the web to draw the same upwardly across the panel and to apply a continuous tension thereto in order to maintain the web in contact with the panel, said take-up means, platen, and the surface of the panel being disposed substantially in line.

5. In a bulletin printing apparatus, a telegraph printer adapted to print transversely of a web, a platen for said printer across which the web passes, a panel extending upwardly from said printer, take-up means for drawing the web upwardly across the panel, said take-up means, the platen and the surface of the panel being disposed substantially in line.

AUGUST H. BLOHM.