

Aug. 27, 1940.

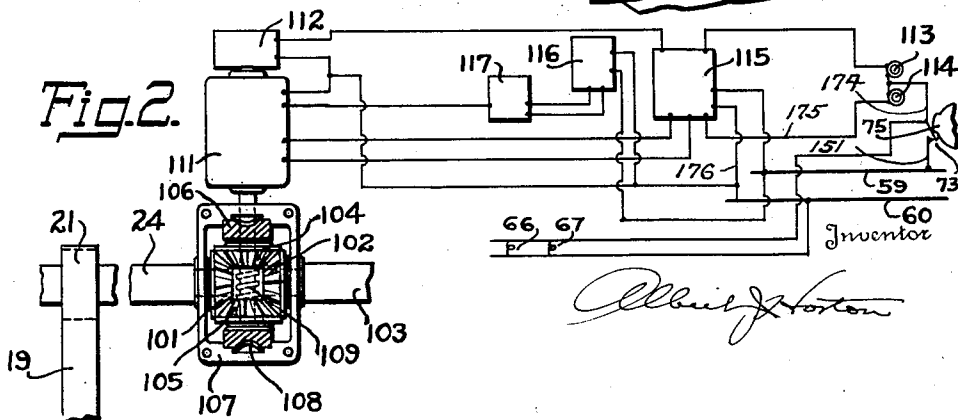
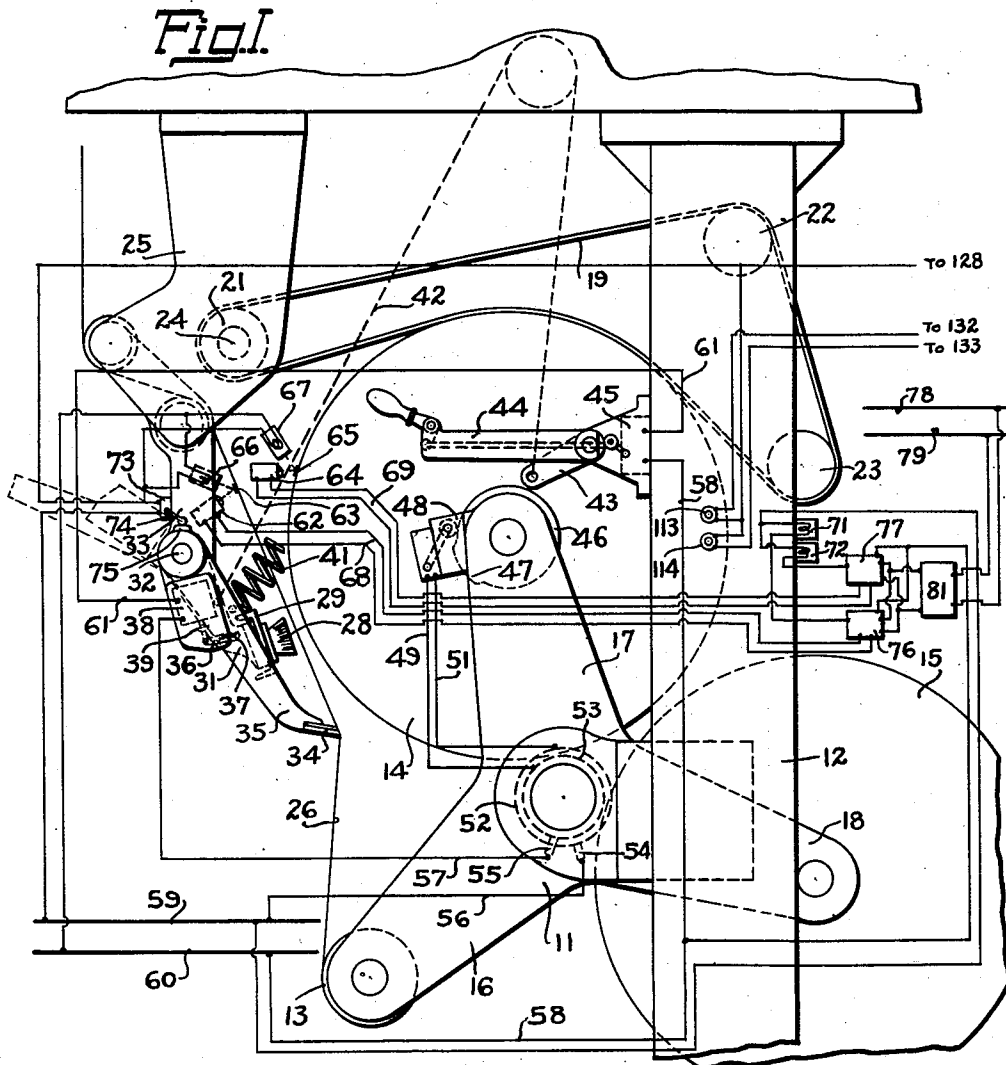
A. J. HORTON

2,212,812

MEANS FOR FEEDING WEBS FROM PRINTED ROLLS

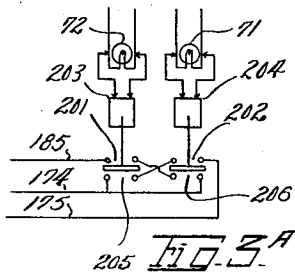
Filed Dec. 31, 1935

3 Sheets-Sheet 1



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Alfred Horton

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Fig. 4.

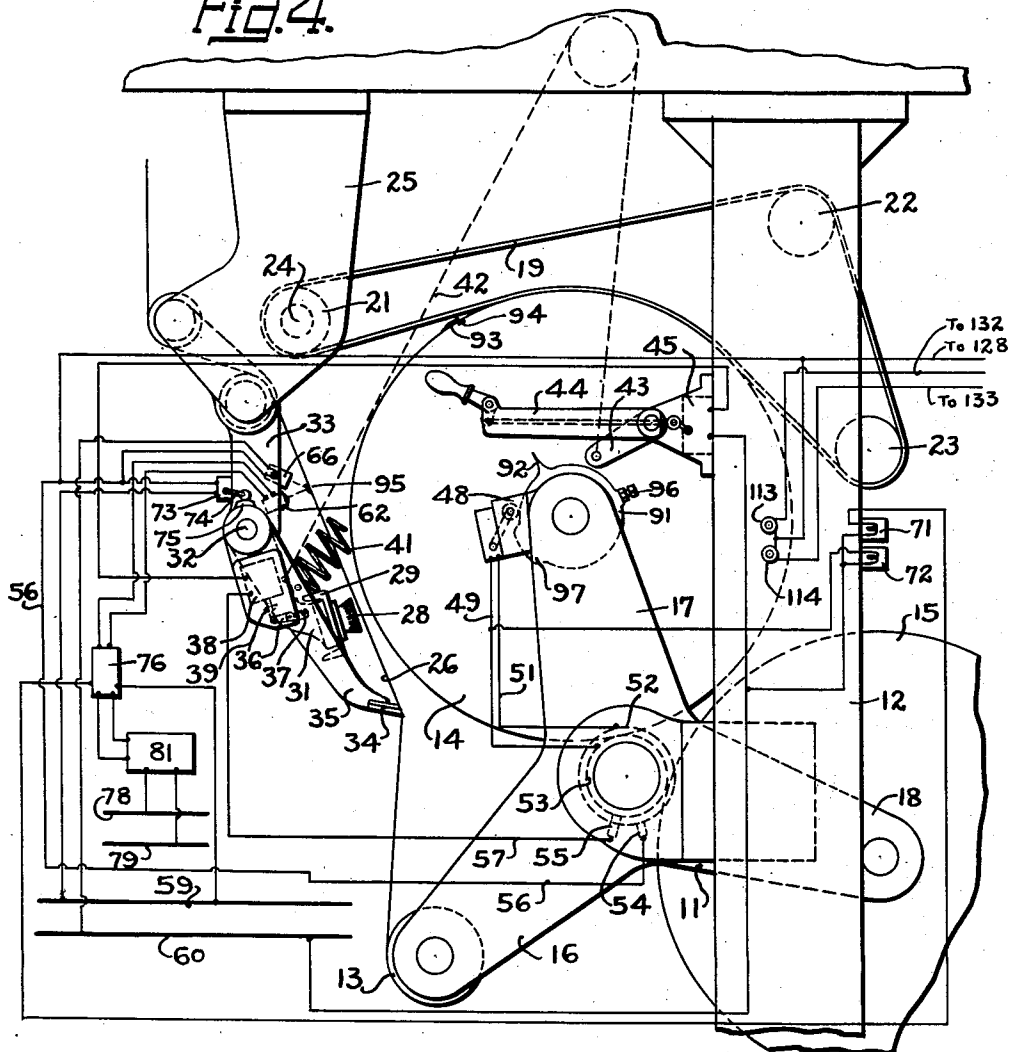
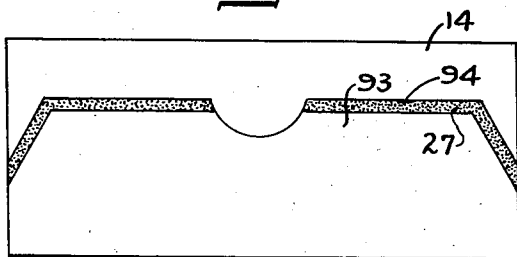


Fig. 5.



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UNITED STATES PATENT OFFICE

2,212,812

MEANS FOR FEEDING WEBS FROM PRINTED ROLLS

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Application December 31, 1935, Serial No. 56,857

22 Claims. (Cl. 242—58)

This invention relates to printing machines and more particularly to a web roll supply mechanism for use with a printing machine, to which a previously printed web is fed, and it is desired to replace an expiring web roll with a replacement roll without decelerating the machine. The chief application of this device is in connection with multi-unit web printing machines printing newspapers, or like products wherein it is desired to insert a previously printed web, that may be in color, (which necessarily is printed at slower speed), in assembly with the product, or products, being printed by the machine. The means for controlling the feed of the printed web so as to associate it with the webs being printed, in proper relation thereto, may be accomplished by the use of known mechanism.

It is particularly desirable that the printed impressions on the web of the replacement roll are in register with those on the running web of the expiring web roll at the time a join is made between the webs. This invention contemplates the provision of means in combination with the web joining mechanism of a printing machine whereby the above results will be obtained, and which is operable to move one web relatively to the other to bring the printed impressions thereon into register before a join is made.

The principal object of this invention is to provide means in a printing machine to join the previously printed web of a replacement roll and a running web together with the printed impressions thereof in register.

Another object is to provide means in a web supply mechanism to insure that the printed impressions on the web of a replacement roll are in register with the printed impressions on a running web before the web join mechanism is operated to join the same.

Still another object is to provide means for indicating that the printed impressions on the web of a replacement roll are in register with the printed impressions on a running web, and that, therefore, a web join may be completed by the operator of the machine.

A further object is to provide mechanism for compensating for variations in the register of printed impressions on the web of a replacement roll and on a running web, before the same are joined together, to bring the same into register.

It is also an object of this invention to provide a web roll supply mechanism of generally improved construction, whereby the device will be simple, durable and inexpensive in construction,

as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a view of an improved web supply mechanism for a printing machine and embodying the features of this invention, and wherein means is provided to indicate the register of the impressions on the webs whereby they may be joined together with the same substantially in register;

Figure 2 is a view of a mechanism, somewhat diagrammatically illustrated, embodying the features of this invention, whereby variations in the register of printed impressions on the web of the replacement roll and on the running web may be compensated for;

Figure 3 is a diagram of the electrical circuits and controls for the mechanism shown in Figure 2;

Figure 3A is a diagram of the electrical circuits and controls for an automatic operation of part of the mechanism;

Figure 4 is a view of a somewhat modified form of mechanism for indicating that the printed impressions on the webs are in register; and

Figure 5 is a view of a web replacement roll prepared to have its web joined to another web according to the arrangement shown in Figure 4.

The web supply mechanism selected to illustrate the features of this invention, is one particularly adapted for use with high speed types of printing machines, and includes web joining mechanism especially designed for joining the web of a replacement web roll to the running web of an expiring web roll without interfering with the operation. Parts of the web supply mechanism shown in Figures 1 and 4 are substantially identical and the same reference characters will be used for like parts to facilitate the description thereof.

A reel 11 is provided which is rotatably mounted to a frame part 12 of the machine. The reel may be rotated by power means (not shown) or otherwise, as desired, to position the web rolls, consisting of an expiring web roll 13, a replacement web roll 14, and another roll 15, supported on reel arms 16, 17, and 18 respectively, in web joining position, as shown. A belt 19, 55

reeved over a plurality of pulleys 21, 22, and 23, and adapted to engage the replacement web roll 14, is driven by rotating pulley 21 through its shaft 24, which is in driving connection with the drive of the machine, as will be hereinafter described, and is journaled in brackets 25, supported from a frame part of the machine. The belt 19, by engagement with the roll 14, when the same is moved into such position by rotation of the reel 11, brings the speed of the roll substantially into synchronism with the speed of the machine, and with the speed of the running web 26, leading from the expiring web roll 13. Preferably the belt 19 is driven at such speed as to impose a slight drag on the roll 14.

The web joining mechanism, herein illustrated, is adapted to press the running web 26 against the web of the replacement web roll 14 to cause and adhesive covered area 27 (Figure 5), on the web of the roll 14, to adhere thereto and then to sever the web 26 as soon as the join is made. The web pressing or deflecting member may be in the form of a brush 28, secured to a bar 29, extending between a pair of arms 31 pivoted at 32 to an extension 33, of the bracket 25. The web severing member may be a retractable knife, mounted in a holder 34, extending between arms 35, which are also pivoted to the extension 33 at 32. The arms 31 and 35 are held together by a catch 36, pivoted to the arm 35 and engaging a pin 37 on the arm 31. The catch 36 is released from such engagement by energization of a solenoid 38, mounted on the arm 35. Energization of the solenoid 38 actuates a plunger 39 secured to the catch 36 to rock the same. A spring 41 secured to the arm 35 biases the connected arms 31 and 35 into the web engaging position as shown. A cable 42, connected at one end to the arm 31 is provided, whereby the web deflector brush 28 may be pulled against the web 26 to deflect the same against the roll 14, when the arm 31 is released from the arm 35 by actuation of the catch 36. The other end of the cable 42 is connected to a lever arm 43 which is rocked by a manipulating lever 44. Associated with the lever 44 is a circuit closing switch 45, which may be operated to close a circuit when it is desired to make a web join.

A cam 46 is provided and secured upon a spindle supporting the roll 14. The cam 46 has a cam surface 47 thereon adapted to engage the switch arm of a circuit closing switch 48, mounted on the reel arm 17. This cam is arranged on the roll shaft, and the cam surface 47 thereof is adapted to time the operation of closing the switch 48, to insure that the adhesive covered area 27 on the web of the replacement roll 14 has passed the web deflecting brush 28 before the switch 48 is so operated. Conductors 49 and 51 from the switch 48 are respectively connected to rings 52 and 53, mounted to rotate with the reel 11. Collector brushes 54 and 55 electrically connect conductors 56 and 57 respectively to the rings 52 and 53. The conductor 56 is connected to a main power supply wire 59 and the conductor 57 is connected to the solenoid 38. The other power supply wire 60 is connected by a conductor 58 to a terminal of the switch 45, the other terminal of which is connected to the solenoid 38 by a conductor 61. The catch 36 is operated to release the brush 28 due to the energization of the solenoid 38 when the switch 45 is closed by manual operation of the lever 44, and the switch 48 is closed by the action of the cam surface 47 on the switch arm, whereby a web join may be

made between the web 26 and the web of the replacement roll 14.

It is thought that the disclosure in the drawings and the foregoing description of the arrangement for timing the release of the pasting brush with respect to the rotation of the roll is sufficient for a full understanding of their operation as applied to the present invention, but a more detailed description of these parts and their operation will be found in the specification of Patent No. 2,182,760, granted December 5, 1939.

In the patent specification referred to, means are shown for selectively connecting the several switches 48 into circuit as the reel is rotated, and also the mechanism and method of operation of the severing device 34 which severs a web after the web join is made.

The means for indicating to the operator that the printed impressions on the web of the replacement web roll 14 are substantially in register with similar printed impressions on the web 26 of the expiring web roll 13 in accordance with the form shown in Figure 1, comprises a photo-cell or electric eye 62 mounted to focus upon a printed or otherwise applied mark 63, disposed upon the web 26 at a predetermined point in relation to the printed impression thereon, and a photo-cell or electric eye 64 mounted to focus upon a similar mark 65 disposed upon the web of the replacement web roll 14 at a point corresponding to the position of the mark 63 on the web 26, in relation to the printed impression thereon. A beam of light from each of lamps 66 and 67, respectively associated with the eyes 62 and 64, cause the latter to close circuits 68 and 69 respectively, when the respective marks 63 and 65 are in position to effect the eyes 62 and 64 either by interruption of the reflection of the beam of light, or due to the reflection of the same, depending upon the preferred arrangement desired. Closing of either circuit 68 or 69 will energize, and thereby light, either of a pair of indicating lamps 71 and 72 respectively. The lamps 71 and 72 are disposed in a position conveniently visible to the operator, who is positioned to readily operate the web joining mechanism by actuation of the lever 44.

Referring to the circuit diagram shown, in connection with the mechanism illustrated in Figure 1, and diagrammatically in Figure 3, the lamps 66 and 67 are herein shown energized by connection through a switch 73 with the power circuit wires 59 and 60. The switch 73 is provided with an operating lever 74 which is arranged to be actuated by a cam 75 disposed on the arm 35, to close the circuit, when the arm 35 is moved into the web pre-joining position as shown, to illuminate the marks 63 and 65. Each of the photo-cells 62 and 64 is operably connected through suitable relays disposed in casings 76 and 77 respectively to cause illumination of the lamps 71 and 72 whenever the respective photo-cell is influenced by the passing of a mark past the beam of light from the respective lamps 66 and 67.

Where required, a separate source of power may be supplied to the photo-cell circuit from power wires 78 and 79 through a transformer 81. The lamps 71 and 72 receive their energizing electrical current in this instance from the power supply wires 59 and 60 through time delay relays 82 and 83 in the casings 76 and 77 respectively, and which are operated by the actuation of relays 84 and 85 respectively by the photo-cells 62 and 63. Whenever the conditions are such that the lamps 71 and 72 flash in unison, thus indi-

ating that the register marks are in register, the operator by manual actuation of the switch 45 closes the circuit of the solenoid 38 to release the catch 36, permitting operation of the brush 28 by the lever 44 to deflect the web 26 against the roll 14 and cause the joining of its web, with web 26.

In the form shown in Figure 4, the cam 91 corresponding in most respects with the previously described cam 46, is rotatably adjustable with respect to the roll 14 and is provided with an indicating pointer 92. In this instance, the roll 14 is prepared by forming the web end 93 and applying the adhesive covered area 27 thereon at an indicating mark 94 corresponding to an indicating mark 95 on the web 26. The indicating pointer 92 on the cam 91 is adjusted to align with the mark 94 and is fastened in this position by means of a set screw 96, whereby the cam surface 97, operable to actuate the switch 48, is in proper timed relation thereto to close the circuit controlled thereby.

In this form of the invention, the conductor 56 leading from the collector brush 54 is connected to the switch 73, through which, when the arm 35 is swung down into the web pre-join position, as shown, the collector brush 54, the switch 48, and the lamp 72 are connected to the power supply wire 59. By this arrangement, the switch 48 and the lamp 72 may be energized only when the arm 35 is in web pre-join position, as shown, at which time the switch 73 is closed.

In this instance, the photo-cell 62 and its associated lamp 66, focus upon the mark 95 and operate the relays in the casing 76 to illuminate lamp 71 as in the previously described manner. The lamp 72, however, is illuminated by being in circuit with the switch 48 so that every revolution of the roll 14 will, through the instrumentality of the cam surface 97, and when the arm 35 is in web pre-join position, flash the lamp 72, thus indicating the passing of the mark 94 and the web end 93, past the brush 28, and in timed relation to the movement of the web 26, to insure register of the respective marks 94 and 95. As in the previous form, simultaneous flashing of the lamps 71 and 72 will indicate to the operator that the marks 94 and 95 are in register and that the web joining mechanism can now be operated as above described to join the webs.

In association with the above forms of web joining mechanisms, a compensating mechanism is provided whereby non-register of the indicating marks may be corrected by a relative movement of one web in respect to the other, herein accomplished by decelerating or accelerating the rotative speed of the roll 14. The compensating mechanism herein shown in Figure 2, is associated with the shaft 24 of the belt pulley 21 and is disposed between it and the drive from the machine. The shaft 24 has a bevel gear 101 secured upon its end and a bevel gear 102 is secured to the end of a shaft 103 connected to a driven member of the machine. A pair of gears 104 and 105 are rotatably mounted within a rotatable ring 106 which in turn is rotatively mounted in a casing 107 enclosing the gears 101 and 102 and in which they are journaled. The ring 106 has worm-wheel teeth 108 formed upon its periphery, with which mesh the teeth of a worm 109 secured to the shaft of a reversible electric motor 111.

The motor 111 may be provided with an electrically operated brake 112, which is of known form and operates upon the armature shaft of

the motor to normally hold it against rotation and, through it, to normally prevent rotation of the worm-wheel 108 and worm 109, thereby insuring uniform drive of the shaft 24 by the shaft 103 under normal operating conditions. The release of the brake 112, by means hereinafter described, will permit the motor 111 to effect the rotation of the roll 14.

A pair of push button switches 113 and 114 are provided and disposed convenient to the operator. The push buttons 113 and 114 are connected with the power wire 59 through the switch 73 controlled by the cam 75 on the arm 35, and then to suitable controls disposed in a box 115, to energize the same, and other controls disposed in boxes 116 and 117, to release the brake 112 and selectively energize the motor 111 to cause it to rotate as desired.

During normal machine operation, the motor 111 is not running, being held in stopped position by the brake 112. The belt 19 is normally driven, through the above described gearing from the machine, at a speed slightly less than the running web 26, to impose a slight drag on the roll 14. When preparing to join the web of a pre-printed replacement web roll to the running web 26, it is first necessary to cause the speed of rotation of the roll 14 to be in synchronism with the speed of the running web 26. This is accomplished in the following manner by the use of the motor 111.

The arm 35 is swung into web pre-join position, thus closing the switch 73 which, by a conductor 151 (see Figure 3), is connected to the power supply wire 59. From the switch 73, through conductors 152 and 153 leading to the coil 128 and from the coil 128, by way of a conductor 154, and then through the switches 129 and 131, controlled by the coils 132 and 133 respectively, and a conductor 155 from the switch 131, the circuit is completed to the other power supply wire 60, to energize the coil 128. The energization of the coil 128 actuates switches or contactors, which are in the motor circuit, to cause the motor 111 to run at the proper speed and direction, to drive the belt 19, and by it, the roll 14, in synchronism with the running web 26.

The motor circuit above mentioned includes, a field rheostat 118, the arm of which is connected to the power supply wire 60 by a conductor 156, and the resistance coil of which is, by a conductor 157, field coil 158, and a conductor 159, connected to the other power supply wire 59, through conductor 151. The rheostat arm is also connected by a conductor 151 to a terminal of a switch 127, the other terminal of which is in connection with the conductor 157 by a conductor 162. By this arrangement, the resistance coil of the rheostat 118 is short circuited by the closing of the switch 127, by energization of the coil 128, to provide a full field for the motor 111.

The armature of the motor 111 is energized by a conductor 163 leading from the power supply wire 60 through a switch 126, closed by energization of the coil 128, through a conductor 164, a resistance 119, a conductor 165 and a conductor 166 connected to one brush thereof. From the other armature brush, the circuit continues through a conductor 167 to a switch 125, closed by energization of the coil 128, and from which a conductor 168 leads to the other power supply wire 59. An armature shunting resistance 120 is connected by the conductor 165 to one side of the armature, the other side of the armature, through conductor 167, being connected to a

switch 124, closed by energization of the coil 128, from which a conductor 169 connects to the resistance 120. The coil 128 also actuates a switch 123, which is connected to the power wire 60 by a conductor 171, and from which a conductor 172 leads to the release coil of the brake 122. From the brake release coil, a conductor 173 leads to the other power wire 59. The motor 111 is now operating to drive the belt 19 at proper speed and in the proper direction to rotate the roll 14 in synchronism with the speed of the running web 26.

First assuming that the marks 63 and 65 are not in register, but as indicated by the flashing of the lamp 71 and before the flashing of the lamp 72, the mark 63 on the web 26 is running ahead of the mark 65 on the roll 14. It is therefore necessary to speed up the roll 14 to register the marks before the web join can be made. This is accomplished by closing the push button 114, one contact of which is connected to the switch 73 by a conductor 174 and through it, by the conductor 151, is connected to the power wire 59. The other contact of the push button 114 is connected by a conductor 175 to one terminal of a switch controlling coil 133, the other terminal of which is connected by a conductor 176 to the power wire 60.

Energization of coil 33 will open switch 131, causing the de-energization of the coil 128 by opening the circuit thereof, and will close a switch 177, one contact of which, by a conductor 178, is connected to power wire 60, and the other contact of which, by a conductor 179 and the conductor 172, is connected to the release coil of the brake 122. De-energization of the coil 128 also opens the switch 127, removing the short circuit of the field rheostat 118 and placing the resistance thereof in circuit with the motor field; opens the switch 125, removing power from the armature through conductor 167; opens the switch 124, removing the effect of the armature shunting resistance 120; and opens the switch 126, removing power from the armature through conductors 163, 164, and 165. The motor 111, however, will continue to run, but at a faster speed, due to the closing of the coil 133. Increase in speed of the motor 111 will, through the differential gearing in box 107, increase the speed of belt 19 and through it, the speed of the roll 14.

As above pointed out, the motor field rheostat 118 is placed in circuit to control the field of motor 111 by the opening of the switch 127. The armature circuit now consists of the conductors 176 leading from power wire 60 to one contact of a switch 135, the other contact of which is connected to one side of the armature by a conductor 181 and conductor 166. The other side of the armature is connected by a conductor 182 to one contact of a switch 183, the other contact of which is connected to the power wire 59 by a conductor 184 and conductor 173.

Should the register mark 63 be running behind the mark 65, the push button switch 113 is closed, whereby the rotation of the motor 111 is reversed to reduce the speed of the belt 19 through the differential gearing in box 107 as above described. Decrease in the speed of the belt 19 will decrease the speed of roll 14. The reversal of rotation of the motor 111 is accomplished when the push button switch 113 is closed, by reversing the current through the motor armature in the following manner. One contact of the switch 113 is connected to the power wire 59 through the conductor 151, switch 73, and the conductors 152 and

174. The other contact of the switch 113 is connected by a conductor 185 to one terminal of the switch controlling coil 132, the other terminal of which is connected by the conductor 176 to the power wire 60. By closing of switch 113, the coil 132 is energized to actuate the switches controlled thereby.

Energization of the coil 132 opens the switch 129, whereby the coil 128 is de-energized, thereby opening switches 123, 127, 125, 124, and 126, causing the opening of the respective circuits controlled thereby. A switch 186 has one contact connected to the power wire 60 by a conductor 187. The other contact of switch 186 is connected by a conductor 188 and the conductor 172 to the release coil of the brake 122, which through the conductor 173 is connected to the power wire 59. The coil 132, when energized, closes the switch 186 and also a switch 134, one contact of which is connected by a conductor 187 to the power wire 60, the other contact being connected by the conductor 182 to one side of the armature of the motor 111. The other side of the armature is connected by the conductors 166 and 181 to one contact of a switch 191, the other contact of which is connected to the power wire 59 by a conductor 192.

The release of either push button 113 or 114, after the register mark 65 on the roll 14 has been brought into register with the register mark 63 on the web 26, as indicated by the simultaneous flashing of the lamps 71 and 72, will cause deenergization of the respective solenoid 132 or 133, closing the respective switch 129 or 131 and cutting in the controls in box 116, whereby the motor 111 will again assume its normal running speed and the roll will be driven in synchronism with the web 26, permitting the web join to be made while the respective marks are in register. After the web join is completed, the arm 35 is moved upwardly away from its web joining position, to the position indicated in dotted lines in Figure 1, whereby the cam 75 releases the lever 74 and the switch 73 is opened to de-energize the solenoid 128, and therefore the brake 112, and the motor 111 is immediately stopped by the brake, and maintained thereby, against rotation. The opening of the switch 73 also de-energizes lamps 66 and 67.

While the means provided for indicating the register of impression is illustrated herein as being in a separate electrical circuit from the controls of the motor 111 and the latter is illustrated as being manually controlled by push buttons 113 and 114, it is believed obvious that those skilled in the electrical art, by the use of known devices and controls could connect these circuits to cause automatic operation of the motor 111 to accelerate or decelerate the same when such operation is required. Such known devices may be contained in a casing 141 into which the terminal leads corresponding to those of the lamps 71 and 72 and of the push buttons 113 and 114 could be directed for proper connection with the known electrical devices therein as shown in dotted lines in Figure 3.

A diagram of electrical circuits and controls possible to install in the casing 141 for use in carrying out the above purpose is shown in Figure 3A and are well known by those skilled in the art. Switches 201 and 202 corresponding to the push button switches 113 and 114 respectively, are provided for actuation by solenoids 203 and 204 respectively when the latter are energized. The solenoids 203 and 204 are respec-

tively connected in parallel with the lamps 72 and 71 so as to be energized therewith. The closing of either switch 201 or 202 will effect operation of the motor 111 as above explained in respect to the push buttons 113 and 114. Each of the circuits in which the respective switches 201 and 202 are disposed is controlled by one or the other of normally closed switches 205 and 206, which are also actuated by the solenoid 203 and 204 respectively. The arrangement is such that when either of the switches 201 or 202 is closed by energization of the proper solenoid, the motor 111 operates to rotate in the direction desired, but, when both are closed, due to the simultaneous energization of the solenoids upon register of the printed impressions, the motor 111 will remain inoperative, as the circuit to both motor control switches 201 and 202 is opened by the opening of the control switches 205 and 206.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, and it will be further understood that each and every novel feature and combination present in or possessed by the mechanism herein disclosed forms a part of the invention included in this application.

What I claim is:

1. In a web supply mechanism for a machine adapted to operate upon a web, the combination of web joining mechanism adapted to be actuated to join the webs of a rotating replacement roll and of a rotating expiring web roll supported by said supply mechanism, both of said webs having printed impressions thereon, and means to vary the relative speed of said rolls to compensate for variations in register of the corresponding printed impressions on the web of the replacement roll and the web running from the expiring web roll, said means being controlled by actuation of said web joining mechanism.

2. In a web supply mechanism for a machine operating upon a web, means to rotatably support a replacement web roll adjacent a running web, means to rotate the roll on said supporting means, including means to vary the speed thereof to effect register of a mark on the web of the replacement roll with a corresponding mark on the running web to be joined thereto, means to control said speed varying means and to join the webs, and means affected by the relative disposition of the marks on the webs to indicate the condition of register thereof.

3. In a machine adapted to operate upon a web, mechanism for joining a previously printed running web to a previously printed web of a replacement web roll and to insure register of corresponding impressions thereon, including means to rotate the web roll to move the web thereon at the surface speed of the running web, means to vary the relative surface speed of the webs, means affected by the relative position of corresponding printed impressions on the webs to indicate the condition of register thereof, and means to control the actuation of said web joining mechanism.

4. In a machine adapted to operate upon a web, mechanism for joining a previously printed running web to a previously printed web of a replacement web roll and to insure register of corresponding impressions thereon, including means

to rotate the web roll to move the web thereon at the surface speed of the running web, means to vary the relative surface speed of the webs, and means affected by the relative position of corresponding impressions on the webs to indicate the condition of register thereof.

5. In a machine adapted to operate upon a web, mechanism for joining a previously printed running web to a previously printed web of a rotating replacement web roll, means to lineally move one web relatively to the other to register corresponding impressions thereon, a position detecting means associated with the running web, a position detecting means associated with the web of the replacement web roll, and means actuated by each of said position detecting means to indicate the relative position of the impressions on said webs.

6. In a machine adapted to operate upon a web, in combination, a mechanism for joining a previously printed running web to a previously printed web of a rotating replacement web roll, and means to insure register of corresponding impressions thereon, including a position detecting means associated with the running web, a position detecting means associated with the web of the replacement web roll, means to vary the relative movement between the webs to register corresponding impressions thereon, means actuated by each of said position detecting means to indicate the relative position of the impressions on said webs, and means actuated by said web joining mechanism to control said movement varying means.

7. In a machine adapted to operate upon a web, in combination, a mechanism for joining a previously printed running web to a previously printed web of a rotating replacement web roll, means to insure register of corresponding impressions thereon, including a position detecting means associated with the running web, a position detecting means associated with the web of the replacement web roll, means to vary the relative movement between the webs to register corresponding impressions thereon, means actuated by each of said position detecting means to indicate the relative position of the impressions on said webs, and common means actuated by said web joining mechanism to control said detecting means and said movement varying means.

8. In combination with a web joining mechanism, means to operate said mechanism to join a previously printed running web with a previously printed web of a rotating replacement web roll, elements operably affected by corresponding marks on the printed webs as they pass thereby, means simultaneously actuated by said elements when the printed impressions on the webs are in register, and means acting upon one of the webs to effect register of the marks on the webs.

9. In combination with a web joining mechanism, means to support a replacement web roll, means to rotate the roll on said support, means to relatively move a running web and the replacement web roll toward each other and into engagement, means to vary the speed of rotation of the roll on said support, and means actuated by said web and roll relative moving means to control the operation of said speed varying means.

10. In combination, a member adapted to support a rotating web roll adjacent a running web, means to control indicating means and which is affected by the passing thereby of corresponding

marks respectively disposed on the web of the supported roll and on the running web, and adapted to be actuated simultaneously when the aforesaid marks are in register, and means for moving one of the webs relatively to the other to compensate for non-register of the marks thereon.

11. In combination, a member adapted to support a rotating web roll adjacent a running web, means to control indicating means and which is affected by the passing thereby of corresponding marks respectively disposed on the roll and on the web, and adapted to be actuated simultaneously when the marks are in register, means to rotate the web roll at a peripheral speed substantially equal to the speed of the running web, and means to actuate said web roll rotating means to accelerate or retard the speed of the roll to register the aforesaid marks.

12. In a web supply mechanism, means to rotate a web roll disposed adjacent a running web, means adapted to be actuated to vary the relative lineal speed of the running web in respect to the peripheral speed of the roll, corresponding marks on the web and on the roll, means associated with the web and with the roll and affected by the passing of the marks thereon, means actuated by said mark affected means to indicate the passing of the marks thereby, and means to actuate said speed varying means to effect register of said marks.

13. In a web supply mechanism, means to rotate a web roll disposed adjacent a running web, means adapted to be actuated to vary the relative lineal speed of the running web in respect to the peripheral speed of the roll, mechanism to join the web on the roll to the running web movable from an inoperative position to an operative one, corresponding marks on the web and on the roll, means associated respectively with the web and with the roll and affected by the passing of the marks thereon, means actuated by said affected means to indicate the passing of the marks thereby, means to actuate said speed varying means to effect register of said marks, and interlocking means affected by movement of said web joining mechanism to prevent operation of the speed varying means when the web joining mechanism is in inoperative position.

14. In a web supply mechanism for a machine adapted to operate upon a web, the combination of web joining mechanism adapted to be actuated to join the web of a rotating replacement web roll having printed impressions thereon with the web running from an expiring web roll having printed impressions thereon, said rolls being supported by said supply mechanism, means for visibly indicating the relative position of the printed impressions on the webs, and means to actuate said indicating means.

15. In a web supply mechanism for a machine adapted to operate upon pre-printed webs, the combination of web joining mechanism adapted to be actuated to join webs of a rotating replacement roll and of a rotating expiring web roll supported by said supply mechanism, both of said webs having printed impressions thereon, means to visibly indicate the relative position of the printed impressions on the webs, means to actuate said indicating means, and means to vary the relative speed of said rolls to compensate for variations in register of the impressions, to permit correction therein before the web join is made.

16. In a web supply mechanism for a machine

adapted to operate upon a web and supporting a rotatable replacement web roll and a rotatable expiring web roll, each roll having printed impressions thereon, the combination of operable web joining mechanism, visible indicating means, means to actuate said indicating means to cause it to indicate the relative position of the printed impressions on the webs, and means to lineally move the webs relatively to each other to compensate for the variations in register of the impressions thereon as indicated and to bring them into register before said web joining mechanism is operated.

17. In a web supply mechanism for a machine operating upon a web, a support for web rolls, means to rotate a replacement web roll on said support, web joining mechanism, means to vary the speed of said web roll rotating means to register a mark on the web of the roll with a corresponding mark on a running web to which it is to be joined, and common means to control the operation of said web joining mechanism and the actuation of said speed varying means.

18. In combination with a web joining mechanism having a web deflecting element, means to actuate said element to deflect a running web having marks thereon against a similarly marked web of a replacement web roll, means to indicate the relative disposition of the marks on the webs, and means affected by the marks on the webs to actuate said indicating means.

19. In combination with a web joining mechanism having a web deflecting element, means to actuate said element to deflect a running web having marks thereon against a similarly marked web of a replacement web roll, means to indicate the relative disposition of the marks on the webs, means affected by the marks on the webs to actuate said indicating means, and means to lineally move one web relatively to the other to cause the marks to register.

20. In a web supply mechanism for a machine operating upon a web, means to rotatably support a web roll, means to rotate the roll on said supporting means, including means to vary the speed of rotation thereof to effect register of a mark on the web of the roll with a corresponding mark on a running web to be joined thereto, means to indicate the position of the mark on one web relatively to the mark on the other, means affected by the marks on the webs to simultaneously actuate said indicating means when the marks are in register, and means to join the webs.

21. In a roll changing mechanism for a machine adapted to operate on a previously printed web drawn from a web roll, and having means to rotatably support a replacement web roll having register imprints thereon, and a running roll from which a web also having register imprints thereon is led adjacent to the replacement roll and thence to the machine, means to accelerate the replacement roll to substantially the speed of the running web and to effect a change in the speed of the replacement roll relative to the running web, to bring a register imprint on the web of the replacement roll opposite a register imprint on the running web, photo-electric devices positioned with respect to the running web and the replacement web roll and actuated by passage of the register imprints, and means operable to press the webs together, whereby they may be joined with their register imprints juxtaposed.

22. In a roll changing mechanism for a machine adapted to operate on a previously printed

web drawn from a web roll, and having means to rotatably support a replacement web roll having register imprints thereon, and a running roll from which a web also having register imprints thereon is led adjacent to the replacement roll and thence to the machine, means to accelerate the replacement roll to substantially the speed of the running web and to effect a change in the speed of the replacement roll relative to the running web, to bring a register imprint on the web

of the replacement roll opposite a register imprint on the running web, a photo-electric device positioned with respect to the running web and actuated by passage of register imprints thereon, a timing switch operated in synchronism with the movement of a register imprint on the replacement roll, and means operable to press the webs together, whereby they may be joined with their register imprints juxtaposed.

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