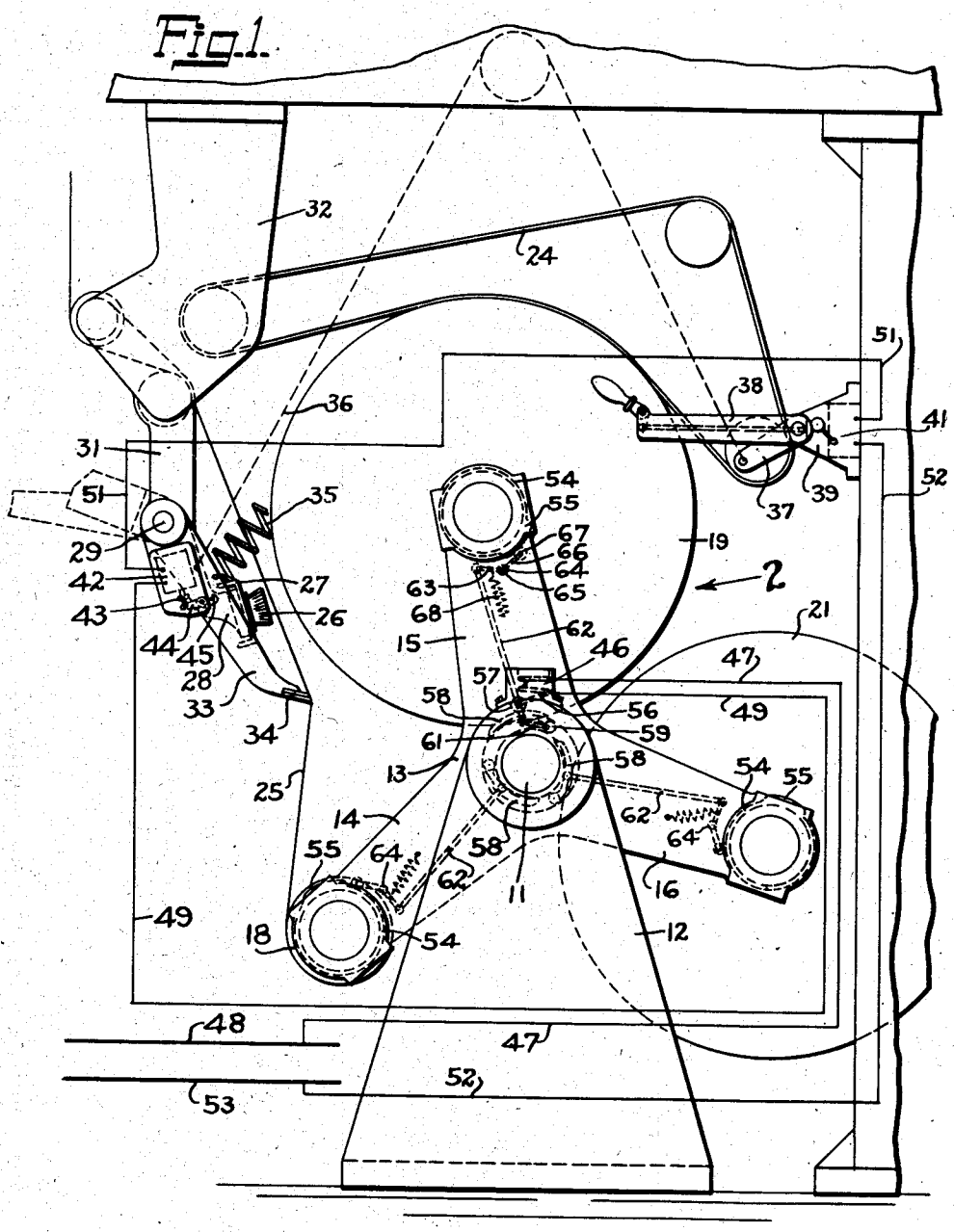
Dec. 20, 1938. A. J. HORTON 2,140,528

WEB SUPPLY MECHANISM FOR PRINTING MACHINES

Filed Dec. 27, 1935 3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

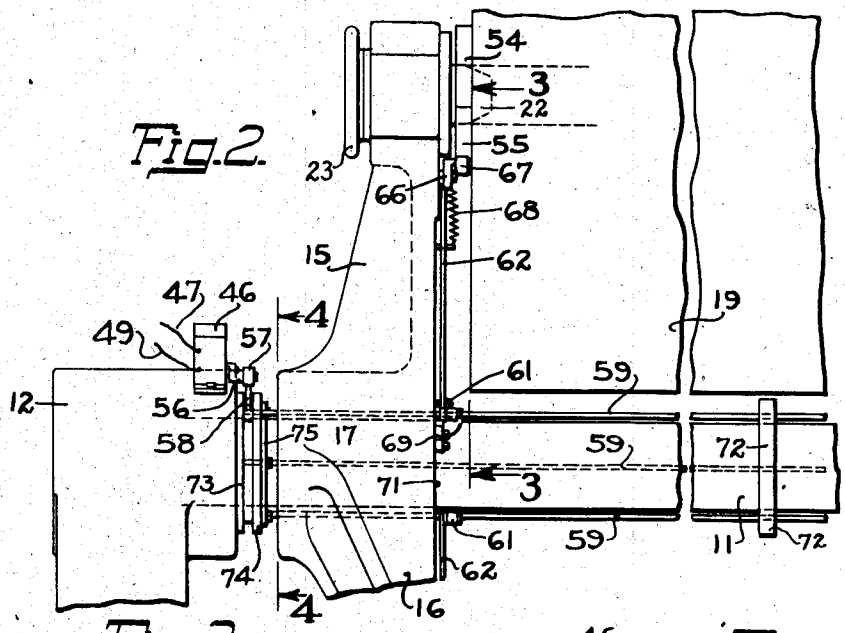


Fig. 3.

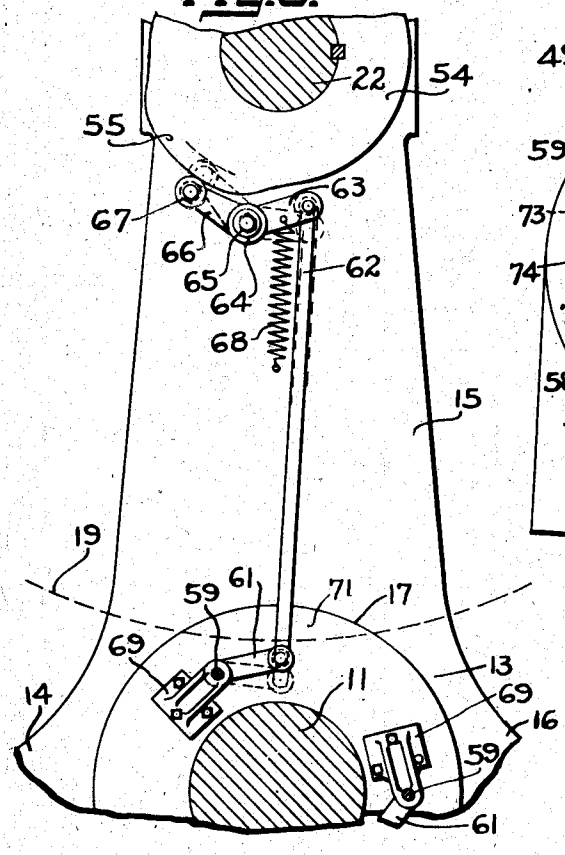
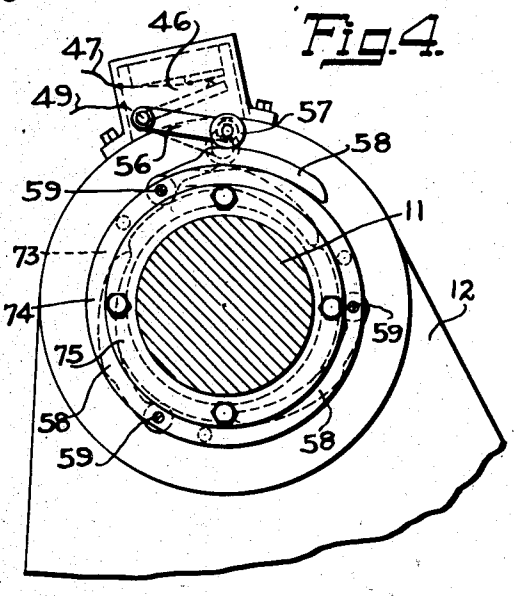


Fig. 4.



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WEB SUPPLY MECHANISM FOR PRINTING MACHINES

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Fig. 5.

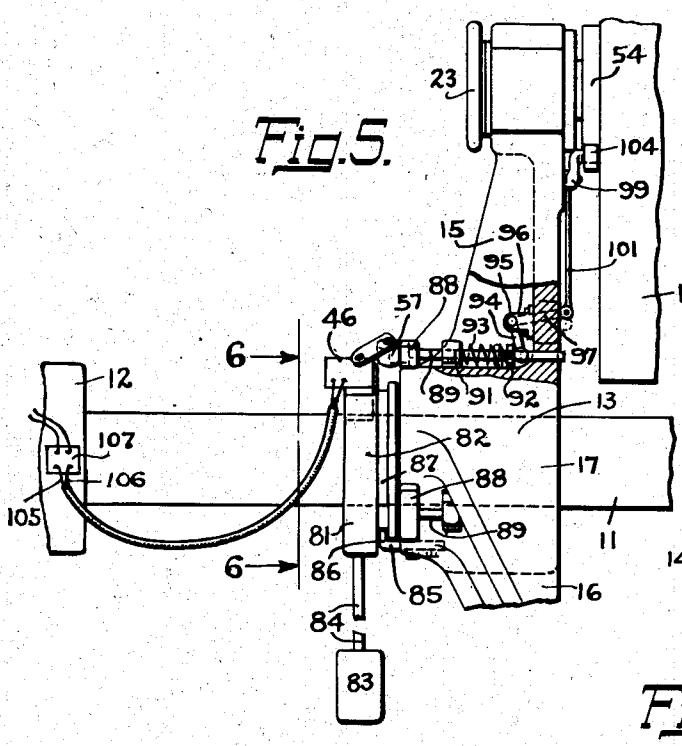


Fig. 6.

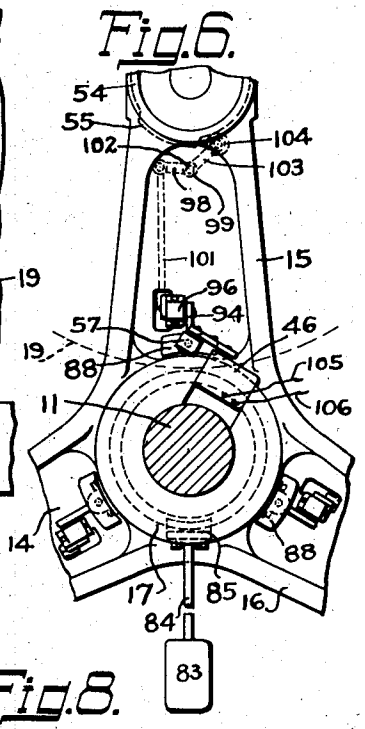


Fig. 7.

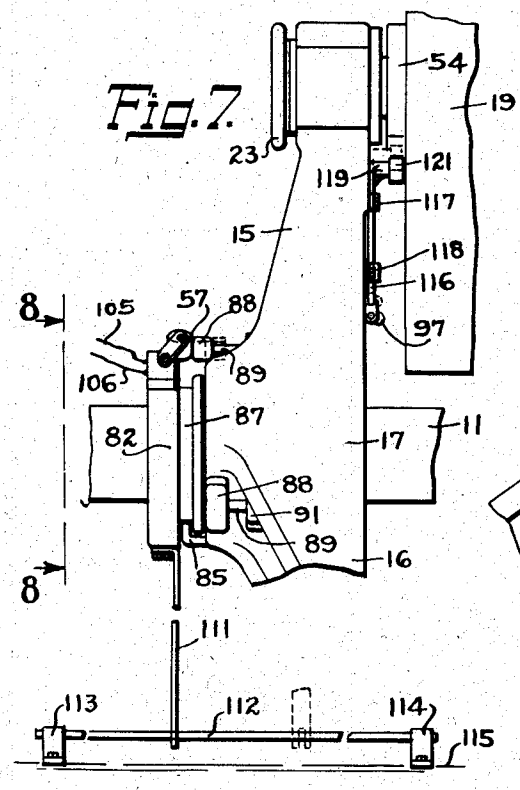
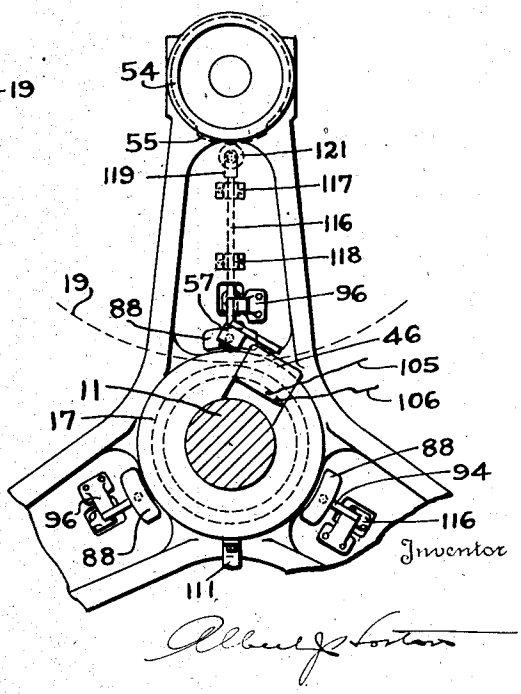


Fig. 8.



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Patented Dec. 20, 1938 2,140,528

UNITED STATES PATENT OFFICE

2,140,528

WEB SUPPLY MECHANISM FOR PRINTING MACHINES

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Application December 27, 1935, Serial No. 56,302

18 Claims. (Cl. 242—58)

This invention relates to machines adapted to operate upon a web and more particularly to an improved web roll supply mechanism, for use with such machines. The invention is chiefly applicable to printing machines in connection with high speed web joining mechanism, and provides an efficient timing device for use with such mechanism whereby the operation thereof will be accurately timed to properly join a web running from an expiring web roll to the end of the web on a replacement web roll.

The invention contemplates as its principal object the provision of a timing device, controlled by the rotation of a cam associated with the replacement web roll to rotate therewith, and which actuates an electrical circuit to control the operation of the web joining mechanism in a new and efficient manner, and which has a minimum number of parts in its structure.

Another object is to provide a timing mechanism which is operated mechanically and which may be readily applied to roll supply mechanisms of existing machines operating upon a web, with which an electrically operated one could not be readily adapted.

Still another object is to provide in the structure, of such a timing mechanism, means to permit axial movement of the web roll supporting means and to permit the use of web rolls of other than full length in axial dimension, without interfering with the timing action thereof.

A further object is to provide a timing mechanism which includes only one electrical switch, which is mounted on a stationary part of the machine, and mechanically operable means on each arm of a web roll supporting reel to actuate the switch when the supported roll is in web joining position, whereby the use of a plurality of movable switches and conductors is avoided.

It is also an object of this invention to provide an improved 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 an end view of a web roll supply mechanism embodying the features of this invention;

Figure 2 is a broken view of the mechanism shown in Figure 1, looking in the direction of arrow 2 thereof;

Figure 3 is an enlarged end view of a part of the timing mechanism of this invention, looking in the direction of arrows 3—3 in Figure 2;

Figure 4 is an enlarged end view of another part of the timing mechanism, looking in the direction of arrows 4—4 of Figure 2;

Figure 5 is a broken side view of a modified form of timing mechanism;

Figure 6 is a view looking in the direction of arrows 6—6 of Figure 5;

Figure 7 is a broken side view of another modification of the timing mechanism; and

Figure 8 is a view looking in the direction of arrows 8—8 of Figure 7.

The features of this invention are illustrated in the drawings applied to a web roll supply mechanism adapted for use with printing machines. The web roll supply mechanism herein shown includes in its structure a high speed web joining mechanism whereby the webs, of a replacement web roll and of an expiring web roll may be joined together without interfering with the operation of the machine. Referring to Figure 1, the mechanism illustrated is adapted to support a plurality of web rolls upon a shaft 11, which is journaled at each of its ends in standards or supports 12, an end view of one of which is shown in Figure 1. The shaft 11 is a arranged to be rotated by suitable mechanism (not shown) to position the respective web rolls in desired positions.

A web roll supporting reel 13 comprising a pair of axially spaced apart members or spiders, is mounted upon the shaft 11 for rotation therewith, while being axially slidable thereon when desired. The reel 13 is arranged upon the shaft 11 between the standards 12. Herein each spider of the reel 13 is provided with three radially extending arms 14, 15 and 16 equally spaced apart peripherally about its hub portion 17. An expiring web roll 18 is shown rotatably supported by the reel 13 between the opposing arms 14 thereof, a replacement web roll 19 between the arms 15, and a spare web roll 21 between the arms 16. The various rolls may be mounted upon the arms for free rotation about their axes by means of a spindle end 22, which may be withdrawn by a handwheel 23 to facilitate mounting of the roll thereon. A belt 24 driven from an operating part of the machine drivingly engages the replacement

roll 19 to bring it up to the speed of the web 25 before its web is joined thereto.

Suitable web joining mechanism is provided for deflecting the running web 25 of the expiring web roll 18 against the web of the replacement roll 19, to press it against a previously prepared adhesive covered area upon the end of the web of roll 19, and for severing the expiring web 25 after a join is made. The means for deflecting the web 25 may be in the form of a brush 26 mounted on a bar 27 secured to arms 28, pivoted at 29, to an extension 31, of a bracket 32, which is secured to a convenient machine part. One of the arms 28 is releasably connected to one of another pair of arms 33 between which is supported a holder 34, in which a retractable web severing knife may be mounted. A spring 35 is provided and connected to an arm 33 to act upon the connected arms to maintain them in web engaging position, as shown. A cable 36 is provided and connected to the arm 28 to swing the brush 26 against the web 25 to deflect the same into contact with the web end on the roll 19. The arms 28 and 33, when not in use, may be swung out of the way into a position as shown in dotted lines in Figure 1.

The cable 36 is connected to an arm 37, swingable with a lever 38 mounted to a bracket 39 secured to a convenient machine frame part. The lever 38, in its swinging movement, is adapted through the cable 36 to pull the arm 28 to deflect the web 25, as above described. Means is provided in association with the lever 38, to adapt it, when moved, to manipulate an electrical circuit closing switch 41. An electrically operated solenoid 42, in circuit with the switch 41, when energized, actuates its plunger 43 to swing a catch 44, pivoted to the arm 33, to disengage it from a pin 45, secured to the arm 28, thereby releasing the arm 28 from the arm 33 to permit it to swing to deflect the web 25.

It is necessary that the web deflector or brush 26 be held by the catch 44 against web deflecting operation by the lever 38, until the adhesive covered area of the web end on the roll 19 is in proper position relatively to the brush for such operation. This is accomplished herein by the timing mechanism of this invention. A circuit closing switch 46 is mounted upon a stationary support or standard 12 and is electrically connected into the circuit containing the switch 41 and the solenoid 42. Herein, the electrical circuit comprises a conductor 47 leading from a main power cable 48 to a terminal of the switch 46, a conductor 49 leading from the other terminal thereof to a terminal of the solenoid 42. From the other terminal of the solenoid 42, a conductor 51 leads to a terminal of the switch 41, from the other terminal of which a conductor 52 leads to the other main power cable 53.

The switch 46 is herein shown in Figures 1–4 inclusive, adapted to be actuated by a system of cams and levers mounted on each of the arms 14, 15 and 16, each system being controlled by a cam 54, mounted to rotate with the respective roll on each arm, and positioned relative to the web end thereof, to control the actuation of the switch 46 in the desired manner above referred to. Each of the cams 54 is provided with a cam surface 55. The switch 46 is provided with an operating lever 56 having a roller 57 upon its outer end which is disposed in the path of, and for actuation by a camming finger 58, one finger being provided in association with each of the arms 14, 15 and 16.

The camming fingers 58 are each secured to a rotatable rod or shaft 59, to which is secured a lever arm 61, the free end of which is connected by a link bar 62, to a lever arm 63, of a bell crank 64, pivoted at 65, to the respective reel arm 14, 15 or 16. The other arm 66 of the bell crank 64 is provided with a roller 67, adapted to engage the surface of the cam 54 and be actuated by the cam surface 55 thereof to swing the bell crank 64 and, through the bar 62, and the lever arm 61 to rock the rod 59 and swing the finger 58 into position to actuate the switch 46. A spring 68 is provided to act upon the bell crank 64 to maintain the roller 67 in contact with the surface of the cam 54. By provision of the above described mechanism the switch 46 may be actuated by whichever cam 54 is with its supporting roll, and reel arm, in the web joining position as shown in respect to the roll 19, but when in either of the other positions, as shown in respect to the rolls 18 and 21, the camming fingers 58 are not in position to effect the actuation of the switch 46.

Provision is herein made to adapt the timing mechanism for use when web rolls, other than of full length, are mounted on the reel 13, and to permit axial adjustment of the reel. The rods or shafts 59 are secured at one end thereof to the camming fingers 58 and are extended through the lever arms 61, while being connected thereto for rocking movement thereby. The lever arms 61 are each secured against axial movement relatively to the reel 13 by being retained between the arms of a bifurcated bracket 69, secured to the inner face 71 of the hub 17 of the reel 13. The rods 59 are extended beyond the arms 61 along reel shaft 11 and are supported at their remote ends by passing through and being axially slidable in a collar 72, which is secured to the shaft 11.

The camming fingers 58 with the rods 59 are maintained against axial movement by the fingers 58 being disposed between the flange of a sleeve-like bracket 73, and a collar 74 which is supported upon the sleeve bracket 73 for rotation thereon with the shaft 11 and rods 59, the rods 59 passing through openings adjacent the periphery of the collar 74. The collar 74 is secured against axial movement in respect to the sleeve 73 by means of a plate 75 secured to the end face of the sleeve 73, which sleeve is secured to the standard 12.

Due to the above described structure, the rods or shafts 59 and the camming fingers 58 rotate with the shaft 11, but are secured against axial movement therewith, while permitting axial movement of the shaft 11 to align the webs of the respective rolls with the machine parts operating thereon and to permit the use of other than full length rolls without interfering with the operation of the timing device in its control of the web joining mechanism.

In the form of timing mechanism illustrated in Figures 5 and 6, the switch 46 is mounted upon a flange 81 of a sleeve 82, which is supported upon the shaft 11. The sleeve 82 is retained against rotative movement with the shaft 11 by the action of gravity on a weight 83, secured to the sleeve by a rod 84. The sleeve 82 is secured to the reel 13 for movement therewith along the shaft 11 by a member 85 secured to the hub 17 of the reel 13 and which has a portion 86 thereof disposed in a groove 87 extending peripherally about the sleeve 82. The switch 46 is so mounted that it will remain constantly in stationary position in respect to the rotative movement of the reel 13 and of the web rolls 18, 19 and 21 and

to properly position its operating roller 57 into the path of slidable switch actuating members 88, one of which is mounted upon the hub 17 of the reel 13 adjacent the base of each arm 14, 15 and 16 thereof.

The switch actuating members 88 are each provided with a stem 89, which extends along the hub 17 of the reel 13, being supported by a bracket 91 secured to the hub and by passing through an opening in the respective arm. A collar 92 is secured to each stem 89 to act as an abutment for a spring 93, positioned about the stem in abutment with the bracket 91, to constantly urge the member 88 out of switch actuating position. In engagement with the collar 92 is an arm 94 of a bell crank 95, pivoted to a bracket 96, which is secured to the respective reel arm. The other arm 97 of this bell crank extends through an opening in the reel arm and is connected to an arm 98 of another bell crank 99 by a link 101. The bell crank 99 is pivoted at 102 to the respective reel arm and is provided with an arm 103 having a roller 104 thereon, in engagement with the surface of the cam 54 for operation, by the cam surface 55 thereof, to actuate the switch 46 through the instrumentality of the slidable member 88, the spring 93 acting to constantly maintain the roller 104 in contact with the cam 54.

The switch 46 may be electrically connected into the circuit of the solenoid 42 through flexible conductors 105 and 106 and a connector block 107 mounted on the reel support or standard 12.

The form shown in Figures 7 and 8 differs from that shown in Figure 5 in that the sleeve 82 is retained against rotative movement with the shaft 11 by a bar 111 extending downwardly therefrom into engagement with a rod 112 secured by brackets 113 and 114 to the floor, or to a base member 115 of the machine. In this form, the arm 97 of the bell crank 95 is connected to one end of a bar 116 slidably mounted to the respective reel arm in brackets 117 and 118. The slidable bar 116 at its other end is connected to a holder 119 on which is mounted a roller 121. The roller 121 by being constantly maintained in contact with the cam 54 by action of the spring 93, is effected by the cam surface 55, to act through the bar 116 and bell crank 95, to move the member 88 into position to actuate the switch 46 by the lever 56 through roller 57.

By the use of the timing mechanism shown in Figures 5–8 inclusive web rolls of other than full length may be employed and axial adjustments of the reel may be made without effecting the efficient operation of the timing mechanism. In all of the above forms the controlling switch is mounted to be in a stationary position in respect to the rotation of either the reel or the web rolls, thus eliminating the necessity of moving electrical contacts and devices with their attendant disadvantages.

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, a web roll supporting reel having a shaft, a support for said reel and in which said shaft is journaled, said reel being adapted to support a freely rotatable web roll, a cam rotatable with the web roll on said reel, an electric circuit closing switch on said reel support having an operating lever, a camming finger rotatable with said shaft and adapted to swing to engage said operating lever to actuate said switch, and means operatively connecting said cam and said camming finger to swing the latter into lever engaging position.

2. In a web supply mechanism, a web roll supporting member, said member being rotatably supported and being adapted to support a freely rotatable web roll, a cam rotatable with the roll on said member, a swingable camming finger rotatable with said member, an electric circuit closing switch having an operating lever and being mounted on a stationary part of said machine, and means actuated by said cam to swing said camming finger into the path of said operating lever to actuate said switch.

3. In a web supply mechanism, a web roll supporting member, said member being rotatably supported and adapted to support a freely rotatable web roll, a cam rotatable with the roll on said member, an electrical circuit closing switch having an operating lever and being mounted on a stationary part of said mechanism, a camming finger rotatable with said member and movable into engagement with said lever to actuate said switch, and means operatively connecting said camming finger with said cam for movement thereby.

4. In a web supply mechanism, a support, a reel rotatably supported thereon, said reel being adapted to rotatably support a plurality of web rolls, a cam associated with each roll supported by said reel and rotating with its respective roll, a corresponding number of camming fingers mounted to rotate with said reel and being movable transversely relatively to the axis of said reel, an electrical circuit closing switch on said support and having an operating member disposed in the rotating path of said camming fingers, and means operatively connecting said cams and said camming fingers to move the latter to engage said operating member and thereby actuate said switch.

5. In a web supply mechanism, a web roll supporting member, said member being rotatably supported and adapted to support a freely rotatable web roll, a cam rotatable with the roll on said member, an electrical circuit closing switch having an operating lever and being mounted on a stationary part of said mechanism, a camming finger rotatable with said member and movable into engagement with said lever to actuate said switch, and means operatively connecting said camming finger with said cam for movement thereby, said means including a rockable shaft connected to said stationary part of said mechanism to prevent axial movement thereof from said part.

6. In a web supply mechanism, a support, a reel rotatably supported on said support, said reel being adapted to rotatably support a plurality of web rolls, a cam associated with each roll supported by said reel and rotating with its respective roll, a corresponding number of camming fingers mounted to rotate with said reel and being movable transversely relatively to the axis of said reel, an electric circuit closing the switch on said support and having an operating member disposed in the rotating path of the said camming fingers, and means operatively connecting

said cams and said camming fingers to move the latter to engage said operating member and thereby actuate said switch, each of said connecting means including a rockable shaft connected to said support to prevent axial movement thereof from said support.

7. In combination, a web joining mechanism, including an electrically operated control, a support, a reel rotatably supported on said support and adapted to support a plurality of freely rotatable web rolls, an electric circuit closing switch mounted on said support and electrically connected to said control, a cam associated with each roll supported by said reel and rotating with its respective roll, a corresponding number of camming fingers mounted to rotate with said reel and being movable transversely with respect to the axis of said reel, said switch having an operating member disposed in the path of said rotating fingers, and means operably connecting said cams and said camming fingers to move the latter to engage said operating member and thereby actuate said switch when the desired one of said rolls is disposed in web joining position in respect to said web joining mechanism by rotation of said reel.

8. In combination, a web joining mechanism, including an electrically operated control, a support, a reel rotatably supported on said support and adapted to support a plurality of freely rotatable web rolls, an electric circuit closing switch mounted on said support and electrically connected to said control, a cam associated with each roll supported by said reel and rotating with its respective roll, a corresponding number of camming fingers mounted to rotate with said reel and being movable transversely with respect to the axis of said reel, said switch having an operating member disposed in the path of said rotating fingers, and means operably connecting said cams and said camming fingers to move the latter to engage said operating member and thereby actuate said switch when the desired one of said rolls is disposed in web joining position in respect to said web joining mechanism by rotation of said reel, each of said connecting means including a rockable shaft connected to said support to prevent axial movement thereof from said support, while permitting axial movement of said reel without interference with the operation of said switch.

9. In a web supply mechanism, a web joining mechanism including an electrically operated control therefor, a rotatable reel to support a freely rotatable web roll and to position it in web joining position, an electric circuit closing switch in connection with said control and mounted to remain stationary with respect to the rotative movement of said reel and roll, said switch having an operating member, a cam mounted to rotate with said roll, and timing means operably connected with said cam to engage said operating member to actuate said switch when said roll is disposed in web joining position by said reel.

10. In a web joining mechanism for a machine adapted to operate upon a web, an electrically operated control, a rotatable reel to support a freely rotatable web roll and to position it in web joining position, an electric circuit closing switch in connection with said control and mounted to remain stationary with respect to the rotative movement of said reel and roll, a cam rotatable with said roll, an actuating member for said switch, and means operably connecting said cam with said switch actuating member whenever said roll is disposed in web joining position with respect to said mechanism by movement of said reel.

11. In a web supply mechanism, means to rotatably support a plurality of web rolls and to bodily move each roll into position to have its web joined to a running web, means operable to join the webs, an electrical control for said web joining means, a circuit closing switch connected to said control and mounted to remain stationary with respect to any bodily movement of said rolls, said switch having an operating member, and means associated with each roll and operably positioned with respect to said switch operating member whenever the corresponding roll is disposed in web joining position to actuate said switch to cause energization of said control.

12. In a web supply mechanism, means to rotatably support a plurality of web rolls and to bodily move each roll into position to have its web joined to a running web, means operable to join the webs, an electrical control for said web joining means, a circuit closing switch connected to said control and mounted to remain stationary with respect to any bodily movement of said rolls, a cam rotatable with each of said rolls, an actuating member for said switch, and means operably connecting each of said cams with said switch actuating member whenever the corresponding roll is disposed in web joining position, to actuate said switch to cause energization of said control.

13. In a web supply mechanism, a reel adapted to rotatably support a plurality of web rolls, said reel being rotatable to position any one of the rolls supported thereby into position to have its web joined to a running web, means to join the webs, operating means rotatable with each roll, an electric circuit closing switch mounted in a stationary position with respect to rotative movement of said reel and to any roll supported thereby, said switch having an operating member, and means operably associated with each operating means and so positioned that it will engage said operating member and actuate said switch only when the roll associated therewith is disposed in web joining position.

14. In a web supply mechanism, an axially slidable and rotatable member, said member being adapted to rotatably support a web roll, an electric circuit closing switch, a part rotatable with the supported web roll, means actuated by said part to operate said switch, said switch being carried by said member for axial movement therewith, and means to maintain said switch substantially stationary with respect to the rotation of the member.

15. In a web supply mechanism, a web roll supporting reel having an axially slidable and rotatable member, said reel being adapted to rotatably support a plurality of web rolls, an electric circuit closing switch, a part rotatable with each roll, means actuated by each said part to operate said switch, said switch being carried by said reel member for axial movement therewith, and means to maintain said switch substantially stationary with respect to the rotation of the member.

16. In a web supply mechanism, in combination, an axially slidable and rotatable web roll supporting reel, a cam rotatable with a web roll on said reel, a part connected to said reel for axial movement therewith, an electric circuit control mounted on said part, means to operably connect said cam to said control, and means oper-

ably connected to said part to hold it substantially stationary with respect to any rotative movement of said reel.

17. In a web supply mechanism, a web roll supporting reel, a support for rotatably supporting said reel, said reel being adapted to support a freely rotatable web roll, a cam rotatable with the roll on said reel, a movable member carried by said reel, an electric circuit closing switch adapted to be actuated by said member, means to support said switch adjacent said reel and in the path of movement of said member, and connections between said cam and said member to cause actuation of said switch by said cam.

18. In combination, a web joining mechanism including an electrically operated control, a support, a reel rotatably supported on said support and adapted to support a plurality of freely rotatable web rolls, an electric circuit closing switch secured to a stationary part and electrically connected to said control, a cam mounted to rotate with each roll, and means adapted to operably connect said switch with the cam rotating with the roll which is disposed in web joining position in respect to the web joining mechanism by the rotation of the reel.

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