July 4, 1939. D. G. BERNARD 2,165,026

DEVICE FOR DELIVERING PAPER TO PRINTING PRESSES

Filed Aug. 31, 1932 3 Sheets-Sheet 1

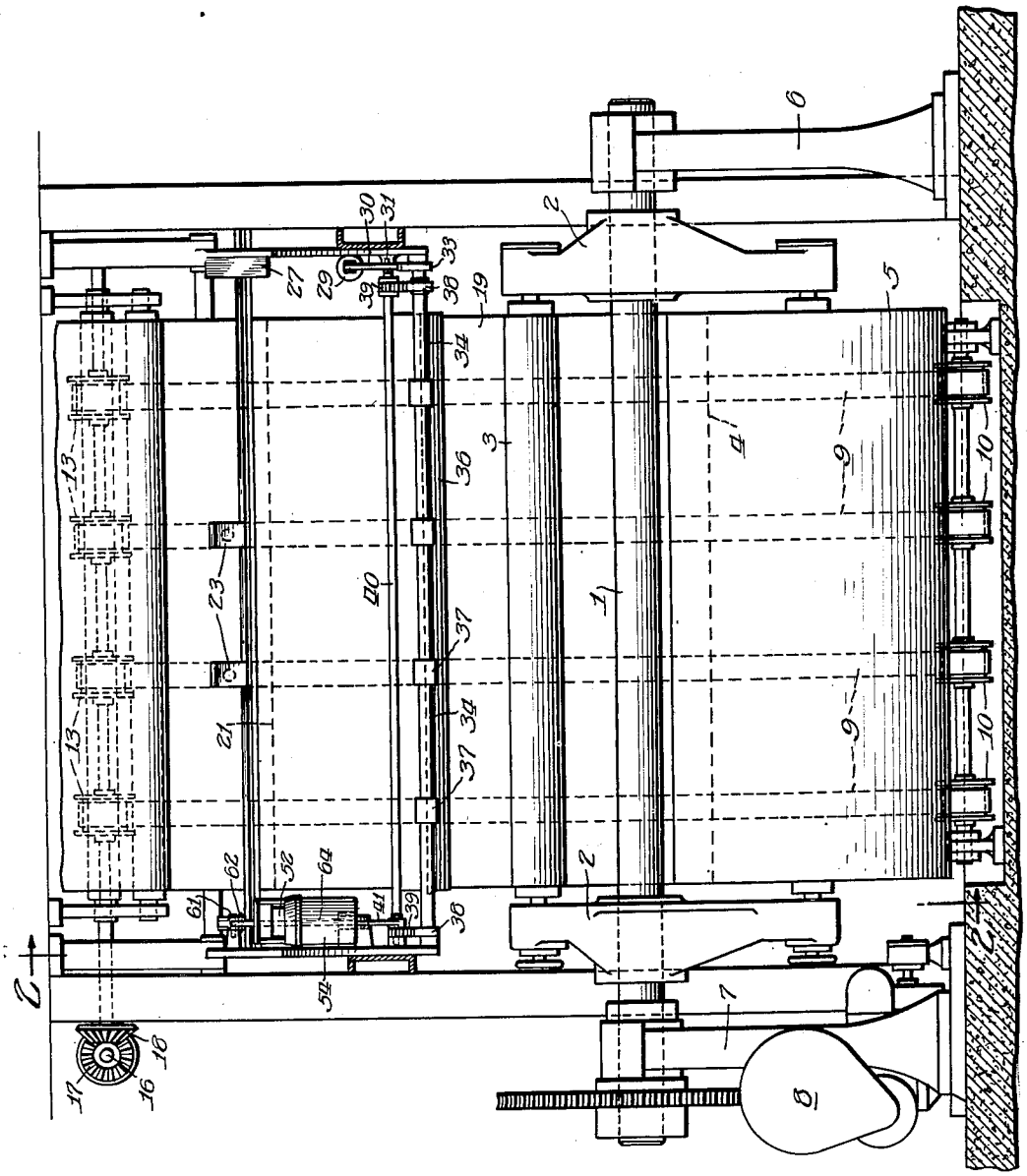


Fig. 1

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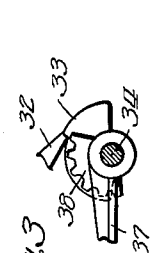


Fig. 3

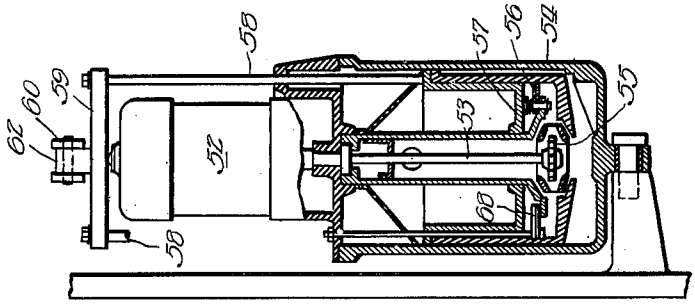


Fig. 4

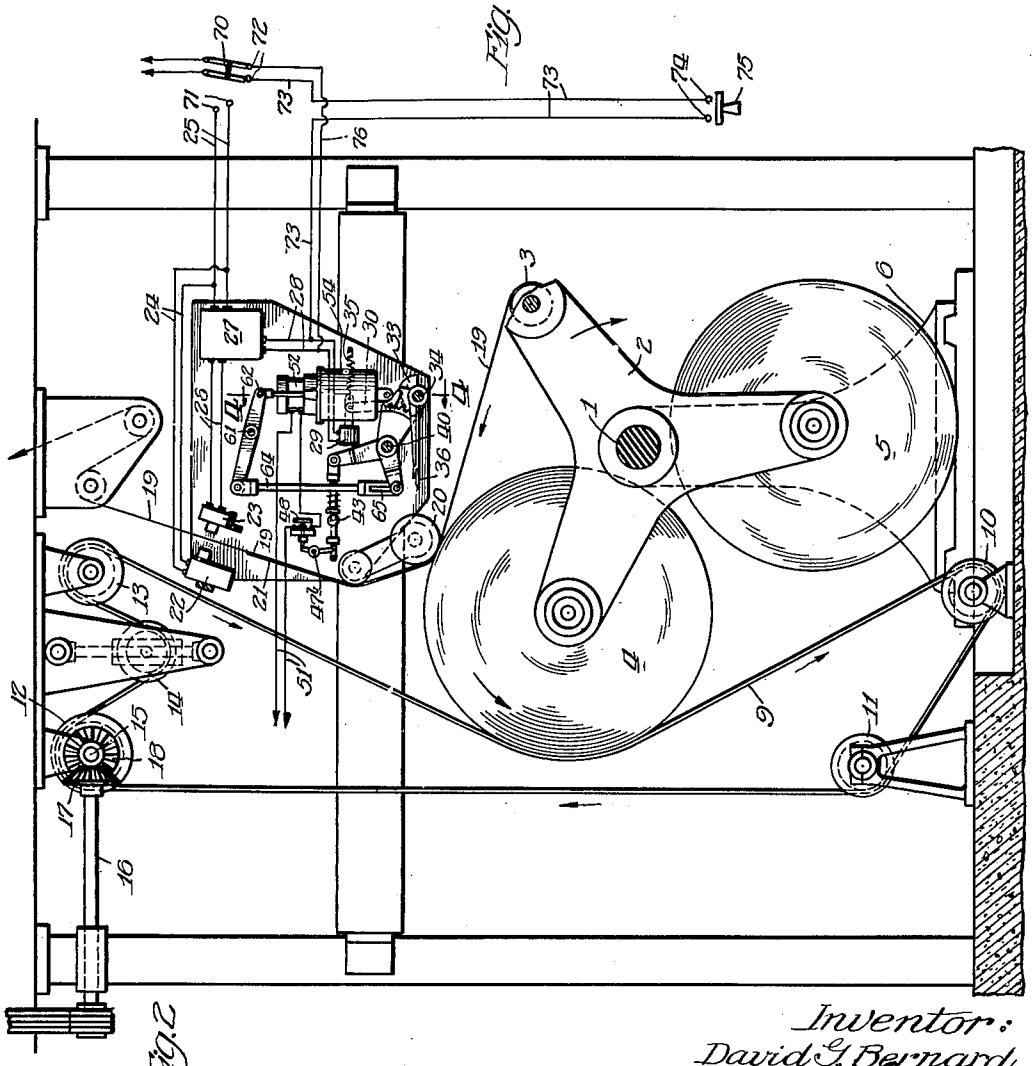


Fig. 2

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DEVICE FOR DELIVERING PAPER TO PRINTING PRESSES

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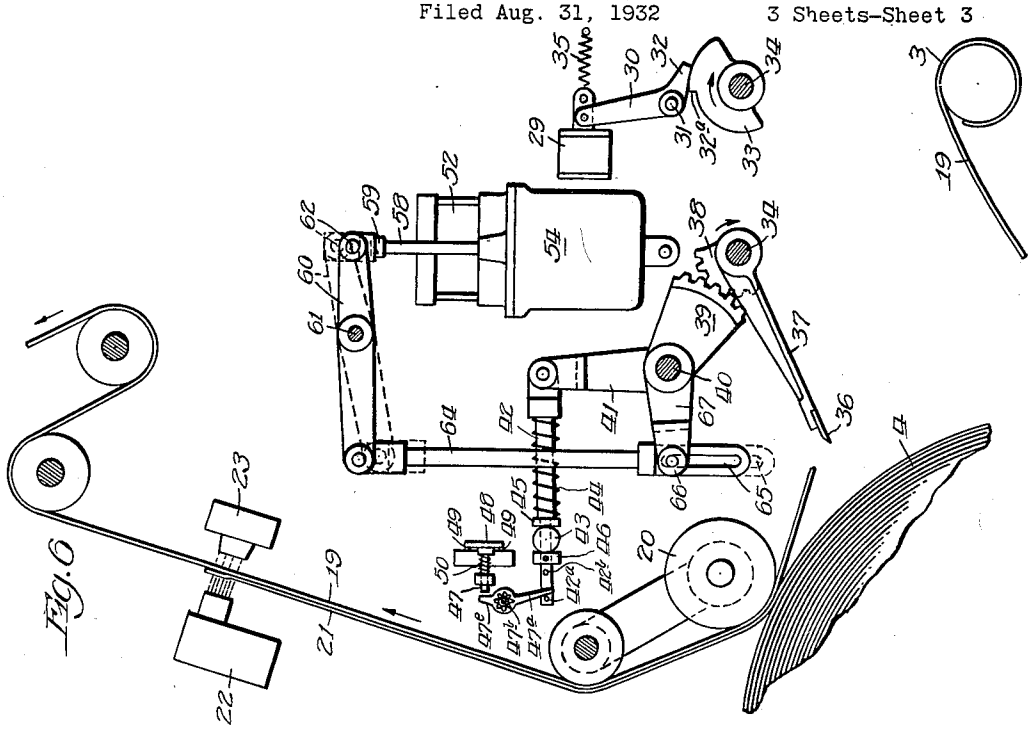


Fig. 6

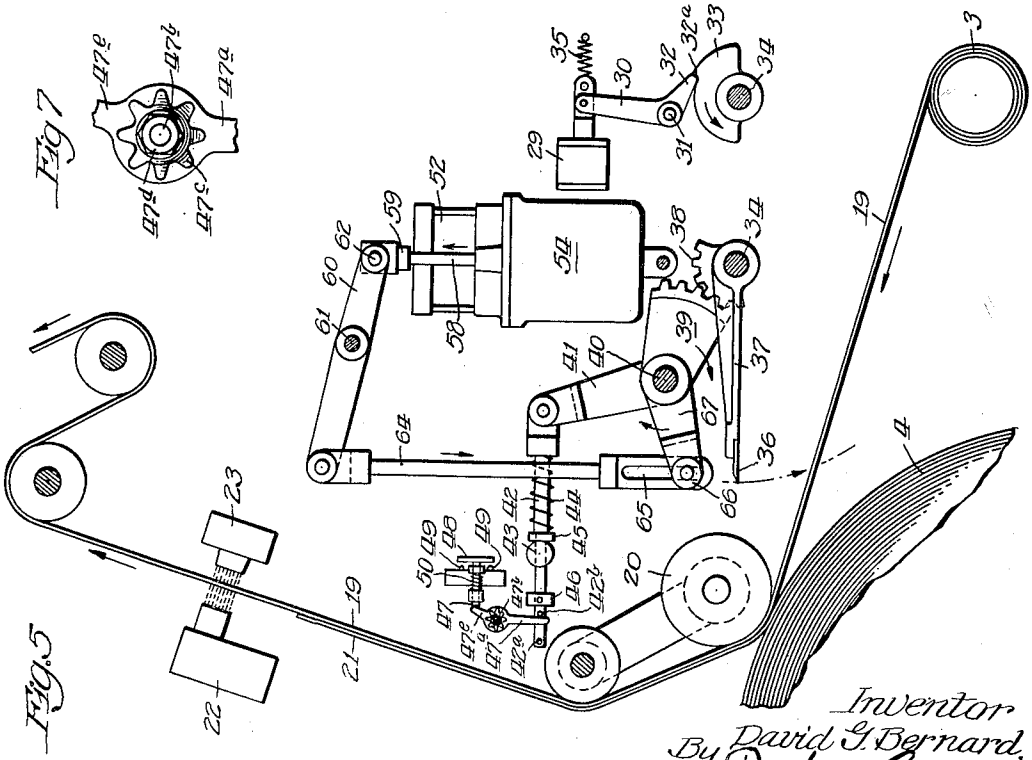


Fig. 5

Fig. 7

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UNITED STATES PATENT OFFICE

2,165,026

DEVICE FOR DELIVERING PAPER TO PRINTING PRESSES

David G. Bernard, Chicago, Ill., assignor, by mesne assignments, to Donald M. Carter, Chicago, Ill.

Application August 31, 1932, Serial No. 631,181

12 Claims. (Cl. 242—58)

This invention relates to devices for delivering paper to printing presses and has for its object to provide a new and improved device of this description. The invention has as a further object to provide a device for delivering paper to printing presses wherein the delivery of the paper is changed from an expiring roll to a new roll without stopping the press, and wherein there is provided means for severing the web of the expiring roll after it has been connected with the new roll. The invention has as a further object to provide an automatic severing device for high speed paper delivering devices. The invention has other objects which are more particularly pointed out in the accompanying description.

Referring now to the drawings, Fig. 1 is a view showing one form of device embodying the invention;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a view of the shaft of the severing device and associated parts;

Fig. 4 is an enlarged sectional view taken on line 4—4 of Fig. 2;

Fig. 5 is a diagrammatic view showing the severing device and operating mechanism therefor before the operating mechanism is set into operation;

Fig. 6 is a view similar to Fig. 5 after the operating mechanism has been set into operation, the device being shown in the resetting movement.

Fig. 7 is an enlarged view showing the spring pressed switch arm.

Like numerals refer to like parts throughout the several figures.

Referring now to the drawings wherein I have illustrated one form of the device embodying the invention, I have illustrated a construction where there is a roll supporting device having a shaft 1 carrying the roll supporting arms 2 between which are supported the rolls of paper 3, 4 and 5. The shaft is mounted upon suitable supports 6 and 7 and is rotated by means of a motor 8 which is operatively connected with the shaft 1, preferably by means of a worm and worm gear. A series of endless belts 9 each pass around a plurality of direction changing devices 10, 11, 12, 13 and 14. The shaft 15 in which the direction changing device 12 is mounted is driven in any suitable manner, as by means of the driving shaft 16 and gears 17 and 18. The direction changing device 14 is movably mounted and is weighted so that it automatically moves as the diameter of the expiring roll decreases so as to keep the belts in proper engagement with the rolls.

When the roll which is delivering paper to the press has about expired the roll support is moved so as to bring the web of the new roll, as for example the roll 4, into contact with the web 19 of the expiring roll 3. The web of the new roll 4 is provided with adhesive material and the movement of the roll support moves the roll 4 so that the web thereof containing adhesive material is pressed by the pressure device 20 against the web 19 of the expiring roll so that the two webs are connected together. When the two webs are connected together the web of the expiring roll is severed and the delivery of the material continued from the new roll.

In this construction, when the web 19 of the expiring roll is connected to the web 21 of the new roll, the two webs move along together toward the press. The web of the paper being delivered to the press passes between a suitable light source and a photo-electric cell unit. Since said web is partially transparent, there will be a certain amount of light pass through it into the photo-electric cell unit, and this is arranged to maintain an open circuit on this amount of light passing through the single web. When the web of the new roll, which has been connected to the web of the expiring roll, reaches this light source, the amount of light passing through the double web is reduced and the photo-electric device now acts automatically to start the operation of the web severing mechanism.

In the drawings I have illustrated one form of light source 22 on one side of the web 19, and the photo-electric device 23 on the other side thereof. The light source 22 is connected by conductors 24 to the conductors 25 which lead to the source of supply. The photo-electric device 23 is connected by conductors 26 with the photo-electric relay and amplifier 27, which in turn is also connected to the conductors 25 leading to the source of supply. The photo-electric relay and amplifier 27 is connected by conductors 28 with the release magnet or solenoid 29 which has its core connected to the lever 30 pivoted at 31, the end 32 of which acts as a pawl for the cam 33 on the shaft 34. A spring 35 normally holds the cam in its holding or locking position. The severing device 36 is connected by arms 37 with the shaft 34 and is held in its operative position by the pawl 32.

In Figs. 5 and 6 I have shown the cam 33 separated from the arms 37 for purposes of clearness, but it will be understood that the cam 33

and the arms 37 are on the same shaft 34. The shaft 34 also has a segmental gear 38 thereon which is engaged by a segmental gear 39 on the shaft 40. There is preferably a segmental gear 38 and 39 at each end of the shafts 34 and 40. Connected with the shaft 40 are arms 41 to which are pivoted rods 42 mounted in swiveled bearings 43. Springs 44 are mounted on the rods 42 and engage stops 45. The ends of the rods are provided with stops 46 which engage the bearings 43 to limit the movement of the rods 42. When the pawl 32 releases the cam 33 these springs 42 suddenly rock the shaft 40 and this, by means of the segmental gears 39 and 38, rocks the shaft 34 so as to move the cutter arms 37 downwardly to cause the cutter 36 to sever the web 19 of the expiring roll.

The movement of the cutter and associated parts starts the resetting mechanism for the cutter into operation. This is accomplished as follows: The rod 42, see Figs. 5 and 6, is provided with two projections 42*a* and 42*b* spaced apart. Between these projections is located a pivoted arm 47*a* movably mounted on a stationary stud 47*b*. This arm is arranged so that it will stay in any position to which it is moved. Any means for securing this result may be provided. As herein shown a series of spring members 47*c* engage the arm 47*a* and are pressed against it by a nut 47*d* which can be tightened to secure the desired frictional contact, see Fig. 7. The end 47*e* of this lever engages a switch arm 47 connected with a switch 48 which cooperates with contacts 49 connected in the electric circuit 51, see Fig. 2. When the cutter is in its inoperative position this switch is out of contact with the contacts as shown in Figs. 2 and 5. When the cutter shaft 34 is released and the springs 44 move the arms 42 to throw down the cutter, the projection 42*a* engages the lever 47 and moves the end 42*e* to the left away from the switch arm 47. The spring 50 then moves the switch 48 into contact with the contacts 49, whereupon a circuit is completed in the conductors 51 leading to a suitable electro-magnet device which acts to return the cutter to its inoperative position. Any suitable device for this purpose may be used and I have shown what is termed a thruster unit, more fully shown in Fig. 4 and which is now on the market.

The closing of the switch 48 energizes a motor 52 which rotates a shaft 53, the end of which projects into a chamber in the cylinder 54 containing suitable liquid and has thereon a wheel 55. The cylinder 54 is pivotally connected to its support as shown. The rotation of the wheel 55 moves the liquid through the valve 56 up under the piston 57 and this raises the piston. The piston has connected therewith the rods 58 which are connected by a closing member 59 with a lever 60 pivoted at 61. The connection to the lever 60 is made by means of a pin 62. The lever 60 is pivotally connected to the link 64, which is provided at its end with a slot 65 in which fits a projection 66 on the reset arm 67 on the shaft 40. When the pawl 32 releases the cam 33 the springs 44 move the cutter rapidly downward and the projection 66 slides up to the top of the slot 65 before the slower acting reset mechanism has moved the link 64 downward. The movement of the piston 57 of the thruster causes the link 64, which is engaging the projection 66 which is now at the upper end of the slot 65, to move the reset arm 67 downwardly and rocks the shaft 40 so that the segmental gears 39 and 38 cause the shaft 40 to be rocked to return the cutter 36 to its initial or inoperative position. This movement of the shaft 40 moves the rods 42 back to their initial position and one of these rods, engaging the switch arm 47, moves the switch 48 out of contact with the contacts 49 which opens the circuit through the motor 52. The liquid in the cylinder 54 beneath the piston 57 now runs out from beneath the piston through the baffle discharge device 68, thus permitting the weight of the parts to return the piston 57, the lever 60 and the link 64 to their initial positions, the projection 66 sliding in the slot 65 so as to permit this movement. The pawl 32 drops down behind the shoulder 32*a* on the cam 33 just as the switch 48 is opened, and when this switch is opened the shaft 34 and cam 33 move forward until the pawl 32 engages the shoulder 32*a*, whereupon the parts are held in their reset or retracted position ready for another cycle of operation.

I have shown a construction wherein the photo-electric device for starting the mechanism may be cut out of circuit and the mechanism started by a hand operated switch. When started by the hand operated switch, the severing mechanism operates as hereinabove set out and is automatically reset after its operation. For this purpose I have provided a switch 70 in the circuit 25 leading to the source of supply. This switch, when it engages contacts 71, connects the photo-electric device in the circuit. When it is moved to engage the contacts 72 it disconnects the photo-electric device from the circuit and connects in circuit the conductors 73 leading through the contacts 74 and switch 75 to one of the conductors 28 which lead to the pawl releasing electro-magnetic device 29. One of the contacts 72 is also connected with the conductors 76 which leads to one of the conductors 28.

When the switch 70 is moved to the position shown in dotted lines so as to disconnect the photo-electric device, the photo-electric device is put out of operation. When the switch is in this position the operator operates the severing mechanism by moving the switch 75 so as to connect the contacts 74, whereupon the pawl controlling electro-magnetic device 29 is operated to release the pawl 32, causing the severing device to operate.

The use and operation of my invention are as follows:

When the expiring roll 3 has about expired, the roll supporting device is rotated so as to move the new roll 4 toward the engaging device 20. In the meantime adhesive has been placed on the web of the new roll between the belts 9. The belts 9, engaging the new roll, bring it up to the desired speed. When the desired speed has been attained the roll supporting device is further moved so as to bring the new roll into contact with the web 19 of the expiring roll. The adhesive on the web of the new roll then causes its web to adhere to the web 19, and the two webs are moved up into the press and between the source of light 23 and the photo-electric device 22. The double web causes the photo-electric device to act to complete the circuit, which circuit is amplified by the photo-electric relay and amplifier 27, and the current then passes to the electro-magnetic device 29 which acts to release the pawl 32, whereupon the springs 44 move the severing blade 36 downwardly by a rapid movement and causes the severing of the web 9 of the expiring roll 3. The movement of the rods 42 causes the switch 48 to be actuated and

this completes the circuit through the motor 52 of the thruster unit which acts to then return the parts to their original inoperative position. This operation is repeated each time the web of the new roll is connected to the web of the expiring roll.

When it is desired to start the severing mechanism by the hand switch, the operator will keep watch on the apparatus and when the web of the new roll has been connected to the web of the old roll, he actuates the switch so as to cause the severing mechanism to be operated to sever the web of the expiring roll. The resetting mechanism automatically acts to reset the apparatus.

I claim:

1. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press, a severing device for severing the web of the expiring roll after the web of the new roll has been connected thereto having a severing blade, means for moving said severing blade downwardly to sever the web of the expiring roll, and automatic reset mechanism for returning the severing device to its initial position comprising a power device set in operation after the severing device has severed the web of the expiring roll.

2. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press, a severing device for severing the web of the expiring roll when said connection has been made, a controlling device for the severing device independent of the movement of any part that engages the webs after they have been connected together and being responsive to the increase in thickness due to the connection of the web of the new roll with the web of the expiring roll.

3. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press, a severing device for severing the web of the expiring roll when said connection has been made, a controlling device for the severing device independent of the movement of any part that engages the webs after they have been connected together and being responsive to the increase in thickness due to the connection of the web of the new roll with the web of the expiring roll, and resetting mechanism for lifting the severing device to its initial position.

4. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press so that the two webs run along together into the press, a severing device for severing the web of the expiring roll, actuating mechanism therefor, a controlling device for said actuating mechanism, responsive to the double thickness of the web due to the connection of the web of the new roll with the web of the expiring roll and independent of the movement of any part that engages the webs after they have been connected together.

5. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press so that the two webs run along together into the press, a severing device for severing the web of the expiring roll, actuating mechanism therefor, a controlling device for said actuating mechanism, responsive to the double thickness of the web due to the connection of the web of the new roll with the web of the expiring roll and independent of the movement of any part that engages the webs after they have been connected together, and resetting mechanism for resetting the severing device to its initial position.

6. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press so that the two webs run along together into the press, a severing device for severing the web of the expiring roll, actuating mechanism therefor, a controlling device for said actuating mechanism comprising a source of light, and a photo-electric device between which the web of paper running to the press passes, the photo-electric device arranged to remain inactive when a single web of paper is running to the press, the double web, produced by connecting the web of the new roll with the web of the expiring roll when passing in front of said photo-electric device, opposing the light sufficiently to cause it to act to actuate the actuating mechanism of said severing device.

7. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press, the connection of the web of the new roll with the web of the expiring roll forming a double thickness of web running to the press, a severing device for severing the web of the expiring roll, actuating mechanism therefor brought into operation by said double web and controlling means for setting said actuating mechanism into operation, said controlling means being independent of the movement of any part that engages the webs after they have been connected together.

8. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press, the connection of the web of the new roll with the web of the expiring roll forming a double thickness of web running to the press, a severing device for severing the web of the expiring roll, comprising a rock shaft, a knife connected therewith brought into severing contact with the web of the expiring roll by the rocking of the shaft, a holding device for holding said severing device in its inoperative position, a releasing mechanism for the holding device comprising an electro-magnetic device, a source of light, a photo-electric device opposed thereto and between which and the source of light the double thickness of web passes, said double thickness of web actuating the photo-electric device causing the photo-electric device to act to complete the circuit through said electro-magnetic device to release said holding device and permit the severing device to move to sever the web of the expiring roll.

9. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press,

the connection of the web of the new roll with the web of the expiring roll forming a double thickness of web running to the press, a severing device for severing the web of the expiring roll, comprising a rock shaft, a knife connected therewith brought into severing contact with the web of the expiring roll by the rocking of the shaft, a holding device for holding said severing device in its inoperative position, a releasing mechanism for the holding device comprising an electro-magnetic device, a source of light, a photo-electric device opposed thereto and between which and the source of light the double thickness of web passes, said double thickness of web actuating the photo-electric device causing the photo-electric device to act to complete the circuit through said electro-magnetic device to release said holding device and permit the severing device to move to sever the web of the expiring roll, an electrically controlled resetting device for resetting the severing device and brought into action by the movement of the severing device.

10. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press, the connection of the web of the new roll with the web of the expiring roll forming a double thickness of web running to the press, a severing device for severing the web of the expiring roll, comprising a rock shaft, a knife connected therewith brought into severing contact with the web of the expiring roll by the rocking of the shaft, a holding device for holding said severing device in its inoperative position, a releasing mechanism for the holding device comprising an electro-magnetic device, a source of light, a photo-electric device opposed thereto and between which and the source of light the double thickness of web passes, said double thickness of web actuating the photo-electric device causing the photo-electric device to act to complete the circuit through said electro-magnetic device to release said holding device and permit the severing device to move to sever the web of the expiring roll, an electrically controlled resetting device for the severing device, a switch therefor, a connection between the severing device and said switch for closing it when the severing device has severed the web of the expiring roll so as to actuate the resetting device.

11. A device for delivering paper to printing presses, comprising means for movably mounting a plurality of rolls in position and for connecting the web of the new roll with the web of the expiring roll without stopping the press, the connection of the web of the new roll with the web of the expiring roll forming a double thickness of web running to the press, a severing device for severing the web of the expiring roll, comprising a rock shaft, a knife connected therewith brought into severing contact with the web of the expiring roll by the rocking of the shaft, a holding device for holding said severing device in its inoperative position, a releasing mechanism for the holding device comprising an electro-magnetic device, a source of light, a photo-electric device opposed thereto and between which and the source of light the double thickness of web passes, said double thickness of web actuating the photo-electric device causing the photo-electric device to act to complete the circuit through said electro-magnetic device to release said holding device and permit the severing device to move to sever the web of the expiring roll, an electrically controlled resetting device for the severing device, a switch therefor, a connection between the severing device and said switch for closing it when the severing device has severed the web of the expiring roll so as to actuate the resetting device, the movement of the resetting device to its initial position opening said switch so as to stop the operation of the resetting device.

12. A device for delivering paper to printing presses, comprising a support for a roll of paper, the web of which passes to the press, a photo-electric device past which this web moves and which remains unaffected by the single thickness of the web, means for movably mounting a second roll of paper in delivery position and for connecting the web of the second roll of paper with the web of the first roll of paper without stopping the press so that a double thickness of web moves past said photo-electric device, the double thickness causing the photo-electric device to act, a severing device for the web of the first roll, and actuating mechanism set into operation by said photo-electric device for actuating the severing device to sever the web.

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