The present invention is directed to a novel, useful and improved mechanism for attaching the lead end of a new web to a running and nearly exhausted web without stopping the machine, the invention finding one of its principal applications in fast rotary printing presses.

My present invention provides a very simple, sturdy and efficient mechanism for the purpose described, and the use of which does not require any material alteration or changes in the ordinary construction of a fast rotary printing press. My invention also provides for easy insertion by the operator of the lead end of the new web into the web-attaching mechanism, and for firmly holding this lead end while adhesive is applied thereto. It provides simple (preferably manually operated) means for pressing said lead end of the web against the running web to attach it thereto, and for releasing the lead end from the means by which it was previously held.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawings, in which:

Figure 1 is an end or side view illustrating a pair of paper supply rolls and one construction of the web renewing mechanism according to the invention associated therewith.

Figure 2 is an enlarged view of the said mechanism.

Figures 3, 4 and 5, illustrate various arrangements of paper feed or supply rolls for different types of printing presses, each arrangement having associated therewith, the web renewing mechanism according to this invention.

Figure 6 is a fragmentary sectional plan taken approximately on the line 6–6 of Figure 3.

Figure 7 is a view of the combined ladder and platform which may be used in the construction shown in Figure 4.

Figures 8 and 9 are respectively an end or side view and a fragmentary plan of another construction of printing press with the web renewing mechanism according to the invention applied thereto.

Figure 10 is a diagrammatic view showing one arrangement of electrical connections for enabling the reserve paper supply roll to be rotated when the web renewing mechanism is actuated.

In the various figures of the drawings, A and B represent a pair of paper feed or supply rolls with which the web renewing mechanism according to this invention is associated, the said mechanism being provided for each pair of rolls A and B used on the machine and being located between the said rolls A and B with operating means situated at one end for enabling the machine attendant to actuate the mechanism as hereinafter described. The said mechanism comprises two pressure rollers C and D which, in the example illustrated are supported at their ends on arms C¹ and D¹ that are fixed on shafts C² and D² and provided with toothed segments C³ and D³ which mesh with each other as shown in Figure 1. The webs A¹ and B¹ from the supply rolls A and B pass around the rollers C and D respectively in travelling to the printing cylinders. One of the aforesaid arms is provided with a hand lever, for example D³ in Figure 1, or C³ in Figures 3 and 4, by means of which the two arms can be angularly moved simultaneously through the medium of the meshing toothed segments C³ and D³ in order to move the rollers C and D towards or away from each other. Levers E¹ and F¹ are loosely mounted on the shafts C² and D² respectively and carry retaining rollers E and F, which are maintained against the rollers C and D by means of springs G and G¹ as shown in Figure 2. The retaining rollers E and F can be readily displaced by the machine attendant against the action of the springs to enable the leading end of either web A¹ or B¹ (when serving as the reserve web) after being passed around the roller C or D to be inserted between the latter and the retaining roller which holds the web in position under the influence of the aforesaid spring. Short levers E², F² rigid with said shafts C² and D² are connected by links E³ and F³ to the levers E¹ and F¹ respectively. The connection of the links E³ and F³ to the levers E¹ and F¹ is effected by pins and slots...
to permit of displacement of the retaining rollers against the springs G and G' when the reserve web is being placed in position around the roller C or D. The distance between the centre of the shaft C' (or D') and the centre of the connection of the link E' (or F') to the arm E2 (or F2) is greater than the distance between the connection of the other end of the link E2 (or F2) to the lever E' (or F') and the centre of the shaft D' (or C'), so that when the hand lever C is moved to bring the two rollers C and D together short arms E' and F' exert through the links a pull on the levers E' and F' which therefore move quicker than the rollers C and D with the result that the retaining rollers E and F are moved away from the pressure rollers C and D and release the leading end of the reserve web as shown in Figure 2. Each paper feed or supply roll A or B is as known adapted to be rotated by means of a driving belt H passing around pulleys H1 and H2 carried in a frame H3, pivotally mounted on the main frame of the printing press in such manner that the said belt can be maintained in contact with the peripheral surface of the feed or supply roll during the unwinding of the web therefrom. The driving pulley H' for the said belt H is driven from the driving mechanism of the printing press through bevel gearing H4, the arrangement of which may vary according to the type of machine to which the invention is applied as will be readily understood on reference to Figures 3, 4 and 5. The driving pulley H' of the said belt H may be coupled to the driving mechanism of the press through a clutch or the like operated by the aforesaid hand lever C or D', when the latter is moved to cause the two rollers C and D to be pressed together. For this purpose the said hand lever may be adapted to serve as an electrical switch so that when it is actuated to press the rollers C and D together it completes a circuit containing an electro-magnetic clutch which connects the driving belt pulley H' to the driving mechanism of the press so as to rotate the reserve supply roll. The web of paper is drawn from either of the rolls A and B (say A) and during the operation of the printing press the machine attendant after separating the pressure rollers C and D by means of the hand lever C or D' places the leading end of the web B' from the other or reserve roll B', around the roller D and under the retaining roller F so that the spring G' in re-acting causes the retaining roller F to maintain the leading end of this web B' in position around the roller D. Adhesive substance in a semi-liquid condition is applied to the back or outer surface of the web B' and the hand lever is then moved to bring the two rollers C' and D together. The arrangement may be such that the movement of the hand lever for this purpose causes the operation of the driving belt for rotating the reserve supply roll simultaneously with or just prior to the actual pressing together of the two rollers C and D. The actuation of the hand lever to bring the pressure rollers C and D together also causes the retaining rollers E and F to be moved and owing to the arrangement of links and levers as aforesaid the levers E', F' are moved slightly quicker than the pressure rollers so that the retaining rollers carried by the said levers are moved slightly away from the pressure rollers to release the leading end of the reserve web. The two webs A' and B' in moving together between the closed pressure rollers C and D are caused to unite by the adhesive applied to the web B' and they travel forward together until the rear part of the web A' is severed from the roll A whereupon the supply is obtained from the reserve roll B. The hand lever operates a clutch for the driving mechanism of each roll A or B, but switches are provided as hereinafter described with reference to Figure 10, by way of example so that either clutch is rendered inoperative as and when required. By means of these switches the machine attendant can break the circuit of the magnetic clutch, when it is desired to discontinue the driving of either of the supply rolls by the aforesaid belts H. During the time that the web B' is being drawn from the roll B, the empty roll A can be removed and replaced by a full roll, and preparations can be made for joining the leading end of the web A' from the new roll A to the rear part of the web B' from the roll B in the manner described so that the supply can then be drawn from the new roll A during which time the empty roll B is removed and replaced by a full one. The operation above described takes place for each change from any of the rolls A to the rolls B and vice versa. It will thus be understood that the renewing of the web by joining one to another as aforesaid and the removal and replacement of the empty rolls can be effectuated without stopping the operation of the printing press. In Figure 3 an arrangement comprising superposed supply rolls in two vertical planes is illustrated and for rendering each web renewing mechanism pertaining to the upper pairs of supply rolls, readily accessible so that the machine attendant can conveniently manipulate the same and apply the adhesive to the reserve web, a platform is provided which in the example shown comprises two sliding sections or parts I and I' that extend between the two sets of superposed rolls as shown in Figures 3 and 5. The paper from any of the rolls in the outer set is taken either below or above the frame of the printing press as shown so that a clear space is provided between the two sets of supply rolls which space may be wide enough to permit of a full supply roll a being hoisted by
cable $a'$ or the like for placing in position in the supports on the printing press frame. For this purpose the two platforms section may be slidably moved away from each other along guides $P$ and $Q$ so as to permit of the hoisting of the roll $a$ suspended from the cable $a'$.

In the example illustrated in Figure 4, a single set of four superposed rolls is shown and in this case the full supply rolls $a$ are hoisted from the outside of or end of the printing press as indicated by the dotted lines in this figure. For the purpose of enabling the machine attendant to manipulate the web renewing mechanism pertaining to the uppermost pair of feed rolls and to apply the adhesive to the reserve roll, a platform $J$, having a ladder $J'$ associated therewith is provided, the combined ladder and the platform having rollers $J'$ for running along tracks so that the combined ladder and platform can be slidably moved, from a position in front of the supply rolls to the side of the printing press for permitting the suspended supply roll $a$ to be hoisted by the cable $a'$ into position for placing in their supports.

In the example illustrated in Figure 5, the two pairs of supply rolls $A$ and $B$ are situated on the same level and are placed in position on trucks $K$ which run along suitable tracks in any appropriate manner. In this particular example the frames $H^1$ carrying the belts $H$ for rotating the rolls $A$ or $B$ can be moved from an operative position into an inoperative position for permitting of the removal and replacement of the said rolls $A$ and $B$ by means of cables $H^2$ that pass around pulleys or rollers $H'$ and are controlled by operating hand wheels $H^3$ as shown. The modification shown in Figures 8 and 9 avoids the use of special means for angularly moving the frames $H^1$ and the driving belts $H$; in this example the printing press frame is provided with supports $L$, $L'$ for the rolls $A$ and $B$, the supports $L$ being hinged to the main frame so as to swing outwards (see Figure 9) on vertical axes for permitting the supply rolls to be moved into position on trucks $M$ ready for rolling on to the supports $L$, $L'$ after the hinged ones have been moved inwards. As the supply rolls move on to the said supports they displace the hinged frames $H^1$ into the position for enabling the driving belts $H$ to bear on the paper supply rolls for rotating the latter as and when required.

One example of electrical means for causing the operation of the driving belts $H$ for initially rotating the reserve paper supply rolls is diagrammatically illustrated in Fig. 10. The circuits are duplicated, the one shown on the right of this figure being used in connection with the starting of the paper supply roll $B$, and the other, at the left-hand side of the figure, being used in connection with the starting of the paper supply roll $A$. When the operating lever $D^1$ is depressed in order to bring the pressure rollers $C$ and $D$ together for joining the rear end of the active web 5 to the leading end of the reserve web 4, the contacts 1 and 2 are bridged by a contact strip 6 mounted on a handle $B'$, thereby establishing a circuit which may be traced as follows: from the negative main to contact 1, contact strip 6, contact 2, switch 7 to electro-magnet $S$, controlling the clutch $8$, and from thence to the positive main 11. As the electro-magnet $S$ of the clutch 9 is energized, the driving shaft 11 is coupled with and drives the belt pulley $H$ through suitable gearing and thereby initiates the rotation of the reserve web roll $B$. The electric circuit for controlling the rotation of the web roll $A$ is substantially identical with that of the circuit for web roll $B$, and when the web roll $A$ is the reserve web roll, switch 14 is thrown to connect it with contact 15, thereby energizing the electro-magnet 16 of the clutch 17 as the handle $D^1$ is depressed, and completes the circuit between contacts 1 and 3. While the electro-magnet 16 is energized, driving shaft 18 is coupled with the gearing driving the belt roller $H'$, thereby controlling the rotation of web roll $A$.

The subject matter of Fig. 10 is shown in more detail and is specifically claimed in my improvement application Ser. No. 194,730, filed May 27, 1927, and in Great Britain August 9, 1928.

What I claim and desire to secure by Letters Patent of the United States is:

1. Web renewing mechanism for printing presses, comprising pressure or uniting rollers, arms carrying said rollers, shafts on which said arms are fixed, means connecting said arms together, a hand lever for angularly moving said arms, retaining rollers for the leading end of the reserve web, levers carrying said retaining rollers and loosely mounted on the said shafts, springs acting on said levers to maintain the retaining rollers against the pressure rollers, slotted links connecting said levers to short arms fixed on said shafts which links and short arms, when said hand lever is actuated to bring the pressure rollers together, pull the said levers away from the pressure rollers so that the retaining rollers release the web.

2. Web renewing mechanism for printing presses, comprising pressure rollers between which the web from the paper supply roll in use and the leading end of the web from a new or reserve paper supply roll can be passed, means for causing the web in use whilst still running and the leading end of the new or reserve web to be pre-rotated into contact by said pressure rollers, and united by previously applied adhesive, driving means for rotating the reserve roll and means whereby the actuation of the pressure rollers to unite the two webs, causes said driving means to rotate.
the reserve roll either simultaneously with or just prior to the actual pressing together of the two pressure rollers.

3. Web renewing mechanism for printing presses comprising pressure rollers between which the web from the paper supply roll and the leading end of the web from a reserve paper supply roll can be passed, driving means for each roll, an operating handle or the like for actuating the two pressure rollers, electrical means whereby the said handle is adapted to serve as an electrical switch and electromagnetic clutches controlled by the operation of said handle or switch for connecting the said driving means to a main driving shaft.

4. A printing press including in combination means for supplying a running web to the press, means for attaching the lead end of a fresh web supply roll to the running web, and means automatically controlled by the operation of said attaching means for rotating the fresh web roll as its lead end is attached to the running web.

5. A printing press including in combination means for supplying a running web to the press, means for moving the lead end of a fresh web supply roll into contact with the running web to unite the webs, and means automatically actuated by the movement of said web-moving means to rotate the fresh web roll.

6. A printing press including in combination means for supplying a running web to the press, means for moving the lead end of a fresh web supply roll into contact with the running web to unite the webs, and means automatically actuated by the web-uniting movement of said web-moving means for initiating the rotation of the fresh web roll.

7. A printing press including in combination means for supplying a running web to the press, means for moving the lead end of a fresh web supply roll into contact with the running web to unite the webs, means for rotating the fresh web roll, and means actuated by the web-uniting movement of said web-moving means for initiating the rotation of the fresh web roll.

8. A printing press including in combination means for supplying a running web to the press, means for moving the lead end of a fresh web supply roll into contact with the running web to unite the webs, means driven from a moving part of the press for rotating the fresh web roll, and a clutch for connecting said means to the moving part of the press, and means actuated by the web-uniting movement of said web-moving means for controlling the clutch to rotate the fresh web roll.

9. A printing press including in combination means for supplying a running web to the press, an operating device for attaching the lead end of a fresh web supply roll to the running web, electrically controlled devices for rotating the fresh web roll from a moving part of the press, and a switch operated by the web-attaching movement of said operating device for initiating rotation of the fresh web-supply roll.

11. Web renewing mechanism including in combination movable rollers adapted to cooperate with different webs respectively, means for receiving and frictionally holding the lead end of a web to one of said rollers, means for moving both rollers together simultaneously to press the web end against the other running web and for causing said holding means to release its web.

12. Web renewing mechanism for printing presses comprising in combination pressure rollers between which the web from the paper supply roll in use and the leading end of the web from a new or reserve paper supply roller can be passed, retaining means associated with the pressure rollers for holding the leading end of the reserve web in position after it has been placed between the pressure rollers, angularly movable arms carrying said rollers, an operating handle for moving said rollers simultaneously to press the reserve web against the active web, and means whereby the movement of said arms releases the retaining means to free the reserve web.

13. Web renewing mechanism for printing presses comprising in combination pressure rollers between which the web from the paper supply roll in use and the leading end of the web from a new or reserve paper supply roller can be passed, retaining means associated with the pressure rollers for holding the leading end of the reserve web in position after it has been placed between the pressure rollers, angularly movable arms carrying said rollers, intermeshing geared segments connected to said arms, and an operating handle for rocking the arms simultaneously to press the reserve and active webs together.

14. Web supply mechanism for printing presses including in combination spaced apart rows of aligned web-roll supports and web-guiding means for guiding the webs from the web rolls away from the space between the rows and thence to one side of the rows whereby the space between the rows is left clear.

15. Web supply mechanism for printing presses including in combination spaced...
apart rows of aligned web-roll supports, web-roll handling mechanism between the rows, and web guiding means for guiding the webs from the web-rolls away from the space between the rows and thence to one side of the rows whereby the space between the rows is left clear for the manipulation of the web-rolls by the handling mechanism.

16. Web renewing and supplying mechanism for printing presses, including in combination means for supporting two paper supply rolls, a pair of pressure rollers, a lever for operating each pressure roller for the joining operation, mechanism for rotating each of said rolls, driving means for operating each of said rotating means and clutch mechanism for alternatively connecting said driving means to one of the rotating means.

17. A web renewing and supplying mechanism for printing presses, including in combination means for supporting two paper supply rolls, a pair of pressure rollers, a lever for operating each pressure roller for the joining operation, endless belts frictionally engaging each of said rolls, driving means for operating each of said belts and clutch mechanism for alternatively connecting said driving means to one of the rotating means.

18. A web renewing and supplying mechanism for printing presses, including in combination means for rotating a reserve web supply roll, an active web supply roll, a pair of pressure rollers each provided with means for gripping the end of the reserve web, means for causing rotation of the reserve web roll and thereafter actuating said pressure rollers to join the webs and release the end of the reserve web.

19. A web renewing and supplying mechanism for printing presses, including in combination a reserve web supply roll, an active web supply roll, a pair of pressure rollers each provided with means for gripping the end of the reserve web, means for rotating the reserve web roll, means for actuating the rotating means preliminarily to the joining of the webs and means for releasing the end of the reserve web.

20. A web renewing and supplying mechanism for printing presses, including in combination means for supporting a plurality of web rolls, a pair of pressure rollers for joining a reserve web to an active web, means for actuating said pressure rollers to effect the joining operation, means on the pressure rollers for gripping the end of the reserve web, means for rotating said supply rolls, and means operated by said actuating means to cause the reserve roll to be rotated by the rotating means.

21. A web renewing and supplying mechanism for printing presses, including in combination means for supporting a plurality of web rolls, a pair of pressure rollers for joining a reserve web to an active web, means for actuating said pressure rollers to effect the joining operation, means on the pressure rollers for gripping the end of the reserve web, means for rotating said supply rolls, and means operated by said actuating means for causing the reserve roll to be rotated before the joining operation is effected.

22. Web supply mechanism for printing presses including in combination a series of web roll supports one above another, a second series of web roll supports one above another, said series of supports being spaced apart to permit the passage of a replenishing web roll between the web rolls of the series, and means for directing the webs from the rolls to the press free of said space for the passage of the replenishing web roll.

23. Web supply mechanism for printing presses including in combination a series of web roll supports one above another, a second series of web roll supports one above another, said series of supports being spaced apart to permit the passage of a replenishing web roll
between the web rolls of the series, means for
directing the webs from the rolls to the press
free of said space for the passage of the re-
plenishing web roll, and means for delivering
a replenishing roll to either series of supports.
29. Web supply mechanism for printing
presses including in combination a series of
web roll supports one above another, a second
series of web roll supports one above another,
said series of supports being spaced apart to
permit the passage of a replenishing web roll
between the web rolls of the series, means for
directing the webs from the rolls to the
press free of said space for the passage of the
replenishing web roll, means for delivering
a replenishing roll to either series of supports
and to any roll support of either series.
30. Web supply mechanism for printing
presses including in combination a series of
web roll supports one above another, a second
series of web roll supports one above another,
said series of supports being spaced apart to
permit the passage of a replenishing web roll
between the web rolls of the series, means for
directing the webs from the rolls to the press
free of said space for the passage of the re-
plenishing web roll, and means permitting
the passage of a replenishing web roll and
supporting and guiding it to any of the web
roll supports.
31. Web supply mechanism for printing
presses including in combination a vertically
disposed series of devices for rotatably sup-
porting web rolls, a second vertically dis-
posed series of devices for rotatably sup-
porting web rolls, said series of devices being
spaced apart to permit the vertical passage
of a replenishing web roll, a pair of track-
ways for each of said devices for receiving a
replenishing web roll and guiding it to feed-
ing-off position, and means for directing the
webs from the various rolls to the press free
of said passage for the replenishing roll.
32. Web renewing and supplying mecha-
anism for printing presses, comprising a pair
of pressure rollers, means for securing the
reserve web on either roller, angularly mov-
able arms carrying the rollers, a hand lever
connected to said arms for actuating them,
mechanism engaged by said hand lever dur-
ing depression of the latter for moving the
pressure roller having the reserve web at-
tached for the web joining operation, endless
belts frictionally engaging a reserve paper
supply roll and an active paper supply roll,
shafts operating said belts, driving means for
said shafts and clutch means operated by said
mechanism to couple the driving shaft of the
belts engaging the reserve paper supply roll
to the actuating means to render said driving
belts operative, when the pressure roller with
the reserve web attached is moved for the web
joining operation.