

Feb. 9, 1926.

1,572,704

C. E. CARPENTER

PAPER FEED

Filed May 28, 1923

4 Sheets-Sheet 1

Fig. 1,

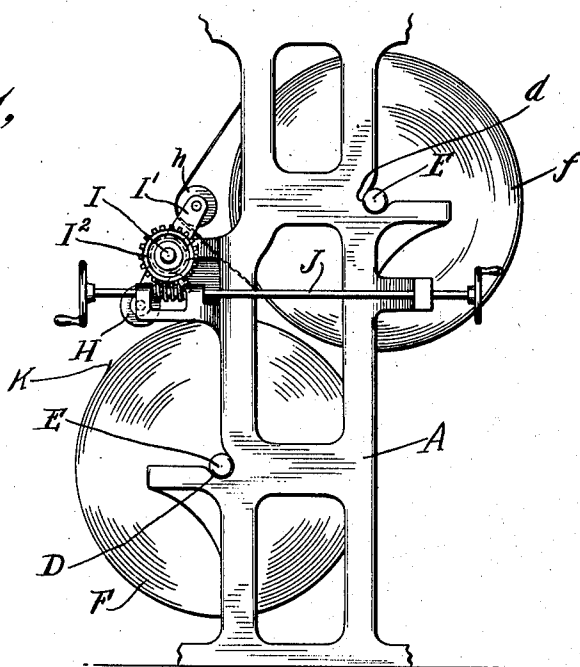
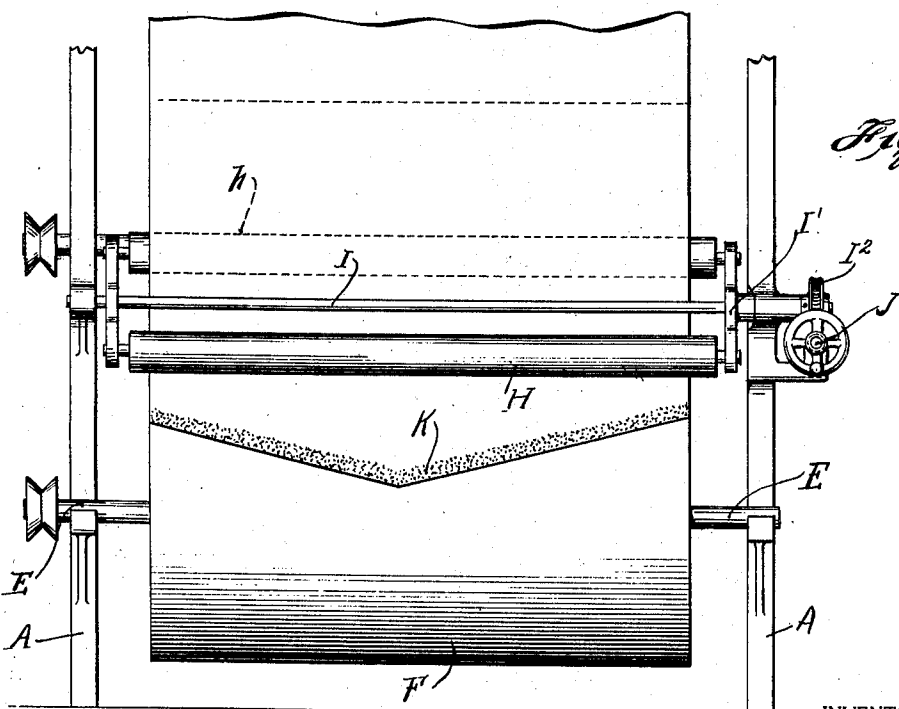


Fig. 2,



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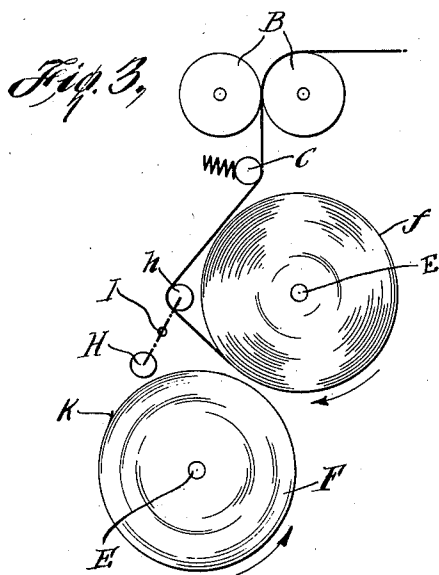
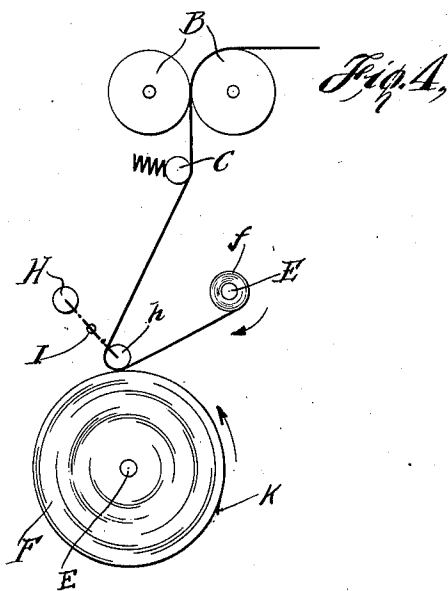
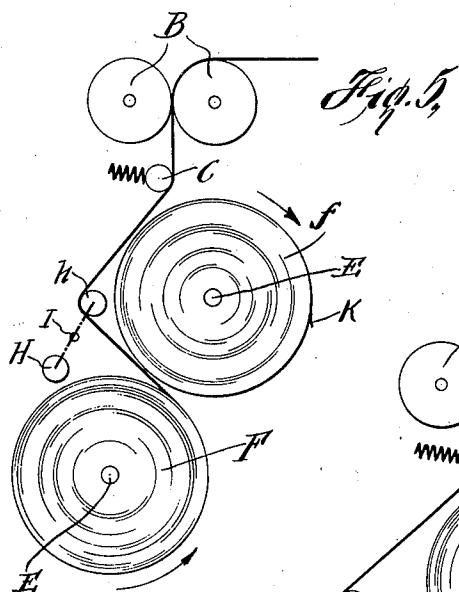
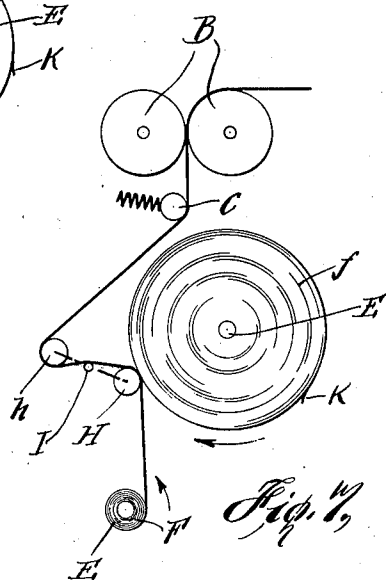
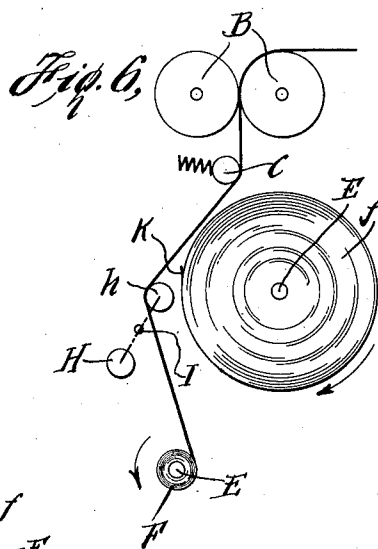
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4 Sheets-Sheet 2



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Fig. 8,

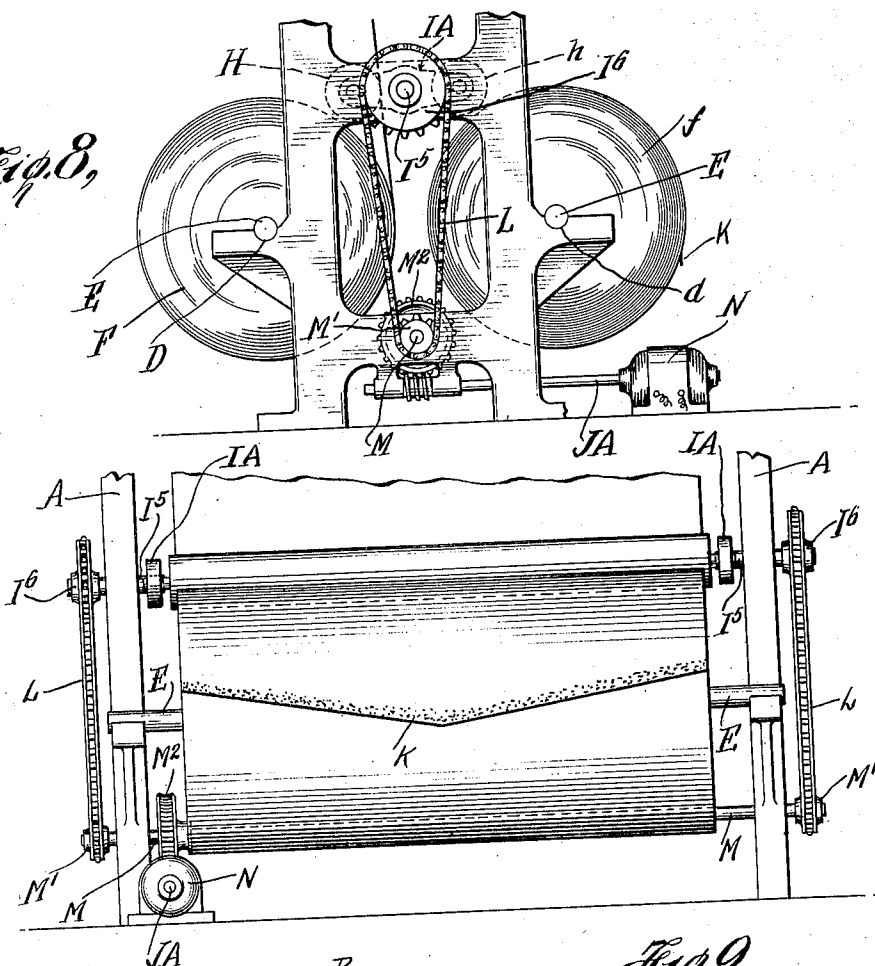
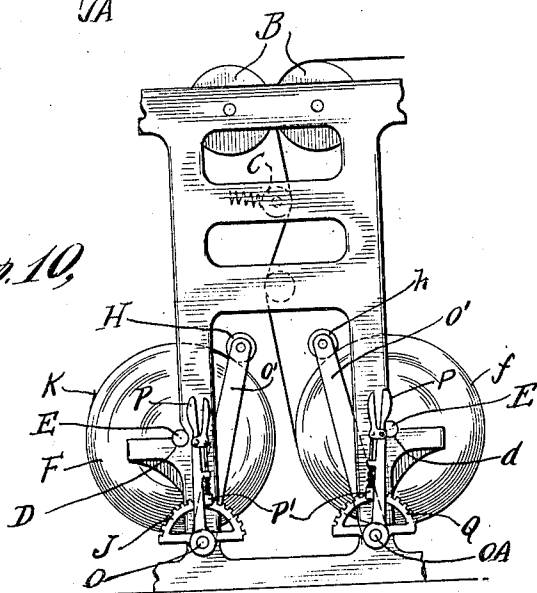


Fig. 9,

Fig. 10,



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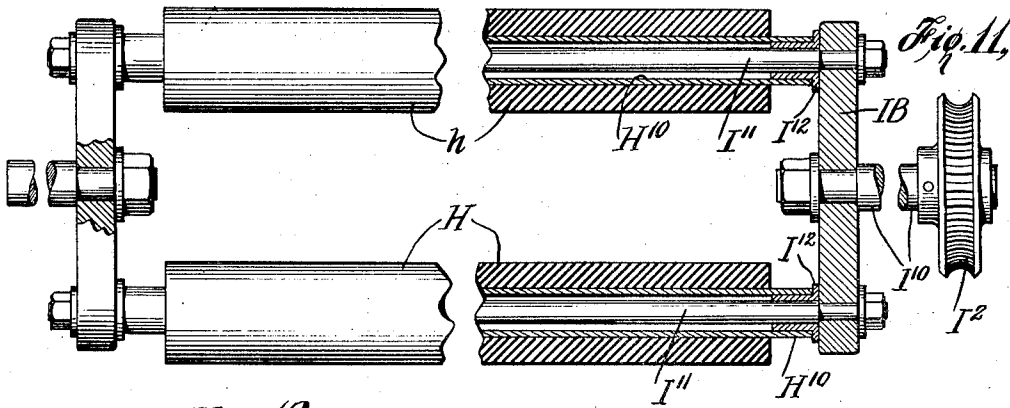
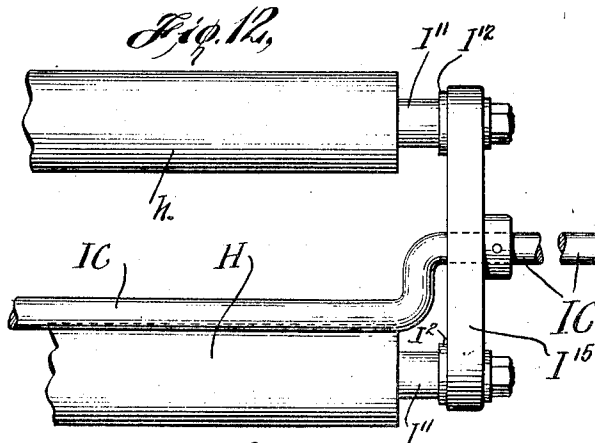
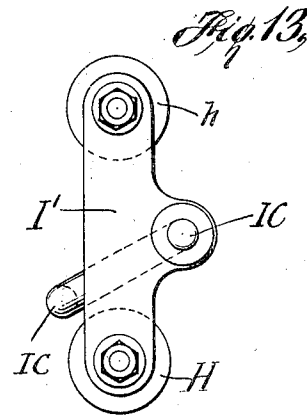
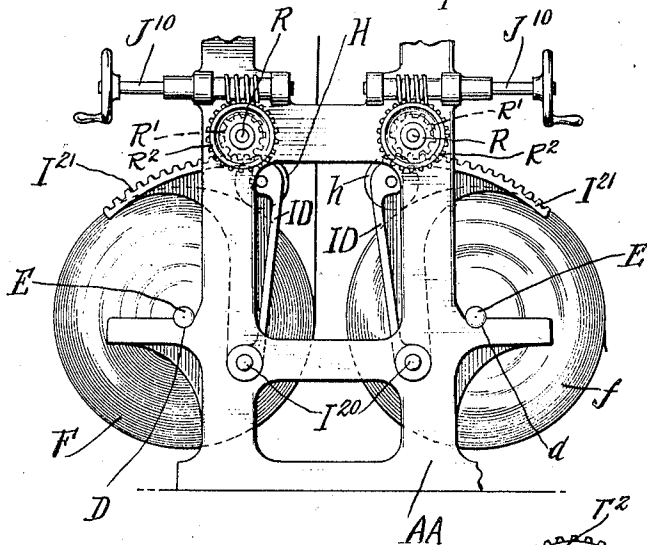
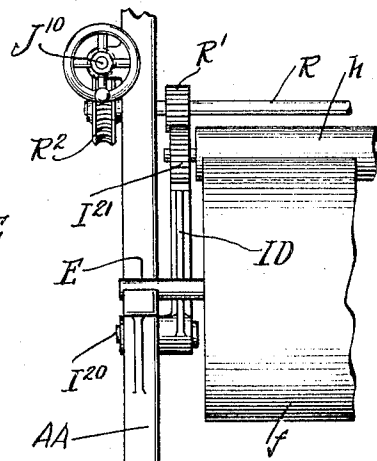
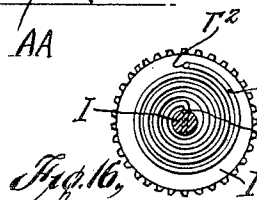
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

CHARLES E. CARPENTER, OF NEW YORK, N. Y.

PAPER FEED.

Application filed May 28, 1923. Serial No. 641,873.

To all whom it may concern:

Be it known that I, CHARLES E. CARPENTER, a citizen of the United States, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Paper Feed, of which the following is a specification.

The general object of the present invention is to provide improved mechanism, characterized by its simplicity and effectiveness, for connecting the end of a web of paper in a fresh or full size roll, to the web of paper being drawn from another roll, so as to permit a continuous feed of a web which is drawn from one supply roll until that roll is exhausted or practically exhausted, and is then drawn from a fresh roll without stopping the travel of the web or unduly reducing its normal speed of travel.

My invention is characterized by the provision of two sets of stationary bearings for the supply rolls arranged side by side so that the web feeding mechanism of the printing press or other mechanism to which the paper web is fed may draw from a roll mounted in either set of bearings and provisions for moving the web passing from a nearly exhausted supply roll mounted in either set of bearings against the periphery of a fresh roll mounted in the other set of bearings, to thereby start the fresh roll into rotation by frictional contact with the web drawn from the expiring roll, and to attach the web on the fresh roll to the web from the expiring roll, as by means of paste previously applied to the outer end of the web of the fresh roll.

In a preferred construction the web shifting provisions comprise a pair of web shifting rolls journaled in a single oscillating frame which may be rotated to cause one web shifting roll to shift the web from the roll in one set of bearings into contact with the roll in the other set of bearings, or to cause the other web shifting roll to engage the web from the roll in the last mentioned set of bearings and move it into contact with the periphery of the roll in the first mentioned set of bearings. The invention is characterized not only by its simplicity and reliability, but by the comparatively

small amount of space which it requires, and by the fact that it may be readily constructed in various forms as required to accommodate the different dispositions of the two supply rolls convenient or desirable with different types of printing presses or different press room space conditions.

The web shifting rolls, which are advantageously faced with yielding material, contact with the web along the full width of the latter, and the force with which either web shifting roll presses the web from an expiring roll against the periphery of a fresh supply roll, has no appreciable effect on the tension applied to the web being fed. These factors each contribute to the formation of an efficient paste bond between the web from the expiring roll and the web of the fresh roll.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, and the advantages attained with it, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described a preferred embodiment of my invention.

Of the drawings:

Fig. 1 is an elevation of a portion of a newspaper press equipped with my invention;

Fig. 2 is an elevation taken at right angles to Fig. 1;

Figs. 3, 4, 5, 6 and 7 are diagrams representing successive conditions of operation and the corresponding adjustments of the web shifting mechanism.

Figs. 8 and 9 are elevations taken at right angles to one another showing a modified form of web shifting mechanism;

Fig. 10 is a somewhat diagrammatic elevation of a second modification of the web shifting mechanism;

Fig. 11 is an elevation partly broken away and in section of a modified form of the rocking frame supporting the web shifting rolls;

Fig. 12 is a partial elevation, and Fig. 13 is an end view of another modification of web shifting roll supporting frame; and

Fig. 14 is a partial side elevation, and Fig. 15 an elevation at right angles to Fig.

14 illustrating another arrangement for supporting and adjusting the web shifting rolls; and

Fig. 16 is an elevation of a portion of a web shifting roll supporting an adjusting mechanism.

In the drawings, and referring first to the construction illustrated in Figs. 1 to 7, inclusive, A represents side frame members of a printing press. Each side frame A is provided with a bearing D for the corresponding end of the mandrel or shaft E of a web supply roll F and with another similar bearing *d* for the corresponding end of the mandrel or shaft E of the roll *f*. The printing rolls B serve as feed rolls for drawing a web of paper over the usual compensating roll C into the press from a supply roll F or *f* as shown in Figs. 3 to 7.

As shown the bearings D are located at a level below that of the bearings *d*, and are horizontally displaced from the latter, but this arrangement is not essential and may be varied as required to best suit the general design of the press or the space conditions in which the press is employed. The only essential relation of the bearings D and *d* is that the two sets of bearings should be side by side and separated from one another by a convenient distance. The distance between the two sets of bearings may conveniently be made just great enough to permit two full rolls F and *f* to be mounted in the bearings D and *d* respectively at the same time, but where the available space is restricted the two sets of bearings may be spaced somewhat closer, in which case a fresh roll cannot be put in place in its bearings until the roll in the other side of the bearings is partially exhausted. The bearings D and *d* may be of the usual type employed to support the paper supply rolls of presses, and the frame work may be provided with the usual instrumentalities for getting the rolls into, and holding them in proper position in their bearings, and for putting the proper braking or tension force on the rolls.

The web shifting mechanism in the form illustrated in Figs. 1 to 7, comprises a pair of parallel web shifting rolls H and *h* each having shaft portions at its ends which are journaled in an oscillating frame. This frame as shown comprises a rock shaft I journaled at its ends in the side frames A and having arms I' secured to it adjacent its ends at the inner sides of the respective side frames. The ends of the shafts of the web shifting rolls H and *h* are journaled in the arms I'.

The mechanical expedient shown for adjusting and controlling the angular position of the rock shaft I comprises a worm gear I² secured to one end of the shaft I and in mesh with a worm carried by an operating shaft J which is journaled in suitable bear-

ings provided on one of the side frames A. Advantageously the shaft J is provided with a hand wheel at each end so disposed and located as to readily permit of the rotation of the shaft J by an operator standing at either side of the rolls F and *f* mounted in the bearings D and *d*, to adjust the web shifting rolls H and *h* back and forth into their different operating positions. The web shifting rolls H and *h* are advantageously provided with yielding faces, and may comprise body portions formed of rubber or the like. Advantageously, in some cases, printing rolls having bodies of the usual composition employed for that purpose, may be employed as the web shifting rolls H and *h*.

In the contemplated mode of operation of the apparatus shown in Figs. 1 to 7, the web shifting rolls H and *h* normally occupy the positions in which they are shown in Figs. 3, 5, and 6. As shown in Fig. 3, the feed rolls B are being fed with paper drawn from a fresh or nearly fresh roll *f* mounted in the bearings *d*. The bearings D hold a fresh roll F which is stationary, and has had paste K applied along the outer surfaces of the end of the web which advantageously is of the angular shape shown in Fig. 2. To connect the web being drawn from the nearly exhausted roll *f* to the outer end of the web on the roll F, and thereafter supply the feed rolls B with web drawn from the rolls F, the rock shaft I is rotated to move the web shifting rolls H and *h* from the positions occupied by them in Fig. 3 into the positions in which they are shown in Fig. 4. As the web shifting roll *h* is thus swung about the axis of the shaft I, it moves the web being drawn from the roll *f* into contact with the periphery of the roll F with such contact pressure as to start the roll F into rotation by the frictional engagement of the periphery of the roll F by the web from the roll *f*. When the consequent rotation of the roll F brings the outer end of the web on that roll into contact with the web from the roll *f*, the paste K unites the webs and breaks the grease or other fragile bond by which the outer end of the web on the roll F was previously connected to the body of the roll, and the web from the roll F is then drawn between the feed rolls B. In practice the roll F is preferably so placed initially as to require nearly a complete turn of the roll F to bring the outer end of the web on that roll into contact with the web from the roll *f*, thus reducing the tension on the web from the roll *f* required to bring the roll F up to the proper speed. When the web from the nearly exhausted roll *f* is attached to the web from the fresh roll F, the web from the nearly exhausted roll may be broken or cut by the attendant in the usual manner, or if the operation is properly timed so that the previously used supply roll is almost en-

tirely exhausted at the time the web therefrom is connected to the fresh roll, the web tension may be relied upon to tear the web passing from the previously used roll *f* free from the mandrel *E* of that roll.

After the web feed from the roll *F* is thus started, the shaft *I* may be turned back from the position shown in Fig. 4 into that shown in Fig. 5 which is the same as that shown in Fig. 3, and a fresh roll *f* is placed in the bearings *d*. The fresh roll *f* may be put in place at any time if the bearings *D* and *d* are spaced sufficiently far apart as shown, and when the bearings *D* and *d* are closer together, the fresh roll *f* may be put in place as soon as the diminishing diameter of the roll *F* permits the new roll *f* to be put in place without having its periphery engage the web passing from the roll *F*.

Fig. 6 illustrates the condition of the apparatus with the roll *F* nearly exhausted, and with the fresh roll *f* in place and with paste *K* applied to the outer surface of the outer end of this web. To start feeding from the fresh roll *f*, the rock shaft *I* is then adjusted in the counter clockwise direction to bring the web shifting rolls *H* and *h* into the positions shown in Fig. 7. As this adjustment of the web shifting roll occurs, the roll *H* engages the web from the nearly exhausted roll *F* and moves it into contact with the periphery of the fresh roll *f* thereby setting the latter into rotation and eventually causing its web to be united by the paste *K* to the web from the nearly exhausted roll *F*. As the roll *F* was previously set into rotation and had its web connected to the previously exhausted roll *f*. As soon as the two webs are thus united, the web from the roll *F*, if the latter is not entirely exhausted, is broken between the roll *H* and mandrel of the roll *F*. After the web feed is thus started from the fresh roll *f*, the rock shaft *I* is turned back to return the rolls *H* and *h* to their normal position shown in Figs. 3, 5, and 6, thus completing the cycle which is then repeated as the operation of the press continues.

In practice I find that when the simple mechanism disclosed, is operated in the manner described, it is possible to bring the fresh roll up to a very substantial angular velocity during the permissible turning movement of the fresh roll of something less than 360°, without subjecting the web from the roll nearing exhaustion to a dangerous tension. As a result it is possible to start feeding the web from a fresh roll by the use of my invention while still operating the press at a considerable speed, and in some cases I consider it unnecessary to make any reduction in the normal speed of an ordinary newspaper press in starting to feed the press from a fresh roll. Those skilled in the art will readily recognize

that my apparatus is substantially simpler in construction and operation than the mechanisms now in use for shifting the web feed from an exhausted roll to a fresh roll without stopping the web feed. A highly desirable characteristic of the invention is that it permits of practically any relative arrangement of the cooperating sets of bearings *D* and *d*, for the two rolls alternately supplying a single web feed, which the design of the press, or the particular arrangement of supply roll hoisting devices, and the like best suiting the space requirements of the press room, may make desirable. By a suitable location of the axis of the shaft *I* relative to the axes of the bearings *D* and *d*, and relative to the axes of the rolls *H* and *h*, the web shifting mechanism may be employed with paper rolls the initial or maximum diameter of which varies substantially.

It will be obvious that many variations in the form of the web shifting mechanism may be made. For example, as shown in Figs. 8 and 9, the arms *IA* in which the web shifting rolls *H* and *h* are mounted may each be carried by a short stub shaft *I*⁵ which is journaled in the corresponding press side frame *A* and is provided at its outer end with a sprocket wheel *I*⁶. The two sprocket wheels *I*⁶ are each connected by a sprocket chain *L* to a corresponding sprocket wheel *M*⁷ carried by a shaft *M* which extends across the machine and carries a worm gear *M*² by which the shaft *M* may be rotated to thereby rotate the two arms *IA* in unison through the sprocket chains *L* and sprocket wheels *I*⁶ and *M*⁷. The shaft *M* may be rotated manually but as shown is rotated by a shaft *JA* which carries a worm in mesh with the gear *M*² and is driven by an electric motor *N*.

The general mode of operation of the apparatus shown in Figs. 8 and 9 is essentially the same as that of the form of apparatus first described. With the cooperating sets of bearings *D* and *d* arranged side by side as shown in Figs. 8 and 9, the web when drawn from either of the supply rolls will not engage either of the web shifting rolls in the normal condition of the latter at least except when the supply roll from which the web is being drawn is nearing exhaustion, whereas, in the arrangement first described the web is at all times in contact with the web shifting roll *h* which thus serves as a guide roll, but this difference is due to the difference in the location of the bearings for the supply rolls rather than to any difference between the web shifting mechanism of Figs. 8 and 9.

In the modified form of apparatus illustrated in Fig. 10, the web shifting roll *H* has its ends journaled in arms *O*⁷ carried at the opposite ends of the rock shaft *O*,

the angular position of which may be adjusted manually by a lever P secured to one end of the shaft and provided with a bolt P' cooperating with a stationary tooth segment Q to lock the rock shaft in any position into which it may be adjusted. The web shifting roll *h* is carried by the arms O' of a rock shaft OA separate from, but similar to the rock shaft O and similarly provided with a lever P, bolt P' and locking segment Q for effecting its angular adjustments. The two rock shafts O and OA are so relatively arranged that the web shifting roll *h* may be swung from its full line position to its dotted line position to bring the web from an expiring roll *f* into contact with the periphery of a roll F, while the web shifting roll H may be similarly adjusted to move the web from an expiring roll F into contact with the periphery of a fresh roll *f*.

In the construction illustrated in Fig. 11, the rocking frame in which the web shifting rolls H and *h* are mounted comprises trunnion shaft extensions I¹⁰ carried by end members IB. The two end members IB are rigidly connected by rods I¹¹ and the rolls H and *h* which are hollow surround the rods I¹¹. The rolls H and *h* as shown each comprise a tubular core H¹⁰ of metal which supports the composition body or face of the roll. The rocking frame is provided with suitable bearings for the rolls H and *h*. As conventionally illustrated the bearings are in the form of collars I¹² on the rods I¹¹, over which the ends of the tubes H¹⁰ extend, though in practice I contemplate the use of roller bearings for the rolls H and *h*.

It may be desirable in some cases at least, to have the axis of oscillation of the rocking frame in which the rolls H and *h* are mounted, at one side of the plane including the axes of the rolls H and *h*, as in the construction shown in Figs. 12 and 13, which differs from that shown in Figs. 1 and 2 in that the ends of the rock shaft IC of Figs. 12 and 13 are thus displaced. The construction shown in Figs. 12 and 13 also differs from that shown in Figs. 1 and 2, in that the body of the shaft IC is laterally displaced from the axis of oscillation of the rocking frame to avoid contact therewith of the web passing between the web shifting rolls.

In the modification illustrated in Figs. 14 and 15, the roll H is journalled at its ends in the upper ends of arms ID, one at each side of the machine, and each turning on a pivot or stud I²⁰ projecting from the inner side of the corresponding side frame AA. Each arm ID is provided at its upper end with a gear segment I²¹ in mesh with a spur gear R' carried by a shaft R extending across the machine and journalled at its ends in the side frames AA. Associated with the shaft R are suitable provisions for an-

gularly adjusting the shaft to give the roll H its desired adjustments. The provisions shown for this purpose comprise a worm gear R² carried by the shaft R adjacent one end. The gear R² is in mesh with a worm carried by an operating shaft J¹⁰ mounted on the corresponding side frame AA and provided with a hand wheel for manual rotation. The roll *h* in the construction shown in Figs. 14 and 15, is supported and operated by parts exactly similar to those provided for supporting and adjusting the roll H.

In the arrangements shown in Figs. 8, 9, 10, 11, 14 and 15, the means for supporting and adjusting the web shifting rolls H and *h* comprise nothing which can come in contact with the web of paper passing between the web shifting rolls H and *h* in any adjustment of the latter, whereas, in the somewhat simpler constructions shown in Figs. 1, 2, 12 and 13, the rocking frame supporting the web shifting rolls may be angularly adjusted into a position in which the web will engage the body of the shaft I or IC. The extent of angular movement which must be given to the rocking frame to adjust the web shifting rolls H and *h* into their different required positions depend, of course, upon the general design of the roll stand in which the supply rolls F and *f* are mounted and the direction in which the web passes from the supply rolls to the guide rolls or web advancing mechanism engaged by the web. Those skilled in the art will understand that different ones of the forms of construction illustrated, or other modifications in form which will occur to those skilled in the art, may be preferable for use in connection with different types of roll stand.

The fact that with my invention in any of the forms illustrated, the web shifting rolls may each engage the web across the full width of the latter, and that the force with which a web shifting roll presses the web from the expiring roll against the periphery of the fresh roll does not appreciably effect the tension on the web being advanced, makes it possible to secure a thoroughly good paste bond between the web from the fresh roll and the web from the expiring roll across the full width of the web. In starting to feed from a fresh roll, the latter is preferably started into rotation without subjecting it to the braking force usually employed in normal operation to retard the full rotation and thereby put the web under the desired tension. As soon as the paste bond between the web from the new and old rolls is formed and drawn into the printing press, the usual tension producing braking force may be applied to the fresh roll.

Where the adjusting mechanism for the web shifting rolls comprises adjusting provisions proper, as unyielding as the worm

and gear drive illustrated in Figs. 1, 2, 8, 14 and 15, it may be advisable to provide a yielding element somewhere in the operating mechanism. For example, as shown in Fig. 5 16, the worm gear I^2 instead of being rigidly connected to the shaft I, may be connected thereto by a spring T shown as in the form of a helix with one end T^1 connected to the worm gear and the other end T^2 connected to the shaft I.

While in accordance with the provisions of the statutes, I have illustrated and described the best forms of my invention now known to me, it will be apparent to those skilled in the art that many changes in form may be made without departing from the spirit of my invention, and that certain features of my invention may sometimes be employed to advantage without a corresponding use of other features.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In web feeding mechanism, the combination with web advancing means, of two sets of supply roll bearings each set being adapted to hold a roll of web material while the web of that roll is delivered to said advancing means, and mechanism for utilizing the pull of the traveling web from a nearly exhausted roll mounted in either set of said bearings to set into rapid rotation a fresh roll mounted in the other set of bearings, said mechanism comprising a pair of web shifting rolls located at opposite sides of the traveling web and having yielding web engaging surfaces, and means for adjusting said web from a roll being exhausted and mounted in either set of said bearings against the periphery of a fresh roll mounted in the other set of bearings.

2. In web feeding mechanism the combination with web advancing means, of two sets of supply roll bearings, each set being adapted to hold a roll of web material while the web of that roll is delivered to said advancing means, and means for moving the travelling web being fed from a nearly exhausted roll mounted in either set of bearings into yielding contact with the periphery of a fresh roll mounted in the other

set of bearings to thereby set the fresh roll into rotation and effect a paste bond between the travelling web and the web of the fresh roll.

3. In web feeding mechanism, the combination with web advancing means, of two sets of supply roll bearings each set being adapted to hold a roll of web material while the web of that roll is delivered to said advancing means, and mechanism for utilizing the pull of the traveling web from a nearly exhausted roll mounted in either set of said bearings to set into rapid rotation a fresh roll mounted in the other set of bearings, said mechanism comprising a pair of web shifting rolls located at opposite sides of the traveling web and having yielding web engaging surfaces adapted to engage the traveling web across the full width of the latter, and means for adjusting said web shifting rolls to press the traveling web from a roll being exhausted in either set of said bearings against the periphery of a fresh roll in the other set of bearings.

4. In web feeding mechanism, the combination with web advancing means, of two sets of supply roll bearings each set being adapted to hold a roll of web material while the web of that roll is delivered to said advancing means, and mechanism for utilizing the pull of the traveling web from a nearly exhausted roll mounted in either set of said bearings to set into rapid rotation a fresh roll mounted in the other set of bearings, said mechanism comprising a pair of web shifting rolls located at opposite sides of the traveling web and having yielding web engaging surfaces adapted to engage the traveling web across the full width of the latter, means for adjusting said web shifting rolls to press the traveling web from a roll being exhausted in either set of said bearings against the periphery of a fresh roll in the other set of bearings, and means for adjusting said web shifting rolls including a yielding pressure transmitting element.

Signed at New York, in the county of New York and State of New York, this 25th day of May A. D. 1923.

CHARLES E. CARPENTER.