July 30, 1929. I. I. STONE 1,722,508

PAPER FEEDING MECHANISM FOR PRINTING PRESSES

Original Filed Dec. 30, 1920 3 Sheets-Sheet 1

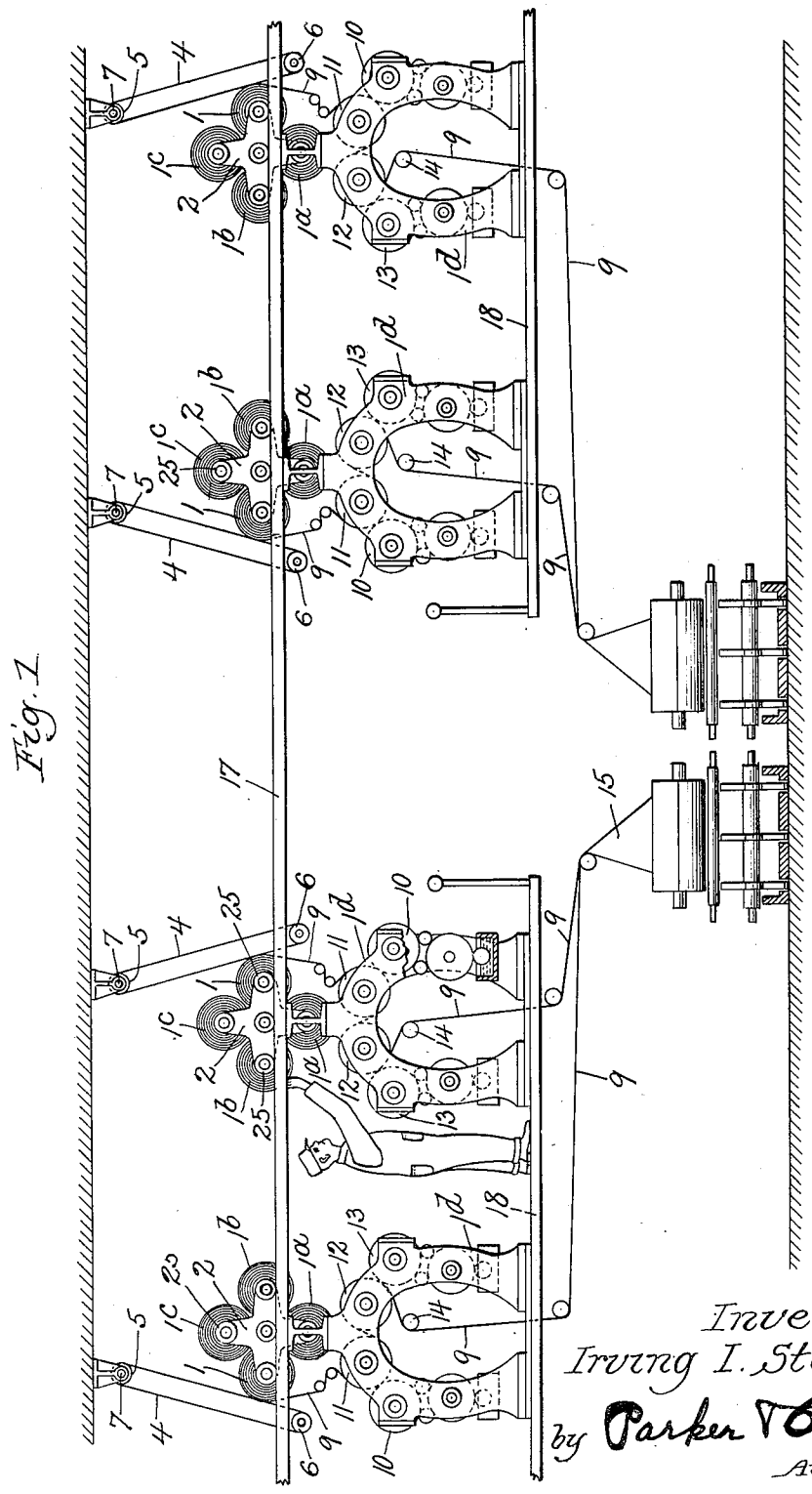


Fig. 1.

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Fig. 2.

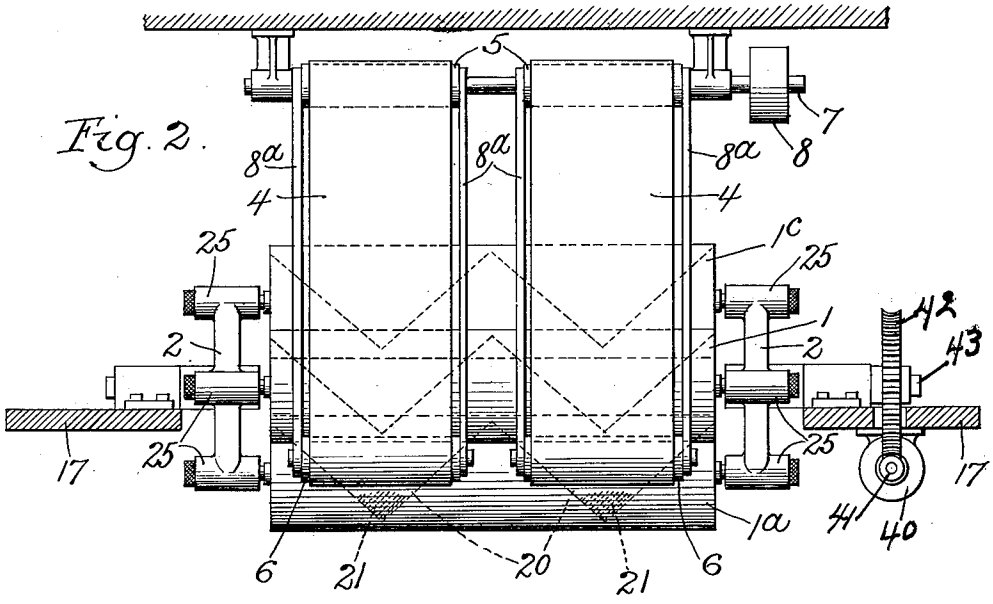


Fig. 3.

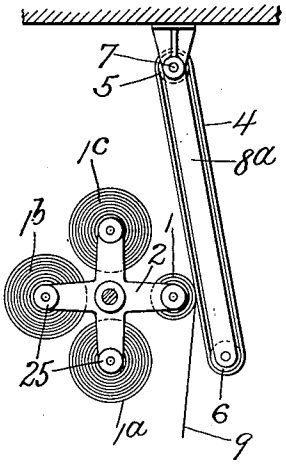


Fig. 4.

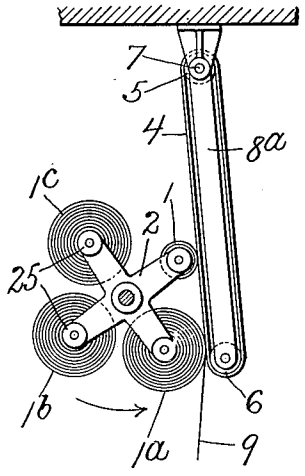
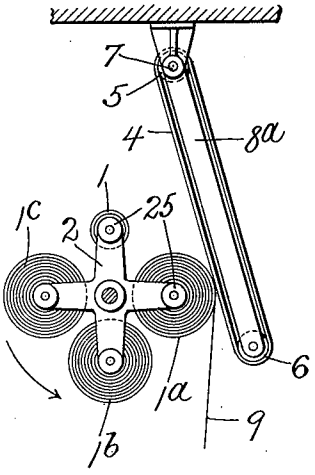


Fig. 5.



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Fig. 6.

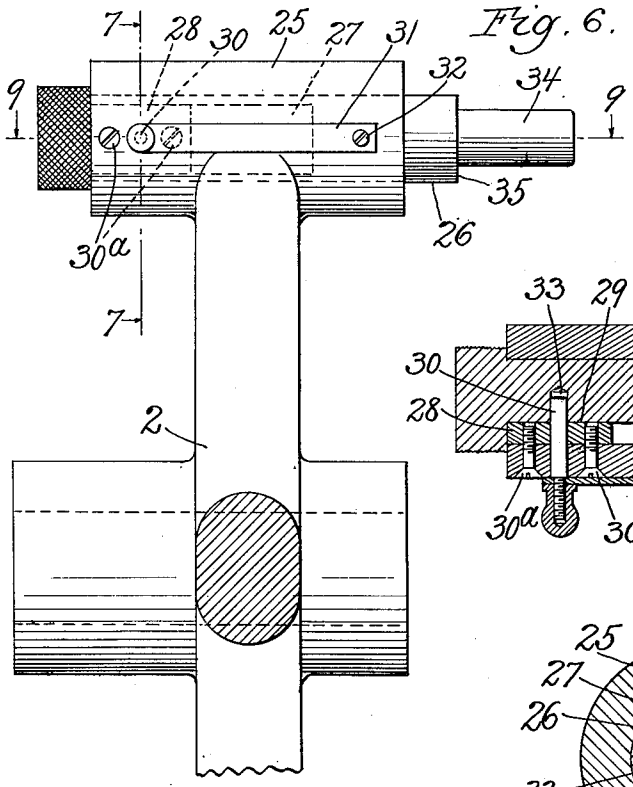


Fig. 9.

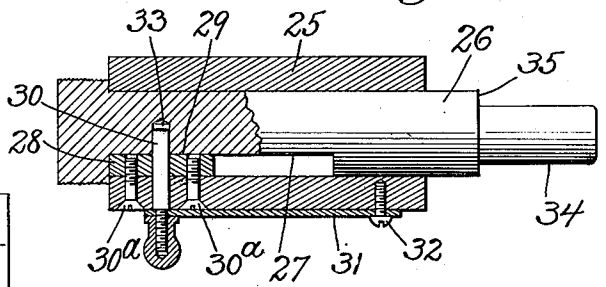


Fig. 7.

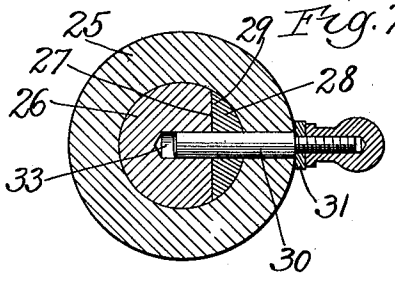
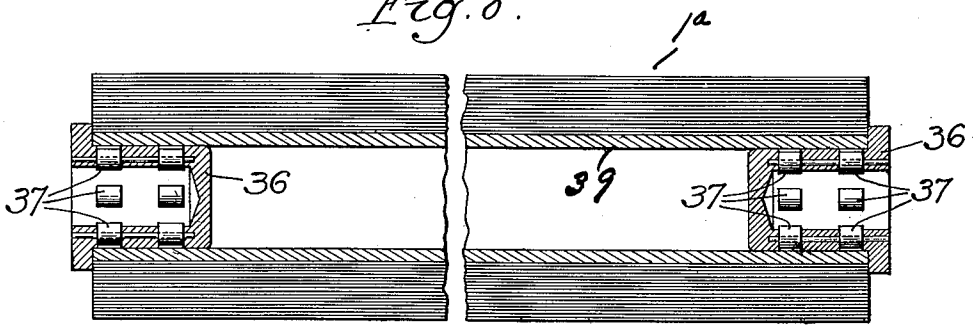


Fig. 8.



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Patented July 30, 1929. 1,722,508

UNITED STATES PATENT OFFICE.

IRVING I. STONE, OF CHICAGO, ILLINOIS, ASSIGNOR TO GUSTAVUS A. E. KOHLER, OF CHICAGO, ILLINOIS.

PAPER-FEEDING MECHANISM FOR PRINTING PRESSES.

Application filed December 30, 1920, Serial No. 433,994. Renewed May 21, 1926.

This invention relates to paper feeding mechanism for printing presses, and has for its object to provide a new and improved mechanism of this description particularly adapted for newspapers. One of the requirements of a daily newspaper is that it shall have the latest news. This necessitates delaying the printing of the newspapers so that they may contain this latest news. When a large number of copies of such newspaper are printed, as in the large cities, the speed of printing becomes of vital importance, because not only must the beginning of the printing be delayed as much as possible, but the papers after the printing is started must be completed and delivered to the readers at the earliest possible moment. One of the objects of my invention is to increase the speed of printing such papers.

The paper supplied to printing presses is first formed into rolls of the desired size, and these rolls are then brought to the press and mounted upon a rotating shaft and the web of paper from the roll, in the present practice, is fed upwardly into and through the press. This, due to the pull on the paper, places a great strain upon the web of paper causing it to accidentally tear or break, and then the press has to be stopped to again thread the paper through it. This requires several men and considerable time, and greatly delays the printing of the newspapers.

By means of my invention I avoid such delays by arranging the paper so that it is fed downwardly to and through the press and to the formers, the force of gravity assisting in the movement, instead of retarding it as has been the case in the practice heretofore adopted.

Another object of my invention is to save paper. With newspaper printing presses as at present operated, there is a large amount of paper wasted and where large editions are printed as in large cities, this waste runs very high. By means of my invention this waste can be greatly reduced.

The invention has other objects which are more particularly pointed out in the following description:

Referring now to the drawings

Fig. 1 is a view showing the mechanism embodying the invention;

Fig. 2 is a side view showing one of the paper carrying devices with the belts in position;

Figs. 3, 4 and 5 are diagrammatic views showing the steps whereby the web from a fresh roll is connected with the web of an expired roll and run through the press without stopping the press;

Fig. 6 is a detail side view of one of the sockets of the reel;

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6;

Fig. 8 is a sectional view through one of the spools for the roll of paper showing the removable hollow receiving devices connected with the ends thereof;

Fig. 9 is a sectional view taken on line 9—9 of Fig. 6.

Like numerals refer to like parts throughout the several figures.

Referring now to the drawings which illustrate one form of mechanism embodying the invention, I provide a printing press 1^d of any of the usual forms. I then mount the roll or rolls of paper above the press, that is in a plane above the press, so that the web will be fed downwardly into and through the press. In the particular construction illustrated I provide a plurality of rolls of paper 1, 1^a, 1^b and 1^c. These rolls of paper are mounted in some manner so as to be brought successively into operative position. They may for example be mounted upon a rotating frame or reel 2, carried by supports. This frame or reel may be rotated by hand or by a motor or by a connection to some source of power. Each of the rolls of paper is mounted so that it is free to rotate to unwind the web of the paper. Belts 4 are arranged to successively engage the rolls of paper. These belts are suspended in proper position and pass over pulleys 5 and 6. The pulley 5 may be a driven pulley, driven by the shaft 7, said shaft driven from any suitable source of power, as by means of the pulley 8. The pulleys 5 and 6, or rather the shafts upon which they are mounted, are connected by a suitable frame 8^a, and this frame and the belt and the pulley 6 may be rocked about the shaft 7 to vary the position of the belt. The belt is normally suspended so that, due to the weight of the parts it passes against the roll, as shown in Fig. 1, and since the belt is moving, it will cause the roll to rotate so

that the paper can be fed to the press, the belt being given the proper speed to permit the proper feed of the paper.

The belt is preferably suspended above the roll of paper so that the roll engages it near the end thereof, that is near the end passing over the pulley 6. This construction does not retard the roll, but starts the paper out instantly and freely. When the belt is in operation the web 9 of the paper passes down through the press 1^a and between the cylinders 10, 11, 12 and 13 of the press, and then after the paper is printed passes around a direction changing roller 14, and then down below the press, and then along to the former 15. It will thus be seen that the web of paper passes downwardly to and through the press and to the former, and that the force of gravity is utilized to assist this movement instead of retarding it.

It will further be seen that this takes away the excessive strain from the paper, and prevents the accidental breaking of the web, thus increasing the capacity of the press.

It will further be seen that the paper can be easily and quickly threaded through the press by one man.

The rolls of paper when exhausted may be replaced in any desired manner as by having them placed upon trucks and brought up into position so that one roll may be attached to the reel while the paper is being fed from another roll, thus avoiding any delay in the printing of the papers. I prefer to support the paper rolls and reel upon the same foundation as the press. This may be done by means of a support 17 which may be a part of the press frame or connected therewith so as to be supported upon the same foundation 18 as the press. This makes a more compact structure and permits the use of the same foundation for the reels and the press and avoids the necessity of a heavy floor above the press. Such a construction permits one foundation on the lower floor to act for all the apparatus, and not only lessens the cost of the construction, but decreases the space necessary, and gives better use of the space provided, thus increasing the efficiency of operation.

When the paper on roll 1 for example is about exhausted, the reel 2 may be moved, preferably in the direction of the arrow (see Figs. 3, 4 and 5). The new roll, as for example the roll 1^a has its free edge 20 provided with some adhesive material 21 as shown in Fig. 2. As the reel 2 is moved it will be seen that the roll 1^a is brought into position where the belt acts upon it, the belt at the same time still acting on the roll 1 (see Fig. 4.) At this time the web 9 from the roll 1 is between the roll 1^a and the belt. The pressure of the belt on roll 1^a starts it in motion when the adhesive edge 21 passes under the web 9 from roll 1, the pressure of the belt causing the web of roll 1^a to adhere to the web of the roll 1. If the transfer is made just as the paper from roll 1 is exhausted, nothing further need be done and the paper will then be fed from roll 1^a. If the transfer from roll 1 to 1^a should be made while there is still considerable paper on the roll 1, the web of paper from roll 1 is cut or separated as soon as the web of roll 1^a is connected therewith so that the printing continues upon the web of roll 1^a.

It will thus be seen that by means of this construction and arrangement the feed to the press may be transferred from one roll to another without stopping the press.

When roll 1^a is exhausted the reel may be again moved so as to transfer the feed to roll 1^b. This may be continued as long as the press is in operation, new rolls being supplied to the reel as hereinbefore described.

It is desirable to have the reel and rolls arranged so that the rolls of paper can be easily and quickly removed from and connected with the reel and that when the roll of paper is connected with the reel it cannot accidentally become disconnected. This is particularly desirable when the rolls are placed above the press. One construction to secure this result is illustrated in the drawings. In this construction each reel is provided at its opposite ends with the frames 2, each having the desired number of arms. At the end of each arm there is provided a socket 25. In each socket is an opening in which slides a pin 26. This pin is provided with a flat side 27. The opening in the socket is preferably circular, and fastened to the socket at one end so as to project into this opening, is a piece 28, also having a flat side 29 which engages the flat side of the pin 26. The piece 28 may be fastened in position by suitable fastening devices 30^a.

Some suitable holding device is provided for holding the pin against movement when it is in a predetermined position. As herein shown there is a locking projection 30 which is fastened to an arm 31, preferably a spring arm, and which is fastened at 32 to the socket 25. This locking projection passes into an opening 33 in the pin 26 when the pin is in a position to properly hold the roll of paper in place. There is also an opening in socket 25 and the piece 28 through which the locking projection 30 passes. Each pin 26 is provided with a reduced portion 34, and a shoulder 35. There are provided for each roll of paper two hollow receiving devices 36. The reduced portions 34 of the two opposite pins 26 extend into these hollow receptacles. The receptacles are preferably provided with friction reducing rollers 37 or other means for reducing the friction. To place a roll of paper in

position the receptacles 36 are placed in the opposite ends of the rolls at the center, that is in the ends of the spools on which the paper is wound, and then the locking projections 30 are moved up so as to release the pins 26, and they are slid back and the exhausted roll is removed. A new roll is placed in between two opposed sockets 25, and the pins then pushed in so that the reduced portions 34 enter the hollow receptacles 36. When these reduced portions reach the proper position the locking projections 30 automatically enter the openings 33 in the pins 26 and hold them against movement, thus preventing any accidental removal of the rolls of paper.

When the web of paper is passing through the press, it must have such a tension as will permit it to be properly printed upon and prevent it from being fed too fast or too slow through the press, and still prevent it from breaking or tearing. By means of the present arrangement this tension is easily and automatically secured. The new roll of paper when first acted upon by the belt, requires more effect to rotate it than when the paper is nearly exhausted therefrom, because the larger the roll, the heavier it is, and as the paper is fed from the roll the lighter the roll gets. This variation in the weight of the roll and the power required to properly rotate it, is automatitcally compensated for by the belt 4. It will be noted that this belt is suspended above the roll acted upon, and in such a manner that when the new roll is in position, the belt is moved out to a greater inclination than when an exhausted roll is engaged by it. This greater inclination causes a greater pressure to be exerted on the large and new roll, and as the paper is fed therefrom and the roll gets smaller and lighter, the angle of inclination of the belt automatically changes, and the pressure exerted by the belt therefore automatically decreases. With this construction the belt that engages the roll of paper may be made of such width as to give the paper passing therefrom, that is the web, the proper and desired tension for printing, thus making it unnecessary to have tension devices connected with the rolls. The belt not only feeds the paper from the roll, but prevents the roll from running too fast and acts to give and maintain a uniform speed to the paper passing through the press. By means of this belt and the method herein shown of mounting the roll on the reel, it is unnecessary to have the expensive spools upon which the paper is wound, as is now necessary. This spool as now used is heavy and expensive and must be returned to the mill each time to be rewound. With the present devices, however, this need not be done as the paper can be wound upon a simple paper tube or spool not more than one fourth of an inch in thickness, and when the roll is exhausted this spool can be thrown away. This greatly reduces the expense as it obviates any investment in spools, and all expense for handling and returning them to the mills. This arrangement also does away with the spindles which it has been heretofore necessary to use in mounting the rolls in position.

In this construction when the roll of paper is in position the bearing upon which it rotates is within the roll, and the roll itself is close up against the sockets of the reel. With this arrangement the paper necessary for a run can be loaded into position on the reels at any time preceding the beginning of the run so that when the printing begins it will be unnecessary to replenish the supply of paper, unless the run demands a capacity exceeding four rolls of paper, in which event the new rolls can be supplied during the run as heretofore described, without stopping the press.

This arrangement provides a condition where one man has the entire apparatus under his supervision and observation and can see what is going on and can also see to it that everything is kept in proper condition. When one roll is to be supplanted by another, it is necessary that the adhesive on the new roll shall be in proper condition and position. With this construction this adhesive is so located that this one man can see it and can see to it that it is all right before the feed is changed to the new roll, and does not therefore have to rely upon other men at a distant point.

In changing the feed of paper from one roll to another the change must be made before the paper is all run out or it will be necessary to stop the press and rethread the paper. If the feed is changed from one roll to another too soon there will be a large amount of paper left on the exhausted roll, and this paper is wasted. By means of this invention when the paper from a given roll is almost exhausted, the operator can move the reel so as to bring this roll down close to him and where he can have his hand on it, and have it under close observation. It may be moved out of contact with the belt at this time because the method of mounting the roll will insure its proper feed when only a small amount is left on the roll, and he can then see just how many coils of paper are still left on the roll, and when all of the paper has been run off except a few of the coils, he can then move the reel so as to bring the next roll into position to change the feed from the exhausted roll to the new roll. By this means he can always make the change when there is only a small amount of paper on the exhausted roll, and thus greatly reduce the waste of paper. This bringing the feed of the paper under the control of one man insures the proper feed, prevents

accidents and delays, and greatly increases the speed of printing.

It will be noted that the arms of the reels are single arms, each one having a single socket at the end. This provides economy of space. It will be noted that with this construction the reels can be mounted directly above the cylinders of the press, and rolls of paper may be used the same width as the cylinders and located so that the ends of the rolls of paper are in substantially the same plane as the ends of the cylinders.

By using the force of gravitation to assist in feeding the paper to and through the press and to the former, a proper feed is secured at all times, and the speed of the press can be varied without affecting the printing of the papers, as proper printing will be secured during all the variations in speed as where the speed of the paper through the press is slowed down or increased for any purpose.

The reels may be rotated by any desired mechanism. In Fig. 8 there is shown a section of the spool about which the roll of paper is wound, this spool consisting of a tube 39 of paper or similar material which can be discarded, and the hollow removable receiving devices 36 are shown connected with the ends of this spool. These receiving devices preferably fit tightly so that they will turn with the roll and themselves turn upon the reduced portions 34 of the pins 26. The reels may be rotated either by hand or by power. I have shown for example in Fig. 2 an electric motor 40, which is provided with a worm 41, engaging a worm wheel 42 on the central shaft 43 of the reel. By means of this motor the reel can be turned backward or forward and be moved under perfect control and held in any desired position.

I claim:

1. A reel for rolls of paper for printing presses comprising a frame having separated arms, sockets at the ends of said arms, pins slidably mounted in said sockets, the roll of paper adapted to be held between said pins, and means for automatically locking said pins against movement when the roll is in position.

2. A reel for rolls of paper for printing presses comprising a rotatable frame separated sockets connected with said frame, pins slidably mounted in said sockets, rotating receptacles into which the ends of said pins are received, and withdrawn by longitudinally moving the pins in said sockets, the rolls of paper supported on said receptacles and rotating therewith.

3. A device of the kind described comprising a rotating reel a series of separated arms forming a part thereof, sockets at the ends of said arms, pins slidably mounted in said sockets, rotating receptacles adapted to be mounted on the ends of said pins, said receptacles having open ends which face toward said sockets to permit said pins to be connected therewith and disconnected therefrom while remaining in said sockets, said receptacles adapted to be connected with the rolls of paper.

4. A device of the kind described comprising a rotating reel, a series of separate arms forming a part thereof, single sockets at the ends of said arms, pins slidably mounted in said sockets, rotating receptacles separate from said pins but adapted to be mounted on the ends of said pins, said receptacles adapted to be connected with the rolls of paper before being mounted on said pins, and means engaging the surface of the paper on the roll for securing and maintaining the proper tension of the web of paper that passes through the press.

5. A device of the kind described comprising a rotatable reel, supporting devices for rotatably supporting the rolls of paper on the reel, and automatic locking devices for locking said supporting devices against accidental movement when they are in their operative supporting position, whereby the rolls of paper cannot be accidentally displaced.

6. A device of the kind described comprising a rotatable reel, supporting devices for supporting the rolls of paper thereon, said supporting devices comprising sliding pins, means for preventing said pins from rotating, receptacles into which the ends of said pins are received when slid longitudinally, said receptacles adapted to be connected with the rolls of paper.

7. A spool for rolls of paper for newspaper printing presses comprising a hollow paper tube about which the paper is wound, and metal receptacles inserted in the opposite ends of said tube, said receptacles having unobstructed openings opening outwardly to receive the supports upon which the roll of paper is rotated and acting as bearings for rotatably supporting the roll of paper while being fed to the press.

8. A device of the kind described comprising a rotating reel provided with a series of projecting arms at each end thereof, a socket at the end of each arm, the sockets at one end being opposed to the sockets at the other end, a pin slidably mounted in each socket and upon which rolls of paper are adapted to be supported, springs connected with said sockets, locking projections on said springs, said locking projections adapted to engage said pins when in their locking position and hold said pins against movement.

9. A device of the kind described comprising a frame, means for rotatably mounting said frame, a series of single projecting arms at opposite ends of the frame, a single socket at the end of each arm, a separate pin for

each arm located in each of said sockets extending substantially at right angles to the arm and adapted to support rolls of paper and means for automatically locking said pins against movement under predetermined conditions.

10. A device of the kind described comprising a frame, means for rotatably mounting said frame, a series of projecting arms at opposite ends of the frame between which rolls of paper are rotatably mounted, a movable belt adapted to engage one of the rolls of paper from which paper is being delivered to the press, said belt having the portion thereof which engages the paper of said roll moving downwardly, and means for rotating said frame so as to move the new roll of paper to first engage the web of paper coming from the expiring roll at the lower end of the belt and move said new roll upward along said belt while transferring the delivery of the paper to the press from the exhausting roll to said new roll.

11. A device for changing the delivery of paper to a printing press from an exhausting roll to a new roll comprising a movable support upon which the exhausting roll and the new roll are rotatably mounted, the new roll having adhesive on its outer face, an endless movable belt which engages the exhausting roll from which the web of paper is passing to the printing press, a frame with which said belt is associated, said frame movably supported, said belt having the portion thereof which engages the paper of said roll moving downwardly, and means for moving the movable support for the rolls when the exhausting roll is about exhausted so as to move the new roll upwardly to bring the new roll into contact with a portion of the web of the exhausting roll opposite the lower end of the belt.

12. The process of transferring the delivery of paper to a printing press from an exhausting roll to a new roll which consists in rotating the exhausting roll so as to move the web of paper therefrom downwardly and then moving the new roll upwardly when the exhausting roll is about exhausted until the periphery of the new roll containing adhesive material comes into contact with the downwardly moving web of the exhausting roll and presses said web against the lower end of a roll engaging device which engages said web and causes the paper of the new roll to adhere to the web of the exhausting roll.

In testimony whereof, I affix my signature this 14th day of December, 1920.

IRVING I. STONE.