R. HOE.

WEB ROLL RENEWER.

APPLICATION FILED JULY 5, 1912.

1,085,909.

Patented Feb. 3, 1914.

10 SHEETS—SHEET 1.

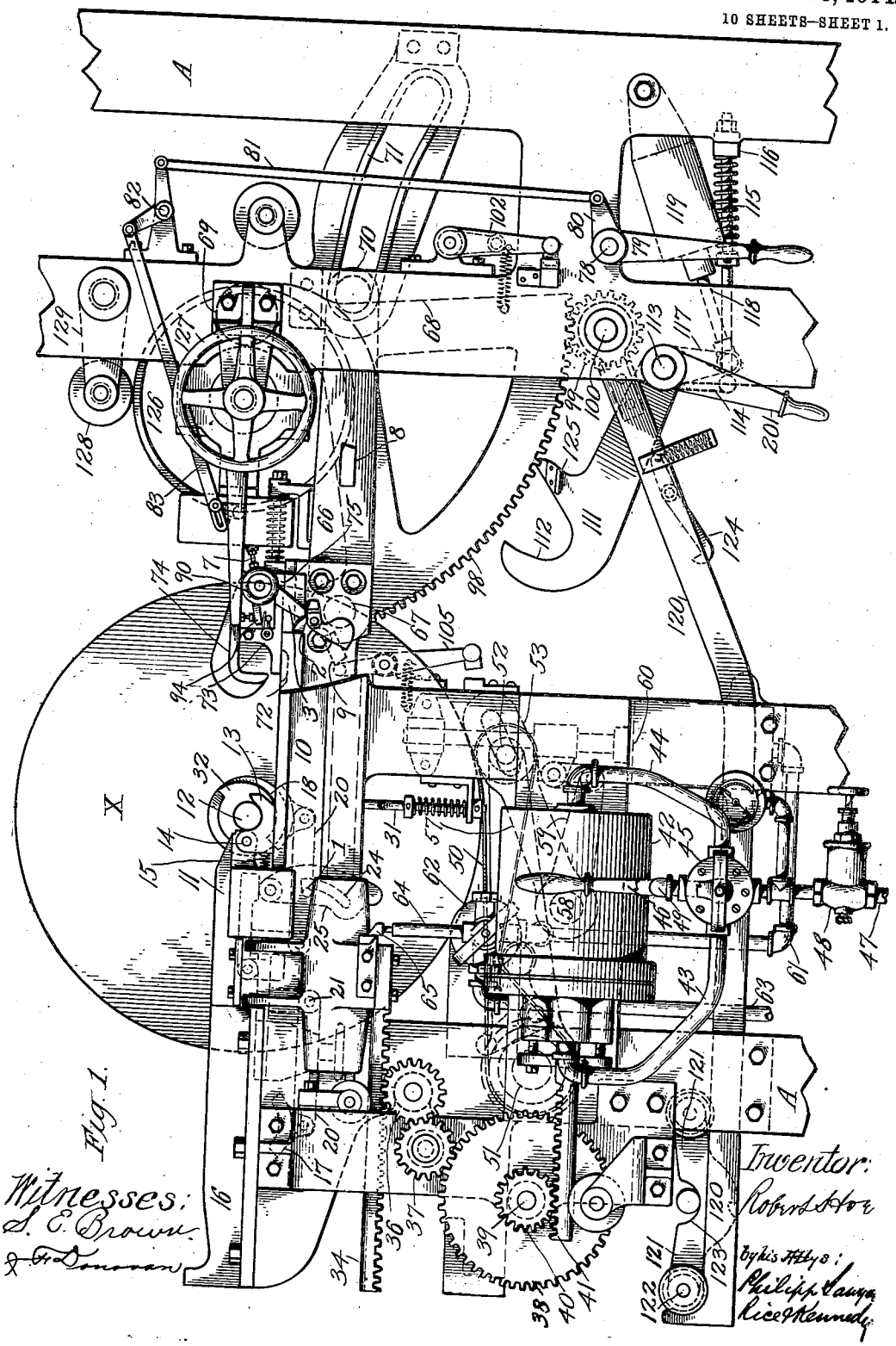

Fig. 1.

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10 SHEETS—SHEET 2.

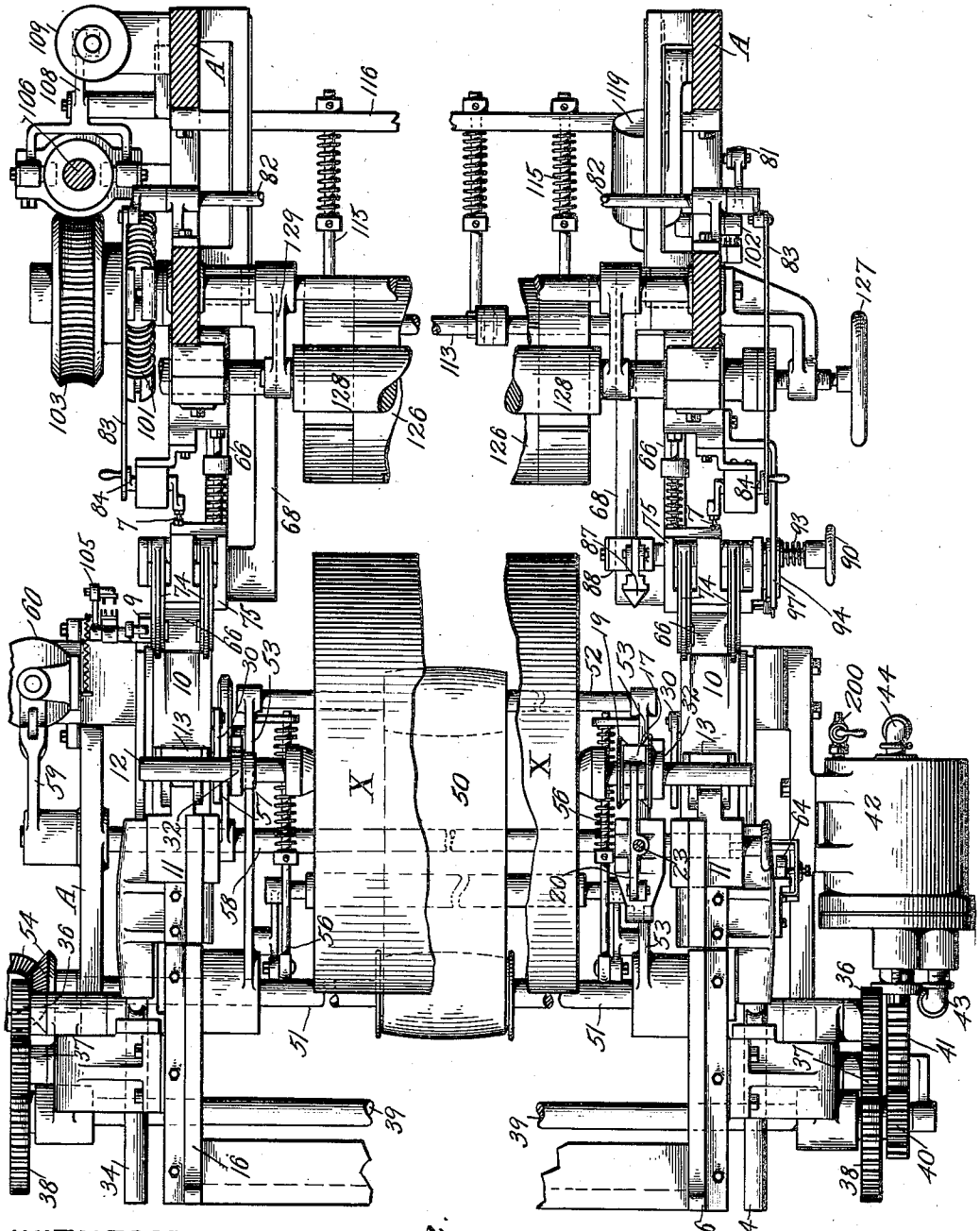

Fig. 2.

WITNESSES.

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10 SHEETS—SHEET 3.

Fig. 4.

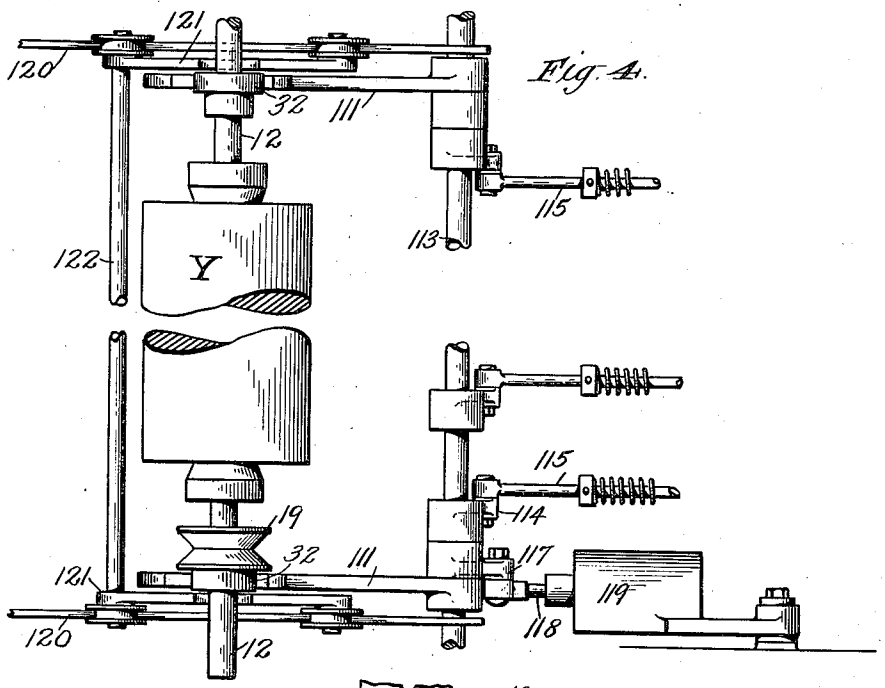
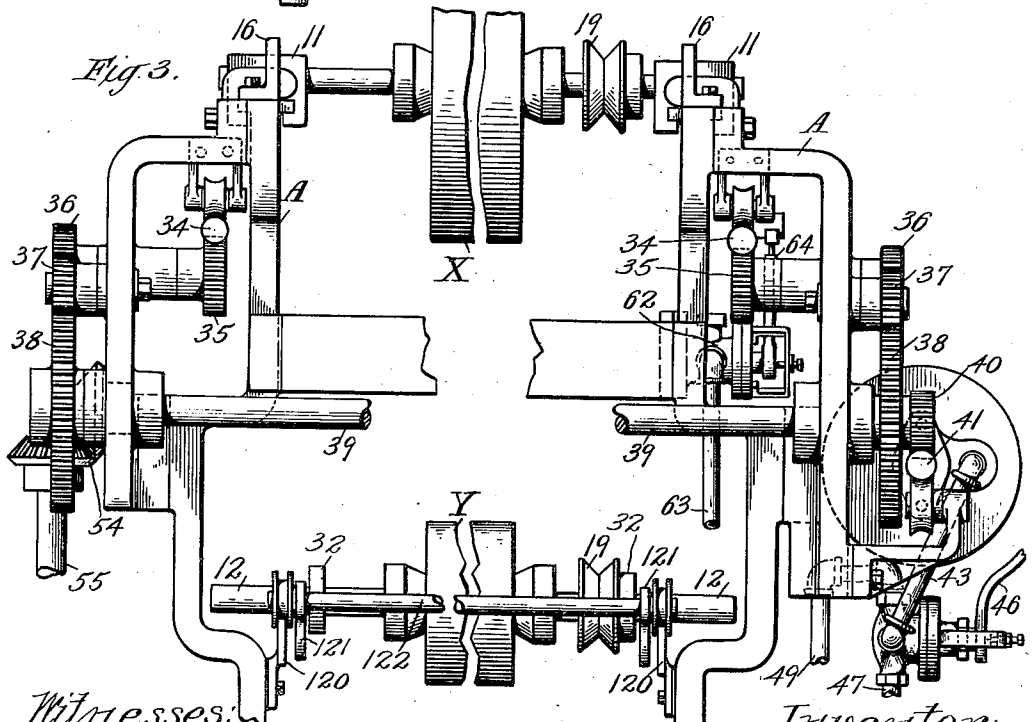


Fig. 3.



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10 SHEETS—SHEET 4.

Fig. 5.

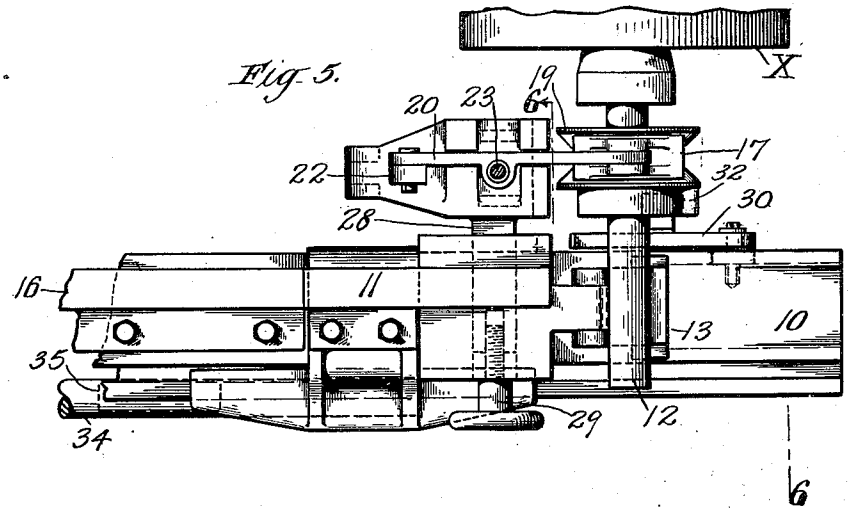


Fig. 6.

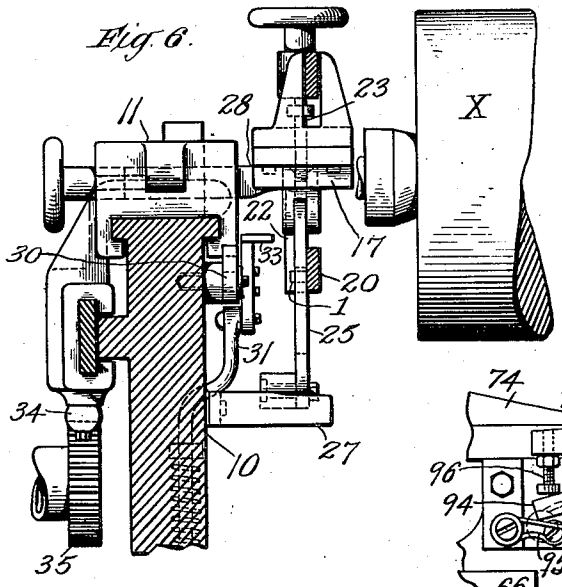


Fig. 8.

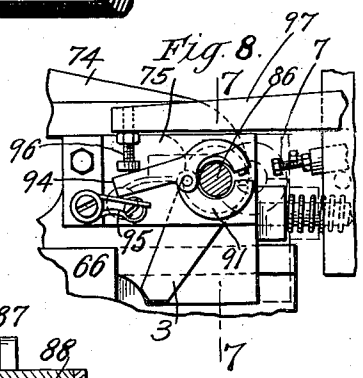
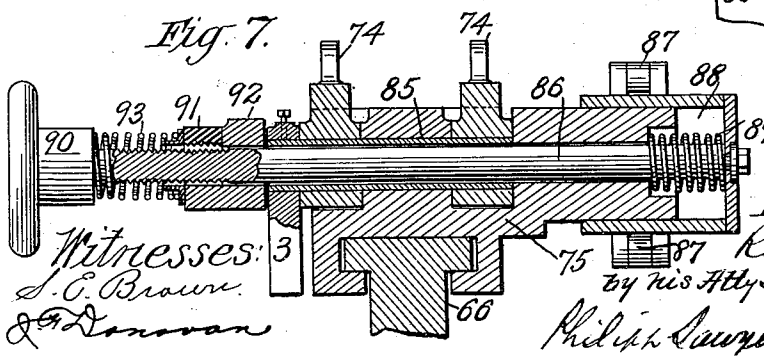


Fig. 7.



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10 SHEETS—SHEET 5.

Fig. 9.

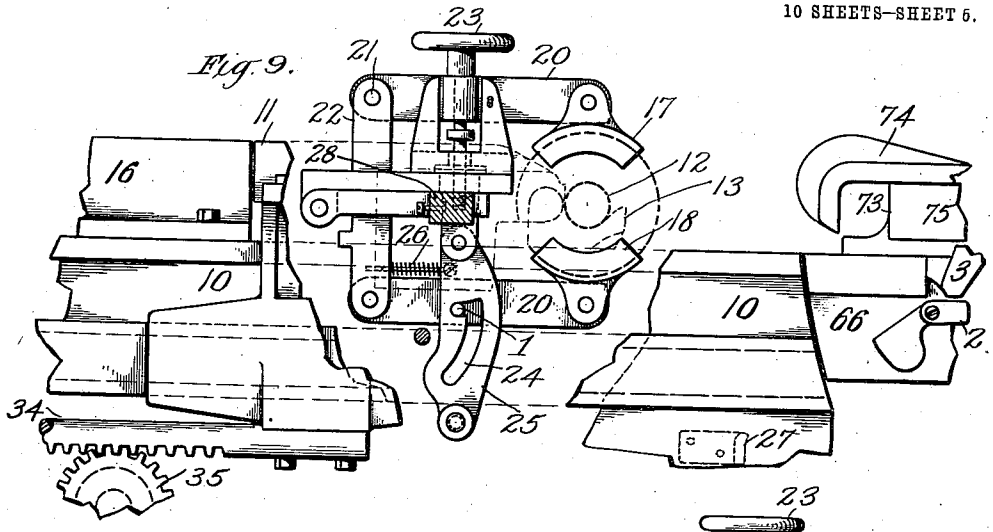


Fig. 10.

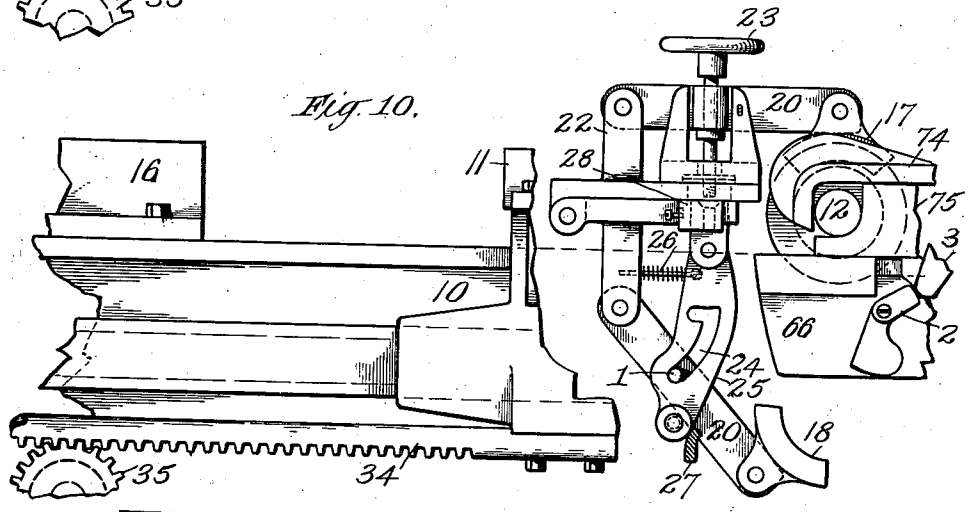


Fig. 11.

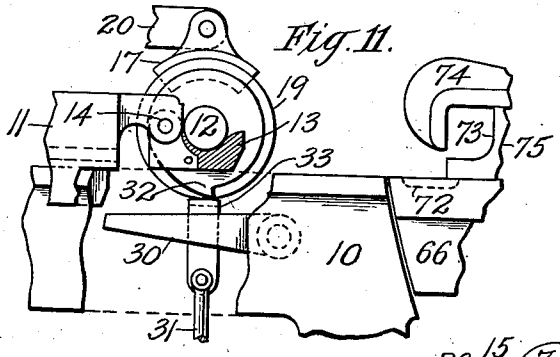


Fig. 12.

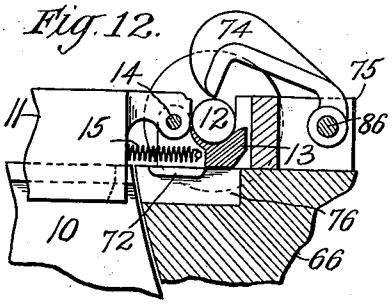
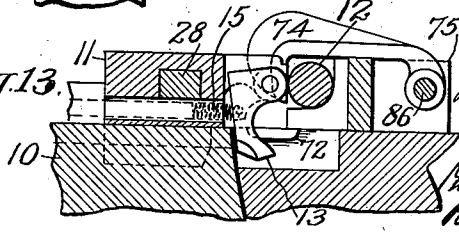


Fig. 13.



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10 SHEETS—SHEET 6.

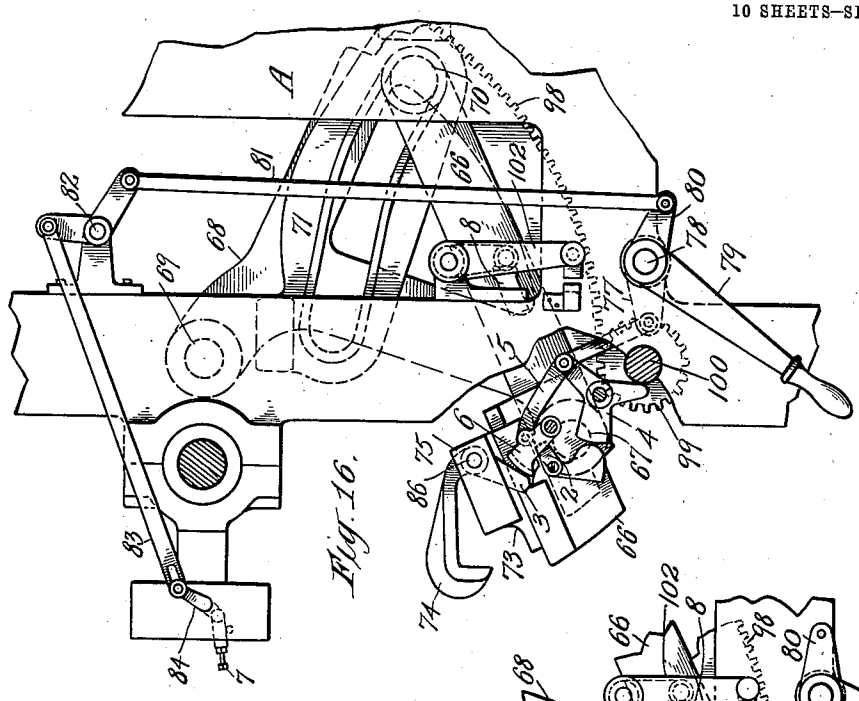

Fig. 16.

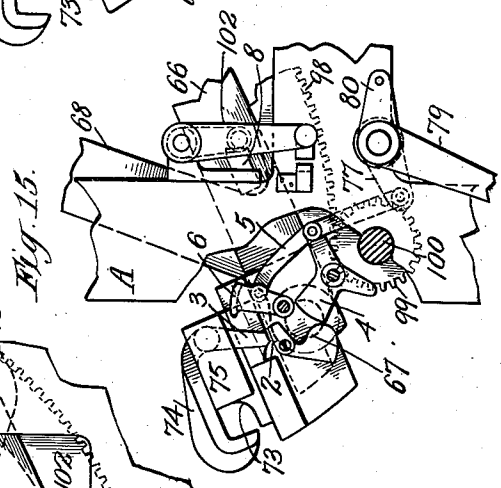

Fig. 15.

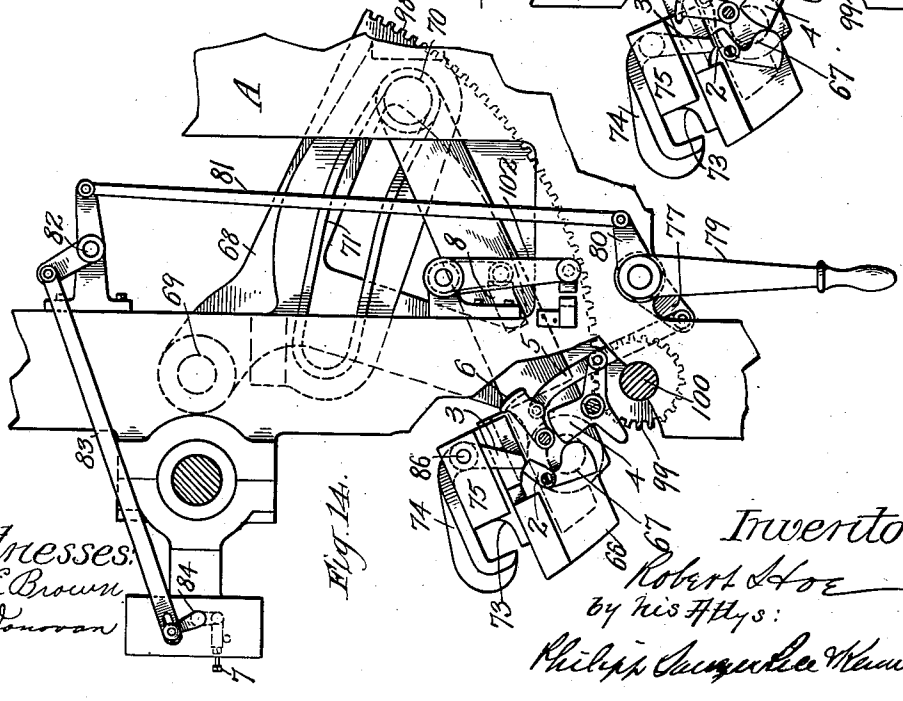

Fig. 14.

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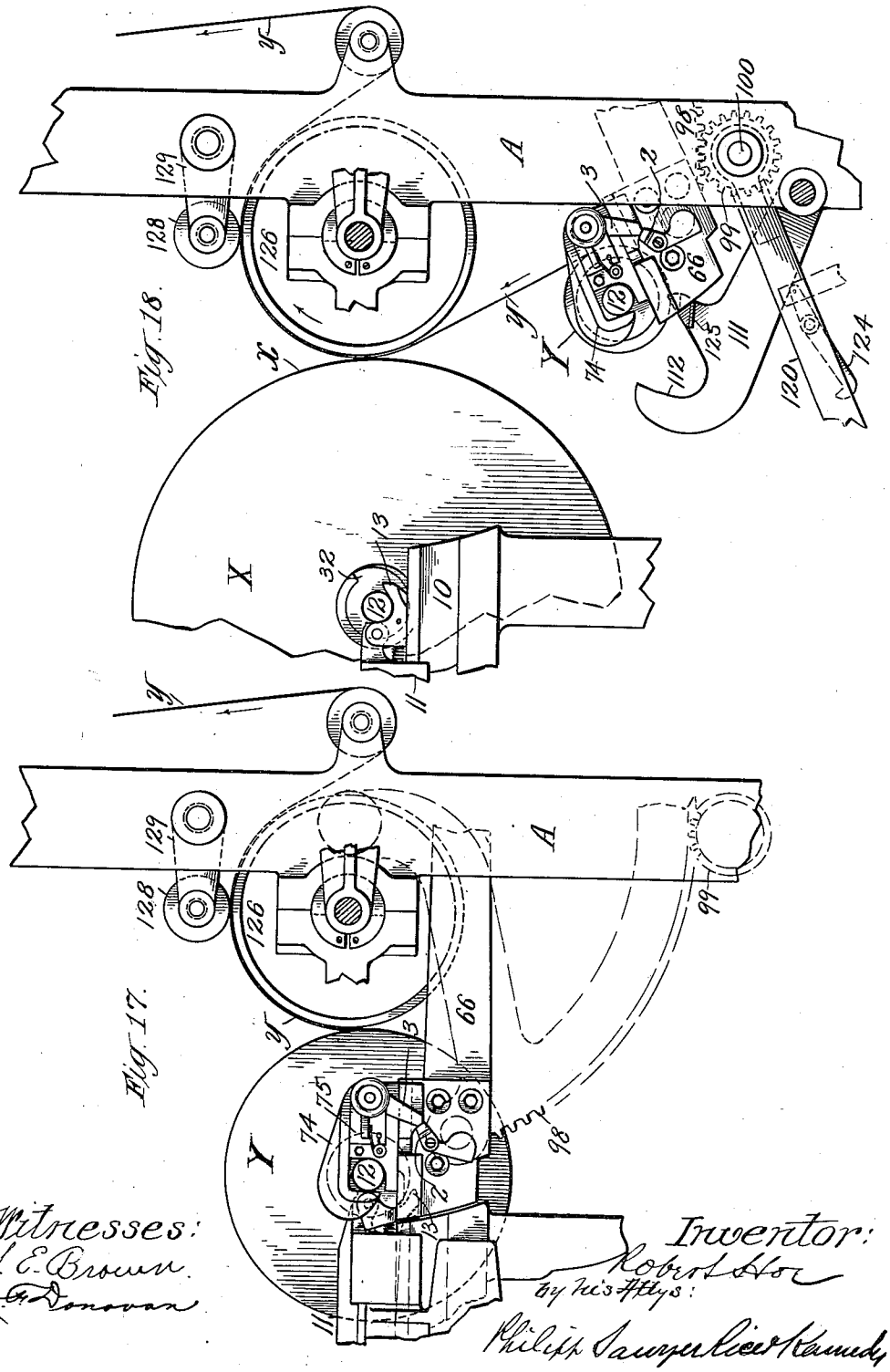
10 SHEETS—SHEET 7.



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APPLICATION FILED JULY 5, 1912.

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Patented Feb. 3, 1914.

10 SHEETS—SHEET 8.

Fig. 19.

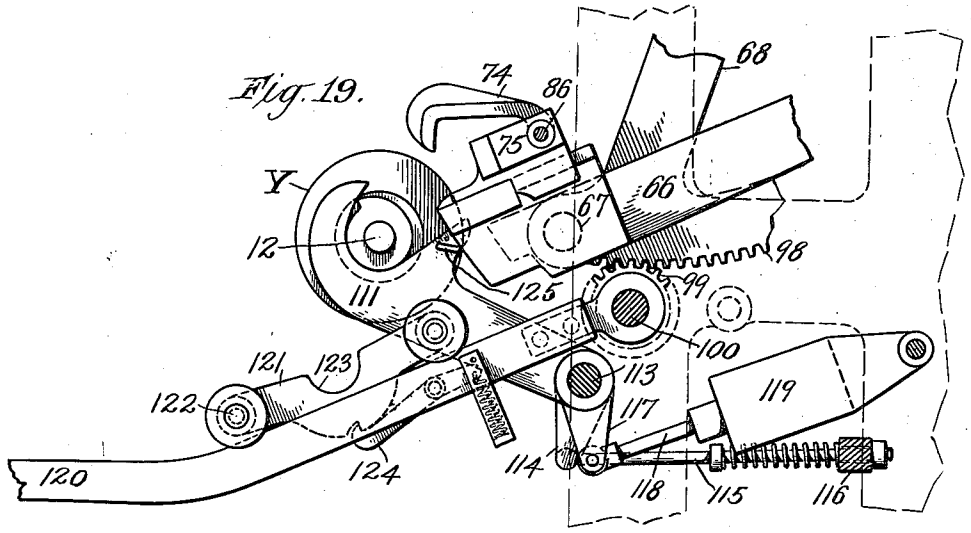
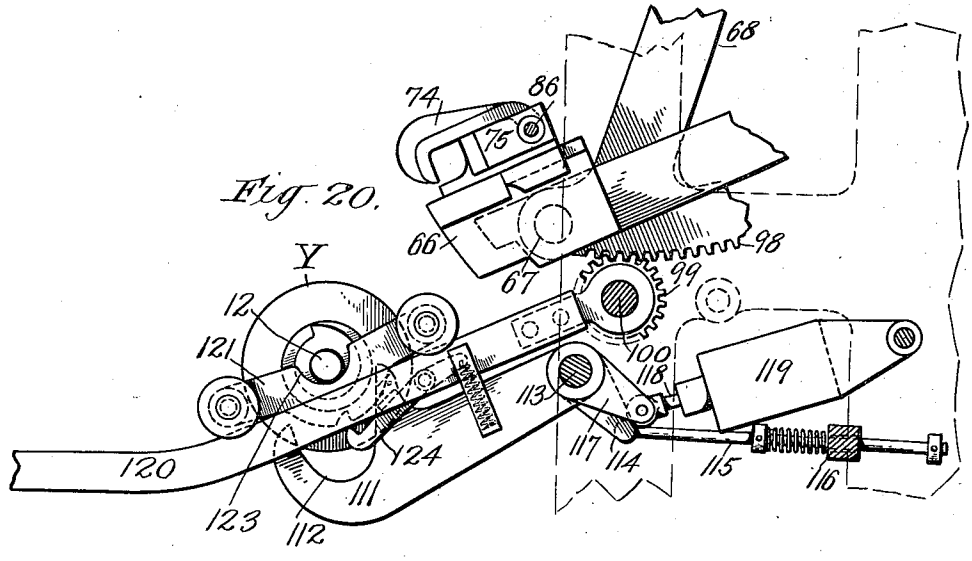


Fig. 20.



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APPLICATION FILED JULY 5, 1912.

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Patented Feb. 3, 1914.

10 SHEETS—SHEET 9.

Fig. 21.

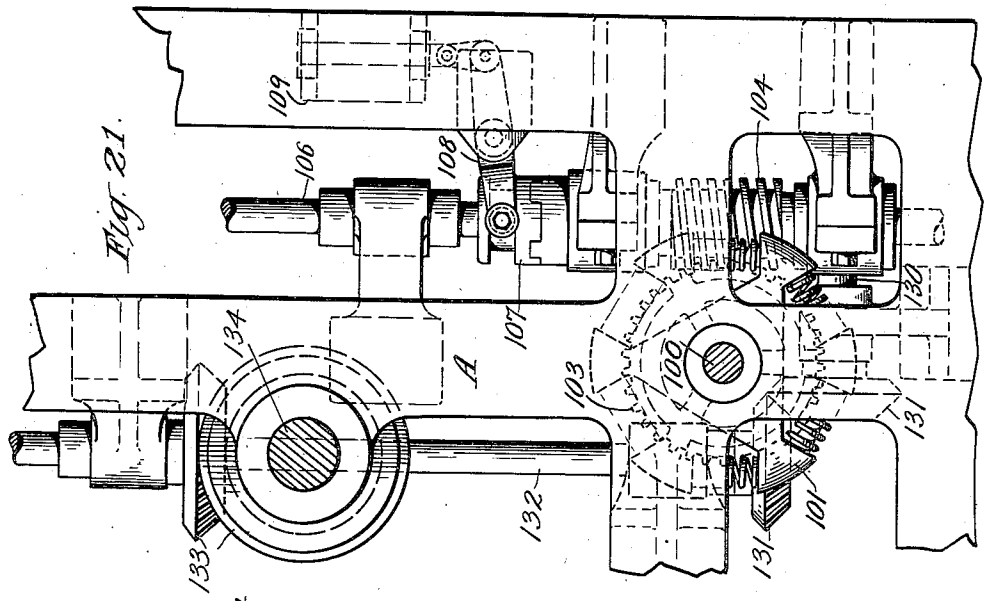


Fig. 22.

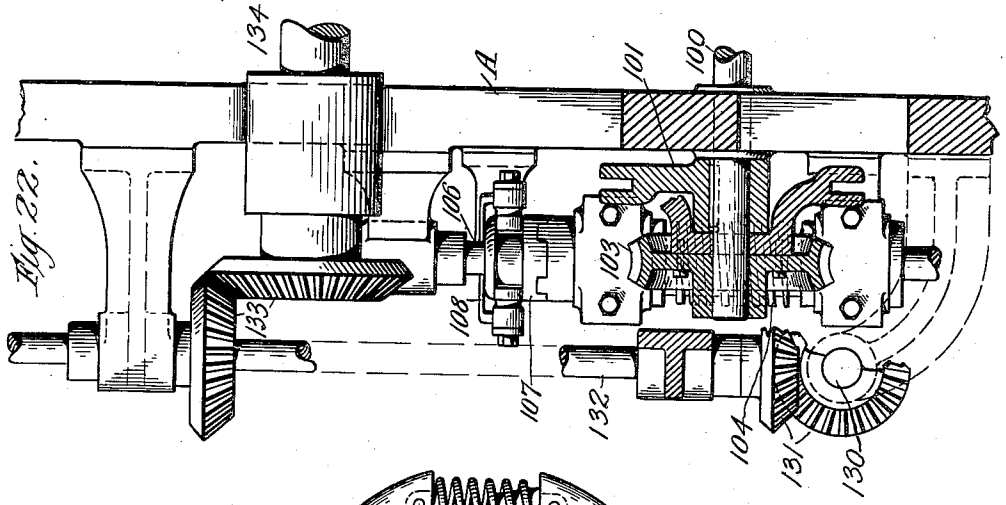
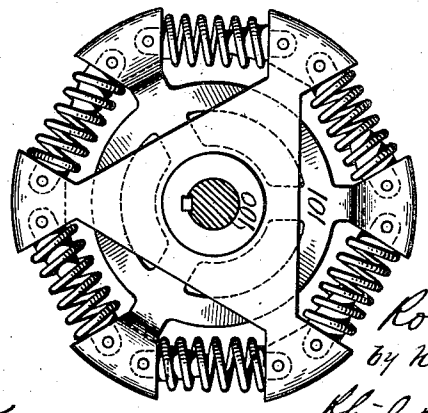


Fig. 23.



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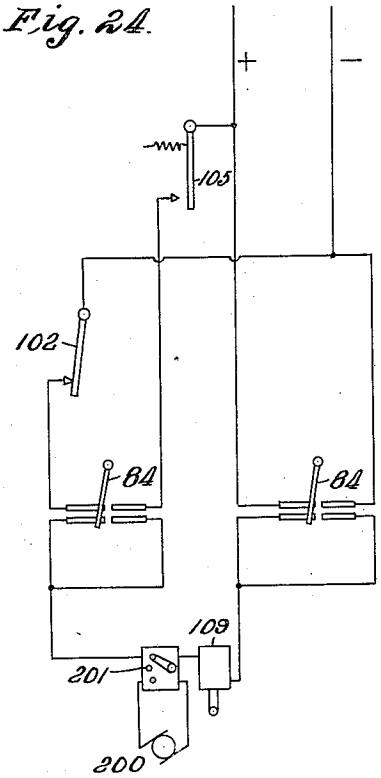
APPLICATION FILED JULY 5, 1912.

1,085,909.

Patented Feb. 3, 1914.

10 SHEETS—SHEET 10.

Fig. 24.



WITNESSES

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UNITED STATES PATENT OFFICE.

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WEB-ROLL RENEWER.

1,085,909. Specification of Letters Patent. Patented Feb. 3, 1914.

Application filed July 5, 1912. Serial No. 707,723.

To all whom it may concern:

Be it known that I, ROBERT HOE, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Web-Roll Renewers, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in mechanism for substituting a full web roll for an expiring web roll in machines which derive their web supply from rolls, the mechanism being particularly adapted for use in high speed web printing machines, but applicable also in machines of other classes, such as bag machines, envelop machines, and the like, in which it is important to renew the web supply without stopping the machine.

The especial object of the present invention is to provide a roll renewing mechanism for printing machines by which the web supply may be renewed without stopping the press and the control of the new web and expiring web shall be such as to secure certainty in operation at comparatively high speeds, while the mechanism shall be compact and convenient of access, so as not to substantially increase the floor or vertical space required for the printing press, and permit a number of decks to be used without interfering with the convenient access to the press parts and direct web run required in modern web printing presses.

In the accompanying drawings forming a part of this specification there is illustrated a web roll renewer suitable for high speed printing presses and embodying all the features of the invention in their preferred form, and this construction will now be described in detail, and the features forming the invention then particularly pointed out in the claims.

In the accompanying drawings: Figure 1 is a side elevation of the mechanism. Fig. 2 is a plan view, broken away at the middle for purpose of illustration. Fig. 3 is an end elevation looking to the right in Figs. 1 and 2. Fig. 4 is a plan view of the spent roll delivery mechanism. Fig. 5 is a detail plan view showing the roll carriage with its brake and margin adjuster. Fig. 6 is a vertical section on the broken line 6 of Fig. 5. Fig. 7 is a detail section on line 7 of Fig. 8, showing the margin adjuster on the shifter. Fig. 8 is a detail cross-section showing the margin adjuster of Fig. 7 released, in full lines, and locked, in dotted lines. Figs. 9 and 10 are broken side elevations showing the brake mechanism on the roll carriage in different positions. Fig. 11 is a detail vertical section showing the roll carriage stop. Figs. 12 and 13 are detail vertical sections showing two positions in the transfer of the roll from its carriage bearings to its shifter bearings. Figs. 14, 15 and 16 are partial side elevations, showing the shifter and its operating and roll holding devices in two positions. Figs. 17, 18, 19 and 20 are diagrammatic side elevations illustrating the operation of roll-renewing and delivering the spent roll. Fig. 21 is a sectional elevation of the driving mechanism for the shifter and expansion roll. Fig. 22 is a broken end elevation of the same with the flexible coupling shown in section. Fig. 23 is a detail of the flexible coupling of Figs. 21 and 22. Fig. 24 is a diagram of the electric circuit, motor and control devices.

Referring now to the drawings, A is the frame in which the mechanism is mounted, this frame preferably being at the end of the printing press with one or more of the roll renewing mechanisms mounted therein one above the other, according to the number of printing decks in the press. On the rear end of the frame A are a pair of fixed tracks 10 upon which slides the roll carriage 11 by which the new web roll X is moved forward into position for attachment of its web x to the web y of the expiring web roll Y, the web roll X being carried by its spindle or shaft 12 in bearings 13 at the forward end of the carriage, these bearings 13 being pivotally connected to the carriage at 14 and spring pressed to swing the bearings downward and rearward by springs 15 as described hereafter. Above and rearward of the carriage tracks 10 are preferably tracks 16 arranged to support the spindle 12 of the new web roll and permit it to be rolled forward and down onto the bearings 13 so that the web roll X may be in position on tracks 16, ready for transfer to the carriage at the desired time.

The carriage 11 is provided with a brake and margin adjuster, the brake preferably consisting, as shown, of top and bottom brake shoes 17, 18 engaging the concave

brake disk 19 on the web spindle 12 and carried by vertically swinging arms 20 pivoted at 21 to standards 22 on carriage 11. The shoes 17, 18 are adjustable to vary the braking pressure by adjusting screw 23 and, by releasing this screw, the top shoe 17 may be thrown back with arm 20 for admission of the roll shaft to its bearings 13. The bottom shoe 18 may be similarly swung back on its arm 20 independently of the screw, this arm 20, with its shoe 18, being normally held in braking position by pin 1 engaging a locking extension at the upper end of a curved slot 24 in a swinging trip 25 depending from the adjustable block controlled by screw 23 and normally pressed forward by spring 26 into position to lock the shoe 18 in braking position through pin 1, the lower end of the trip 25 engaging fixed stop 27 at the proper point in the forward movement of the carriage to release brake shoe 18, as hereafter described.

The brake mechanism, with arms 20 and standards 22, is carried on a slide 28 mounted to move transversely to the carriage and adjustable by adjusting screw 29 to move the brake mechanism and roll X sidewise for margin adjustment.

The advancing carriage is stopped until the pasted leading end of web x on roll X is in proper position for final advance by swinging stop 30 normally moved upward into position to engage and stop the carriage by spring pressed rod 31, and depressed to release the carriage at the proper time by cam 32 carried by the roll shaft 12 and engaging head 33 on the stop, such stop mechanism being provided at each end of the roll.

The carriage 11 with the new roll is preferably advanced along the tracks 10 for roll renewal and the yielding pressure on the web roll preferred for pasting and web feeding is preferably secured by compressed air, the mechanism shown for this purpose being as follows:—The carriage 11 carries at each side of the frame a fixed rack 34 meshing with gears 35 on short shafts mounted in the frame and carrying outside the frame A gears 36 driven by intermediates 37 from gears 38 on opposite ends of shaft 39 extending across the machine, this shaft 39 being driven by gears 40 thereon meshing with rack 41 carried by the piston of compressed air cylinder 42, which piston is moved in opposite directions by the admission of compressed air to one or the other end of the cylinder through supply and exhaust pipes 43, 44 controlled by valve 45 actuated by hand-lever 46, and to which air is supplied from any source through pipe 47 controlled by regulating valve 48 so that the pressure may be regulated thereby and then controlled as desired by handle 46 and valve 45, the exhaust being by pipe 49. A hand operated relief valve 200 is preferably provided for use as hereafter described.

The starting device for securing the desired speed of rotation and control of web roll X before its web is attached to the expiring web preferably consists, as in the form shown, of driving belt 50 mounted below the carriage and swung upward into driving contact with the lower side of the roll X and downward out of such driving contact, this belt 50 being carried by pulleys on its driving shaft 51 and shaft 52, the latter mounted in arms 53 swinging concentrically with driving shaft 51, shaft 51 being driven to secure the desired speed by bevel gears 54 from driving shaft 55 preferably driven from the press, so as to assure correct timing, but which may be independently driven with the required timing. The swinging arms 53 are normally drawn downward to hold the driving belt 50 out of position for contact with roll X by spring pressed rods 56 and rocked upward against the spring tension of rods 56 by arms 57 pivoted to arms 53 and carried by rock shaft 58, which is rocked by arm 59 actuated by piston in pressure cylinder 60 to which compressed air is admitted to raise the piston through pipe 61 extending to the opposite or operating side of the press, and there controlled by valve 62 having air inlet pipe 63 connected to any suitable supply. The valve 62 is controlled by hand through handle 64 to admit air for bringing the belt 50 into contact with roll X for starting the latter, the handle then being thrown into vertical position, and the handle 64 is thrown downward to actuate valve 62 to release the air pressure in cylinder 60 and lower the belt 50 out of contact with the roll by the engagement of roll carriage 11 with the upper end of the handle, at the proper point in the forward movement of the carriage the top of the handle 64 being provided with a spring supported trip 65 having its forward side inclined so as to permit the carriage to return past the handle 64 without operating it, but to engage the trip 65 and operate the handle on its forward movement.

Referring now to the means for removing the expiring roll from the path of the new roll, and the web attaching and feeding devices, a vertically swinging carrier, which I call a shifter, is mounted on frame A, this shifter consisting in the form shown of bars 66 pivoted at 67 in bearers 68 pivoted at 69 in the frame A, the bars 66 carrying bowls 70 running in curved slots in fixed brackets 71 so that the bars 66 are rocked on their pivots 67 at the same time that they are swung downward with bearers 68. The shifter bars 66 carry at their ends next tracks 10 supporting surfaces 72 in line with the tracks 10 onto which ride the roll bearings 13 in the extreme forward position of

roll carriage 11, and bearings 73 receiving the roll spindle 12 from bearings 13, and in which the roll spindle is held by pivoted hooks 74 forming roll holders. These bearings 73 and hooks 74 are mounted on carriage 75 having a limited movement on tracks in line with tracks 10, so that this carriage 75 may be moved back a short distance under the pressure of the advancing bearings 13 and spindle 12, to bring the shifter into operation, as described hereafter. The supports 72 over which bearings 13 pass onto the shifter consist of bridges, as shown clearly in Fig. 13, beyond and below which space 76 is provided by cutting out the shifter to permit the bearings 13, which are carried by side arms, to drop from the position shown in Fig. 12 to that shown in Fig. 13, and return below the bridge, as the carriage 11 is withdrawn.

The shifter bars 66 carry locking catches 2 engaging depending arms 3 on hooks 74, to lock these hooks in position to hold the roll spindle in bearings 73 and to lock the carriage 75 in its forward position, these locking catches 2 being pivoted and weighted to swing into locking position, and being moved to unlock the hooks and release the carriage by swinging trips 4 pivoted on the frame and actuated by links 5, which also actuate swinging trips 6 acting against arms 3 to raise the hooks 74 and release the roll spindle, links 5 being actuated from arms 77 on rock shaft 78 extending across the frame and operated by handle 79, this rock shaft 78 also carrying arm 80 connected by link 81 to an arm on rock shaft 82 extending across the frame and carrying at each side of the frame arms connected by slotted links 83 to contact levers 84, presently to be described. Catch 2 on one side of the frame is preferably set or actuated so as to release its end of the carriage 75 slightly before the other end, for breaking the expiring web as described hereafter.

The carriage 75 carries a margin adjuster, no brake being necessary with the web feeding mechanism shown. This margin adjuster is shown in detail in Figs. 7 and 8. The hooks 74 forming one side of the roll spindle bearings on carriage 75 are carried by sleeve 85 mounted on adjusting screw 86 in carriage 75 at the operating side of the frame, and this sleeve carries stop arm 3. At its inner end the screw 86 carries the conical shoe 87 which enters brake pulley 19 when the roll spindle 12 is in bearings 73, this shoe being carried by arms pivoted on box 88 sliding on a boss extending inward from carriage 75 and secured to screw 86, the box 88 and shoe 87 being pressed inward by spring 89. The screw 86 is screw threaded in split half nut 91 and runs freely through sleeve 92 fixed to the carriage. Screw 86 is adjusted by head 90 and spring pressed outward by spring 93. Split half nut 91 is carried by pivoted arm 94 and is clamped or unclamped on screw 86 by rocking arm 94, which is spring pressed to lock the nut on the screw threads by spring 95, and held against the spring pressure to release the nut by adjustable stop 96 on fixed arm 97. When the half nut 91 is clamped upon hand screw 86, box 88 with shoe 87 and the web roll Y may be adjusted for margin by rotating screw 86 and when half nut 91 is released from screw 86, the screw 86 with shoe 87 may move endwise in either direction against spring 89 or 93, according to the position of the brake pulley 19, as controlled by the margin adjuster on carriage 11, as described hereafter.

Any suitable driving mechanism may be used for raising and lowering the shifter 66. In the construction shown, the bearers 68 carry gear segments 98 engaging gears 99 on shaft 100 extending across the machine, and this shaft 100 is driven through flexible spring coupling 101 from worm wheel 103 driven by worm 104 which is clutched to and unclutched from shaft 106 by clutch 107 controlled through lever 108 by a two-way solenoid 109, the shaft 106 being driven from a reversible motor controlled by contacts so that the shaft 100 may be driven from shaft 106 in either direction to drop the shifter and return it to normal position. The flexible coupling secures a yielding action at the ends of the movement of the shifter and permits the shifter to be forced home on return to its normal position without danger of locking the worm and worm wheel.

The shifter control is as follows:—The carriage 75, in its most advanced position (toward roll 126), presses contact buttons 7, thus moving contact levers 84 and closing contacts for clutching shaft 106 to worm 104 for moving the shifter downward, and at the end of the downward movement of the shifter the circuit is broken by circuit-breaker 102 actuated by trip 8 to stop the shifter. The circuit is then closed again in the reverse direction by actuating handle 79 to move contact levers 84 and buttons 7 back to normal position by links 83, and the motor is then started in the opposite direction and clutched to worm 104 to return the shifter to normal position, and the circuit is broken to stop the shifter on its full return by the engagement of another circuit breaker 105 by trip 9 on the shifter. Two sets of contacts 84 and buttons 7 are preferably used, as shown, one at each side of the machine, and their contacts arranged in series, so that both ends of the carriage 75 and the roll spindle must be in proper position before the shifter is moved downward.

The spent roll with its spindle 12 is de-

livered beneath the roll renewing mechanism after substitution of the new roll, and preferably, as shown, carried backward to the outer end of the frame in convenient position for removal, and means are provided for breaking the expiring web from this spindle for its delivery, although the expiring web may be broken by hand instead of automatically. The means for securing these results are as follows:—Below the shifter are pivoted two arms 111 forked at their inner ends to form bearings 112 for the spent roll spindle, these arms being carried by rock shaft 113 having handle 201 and arms 114 pressed by spring pressed rods 115 mounted in cross bar 116 of frame A, which spring pressed arms act to hold the bearings 112 in position to receive the spent roll spindle from the shifter. Rock shaft 113 carries, also, an arm 117 connected to the stem 118 of the piston in dash pot or cataract cylinder 119 forming a retarding device controlling the movement in both directions of the arms 111 and bearings 112, thus preventing slam by the weight of the spent roll or spring return. The arms 111 with bearings 112 swing vertically between tracks 120 inclined downward from their ends below the shifter and extending rearward to the outer end of the frame below the roll advancing mechanism, and on these tracks runs a carriage 121 formed by side frames shown as having wheels running on the tracks, these frames being connected by rear cross bar 122 and having bearings 123 receiving the spent roll spindle 12 carrying the last unused portion of the web roll Y. The carriage 121, is held in its forward position on the incline of tracks 120 by spring pressed pivoted catches 124 at each side of the frame tripped to release the carriage by trips 125 on each of the arms 111, these catches 124 being shown as engaging notches on the bottom of the side frames of carriage 121.

It is important that the web in use should run at exactly the surface speed of the type cylinder, and that the new web roll should be fully controlled in renewing and feeding the web, in order to assure the pasting together of the new and old webs at high speed without breaking either web. This result is secured in the mechanism shown by using a driving roll over which the web runs to the press and which forms also an abutment against which the pasting is done, and making the surface speed of this roll adjustable so that exactly the proper speed of the driving roll and old web can be maintained and this speed immediately taken up and maintained by the new roll under the compressed air pressure forcing the new roll against the driving roll for pasting and feeding. The mechanism shown for this purpose consists of driving roll 126 which may be an expansion roll of any suitable form, adjustable by hand screw 127 for varying the diameter and surface speed of the roll, and upon this roll preferably runs an idler roll 128 shown as carried in swinging arms 129, this idler roll preferably having a yielding surface which may be formed of substantially ink roll composition or other suitable material. The expansion roll 126 may be driven by any suitable means, either from the press shaft, or preferably from the press, and as shown is driven from driving shaft 130 through bevel gears 131, shaft 132 and bevel gears 133 gearing up to the expansion roll shaft 134. Instead of making the driving roll 126 expansible for adjustment of surface speed, a non-expansible roll may be used and made adjustable to vary the surface speed in any usual or suitable manner.

The operation of the mechanism in roll renewing will be understood from a brief description in connection with the drawings, and especially Figs. 17 to 20, illustrating the successive steps of roll renewing, and Figs. 14 to 16, showing the different positions of the dropped shifter and its roll-holding devices.

As shown in Fig. 1 no web is being fed to the press, but a web roll X has been rolled over the tracks 16 and down onto bearings 13 on carriage 11, and has been speeded up by belt 50, in contact with its under side, and the carriage with web roll X is ready to have its web threaded up between rolls 126, 128, and moved forward into contact with roll 126 for feeding the web to the press, the upper brake shoe 17, with its arm 20 and adjusting screw 23 being shown in dotted lines as thrown back for the admission of the roll shaft 12 to bearings 13, and the lower brake shoe 18 as already thrown up to receive the brake trip, although this brake shoe 18 may be thrown up later, as no braking is desired during the control of the roll by belt 50. It will be understood that in putting in this first roll, the leading end of the web will simply be threaded through by hand, as usual in printing presses, but thereafter the leading end of the new web will be attached to the expiring web by this roll renewing mechanism without stopping the press.

In Fig. 17 the parts are shown in position with the expiring web roll Y ready to be dropped by the shifter to permit the new web roll X to be advanced for roll renewal, and in Fig. 18 the parts are shown in the position of pasting the leading end of the new web x on web roll X to the expiring web y, the expiring web roll Y having been dropped by the shifter for this purpose. In Fig. 19, the old web y has been broken and spent roll Y transferred from the shifter to the arms 111 for delivery, and in Fig. 20 the

spent roll Y has been deposited on the carriage 121 and the latter released for delivering the spent roll at the rear end of the frame.

Assuming now that a new roll X is to be substituted for an expiring roll Y, and the latter in the position shown in Fig. 17, the new web roll X has the leading end of its web pasted down lightly so as to be readily detached from the roll, and has paste or other suitable adhesive applied on its outer side for attachment to the old web, the leading end of the web with its paste being located in a certain position relatively to the cam 32 on the roll shaft 12. The web X, thus prepared, is rolled over the track 16 and down onto the bearings 13 on carriage 11 with the top brake shoe thrown back, as shown in dotted lines in Fig. 1, or with both brake shoes thrown back. The top brake shoe 17 is then brought into operative position by swinging the upper brake parts over into the position shown in Fig. 9, with top brake shoe 17 above brake pulley 19 and bottom brake shoe 18 in position below the pulley and held in adjustable position by hand screw 23, but braking pressure not being applied. Valve 62 is then operated by moving handle 64 into the vertical position shown in Fig. 1 so as to admit pressure air to cylinder 60 and rock shaft 58 to raise belt shaft 52 and move the forward end of starting belt 50 into driving contact with the underside of roll X and speed up the web roll X to the speed required. Roll X is preferably driven by belt 50 at a surface speed slightly in excess of the surface speed of roll 126, to provide for a slight drop in speed of the web roll between its release by belt 50 and engagement with roll 126, the important result desired being that the surface speed of web roll X shall be substantially the same as that of roll 126 when brought into driving engagement with it, and it being especially important that web roll X shall not be too slow when the pasting takes place.

Assuming now that the expiring roll Y has been dropped by the shifter below the path of roll X and its web y is now running from the dropped roll Y over roll 126, as shown in Fig. 18, so that the mechanism is ready for attachment of the new web x on its roll X, handle 46 is moved by the operator to shift valve 45 so as to admit pressure air through pipe 44 to the inner end of air cylinder 42 and open pipe 43 to discharge, so as to move the air piston to the left in Fig. 1 and thus, through racks 41, 34 and the intermediate gearing, advance carriage 11 with roll X to the right toward roll 126, the pressure being adjusted by the regulating valve 48. During this movement of the carriage, handle 64 is moved to the right in Fig. 1 by engagement of the carriage with head 65, and valve 62 is thus operated to cut off the pressure air from cylinder 60, and starting belt 50 lowered out of contact with web roll X by the spring rods 56.

Before the web roll X has made contact with the web y of roll 126, the carriage is stopped by engagement with stops 30 and is held until, in the rotation of roll X, cams 32 engage and depress stops 30, as shown in Fig. 11, so as to release the carriage to advance web roll X against the web y on the roll 126. The cam 32 and pasted leading end of the web on roll X are so positioned that, on the release of stops 30, roll X will be brought against web y on roll 126 some time, and preferably nearly a full revolution, before the pasted edge of web x comes into contact with the web y, thus assuring the pasting together of the two webs by the whole pasted surface and avoiding danger of a loose flap on the new web, which might result if reliance were placed on bringing the pasted portion directly into contact with the web y by the advance movement of the new roll. This also aids in securing exactly the same speed of the two webs before pasting, and in avoiding danger of breaking one web or the other, or failure in proper pasting. The position of pasting is shown in Fig. 18, and web x is now carried forward with web y to which it is pasted, until web y is broken off, as described hereafter, completing the substitution of web x for web y.

When the new web roll X has been advanced to the expansion roll 126 and web x substituted for web y, the brake shoes 17, 18 are adjusted by hand screw 23 to secure the braking pressure desired, and the web roll X with its shaft spindle 12 is adjusted sidewise in bearings 13 by hand screw 29 for margin adjustment, as usual in printing machines. The air pressure on carriage 11 usually will require adjustment, also, as quite heavy pressure is preferably employed in advancing the carriage to bring the web roll X into contact with web y on expansion roll 126 so as to secure the quick advance and strong pasting pressure desired, and such heavy pressure, if used, is not suitable for continuously feeding the web. The air pressure, therefore, is preferably lessened and adjusted as desired, by opening hand relief valve 200 for quick release of the high pressure, and adjusting the pressure by regulating valve 48 and closing relief valve. Web roll X is now driven and its web x unrolled and fed by pressure against the expansion roll 126 maintained by the air pressure on carriage 11, perfect control of the speed of web roll X and perfect feed of the web x being thus secured as web roll X decreases in size, and web roll X is thus advanced with its carriage 11 moving

on tracks 10 until the roll X is reduced in size so that the bearings 13 move from the ends of the fixed tracks 10 over the bridges 72 on shifter bars 66, so as to carry roll spindle 12 into the open bearings 73, spindle 12 raising the hooks 74 as it moves into the open bearings 73, so as to permit the spindle to pass the hooks, which then are lowered to embrace spindle 12 and hold it in the bearings 73. As roll X decreases in size and the roll spindle 12 is thus moved into the open bearings 73, brake pulley 19 receives the conical shoe 87 on margin adjuster box 88, between the brake shoes 17, 18, shoe 87 and box 88 being then movable sidewise in either direction against spring 93 or spring 89 to permit the shoe 87 to take the position of the brake pulley 19 for margin adjustment, as half nut 91 is then raised from the threads of screw 86 to release the latter, by the engagement of its arm 94 with trip 96, as shown in full lines in Fig. 8, so that the margin adjustment can be controlled by hand screw 29 on carriage 11 during the feeding off of the paper roll as long as arm 94 is held depressed by trip 96, and half nut 91 thus held raised. The bearings 13 on passing the bridge 72 and delivering the spindle 12 to bearings 73, are dropped through the space 76 by springs 15 to be rocked upward onto tracks 10 against the tension of springs 15 on the rearward movement of the carriage 11 after the shifter is dropped (see Figs. 11 to 13).

Referring now to the operations of dropping the expiring roll, for pasting on the new web, breaking the expiring web, and delivering the spent roll spindle, the carriage 75, with the expiring roll Y in bearings 73, is moved backward from the position shown in Figs. 1 and 9 to that shown in Figs. 10 and 17, as the web roll decreases in size, the arms 3 on hooks 74 passing weighted stops 2 which then swing up to lock the hooks and hold the carriage in this position. The carriage thus strikes both push-buttons 7 at opposite sides of the machine, moving contacts 84 so as to close an electric circuit to start the reversible motor 200 to drive shaft 106 and operate solenoid 109 to actuate clutch 107 to rotate shaft 100 through worm 104, gear 103, and flexible coupling 101, to the right in Fig. 1, and, by engagement of gears 99 with segments 98, swing the bearers 68 downward with shifter bars 66, the shifter bars being also rocked on their pivot 67 by bowls 70 running in fixed cam grooves 71, and the shifter with roll Y being thus moved from the position shown in Figs. 1 and 17, to that shown in Figs. 14 and 18, with the expiring roll Y carried by the shifter and its web y running upward over expansion roll 126, as shown clearly in Fig. 18, and shaft 12 held in the open bearings 73 by hooks 74. As the shifter reaches this position, circuit breaker 102 is actuated by trip 8 to unclutch and stop shaft 100 and stop the reversible motor.

In connection with dropping the shifter, as above described, it is necessary that the lower brake shoe 18 should be moved out of the path of brake pulley 19 on spindle 12, and that the margin adjuster on carriage 75 should be brought into operation to control the margin adjustment during the remaining feeding of the expiring roll and to permit margin adjustment, if required. The release of the lower brake shoe 18 is secured by the engagement of lever 25 with stop 27 which moves lever 25 rearward against the tension of spring 26 thus releasing pin 21 on arm 20 and allowing this arm with the brake shoe 18, to drop from the position shown in Fig. 9 to that shown in Fig. 10. Spindle 12 is then free to drop away from top brake shoe 17, as the shifter moves downward. The change of margin adjustment control is secured by arm 94 passing off trip 96 as carriage 75 reaches the position in which the shifter is started downward, the half nut 91 thus being thrown downward to lock on the screw threads of hand screw 86 by the upward movement of arm 94 under pressure of spring 95, as shown in dotted lines in Fig. 8, so that screw 86 with box 88 and shoe 87 engaging pulley 19 is not free to move sidewise, but locks the web roll in its margin adjustment, which now may be varied by turning screw 86 in nut 91 by head 90.

The shifter having been dropped with expiring roll Y, the carriage 11 is ready to be withdrawn from the position shown in Fig. 17 to that shown in Fig. 1, for receiving and advancing another roll. In withdrawing the carriage the operator throws handle 46 to the left of its normal vertical position, shown in Fig. 1, thus shifting valve 45 to admit pressure air to the rear end of air cylinder 42 through pipe 43 and connect pipe 44 to exhaust, thus moving the piston to the right and returning carriage 11 to the left, in Fig. 1. The regulating valve 45 may be adjusted for higher pressure to return the carriage 11, or may be adjusted after return for the higher pressure desired in advancing the next web roll.

The new web x having thus been pasted to the expiring web y and the web renewal completed with the parts in the position shown in Figs. 14 to 18, the expiring web y is to be broken and the spent roll Y delivered, as follows: The handle 79 is first thrown from the position shown in Fig. 14 to the position shown in Fig. 15, which rocks shaft 78 and through arms 77 and links 5 moves trips 67 to rock weighted catches 2 to release arms 3 on the shafts of hoofs 74 and permit the latter to be raised for releasing spindle 12 of web roll Y. This move-

ment of catches 2 also releases carriage 75 and permits it to slide downward on the shifter a short distance, from the position shown in Fig. 14 to that shown in Fig. 15. The breaking of the web *y* is secured by this sliding movement of the carriage 75, the trip 4 and catch 2 on one side of the frame being arranged to release that end of the carriage 75 slightly before the other end is released, so that one end of the carriage slides down before the other and thus tears the web across, detaching the spent roll from the new web. The parts are now in the position shown in Fig. 15, which corresponds with Fig. 18, except that the carriage has been released and moved downward slightly from the position shown in Fig. 18 and the web *y* has been broken. The handle 79 is now thrown from the position shown in Fig. 15 to that shown in Fig. 16, thus moving the links 5 farther to swing trips 6 against arms 3 and positively raise hooks 74 to release spindle 12 of roll Y, which spindle then rolls out of the open bearings 73 and downward into bearings 112 on arms 111. This movement of lever 79 also, through link 81, shaft 82 and its arms, and slotted links 83, moves contacts 84 to return push buttons 7 to normal position and close contacts to actuate the reversible motor and through solenoid 109 to clutch in worm 104 and rotate shaft 100 to the left in Fig. 1, thus through segments 98 actuating the bearers 68 to carry shifter bars 66 back to normal position, and on the full return of the shifter circuit breaker 105 is actuated by trip 9 to stop the motor and unclutch shaft 100. If desired, another circuit controller or controllers 201 may be added to enable the operator to stop, start or reverse the shifter by hand at any point in its movement. The position of the parts with the spent roll transferrer to bearings 112, and the shifter ready to return to normal position when handle 79 is operated, is shown in Figs. 16 and 19. Shaft 113 is now rocked by the weight of the spent roll Y against the spring pressed rods 115 and dash pot 119, thus lowering arms 111 with spent roll Y and its spindle 12, so as to drop the spindle 12 into bearings 123 on carriage 121, and shaft 113 is then rocked by its handle 201 to move the arms 111 down and rock spring catches 124 to release the carriage, the carriage 121 then running down the incline and over tracks 120 to the rear end of frame A to deliver the spent roll in convenient position for removal, the positions of the parts during this operation being shown in Figs. 19, 20, and 4, and the final position of the carriage in Figs. 1 and 3. Rock shaft 113 is then returned to position by spring pressed rods 115 on the release of handle 201, this return movement as well as the downward movement being retarded as desired by dash pot 119, and spring catches 124 returned to normal position to hold carriage 121 on its return, all as shown in Fig. 1.

The invention is not be limited to the exact form or arrangement of the apparatus illustrated, but many changes may be made while retaining the invention defined by the claims. The arrangement shown by which the abutment roll not only secures the pasting operation desired, but acts in itself as the driver for feeding off a large part of the web from the new web roll and controlling the latter, secures a very efficient operation with a simple and compact construction, but it will be understood that many features of the invention may be used in constructions in which the feeding off and control of the new web after pasting is otherwise secured.

What I claim is:

1. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, and power operated means for moving a partially spent roll out of the path of the advancing roll to permit the advancing roll to engage the web from the partially spent roll running over the abutment roll.

2. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, and power operated means brought into action by a partially spent roll for moving it out of the path of the advancing roll to permit the advancing roll to engage the web from the partially spent roll running over the abutment roll.

3. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, and power operated means controlled by the size of a partially spent roll for moving it out of the path of the advancing roll to permit the advancing roll to engage the web from the partially spent roll running over the abutment roll.

4. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, a shifter, means for moving the shifter to move the partially spent roll out of the path of the advancing roll to permit the advancing roll to engage the web from the partially spent roll running over the abutment roll, and devices controlled by the size of the partially spent roll for bringing the shifter operating means into action.

5. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, a shifter, means for moving the shifter to move the partially spent roll out of the path of the advancing roll to permit the advancing roll to engage the web from the partially spent roll running over the abutment roll, bearings for the advancing roll and roll bearings on

the shifter to which the partially spent roll is transferred before the shifter is operated to move the roll out of position.

6. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, a shifter, means for moving the shifter to move the partially spent roll out of the path of the advancing roll to permit the advancing roll to engage the web from the partially spent roll running over the abutment roll, bearings for the advancing roll, roll bearings on the shifter, and means controlled by the partially spent roll for automatically transferring it to the shifter bearings and bringing the shifter operating means into action.

7. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, a shifter, means for moving the shifter to move the partially spent roll out of the path of the advancing roll to permit the advancing roll to engage the web from the partially spent roll running over the abutment roll, bearings for the advancing roll, roll bearings on the shifter, and a margin adjuster on the shifter for controlling the margin on the partially spent roll.

8. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, a shifter, means for moving the shifter to move the partially spent roll out of the path of the advancing roll to permit the advancing roll to engage the web from the partially spent roll running over the abutment roll, a margin adjuster for the advancing roll, and a margin adjuster on the shifter to which the partially spent roll is transferred.

9. The combination with an abutment roll, of a web roll carriage and means for advancing it to move the web roll against the abutment roll, a margin adjuster on the carriage, a shifter for moving the partially spent roll out of the line of the advancing roll, a margin adjuster on the shifter, and means for automatically releasing the margin adjuster on the carriage and bringing the margin adjuster on the shifter into operation to control the web roll when the roll is moved out of position by the shifter.

10. The combination with an abutment roll, of a web roll carriage and means for advancing it to move the web roll against the abutment roll, a web roll brake mechanism on the carriage, a shifter for moving the partially spent roll out of the path of the advancing roll, and means for automatically releasing the brake mechanism for the shifter movement.

11. The combination with an abutment roll, of a web roll carriage and means for advancing it to move the web roll against the abutment roll, a starting device for speeding up the advancing roll, means for automatically throwing the starting device out of operation before the advancing web roll engages the abutment roll, a brake mechanism on the carriage for controlling the web roll after engagement with the abutment roll, a shifter for moving the partially spent roll out of the path of the advancing roll, and means for automatically releasing the brake mechanism on the carriage to permit the shifter to move the roll out of position.

12. The combination with an abutment roll, of a web roll carriage and means for advancing it to move the web roll against the abutment roll, a starting device for speeding up the advancing roll, means for automatically throwing the starting device out of operation before the advancing web roll engages the abutment roll, a shifter for moving the partially spent roll out of the path of the advancing roll, separate roll bearings on the carriage and shifter, and means for automatically transferring the web roll from the carriage bearings to the shifter bearings and permitting the carriage bearings to return with the carriage for receiving another roll.

13. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, a shifter, means for moving the shifter to move a partially spent roll out of the path of the advancing roll, bearings for the spindle of the advancing roll, bearings on the shifter to which the roll is transferred, a carriage below the path of the advancing roll for receiving the spent roll, and means for transferring the spent roll from the shifter to the carriage for the return of the shifter.

14. The combination with an abutment roll, of means for advancing and holding a web roll against the abutment roll, a shifter, means for moving the shifter to move a partially spent roll out of the path of the advancing roll, bearings for the spindle of the advancing roll, bearings on the shifter to which the roll is transferred, a carriage below the path of the advancing roll for receiving the spent roll, a transferrer for transferring the spent roll from the shifter to the carriage, and means for cushioning the movement of the transferrer.

15. The combination with an abutment roll, of means for advancing a web roll and holding it against the abutment roll, a shifter for moving a partially spent roll out of the path of the advancing roll, a carriage on the shifter receiving the web roll and movable toward the abutment roll as the roll decreases in size, means controlled by the movement of the shifter carriage for operating the shifter to move the partially spent roll out of position, means for locking the shifter carriage in position when the web roll is moved out of contact with the abut-

ment roll, and means for releasing the carriage and returning it to normal position on the shifter.

16. The combination with an abutment roll, of means for advancing a web roll and holding it against the abutment roll, a shifter for moving a partially spent roll out of the path of the advancing roll, a carriage on the shifter receiving the web roll and movable toward the abutment roll as the roll decreases in size, means controlled by the movement of the shifter carriage for operating the shifter to move the partially spent roll out of position, means for locking the shifter carriage in position when the web roll is moved out of contact with the abutment roll, said locking and releasing means being arranged to secure the return movement of one end of the shifter carriage before the other to break the expiring web.

17. The combination with an abutment roll, of fluid pressure actuated means for advancing a web roll and yieldingly holding it against the abutment roll, and means for adjusting the pressure to permit a high pressure to be used for moving the web roll against the abutment roll, and a lower pressure during the feeding of the web.

18. The combination with an abutment roll, of fluid pressure actuated means for advancing a web roll and yieldingly holding it against the abutment roll, means for moving a partially spent roll out of the path of the advancing roll to permit the advancing roll to engage the web of the partially spent roll running over the abutment roll, and means for adjusting the pressure to permit a high pressure to be used in attaching the new web to the expiring web and a lower pressure during the feeding of the new web.

19. The combination with a web roll advancing mechanism, of a starting device mounted to move into and out of position to engage the web roll, fluid operated mechanism for bringing and holding the starting device in contact with the web roll, and means operated by the advancing roll for automatically controlling the fluid pressure to throw the starting device out of contact with the web roll.

20. The combination with a web roll carriage for advancing a web roll, of fluid operated mechanism and controlling devices below the path of the advancing roll for moving said carriage, a starting device engaging the lower side of the roll, and controlling mechanism for said starting device located below the path of the roll.

21. The combination with a web roll support and a carriage moving thereon for advancing a web roll, of fluid operated mechanism and controlling devices below the path of the advancing roll for moving said carriage, a starting device engaging the lower side of the roll, controlling mechanism for said starting device located below the path of the roll, a shifter in line with the roll support to which the roll is transferred, means for actuating the shifter to move the partially spent roll below the path of the advancing roll, and means for delivering the spent roll from the shifter beneath the path of the advancing roll.

22. The combination with a web roll support and a carriage moving thereon for advancing a web roll, of fluid operated mechanism and controlling devices below the path of the advancing roll for moving said carriage, a starting device engaging the lower side of the roll, controlling mechanism for said starting device located below the path of the roll, a shifter in line with the roll support to which the roll is transferred, means for actuating the shifter to move the partially spent roll below the path of the advancing roll, a track extending below the path of the advancing roll, a carriage on said track, and means for transferring the spent roll from the shifter to the carriage.

23. The combination with a web roll support and a carriage thereon for advancing the web roll, of a shifter in line with the support, roll bearings on the shifter to which the web roll is transferred, hooks retaining the roll in the shifter bearings, means for operating the shifter to transfer the expiring roll out of the path of the advancing roll, and means for moving the hooks to release the spent roll for its delivery from the shifter.

24. The combination with a web roll support, and a carriage thereon for advancing the web roll, of a shifter in line with the support, roll bearings on the shifter to which the web roll is transferred, hooks retaining the roll in the shifter bearings, means for operating the shifter to transfer the expiring roll out of the path of the advancing roll, means for locking the hooks during the movement of the shifter and feeding off of the expiring roll, and means for unlocking the hooks and moving them to release the spent roll for its delivery from the shifter.

25. The combination with a web roll carriage and means for advancing it, a margin adjuster on the carriage, a shifter to which the roll is transferred from the carriage, a margin adjuster on the shifter having an adjusting screw, and means for locking and releasing the margin adjuster on the shifter to permit the member engaging the roll to move sidewise independently of the adjusting screw for receiving the roll and permitting its control by the margin adjuster on the carriage and locking the margin adjuster for holding and adjusting the margin by the screw when the margin adjuster on the carriage is out of operation.

26. The combination with a web roll car-

riage and means for advancing it, of a margin adjuster on the carriage, a shifter to which the roll is transferred from the carriage, a margin adjuster on the shifter having an adjusting screw, and means for locking and releasing the margin adjuster on the shifter to permit the member engaging the roll to move sidewise independently of the adjusting screw for receiving the roll and permitting its control by the margin adjuster on the carriage and locking the margin adjuster for holding and adjusting the margin by the screw when the margin adjuster on the carriage is out of operation, said locking and releasing means being controlled by the size of the expiring roll to automatically lock the margin adjuster when the margin adjuster on the carriage is to be released.

27. The combination with a web roll carriage, of roll bearings thereon pivoted to swing away from the roll spindle, a support on which the bearings travel, and a shifter in line with the support having bearings to which the roll is transferred, said shifter being constructed to permit the carriage bearings to release the roll spindle on the transfer of the roll and permit the shifter movement.

28. The combination with a web roll support, and means for advancing a web roll thereon, of a shifter in line with the support receiving the roll and yielding means for moving the shifter transversely to the support and returning it to position.

29. The combination with a web roll support, and means for advancing a web roll thereon, of a shifter in line with the support receiving the roll, said shifter being pivoted to swing transversely to the support, roll bearings carried by bars pivoted in said shifter, and means for swinging the shifter and rocking said bars to move the roll into position for delivery from the shifter.

30. In a web roll renewer, the combination with means for pasting the leading end of a new web roll to the web running from an expiring roll, of delivery means for the expiring roll including means for moving one end of the expiring roll before the other end to break and discontinue the expiring web.

31. The combination with an expansion driving roll and co-acting web feed roll thereon, of means for advancing a web roll against a web passing over the driving roll for pasting and for pressing the web roll against the driving roll for feeding off the web, and means for moving the partially spent roll out of the path of the advancing roll.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

ROBERT HOE.

Witnesses:
A. WHITE,
C. J. SAWYER.