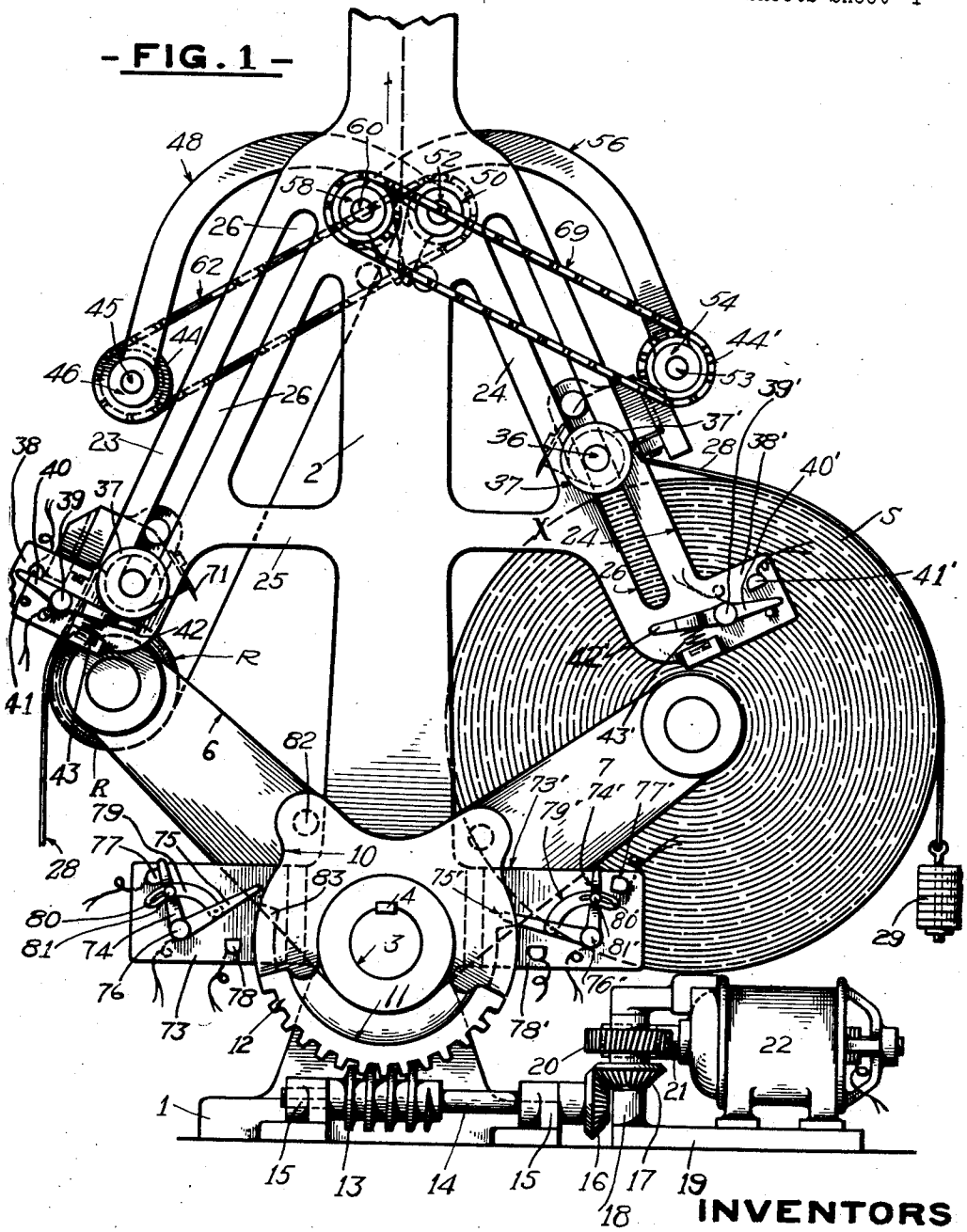
Oct. 27, 1931. H. V. BALL ET AL 1,828,898

WEB ROLL CONTROLLING MECHANISM

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-FIG. 1-



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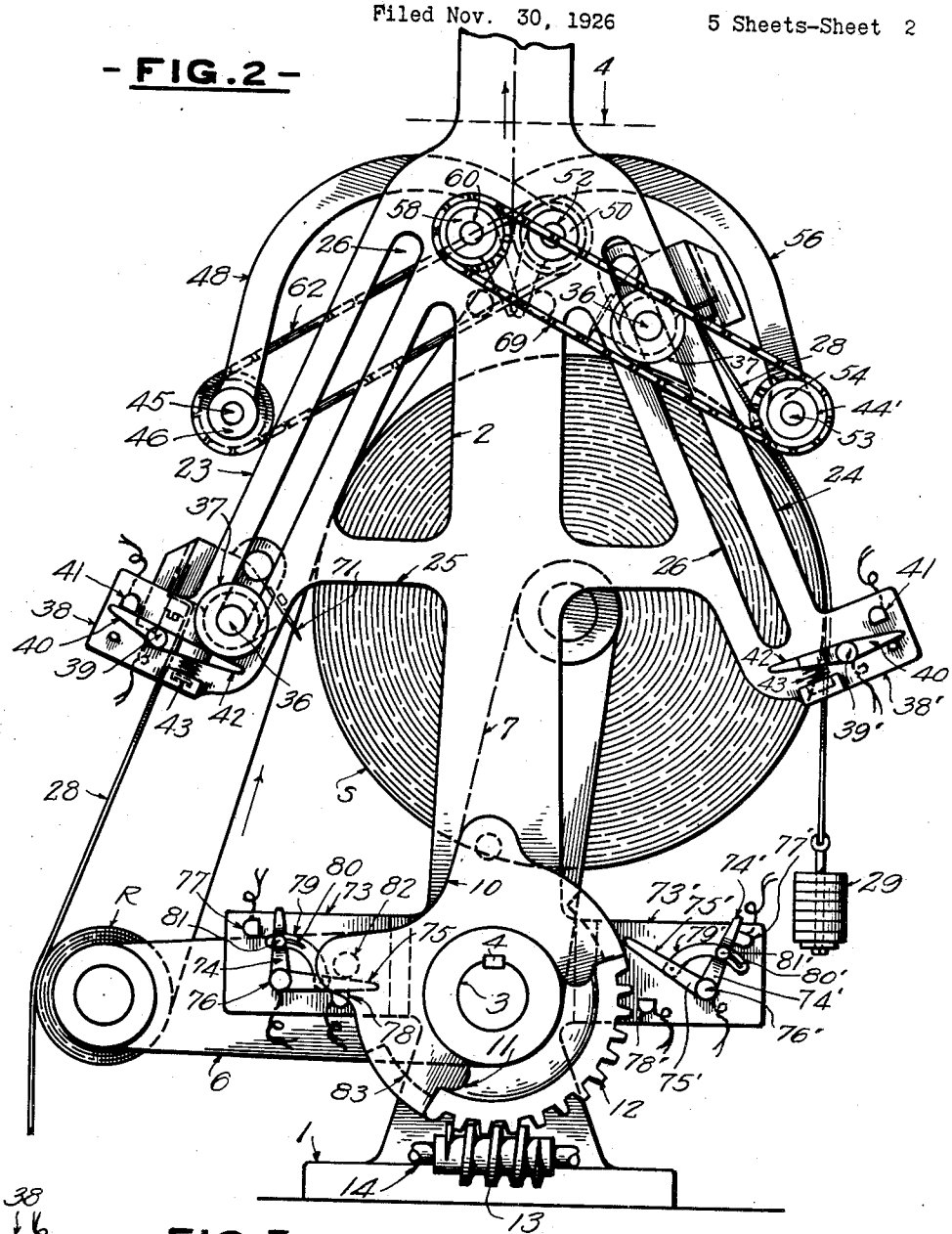
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Oct. 27, 1931. H. V. BALL ET AL 1,828,898

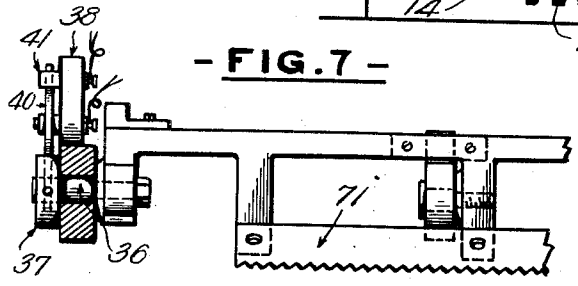
WEB ROLL CONTROLLING MECHANISM

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- FIG. 2 -



- FIG. 7 -



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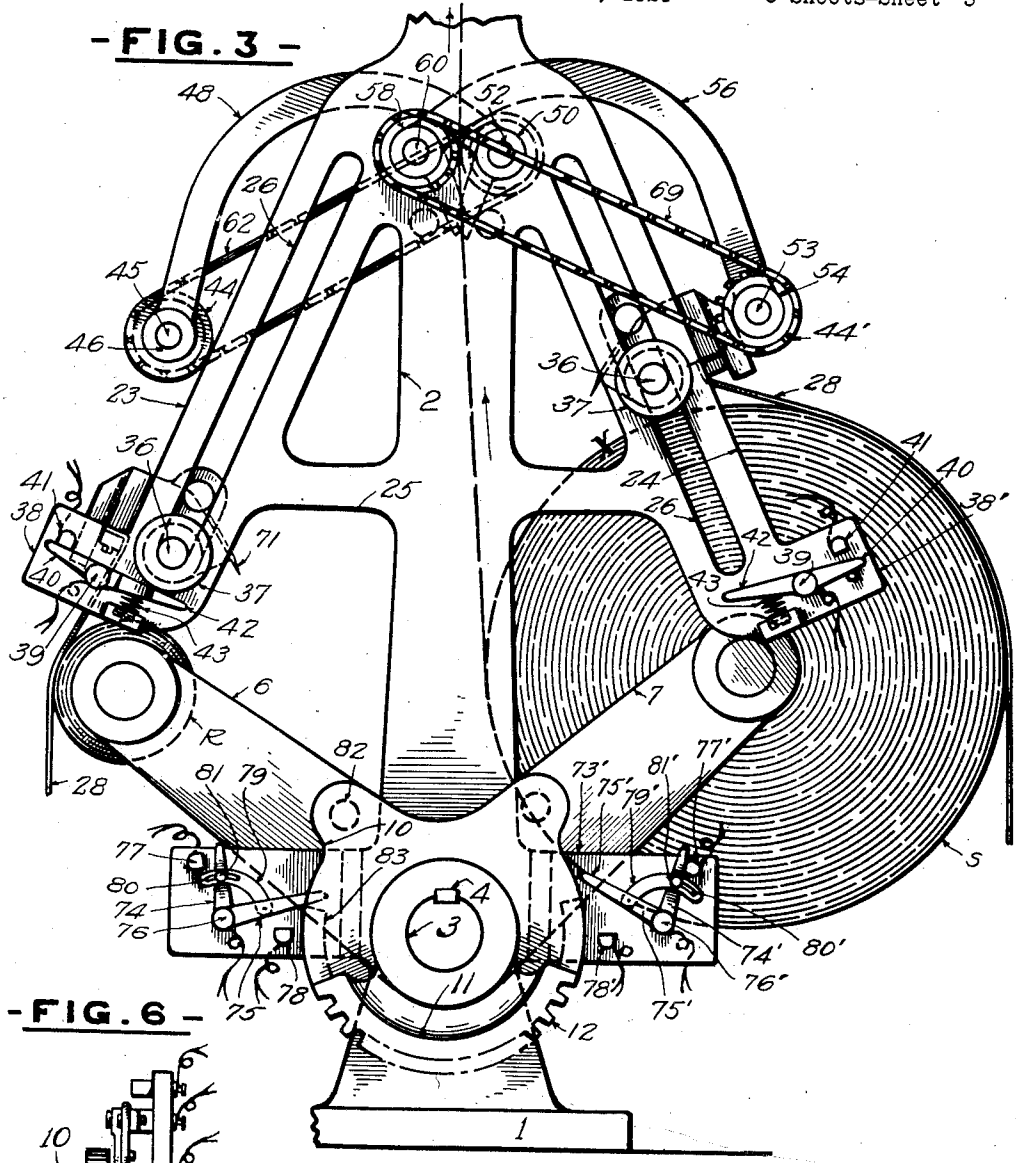
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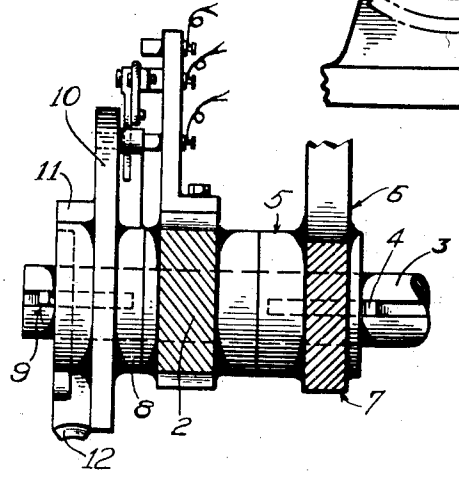
WEB ROLL CONTROLLING MECHANISM

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-FIG. 3-



-FIG. 6-



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WEB ROLL CONTROLLING MECHANISM

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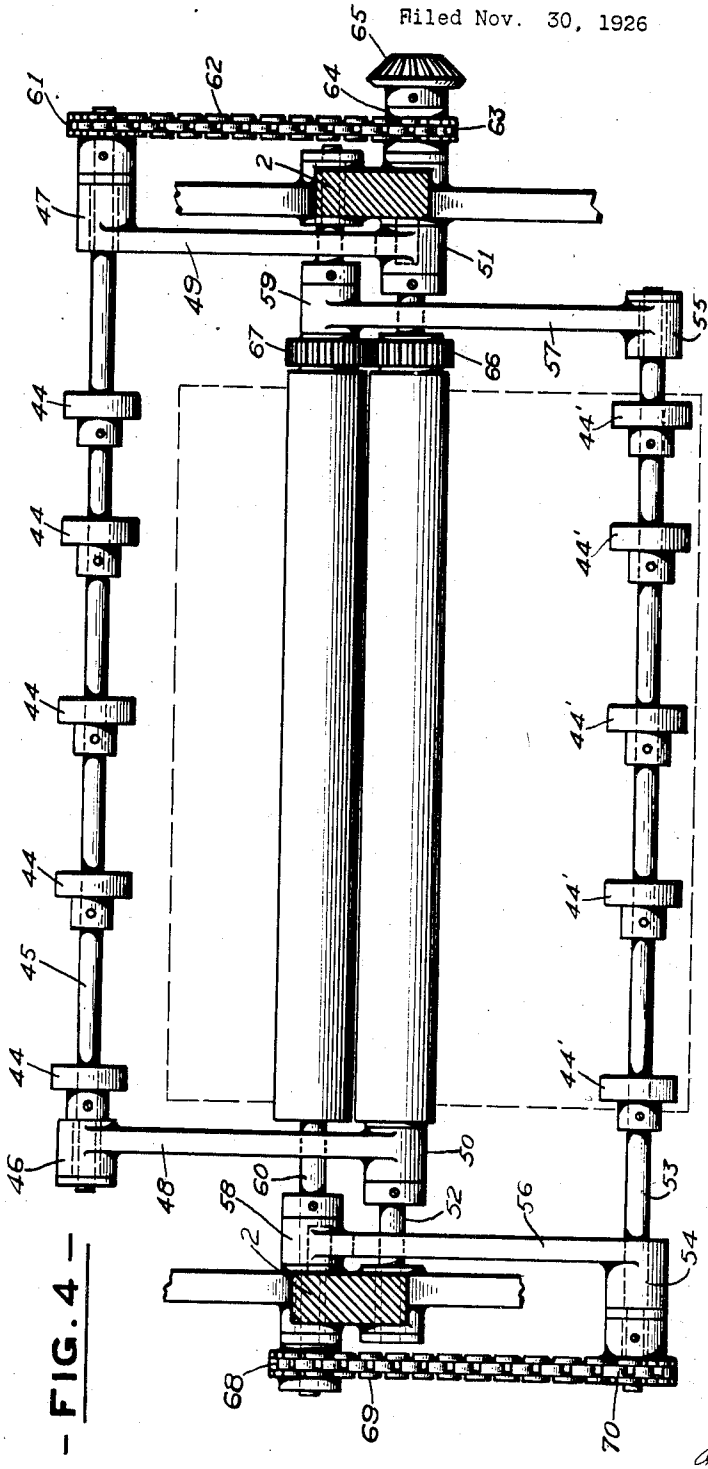


FIG. 4

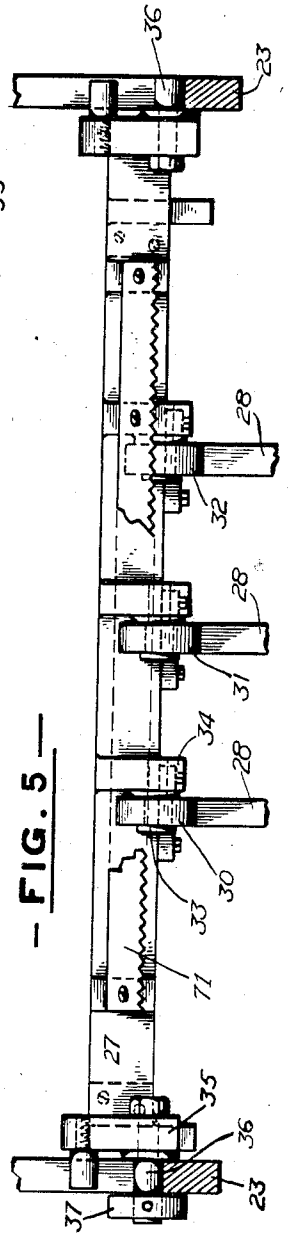


FIG. 5

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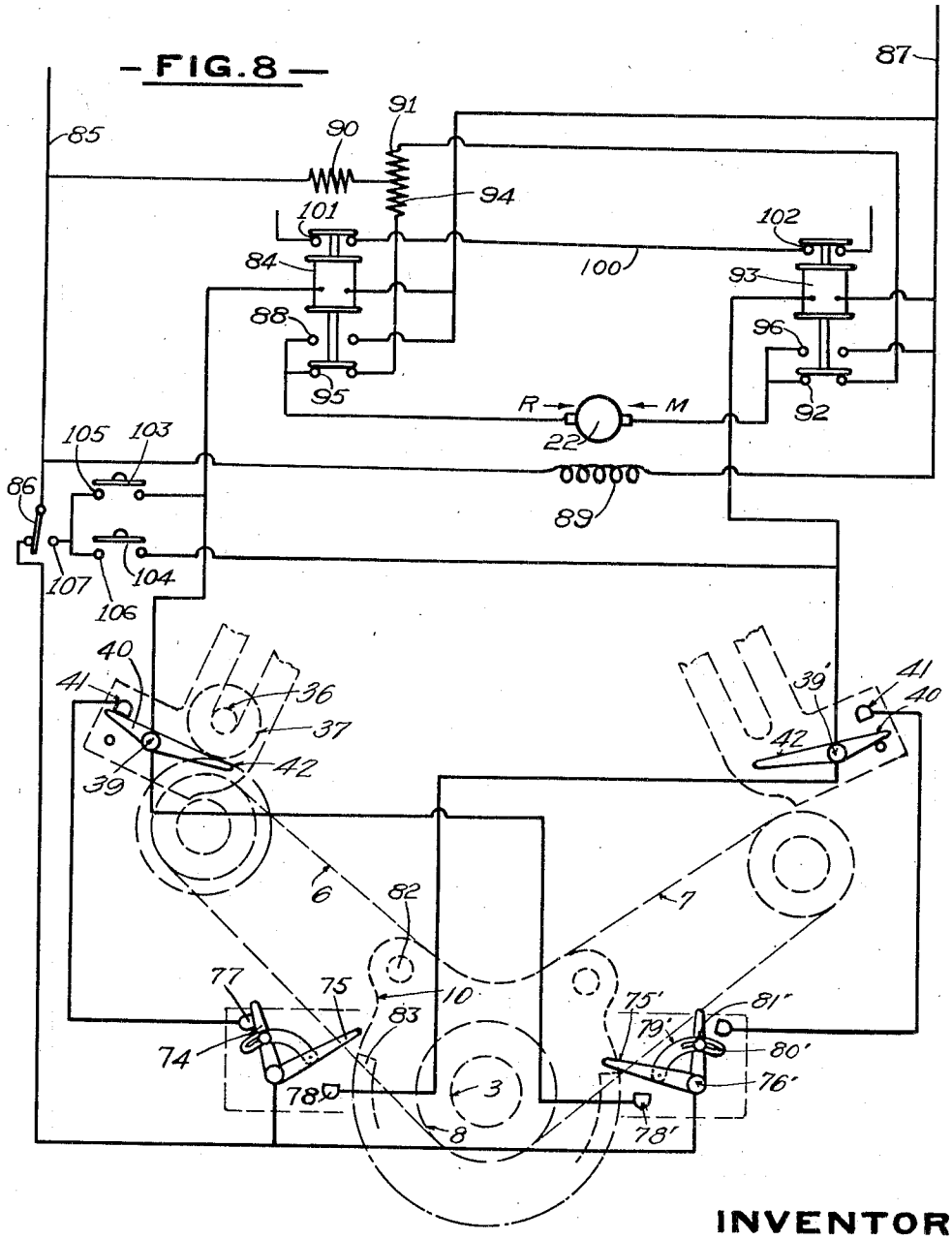
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WEB ROLL CONTROLLING MECHANISM

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— FIG. 8 —



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UNITED STATES PATENT OFFICE

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WEB ROLL CONTROLLING MECHANISM

Application filed November 30, 1926. Serial No. 151,756.

This invention relates to certain improvements in web roll controlling and roll changing mechanism for use with printing machines.

In modern high speed press operation in which a large number of copies of the product are to be run off the press, the webs have to be renewed from time to time during the press run. In the operation of these printing machines saving of time is, of course, of the highest importance and it is desirable that the operation of the press shall be interfered with to the least possible degree during this web renewal.

It is the especial object of the invention to provide a web roll controlling mechanism in which the renewing of a web can be accomplished in an entirely automatic manner, that is, the new web roll is joined or spliced to the old web, the old web severed and the new web roll placed in running position without necessitating any manual operation, the entire cycle being automatically performed and without stopping the press.

It is a further object of the invention to provide such a construction in which, in addition to the automatic changing of the rolls, mechanism is provided for manually effecting the change in case of emergency or any other desired reason.

It is a further object of the invention to provide mechanism by which the automatic changing of the roll is effected by the decrease in the size of the running roll and in which the new roll is so manipulated or controlled as to be brought up to the speed of the web at the time the paste is made.

It is a further object of the invention to provide means engaging the surface of the roll for controlling the web as it unwinds, the controlling means following the roll as it decreases in size so as to maintain the same relative pressure or tension on the roll.

It is a further object of the invention to provide means whereby the speed of the press may be automatically slowed down while making the paste and then accelerated or speeded up to running speed after the new roll has been joined to the old web.

With these and other objects not specifically referred to, the invention consists in certain novel parts, arrangements and combinations which will be described in connection with the accompanying drawings and the novel features pointed out in the claims hereunto annexed.

Referring now to these drawings,—

Figure 1 is an end elevation, partly broken away, of the improved web roll renewing and controlling mechanism, the parts being shown in the position they occupy when a running web roll is about to expire;

Figure 2 is a similar view showing the parts in the position they occupy after the new web has been pasted to the old web and the old web severed;

Figure 3 is a similar view showing the new web roll moved to running position;

Figure 4 is a plan view of certain of the constructions shown in the preceding figures and partly in section, the view being taken in the direction of arrow 4 of Figure 2;

Figure 5 is a detail, partly sectional and partly broken view showing the cutting knife and part of the controlling mechanism for operating the switches;

Figure 6 is a detail, partly sectional view of the switch mechanism for reversing the motor;

Figure 7 is a detail, partly sectional view of the cutting knife; and

Figure 8 is a diagrammatic view showing the circuits by which the mechanism is controlled in their relation to the web roll support.

Referring now to these drawings, the mechanism which has been selected to illustrate the invention includes a roll support capacitated to carry a running roll and a spare roll, and this support is shown as one which has a rocking movement from pasting to loading and running position.

It will be understood, however, that the invention is not to be confined to a roll support of this character, but that it may be use with web roll supports of widely varying characters.

Generally speaking, however, the mechanism shown will include devices for moving a new roll into pasting position, speeding up

the new roll to web speed, pasting the new roll to the old web, severing the old web, and moving the new roll to running position, the mechanism being capable of performing all of these operations in an entirely automatic manner.

Referring now to these drawings, there is provided a base 1 supporting suitable side frames spaced apart and marked 2, in which the operative parts of the machine are supported. Suitably supported in these frames 2 is a shaft 3 to which is keyed by a key 4 a hub 5 carrying a pair of arms 6, 7, in the outer extremities of which are bearings for supporting a running roll R and a spare roll S. It is understood that this construction is duplicated on each side of the machine.

These supporting arms 6, 7, which will be hereinafter referred to as the racks, are, in the particular construction illustrated, given a rocking movement for purposes which will hereinafter appear. While this movement may be effected in various ways, the shafts 3 has secured on the outer end thereof, at one side of the machine beyond the side frames 2, a hub 8, this hub being keyed by a key 9 to the shaft so as to rotate therewith (Fig. 6). This hub carries a plate 10, hereinafter more fully referred to, which has formed with or secured thereto a sector 11 having a gear 12. This gear 12 meshes with a worm 13 on a short shaft 14 suitably supported in bearings 15 and provided at one end with a miter gear 16 meshing with a miter 17 on a vertical stud 18 suitably mounted on a base 19. This stud 18 carries a gear 20 which is driven from the armature shaft 21 of a motor 22 suitably supported on the base 19, this motor 22 operating the rack so as to turn it in either a clockwise or counter-clockwise direction through mechanism and circuits referred to later.

In accordance with the invention, means are provided for rocking this rack automatically on the expiration of the running roll to unite a new roll to the old expiring web which is done by the motor 22 through certain circuits referred to hereafter and circuit switches, the construction being such in the preferred arrangement of the invention that the control of the motor is effected by the decrease in the size of the running roll. In constructions embodying the invention in its preferred form, furthermore, certain controlling devices are employed for maintaining the proper tension or pressure on the web roll as it unwinds, these devices moving with the roll as it decreases in size.

While the specific mechanism employed for effecting these functions may be varied within considerable limits, in the particular construction illustrated the side frames 2 at each side of the machine are provided with downwardly extending diverging frames marked 23, 24, these frames being strengthened by webs 25, and being provided with long slots or grooves 26. Supported to have a sliding vertical movement with respect to the frames 23, 24, are bars 27, it being understood that one of these bars is provided at each side of the machine. Secured to these bars is one end of suitable controlling means shown in the form of narrow friction straps or belts which engage the surface of the unwinding roll and thus control the unwinding of the web from the roll. These straps or belts may be provided in any number. As shown, there are three of these marked 28 (see Fig. 5) arranged to run in the margin spaces of the web. It will be understood that, if desired, they may be otherwise arranged.

The free ends of these straps are weighted by adjustable weights 29, the straps being hung over the roll, as shown in Fig. 1. Mounted on the cross-bar 27 are small rollers 30, 31, 32, these rolls being carried on studs 33 and secured in arms 34 on the cross-bar. These small rolls are preferably provided in similar numbers to those of the straps and are arranged in line therewith, and these rolls carry the weight of the cross-bar and the end of the straps or belts so that the straps are always in proper engagement with the surface of the web roll. The bar 27 may be supported in any suitable manner so as to follow the roll as the roll decreases in size, but, as shown, where the mechanism is to operate automatically, the bar at each end is provided with a block 35 in which is carried a stud 36 which engages with and slides in the slots 26, before referred to. At one side of the machine, for instance the front, the stud extends beyond the frame 23 and is provided with a collar 37, this construction being duplicated for each of the frames 23, 24. These collars will thus move up and down following the roll surface and the function of these collars is to actuate certain switch mechanism for controlling the operation of the motor 22, as will now be described. It will be understood, however, that these collars may be omitted in some circumstances.

This switch mechanism is duplicated on each side of the machine so that the operation of the mechanism will be effective for a roll carried in either of the supports 6, 7, before referred to, the parts on the right hand side of the mechanism being primed for convenience. The lower ends of the frames 23, 24, before referred to, are provided with outwardly extending projections at the front end of the machine marked 38, 38′, in each of which is pivoted a two-arm switch lever 39, 39′, one arm of which, 40, engages the contact 41 and the arm 42 which is engaged by the collar 37, and preferably the end of this switch is rocked against a spring 43, this taking place when the roll has unwound to the point of exhaustion and it is desired to unite a new web roll thereto, this position of the parts being shown in Fig. 1. As soon as

switch arm 40 is closed, the motor 22 is operated to rotate the rack arm from the position shown in Fig. 1 toward the position shown in Fig. 2, that is, in a counterclockwise direction and as the new spare roll is thus elevated certain devices for giving the new roll a turning movement are brought into operation to bring the new roll up to web speed.

While these devices may be of various characters, in the particular construction illustrated these devices are in the form of traction wheels 44 (see Fig. 4) suitably secured on a cross-shaft 45 having bearing in hubs 46, 47, on arms 48, 49, which at their other ends are secured to hubs 50, 51, on a shaft 52 suitably supported in the upper part of the side frames 2, before referred to. These speed up rolls are provided on both sides of the machine, a second set of rolls 44′, being illustrated in Fig. 4, carried on cross-shaft 53 taking bearing in hubs 54, 55, supported by arms 56, 57, on hubs 58, 59, on a second shaft 60 also suitably supported in the frame 2, before referred to. The shafts 45. 53, are driven shafts which are driven from the press at web speed and thus act to bring the new roll up to web speed so that when it reaches the position shown in Figure 2, the surface of the new roll will be running at the same speed as the old web.

While the means for thus driving the shafts 53, 44, may be varied, in the particular construction shown the shaft 45 beyond the hub 47 is provided with a sprocket 61 over which pass a chain 62, this chain also passing over a sprocket 63 on a hub 64 on the shaft 52, before referred to. This hub is provided with a miter 65 being driven from any convenient part of the press, the sprockets and chains being located outside the frames 2, as shown in Fig. 4. This shaft 52 is also provided with a gear 66 which meshes with a gear 67 on the shaft 60, which at its other end has a sprocket 68, over which passes a driving chain 69, this driving chain driving a sprocket 70 on the shaft 53. Thus whichever set of rolls is being used is driven at press speed.

It will be understood that paste or suitable adhesive is secured to the new web roll, as for instance at the point X in Figure 1, where it will not interfere or come in contact with the friction belts or straps and the speed up rolls so that when the new roll and old web come in contact the two are pasted together just before reaching the position shown in Figure 2.

Machines constructed in accordance with the invention will operate to sever the old web after the paste has been made. While these means may vary somewhat in construction, as shown there is provided a serrated severing knife 71 carried by the cross bar 27. before referred to, against which the old web is moved by a further counter-clockwise movement of the roll support, this position being shown in Figure 2.

After the web from the old roll R has been severed by the knife 71, the mechanism is automatically operated to return the roll S, which is now the running roll, to its running position, shown in Fig. 3. While the particular construction for effecting this may be varied, as shown, the side frames 2, before referred to, are provided on one side of the machine with oppositely extending brackets or arms 73, 73′, on which are supported a switch mechanism for effecting this automatic return of the new roll to running position. This switch mechanism includes for each roll position a two part switch mechanism including arms 74, 75 pivoted on a contact stud 76 supported in the bracket 73, these arms engaging upper and lower contacts 77, 78 in the bracket, it being understood that these parts are suitably insulated. These switch arms 74, 75 are connected by a link 79 having a slot 80, in which rides a pin 81 on the switch arm 74, the purpose of which shall be hereinafter referred to. These switches are automatically operated to make and break the proper circuits by means of a pin 82 carried on the inside of the plate 11 and a cam 83 also carried on the inside of this plate. It will be understood that these parts are duplicated for causing the actuation of the roll support in either position, the numerals at the right hand side of the mechanism being primed for easy reference.

The operation of the devices may be understood by a description of the circuits and their relation to the switch mechanism, before referred to, with special reference to Fig. 8, as follows: Referring to this figure, it will be observed that the parts are in the position shown in Fig. 1, and the switches 40 and 74 are closed, the switch arm 40 having been operated by the collar 37, which has followed the roll down to the expiring point. The closing of switch 40 energizes a solenoid by completing a circuit therefor, which can be traced from the line 85 through the manually operated switch 86 in its left hand position, as shown in Fig. 8, contact 77 of switch 74, the closed contact of switch 40, the winding of the solenoid or relay 84 to line 87. Upon the energizing of solenoid 84, the upward movement of its core closes a circuit through contacts 88 for energizing the operating motor 22. The field winding 89 of motor 22 is permanently connected across the lines 85 and 87, and the circuit for the armature of this motor is completed through resistances 90, 91, the lower contacts 92 of a solenoid 93, through the armature of the motor in the direction designated by the arrow M through the upper contacts 88 of solenoid 84 to the other side of the line 87. The motor 22, therefore, operates counter-clockwise and

turns the roll support from the position shown in Fig. 1 to the position shown in Fig. 2, bringing the roll in contact with the rolls 44′ at the right hand side of the mechanism. These traction wheels speed up the new web roll to the speed of the running web so that the roll and web are running at press speed at the time the paste is made.

When the roll support has been rotated into pasting position, as described, the pin 82 has engaged the switch arm 75, closing the circuit through the contact 78 and opening the circuit through switch arm 74 which moves with the switch arm 75. The breaking of the circuit through switch arm 74 de-energizes the solenoid 84, thus stopping the rotation of the motor. This stoppage, however, is but momentary since the closure of the switch arm 75 completes a circuit from line 85, switch 86, contact 78, through the winding of solenoid 93 to the other side of the line 87. Solenoid 93 being energized causes the motor 22 to be energized and rotated in a direction opposite to that in which it rotated when under the control of solenoid 84, that is, the motor rotates in a clockwise direction.

The circuit thus established extends from line 85 through resistances 90, 94, through the lower contacts 95 of solenoid 84, through the armature of motor 22 in the direction indicated by arrow R of Fig. 8, through the upper contacts 96 of solenoid 93 to the other side of line 87. The roll support now turns in a clockwise direction until it reaches the position shown in Fig. 3. In this position, switch arm 75 has been engaged by the cam 83 and is opened, and the opening of this de-energizes solenoid 93 and consequently stops motor 22, the roll support remaining in its running position.

The right hand roll S in the position shown in Fig. 3 is now feeding to the press. As soon as this roll becomes exhausted, the corresponding mechanism on the right hand side of the machine will operate in the same manner as that heretofore described for renewing a new roll loaded into the support on the left hand side of the machine.

It will be observed that the arrangement of the switches 74, 75 is such that the initial downward movement of the switch 75 takes place without breaking a contact between switch arm 74 and contact 77, the pin and slot arrangement 80, 81 permitting this, so that the contact of switch arm 74 is broken simultaneously with the making of the contact between switch arm 75 and contact 78. It will be further observed that when the switch arm 75 is moved from the position shown in Fig. 2 to that shown in Fig. 3, the circuit is broken, but the circuit of arm 74 and contact 77 is not made until the support is turned for the next pasting operation, when the switch arms are moved to the position corresponding to the position of the switch arms 74′, 75′ of Fig. 2. With this arrangement, it results that during the operation of the mechanism the switch arms are in the proper position, so that an undesired reversal of the motor does not take place.

Under some circumstances it may be desirable to slow down the speed of the main press motor and consequently the speed of the old web at the time the paste is being made, this being effected automatically and, after the paste is made, the press being again brought up to running speed, and a circuit for effecting this is shown in part in Fig. 8, this circuit actuating certain controlling mechanism, not shown, by which the speed of the main press motor may be controlled. This circuit is indicated by the numeral 100 and is controlled by the movements of the cores of the solenoids 84, 93, through contacts 101, 102, so that the main press motor will be slowed down while the rolls are being pasted and then again brought up to speed.

The machine so far described is entirely automatic in its action. Under some circumstances it may be desirable to effect certain of the operations hereinbefore described manually, as it may happen that some emergency may arise where it may be desirable or necessary to dispense with the automatic operation, as for instance when one side of the support is being used the other side being empty, and means have been provided for doing this.

As shown, there are provided push-buttons 103, 104 controlling contacts 105, 106. The push-button 103 when operated to close the contact 105 energizes the solenoid 84 to move the support counter-clockwise, while the push-button 104 through contact 106 energizes the solenoid 93 to move the support in a clockwise direction. It will be understood, of course, that when the mechanism is to be controlled by these push-buttons, the switch 86 is moved from the position shown in Fig. 8 to engage a contact 107 in order to complete the circuits controlled by the push buttons.

It will be observed that the tension or pressure controlling belts 28, which control the roll while it is unwinding, are so arranged that they follow the roll as it unwinds and decreases in size, the bar to which they are secured moving downwardly with the roll, affording a very efficient control of the web as is unwinds. This construction has certain advantages in these web roll controlling mechanisms, and it will be understood that this feature may be employed with these web roll controlling devices aside from the automatic features hereinbefore described, and that roll supports other than rotating or otherwise movable supports, as for instance rigid frames or the like, may be employed, and that the use of these web

roll controlling devices with such other supports for the web roll is within the invention.

While the invention has been shown and described in its preferred forms, it will be understood that the specific construction and arrangement of the parts for effecting the function of this invention can be varied and that certain features of the invention are applicable for use in constructions other than those so shown and described, and that the invention, therefore, is not to be limited to this specific roll changing mechanism.

What is claimed is:

1. In a web renewing mechanism, the combination of means for supporting a running web roll and a spare roll, and means engaging with and controlled by the expiring roll for automatically uniting the web therefrom with the new roll.

2. In a web renewing mechanism, the combination of means for supporting a running web roll and a spare roll, and automatically operated means controlled through engagement with the running roll for speeding up the spare roll to the speed of the running web, for uniting the running web and the spare roll and for severing the expiring web.

3. In a web renewing mechanism, the combination of means for supporting a running web roll and a spare roll, automatically operated means controlled through engagement with the running roll for speeding up the spare roll to the speed of the running web, for uniting the running web and the spare roll and for severing the expiring web, and means for controlling the tension of the unwinding web.

4. In a web roll controlling mechanism, the combination of means for supporting a running web roll and a spare roll, automatically operated means controlled through engagement with the running roll for uniting the spare roll and the running web and for severing the running web, and means moving with the running roll as the roll decreases in size for controlling the tension of the unwinding web.

5. In a web roll controlling mechanism, the combination of a movable support for simultaneously supporting a spare web roll and a running roll, means for moving the support to bring the spare roll into contact with the running web to join it therewith, means for speeding up the new roll, means for severing the expiring web, and mechanism brought into operation by the decrease of the running roll to a predetermined diameter for causing said operations in a predetermined sequence.

6. In a web roll controlling mechanism, the combination of a movable support for simultaneously supporting a spare web roll and a running roll, means for moving the support to bring the spare roll into contact with the running web to join it therewith, means for speeding up the new roll, means for severing the expiring web, means for moving the support to running position after the running web has been joined with the spare web, and mechanism brought into operation by the decrease of the running roll to a predetermined diameter for causing said operations in a predetermined sequence.

7. In a web roll controlling mechanism, the combination of a movable support for simultaneously supporting a spare web roll and a running roll, means for moving the support to bring the spare roll into contact with the running web to join it therewith, means for speeding up the new roll, means for severing the expiring web, means for moving the support to running position after the running web has been joined therewith, mechanism brought into operation by the decrease of the running roll to a predetermined diameter for causing said operations in a predetermined sequence and means for controlling the tension of the unwinding web.

8. In a web roll controlling mechanism, the combination of a movable support for simultaneously supporting a spare web roll and a running roll, means for moving the support to bring the spare roll into contact with the running web to join it therewith, means for speeding up the new roll, means for severing the expiring web, means for moving the support to running position after the running web has been joined therewith, mechanism brought into operation by the decrease of the running roll to a predetermined diameter for causing said operations in a predetermined sequence, and means moving with the running roll as the roll decreases in size for controlling the tension of the unwinding web.

9. In a web roll controlling mechanism, the combination of a movable support for simultaneously supporting a running web roll and a spare roll, means for moving the support to bring the spare roll into contact with the running web and paste the web thereto, means for speeding up the new roll to the speed of the running web, means for severing the expiring web, and mechanism brought into operation by the decrease of the running roll to a predetermined diameter for causing said operations in a predetermined sequence.

10. In a web roll controlling mechanism, the combination of a movable support for simultaneously supporting a running web roll and a spare roll, means for moving the support to bring the spare roll into contact with the running web and pasting the web thereto, means for speeding up the new roll to the speed of the running web, means for severing the expiring web, means for moving the support and the spare roll to running position after the paste, and mechanism brought into operation by the decrease of the running roll

to a predetermined diameter for causing said operations in a predetermined sequence.

11. In a web roll controlling mechanism, the combination of a movable support for simultaneously supporting a running web roll and a spare roll, means for moving the support to bring the spare roll into contact with the running web and pasting the web thereto, means for speeding up the new roll to the speed of the running web, means for severing the expiring web, means for moving the support and the spare roll to running position after the paste, mechanism brought into operation by the decrease of the running roll to a predetermined diameter for causing said operations in a predetermined sequence, and means for controlling the tension of the unwinding web.

12. In a web roll controlling mechanism, the combination of a movable support for simultaneously supporting a running web roll and a spare roll, means for moving the support to bring the spare roll into contact with the running web and pasting the web thereto, means for speeding up the new roll to the speed of the running web, means for severing the expiring web, means for moving the support and the spare roll to running position after the paste, mechanism brought into operation by the decrease of the running roll to a predetermined diameter for causing said operations in a predetermined sequence, and means following the running roll as it decreases in size for controlling the tension of the unwinding web.

13. In a web roll supporting mechanism, the combination of a movable support for supporting a running web roll and a spare roll, a motor, and means controlled by the decrease in the size of the running roll for starting the motor to move the support into position to unite the running web and the spare roll and for reversing the motor to move the then running roll back to running position and for stopping the motor.

14. In a web roll controlling mechanism, the combination of a movable support for supporting a running web roll and a spare roll, a motor, a switch mechanism controlled by the decrease in the size of the running roll for starting the motor to move the support into position to unite the running web with the spare roll, and switches controlled by the movement of the support for reversing the motor to move the support and the then running roll back to running position and for stopping the motor.

15. In a web roll controlling mechanism, the combination of a movable support for supporting a running web roll and a spare roll, a motor, a switch mechanism operated by the decrease in the size of the runing roll for starting the motor to move the support into a position to join the spare roll with the running web, means for speeding up the spare roll as it moves to web joining position, means for severing the old web after it has been joined to the spare roll, and switch mechanism for reversing the motor for moving the support and the then running roll back to running position after the paste and for stopping the motor.

16. In a web roll controlling mechanism, the combination of a running roll, and friction means engaging the roll surface and carried by means which follow the surface of the roll as the roll decreases in size.

17. In a web roll controlling mechanism, the combination of a support for a web roll, a plurality of spaced friction means engaging the surface of the roll, and means for mounting the friction means which follows the surface of the roll as the roll decreases in size with the same relative degree of wrap.

18. In a web roll controlling mechanism, the combination of a support for a web roll, a plurality of belts or straps engaging the surface of the roll, means for securing the straps at one end, the other ends of the straps being free, and means for mounting the fixed ends of the straps so that they will follow the surface of the roll as it decreases in size.

19. In a web roll controlling mechanism, the combination of a support for a web roll, a plurality of belts or straps engaging the surface of the roll, a bar to which the straps are secured at one end, and guides for the bar so that it will follow the roll as the roll decreases in size.

20. In a web roll controlling mechanism, the combination of a support for a web roll, a plurality of belts or straps engaging the surface of the roll, a bar to which the straps are secured at one end, weights at the other ends of the belts, and guides in which the bar has a sliding movement so that it follows the roll as the roll decreases in size.

21. In a web roll renewing mechanism, the combination of means for supporting a running web roll and a spare roll, means engaging with and controlled by the expiring roll for automatically uniting the web therefrom with the new roll, and means for controlling the speed of the running web while it is being united to the new roll.

22. In a web roll renewing mechanism, the combination of a rotatable support for supporting a running web roll and a spare web roll, and means operative when the running roll reaches a predetermined diameter for rotating the support to unite the spare roll with the running web, for severing the expiring web and for moving the new roll to running position.

23. In a web roll renewing mechanism, the combination of a rotatable support for supporting a running web roll and a spare web roll, means for automatically rotating the support to a pasting position and to paste the spare roll to the running web, for severing

the expiring web and for moving the spare roll to running position, and means arranged to engage the spare roll as it moves to pasting position for bringing the spare roll up to the speed of the running web.

24. In a web roll renewing mechanism, the combination of a movable support for supporting a running web roll and a spare roll, a follower engaging the roll surface as the roll decreases in size, a motor, a switch engaged by the follower for energizing the motor to move the support to unite the running web and the spare roll and to sever the expiring web, and a switch mechanism arranged to stop the motor, restart the motor so that it will move the new roll to running position and again stop the motor.

25. In a web roll renewing mechanism, the combination of a movable support for supporting a running web roll and a spare roll, a follower engaging the roll surface as the roll decreases in size, a motor, a switch engaged by the follower for energizing the motor to move the support to unite the running web and the spare roll and to sever the expiring web, and a two part switch for stopping the motor and starting it in a reverse direction to move the new roll to running position and again stop the motor.

26. In a web roll controlling mechanism, the combination of a running roll, and friction means under tension engaging the roll surface and carried by means which follow the surface of the roll as the roll decreases in size.

27. In a web roll controlling mechanism, the combination of a running roll, and friction straps or belts under tension engaging the roll surface and carried by means which follow the surface of the roll as the roll decreases in size.

28. In a web roll controlling mechanism, the combination of a running roll, friction straps or belts engaging the roll surface, and a support to which the straps are secured at one end arranged to follow the roll as the roll decreases in size.

29. In a web roll renewing mechanism, the combination of a movable support for supporting a running web roll and a spare web roll, an actuator controlled by a predetermined diameter of the running roll, a motor, a switch engaged by the actuator for energizing the motor to move the support to unite the running web and the spare roll and to sever the expiring web, and a switch mechanism arranged to stop the motor, restart the motor so that it will move the new roll to running position and again stop the motor.

30. In a web roll renewing mechanism, the combination of a movable support for supporting a running web roll and a spare roll, an actuator controlled by a predetermined diameter of the running roll, a motor, a switch engaged by the actuator for energizing the motor to move the support to unite the running web and the spare roll and to sever the expiring web, and a switch mechanism for stopping the motor, starting it in a reverse direction to move the new roll to running position and again stop the motor.

31. In a web roll controlling mechanism, the combination of a running roll friction means engaging the roll surface, a support by which the friction means are carried, and diagonally arranged guides in which the support moves to follow the roll as the roll decreases in size.

32. In a web roll controlling mechanism, the combination of supporting arms for movably supporting a running roll, friction means engaging the roll surface, a support arranged inside the arms and by which the friction means are carried, said support being arranged to follow the roll as the roll decreases in size.

33. In a web roll controlling mechanism, the combination of supporting arms for movably supporting a running roll, friction means engaging the roll surface, a support arranged inside the arms which carries the friction means, and diagonally arranged guides in which the support moves to follow the roll as the roll decreases in size.

34. In a web roll renewing mechanism, the combination of a rotatable support capacitated to simultaneously support a running web roll and a spare web roll, means for rotating the support to bring the spare roll into contact with the running web to join it therewith, means for severing the expiring web, and mechanism brought into operation by the decrease of the running roll to a predetermined diameter for causing these operations in a predetermined sequence.

In witness whereof, we have hereunto set our hands.

HARRY V. BALL.
ALBERT J. HORTON.