April 18, 1933. K. G. LAYCOCK 1,904,870

WEB CONTROLLING MECHANISM

Filed March 18, 1930 4 Sheets-Sheet 1

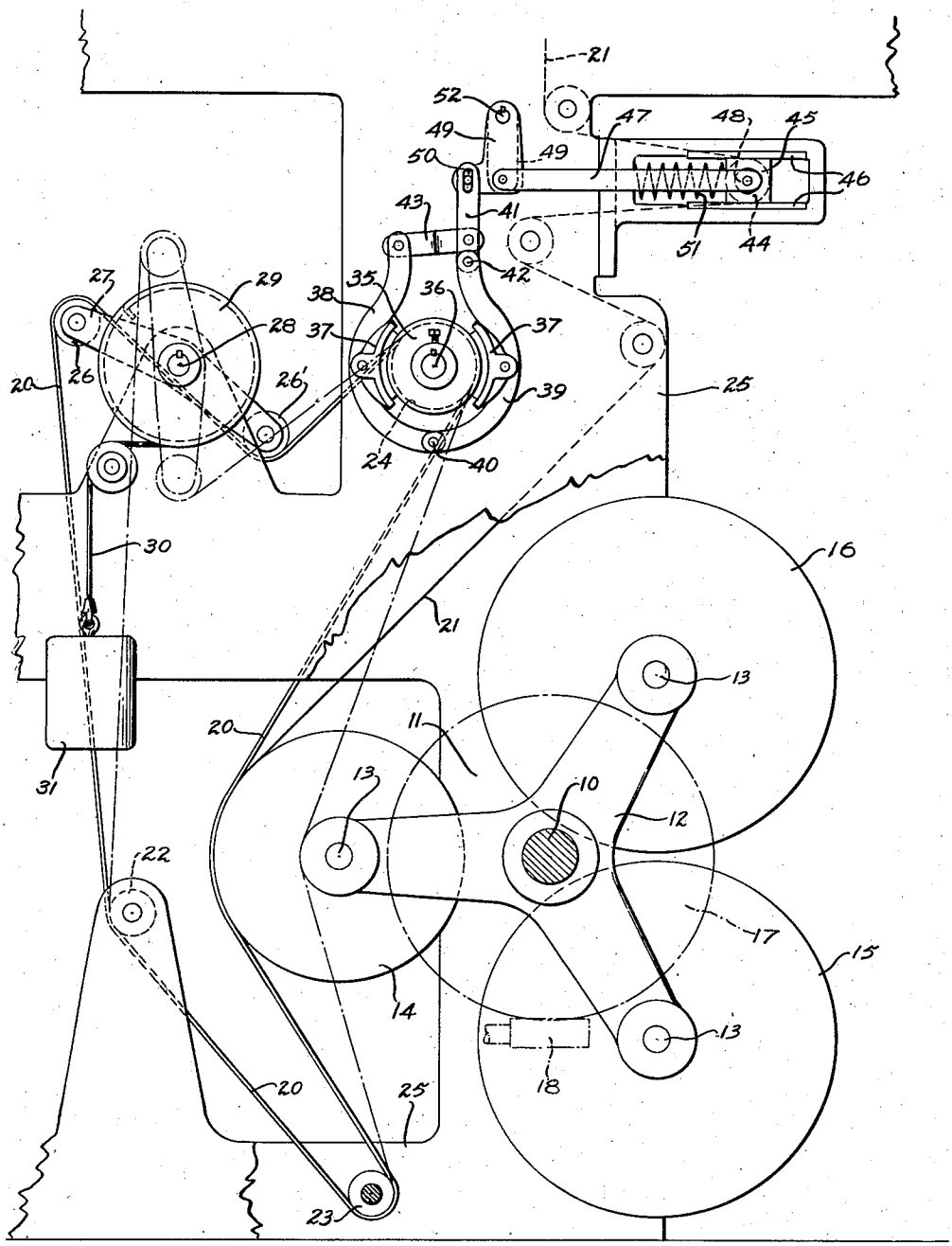


Fig 1

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WEB CONTROLLING MECHANISM

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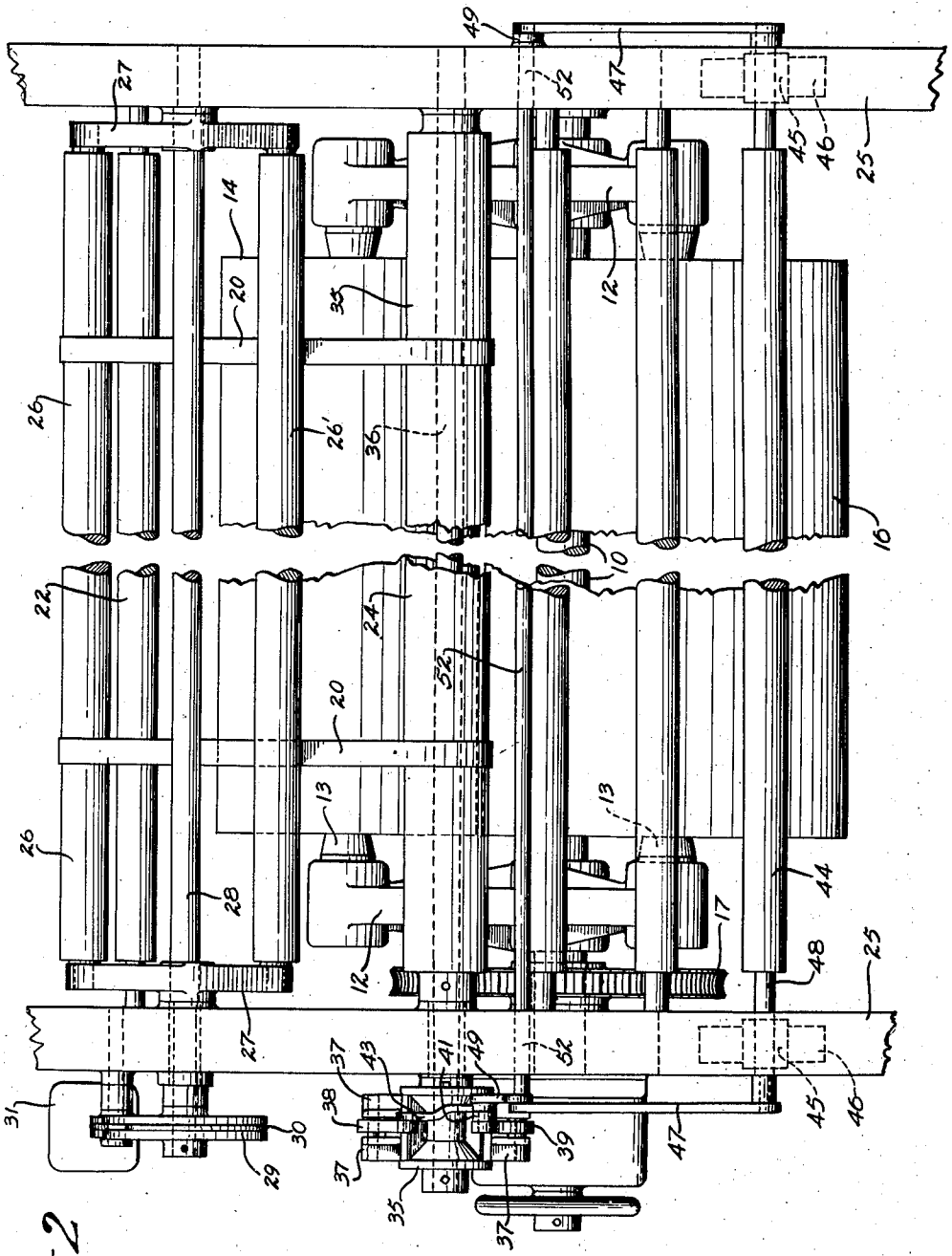


FIG 2

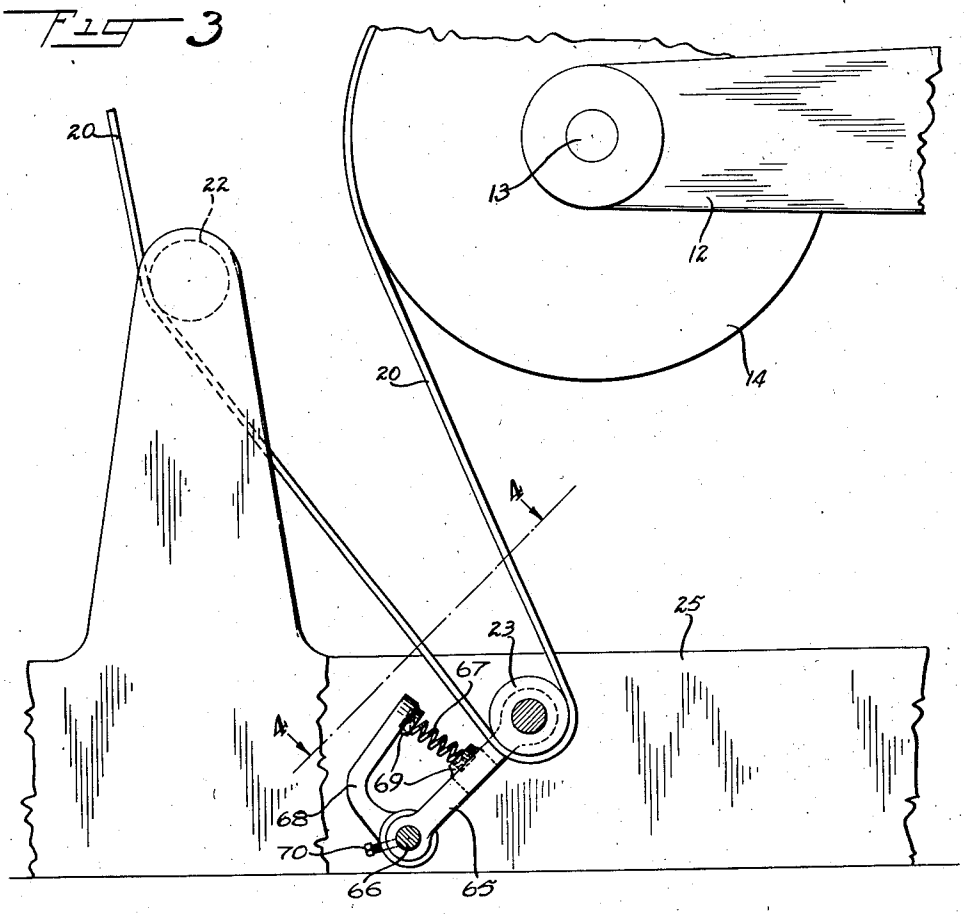
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WEB CONTROLLING MECHANISM

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Fig 3



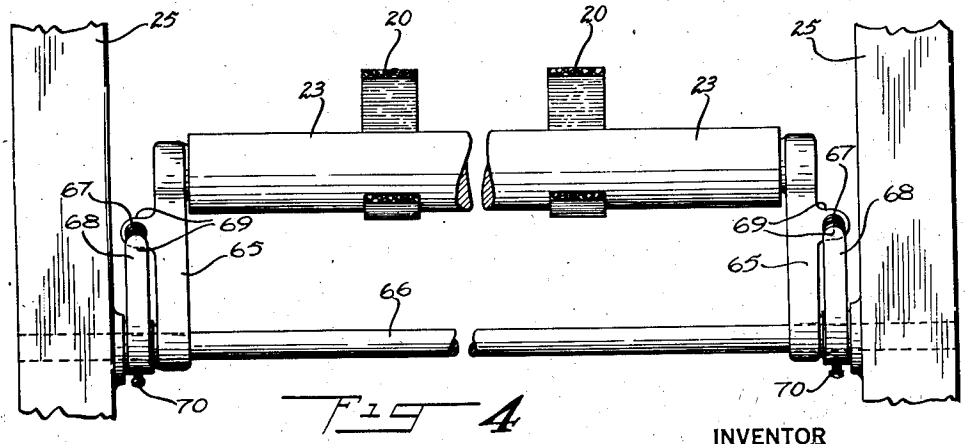


Fig 4

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WEB CONTROLLING MECHANISM

Filed March 18, 1930 4 Sheets-Sheet 4

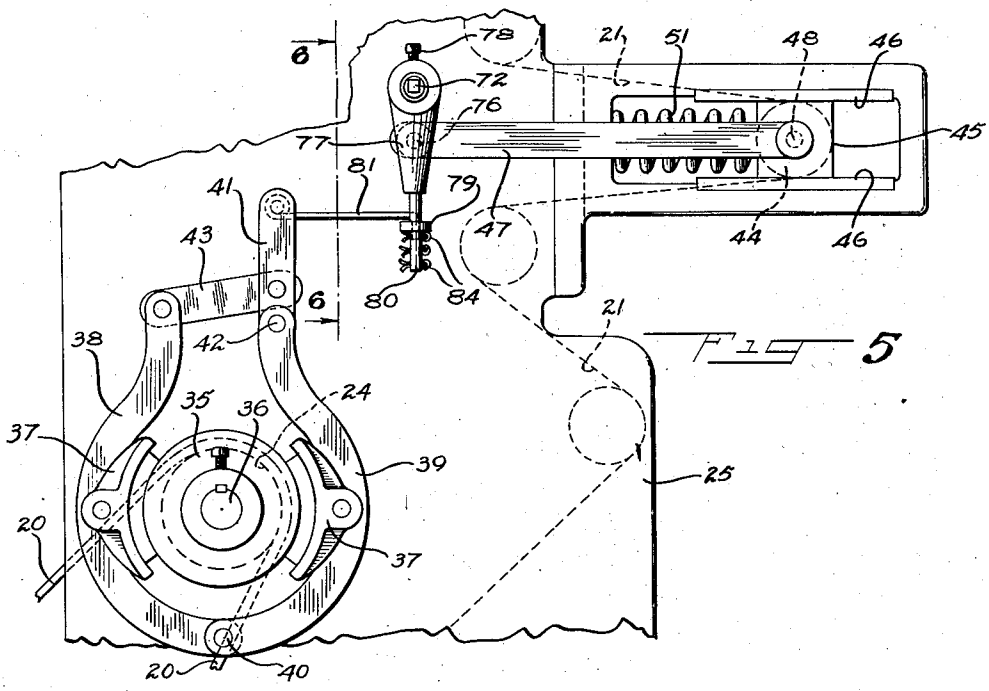


Fig 5

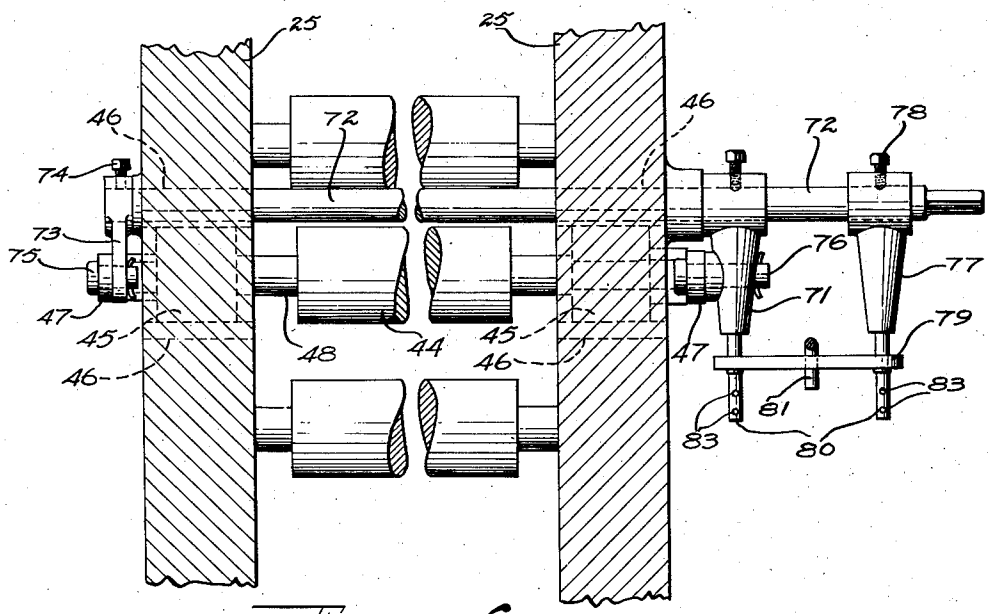


Fig 6

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Patented Apr. 18, 1933 1,904,870

UNITED STATES PATENT OFFICE

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WEB CONTROLLING MECHANISM

Application filed March 18, 1930. Serial No. 436,835.

The present invention relates to web controlling mechanism and more particularly to mechanism for continuously controlling the rotation of web rolls for tensioning the web as the web is led from the web roll to a printing press or other web using machine.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, construction, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Figure 1 is a side elevation of a web roll controlling mechanism illustrating the present preferred embodiment of the invention, with certain parts broken away; and

Figure 2 is a plan of the web roll controlling mechanism shown in Figure 1.

Figure 3 is a fragmentary detailed side elevation of a modified embodiment of the present invention with certain parts broken away;

Figure 4 is a detailed sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a detailed fragmentary side elevation of a further modification of the present invention showing an equalizing means connecting the pilot roller and the brake; and

Figure 6 is a detailed transverse vertical section taken on the line 6—6 of Figure 5.

The present invention has for its object the provision of a novel web controlling mechanism for controlling the tension of the web as it is drawn from a web roll by a printing press and is particularly adapted for use in connection with high speed rotary newspaper presses requiring a normally constant web tension. Another object is the provision of a controlling mechanism for quickly stopping the rotation of the web roll as the press is stopped or in case of a break in the web. The invention also provides a very simple and reliable web controlling mechanism which does not interfere with the substitution of a new web roll for an exhausted roll and reduces the time required for making the pasters.

The present preferred embodiment of the invention comprises a web roll support, for rotatably supporting a web roll, together with flexible friction means engaging the periphery of the web roll and movable with the web roll for controlling the rotation of the web roll. Means are also provided for maintaining the friction means in engagement with the web roll, and other means are provided for opposing movement of the friction means to tension the web or to stop the rotation of the web roll. As embodied, means are provided for automatically controlling the friction means to produce a normally constant web tension and to stop the web roll when the web breaks.

Other features of the invention will be initially pointed out in connection with the following detailed descriptions of the present preferred embodiment of the invention, and it will be understood that the foregoing general description and the following detailed description are both exemplary and explanatory, but not restrictive of the invention.

Referring now in detail to the illustrative embodiment of the present invention shown by way of example in the accompanying drawings, the web controlling mechanism is shown in connection with a web roll support of conventional construction which may comprise a rotatable shaft 10 carried by end supports 11 and rotatably journalled therein and equipped with triple-arm devices 12 carrying rotatable spindles 13 which engage the ends of the web rolls 14, 15 and 16. Shaft 10 is also preferably provided with suitable means for turning it and bringing a new web roll into position, as well as with means for locking the shaft and web rolls in any desired

position, and for these purposes, shaft 10 is provided with a worm gear 17 meshing with a rotatable worm 18 which may be driven by any suitable means.

According to the present invention the necessary web tension is produced by a friction member engaging the surface of the web roll and maintained in contact therewith to exert a retarding force on the rotation of the web roll, and as embodied, endless belts 20 are mounted adjacent to the active web roll 14 from which the web 21 is led to the printing press, and these belts are pressed into engagement with the web roll and move with it. There are preferably provided a plurality of these endless belts spaced apart transversely of the web, and these belts are mounted adjacent to the active web roll by means of freely rotatable rollers 22 and 23 and brake roller 24, extending parallel to the web roll and journalled at their ends in the side frames 25 of the printing press.

For maintaining the endless belts in contact with the web roll as the web roll gradually diminishes in size and permitting the endless belts to be moved as a new web roll is brought into place, a compensating means is provided which in the illustrative embodiment comprises a pair of rollers 26, 26′, rotatably mounted in arms 27 at either end, the arms in turn being rigidly mounted on a shaft 28 journalled in the side frames of the press. The belts 20 pass over roller 26 and under roller 26′, and for taking up the slack in the belts and for maintaining a substantially constant pressure between the belts 20 and the active web roll 14, there is provided a drum 29 fast on shaft 28 and on which is wound a cable 30 fastened to the drum and supporting weight 31. The weight 31 is of sufficient mass to produce enough pressure to prevent any slipping between the web roll and the belts. As shown, the arms are preferably so formed that the rollers are on one side of shaft 28 and the shaft does not interfere with the free movement of the belts.

For opposing the free movement of the belts as the web is drawn from the web roll and for tensioning the web 21, there is preferably provided braking means acting on one of the rollers over which the belts pass. As embodied, a brake drum 35 is fast to the shaft 36 supporting brake roller 24, and this drum cooperates with brake shoes 37 which are supported and moved by brake arms 38 and 39 pivotally connected together by pivot pin 40 mounted on the press frame.

The upper end of the brake arm 39 is preferably pivotally connected with brake operating lever 41 by pivot pin 42.

Brake operating lever 41 is connected with brake arm 38 by means of link 43 pivotally connected with the upper end of arm 38 and with lever 41. As the operating lever is moved, the brake force is varied and consequently the tension of the web is varied accordingly.

Means may be provided for manually varying the braking force applied to the belts but the braking force is preferably continuously and automatically controlled by the tension of the web to produce a normally substantially constant tension on the web. As embodied, there is provided a pilot roller 44 around which web 21 passes as it is drawn off by the printing press, the pilot roller being supported at either end by slidable journal blocks 45 slidable in guideways 46 formed in the side frames of the press. The pilot roller 44 in the present embodiment is connected with the brake mechanism by means of links 47 attached to the ends of the pilot roller shaft 48 and is pivotally connected with levers 49, one of which is connected with brake lever 41 by a pin and slot 50 connection.

For opposing the movement of the pilot roller by the tension of the web, springs 51 are provided between the journal blocks 45 and the ends of the guideways 46. The pilot roller is maintained parallel with the web roll by means of levers 49 which are keyed to a shaft 52 rotatably journalled in the press frame and are connected with links.

In operation, the weight 31 maintains the belts 20 in contact with the surface of the web roll 14, and as pilot roller 44 moves, in accordance with slight changes in web tension the braking force applied to the belts is oppositely changed to return the web tension to normal. In case the web breaks or the press is quickly stopped, the pilot roller 44 is moved by springs 51 to the right (Fig. 1) and applies the full force of the springs to the brake, quickly stopping the web roll.

In accordance with a modified embodiment of the present invention, spring means may be provided for maintaining the belts 20 in contact with the surface of the web roll 14, as shown in detail in Figures 3 and 4 of the accompanying drawings. In this modification the lower ends of the belts 20 are looped around a roller 23 which is rotatably journalled at either of its ends in arms 65 which are loosely mounted on a shaft 66 extending transversely of the press and secured in suitable apertures in the press frame 25. For pressing the roller 23 downwardly to tension the belts and maintain them in contact with the web roll, variably tensionable spring means are provided which may comprise springs 67 extending between roller supporting arms 65 and arms 68 also mounted on the shaft 66, and suitable recesses 69 are provided in the arms 65 and 68 to receive and retain the ends of the compression springs 67. For securely fastening the arms 68 on the shaft 66 in the desired angular position to give the necessary compression to spring 67, arms 68 are preferably provided with set-screws 70

by which the arms may be tightly clamped to the shaft 66.

In accordance with a further modified embodiment of the present invention, as illustrated in Figures 5 and 6, and which may be used with the parts shown in Figures 3 and 4, means may be provided for equalizing the tension of the web roll and for controlling the braking action of the braking means in accordance with the average movement of the ends of the pilot roller, thereby compensating for inequalities in the tension of the web at either side thereof.

In the illustrated embodiment the pilot roller 44 is rotatably mounted in slidable blocks 45 at either end of the roller. and the web 21 is looped around the pilot roller 44 as the web is drawn from the web roll and passes to the press. One end of the pilot roller shaft 48 is connected with an arm 71 depending from and loosely mounted on a shaft 72 extending transversely of the press and rotatably mounted in side frames 25. The other end of the roller shaft 48 is connected with an arm 73 depending from shaft 72 and securely held thereon by suitable means such as set-screw 74. This end of the roller is connected with arms 73 by means of link 47 which is pivotally connected with the arm 73 by pivot pin 75, and the other end is similarly connected with arm 71 by means of pivot pin 76. These means permit the ends of the pilot roller to be moved independently of each other in accordance with changes in the web tension at either side of the web 21.

Mounted on shaft 72 and closely adjacent to arm 71 is an arm 77 of similar shape and size, which is securely fastened to shaft 72 by set-screw 78 and is moved in unison with arm 73. Arms 71 and 77 at their lower ends are connected with an equalizer bar which preferably comprises a short link 79 provided with suitable apertures at either end which fit over the reduced end portions 80 of the arms 71 and 77. For transmitting the average movement of the pilot roller to the braking mechanism, which may be and preferably is similar to that previously described, the equalizer part 79 is provided with a central aperture which receives the bent end of a link 81 which is connected at its other end with the upper portion of brake operating lever 41.

For varying the leverage and thereby the control of the pilot roller upon the braking means the reduced end portions 80 of the arms 71 and 77 are preferably provided with a plurality of holes 83 at varying distances from the shaft 72, and the equalizer part 79 may be positioned at the desired distance from the shaft 72 by the insertion of cotter pins 84 in the proper hole 83.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. A web controlling mechanism including in combination a web roll support, friction members engaging the surface of the web roll, a pilot roller controlled by the tension of the web, said roller having its ends independently movable, and means controlling the friction members by the average movement of the ends of the pilot roller to control the tension of the web.

2. A web controlling mechanism including in combination a web roll support, friction members engaging the surface of the web roll, a pilot roller controlled by the tension of the web and having its ends independently mounted, means connecting the friction members to the pilot roller, including an equalizer moved by the ends of the pilot roller.

3. A web controlling mechanism including in combination a web roll support, movable friction members engaging the surface of the web roll, a brake for opposing movement of the friction members, a pilot roller having its ends independently movable, and an equalizer connected with the ends of the pilot roller and controlling the brake.

4. A web controlling mechanism including in combination a web roll support, friction members engaging the surface of the web roll, a pilot roller controlled by the tension of the web, said roller having its ends independently movable, and means controlling the friction members by the average movement of the ends of the pilot roller to control the tension of the web, and spring means for maintaining the friction member in engagement with the web roll.

5. A web controlling mechanism including in combination a web roll support, friction members engaging the surface of the web roll, a pilot roller controlled by the tension of the web and having its ends independently mounted, means connecting the friction members to the pilot roller including an equalizer moved by the ends of the pilot roller and spring means for maintaining the friction member in engagement with the web roll.

6. A web controlling mechanism including in combination a web roll support, movable friction members engaging the surface of the web roll, a brake for opposing movement of the friction members, a pilot roller having its ends independently movable, and an equalizer connected with the ends of the pilot roller and controlling the brake, and spring means for maintaining the friction member in engagement with the web roll.

7. Web controlling mechanism including in combination a magazine reel to support active and reserve web rolls, a continuous

belt contacting with the active web roll to tension the web drawn therefrom, means for opposing movement of the belt, a pair of rollers between which the belt is threaded and means for revolving the rollers to take up slack in the belt.

8. Web controlling mechanism including in combination means for rotatably supporting an active and a reserve web roll, a continuous belt contacting with the roll, means for opposing movement of the belt, and a takeup device for the belts including bodily movable guiding means over which the belt is passed, a rotatable frame in which said guiding means are mounted, and means for rotating the frame as the web roll wears down.

9. Web controlling mechanism including in combination means for rotatably supporting a web roll, a continuous belt contacting with the roll, means controlled by the tension of the web drawn from the active roll to variably oppose movement of the belt and thereby tension the web, a pair of bodily movable guiding means over which the belt is passed and means for bodily moving the guiding means to take up slack in the belt.

10. Web controlling mechanism including in combination a magazine reel to rotatably support active and reserve web roll, a continuous belt contacting with the active web roll and controlled by the tension of the web drawn from the active roll to variably oppose movement of the belt and thereby tension the web, a pair of bodily movable guiding means over which the belt is passed, a rotatable frame in which said guiding means are mounted, and means for rotating the frame as the web roll wears down.

In testimony whereof, I have signed my name to this specification.

KENNETH G. LAYCOCK.