Jan. 9, 1934. H. A. W. WOOD 1,942,504

AUTOMATIC COMPENSATOR FOR PAPER ROLLS

Original Filed July 9, 1929 3 Sheets-Sheet 1

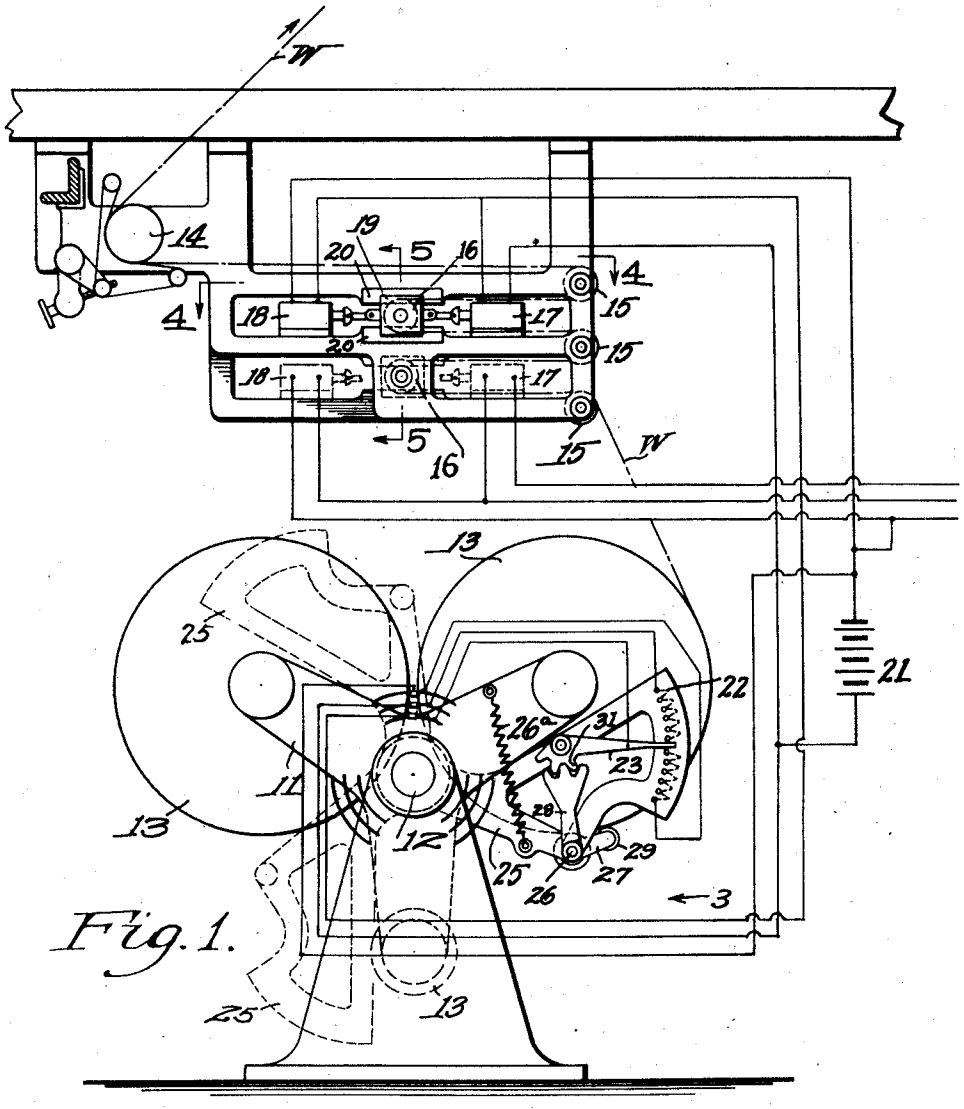



Fig. 1.

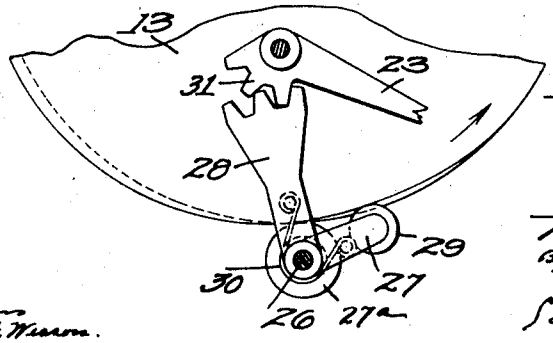



Fig. 2.

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Fig. 3.

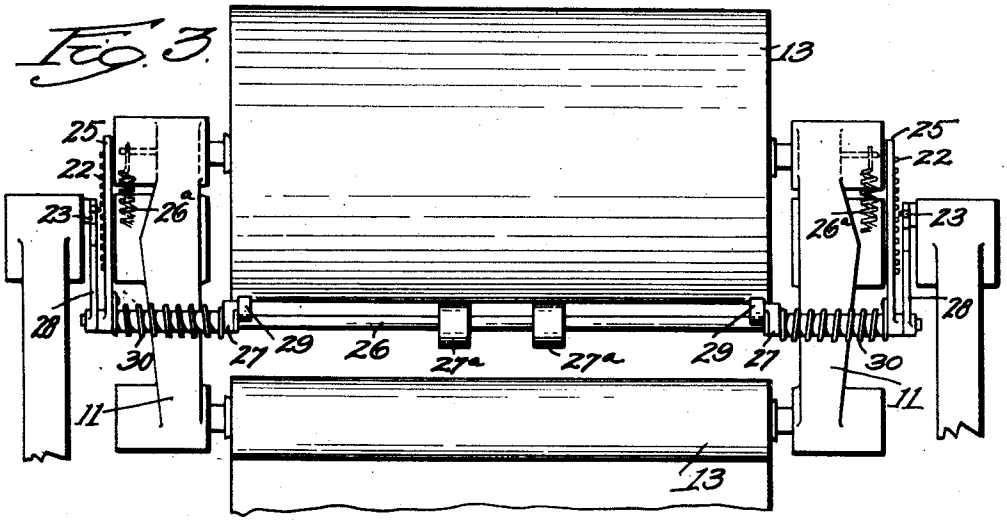



Fig. 4.

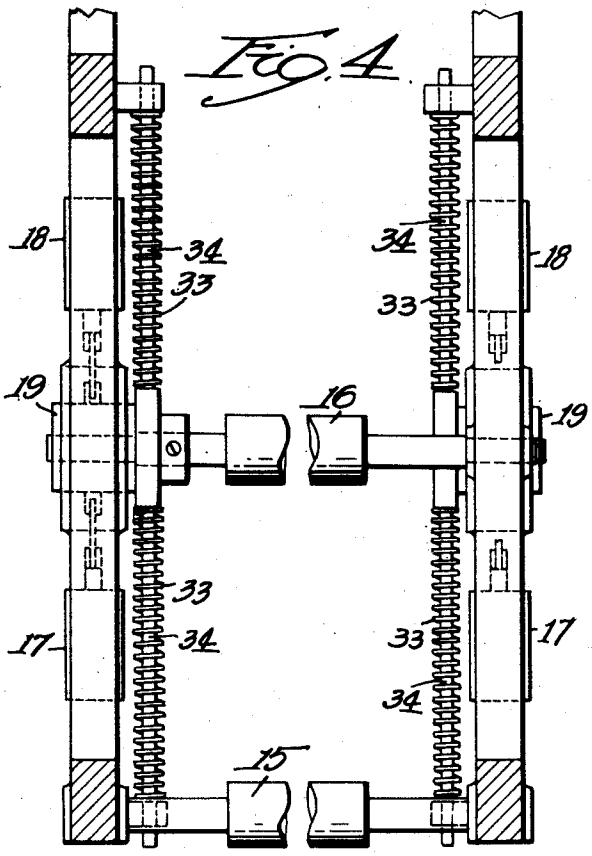
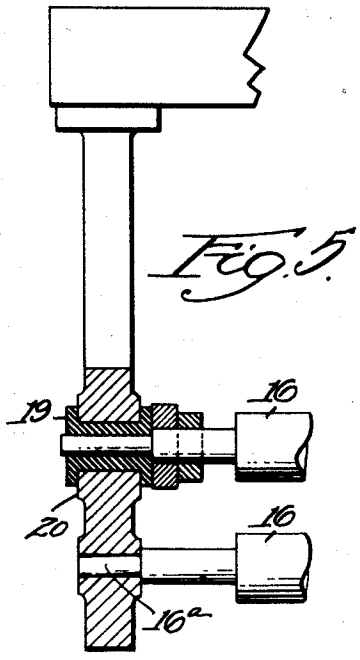



Fig. 5.




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AUTOMATIC COMPENSATOR FOR PAPER ROLLS

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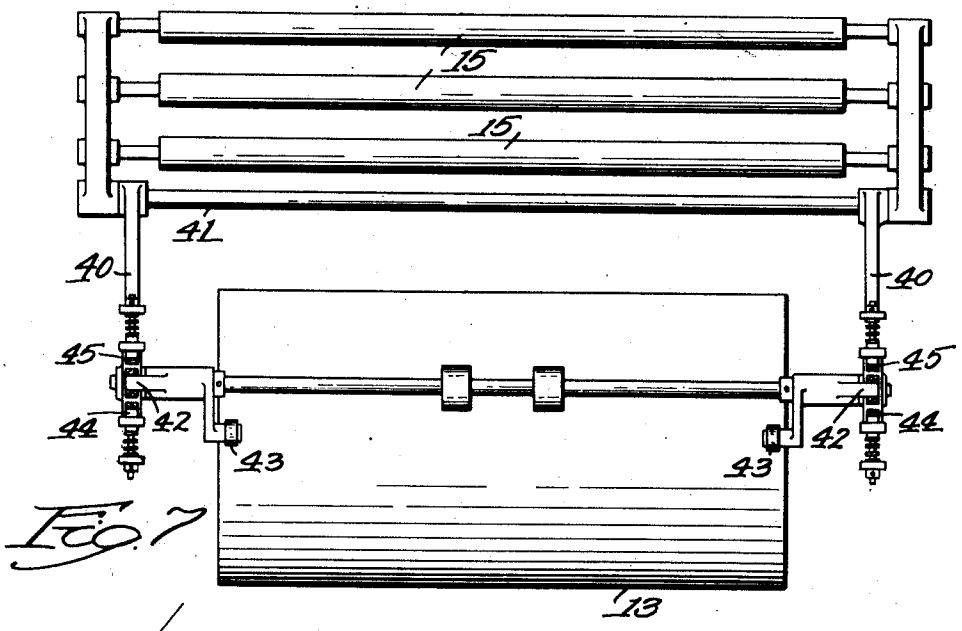



Fig. 7

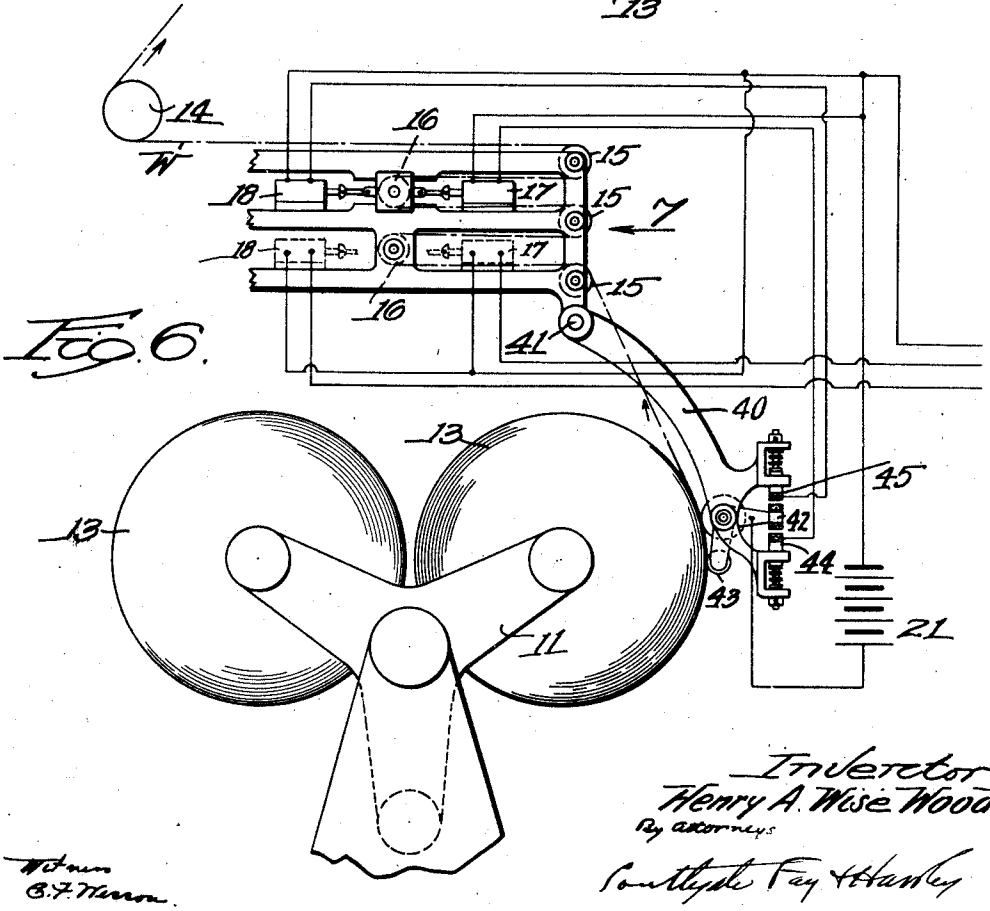



Fig. 6.

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# UNITED STATES PATENT OFFICE

1,942,504

## AUTOMATIC COMPENSATOR FOR PAPER ROLLS

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Application July 9, 1929. Serial No. 376,889
Renewed July 29, 1932

14 Claims. (Cl. 242—75)

This invention relates to means for compensating for difficulties due to the feeding of paper from a roll at high speeds when said roll is misshapen.

The principal objects of the invention are to provide means for changing the length of the web path from a roll, from which the web is unwound, to a printing machine or the like, to compensate for irregularities in the shape of the roll and to provide for changing the length of the path at either side of the web so as to compensate for the fact that the roll is larger in diameter on one end than on the other or is out of round at one or both ends or carrying flats at either end.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which

Fig. 1 is an end view of a means for supporting a roll from which the web is to be unwound and showing a set of compensating rolls therefor arranged according to this invention;

Fig. 2 is a similar view of a part of Fig. 1 showing the parts in a different position;

Fig. 3 is a side view looking in the direction of the arrow 3 in Fig. 1;

Fig. 4 is a plan of the adjusting rolls and the balanced springs against the bearings for stabilizing the action;

Fig. 5 is a sectional view of the means for supporting the adjusting rolls at one end;

Fig. 6 is a view similar to Fig. 1 showing a modification, and

Fig. 7 is a side view of the same looking in the direction of the arrow 7 in Fig. 6.

Paper rolls which are out of round on one or both ends, larger in diameter on one end than the other, carrying flats, or which are otherwise misshapen are a source of constant trouble and deterrent in the printing of newspapers, especially when it is desired to operate presses at high speeds. As stated, the objects of this invention have to do with providing means for compensating for the difficulties above mentioned.

Referring first to the first five figures, I have shown a form of this invention which is designed to correct irregularities such as those mentioned above by automatically adjusting the length of the web pathway and have shown means for separate compensation at each side of the web roll or at each side of the web. The invention is illustrated as applied to a well-known type of paper reel 11 carried by a shaft 12 and adapted to hold three rolls 13 and to be turned as desired to bring these rolls successively into position for feeding the web. I have shown the web W as passing from the roll 13 in a well known way to a guide roll 14.

For the purpose of this invention, the web also passes over a series of stationary guide rolls 15 having between them one or more adjusting rolls 16. Each of these adjusting rolls is swiveled at one end at $16^a$ to move laterally at the other end toward and from the rolls 15 and the web passes around each of these rolls 16 so that when these rolls move horizontally they will shorten or lengthen the web path as will be obvious. Also if these adjusting rolls 16 are swung so that one end moves toward or from the rolls 15 without moving the other, that side of the web will be tensioned to compensate for any irregularity of the roll 13 at the same end of the web. This will be explained later.

The rolls 16 are carried by bearing blocks 19 which slide back and forth in horizontal guides 20 and are pressed normally into central position by springs 33 on rods 34 properly supported in guides on the frame. These springs stabilize the rolls but allow a controlled movement of the movable end of each roll.

For the purpose of moving each of these rolls 16 a pair of solenoids 17 and 18 is located at one end of each roll. These solenoids are connected with the bearings 19 of the rolls at opposite ends of the two rolls. Obviously if the solenoid 17 is energized so as to pull in its plunger and move the bearing block 19 over toward it the web path is shortened on this side, while if the solenoid 18 is operated, the web path on this side will be lengthened. One of these rolls 16 is used to take care of one edge of the web and the other for the other edge. Each roll is pivotally mounted at the end opposite its solenoids.

The solenoids are connected with a battery or source of power 21 and the three wires which control them are connected with a rheostat 22. The rheostat 22 is supported on the pivoted arm 25. The rheostat is provided with an operating arm 23 which passes over the contacts on the rheostat and energizes one or the other solenoid according to whether it is located above or below the center and pulls the plunger further in as it goes away from the center.

On the reel 11 at each end is pivoted an arm 25 with a spring $26^a$ for holding it back. On this arm is a shaft 26 extending across the reel and

having a pair of free rollers 27ª thereon engaging the roll 13 so as to keep the shaft near the surface of the roll 13. On the shaft 26 at each end is pivoted a bell crank consisting of an arm 27 and an arm 28. The arm 27 is provided with a roller 29 which rests on the roll 13 near its edge. A coil spring 30 constantly forces this roller 29 against the web roll. The arm 28, which is fixed with respect to the arm 27 and movable with it has a gear segment which meshes with a gear segment 31 on the arm 23. Therefore it is obvious that any irregularity at either end is transmitted immediately to the arm 23 at that end and one of the rolls 16 moved accordingly so as to compensate for it immediately. The web can be tightened at both ends simultaneously when out of true by the operation of the corresponding two solenoids at the same time. As the contact arm 23 changes in position, one solenoid becomes weaker and the other stronger, according to the direction moved, thus a lengthening or shortening of the web path on the movable end of the roll 16 is obtained. One mechanism is carried on each reel arm and a commutator is provided for connecting only the mechanism that is in the operating position to the solenoids, and the source of power.

If one end of the web roll 13 is larger than the other and round, one of these arms 23 will be kept in such condition as to move the end of one of the rolls to compensate for that. If the two ends are of the same size but the roll carries a flat throughout its full width there will be a vibration of both arms 23 during each rotation of the web roll and if the roll 13 is out of round at one or both ends there will be a complete vibration back and forth for each revolution of the web roll 13.

As stated two rolls 16 can be employed both connected up in the manner described and the mechanism illustrated in Fig. 1 is repeated on the rear side of the machine in order to make the above operations all possible.

Referring now to Figs. 6 and 7 a modification is shown whereby the detecting mechanism is carried on an arm 40 pivoted at 41 on a stationary part of the press. This is provided with a pivoted contact 42 operated by a roller 43 on the edge of the web roll 13 and this contact is connected with a source of power 21. The contact 42 is a double one operated between two contacts 44 and 45, one connected with one of the solenoids 17 and the other connected with the solenoid 18 previously described. This mechanism is repeated on the back side of the machine. This type of construction requires for selective commutation only one detecting apparatus instead of three as used in the other form.

The mechanism shown in these two figures permits of only three positions, but the same type of grouped contacts in the rheostat could be used with this machine to give any number or desired refinement in gradation of power. In either case the desired results are secured, but in the form shown in the first five figures a finer variation in the movement of the spring supported guide rolls is provided.

Although I have illustrated and described only two forms of the invention I am aware of the fact that other modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited in this respect but what I claim is:

1. In a compensating device for a web feeding mechanism, the combination with a guide roll for the web, said guide roll being movably mounted, and a roller located on the web roll, of means connected with said roller for automatically moving the guide roll to change the tension of the web in accordance with irregularities in the web roll.

2. In a compensating device for a web feeding mechanism, the combination with a movable roll located in a loop of the web, of a roller located near the edge of the web roll and movable out and in, and means connected with said roller for moving the end of the said guide roll to increase or decrease the extent of the loop in which the guide roll is located.

3. In a compensating device for a web feeding mechanism, the combination with a series of guide rolls including a movable roll located in a loop of the web formed by the other guide rolls, of a roller located near the edge of the web roll and movable out and in, in accordance with the shape and size of the edge of the web roll, and means connected with said roller for moving the corresponding end of the said guide roll back or forward to increase or decrease the extent of the loop in which the guide roll is located.

4. In a compensating device for web feeding mechanism, the combination with a reel for supporting the web roll, an arm movably mounted on the reel and spring pressed toward it, a shaft carried by said arm at one end, rolls on said shaft to engage the web roll and hold the shaft at a constant distance from its surface, a pair of arms adapted to turn on said shaft and fixed with respect to each other, one having a roller bearing on the web roll and electric means controlled by the other arm, of a guide roll engaging the web, a pair of solenoids connected for moving one end of the guide roll, and electric circuits connected with the said electric means and with the solenoids, whereby the position of the roller on the web roll will determine the position of the end of the guide roll and the tension of the web on one side.

5. In a compensating device for web feeding mechanism, the combination with a reel for supporting the web roll, an arm movably mounted on the reel and spring pressed toward it, a shaft carried by said arm at one end, rolls on said shaft to engage the web roll and hold the shaft at a constant distance from its surface, a pair of arms adapted to turn on said shaft and fixed with respect to each other, one having a roller bearing on the edge of the web roll and a rheostat having an arm adapted to pass over it for controlling the current passing through it, the rheostat arm and the other arm on the shaft being connected together whereby one will swing the other, of a guide roll engaging the web, a pair of solenoids connected for moving one end of the guide roll, and electric circuits connected with the rheostat and with the solenoids, whereby the position of the roller on the edge of the web roll will determine the position of the end of the guide roll and the tension of the web on one side.

6. In a compensating device for a web feeding mechanism, the combination with a support for the web roll, spring-pressed arms at the opposite ends of the web roll, a shaft carried by said arms, rolls on the shaft for engaging the web roll at a distance from its ends to hold the shaft at a con-

stant distance from the surface of the web roll, and a bell crank at each end of said shaft having a roll on one arm engaging the web roll near its edge and rack teeth on the other arm, of two rheostats, each having an arm provided with a segmental rack engaging said rack teeth, whereby the rheostat arms will be moved over the rheostats by the motion of said rollers, a guide roll located in a loop in the web fed from the web roll, a solenoid connected with each side of one end of each roll, and means connected with said rheostats for moving one end of each guide roll in accordance with the positions of the two rollers on the web roll.

7. In a compensating device for a web feeding mechanism, the combination with means for supporting a web roll, of a pair of guide rolls located in loops of the web, the two guide rolls being pivoted at the end, one at one end and the other at the opposite end, springs for supporting the free ends of said guide rolls to normally bring them to the same center as the pivoted end, a slidable bearing for the free end of each guide roll, means mounted at the opposite ends of the web roll for partaking of the movement of any irregular surface thereof, and means connected with said means for moving the respective ends of the guide rolls in accordance with the irregularities in the ends of the web roll.

8. In a compensating device for a web feeding mechanism, the combination with means for supporting the web roll, arms movably mounted, a shaft carried by said arms and extending along the surface of the web roll, and a bell crank on the end of said shaft having a roller on one arm engaging the web roll near its end and a contact on the other arm, of a guide roll located in a loop in the web fed from said web roll, said guide roll being pivoted at one end and movable at the other, a pair of solenoids connected with the movable end of the guide roll for moving it back and forth, and electric means connected with said contacts for energizing one or the other of said solenoids in accordance with the position of the roller on the web roll.

9. The combination with a printing press and means for supporting a running web roll, of means for changing the length of the web path between the two, and means controlled by the circumference of the web roll for operating said means.

10. The combination with a printing press and means for supporting a running web roll, of means for changing the length of the web path between the two at each edge of the web, independently of the other, and means engaging the ends of the web roll on the circumference thereof for automatically operating the web length changing means.

11. The combination with a printing press and means for supporting the running web roll, of means for changing the length of the web path from one to the other to compensate for irregularities in the shape of said roll, and means running on the circumference of the roll for operating the last named means.

12. The combination with a printing press and means for supporting the running web roll, of electromagnetic means for automatically changing the length of the web path from one to the other to compensate for irregularities in the shape of said roll, and means actuated by the roll at its circumference for controlling said electro-magnetic means.

13. The combination with a printing press and means for supporting the running web roll, of means for changing the length of the web path from one to the other at either edge of the web independently, to compensate for the fact that the web roll may be larger at one end than at the other, and means engaging the circumference of the roll near each end for controlling the operation of said length changing means.

14. The combination with a printing press and means for supporting the running web roll, of means for changing the length of the web path from one to the other at the edge of the web, wherever the roll is out of round or carries flats, to compensate therefor, and means operating on the surface of the web roll near its end for promptly operating said length changing means.

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