

Dec. 14, 1926.

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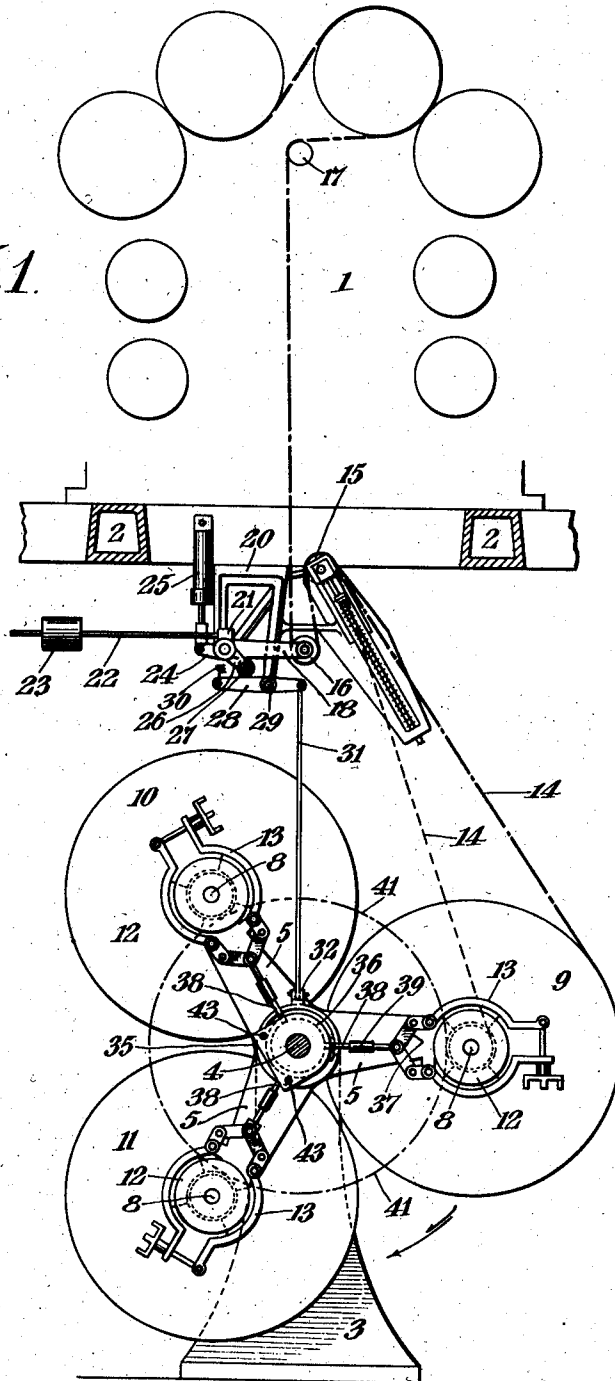
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WEB TENSION MECHANISM

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3 Sheets-Sheet 1

Fig. 1.



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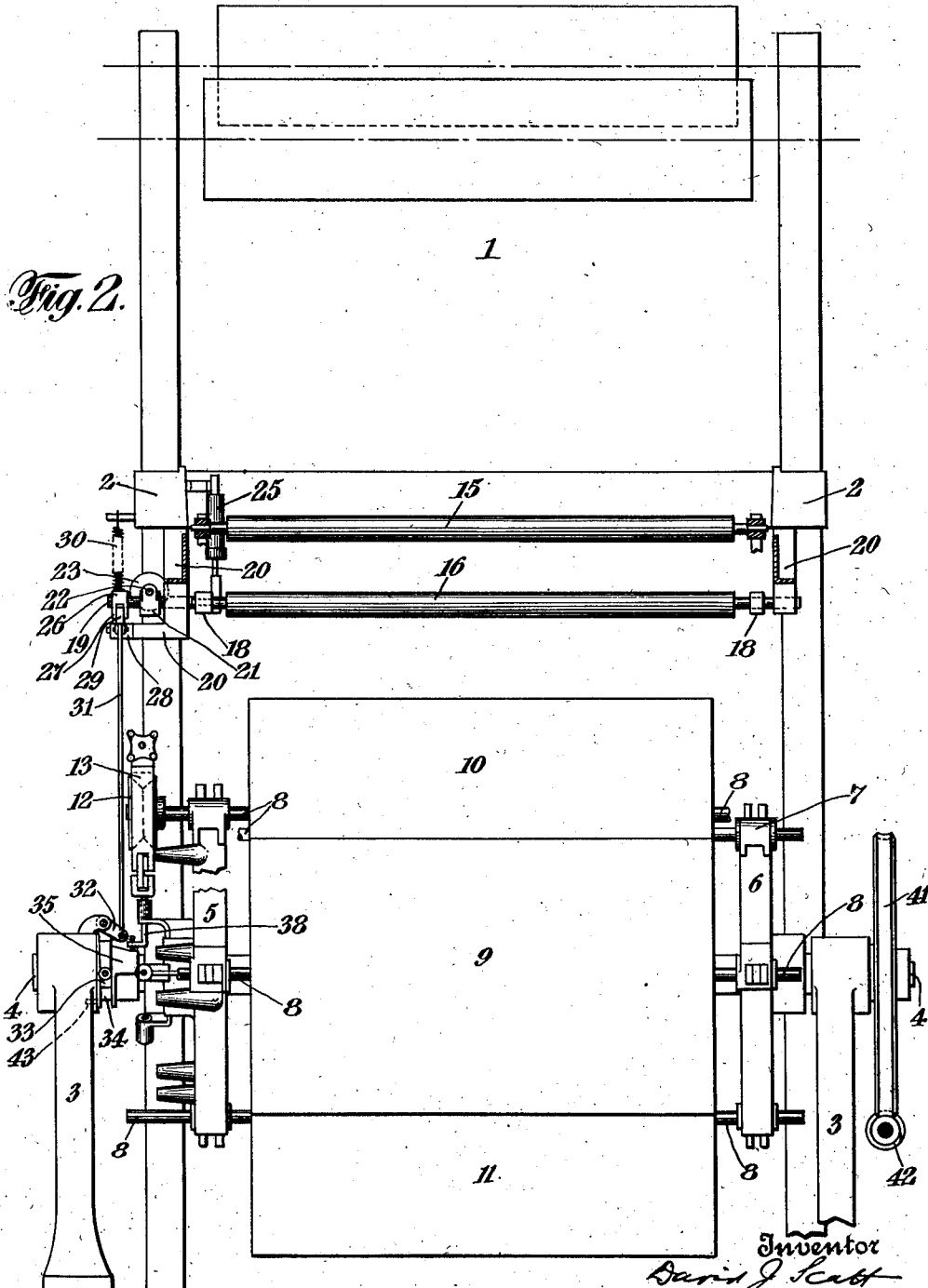


Fig. 2.

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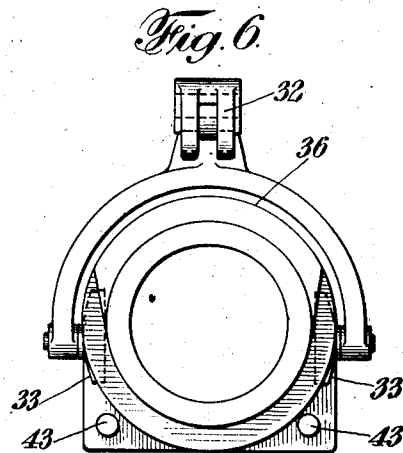
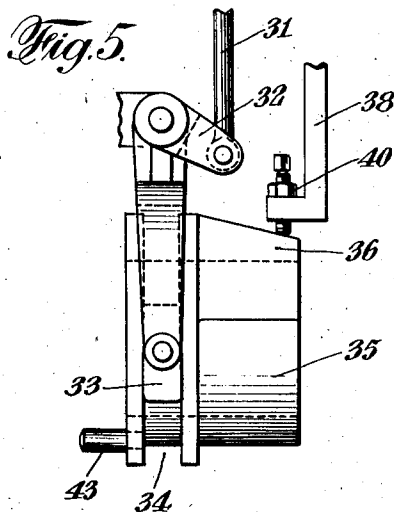
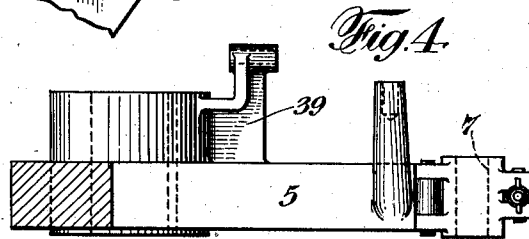
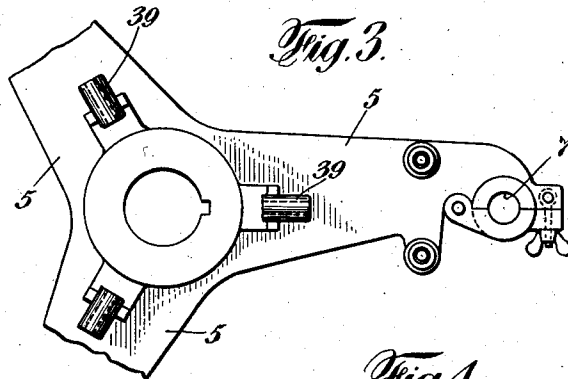
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WEB TENSION MECHANISM

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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WEB-TENSION MECHANISM.

Application filed October 2, 1924. Serial No. 741,098.

This invention relates to web tension mechanism for rolls of paper used in printing or other machines.

It is customary in the art, at the present time, when a feeding web becomes slack to increase the braking action on the web roller and, conversely, when the web becomes taut to decrease the braking action on the web roll. Such devices are shown in the Letters Patent to Scott No. 558,426 of April 14, 1896, and in the Letters Patent to Jones No. 1,395,830 of Nov. 1, 1921. It is also customary in the art to provide means whereby when a roll feeding a web of paper is about to become exhausted to automatically move another roll into position and to paste a new web to the one that is about to become exhausted thereby replenishing the paper supply. A device of this character is shown in the patent to Stone No. 1,124,673 of Jan. 12, 1915.

The main object of this invention is to apply an automatic tension device of the character shown in the Scott or Jones patents to an automatic, or semi-automatic, replenishing device such as shown in the Stone patent.

Accordingly the invention consists of the hereinafter described arrangement of parts, combination of elements and features of construction.

In the accompanying drawings the invention is disclosed in a concrete and now preferred form in which—

Fig. 1 is a side elevation looking in the direction of arrow 1 of Fig. 2, one of the supporting pedestals being removed and with parts in section. The printing machine or other take-up device is shown diagrammatically and is of the type in which the web is fed from beneath the machine.

Fig. 2 is an end elevation looking in the direction of arrow 2 of Fig. 1 with parts in section.

Fig. 3 is a fragmentary side elevation of the rotatable web-supporting means, looking at the top of Fig. 4.

Fig. 4 is a view, partly in section, looking in the direction of arrow 4 of Fig. 3.

Fig. 5 is a side elevation of the actuator, for the brake mechanisms, and adjacent elements.

Fig. 6 is an end elevation of the parts shown in Fig. 5 looking in the direction of arrow 6 of Fig. 5.

1 indicates a printing machine of any suitable construction having a bed plate 2 in the usual manner. 9, 10 and 11 indicate a plurality of web rolls which are successively brought into feeding position with respect to the printing machine being here carried by a rotatable supporting means consisting of shaft 4, mounted in pedestals 3, and two spiders 5 and 6, each of which spiders has three arms, there being a capped journal 7 at the end of each arm for removably holding a paper roll spindle 8. The roll 9 is shown in feeding position and the web 14, being the feeding web passing to the printing machine, is shown in two positions to indicate the maximum and minimum diameters of the roll. Shaft 4 carries a worm wheel 41 driven by a worm 42 that can be turned by hand or by motor to bring successive web rolls into feeding position; and it will be understood that if paste be applied to substitute or replenishing roll 10 and then, while the press is being run at slow speed, the supporting means for the web rolls, be rotated clockwise, in Fig. 1, roll 10 (being rotated slowly by hand) will come in contact with web 14 and 10 and 14 may then be pasted together. As soon as the two webs are joined, the web from roll 9 may be broken and roll 10 then moved into the position previously occupied by roll 9, and the empty spindle from roll 9 may be taken out and a fresh roll put in while in the position occupied by roll 11.

Suitable controlling mechanism, governed by the tension of the feeding web and suitable brake mechanism for the web rolls are provided. Preferably, the construction is such that the brake mechanism relating solely to the roll in feeding position is affected by the controlling means, and also, preferably, the parts are so arranged that the movement of a new roll into feeding position will not merely bring the parts into such relation that the controlling mechanism and the brake mechanism may coact when coupled up, but the parts become automatically coupled or related so that no additional work, such as latching two parts together, is necessary. Preferably, the controlling mechanism mounted independently of the supporting means for the web rolls consists of a controlling member and associated elements, and an actuating member centrally disposed with respect to the web rolls.

The brake mechanism is here constructed as follows:

On one end of each paper roll spindle there is carried the brake wheel 12, preferably V-shape, against which are clamped the friction straps 13, with the usual adjustment for compressing the straps around the brake pulley to produce more or less braking effect. The tension straps 13, in addition to the usual hand screw adjustment, are mounted in such manner that the ends of the straps opposite the hand wheel adjustment are also movable to increase or decrease the wrap of the brake shoes by means of toggle 37 with the usual toggle connections. This toggle 37 has a brake rod 38 sliding through a bracket 39 and ending in an adjusting screw 40 which is in position to be acted on by cam 36 on sliding collar 35.

The controlling mechanism is here constructed as follows:

Cam 36 and sliding collar 35 constitute an actuating member centrally disposed with respect to the web rolls. The sliding collar is carried loosely on shaft 4, is adjustable lengthwise thereof, and is prevented from rotating by means of pin 43 extending into pedestal 3. Cam 36 is so shaped as to be active with respect to the brake rod of the web roll in feeding position.

Side register of the web can be obtained in the usual manner, either by shifting one of the pedestals 3 sidewise and with it the shaft 4 and all that it carries, or shaft 4 may be mounted to slide back and forth to side register the webs; or, if preferred, each web can be side registered individually by moving the paper-roll spindle sideways, such as is usually done on floor fed newspaper presses and is common practice in the art. Web 14 runs to spring roller 15 which is of the ordinary construction and provides some yield to the variations in the winding of the various rolls of paper. From this roller, the web passes underneath the automatic tension-adjusting roll 16 and from there on to press roller 17 and thence into the press. Tension-adjusting roller 16 is carried by arms 18 on shaft 19 which is pivoted in the frame or bracket 20. On shaft 19 there is bracket 21 carrying extension rod 22 and balance weight 23 which balance weight is adjustable by sliding closer to and further from the shaft 19 and this counter-balances the weight of the roller 16 and arms 18. Carried also by shaft 19 is the lever 24 connecting with dash pot 25 which may be an air or oil checking device to steady the travel of the web-tension roller 16 and to prevent violent and continuous vibration of the roller. There is also carried on shaft 19, adjusting lever 26 carrying a roll 27 that operates on crank lever 28. This crank lever is pivoted to frame 20 at point 29. The spring 30 is arranged to pull up one end

of crank lever 28, while to the other end there is pivoted connecting rod 31 reaching to bell crank 32 which is forked at the lower end and ends in shoes 33 operating in groove 34 of sliding collar 35.

The operation of the device is as follows: When starting the press, the operator screws down the hand tension until the correct web tension is obtained and he then adjusts the sliding weight 23 so that, with this tension adjustment, arm 16 will be in a horizontal position ready to move up or down as far as necessary. Also, he then adjusts roll 27 on arm 28 so as to bring sliding collar 35 and cam face 36 in the middle of its movement and he adjusts screw 40 in connecting rod 38 so that the adjustment of toggle 37 is in the center of its position. In other words, all the adjustments are set midway ready to increase or decrease the amount of tension, and the control is entirely by means of roller 16. If for any reason the tension is increased, such as in speeding up the press or through uneven winding of the paper, or if the bearing friction on the spindle increases excessively, roller 16 will lift thereby allowing the spring end of lever 28 to raise which depresses connecting rod 31 and through its connections shifts cam face 36 outwardly thus releasing pressure on screw 40 and connecting rod 38, which in turn releases toggle 37 and reduces the friction on the brake pulley. On the other hand, if the tension should become so loose, or the press slowed down to such extent, that the paper feed is at greater speed than the press speed, roller 16 drops thereby reversing the action and putting on more tension. It will therefore be seen that by setting the balance weight in proper position and adjusting the tension by hand until roller 16 stands in the middle of its motion, each successive roll of paper may be run off under the same tension and will also have its tension automatically adjusted. It is also to be noted that by reason of cam 36 being on a sector only of sliding collar 35, it is effective only on the roll that is in running position and has no effect whatever on the substitute rolls that are waiting to be run off in turn.

I claim:

1. A tension device for web rolls including: means for bringing web rolls, one at a time, into feeding position, controlling mechanism governed by the tension of the web from the roll in feeding position, and brake mechanism for said rolls to coact with said controlling mechanism.

2. A tension device for web rolls including: means for bringing web rolls, one at a time, into feeding position, controlling mechanism governed by the tension of the web from the roll in feeding position, and brake mechanism for said rolls, movable with

operatively related to said controlling mechanisms as each roll comes into feeding position.

17. A tension device for web rolls including: means for bringing web rolls, one at a time, into feeding position, controlling mechanism, mounted independently of the movement of said means, governed by the tension of the web in feeding position, and a plurality of brake mechanisms, one for each roll, the brake mechanism of a roll automatically becoming operatively related to said controlling mechanism as the roll comes into feeding position.

18. A tension device for web rolls including: means for bringing web rolls, one at a time, into feeding position, controlling mechanism, mounted independently of the movement of said means, governed by the tension of the web in feeding position, and a plurality of brake mechanisms, one for each roll, movable with said means, the brake mechanism of a roll automatically becoming operatively related to said controlling mechanism as the roll comes into feeding position.

19. A tension device for web rolls including: means for bringing web rolls, one at a time, into feeding position, a plurality of brake mechanisms, one for each roll, and controlling mechanism governed by the tension of the web from the roll in feeding position to control the brake mechanism of the roll in feeding position.

20. A tension device for web rolls including: means for bringing web rolls, one at a time, into feeding position, a plurality of brake mechanisms, one for each roll, and controlling mechanism governed by the tension of the web from the roll in feeding position to successively control the brake mechanism of each roll as it comes into feeding position.

21. A tension device for web rolls including: means for bringing web rolls, one at a time, into feeding position, a plurality of brake mechanisms, one for each roll, and controlling mechanism governed by the tension of the web from the roll in feeding position to automatically become operatively related to the brake mechanism of successive rolls as they come into feeding position.

22. A tension device for web rolls including: supporting means for a plurality of web rolls to successively move said rolls into feeding position, controlling mechanism governed by the tension of the web from the roll in feeding position, and brake mechanism for the rolls movable into and out of operative relation with the controlling mechanism by movement of the supporting means.

23. A tension device for web rolls including: supporting means for a plurality of web rolls to successively move said rolls into feeding position, controlling mechanism

governed by the tension of the web from the roll in feeding position, and a plurality of brake mechanisms, one for each roll, movable into and out of operative relation with the controlling mechanism by movement of the supporting means.

24. A tension device for web rolls comprising: supporting means for a plurality of web rolls to successively move said rolls into feeding position, controlling devices governed by the tension of the web from the roll in feeding position, and braking devices for the rolls movable into and out of operative relation with the controlling devices by movement of the supporting means.

25. A tension device for web rolls comprising: supporting means for a plurality of web rolls to successively move said rolls into feeding position, controlling devices governed by the tension of the web from the roll in feeding position, and a plurality of braking devices, one for each roll, movable into and out of operative relation with the controlling devices by movement of the supporting means.

26. A tension device for web rolls comprising: supporting means, having a plurality of arms each carrying a web roll, rotatable to successively move said rolls into feeding position, controlling devices governed by the tension of the web from the roll in feeding position, and a plurality of braking devices for the rolls, one on each arm of the support, to be moved into and out of operative relation with the controlling devices by rotation of the support.

27. A web tension device comprising: a rotatable supporting means carrying a plurality of web rolls, a brake for each roll, a plurality of brake rods on said supporting means, and a centrally disposed actuating member controlled by the tension of a web and in turn acting to control said brake rods.

28. A web tension device comprising: a rotatable supporting means carrying a plurality of web rolls, a brake for each roll, a plurality of brake rods on said supporting means, and a non-rotating centrally disposed actuating member to successively cooperate with said brake rods as the supporting means are rotated.

29. A web tension device comprising: a rotatable supporting means carrying a plurality of web rolls, a brake for each roll, a plurality of brake rods on said supporting means, a centrally disposed actuating member to control said brake rods, and a controlling member governed by the tension of a feeding web for adjusting the position of the actuating member.

30. A web tension device comprising: a rotatable supporting means carrying a plurality of web rolls, a brake for each roll, a plurality of brake rods on said supporting means, a non-rotating centrally disposed ac-

tuating member to successively coact with said brake rods as the supporting means are rotated, a controlling member mounted independently of the support, and a connection
5 between the controlling member and the actuating member.

31. A web tension device comprising: a rotatable supporting means carrying a plurality of web rolls, a brake for each roll, a
10 plurality of brake rods on said supporting means extending outwardly from the center thereof, and a centrally disposed actuating member controlled by the tension of a web and in turn acting to control said brake rods.

15 32. A web tension device comprising: a rotatable supporting means, a plurality of arms carried by said supporting means, each arm carrying a web roll, a brake for each roll, a brake rod on each arm, and a central-
20 ly disposed actuating member controlled by the tension of a web and in turn acting to coact with said brake rod.

25 33. A web tension device comprising: a rotatable supporting means, a plurality of arms carried by said supporting means, each arm carrying a web roll, a brake for each roll, a brake rod on each arm, and a non-rotating centrally disposed actuating member

to successively coact with said brake rods as the supporting means are rotated.

30 34. A web tension device comprising: a rotatable supporting means, a plurality of arms carried by said supporting means, each arm carrying a web roll, a brake for each roll, a brake rod on each arm, a centrally dis-
35 posed actuating member to coact with said brake rod, and a controlling member governed by the tension of a feeding web for adjusting the position of the actuating member.

40 35. A web tension device comprising: a rotatable supporting means, a plurality of arms carried by said supporting means, each arm carrying a web roll, a brake for each roll, a brake rod on each arm, a non-rotat-
45 ing centrally disposed actuating member to successively coact with said brake rods as the supporting means are rotated, a controlling member mounted independently of the support, and a connection between the control-
50 ling member and the actuating member.

Signed at Plainfield in the county of Union and State of New Jersey this 25th day of September, 1924.

DAVID J. SCOTT.