

July 28, 1936.

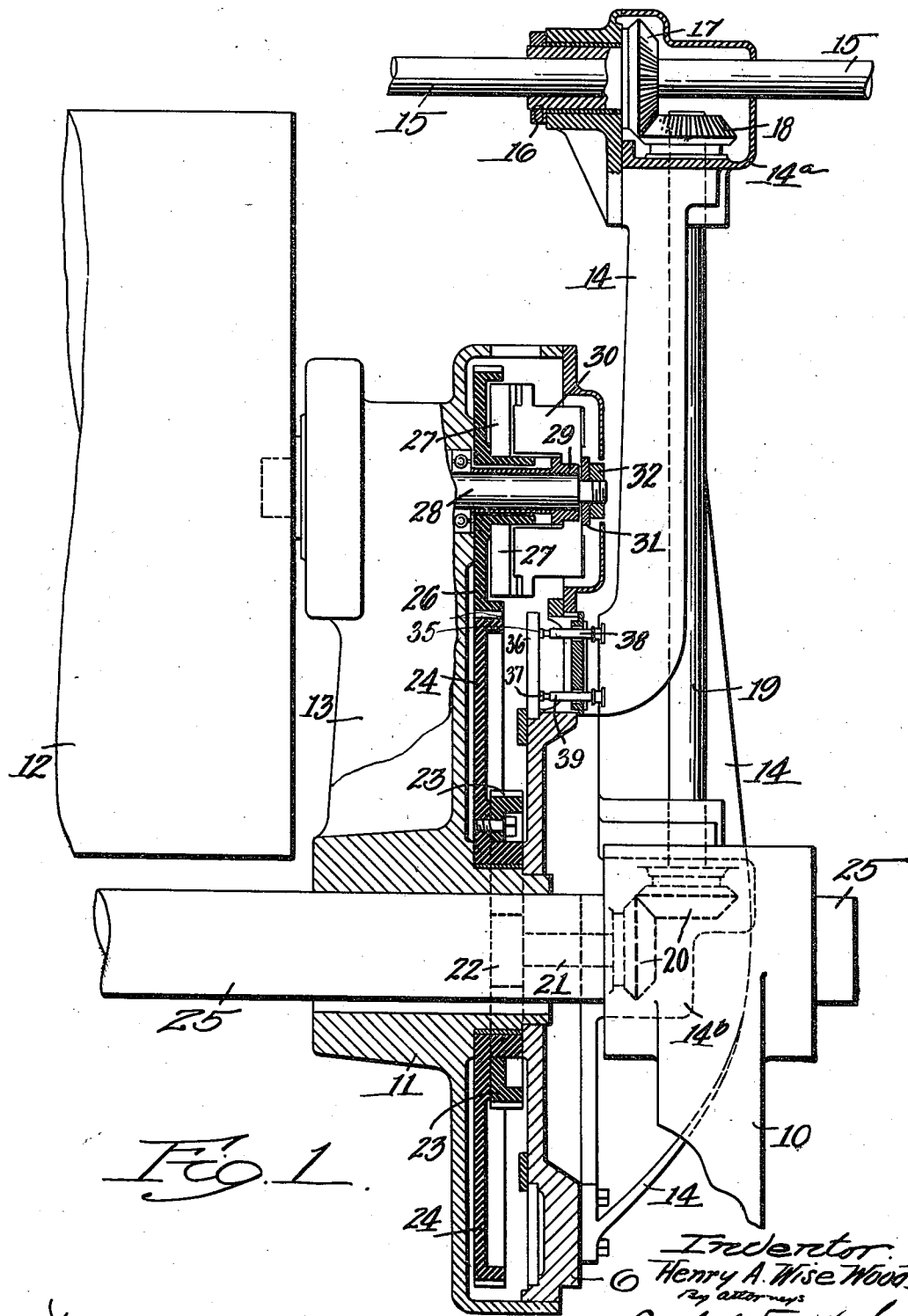
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PAPER ROLL BRAKING DEVICE

Filed Feb. 3, 1931

3 Sheets-Sheet 1



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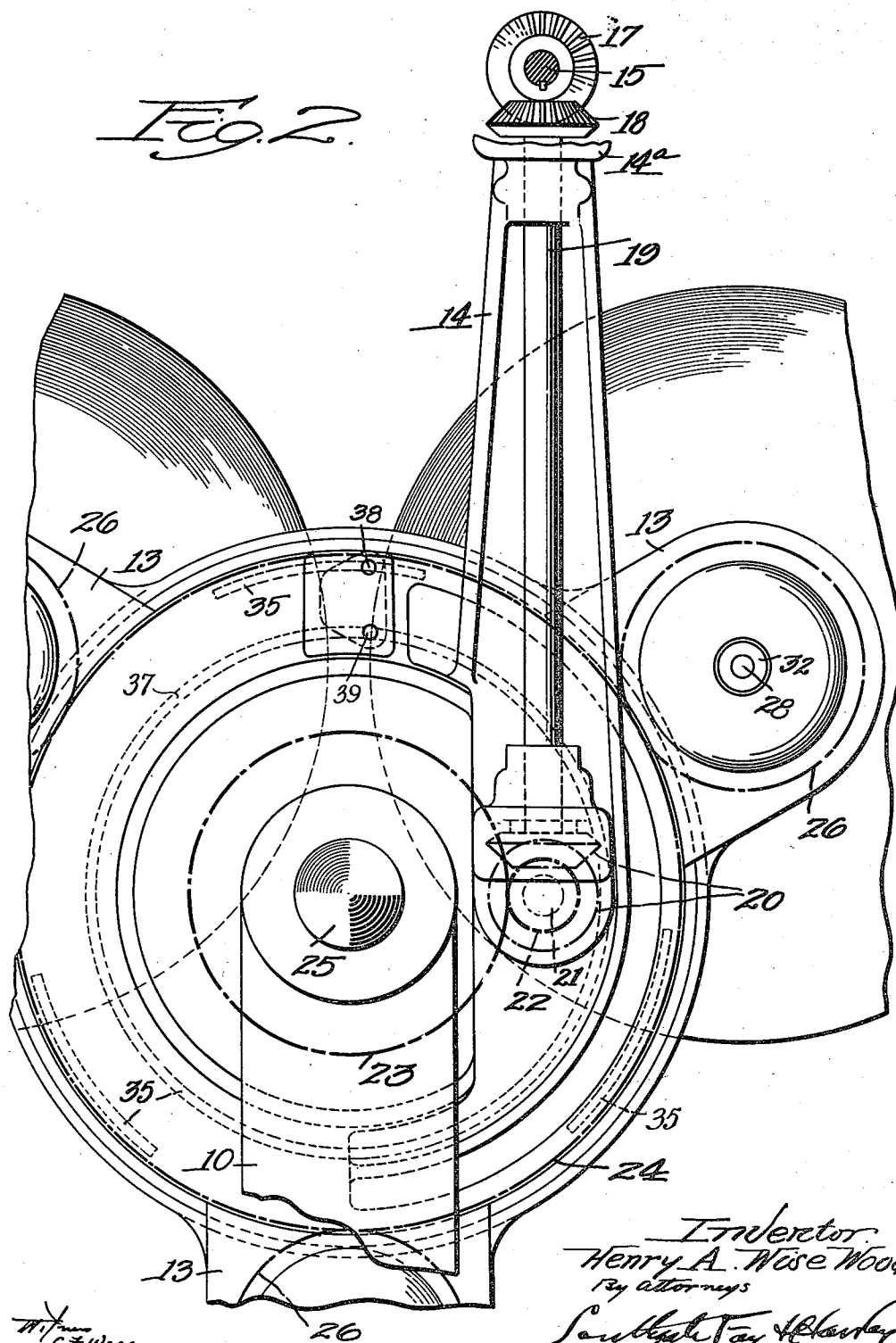
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Fig. 2.



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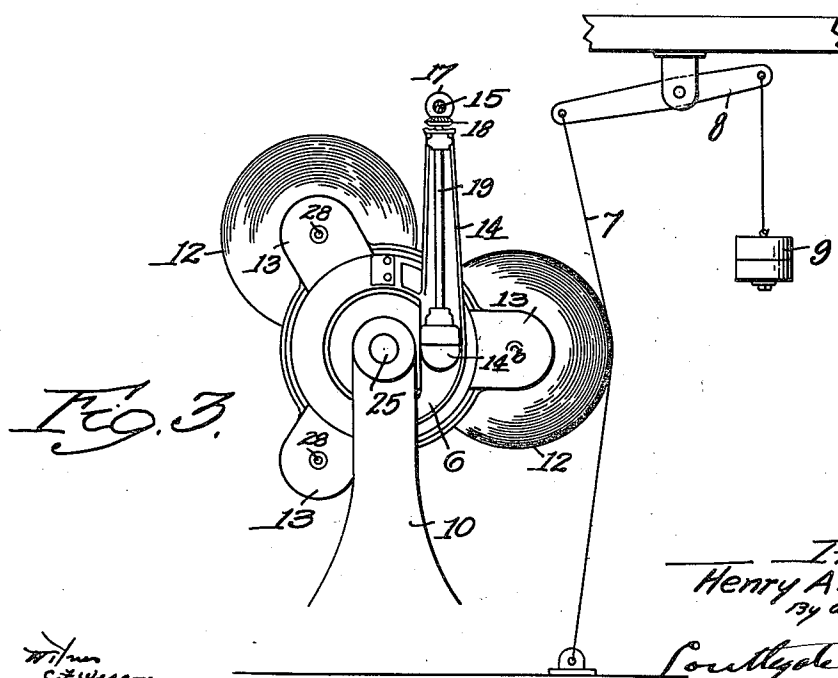
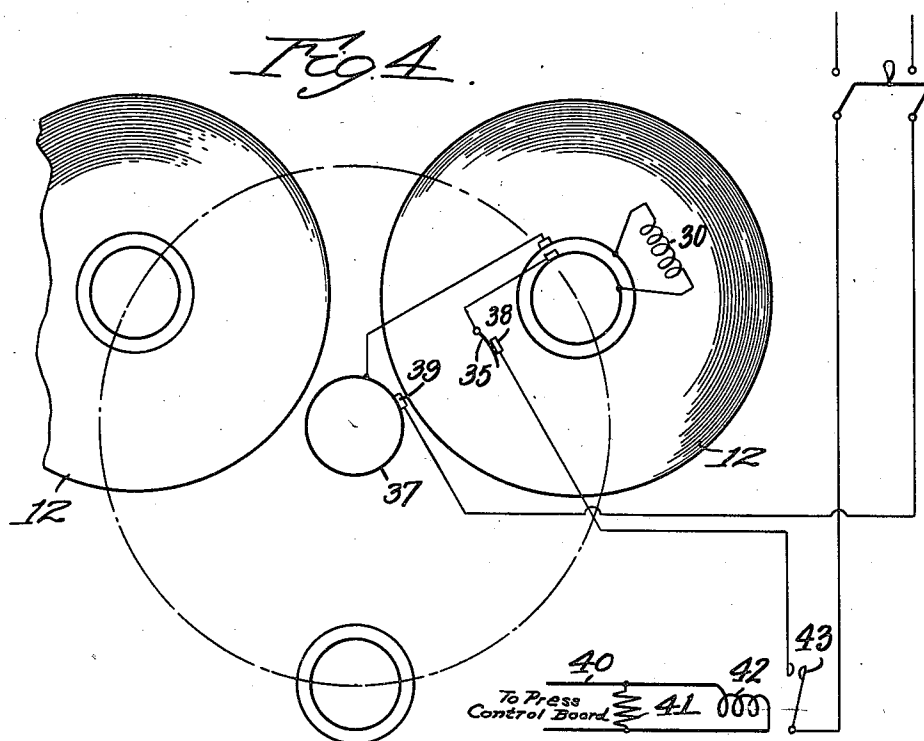
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UNITED STATES PATENT OFFICE

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PAPER ROLL BRAKING DEVICE

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Application February 3, 1931, Serial No. 513,119

10 Claims. (Cl. 242—75)

This invention relates to a device for braking and slowing down the rotation of a heavy roll and is particularly adapted for use in connection with the web rolls supplying paper to a newspaper printing machine.

The principal objects of the invention are to provide a combination of retarding forces for stopping one of these rolls when the press is rapidly decelerating, one device applying the normal tension through tension members operating against the circumference of the roll for retarding and the other applying a retarding effect against the central axis of the roll; to provide these two forces in such a manner that they can be used simultaneously if desired, or either one alone, according to the size of the roll and speed of operation, and to provide for the operation of both of them in order to avoid injuring the surface of the roll by the application of too much tension or pressure directly on the surface thereof. It will be seen therefore that two controls are used, one depending for its effectiveness directly on the size and rapidity of rotation of the roll itself and the other being controlled by the speed of the press.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a side view, partially in section, of a support for paper rolls having means for applying the brake to the center of the spindle;

Fig. 2 is an end view showing the part of the reel and the mechanism for applying the brake above mentioned;

Fig. 3 is an end view of a means for applying a separate brake to the outer surface of the roll to cooperate with the other device, and

Fig. 4 is a wiring diagram.

In large newspaper printing presses the control of the heavy rolls presents a serious problem on account of the fast acceleration or deceleration of the press. In cases of emergency it is necessary to stop the press quite suddenly and it is desirable to have the paper rolls stopped in the same manner so that too much tension will not be applied to them, thus breaking the web, or too little tension, thus causing a paper flood.

It is customary to control the normal tension on the roll while the press is running by straps or belts engaging the surface of the running roll. This is found not to be sufficient to slow down the roll as the press is decelerating and the amount of retardation of the roll is not directly dependent on the changing speed of the press. By the

present invention this braking by means of the tension belts is retained and combined with the braking of the running web roll by the application of a retarding effect to it through its central axis directly controlled by the speed of the press.

The invention is shown as applied to a well known type of construction in which a pair of pedestals 10 support the opposite sides of a reel 11 rotatable on a shaft 25 carried by the pedestals. In the present case the reel comprises three pairs of arms 13 forming a spider at each end and supporting three web rolls 12. As is well understood, this reel is adapted to be rotated to bring the proper web roll into position to attach it to the expiring web. The details of the operating mechanism for the reel are not shown as any that are on the market can be used with this invention. One of these pedestals is made adjustable to and from the other to accommodate different lengths of paper roll.

As shown in Fig. 3, the running roll has tension applied to it at all times by tension belts or straps 7, each having one end fixed and the other pulled taut through levers 8 and removable adjustable counterweights 9. In addition to the adjustment of the retarding effect, applied to the outer surface of the roll on removing or adding weights, variation can be provided by turning the reel. Thus the roll being used will bear on these straps with more or less pressure.

On a stationary plate 6 supported by the hub of the reel is a hollow bracket 14 extending upwardly and provided at its upper end with a bearing for a longitudinal shaft 15. This shaft is supported by the two brackets 14 at opposite ends of the reel and is connected, by means not shown, with the press so as to rotate at a certain definite ratio with respect to the speed of the press. This shaft is provided with a collar 16 mounted in the bracket 14 and splined to the shaft is a bevel gear 17 held by this collar. This construction allows longitudinal motion of the bracket 14 and bevel gear with it for adjusting the paper reel for side register or for moving the pedestal in and out for different widths of rolls.

The bevel gear 17 operates a second bevel gear 18 on a vertical shaft 19 which by a pair of bevel gears 20 drives a longitudinal shaft 21. On this shaft 21 is a pinion 22 meshing with a gear 23. This gear 23 is bolted to a gear 24 and both are concentric with the central shaft 25 of the reel and are mounted to rotate on bearings carried by the spider 13 which make up one end of the reel. With the gear 24 mesh three gears 55

26, one on each arm of the reel. Each of these gears 26 is provided with a spring friction disc 27 secured to it.

It will be understood that each of the three paper rolls carried by the reel is mounted at each end on a stud carried by a spindle 28. This spindle is mounted on ball bearings in the spider and has secured to it a spacer 29 and a magnetic clutch 30. A washer 31 and jam nut 32 on the end of the shaft 28 secure the magnetic clutch in position.

It will be obvious that the shaft 28 rotates with the web roll and that the gear 26 rotates accurately in proportion to the speed of the press. The gearing is designed so that the gear 26 will rotate slower than the spindle 28 during the normal operation of the press. Now if the magnetic clutch 30 is energized a friction connection is made between the clutch and friction disc 27, one being secured to the shaft and the other to the gear. This exerts a retarding effect on the spindle 28 and therefore on the roll which is carried by it.

A casing 14^a is provided around the gears 17 and 18 and a casing 14^b for the gears 20. These casings are both a part of the bracket 14. The hub of the spider 13 is extended out around the gearing to form an enclosure therefor so that all the gearing on the reel is enclosed.

These tension straps 7 constitute by themselves sufficient retarding effect to control the rolls on sudden stops of the press when the rolls are small, but not when they are large. Therefore, it is desirable to have the added retardation acting through the axis of the roll only when the roll is of large diameter. This cooperation of these two retarding devices could be arranged in accordance with this invention automatically but a simple embodiment is shown, in the first three figures, whereby the reel operator keeps his running roll above the center on the belts 7 until such time as the roll is decreased sufficiently in size so that the action of the straps 7 will be sufficient to do all the stopping necessary. After this the reel is rotated under hand control so that the roll is placed below the center. In this case the stopping of the press does not supply retardation through the central axis of the roll but the tension straps 7 are relied on alone.

This is taken care of by the use of a series of segments 35, one for each of the three spindles. Thus the retardation will be selective of the roll which is being operated. The segments 35 are mounted on an insulated ring 36 along with a contact ring 37, the whole being secured to rotate with the spider 11. Each segment 35 is connected with a brush 38 during that period of operation when its roll is large and is located above the center in Fig. 3. The ring 37, through a brush 39, is connected as shown in the diagram, Fig. 4, to bring power into one side of the magnetic clutch 30. The other side of the magnetic clutch is connected with the power when the brush 38 cooperates with the proper one of the segments 35. The press-control board is so operated that the braking of the press is severe. This, as shown here, is a sort of hand operation because the reel man controls the turning of the reel by hand to set it below the center at the proper time, at which time the connections to the magnet clutch 30 are broken and this part of the mechanism is no longer relied upon.

In Fig. 4 other features are shown, whereby the braking is done by a dynamic circuit 40 on

the motor. Connected in parallel with the braking resistance 41 is a coil 42 which controls a contact 43 to close a circuit from the line through the contact brush 38. It is apparent therefore that if the contacts are made both by one of the segments 35 and brush 38 and also the coil 42 is energized so that the contacts 43 are closed, a retardation is exerted on the running roll at its axis.

I have shown the magnetic clutch 30 as rotatable with the roll spindle 28 but from that I do not wish it understood that the invention is limited to this particular feature, except as expressed in the claims. This magnetic clutch could be made stationary and would impart retardation to the roll spindle when the clutch was energized. It is obvious therefore that a modification of the arrangement described could be made acting through the axis of the web roll but with a stationary magnetic clutch instead of a rotatable one. As the drawings do not show whether this clutch is rotatable or stationary it is thought that another illustration of it showing it stationary would not add to the disclosure and such an illustration is not provided therefore.

It will be seen from the above that a combination of forces is applied for controlling the proper deceleration of the web roll. The usual application of friction to the surface of the roll is employed and is used by itself when the roll reaches a small enough diameter. However, when the roll is of large diameter this retardation is not sufficient and is amplified by the retardation through the central axis of the roll as described. Thus I have a combination of retarding forces when the press is rapidly decelerated and running a large roll.

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 do claim is:—

1. The combination with means for supporting a web roll in position to supply the web to a printing press, and means for retarding the speed of the web roll by action on its surface, of a wheel concentric with the web roll, means connected to rotate said wheel at a definite ratio to the speed of the press and normally at a speed less than that of the web roll, and means, fixed to rotate exactly with the web roll, for tending to bring the speed of the web roll down to that of said wheel.

2. The combination with means for supporting a web roll in position to supply the web to a printing press, and means for retarding the speed of the web roll by action on its surface, of a wheel concentric with the web roll, means connected to rotate said wheel at a definite ratio to the speed of the press and normally at a speed less than that of the web roll, and means acting through the axis of the web roll for slowing down the web roll to rotate at the speed of said wheel.

3. In a web roll braking device, the combination of a shaft rotated from a printing press, a web roll spindle, a gear running loosely on the web roll spindle, means connected with said shaft for rotating said gear at a speed less than that of the spindle, and a magnetic clutch adjacent the spindle for slowing down the spindle to the speed of said gear.

4. In a web roll braking device, the combina-

tion of a reel, a web roll and its spindle rotatably supported thereon, a magnetic clutch secured to the spindle to rotate therewith, a gear rotatably mounted on the spindle, a friction disc secured to the gear to rotate therewith and located in position to be held by the clutch when energized, whereby the clutch at that time will tend to bring the rotation of the web roll into synchronism with that of the gear, and means connected with a press to which the web roll supplies paper for rotating the gear in proportion to the speed of the press and at a speed less than that of the roll.

5. The combination with means for supporting a web roll in position to supply the web to a printing press, and means for retarding the speed of the web roll by action on its surface, of a wheel concentric with the web roll, means connected to rotate said wheel at a definite ratio to the speed of the press and normally at a speed less than that of the web roll, means acting through the axis of the web roll for slowing down the web roll to rotate at the speed of said wheel, and means whereby when the web roll is moved beyond a predetermined point, the last named means will be thrown out of action.

6. In a web supply device for a printing press, the combination with a rotary reel having means thereon for supporting a plurality of web rolls, each adapted to come into position to deliver the running web to the press, at a certain point in the circle through which the reel rotates, means for applying tension to the surface of the running roll so located that the tension can be changed by the turning of the reel with the roll thereon, means for applying a braking action at the center of the web roll controlled by and dependent upon the speed of the press, and means whereby any roll on the reel will come under the influence of the last named means in accordance with the rotation of the reel.

7. The combination of a bodily movable web roll, means for rotating it on its own axis, means for bodily moving said roll tension means in position for engaging the surface of said roll when it moves into running position, a clutch, and means for operating said clutch to apply a force to resist the rotation of the roll while said tension means is in contact with said roll.

8. The combination with means for supporting a web roll in position to supply the web to a printing press, of means for applying retardation to the web roll on its surface, and means operated from a printing press for applying retardation to the web roll through its central axis when the press is decelerated.

9. In a web-splicing device, the combination of two tensioning devices for a web roll, means whereby one exerts its retarding force on the circumference of the roll and means whereby the other exerts its retarding force through the axis of said roll, of means whereby the control of the web roll by the first tensioning device is progressively increased as the roll moves bodily toward running position and the other is applied during that period.

10. The combination with means for supporting a web roll in position to supply the web to a printing press and tension straps for applying normal tension to the running roll by action on its surface, of a wheel concentric with the running roll, means connected to rotate said wheel at a speed in definite ratio to the speed of the press and normally at a speed less than that of the web, a magnetic clutch fixed to rotate exactly with the running roll when the press is being slowed down, and means whereby said clutch will tend to bring the speed of the running roll down to that of said wheel.

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