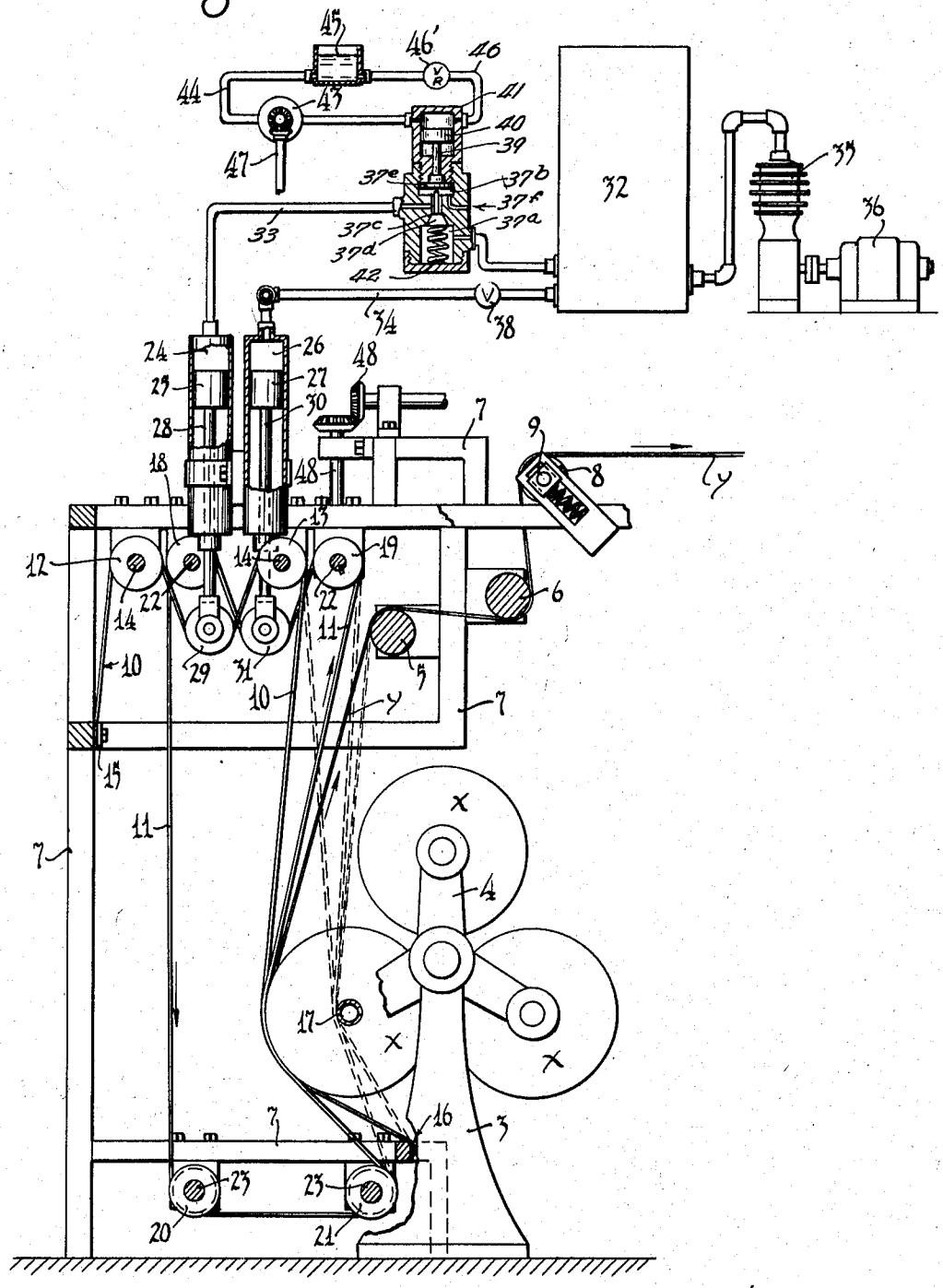
Dec. 15, 1936. G. H. WHELDON ET AL 2,064,638

WEB TENSIONING MECHANISM

Filed March 30, 1935 2 Sheets-Sheet 1

Fig. 1



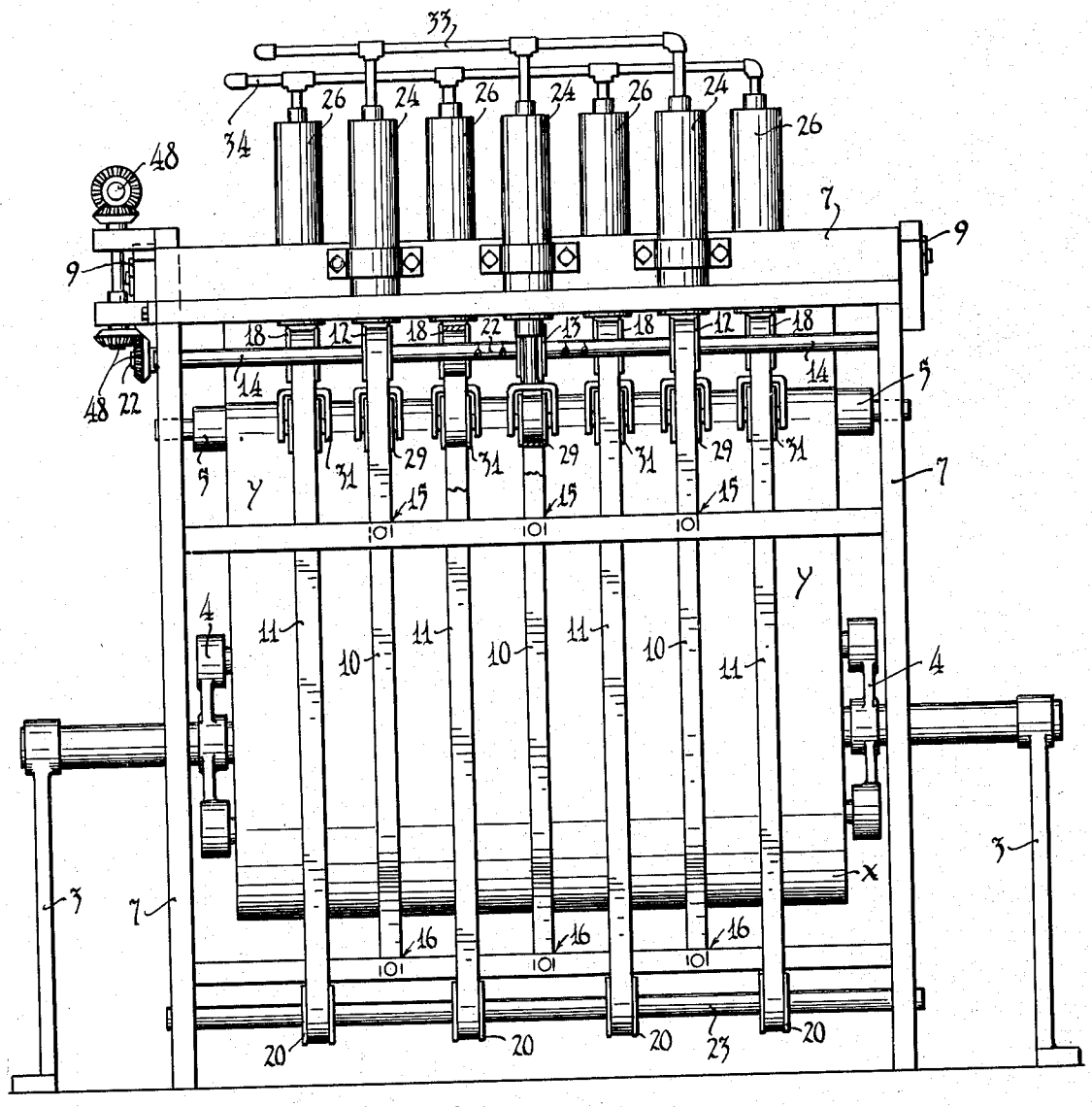

INVENTORS
Joseph E. Murphy
George H. Wheldon
Herbert A. Lotz
BY THEIR ATTORNEYS
Merchant & Gifford

Dec. 15, 1936. G. H. WHELDON ET AL 2,064,638

WEB TENSIONING MECHANISM

Filed March 30, 1935 2 Sheets-Sheet 2

Fig. 2




INVENTORS
Joseph E. Murphy
George H. Wheldon
Herbert A. Lotz
BY THEIR ATTORNEYS
Merchant & Kilgore

Patented Dec. 15, 1936 2,064,638

# UNITED STATES PATENT OFFICE

2,064,638

## WEB TENSIONING MECHANISM

George H. Wheldon, Joseph E. Murphy, and Herbert A. Lotz, Minneapolis, Minn.

Application March 30, 1935, Serial No. 13,924

11 Claims. (Cl. 242—75)

Our invention has for its object the provision of simple and highly efficient mechanism for tensioning a web of material as the same is fed to a printing press or the like from a web roll to prevent the web roll from running ahead when the press is stopped suddenly, and for automatically reducing the tension on the web when the press is stopped or is running below normal speed, and for automatically increasing the tension on the web when the press is running at normal speed.

The prime or basic purpose of this invention is to exert a sufficient and predetermined amount of tension on a roll of paper irrespective of printing press speeds, good or badly wound rolls, to enable the pressman in charge of a rotary press to secure approximately the same quality of reproduction on the sheet printed from the first plate cylinder as the sheet printed on the second plate cylinder.

More specifically stated, pressmen in all pressrooms have always had great difficulty on rotary cylinder presses in getting as good or clear a reproduction from the first plate cylinder as they obtain from the second plate cylinder.

It is well known that when the web goes over the first plate cylinder it secures the printed reproduction as a result of pressure from a companion press blanket cylinder which operates against and in parallel with the plate cylinder. The unprinted side of the web comes in contact with this first blanket impression cylinder and it then passes under a second blanket impression cylinder and over a second plate cylinder, thereby bringing the freshly printed first impression printing in direct contact with the second impression blanket cylinder and depositing some of the freshly printed ink on the second impression cylinder.

In the event the tension is improper to maintain perfect register up and down and sideways of the web as between cylinders, the ink which is constantly being deposited on the second impression blanket will have a tendency to become out of register with the initial printed page and thereby cause a double printed effect or a slurring effect.

In view of the above condition the primary object of this invention is the provision of a tensioning device by the use of which a proper predetermined tension may be obtained at all times to eliminate the double impression or slurring effect that pressman constantly complain about.

To the above and, generally stated, the invention consists of the novel devices, combinations of devices and arrangement of parts hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a view partly in side elevation and partly in section with some parts broken away, and partly in diagram showing one embodiment of the invention; and

Fig. 2 is an end elevation of certain of the parts shown in Fig. 1.

It may be assumed that the invention illustrated is embodied in a press for printing newspapers. The numeral 3 indicates an ordinary reel stand on which is mounted a reel 4 carrying three web rolls X of paper. For the purpose of this case, it is not thought necessary to illustrate the mechanism for turning the reel about its axis to position a web roll while making a flying paster and for taking the place of an exhausted web roll.

The web Y from an active web roll X passes over a guide roller 5, under a guide roller 6, both of which are journaled on a frame 7, and over a guide roller 8 to the printing press. Said guide roller 8 is spring-supported in bearings 9 on the frame 7. Hereinafter the use of the words "web roll" will refer to the web roll X being unwound.

Referring now in detail to the invention, the numeral 10 indicates a plurality of friction straps, as shown three, and the numeral 11 indicates a plurality of endless friction belts, as shown four. The belts 11 are edgewise spaced apart and the straps 10 are positioned midway therebetween. The straps 10 and the belts 11 are, as shown, alternately spaced equal distances apart from one end of the web roll X to the other. Each strap 10 extends over a pair of flanged guide rollers 12 and 13 loosely journaled on a pair of horizontal shafts 14 mounted on the frame 7 at the top thereof materially above the web roll X. These shafts 14 extend parallel to the axis of the web roll X and are radially spaced apart in the same horizontal plane.

The straps 10, where they pass over the rollers 12, are anchored at their respective ends to the frame 7 below said roll, as indicated at 15. Said straps 10, where they pass over the guide rollers 13 and depend therefrom, extend transversely around the side of the web roll X from which its web Y is being unwound, and their respective ends are anchored to the frame 7 below said roll, as indicated at 16.

It is important to note that the axis of the

spindle 17, on which the web roll X is wound, is off center from a line extending from the axes of the guide rollers 13 to the anchor points 16, so that the straps 10 are held bowed around the diminishing diameter of the web roll X, and, in fact, they are thus held around the respective spindle 17 after the web roll X is completely exhausted, as shown by full and broken lines in Fig. 1.

The endless friction belts 11 run over a pair of upper flanged guide rollers 18 and 19 and a pair of lower flanged guide rollers 20 and 21. Mounted on the frame 7 is a pair of shafts 22, on one of which the guide rollers 18 are loosely journaled, and on the other of which shafts the guide rollers 19 are keyed. Said shafts 22 extend parallel to the shafts 14 in the same horizontal plane. The guide rollers 20 and 21 are loosely journaled on a pair of shafts 23 mounted on the frame 7 below the web roll X. The guide rollers 19 and 21 hold the belts 11 bowed around the web roll X in the same manner as the straps 10. Said straps 10 are looped between the guide rollers 12 and 13 and the belts 11 are looped between the guide rollers 18 and 19.

Air or other fluid under pressure is used for independently and yieldingly holding each strap 10 and each belt 11 under the desired tension on the web roll X, by means of a cylinder 24 and a co-operating pistons 25. The pistons 25 have stems 28 on which are journaled flanged rollers 29 that run in the loops of the straps 10 and are yieldingly pressed onto said strap and hold the same under the desired tension on the web roll X, when fluid under pressure is admitted to the cylinder 24. Stems 30 on the pistons 27 have journaled thereon flanged rollers 31 which run in the loops of the belts 11 and are yieldingly pressed onto said belt and hold the same under the desired tension on the web roll X, when fluid under pressure is admitted to the cylinder 26. The cylinders 24 and 26 are mounted on the frame 7 above the shafts 14 and 22 in upright positions with the stems 28 and 30 of the respective pistons depending into the loops of the straps 10 and the belts 11, respectively.

Fluid, preferably air, under pressure, is conveyed from a storage tank 32 through pipes 33 and 34 to the cylinders 24 and 26, respectively. An air compressor 35 operated by a motor 36 supplies air to the storage tank 32 at predetermined pressure.

A valve casing 37 is interposed in the pipe 33 and a hand valve 38 is interposed in the pipe 34. Within the valve casing 37 is a lower valve chamber 37*a*, an upper valve chamber 37*b*, and an axial passageway 37*c* connecting the said two chambers. The section of the pipe 33 leading from the tank 32 is arranged to discharge into the valve chamber 37*a* and the other section of the pipe 33 leads from the passageway 37*c*. Within the valve chamber 37*a* is an automatic valve 37*d* for opening and closing the air supply for the storage tank 32 to the cylinders 24 and within the valve chamber 37*b* is an automatic relief valve 37*e*. These two valves, 37*d* and 37*e*, are carried on the stem 39 of a piston 40 working in a cylinder 41 mounted on the top of the valve casing 37. A relief port 37*f* in the valve casing 37 leads from the exterior of said casing to the valve chamber 37*b*. The valves 37*d* and 37*e* are arranged on the valve stem 39 to be alternately opened and closed by the piston 40, as will presently appear.

A coiled spring 42, compressed between the bottom of the valve casing 37 and the valve 37*d*, is under strain to hold the piston 40 raised with the relief valve 37*d* closed and the valve 37*e* open. When valve 37*d* is opened compressed air from the supply tank 32 projects the pistons 25 and thereby places the belts 10 under tension and thus holds the same. At this time the relief port 37*f* is closed by the valve 37*e*. On the other hand, when the valve 37*d* is closed compressed air to the cylinders 24 is cut off and the relief port 37*f* is opened by the valve 37*e* to reduce air in the cylinders 24 to atmospheric pressure and allow the pistons 25 to retract and thereby release the tension on the belts 10. Oil or other fluid for operating the piston 40 is delivered to the cylinder 41, on the opposite side of the piston 40 from its stem 39, by a pump 43, through a pipe 44 leading from an open supply reservoir 45. Oil in the cylinder 41 is returned to the reservoir 45 through a return pipe 46. Connections 47 drive the pump 43 from a moving part of the press having a variable speed. A reducing valve 46′ interposed in the pipe 46 is provided to restrict said pipe and thereby cause the desired oil pressure to be built up in the cylinder 41, to manipulate the piston 40 and thereby open the valve 37*a* and close the valve 37*b*, when the press is running at normal speed, as will hereinafter appear.

The shaft 22, on which the guide rollers 19 are keyed, is driven by connections 48 from a moving part of the press having a variable speed. The belts 11 are driven by the shaft 22 in the direction of the arrows marked on Fig. 1, which is in the same direction that the web Y is moving from the web roll X. Preferably, the belts 11 are driven at a speed, say two per cent (2%) less than the lineal travel of the web Y.

When the press is operating at slow speed, the adjustment of the reducing valve 46′ is such as to prevent the building up of sufficient pressure in the cylinder 41 to overcome the tension of the spring 42, and hence the valve 37*d* will remain closed and the valve 37*e* will remain open; and as there is no air pressure on the piston 25, there will be no tension on the belts 11. However, as soon as the press reaches normal printing speed, the pump 43 builds up sufficient oil pressure in the cylinder 41 to overcome the spring 42, and retract the piston 40 which, in turn, will close the valve 37*e* and open the valve 37*d* to admit air to the cylinders 24. Air admitted to the cylinders 24 will operate the pistons 25 and thereby press the rollers 29 onto the straps 10 and place the same under tension, so that they act as a friction brake for the web roll X. The belts 11 are held under tension as long as the hand valve 38 remains open and compressed air is admitted to the cylinders 26. In fact, the only time the hand valve 37 will be closed to release tension on the belts 10 is when making repairs.

When the web roll X is substantially exhausted, a so-called flying paster is made to feed the web of a new roll to the press. In making a flying paster, paste is applied to the outer end portion of the web of the new roll in the customary manner, and at this time, the speed of the press is reduced. This reduced speed of the press acting on the pump 43 will cause the valve 37*e* to be automatically opened and the valve 37*d* to be automatically closed and thereby release the tension of the straps 10. Next, the reel 4 is operated to swing the new web roll into contact with the moving web Y of the exhausted roll, and the overlying belts 11 start the rotation

of said new roll, and as the pasted ends of its web are pressed between the respective web roll and the moving web Y, the same is pressed onto the web Y and adheres thereto. The travelling movement of the web Y carries the web of the new roll to the press. As soon as the web of the new roll is connected to the web Y of the exhausted roll, the web Y of the exhausted roll is severed back of the connected end of the new roll. At the completion of the making of a flying paster, the reel 4 continues its movement until the new roll is in the place of the exhausted roll, and subject to the tension of the belts 11. The speed of the press is now changed to normal printing speed with the result that oil pressure is again built up in the cylinder 41 and the piston 40 operated to close the relief valve 37e and open the valve 37d to admit compressed air to the cylinders 24 and thereby places the straps 10 under tension, as previously described. Obviously, the pistons 25 and 27 independently and yieldingly hold the straps 10 and the belts 11 on the web roll X and which straps and belts automatically adjust themselves to all irregularities in the circumference of the web roll, so that an even and constant tension is applied to the web roll by said straps and belts at longitudinally spaced points. As heretofore stated, less tension on a web roll is necessary when the press is running at slow speed than when said press is running at normal printing speed. From the above description it is evident that tension on a web roll is automatically reduced when the press is stopped, thus making it easy to overcome the inertia of the roll when starting the press. It is also advantageous to have reduced tension on a web roll when the press is running at slow speed during the threading of the web through the press or when making a flying paster and during the movement of the new web roll to take the place of the exhausted roll. As soon as speed of the press is changed from so-called "slow-speed" to normal printing speed, the tension on the web roll is automatically increased.

It may be here stated that the details of the valve mechanism, such as 37a, 37b, 37c, 37d, 37e, 37f, and 40 and the relief valve 46' are conventional and form no part of the applicant's invention aside from the main function of controlling the flow of fluid from the tank 32 to the cylinder 24.

From what has been said, it will be understood that the device described is capable of modifications as to details of construction and arrangement within the scope of the invention herein disclosed and claimed.

What we claim is:

1. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a tension control device for the web including a braking member for the web roll, means normally holding the braking member operative when the press is running at normal speed and for releasing the braking member when the press is stopped or running at a speed below normal, said holding means being automatically controlled by a moving part of the press having a variable speed, and including a source of fluid, a valve set to cut off fluid from said source when the press is stopped or running at a speed below normal, a second source of fluid, a cylinder and cooperating piston for opening the valve, a pump for supplying fluid from said second source to the cylinder, and means for operating the pump from a moving part of the press having a variable speed, said cylinder having a fluid escape passage that prevents the pump from building up sufficient pressure in the cylinder to operate its piston and open the valve while the press is running below normal speed.

2. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a tension device for the web including a friction strap pressing against the web roll, a cylinder and co-operating piston having a member engaging the friction strap to place the same under tension, a source of fluid under pressure leading to the cylinder, a valve set to cut off fluid from said source to the cylinder when the press is stopped or running at a speed below normal, and automatic means for opening the valve when the press is running at normal speed, said automatic means being controlled by a moving part of the press having a variable speed.

3. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a tension device for the web including a friction strap pressing against the web roll, a cylinder and co-operating piston having a member engaging the friction strap to place the same under tension, a source of fluid under pressure leading to the cylinder, a yieldingly closed valve normally cutting off the fluid from said source to the cylinder when the press is stopped or is running at a speed below normal, a second source of fluid, a cylinder and co-operating piston for opening the valve, a pump for supplying fluid from said second source to the last noted cylinder, and means for operating the pump from a moving part of the press having a variable speed, said last noted cylinder having a fluid escape passage that prevents the pump from building up sufficient pressure in the last noted cylinder to operate its piston and open the valve while the press is running at a speed below normal.

4. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a friction strap, anchored at its ends, and an endless friction belt pressing against the web roll, means for driving the belts, cylinders and co-operating pistons having members engaging the strap and the belt to independently place the same under tension, a source of fluid under pressure leading to the cylinders, a valve set to cut off fluid from said source to the cylinder for the strap when the press is stopped or running at a speed below normal, automatic means for opening the valve when the press is running at normal speed, and means for controlling the automatic means from a moving part of the press having a variable speed.

5. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a plurality of friction straps, anchored at their ends, and a plurality of endless friction belts pressing against the web roll and alternately arranged, means for driving the belts, a cylinder and co-operating piston for each strap and each belt, each piston having a stem on which is journaled a roller engaging the respective strap or belt to place the same under tension, a source of fluid pressure leading to the cylinders, a valve set to cut off fluid from said source to the cylinders for the straps when the press is stopped or is running at a speed below normal, automatic means for opening the valve when the press is running at normal speed, and means for controlling the

automatic means from a moving part of the press having a variable speed.

6. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a plurality of friction straps, anchored at their ends, and a plurality of endless friction belts pressing against the web roll and alternately arranged, means for driving the belts, a cylinder and co-operating piston for each strap and each belt, each piston having a stem on which is journaled a roller engaging the respective strap or belt to place the same under tension, a source of fluid pressure leading to the cylinders, a valve set to cut off fluid from said source to the cylinders for the straps when the press is stopped or is running at a speed below normal, automatic means for opening the valve when the press is running at normal speed, including a second source of fluid under pressure, a cylinder and co-operating piston for opening the valve, a pump for supplying fluid from said second source of fluid to the last noted cylinder, and means for operating the pump from a moving part of the press having a variable speed, said last noted cylinder having a fluid escape passage that prevents the pump from building up sufficient pressure in the last noted cylinder to operate its piston and open the valve while the press is running at below normal speed.

7. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a tension control device for the web including a plurality of independent braking members, operative directly on the roll, and automatic means for releasing at least one but not all of the braking members to reduce the tension on the web when the press is stopped or running at a speed below normal.

8. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a tension control device for the web including a plurality of independent braking members, operative directly on the roll, automatic means, controlled by a part of the press having a variable speed, for releasing at least one but not all of the braking members to reduce the tension on the web when the press is stopped or running at a speed below normal.

9. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a tension control device for the web including a plurality of independent braking members operative on the periphery of the roll at transversely spaced points, and means for releasing only part of the braking members to reduce the tension on the web when the press is stopped or running at a speed below normal.

10. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a tension control device for the web including a plurality of friction straps operative on the periphery of the roll, and means for releasing at least one but not all of the straps to reduce the tension on the web when the press is stopped or running at a speed below normal.

11. In a printing press or the like, the combination with a support for a running web roll to be controlled, of a tension control device for the web including a plurality of friction straps operative on the periphery of the roll, and automatic means, controlled by a part of the press having a variable speed, for releasing at least one but not all of the straps to reduce the tension on the web when the press is stopped or running at a speed below normal.

JOSEPH E. MURPHY.
GEORGE H. WHELDON.
HERBERT A. LOTZ.