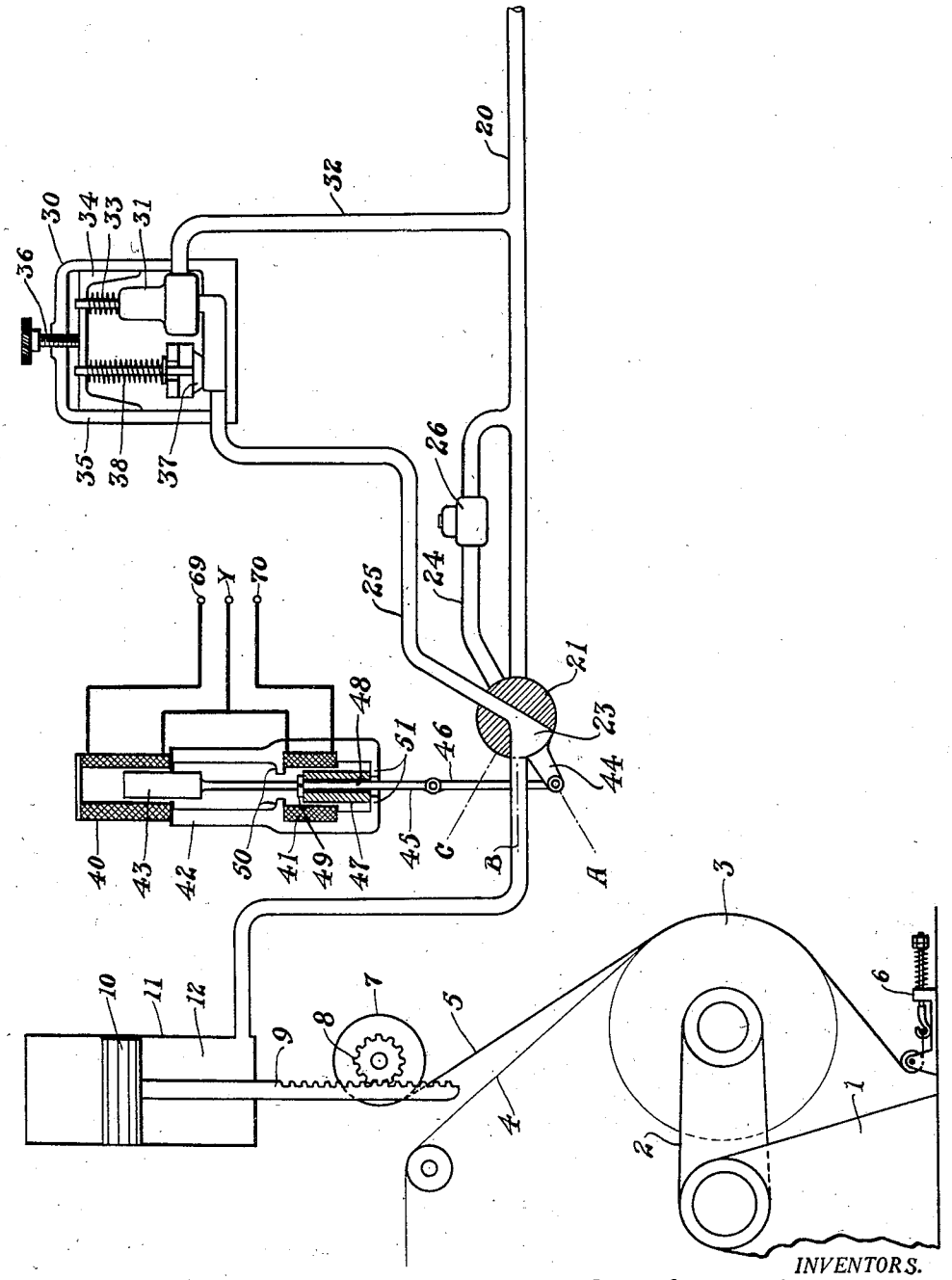
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FLUID PRESSURE WEB CONTROLLER FOR PRINTING PRESSES

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FLUID-PRESSURE WEB CONTROLLER FOR PRINTING PRESSES.

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This invention relates to means for controlling the tension of web-paper running to press during the normal operation of the press and preventing the overrunning of the web when the press is to be decelerated or brought to a stop and through the regulated use of a single apparatus. It is one specific embodiment of the broad invention disclosed and claimed in our Patent No. 1,618,975 dated March 1, 1927. In such patent we showed an electric torque motor actuating a system of stationary straps or aprons which gave a regulatable tension upon the surface of the rotating roll of web-paper being drawn to press during the normal operation of the same, with means for applying therethrough an increased tension for emergency stops.

In the present case it is our object to secure such results by providing a fluid-pressure tension device in connection with sources of variable pressure and electrically controlled means for subjecting the fluid-pressure device to one or another of the standards of fluid-pressure.

The accompanying somewhat diagrammatic illustration of the preferred exemplification of our invention shows a pedestal 1 of a roll-stand having a reel with a plurality of arms 2, each designed to carry a roll 3 of web paper for feeding to press, as at 4. In contact with the surface of the roll are one or more stationary straps or aprons 5, anchored at one end, as at 6, the other end passing over or around a drum or similar device 7. These straps or aprons are designed to determine or regulate the amount of frictional braking force to be applied to the web-roll in regulating the tension of the web 4.

It is desirable that any motor used in actuating such straps or aprons shall be capable of securing the required frictional control of the web-sheet in spite of the constantly-varying diameter of the roll 3. To this end we provide a pinion 8 on the drum 7, gearing with a rack upon the piston-rod 9 extending from the piston 10 in the cylinder 11. In order that pressure may be admitted to the space 12 beneath the piston 10, such space is connected to a switching valve 21 by the conduit 22. The valve 21 is designed to connect the conduit 22 to any one of several ports through which are made available either a high pressure of 100 pounds, for example, through the pipe 20, or a medium pressure of, say, 70 pounds through the pipe 24 controlled by the valve 26, or a regulatable and relatively low pressure for normal operation secured through the pipe 25 and the valve 31.

The switching valve 21 is shown as electrically actuated by a double-solenoid device 40, 41, automatically controlled as part of the general control of the press drive. Thus the solenoid 40 is connected in the emergency "stop" circuit of the main controller, while the solenoid 41 is connected in the "decrease" circuit of the main controller. These two solenoids may be carried in a frame 42. Solenoid 40 has an armature 43 and solenoid 41 has an armature 47. The movement of 47 is limited in its upward and downward directions by stops 50 and 51 and such movement is substantially half that possible with armature 43. A regulator-arm 44 of the valve 21 is connected to the armature rod 45 by the link 46. The rod 45 has secured upon it a collar 49 which determines the downward extent of movement of the armature 43. The armature 47 has a bore 48 through which the rod 45 passes freely. By these means the valve 21 may be brought to any one of three positions: The first, as shown at "A," is the position normally assumed, under gravitation for example, and this would be the ordinary running position, where the lowest fluid pressure would be admitted to the plunger chamber 12; by means of connections 70—Y solenoid 41 may be energized and the arm 44 lifted to position "B," connecting pipe 22 with the intermediate pressure pipe 24; by means of connections 69—Y solenoid 40 may be energized, lifting arm 44 to its extreme position, connecting pipe 22 with the high pressure pipe 20. When the solenoids are both de-energized, the rod 45 drops the arm 44 to its low-pressure position, re-connecting pipe 22 with pipe 25 and permitting the high pressure in the chamber 12 to be reduced, as will be shown.

The unit 30 is shown as a manually adjusted arrangement for primarily setting the braking effect of the straps or aprons 5 during the normal running of the press and, secondly, permitting the exhaust of high pressure from the chamber 12 when the solenoids 40, 41 are de-energized. The hand-

screw 36 presses upon the slide 34 in the frame 35, regulating the compression of springs 33 and 38 on the valve stems of low-pressure valve 31 and exhaust valve 37. In this simple manner the degree of pressure through pipe 25, valve 21 and pipe 22 to the chamber 12 may be fixed at will and altered as circumstances demand. At the same time, any excess of pressure in the chamber 12 may be exhausted through the valve 37.

In the normal operation of the press the relative positions of the parts of our described tension regulator are substantially as shown in the drawing. Any running adjustment of web-tension can be made by regulating the hand wheel 36. A forcing down of the slide 34 raises the standard of pressure of the valves 31 and 37 while a release of the slide 34 weakens the valve 37 and permits the excess pressure to escape therethrough, while setting a lower standard at the valve 31. The valve 26 may be set at the point giving a sufficient pressure through the pipe 24 for decelerating purposes when solenoid 41 is energized through connections 70—Y of the press control. The emergency actuation of solenoid 40 through connections 69—Y puts the high pressure source in direct communication with the cylinder 11, applying the maximum strain upon the straps or aprons 5, tending to stop the rotation of the roll 3, thus preventing a flooding of the press with paper through the over-running of the roll 3 due to its weight and momentum.

What we claim as our invention is the following:

1. A web-tension regulator for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, such strap being secured at one end and passing over a rotatable drum at the other end, a fluid-actuated motor for rotating the drum to apply tension to the friction strap and means for regulating the amount of tension applied by such motor.

2. A web-tension regulator for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, such strap being secured at one end and passing over a rotatable drum at the other end, a fluid-actuated motor for rotating the drum to apply tension to the friction strap, a source of fluid pressure, means for making available a plurality of standards of fluid pressure from such source and means for selectively connecting the fluid-motor to a desired standard of fluid pressure.

3. A web-tension equipment for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, a fluid-actuated motor acting upon the strap to supply a continuous strain thereto for applying a braking force upon the surface of the web-roll, and means for regulating the fluid pressure applied to such motor.

4. A web-tension equipment for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, a fluid-actuated motor acting upon the strap to supply a continuous strain thereto for applying a braking force upon the surface of the web-roll, a source of fluid pressure, means for making available a plurality of standards of fluid pressure from such source, and means for selectively connecting the fluid motor to a desired standard of fluid pressure.

5. A web-tension equipment for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, a fluid-actuated motor acting upon the strap to supply a continuous strain thereto for applying a braking force upon the surface of the web-roll, means for establishing a standard of fluid pressure to be applied to such motor and means for reducing such pressure.

6. A web-tension equipment for printing presses or the like comprising a friction strap pressing against the web roll to be controlled, a fluid-actuated motor acting upon the strap to supply a continuous strain thereto for applying a braking force upon the surface of the web-roll, a source of fluid pressure, means for making available a plurality of standards of fluid pressure from such source, means for selectively connecting the fluid-motor to a desired standard of fluid pressure and means for reducing the tension applied by such motor.

7. A web-tension equipment for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, a fluid-actuated motor acting upon the strap to supply a continuous strain thereto for applying a braking force upon the surface of the web-roll, a source of fluid pressure, means for making available a plurality of standards of fluid pressure from such source and means for progressively connecting the fluid motor first to a low fluid pressure and then to a higher pressure as required by changed conditions of operation.

8. A web-tension equipment for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, a fluid-actuated motor acting upon the strap to supply a continuous strain thereto for applying a braking force upon the surface of the web-roll, a source of fluid pressure, means for making available a plurality of standards of fluid pressure from such source, a valve for selectively connecting the fluid motor to a desired standard of fluid pressure and means for auto-

matically changing the position of such valve to supply a higher standard of fluid pressure to the motor when the machine is to be decelerated.

9. A web-tension equipment for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, a fluid-actuated motor acting upon the strap to supply a continuous strain thereto for applying a braking force upon the surface of the web-roll, a source of fluid pressure, means for making available a plurality of standards of fluid pressure from such source, a valve for selectively connecting the fluid motor to a desired standard of fluid pressure and means for automatically changing the position of such valve to supply a higher standard of fluid pressure to the motor when the machine is to be slowly decelerated and further changing of the position of such valve to supply a still higher standard of fluid pressure to the motor when a quick stop of the machine is desired.

10. A web-tension equipment for printing presses or the like comprising a friction strap pressing against the web-roll to be controlled, a fluid-actuated motor acting upon the strap to supply a continuous strain thereto for applying a braking force upon the surface of the web-roll, a source of fluid pressure, means for making available a plurality of standards of fluid pressure from such source, a valve for selectively connecting the fluid motor to a desired standard of fluid pressure, electro-magnetic means in the "decrease" control circuit of the press for shifting the valve from normal running fluid pressure to a higher pressure standard and further electro-magnetic means in the "stop" control circuit for shifting the valve to the highest standard of fluid pressure.

11. In a web-tension regulator including a fluid pressure motor for applying tension to a friction strap for controlling the rotation of a web-roll, an electro-magnetic valve controller comprising two solenoids, a plunger armature for each, an armature rod common to both and connected to the valve, and means for giving a wider range of rod-movement when one solenoid is energized than when the other solenoid is energized.

12. In a web-tension regulator including a fluid pressure motor for applying tension to a friction strap for controlling the rotation of a web-roll, an electro-magnetic valve controller comprising two solenoids, a plunger armature for each, an armature rod common to both and connected to the valve, stops limiting the extent of movement of one armature as compared with the movement of the second armature, a free passage-way for the rod through the first armature and a collar secured to the rod above the first armature whereby such armature may give movement to the rod without limiting the capacity of such rod to move further under the influence of the second armature.

13. In a web-tension regulator including a fluid-pressure motor for applying tension to a friction strap for controlling the rotation of a web-roll, a combined pressure and exhaust regulator comprising a spring-controlled pressure valve, a spring-controlled exhaust valve, a support common to both, a spring-compressing member common to both, and means for controlling the position of the spring-compressing member.

14. In a web-tension regulator including a fluid-pressure motor for applying tension to a friction strap for controlling the rotation of a web-roll, a combined pressure and exhaust regulator comprising a spring-controlled pressure valve, a spring-controlled exhaust valve, a support common to both, a spring-compressing member common to both, and manually actuated means for controlling the position of the spring-compressing member.

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