No. 701,118. Patented May 27, 1902.

# H. A. W. WOOD.

## WEB CONTROLLING MECHANISM.

(Application filed Mar. 4, 1898. Renewed Oct. 12, 1901.)

(No Model.) 3 Sheets—Sheet 1.

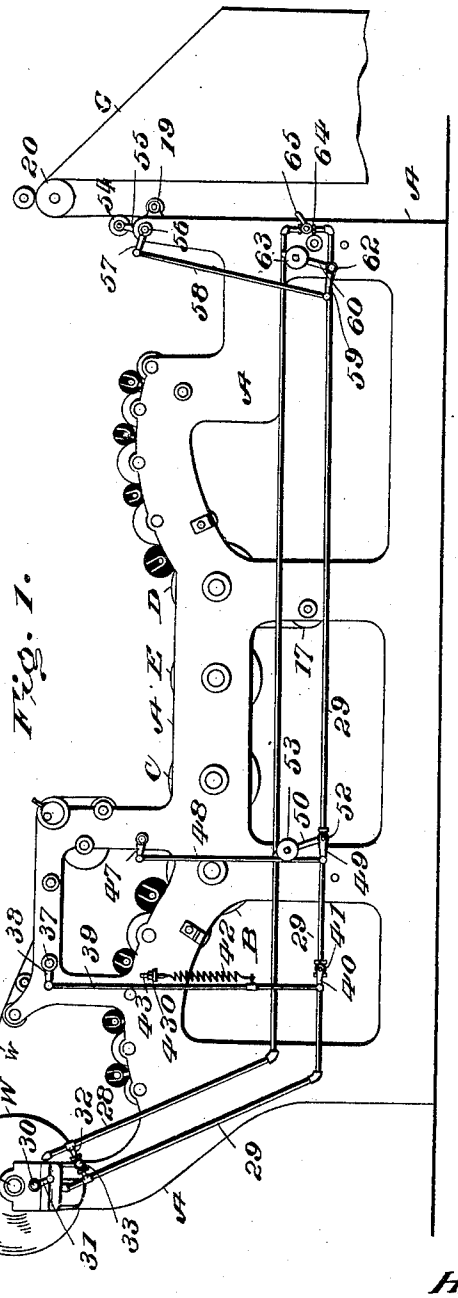


Fig. 1.



Fig. 1a.



Fig. 1a.

Witnesses.

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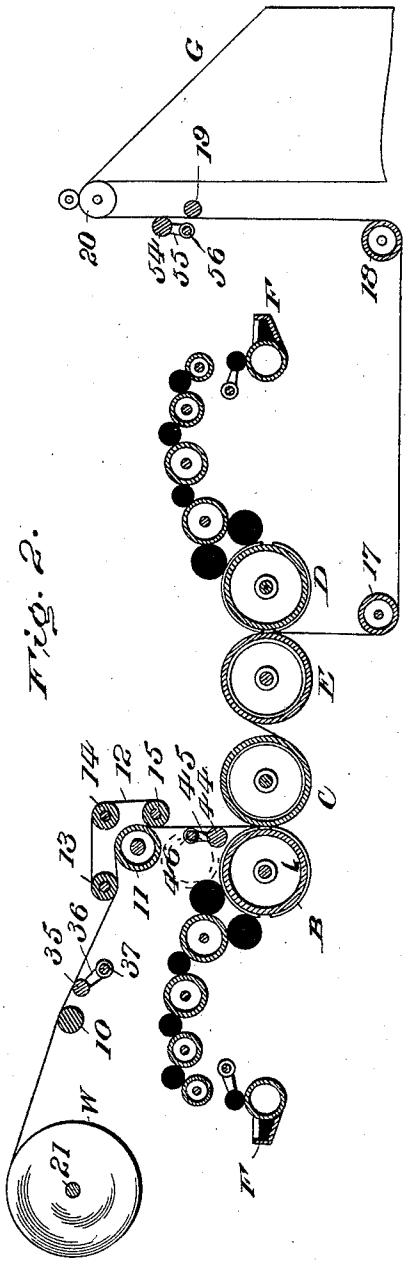
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## WEB CONTROLLING MECHANISM.

(Application filed Mar. 4, 1898. Renewed Oct. 12, 1901.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 2.




Witnesses.

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## WEB CONTROLLING MECHANISM.

(Application filed Mar. 4, 1898. Renewed Oct. 12, 1901.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

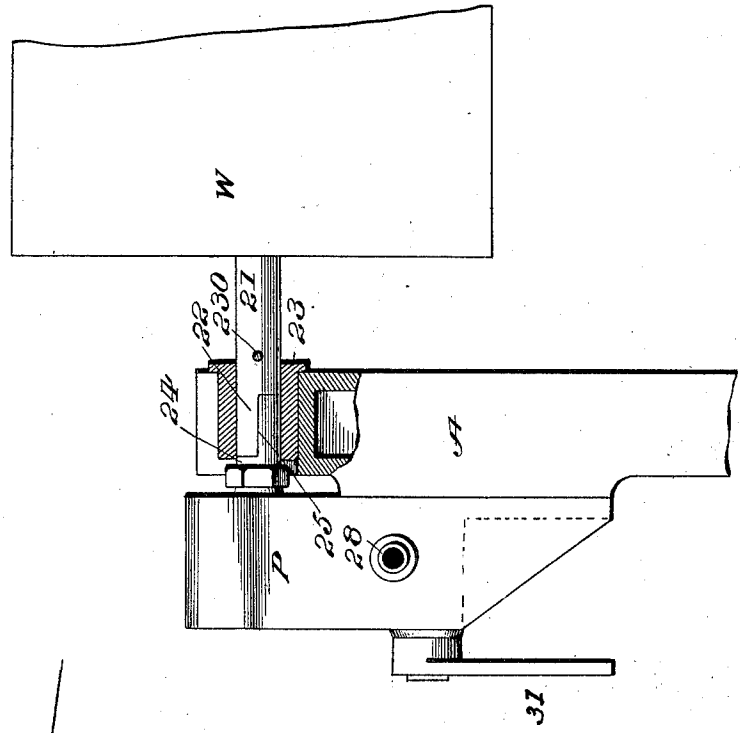
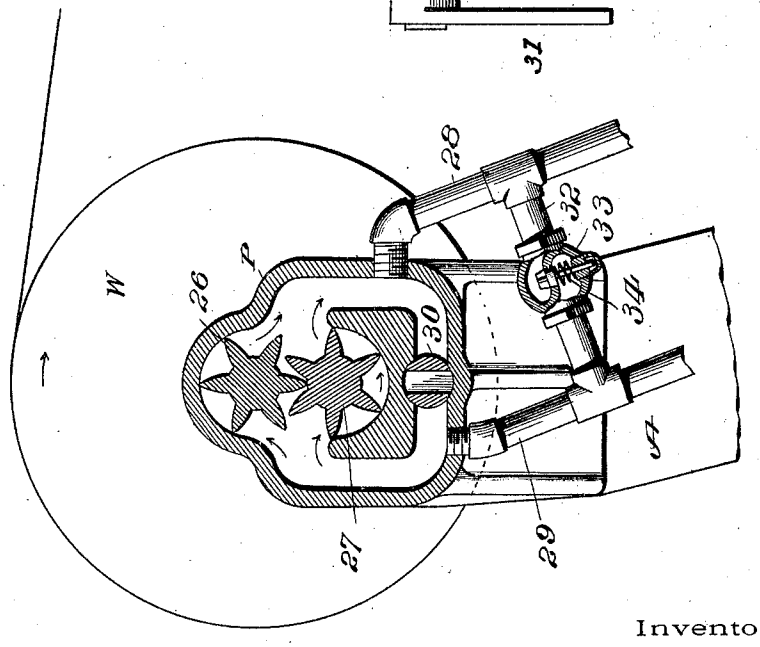



Fig. 4.




Witnesses.

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# UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR TO THE CAMPBELL PRINTING PRESS & MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## WEB-CONTROLLING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 701,118, dated May 27, 1902.

Application filed March 4, 1898. Renewed October 12, 1901. Serial No. 78,503. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Web-Controlling Mechanism, of which the following is a specification.

My invention relates to a new and improved web-controlling mechanism for a web-printing press or a web-printing press and delivering mechanism.

Web-printing presses to-day are driven at a high rate of speed. It is necessary in most web-printing presses to hold back on the web or web-roll, so as to put the web which is being manipulated under tension. The customary way to do this is to apply a brake to the shaft of the web-roll. This brake in the ordinary web-printing press is hand-operated. As the web is drawn from the web-roll the web-roll diminishes in size and the rotation thereof increases, as the speed of the printing-press is practically a constant. Hence if the same tension is to be kept upon the web it is necessary to gradually release or diminish the friction of the brake as the web-roll decreases in size. This has to be done by hand and requires generally the constant supervision and attendance of the operator.

One aim of my invention is to provide a simple automatic means for controlling the tension of the web. Further, as modern web-printing presses are driven so rapidly the inertia of the moving parts, which weigh many hundred pounds, is something enormous, and it is almost impossible to quickly stop a machine running at full speed. If the web in the press or delivery mechanism breaks, a "choke" is very apt to occur—that is, the incoming web is apt to wind up on one of the cylinders or one of the moving parts, and thus wedge the operating parts away from each other and burst or damage the machine. It has been attempted to remedy this evil by providing stop mechanism, which has been arranged to stop the press in case of the breakage of the web. This arrangement, however, has only partially remedied the evil referred to, for, as above stated, the inertia of the moving parts is so great that it is not practical to stop the machine at once.

A further improvement which I have devised consists in a device which will automatically stop the supply of web in case of breakage or derangement of the web, and although the press continues in operation no fresh web will be supplied thereto and practically all choke will be prevented.

The specific means which I have invented for accomplishing the purposes of regulating the supply of web and stopping the supply in case of accident consists of a pump actuated from the web-roll, said pump serving as a controller or brake for the web-roll and being arranged to pump an incompressible liquid, as oil or water. I arrange a valve in the eduction of the pump, which will be automatically adjusted by the tension of the incoming web. Thus if the tension on the web is not enough the valve will be slightly closed, and hence the pump will have to work against more resistance. If the tension is too much, the valve will be slightly opened, and hence the resistance which the pump will have to work against will be decreased. By this arrangement the tension of the incoming web will be automatically regulated. I preferably use in connection with the pump a circulating line of pipe.

Another feature of my improvement consists in arranging with the pump one or more stop-valves and in providing the same with connections, so that if the web in the press or delivering apparatus should break the stop-valve will be instantly closed, and hence the web-roll instantly stopped, cutting off the supply of web. It is practical to instantly stop the web-roll, as the same is only one part, while it is not practical to instantly stop an entire printing-machine.

There are other features of improvement of my invention which are hereinafter specifically described at length.

I will now describe one specific application of my invention to one form of press to enable those skilled in the art to which my invention appertains to make and use the same.

Referring to the accompanying three sheets

of drawings, Figure 1 is a side elevation of a rotary web-printing press with my improvements applied thereto. Figs. 1[a] and 1[b] are detail sectional views of two of the valves. Fig. 2 is a sectional elevation of the press. Fig. 3 is a partial end elevation, on an enlarged scale, showing how the web-roll may be coupled to the pump; and Fig. 4 is a sectional elevation through the pump.

In detail, A represents the framing of the machine; B, the first printing-cylinder; C, the first impression-cylinder; D, the second printing-cylinder, and E the second impression-cylinder. Coacting with each of the printing-cylinders is a suitable inking apparatus, as F. G represents a suitable folder or delivery mechanism.

W represents the web-roll from which the web *w* may be drawn. The web from the web-roll is led first over a suitable guide or roll 10, then around a drawing-cylinder 11, coacting with which is a set of tapes or a belt 12, which runs around pulleys 13, 14, and 15. The drum 11 is continuously rotated by any suitable gearing, as by an intermediate gear from cylinder B, (dotted lines, Fig. 2,) to positively draw the web from the web-roll and pass the same into the machine. The web then passes around the two impression-cylinders and then is led by means of suitable guides or rollers 17, 18, 19, and 20 to the folding or delivering apparatus.

21 designates a shaft which is inserted in the web-roll and to which the web-roll is secured in any of the ordinary ways. The end of the shaft 21 is slabbed or cut away, as at 22, and fitting on said shaft 21 is a coupling 23, which may be held in its outermost position by means of a pin 230, fitting in said shaft 21.

P designates a suitable pump, the specific pump that I have chosen to illustrate my invention being a rotary pump of any of the ordinary constructions, although, of course, any other form of pump or pumping device may be used.

24 designates the shaft of the pump. This shaft 24 is slabbed, as at 25, so that the slabbed end 22 of the shaft 21 will fit thereon. By this construction the web-roll can be placed in its bearings, the two shafts 21 and 24 placed together, and the coupling 23 slid over the slabbed portions thereof to couple the shaft of the web-roll positively to the pump. This affords a cheap mechanical construction, as the coupling 23 will thus form one journal for the web-roll.

In some instances I contemplate using a gear, as a multiplying-gear, between the shaft of the web-roll and the pump.

The pump P consists of a suitable casing, arranged in which are two gears 26 and 27. These gears are the ordinary gears which constitute a rotary pump and are so arranged that when the web-roll is turned in the direction indicated by the arrow in Fig. 4 the liquid will be forced from the left-hand side of the casing to the right-hand side. An eduction-pipe 28 is connected to the right-hand compartment and an induction 29 to the left-hand compartment. These two pipes are connected together and form a circulating system for the liquid. The pipe and circulating system are filled with a liquid, preferably oil. A valve 30, having a suitable handle 31, is arranged in the pump-casing. By opening this valve the two compartments of the pump may be connected so that the pump practically has to work against no resistance, so that the web can be easily drawn from the web-roll. This valve is opened when it is desired to draw the web from the web-roll to thread up the machine, but is kept closed in the normal operation. A shunt-pipe 32 may be arranged between the pipes 28 and 29, and a relief-valve 33, closing toward the pipe 28, may be arranged in this shunt 32. This relief-valve may have a suitable adjustable spring 34. The purpose of this valve is to prevent a hammer, if one of the stop-valves, hereinafter referred to, should be instantly closed, and to allow the web-roll perhaps to move, say, one or two inches, if the stop-valve is instantly closed. I do not always use this relief-valve, but contemplate using the same where desirable. A roller 35 is arranged to bear on the web between the roller 10 and the drawing-cylinder 11. This roller 35 is arranged in arms 36, which are secured to a shaft 37, journaled in the frames of the machine. On one end of the shaft 37 is arranged an arm 38, which connects by link 39 to the lever 40 of valve 41, arranged in the pipe 29. A spring 42 is secured to the link 39 and to a screw 43, which passes through a part projecting from the framing, and which has an adjusting-nut 430. By this means the tension of the spring 42 can be adjusted. This mechanism will act to keep a constant tension on the incoming web. For instance, if the tension on the web between the drawing-drum and the web-roll becomes slack the roller 35 will be pulled up by the spring and the link 39 also pulled up, and the valve 41 slightly closed. If the tension becomes too great, the roller 35 will be pushed down and the valve 41 slightly opened. By this means the pump will have to work against more or less resistance, and hence more or less resistance will be offered to the unwinding of the web from the roll. By this means the tension of the incoming web will be automatically kept at a constant, and this action will act to offset the increasing rotation of the web-roll due to its decreasing diameter. Another roller 44 is arranged to bear on the web between the drawing-cylinder 11 and the first impression-cylinder. This roller 44 is mounted in arms 45, secured to a shaft 46, journaled in the framing of the press. On the end of the shaft is secured a lever 47, which connects by a link 48 to one end of a bell-crank lever 49 50, which is secured to a valve 52. A weight 53 is arranged on the other arm of the bell-crank lever. The nor-

mal position of these parts is shown in Fig. 1. The weight 53 is just over the center to the left, and the roller 44 is thereby slightly pressed against the web. If the web should break between the drawing-cylinder and first impression-cylinder, the weight 53 would fall and instantly close the valve 52, thus instantly stopping the pump and, preferably, the web-roll. When this action takes place, the end of the web will either slip in the drawing-in device or the web will be broken between the drawing-in device and the web-roll. In either event the supply of fresh web will be instantly stopped. I may use as many of these stop-valves as desirable and arrange them at such points on the printing-machine or delivering apparatus as the web is liable to break.

I have shown another roller 54, arranged in the path of the web between the rollers 19 and 20, or just before the web passes to the delivering apparatus. This roller is arranged on arm 55, secured to a shaft 56, which carries a lever 57, which connects by link 58 to bell-crank lever 59 60, secured on valve 62, which has an adjustable weight 63, arranged substantially as above described.

I may omit the stop valve or valves in some instances and use my device simply as a tension-regulating device for the incoming web or as a device whereby the web-roll can be controlled at a point remote from the same by means of the hand-valve next described.

I may use my arrangement to afford a convenient means whereby the operator can control the friction or resistance of the web-roll at a point remote therefrom by simply arranging a valve 64, provided with a hand-lever 65, in the pipe-line at a point remote from the web-roll. The operator of the machine generally stands near the delivering apparatus, and by this arrangement he can adjust the operation of the web-roll from this point.

I may use any one or all of these devices in a single system, the application of my improvements of course being controlled by the special form of machine to which the same is applied.

My invention of course is not limited in application to a rotary web-printing press, as the same may be applied to any form of web-manipulating mechanism.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination in a web-printing press of a web-roll, with a pump actuated therefrom, serving as a controller or brake for the web-roll, said pump being arranged to pump an incompressible liquid.

2. The combination in a web-printing press of the web-roll, a pump actuated therefrom, and arranged to pump an incompressible liquid, and means for controlling the resistance against which the pump has to work to regulate or control the motion of the web-roll.

3. The combination in a web-printing press of the web-roll, a pump actuated therefrom, and arranged to pump an incompressible liquid, and means for controlling the eduction of the pump to regulate or control the motion of the web-roll.

4. The combination in a web-printing press of the web-roll, a pump actuated therefrom, and arranged to pump an incompressible liquid, a circulating-line connected therewith, and a valve arranged in said line.

5. The combination in a web-printing press of a pump secured thereto, and arranged to pump an incompressible liquid, the shaft of the web-roll and means for connecting the same to the pump.

6. The combination in a web-printing press of the shaft carrying the web-roll, said shaft being slabbed at its end, a pump, a shaft arranged to actuate the pump, this shaft being slabbed to fit the slabbed end of the web-roll shaft, and a coupling for sliding over the slabbed ends of the shafts to couple said shafts together.

7. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, and a valve arranged to connect the eduction with the induction of the pump so that the web-roll can be easily turned and the web drawn therefrom to thread the machine.

8. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, means for closing the eduction of the pump and a relief-valve arranged between the eduction and induction of the pump.

9. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, a regulating-valve controlling the resistance of the pump, and means for operating said regulating-valve from the tension of the web.

10. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, a spring-actuated regulating-valve for controlling the resistance against which the pump has to work, and connections for operating this valve from the tension of the web.

11. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, a valve controlling the resistance against which the pump has to work, a movable roll bearing on the web, and connections from the roll to the valve.

12. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, a drawing device for drawing the web

from the web-roll, and a valve controlling the resistance against which the pump has to work.

13. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, a stop-valve controlling the action of the pump, and connections whereby when the web breaks, the stop-valve will be closed.

14. The combination in a web-printing press of a web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, a stop-valve controlling the action of the pump, a roller bearing on the web, and connections between the roller and the stop-valve.

15. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, a stop-valve having a weight tending to normally close the same, a roll bearing on the web and holding said valve normally open, and connections from the roll to the valve whereby when the web breaks, the valve will automatically close and stop the pump.

16. The combination in a web-printing press of the web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, and a plurality of stop-valves with connections to stop the pump in case the web breaks.

17. The combination in a web-printing press of a web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving as a controller or brake for the web-roll, and a hand-valve arranged at a point remote from the web-roll controlling the resistance of the pump, whereby the motion of the web-roll may be controlled at a point remote from the same.

18. The combination in a web-printing press of a web-roll, a pump arranged to pump an incompressible liquid actuated therefrom and serving both as a controller and brake for the web-roll, a valve controlling the resistance against which the pump has to work, a movable roller bearing on the web, connections from the roller to the valve, a stop-valve arranged in the eduction of the pump, another roller bearing on the web, and connections whereby this roll connects to the stop-valve, whereby the first-named roller will act to properly tension the web-roll, and the second-named roller will act to stop the web-roll if the web breaks.

19. The combination of a web-roll, a rotary pump actuated therefrom to serve as a brake for the web-roll, said pump being arranged to pump an incompressible liquid through a circulating system, and a valve in said system for varying the resistance against which said rotary pump has to work.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

H. A. WISE WOOD.

Witnesses:
HENRY W. COZZENS, Jr.,
LOUIS W. SOUTHGATE.