No. 692,570. Patented Feb. 4, 1902.

M. J. WHITLOCK.

CALENDERING MACHINE.

(Application filed May 27, 1901.)

(No Model.)

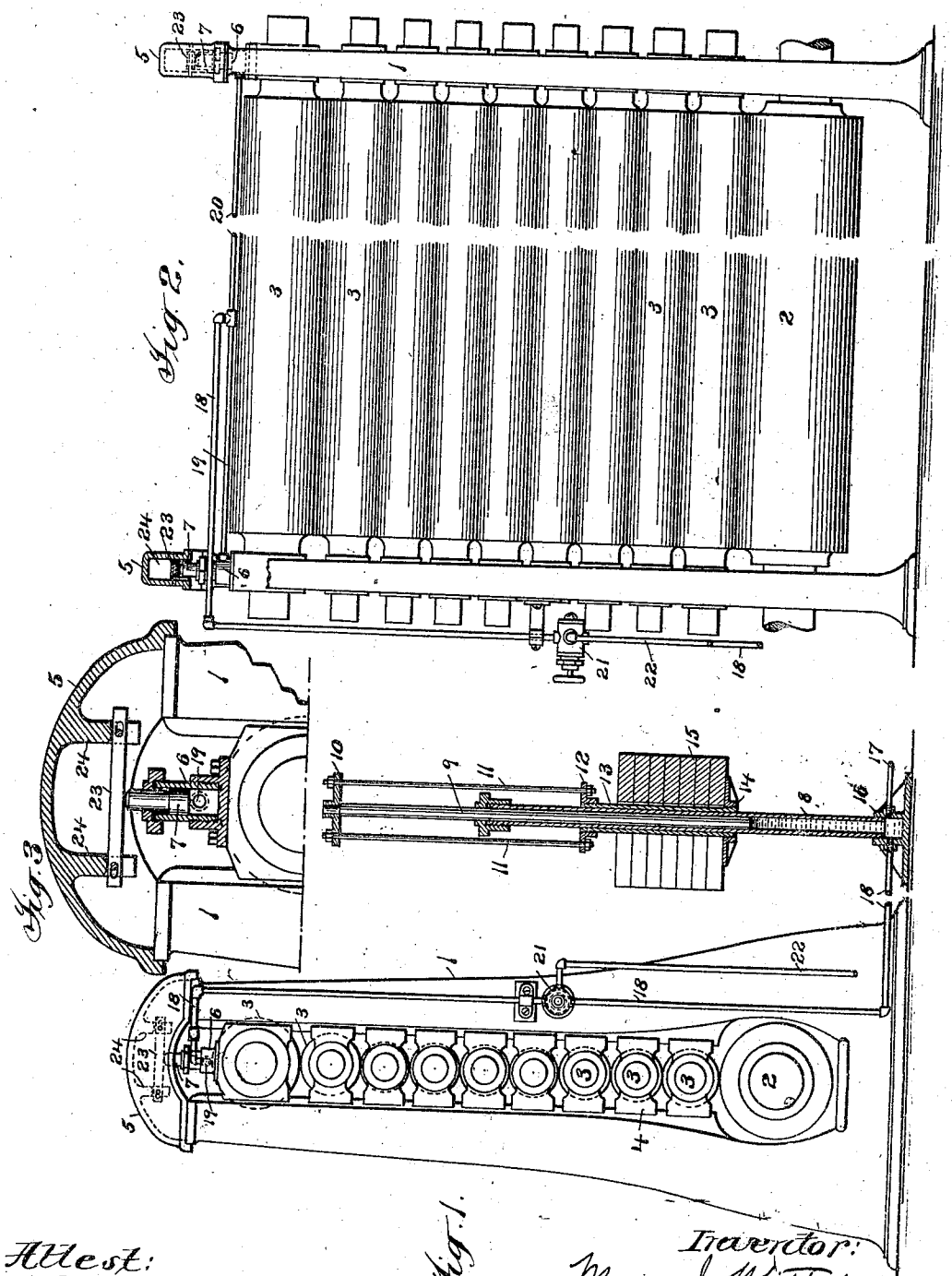


Fig. 2.

Fig. 3.

Fig. 1.

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UNITED STATES PATENT OFFICE.

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CALENDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 692,570, dated February 4, 1902.

Application filed May 27, 1901. Serial No. 61,996. (No model.)

To all whom it may concern:

Be it known that I, MYRON J. WHITLOCK, a citizen of the United States, residing at Ansonia, county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Calendering-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in calendering-machines.

As is well known, the web of paper as it comes from the paper-making machine is led through calender-rolls which subject the web to a pressing operation, which is a final one in the manufacture of paper, the finish of the paper varying with the amount of pressure which is put on the web by the calender-rolls. In order, therefore, to enable a calendering-machine to produce different kinds of finish without changing the rolls, it is necessary to provide the machine with means by which the pressure of the rolls upon the web as it passes through the calender can be increased or diminished. In calendering-machines now ordinarily used the desired pressure on the rolls is produced by mounting the rolls of the calender, except the lower one, in sliding bearings in the calender-frame and by employing a system of compound levers, the lower one of which is weighted to produce the pressure on the roll-bearings, the pressure varying with the amount of weight employed and with its position on the lever upon which it operates. This system of compound levers is complicated and expensive and is in the way of the machine tender as he moves about the machine. Furthermore, if any foreign matter is contained in the paper web or the web is of unusual thickness at any point the rolls are forced apart suddenly, thus placing a violent and sudden strain on the system of levers, which frequently results in breakage. It also happens that the web of material passing through the rolls varies in thickness, the variation being due either to foreign matter in the web or to a bunching of the stock of which the web is composed. The calender-rolls should therefore be so mounted as to permit them to separate when an unusual thickness of material is to be forced between them, or otherwise breakage is liable to occur, and it is also desirable that the construction be such that the separation and readjustment of the rolls take place without disarranging the means for producing pressure on the rolls.

The object of the invention is to produce an improved machine in which a heavy and constant pressure can be maintained on the calender-rolls by devices which will permit the rolls to separate when any foreign matter or a web of unusual thickness passes between them, thus avoiding breakage.

With this and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings, forming a part of this specification, in which like characters of reference indicate the same parts, Figure 1 is a side view of a calendering-machine, an accumulator being shown in connection therewith. Fig. 2 is a front view of the calender shown in Fig. 1. Fig. 3 is a sectional detail view.

Referring to the drawings, which illustrate one embodiment of the invention, 1 indicates the side frames of a calendering-machine. The lower calendering-roll 2 is mounted in fixed bearings in said frame and the upper rolls 3 are mounted in bearings 4, which are arranged to slide in the frame, this construction being a usual one. The construction by which pressure is maintained on the rolls in order to force them together includes a fluid-containing chamber and piston, said chamber being constructed to contain an incompressible fluid—such, for instance, as water or oil. The construction by which the fluid-containing cylinder is utilized may be varied within wide limits. Preferably, however, each of the side frames 1 will be provided with an abutment, these abutments in the present machine being formed by cap-pieces 5, which are mounted on the top of the side frames and may be secured thereto in any usual or desired manner. In the construction shown two fluid-containing chambers 6 are used, and these chambers are interposed between the cap-pieces or abutments 5 and the roll-bearings. Each of the cylinders 6 is pro-

vided with a piston 7, the pressure on which is transmitted to the roll-bearings.

The chambers 6 are arranged to contain an incompressible fluid, such as water or oil, and the means by which this liquid is introduced into the chambers should be of such a character as to enable a fixed pressure of any desired amount to be maintained in the chambers and at the same time these means should be such that the degree of pressure may be readily varied when desired. In the preferred construction the means by which the liquid is introduced in the chambers 6 will include a chamber 8, having a piston 9 working therein. This piston 9 has a collar 10 connected to it, said collar being in turn connected by means of rods 11 with a second collar 12, to which is secured a sleeve 13, mounted to slide on the outside of the chamber 8. This sleeve 13 is secured to a collar 14 or other similar device, said collar serving to support a series of weights 15, the whole forming an accumulator of well-known type.

The chamber 8 is supported in any suitable manner, as by a base 16, and is supplied with fluid through a pipe 17, which leads to any suitable source of supply—as, for instance, a pump. The chamber 8 is in open communication with the chambers 6 through pipes, which may be arranged in any suitable manner. As shown, a pipe 18 leads from the lower part of said chamber or from the base in which said chamber is mounted to the top of the calender-frame. At the top of the frame this pipe divides into two branches 19 and 20, which branches tap the cylinders 6. A suitable valve 21, which is preferably a three-way valve, is or may be located at any suitable point in the pipe, and to the casing of this valve there is preferably connected a waste-pipe 22. By means of this valve 21 the communication between the chamber 8 and the chambers 6 may be interrupted without allowing the liquid to escape from the chambers, or the communication may be interrupted and the liquid permitted to escape from the chambers 6 through the waste-pipe.

Means are preferably provided to permit the separation of the rolls when any foreign matter or a web of unusual thickness passes between them. These means may vary widely in construction. Preferably, however, and as shown, the abutments or cap-pieces are provided with strong springs 23. These springs may be supported on the abutments in any suitable manner. Preferably, however, the abutments are provided with projections or arms 24 to which the springs are connected. It will of course be understood that these springs are sufficiently stiff, so as not to yield under the pressure imparted to the roll-bearings by the pistons. They will, however, yield under the strain produced when any foreign matter or an unusual thickness of web passes between the rolls.

The construction being as before described it will be seen that the weights acting on the piston 9 will maintain a constant pressure on the pistons 7 through the chambers and the pipes connecting them, and it will be further seen that the degree of pressure may be readily and quickly regulated. Furthermore, the attendant has a ready means of determining the exact amount of pressure necessary to produce any given finish and can easily secure this pressure by varying the number of weights. It is also apparent that should any foreign matter or a web of unusual thickness pass between the rolls the springs 23 will permit the rolls to separate and immediately resume their normal position without in any way disturbing the pipes for applying the pressure to them. It will also be seen that small chambers may be employed and that these chambers may be located in the frame and between the cap-pieces and the roll-bearings, where they are out of the way and do not disfigure the machine.

While the yielding means for permitting the separation of the rolls will preferably be used in connection with the liquid-containing chambers, they may be employed in connection with other devices for obtaining pressure on the rolls.

The devices for separating the rolls may be of any approved type and are not herein shown, since they have no connection with the invention. It may be here remarked, however, that the construction which has been described for forcing the rolls together permits the roll-separating means to be operated without in any way disturbing the adjustment of the pressure devices. When the roll-separating means are operated, the steady and slow movement of the pistons in the chambers 6 will force the water or other incompressible fluid from the chambers 6 back into the accumulator, thus raising its weighted piston.

While the machines which have been hereinbefore described are particularly applicable to calendering-machines, it is to be understood that they may be used in whole or in part in other relations. It will also be understood that changes and variations may be made in the construction shown and described without departing from the invention. The invention is not, therefore, to be limited to the precise construction which has been described.

What is claimed is—

1. The combination with a frame, of sliding bearings mounted therein, rolls supported by the bearings, an abutment carried by the frame, a liquid-containing chamber, a piston in said chamber, said chamber and piston being interposed between the roll-bearings and the abutment, means for forcing liquid into said chamber, and yielding means for transmitting the pressure on the piston to the roll-bearings, substantially as described.

2. The combination with a frame, of sliding bearings mounted therein, rolls supported by the bearings, an abutment carried by the

frame, a liquid-containing chamber, a piston in said chamber, said chamber and piston being interposed between the roll-bearings and the abutment, means for forcing liquid into said chamber, and a suitably-mounted spring coöperating with the piston to transmit the pressure on the piston to the roll-bearings, substantially as described.

3. The combination with a frame, of sliding bearings mounted therein, rolls supported by the bearings, abutments on each side of the frame, a pair of liquid-containing chambers, pistons mounted therein, said chambers and pistons being interposed between the roll-bearings and the abutments, springs mounted on the abutments and against which the piston-heads bear, and means for forcing liquid into said chambers, substantially as described.

4. The combination with a frame, of sliding bearings mounted therein, rolls supported by the bearings, abutments mounted on the frame, a pair of liquid-containing chambers, pistons mounted in said chambers, said chambers and pistons being interposed between the abutments and the roll-bearings, a chamber in open communication with said pair of chambers, a piston in said chamber, means for applying varying degrees of pressure to said piston, whereby varying degrees of pressure can be applied to the pistons in the pair of chambers, and yielding means for transmitting said pressure to the roll-bearings, substantially as described.

5. The combination with a frame, of sliding bearings mounted therein, rolls supported by the bearings, abutments mounted on the frame, a pair of liquid-containing chambers, pistons mounted in said chambers, said chambers and pistons being interposed between the abutments and the roll-bearings, a chamber in open communication with said pair of chambers, a piston in said chambers, means for applying varying degrees of pressure to said piston, whereby varying degrees of pressure can be applied to the pistons in the pair of chambers, and a spring for transmitting said pressure to the roll-bearings, substantially as described.

6. The combination with a frame, of sliding bearings mounted therein, rolls supported by said bearings, abutments mounted on the frame, springs carried by the abutments, a pair of liquid-containing chambers, pistons mounted in said chambers, said chambers and pistons being interposed between the roll-bearings and the springs, a liquid-containing chamber in open communication with said pair of chambers, a piston in said chamber, means whereby said piston may be caused to support a series of weights whereby varying degrees of pressure may be applied to said piston, and a spring for transmitting said pressure to the roll-bearings, substantially as described.

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

MYRON J. WHITLOCK.

Witnesses:
WALTER PERRY,
LAWRENCE K. BLACKMAN.