

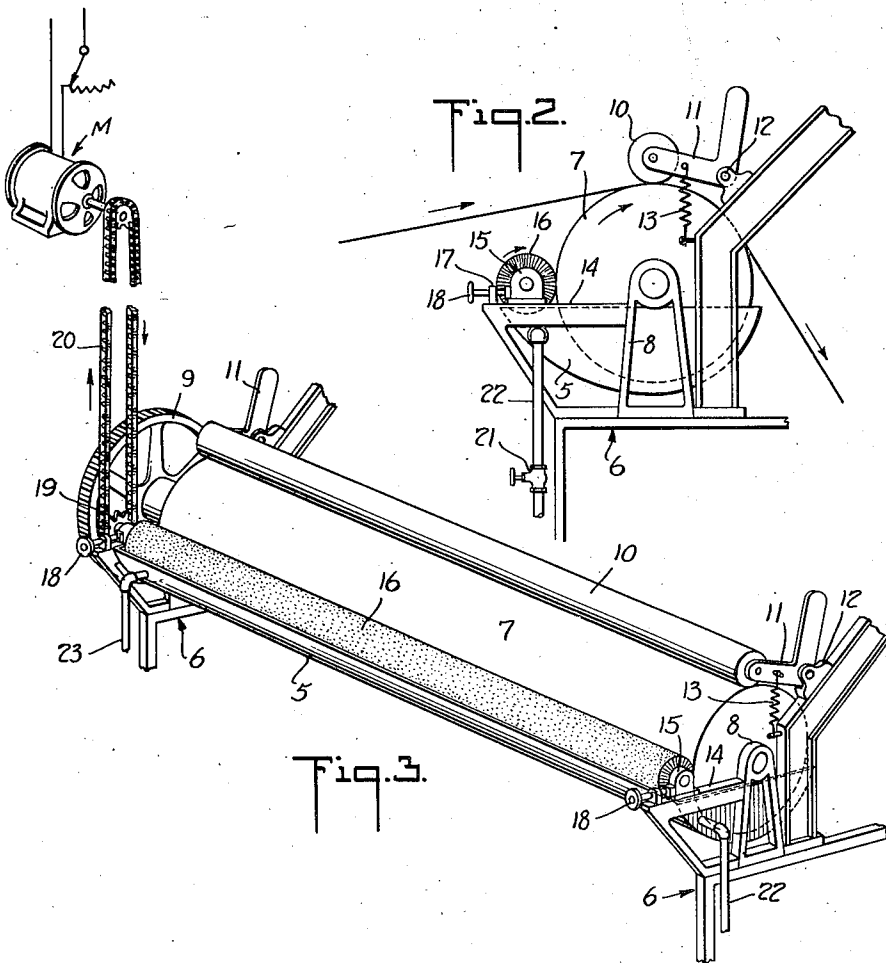
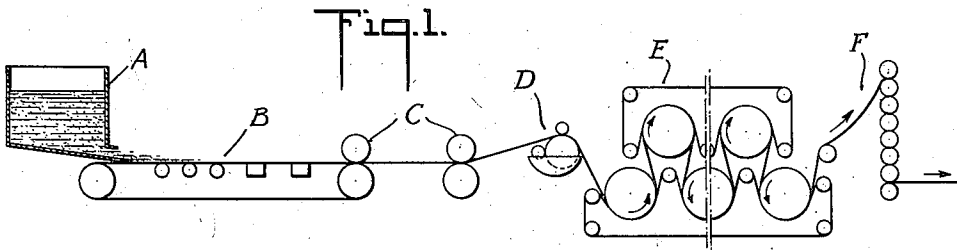
Dec. 9, 1941.

L. H. REED ET AL

2,265,856

APPLICATOR

Filed Aug. 3, 1940



INVENTORS
LEWIS H. REED
and MAURICE D. REUBEN
BY *James D. Beck*
ATTORNEY

UNITED STATES PATENT OFFICE

2,265,856

APPLICATOR

Lewis H. Reed, Marinette, Wis., and Maurice D. Reuben, York, Pa., assignors, by mesne assignments, to International Paper Company, New York, N. Y., a corporation of New York

Application August 3, 1940, Serial No. 350,819

6 Claims. (Cl. 91—51)

This invention relates to new and useful improvements in presses of the type normally employed in papermaking machines and particularly seeks to provide a novel solution press capable of applying to a revolving roll a thin, uniform film of liquid for subsequent transfer to a web of wet paper.

Presses of the type used in papermaking machines are normally divided into two classifications, the first of which includes a driven bottom roll and a top press roll resiliently urged into contact with the bottom roll. This type of press is used to compact the fibers of a paper web passing between the nip of the rolls and for expressing some portion of the residual free water from the web. The second class of presses normally includes a solution tray, a driven bottom or dip roll partially immersed in the solution carried by the tray, and a top press roll. The latter type of press is also used to compact the fibers of the paper web passing between the nip of the rolls, but is additionally used to apply a treating or impregnating solution to the web. This invention relates to novel improvements in the latter of the above mentioned types of presses.

An object of this invention is to provide a novel solution press for use in conjunction with a papermaking machine and which is capable of applying a film of treating liquid under absolute thickness control to a web of paper.

Another object of this invention is to provide a device of the character stated which includes means for accurately regulating the thickness of the liquid film carried by the dip roll.

Another object of this invention is to provide a device of the character stated which includes a brush roll located adjacent one side of the dip roll and with its axis parallel to the axis of the dip roll, means for rotating the brush roll at selectively variable speeds, and means for varying the position of the brush roll relative to the dip roll whereby the brush roll will function as a doctor to regulate the thickness of the liquid film carried by the dip roll.

Another object of this invention is to provide a device of the character stated which is capable of applying to a dip roll and subsequently to a web of wet paper a uniform film of treating liquid of the order of .0001 to .003 inch in thickness.

Another object of this invention is to provide a device of the character stated which is simple in design, rugged in construction and economical to manufacture.

With these and other objects in view, the nature of which will become more apparent, the in-

vention will be more fully understood by reference to the drawing, the accompanying detailed description, and the appended claims.

In the drawing:

Fig. 1 is a diagrammatic elevation of a papermaking machine with which a press constructed in accordance with this invention may be associated;

Fig. 2 is an end elevation of the press; and

Fig. 3 is a perspective view thereof.

Referring to the drawing in detail, the invention as illustrated is embodied in a solution press including a tray 5 mounted between spaced supporting frames 6, 6. A dip roll or pony drier 7 is journaled on standards 8 extending upwardly from the frames 6. The dip roll is disposed with its axis parallel to the longitudinal axis of the tray 5 and has its lower portion projecting downwardly into the tray. The dip roll 7 may be driven from any convenient source of power (not shown) through the medium of gear connections indicated at 9.

A top press roll 10 is journaled on brackets 11 which are pivotally connected to the respective supporting frames as at 12. The roll 10 may be urged into pressure contact with the dip roll 7 by springs 13 extending between the brackets 11 and the frame.

Each frame 6 is provided with a horizontal shelf portion 14 which slidably supports a bearing block 15. A brush roll 16 is journaled in the bearing blocks 15 and is normally disposed in close proximity to the dip roll 7. The exact spacing between the brush roll and the dip roll may be accurately regulated through the medium of adjusting means which include an upstanding lug 17 secured to each shelf portion 14 and through which is threadably engaged an adjusting screw 18 having its inner end rotatably affixed to the associated bearing block 15.

The brush roll 16 may be rotated independently of the dip roll 7 through the medium of driving connections which include a sprocket gear 19 secured to one end of the brush roll and a sprocket chain 20 connected with any suitable variable speed drive mechanisms generally indicated at M.

Control of treating solution to the tray 5 is effected through the medium of valve 21 and supply pipe 22. Obviously the valve 21 may be opened to a degree sufficient to fill the tray to the desired level. Any tendency towards overflow of the liquid in the tray may be taken care of through the provision of an overflow pipe 23, preferably located at the opposite end of said

tray. Thus the liquid within the tray may be readily maintained at a constant level.

One specific installation of a solution press which is constructed in accordance with this invention is diagrammatically indicated in Fig. 1. In this figure the head chest A is adapted to feed a pulp slurry onto a wire B to thereby form a web. Water is adapted to be expressed from the web at first and second press stages indicated at C, after which the web is led to a third press stage D where it is impregnated with a solution applied through the medium of the press constructed in accordance with this invention. After the web is treated with the solution it is passed over the usual dryer rolls E and through the calender stack F in the well known manner to thereby form the finished web. It is, of course, obvious that the solution press which is constructed in accordance with this invention may be alternatively located at any one of a number of positions such as at the second press stage C or in place of the usual size press located intermediate the dryer stages, or even after the dryer stages, depending, of course, upon the type of treatment to which the web is subjected.

In use, a web of paper is fed between the nip of the rolls 7 and 10 and is then carried over the next associated dryer roll in the well known manner. When it is desired to impregnate the web with a treating solution the tray 5 is filled to the desired level, thereby permitting the dip roll 7 to pick up a film of the solution on its surface for transfer to the web. As it is a definite objective to accurately regulate the amount of treating solution to be applied to the web, the thickness of the film on the dip roll must be maintained at a constant value. This is effected through the brush roll 16 which is rotated in the same direction as the dip roll 7 and serves to doctor the film carried by the roll 7 to the desired thickness. It has been found that if an 8" outside diameter brush roll is rotated at speeds less than 650 R. P. M. and is disposed in close proximity to or even touching the roll 7, a film of liquid equivalent to a uniform layer of .0001 to .003 inch in thickness can be accurately maintained on the dip roll for actual transfer to the web.

When the brush roll 16 is being rotated each bristle thereof acts as a minute hammer against the liquid film carried by the dip roll, and by varying the speed of rotation and the impact of the individual bristle hammers, the thickness of the fluid film carried by the dip roll can be varied at will.

It has been found that when a brush roll of the diameter described is rotated at speeds below 650 R. P. M. it acts strictly as a doctor to accurately regulate the film thickness on the dip roll, and above 650 R. P. M. the centrifugal force is sufficient to throw a spray upwardly to thereby destroy the film thickness regulating characteristics. It should be noted that the above mentioned operative speeds of the brush roll are intended to be merely indicative rather than absolute. The above mentioned operative speeds of rotation of the brush roll have been found to be substantially correct for treating liquids having a surface tension and viscosity approximating that of water. It is of course obvious that when treating liquids are employed which have a different specific gravity, surface tension or viscosity, the operative speeds of rotation of the brush roll will be varied accordingly.

It has been found that a brush roll in which

the bristles are formed from crimped metal wire bound together on a metal rod spirally wound on the brush shaft is entirely satisfactory, although brushes having bristles formed from other materials could be employed equally as well. It should be noted that by changing the spacing, number and size of the bristles the effective operative range of the brush when used as a doctor can be changed.

It is of course to be understood that certain details of arrangement and proportions of parts may be variously modified without exceeding the scope of the appended claims.

We claim:

1. In a solution press for paper machines wherein is provided a solution carrying tray, a driven dip roll partially immersed in the solution in said tray and adapted to receive a film of liquid therefrom, and a top press roll urged towards pressure contact with said dip roll; a brush roll including a plurality of bristles and rotatably mounted in close proximity to said dip roll, and means to rotate said brush roll whereby the individual bristles thereof will smooth the liquid film carried by said dip roll to a uniform thickness.

2. In a solution press for paper machines wherein is provided a solution carrying tray, a driven dip roll partially immersed in the solution in said tray and adapted to receive a film of liquid therefrom, and a top press roll urged towards pressure contact with said dip roll; a brush roll including a plurality of bristles and rotatably mounted in close proximity to said dip roll, and means to rotate said brush roll in the same direction as said dip roll whereby the individual bristles thereof will hammer against the liquid carried by said dip roll and reduce said liquid to a film of uniform thickness.

3. In a solution press for paper machines wherein is provided a solution carrying tray, a driven dip roll partially immersed in the solution in said tray and adapted to receive a film of liquid therefrom, and a top press roll urged towards pressure contact with said dip roll; a brush roll including a plurality of bristles and rotatably mounted in close proximity to said dip roll, means to rotate said brush roll in the same direction as said dip roll whereby the individual bristles thereof will hammer against the liquid carried by said dip roll and reduce said liquid to a film of uniform thickness, and means to vary the distance between said brush roll and said dip roll whereby the thickness of the film on said dip roll may be regulated.

4. In a solution press for paper machines wherein is provided a solution carrying tray, a driven dip roll partially immersed in the solution in said tray and adapted to receive a film of liquid therefrom, and a top press roll urged towards pressure contact with said dip roll; a brush roll including a plurality of bristles and rotatably mounted in close proximity to said dip roll, means to rotate said brush roll in the same direction as said dip roll whereby the individual bristles thereof will hammer against the liquid carried by said dip roll and reduce said liquid to a film of uniform thickness, and means to vary the speed of rotation of said brush roll whereby the thickness of said liquid film will be regulated.

5. In a solution press, a supporting frame, an applicator roll journaled on said frame and over which a web of sheet material is adapted to pass, means for applying a film of liquid to said applicator roll for transfer to said web, means for ro-

tating said applicator roll, means for urging said web towards pressure contact with said applicator roll, a brush roll including a plurality of bristles and rotatably mounted in close proximity to said applicator roll, and means to rotate said brush roll in the same direction as said applicator roll whereby the individual bristles thereof will hammer against the liquid carried by said applicator roll and reduce said liquid to a film of uniform thickness.

6. In a solution press, a supporting frame, an applicator roll journaled on said frame and over which a web of sheet material is adapted to pass, means for applying a film of liquid to said applicator roll for transfer to said web, means for 15

rotating said applicator roll, means for urging said web towards pressure contact with said applicator roll, a brush roll including a plurality of bristles and rotatably mounted in close proximity to said applicator roll, means to rotate said brush roll in the same direction as said applicator roll whereby the individual bristles thereof will hammer against the liquid carried by said applicator roll and reduce said liquid to a film of uniform thickness, and means to vary the speed of rotation of said brush roll whereby the thickness of said liquid film will be regulated.

LEWIS H. REED.
MAURICE D. REUBEN.