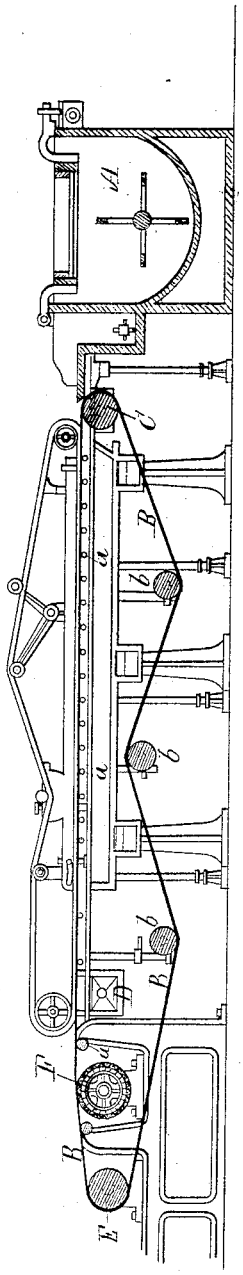
(No Model.)

F. CURTIS.

FOURDRINIER PAPER MACHINE.

No. 260,172. Patented June 27, 1882.



Witnesses.
F. G. Dingman.
H. C. Lodge.

Inventor.
Francis Curtis.
F. Curtis. Atty.

UNITED STATES PATENT OFFICE.

FRANCIS CURTIS, OF HYDE PARK, MASSACHUSETTS.

FOURDRINIER PAPER-MACHINE.

SPECIFICATION forming part of Letters Patent No. 260,172, dated June 27, 1882.

Application filed April 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS CURTIS, a citizen of the United States, residing at Hyde Park, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Fourdrinier Paper-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to letters or figures of reference marked thereon, which form a part of this specification.

The primary object of my invention is to provide a machine for the manufacture of a thick, soft web, which in the ordinary Fourdrinier machine would be subjected to such pressure as to be injured for the purposes I intend it, a secondary object of my invention being to simplify the construction of the machine and lessen to a marked degree the wear upon the endless wire shake-apron.

Heretofore in Fourdrinier machines the web of pulp, after leaving the wire shake-apron, is led over a vacuum or suction box, thence over a guide-roll, thence deflected downward to and led between a pair of felt-covered rolls, termed the "coucher-rolls," and from these rolls the web passes to the endless blanket-apron, called in technical parlance the "first felt," and so on to the end of the machine.

In the preliminary manufacture of the thick soft material before alluded to, I have found that the pressure upon the web between the coucher-rolls is too great for my purpose—in fact, defeats the object I have in view—and I have also found that the suction or vacuum box usually employed is not of sufficient capacity to extract the water from so thick a material as I propose producing. I have therefore, and in this the essential feature of my invention consists, discarded the coucher-rolls, employing simply an idle guide-roll or a suction-box in place of the lower one, and in place of the guide-roll heretofore employed in front of the coucher-rolls I employ a suction or vacuum box, which by preference is a rotary one, to avoid wear upon the shake-apron. By dispensing with the coucher-rolls I effect a considerable item of economy in avoiding covering them with the felt jacket now employed, and I simplify the construction of the machine. Moreover I avoid the injury to the wire resulting from the crushing action of the coucher-rolls.

The drawing accompanying this specification represents a sectional elevation of a portion of a Fourdrinier paper-making machine embodying my improvements.

In such drawing, A represents the stuff-vat; B, the endless woven-wire "shake-apron;" C, the "breast-roll," so called—that is, the roll nearest the vat A, about which the apron B passes; *a a a b b b*, &c., the various guide-rolls, about which the said apron travels; and D, the suction or vacuum box of a Fourdrinier machine.

In carrying my invention into practice I omit the upper coucher-roll altogether, and in place of the lower coucher-roll I employ a simple guide-roll, E, while in place of the guide-roll now employed in front of the coucher-roll I employ a suction-box, (shown at F.) This suction-box F may be the ordinary stationary flat box; but to lessen the wear upon the shake-apron B, I prefer that this box shall be a rotary one, as shown.

Heretofore the woven-wire shake-apron has been impelled mainly by the coucher-rolls. As I dispense with the coucher-rolls, other means must be employed to drive the apron, and I utilize the breast-roll C for this purpose by adding mechanism to rotate this roll.

By dispensing with the two coucher-rolls and the employment in place of them of a simple guide-roll, I avoid the heavy pressure upon the web of pulp universally exerted by the coucher-rolls in Fourdrinier machines, and I am enabled by this means to produce a light, thick, and elastic web.

To avoid as far as possible tendency to consolidation and hardening of the web, I employ in lieu of the ordinary cylinder driers, which have unbroken smooth peripheries and dry the web by continuous contact therewith, skeleton driers, which present interrupted or irregular surfaces to the web to allow of passage of air and lessen extent of bearing-surface between the two. Moreover, by dispensing with the

coucher-rolls I avoid the cost of the felt jackets and the loss of time in shutting down the machine to apply them—no small items in the expense of running a Fourdrinier machine.

If the suction-boxes D and F do not afford sufficient draft to remove the water from the web of pulp, a third one may be substituted for the guide-roll E. In fact, in the manufacture of web for certain purposes I shall undoubtedly employ a suction-box (preferably rotary) in place of the said roll E.

I claim—

1. In a Fourdrinier paper-machine, the combination of the woven-wire apron, the guide-roll E, and the suction-box F with the stuff-vat A.

2. In a Fourdrinier paper-machine, the combination of the woven-wire apron, the guide-roll E, the stuff-vat A, a suction box or boxes properly located to drain the web formed upon the apron, and the breast-roll C, adapted to drive the said apron.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS CURTIS.

Witnesses:

H. E. LODGE,

F. CURTIS.