

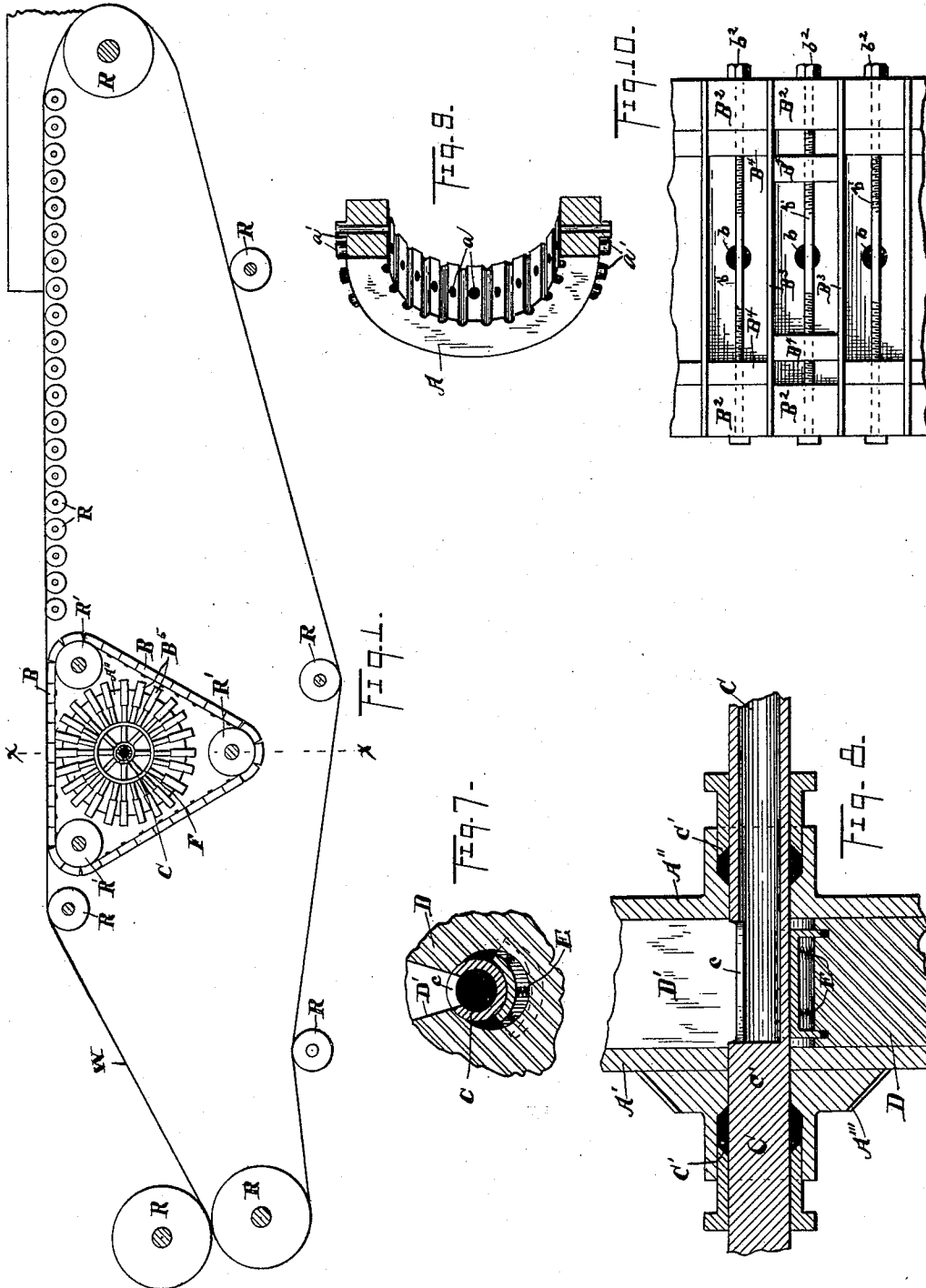
(No Model.)

3 Sheets—Sheet 1.

E. SANDERSON & F. C. BASE.
SUCTION APPARATUS FOR PAPER MILLS.

No. 478,290.

Patented July 5, 1892.



WITNESSES.
Bills S. Loring.
R. B. Buchwalter.

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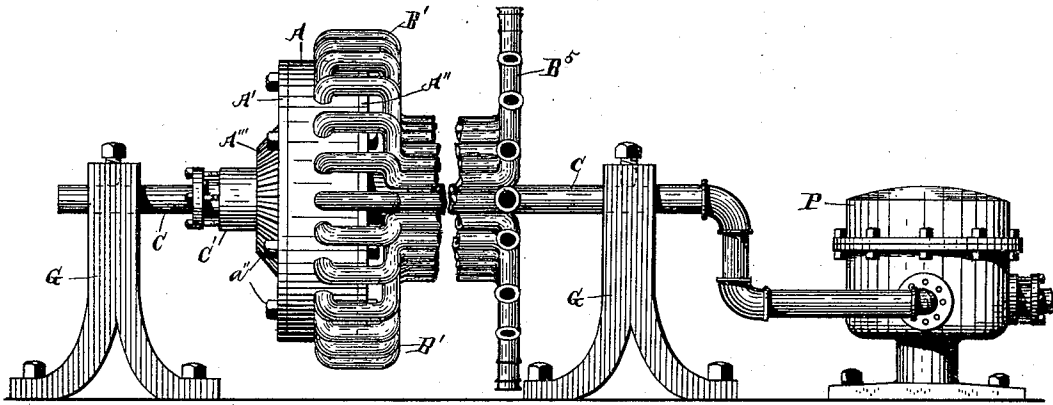


Fig. 3.

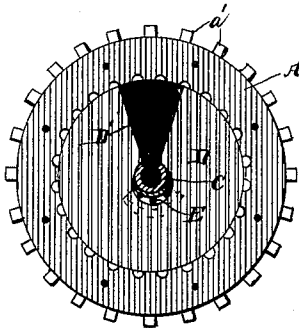


Fig. 4.

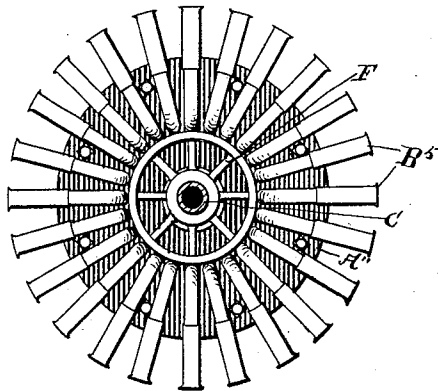
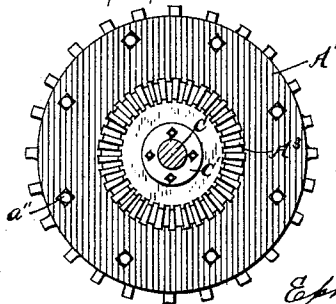


Fig. 5.



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UNITED STATES PATENT OFFICE.

EPHRAIM SANDERSON AND FRANK C. BASE, OF CLEVELAND, OHIO.

SUCTION APPARATUS FOR PAPER-MILLS.

SPECIFICATION forming part of Letters Patent No. 478,290, dated July 5, 1892.

Application filed December 19, 1891. Serial No. 415,579. (No model.)

To all whom it may concern:

Be it known that we, EPHRAIM SANDERSON and FRANK C. BASE, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Suction Apparatus for Paper-Mills, of which the following, with the accompanying drawings, is a specification.

Our invention relates to apparatus for removing water from pulp and from the fiber of paper as it is carried by the wire over the rolls in a paper-mill.

The object of our invention is a mechanism, which is simple in construction and effective in operation, to remove water from pulp and paper while the same is being carried over "the wire;" and it consists in the construction and combination of parts, as shown in the drawings, described herein, and defined in the claims.

In the drawings, Figure 1 is a side elevation in general outline, illustrating the application of our invention. Fig. 2 is an enlarged vertical section of our device on the line xx of Fig. 1. Fig. 3 is an enlarged elevation of our suction device and the pump. Fig. 4 is a front end view of the suction device with the face-plate removed. Fig. 5 is an opposite end view of the suction device, showing the pipes that make connection with the endless series of suction-boxes. Fig. 6 is an outside end view of the suction device and illustrates the outside face-plate with gear attachment. Fig. 7 is an enlarged broken vertical sectional view illustrating the means employed to insure a tight closing of the radial holes through the rotating shell. Fig. 8 is an enlarged longitudinal section illustrating the arrangement of the suction-regulator and suction-pipe with reference to each other. Fig. 9 is an interior view in cross-section of the ring of the rotating shell; and Fig. 10 is an enlarged detail view of the suction-boxes, the length of the boxes being contracted with reference to their width.

In the drawings, Fig. 1 shows in outline, in elevation; the wire W and the rolls R , over which the wire travels. The endless series of boxes B travel over rolls R' . The suction-regulator stands outside of a vertical line with the endless series of boxes, and the suction-

regulator pipes extend in between the laps of the endless series of boxes to make connection therewith. The relative location of the invention to the wire and rolls of a paper-mill is illustrated by Figs. 1 and 2.

The suction-boxes B are preferably constructed of rubber and consist of open-top boxes the width of the wire W and rolls R and have an opening b in the bottom at their center. The end pieces B'' consist of endless pieces of rubber grooved part way through their depth, into which grooves fit the partitions B''' . This construction allows the boxes to pass easily over the rolls R' by opening a little as the boxes round the rollers, and still they close tightly together when on a straight line as they are immediately under the wire W .

Inside the end pieces B'' are adjustable heads B'''' , capable of movement longitudinally in the boxes. A rod b' extends through the boxes, passing through the end pieces B'' and the movable heads B'''' . Said rods b' have a head b'' upon the outside of the box or have other means provided for turning the same. Within the end pieces B'' the rods b' are smooth; but inside said end pieces the rods are threaded nearly to the middle of the rods, one end having a right-hand thread and the opposite end a left-hand thread. The movable heads B'''' are also threaded interiorly, so that when the rods b' are turned the heads B'''' may be thrown to or from the middle of the boxes, and thus adapt them to use when running paper of different widths through the mill. The rolls R' , over which the endless series of suction-boxes travel, are such as are in common use in paper-mills, and need no description.

Our suction-regulator consists of a shell formed of a ring A (through which are radial openings a and nipples a' on the periphery of said ring for making pipe connections therewith) and face-plates A' and A'' . Said face-plates are secured to the ring A by means of bolts a'' , as illustrated. A suction-pipe C , which also serves as an axle for the suction-regulator shell, passes through the center of said shell, and the shell rotates thereon. To make the shell air-tight around said suction-pipe C , we employ suitable stuffing-boxes C' . To the face-plate A' we attach a gear A''' to provide a means of driving the suction-regu-

lator shell. Within said shell is a stationary cylindrical block D.

Below the suction-pipe C, between it and the cylindrical block D, we interpose springs 5 E or rubbers to force the said block D tightly against the inner face of the ring A of the shell to insure a tight closing of the radial openings *a*. In the top of said block D an opening D' is made, preferably wide enough 10 to leave open not more than three of the radial openings *a*. An opening *c* is made in the top of the suction-pipe C to communicate with the opening D'. Said suction-pipe is open through its length from said opening *c* to the 15 suction-pump P, and it is closed outside said opening *c* to the opposite direction, as seen at *c'*.

To the nipples *a'* are attached pipes B', which bend over the edge of the shell toward the shaft C, run along the shaft C to a point 20 under the middle of the suction-boxes B, and then turn outwardly, so as to make connection with the holes *b* in said suction-boxes. The radial part B⁵ of the said pipes is preferably made of rubber, so that they will be 25 yielding and that three of them may be in connection at all times with the suction-boxes B. Instead of using rubber pipes for this purpose, metal pipes with spring-operated sliding sleeves may be used. These pipes B⁵ 30 must be so arranged as to register with the openings *b* in the bottoms of the boxes B. To keep said pipes B' and their radial projections B⁵ in proper position, we use a spider F of any suitable construction.

G G are brackets to support the suction-pipe C and the suction-regulator, and H H 35 are brackets to support the rolls R R.

The wire W, the endless series of boxes, and the suction-regulator are each driven by 40 separate power connections.

The operation of our apparatus will be readily understood from the drawings and the description already given. The wire W carries the paper or pulp over the boxes B, and said 45 boxes travel with said wire. In the travel of the boxes B the radial pipes B⁵ make connection with the opening *b* in the suction-boxes, and the pump P creates a vacuum in the opening D' of the suction-regulator, which 50 draws the water from the paper or pulp over the boxes B as they come into connection, and the water is carried out through the suction-pipe C. As the shell of the suction-regulator turns the different pipes B⁵ are brought 55 to register with the boxes B, and the cylindrical block D keeps closed all the radial openings *a*, except those that are in connection with said boxes B.

The machine will work for different widths 60 of paper by adjusting the movable heads B''' of the boxes B, as hereinbefore described.

Our invention may take on various modifications in details of construction, and we do not therefore limit ourselves to the exact form 65 and arrangement of parts, as shown and described.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a machine of the character described, a suction-regulator consisting of a rotating 70 circular shell having radial openings through it for tube connections, and a stationary circular block within said shell and having a vertical opening in its upper side and adapted to close all the radial openings in the circular 75 shell except those opposite said vertical opening, substantially as shown and described.

2. In a machine of the character described, the combination of a suction-regulator consisting of a rotating circular shell having 80 radial openings through it for tube connections and a circular stationary block within said shell and having a vertical opening in its upper side, said stationary block being adapted to close all the radial openings of the 85 shell except those opposite the vertical opening in the block, with a suction-pipe opening into the vertical opening in said stationary block, substantially as shown and described.

3. The combination, in a machine of the 90 character described, of a suction-regulator consisting of a rotating circular shell having radial openings through it for tube connections and a circular stationary block within said shell, said block having a vertical open- 95 ing in its upper side and being adapted to close all the radial openings of the shell except those opposite said vertical opening, a suction-pipe opening into the said vertical opening in said block, and an expansible de- 100 vice interposed between the under side of said suction-pipe and said stationary block, substantially as shown and described.

4. The combination, in a machine of the character described, of a suction-regulator 105 with an endless series of suction-boxes, substantially as shown and described.

5. The combination, in a machine of the character described, of an endless series of traveling suction-boxes, a rotating shell hav- 110 ing radial openings, means for making connection successively between the radial openings of the rotating shell and the traveling suction-boxes of the endless series, a suction-pipe to enter the rotating shell, and a block 115 within the shell, said block being adapted to close connection between the suction-pipe and all the radial openings of the rotating shell except such as are in connection with the endless series of traveling suction-boxes, sub- 120 stantially as shown and described.

6. The combination, in a machine of the character described, of a suction-regulator, an endless series of suction-boxes, yielding pipes attached to the suction-regulator and adapted 125 to make and break connection with the suction-boxes, a wire, a suction-pump, and pipe connection between said suction regulator and pump, substantially as shown and de- 130 scribed.

7. The combination, in a machine of the character described, of an endless series of

suction-boxes having an opening in the bottoms, a suction-regulator consisting of a rotating circular shell having radial openings through it for tube connections, and a circular
5 stationary block within said shell and having a vertical opening in its upper side, said stationary block being adapted to close all the radial openings of the shell except those opposite the vertical opening in the block, a suction-pipe opening into the vertical opening in
10 the stationary block, and tubes attached over the openings in the rotating shell and adapted

to make and break connection with the endless series of boxes, substantially as shown and described.

In testimony whereof we affix our signatures, in presence of two witnesses, this 17th day of December, 1891.

EPHRAIM SANDERSON.
FRANK C. BASE.

Witnesses:

E. E. ARCHER,
J. A. OSBORNE.