W. H. MILLSPAUGH.

SUCTION SLICE.

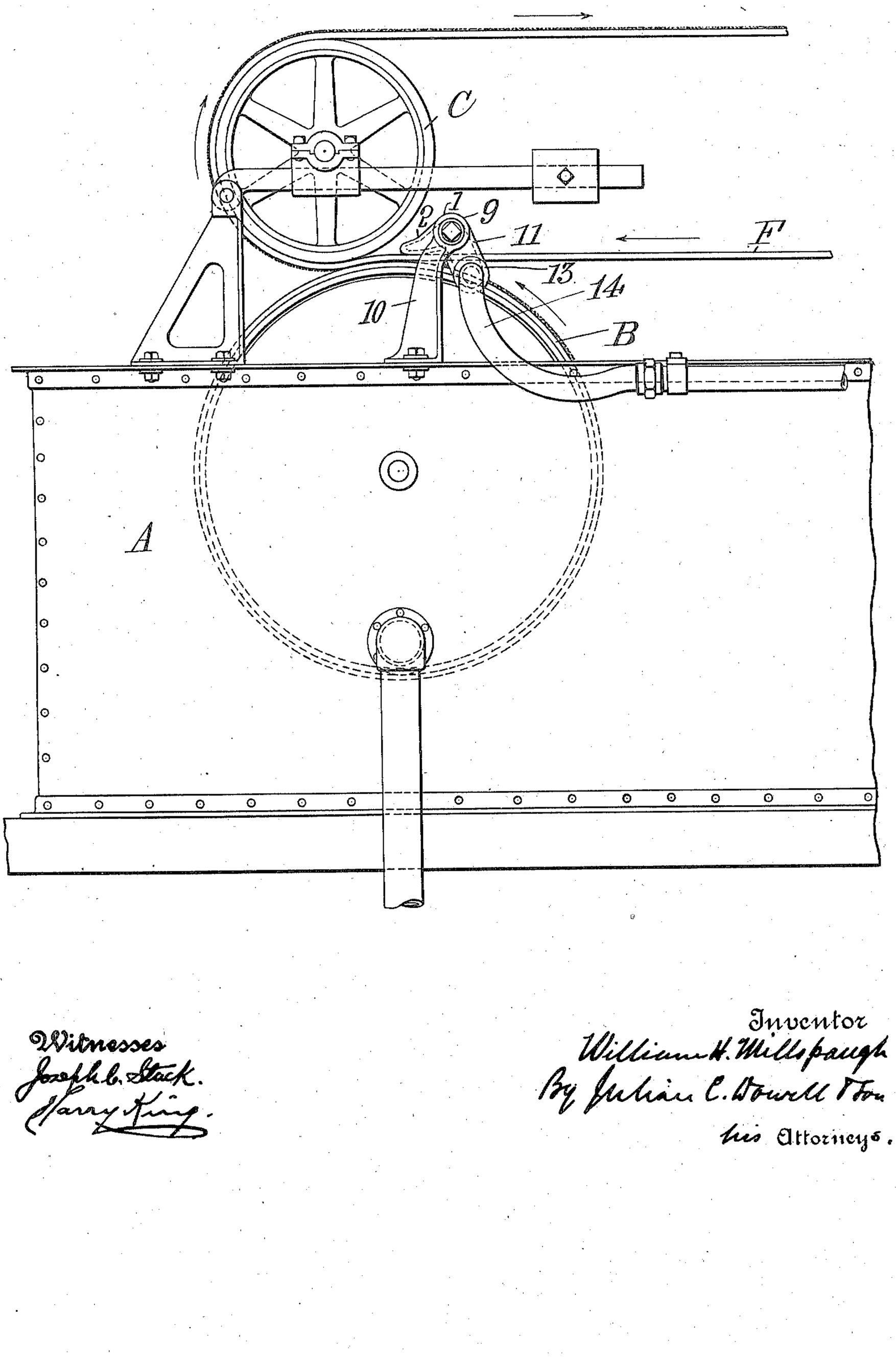
APPLICATION FILED JUNE 10, 1909.

957,981.

Patented May 17, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Joseph B. Stack.
Harry King.

Inventor
William H. Millspaugh
By Julian C. Dowell & Son
his Attorneys.

W. H. MILLSPAUGH.

SUCTION SLICE.

APPLICATION FILED JUNE 10, 1909.

957,981.

Patented May 17, 1910.

2 SHEETS—SHEET 2.

Fig. 2.

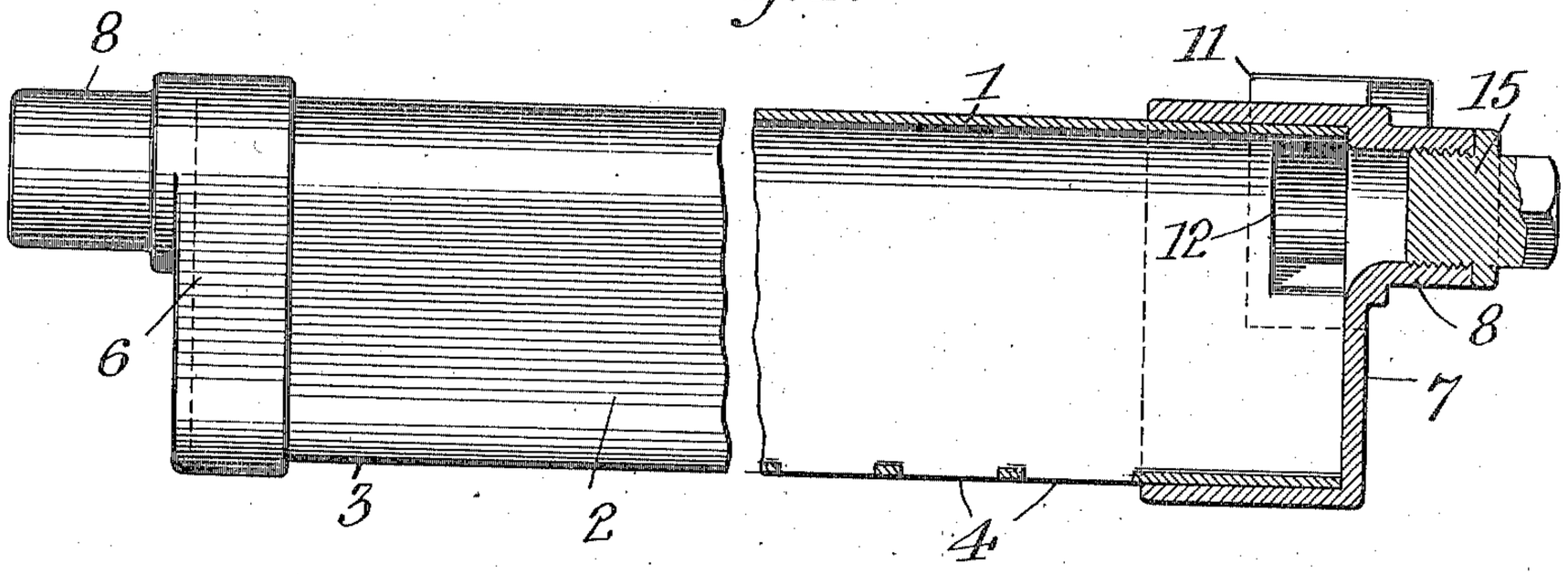


Fig. 3.

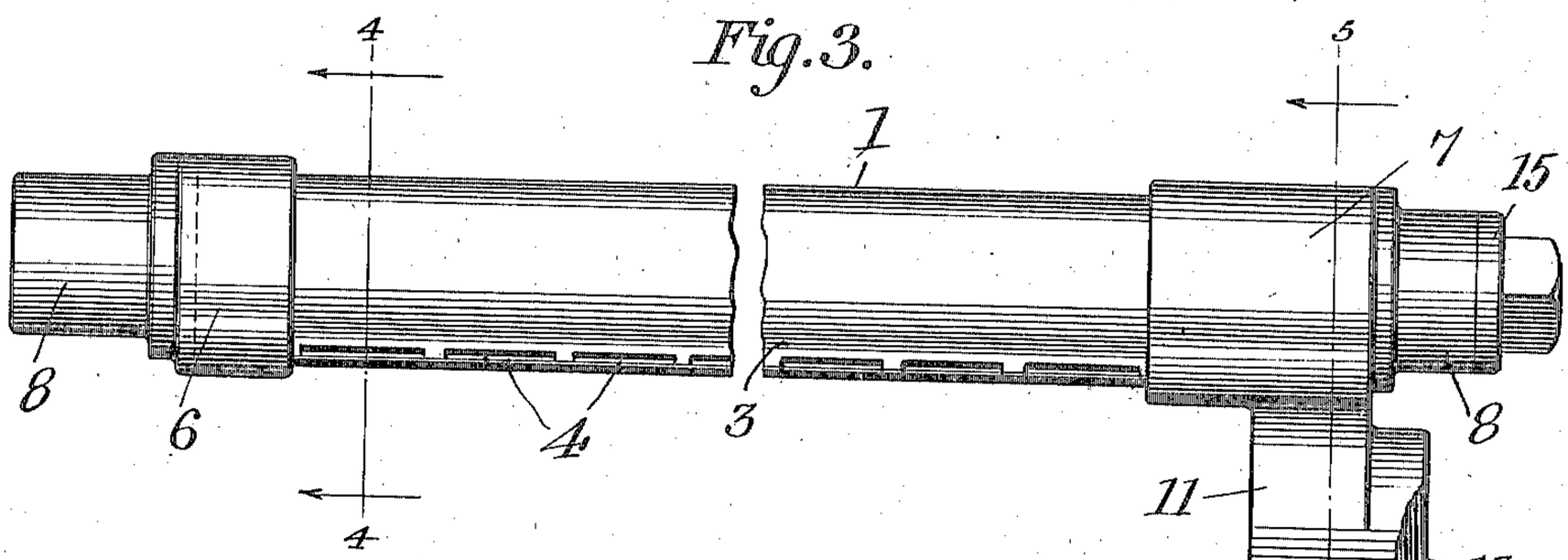


Fig. 4.

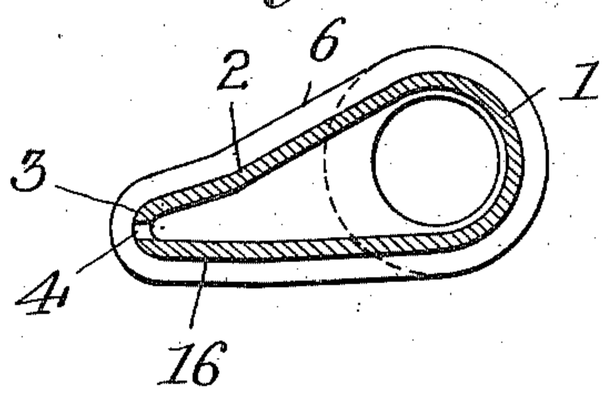


Fig. 5.

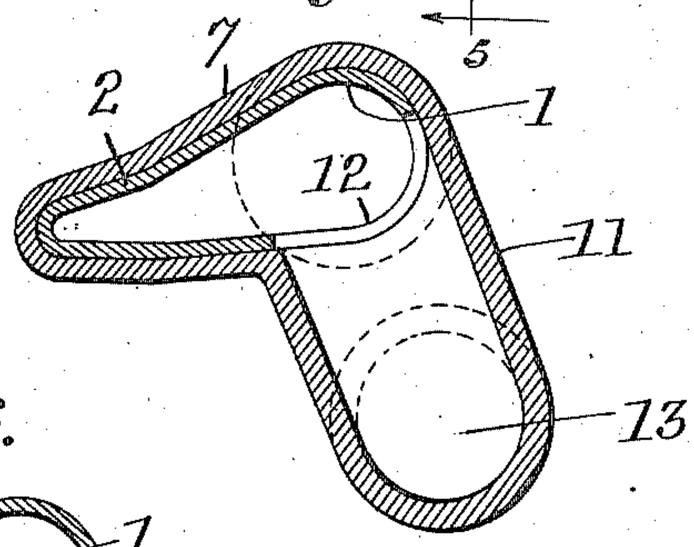
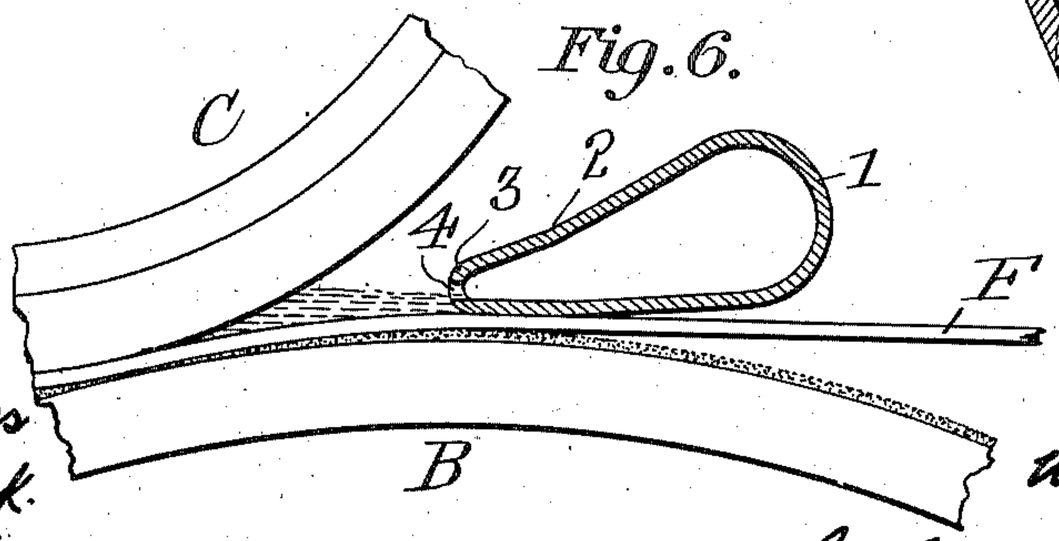


Fig. 6.



Witnesses
Joseph B. Stack.
Harry King.

Inventor
William H. Millspaugh
By Julian C. Dowell Son
his Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM H. MILLSPAUGH, OF SANDUSKY, OHIO.

SUCTION-SLICE.

957,981. Specification of Letters Patent. Patented May 17, 1910.

Application filed June 10, 1909. Serial No. 501,326.

To all whom it may concern:

Be it known that I, WILLIAM H. MILLSPAUGH, a citizen of the United States, residing at Sandusky, in the county of Erie and State of Ohio, have invented certain new and useful Improvements in Suction-Slices; 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.

This invention, which I term a "suction-slice," is a device for rapidly and continuously removing by vacuum the water which is expressed by co-acting rolls from a web of pulp or other wet stock fed between said rolls; as in the case of a cylinder paper-making machine where an endless felt passes around a weighted couch-roll bearing upon the cylinder-mold or forming-cylinder which revolves in the pulp-tank or vat and takes up a film or coating of pulp which is transferred to the surface of the felt by pressure of the couch-roll; the latter acting to squeeze the water out of the sheet of pulp that is formed on the cylinder-mold and by this action to make the sheet of pulp adhere firmly to the felt; or, in the case of a cylinder machine having more than one cylinder, to make each successive layer of pulp attach itself to the preceding one. This process of squeezing forces the water through the sheet of paper-pulp and through the felt. At present a common piece of board or metal, called a "slice," is mounted upon the felt and forms a dam to prevent the water from running back on the felt and to cause the water to leave or flow off from the sides of the felt at the ends of the slice. In making many kinds of paper, the water piles up for a considerable depth from half an inch to an inch and a half or more, and in such cases it is quite apt to work its way back under the slice or between the felt and the paper carried by the felt, in which case injury to the paper results. In the language of the machine tender, the sheet shows "worms, railroads" and "flowers." The purpose of the suction-slice is to instantly remove this water avoiding the difficulty above mentioned and assisting to a certain extent in the drying of the felt and paper at this point.

My invention will be hereinafter first fully described with reference to the accompanying drawings which form a part of this specification and then more particularly pointed out in the appended claims.

In said drawings: Figure 1 is a side elevation of the wet end of a cylinder paper-making machine showing an application of my invention thereto. Fig. 2 is a half plan and half horizontal section of the suction-slice, an intermediate portion thereof being broken away. Fig. 3 is a back view of the same. Fig. 4 is a cross-section on line 4—4 of Fig. 3. Fig. 5 is a cross-section on line 5—5 of Fig. 3. Fig. 6 is an enlarged sectional elevation of so much of the cylinder paper-making machine as will show the relation of the suction-slice to the felt, forming cylinder and couch-roll.

In Fig. 1, A is the pulp-tank or vat; B is the cylinder-mold or forming-cylinder; C is the couch-roll, and F is the endless felt which passes between the forming-cylinder and couch-roll and returns over the latter. The forming cylinder B takes up a film or coating of pulp which is transferred to the felt, and in passing between the cylinder and the couch-roll the water is expressed therefrom into the angular recess between the felt and the couch-roll whereby the sheet of pulp is caused to attach itself firmly to the felt.

The suction-slice which is placed across the felt behind the couch-roll, is shown more clearly in Figs. 2 to 6. It comprises a pipe or tube 1 approximately wedge-shaped or sector-shaped in cross section, or of such other suitable cross sectional shape as to provide a lateral contracted portion 2 with a narrow edge 3 which is or may be either continuously slotted longitudinally or else provided with a plurality of elongated ports or slots 4 as shown, or it may be perforated with a row of closely adjacent smaller orifices. The pipe thus provides an elongated exhaust chamber having a longitudinal contracted mouth with a narrow longitudinal passage or passages for admission of air, and with an enlarged body-portion; so that by exhausting air from said chamber, strong air-currents are created through the ports 4. The pipe is closed at its ends, and its interior chamber is in communication by suitable pipe-connections with a suction-pump or other appropriate exhaust apparatus; and the ends of the pipe are provided with trunnions or journals mounted in suitable bearings therefor at opposite sides of the felt, said trunnions or journals being so dis-

posed that the contracted portion 2 of the pipe will extend forwardly or toward the couch-roll and rest of its own weight upon the felt, so that the slotted or perforated edge 3 is presented to the angular recess between the felt and couch-roll for rapidly and continuously sucking up the water as it is expressed by the co-acting roll and cylinder from the sheet of pulp forming on the felt, as more clearly appears from Fig. 6. As shown, the ends of the pipe are provided with and closed by flanged heads or caps 6 and 7 of a shape corresponding to the pipe and in which the ends of the pipe are fitted and preferably brazed or otherwise secured and made substantially air-tight and said caps or heads are provided with the trunnions or journals 8, the axis of which trunnions is through the enlarged back portion of the pipe, so that when mounted the forwardly offset contracted portion 2 of the pipe will bear upon the felt as aforesaid.

In Fig. 1, 9 indicates the bearings for the trunnions or journals of the suction-slice, which bearings are shown supported by arms or standards 10 mounted on the sides of the vat A. One of the heads or caps, as the cap 7, is formed with a hollow crank-like arm 11 in communication with the interior of the pipe through the opening 12 shown in Fig. 2; and said arm 11 has a lateral opening at 13 which is preferably interiorly screw-threaded for coupling with the end of a suction-pipe 14 shown in Fig. 1, which suction-pipe leads to the exhaust-pump. One of the caps, preferably the same cap 7, is also provided with a cleaner-hole in the end of its trunnion closed by a removable screw-cap 15, the latter being shown formed externally with a nut for engagement by a wrench.

Preferably the bottom side of the pipe 1 is beveled as indicated at 16 just behind the perforated front edge 3, and the pipe is so mounted in its journal-bearings that only the narrow flat surface 16 rests upon the felt, instead of the whole bottom side of the pipe, thus reducing friction on the felt.

While I have shown and described my improvement in connection with a cylinder paper-making machine, and for removing the water from the angular space between the felt and couch-roll, it should be stated that the device is not so restricted in its useful applications, but may also be used for removing water between coacting rolls at other places in paper-making machines, either of the cylinder type or the Fourdrinier type; nor do I intend to limit the invention to use with paper-making machines only as it may be used generally for removing water expressed by coacting rolls from a sheet of wet stock fed between the rolls either with or without a traveling felt or apron; and in some such cases the suction-slice would rest upon the lower roll or cylinder and under the web or apron instead of upon the felt as shown.

I am aware that the proposition of removing water from between the felt and couch-roll of a cylinder-machine, by means of an external vacuum appliance is not broadly novel, and hence I do not claim such means broadly; but so far as I am aware the means heretofore suggested for such purpose have not been satisfactory and practicable, as my present improvement is believed to be. The suction-slice may also be used for removing water from a wet felt or apron in cases where the felt passes between press-rolls or squeeze-rolls without a film of stock thereon.

What I claim as my invention and desire to secure by Letters Patent is:

1. A suction-slice consisting of a tube adapted for communication with an exhaust apparatus, said tube having an enlarged body portion and a contracted lateral portion the top and bottom sides of which come together in a narrow edge, the latter being provided with a longitudinal opening or openings of narrow width, whereby exhaustion of air from said tube will create strong air currents through said opening or openings, for the purpose described.

2. A suction-slice comprising a pipe adapted for communication with an exhaust apparatus and having a longitudinal opening or openings for sucking water thereinto, said pipe being provided with eccentric pivot means whereby its perforated side will swing downward on pivots, for the purpose described.

3. A suction-slice comprising a pipe adapted for communication with an exhaust apparatus, said pipe having pivot means and formed with a lateral contracted portion offset from said pivot means and provided with a longitudinal opening or openings, for the purpose described.

4. A suction-slice comprising a pipe adapted for communication with an exhaust apparatus and having caps or heads closing the ends thereof and provided with trunnions or journals eccentric to the pipe, the side of the pipe opposite said trunnions or journals being provided with a longitudinal opening or openings for sucking the water into the pipe, for the purpose described.

5. A suction-slice comprising a pipe having a longitudinal inlet opening or openings and having caps or heads closing the ends thereof and provided with trunnions or journals, one of said caps or heads having a hollow arm in communication with the pipe and adapted for connection with a pipe leading to an exhaust apparatus, for the purpose described.

6. A suction-slice comprising a pipe having eccentric trunnions or journals and provided at its side opposite said journals

with an inlet opening or openings, the pipe being adapted for communication with an exhaust-apparatus, and a cleaner hole in the end of a trunnion or journal with a removable cap therefor.

7. In combination with traveling surfaces meeting at an angle and between which a sheet of wet material is fed and the liquid expressed therefrom into the angular recess between said surfaces, of a suction-slice consisting of a transversely arranged tube mounted on eccentric pivots whereby a side of the tube rests upon one of said surfaces, the said side being provided with a longitudinal inlet opening or openings, and the tube being in communication with an exhaust apparatus, substantially as and for the purpose described.

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

WILLIAM H. MILLSPAUGH.

Witnesses:

CHAS. MOORE,

C. L. MIELKE.