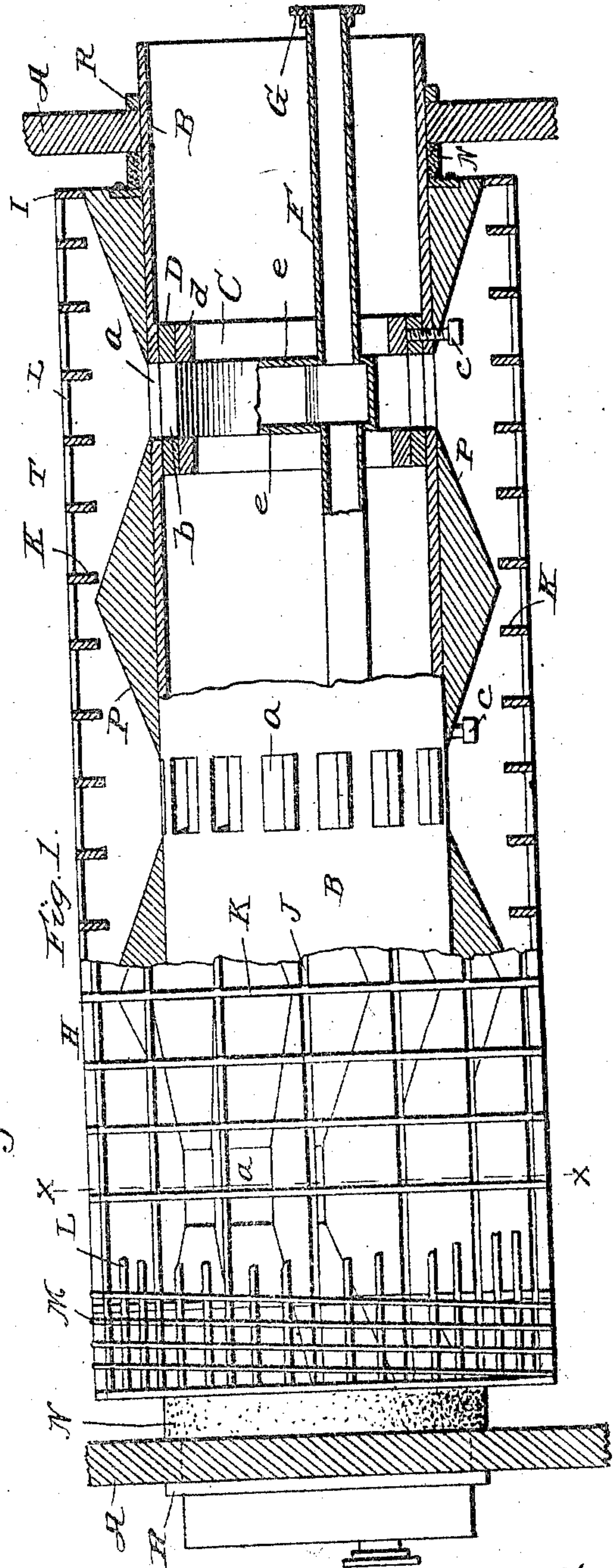
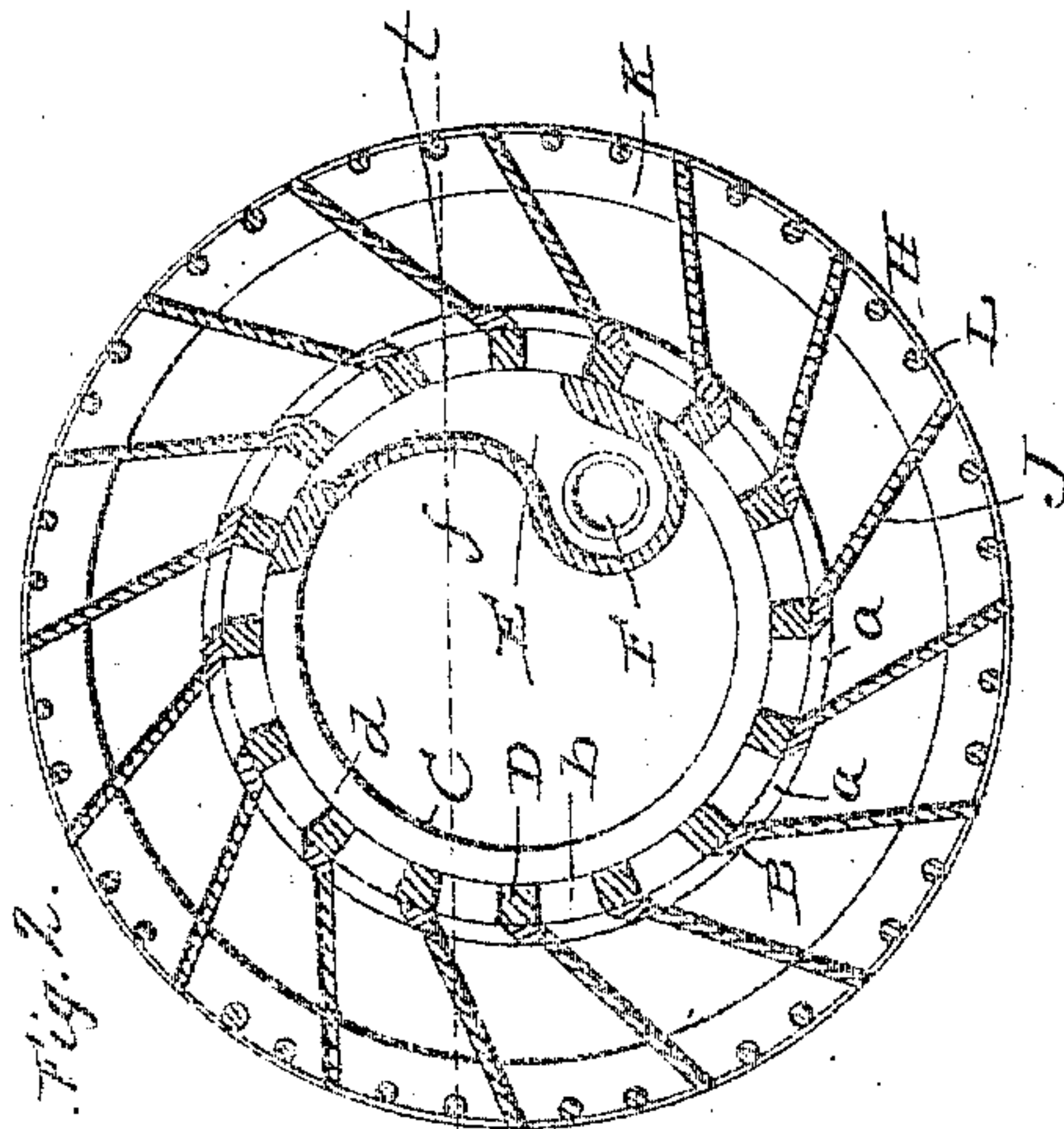
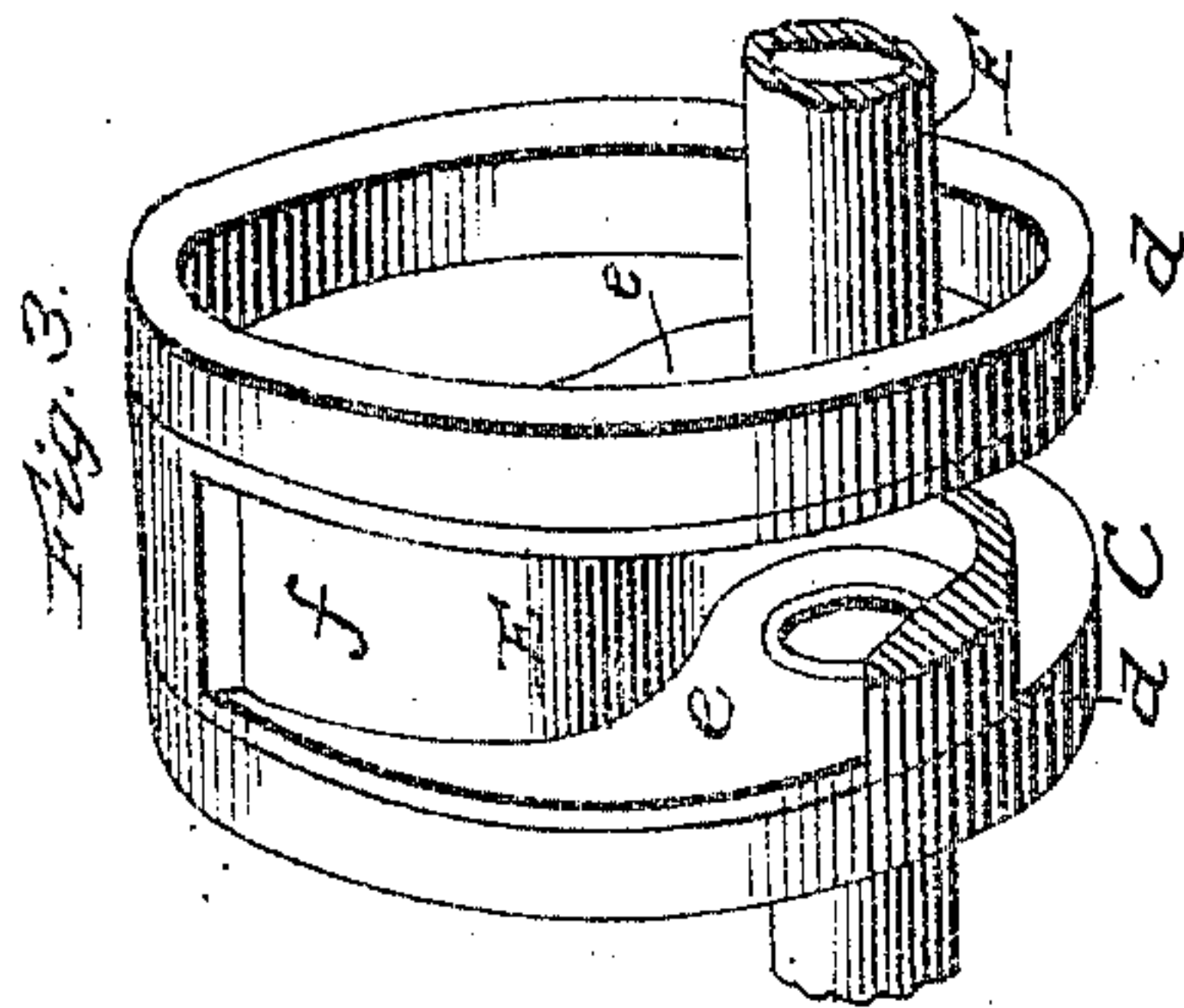
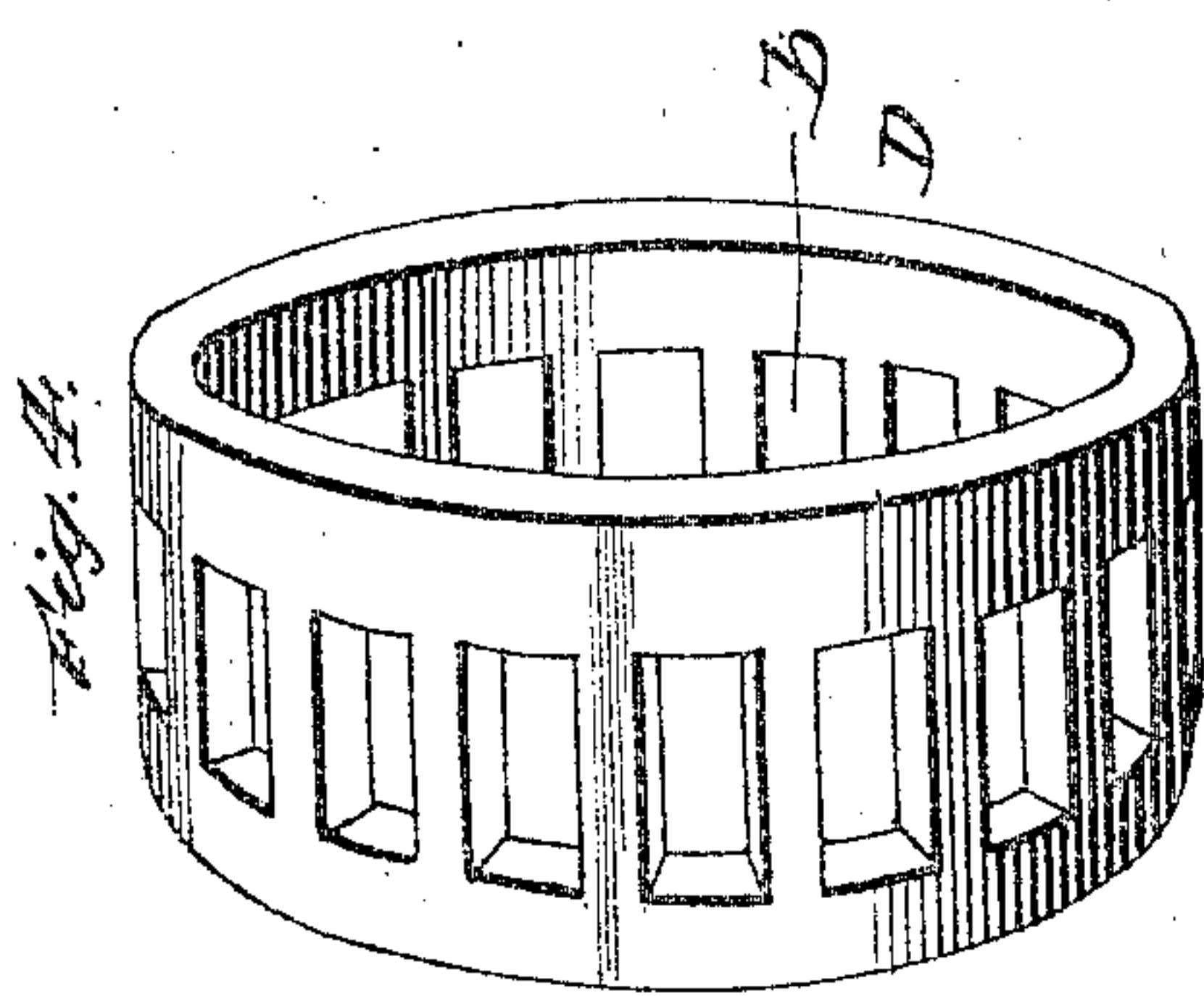


(No Model.)

M. D. KEENEY.
FORMING CYLINDER.

No. 581,732.

Patented May 4, 1897.



Witnesses:
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UNITED STATES PATENT OFFICE.

MARBLE D. KEENEY, OF ANTIOCH, CALIFORNIA.

FORMING-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 581,732, dated May 4, 1897.

Application filed November 5, 1895. Serial No. 588,000. (No model.)

To all whom it may concern:

Be it known that I, MARBLE D. KEENEY, a citizen of the United States, residing at Antioch, in the county of Contra Costa and State of California, have invented certain new and useful Improvements in Forming-Cylinders; and I do 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.

My invention relates to improvements in forming-cylinders designed for use in cylinder paper-making machines; and it has for its general object to provide a forming-cylinder which is adapted to draw water from the sheet of pulp and to hold the pulp against falling or sliding back into the forming-vat, and is, in consequence of this, capable of forming a thick and solid sheet with firmly-interwoven fibers and one which will not be liable to be watermarked or blistered when couched, and is also capable of being run with the machine at a high rate of speed, which is an important desideratum.

Other objects and advantages of the invention will be fully understood from the following description and claims when taken in connection with the annexed drawings, in which—

Figure 1 is a view, partly in elevation and partly in section, of my improved cylinder in its operative position. Fig. 2 is a transverse section taken in the plane indicated by the line *xx* of Fig. 1. Fig. 3 is an enlarged perspective view, partly broken away, of one of the sections of the stationary valve removed; and Fig. 4 is a perspective view of one of the rotary valve-cages or rings.

Referring by letter to said drawings, A indicates the side walls of the forming-vat of a cylinder paper-making machine, and B indicates the central tube of my improved forming-cylinder, which may have one or both of its ends open, as shown, for a purpose presently described. This tube B is journaled in the side walls A of the forming-vat, as shown, and it is provided at intervals in its length with three (more or less) circular series of apertures *a* to admit water and air to the stationary valve-sections C, presently described.

D indicates circular valve-cages or perforated rings which are arranged in the tube B

so that their perforations *b* register with the perforations *a*, as better shown in Fig. 1. These cages or rings D are detachably connected to the tube B by screws *c*, or in any other suitable manner so as to enable them to turn with said tube, and such connection, as will be readily observed, admits of the rings or cages being readily removed from the tube for repairs or for any other purpose without disturbing any of the other parts of the cylinder and also permits of the rings or cages being as readily replaced and secured in position.

The stationary valve-sections C, which are, as stated, arranged within the rings or cages D, may be of any construction suitable to the purposes of my invention, but I prefer to construct them as better shown in Figs. 2 and 3 of the drawings. As so constructed the valve-sections respectively comprise the parallel rings *d*, which conform to the interior of the rings D, so as to permit the same to freely turn, and are provided with the inwardly-extending flanges *e* and the preferably-curved connecting-wall *f*, which serves, in conjunction with the flanges *e*, to form a pocket or receiver E, having an induction-opening *t*, as shown. These pockets or receivers E of the several valve-sections C are arranged in the position shown in Fig. 2 with respect to the center and direction of rotation of the forming-cylinder for a purpose presently described, and they are connected by the tubes F, which may be formed integral with the valves or may be formed separately and screwed into or otherwise connected to the side walls *e* of the pockets or receivers, as desired. The several receivers or pockets E are thus connected together, and one or both (preferably both) of the end receivers are connected by pipes G with a suction-pump (not illustrated) which may be of the ordinary well-known construction.

H indicates the revoluble portion of my improved cylinder, which may be of any suitable construction that falls within the scope of my invention, but which preferably comprises the tube B and valve-cages or rings D, described. The end rings I, which are connected to and surround the tube B, the longitudinally-extending and tangentially-disposed partitions J, which are fixedly connected

to the tube B and are arranged between the openings *a* in said tube, the inclined walls P, arranged between the partitions J and connected to the tube B and pitched toward the openings *a* in said tube B, so as to quickly lead the water which enters said inclosures formed by the partitions J into said openings *a*, the circular rings K, which are connected to and surround the partitions J at intervals in the length thereof and are so arranged that their outer edges are flush with the outer edges of the partitions, and the screen T, formed by the longitudinal rods L of wire or the like, which are suitably connected with the end rings I and are sunk in the outer edges of the intermediate rings K, so as to be flush with the outer edges of said rings, and the wire or wires M, which surround the partitions J throughout the length of the cylinder and are sunk in said partitions, as shown, so as to be flush with the outer edges thereof. The cylinder also preferably comprises suitable packing or washers N, which are interposed between the end rings I and the side walls A of the vat and are designed and adapted to prevent leakage between the tube B and the said side walls A. Collars R are also provided upon the tube B at the outer sides of the vat-walls, as shown, in order to prevent longitudinal movement or play of the cylinder in the vat.

In the practice of the invention the parts are so made and fitted that when air and water are drawn into one of the inclosures formed by the longitudinal partitions J they will pass through the apertures *a* in tube B, the apertures *b* in cages or rings D, and into the receivers or pockets E of the stationary valve-sections, and from thence to the suction or exhaust pump and will not be liable to escape in transit. The receivers E of the stationary valve-sections are by preference of such a size that they will at one time communicate with four (more or less) of the openings *b* of each ring D, so as to enable the suction or exhaust pump to create a suction through four of the inclosures formed by the partitions J at one time.

The valve induction-openings may be diminished and increased in size by the introduction and removal of a piece, (not illustrated,) so as to communicate with more or less of the induction parts.

The improved cylinder described is arranged in the forming-vat of a cylinder paper-making machine so that the water-line comes to about the point indicated by the dotted line in Fig. 2 of the drawings. In consequence of this it will be observed that the sheet of pulp taken up by the cylinder will be subjected to suction both below and above the water-line and will be held to the cylinder by such suction, so that the water will be drawn from the sheet before it passes to the cou cher, which is an important advantage, as it obviates watermarking, blistering, and other difficulties generally attendant upon

the couching of the sheet. Again, it will be observed that the suction, by drawing and holding the sheet against falling back into the vat, forms a thick and solid or compact sheet and one having securely-interwoven fibers, and also permits of the cylinder being revolved at a high rate of speed, which materially increases the capacity of the machine of which it forms a part, and is in consequence a highly-important advantage.

As will be readily observed by reference to Fig. 2, the tangential disposition of the partitions J throughout their width is desirable, for the reason that when each inclosure reaches a position where it communicates with the receivers or pockets of the valves its lower partition or wall J will be pitched downwardly toward the openings *a* in the tube B, so as to facilitate the entry of the water into said openings *a* and the valve. Again, the tangential disposition of the partitions J is highly desirable, for the reason that it enables them to gather water to the openings in the tube B and valve more rapidly and also overcomes the centrifugal motion which, if the partitions were otherwise arranged, would repel the water from the cylinder.

It will be further observed that the sheet is formed in the usual manner, the water passing through the screen and openings in the tube B into the said tube and to the usual exhaust-pump. This continues until the suction construction at the back of the cylinder is reached, which suction construction is so arranged that the suction will commence at a foot (more or less) below the water-line and is continued until the sheet passes under the cou cher.

In virtue of the fact that the partitions J facilitate the entry of the water into the openings *a* and also serve to prevent the water from being repelled from the cylinder by centrifugal action it will be appreciated that the cylinder may be rotated at a comparatively high rate of speed, which is a desideratum in this class of devices.

Having described my invention, what I claim is—

1. In a forming-cylinder for paper-making machines, the combination of the valve-sections respectively comprising the circular rings and the pockets or receivers connected with the rings and having induction-openings, pipes connecting the pockets or receptacles of the several valve-sections, a pipe for connecting one of the valve pockets or receptacles with a suction device, and the revolvable portion comprising the tube having the circular series of apertures *a*, rings arranged within and connected to the tube and having perforations communicating with the perforations of the tube, the outer screen, and longitudinal partitions arranged between the screen and tube, substantially as specified.

2. In a forming-cylinder for cylinder paper-making machines, the combination of the stationary valve pockets or receivers connected

together and provided with induction-openings and adapted to be connected with a suction device, and a revoluble portion surrounding and adapted to revolve around the valve receivers or pockets and comprising an outer screen, longitudinal partitions, between the valve pockets or receivers and the screen, said partitions being disposed tangentially throughout their width and forming inclosures adapted to communicate with the openings in the valve pockets or receivers and walls arranged between the partitions and pitched or inclined in the direction of the length of the cylinder and toward the openings in the receivers or pockets, substantially as specified.

3. In a forming-cylinder for cylinder paper-making machines, the combination of the valve-sections respectively comprising the circular rings and the pockets or receivers connected with the rings and having induction-openings, pipes connecting the pockets or receptacles of the several valve-sections, a pipe for connecting one of the valve pockets or receptacles with a suction device and the revoluble portion comprising the tube having the circular series of apertures *a*, rings arranged within and connected to the tube and

having perforations communicating with the perforations *a*, of the tube, the outer screen, the longitudinal, tangentially-disposed partitions arranged between the screen and tube and forming inclosures communicating with openings, in tube, and the inclined walls arranged between the partitions and pitched toward the openings *a*, in the tube, all substantially as and for the purpose set forth.

4. In a forming-cylinder for cylinder paper-making machines, the combination of a valve-section comprising the circular rings and the pocket or receiver connected with the rings and adapted to be connected with a suction device, and a revoluble portion having a tube provided with a circular series of apertures *a*, and a ring arranged within and connected to said tube and surrounding the rings of the valve-section and having perforations communicating with the perforations of the tube, substantially as specified.

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

MARBLE D. KEENEY.

Witnesses:

FRANK D. BLACKISTONE,
K. F. MATTHEWS.