

No. 775,511.

PATENTED NOV. 22, 1904.

R. BINNS.

PAPER MAKING APPARATUS.

APPLICATION FILED FEB. 23, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

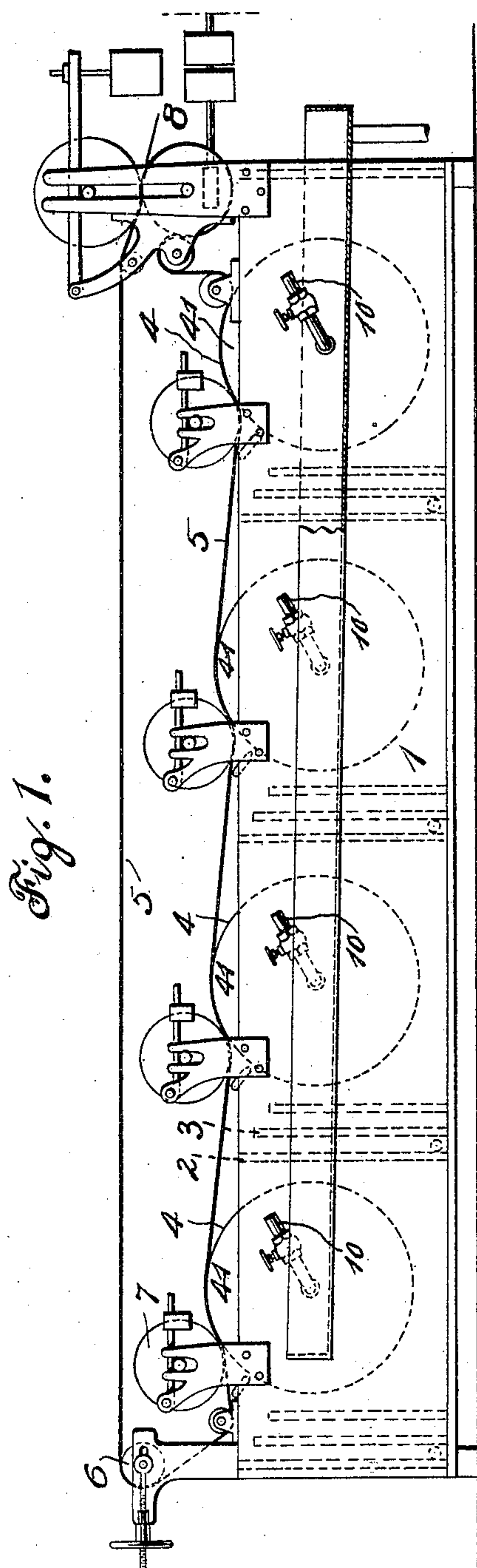


Fig. 1.

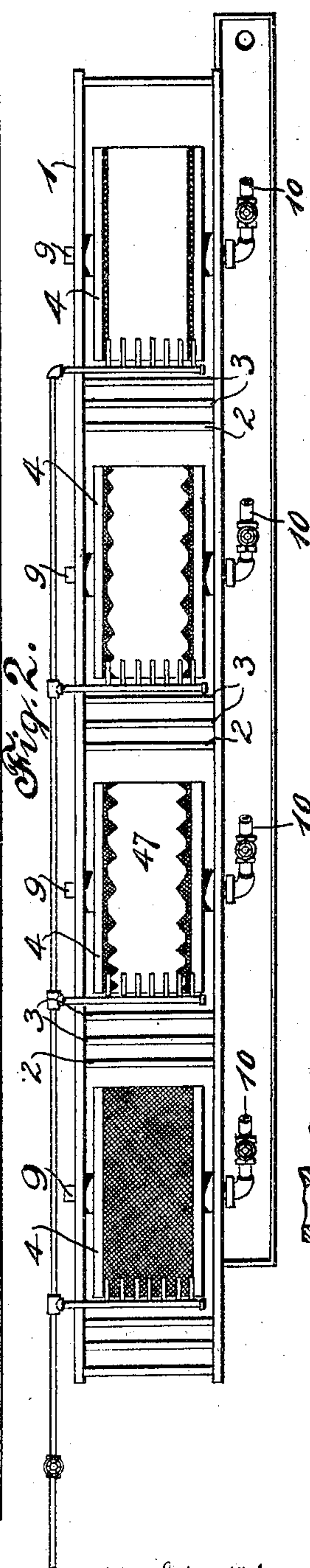
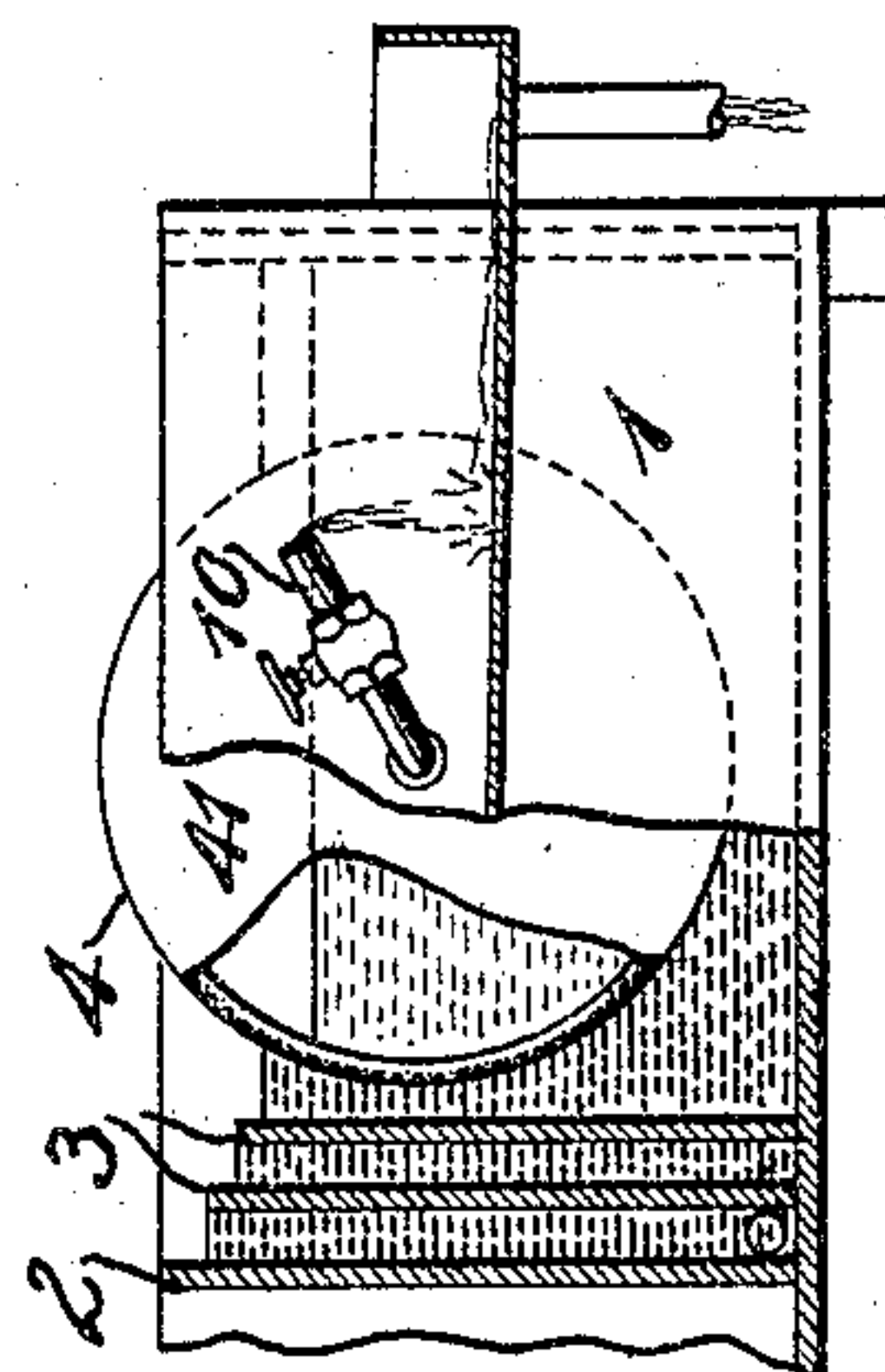


Fig. 2.



5. *Fig.*

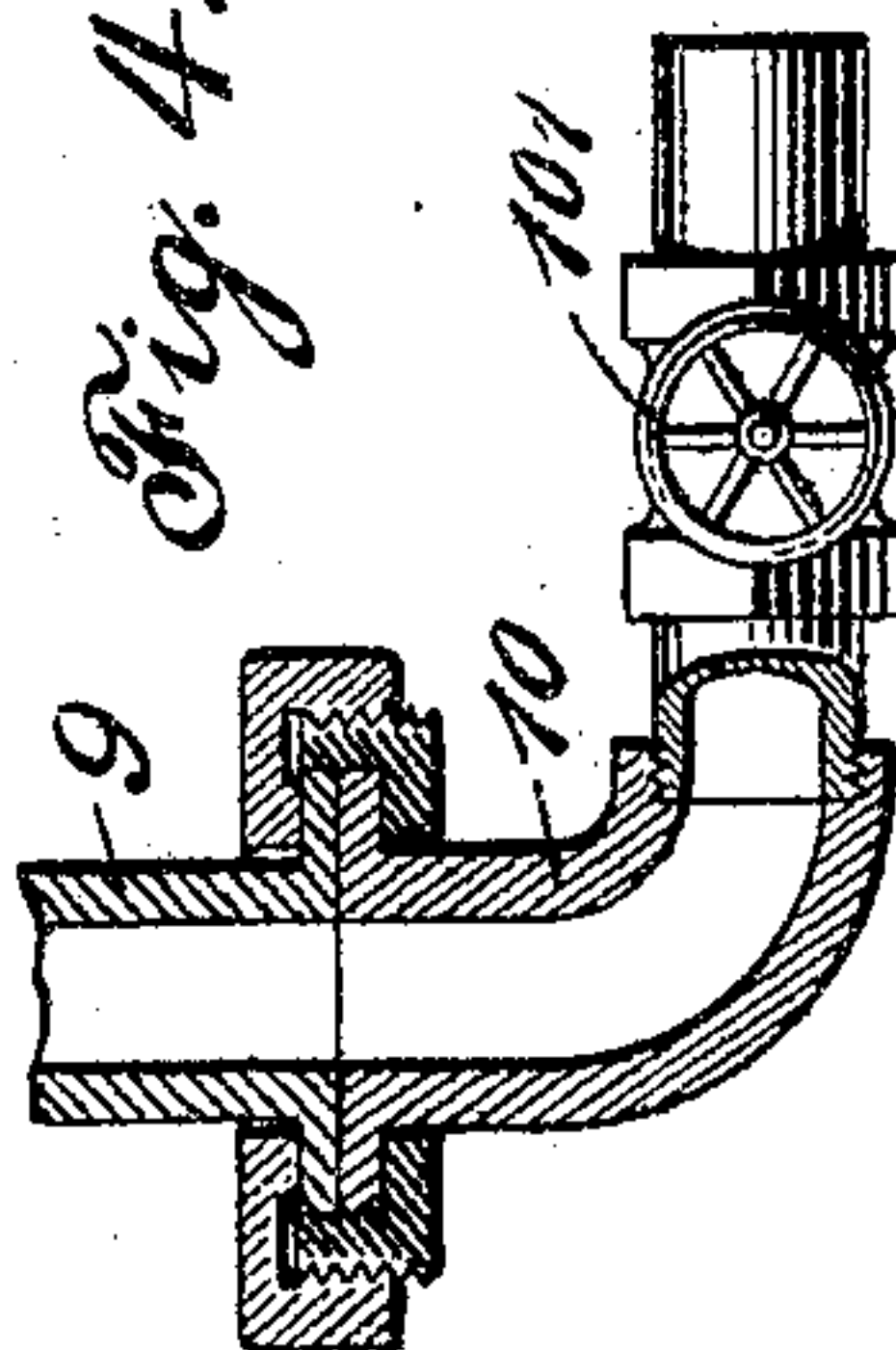


Fig. 4.

Witnesses
 Ralph Ober
 G. H. Thelwell

Inventor
Robert Binns
By his Attorneys
Bartley, Bunnell & Hutchins

R. BINNS.
PAPER MAKING APPARATUS.
APPLICATION FILED FEB. 23, 1904.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 7.

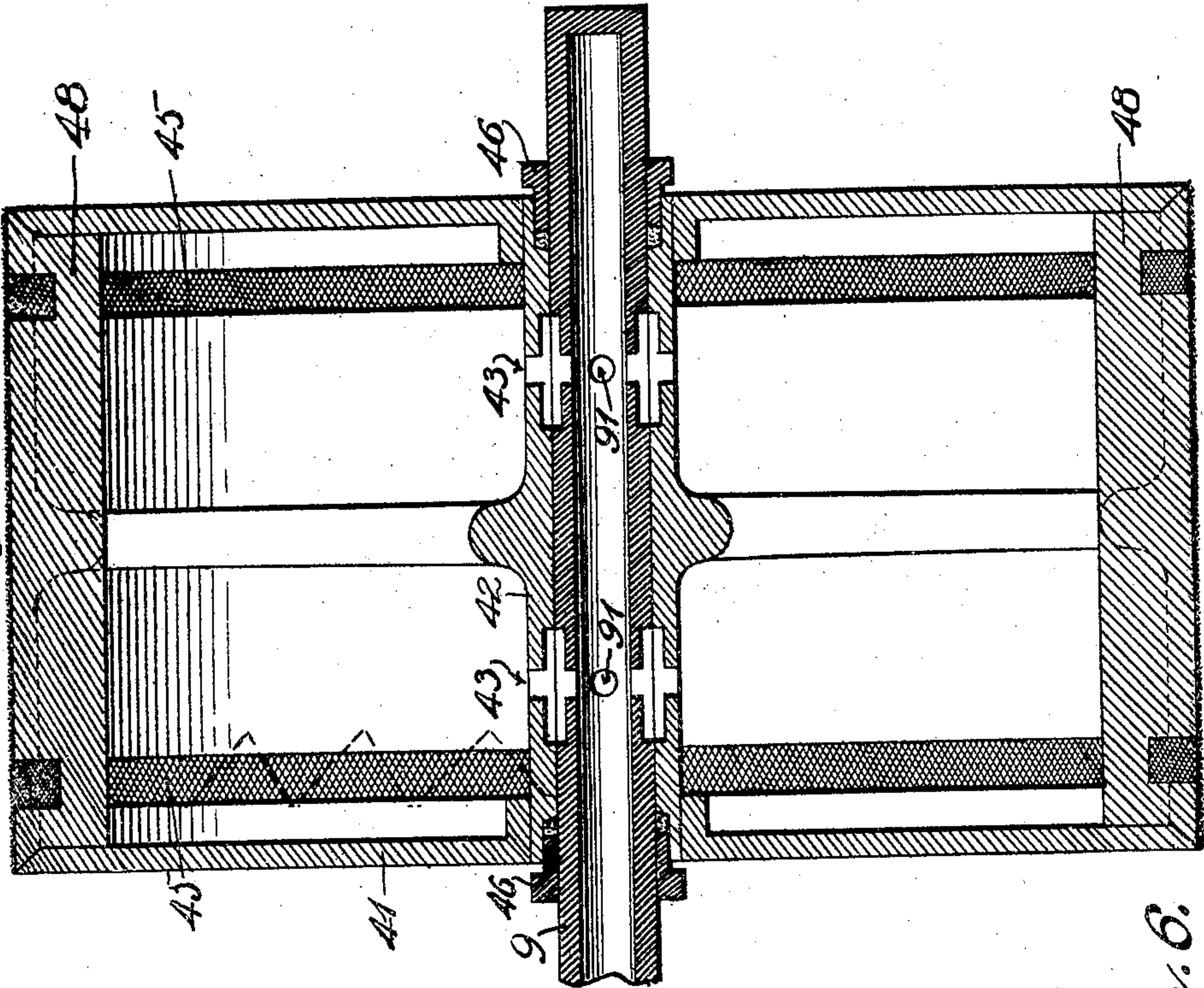
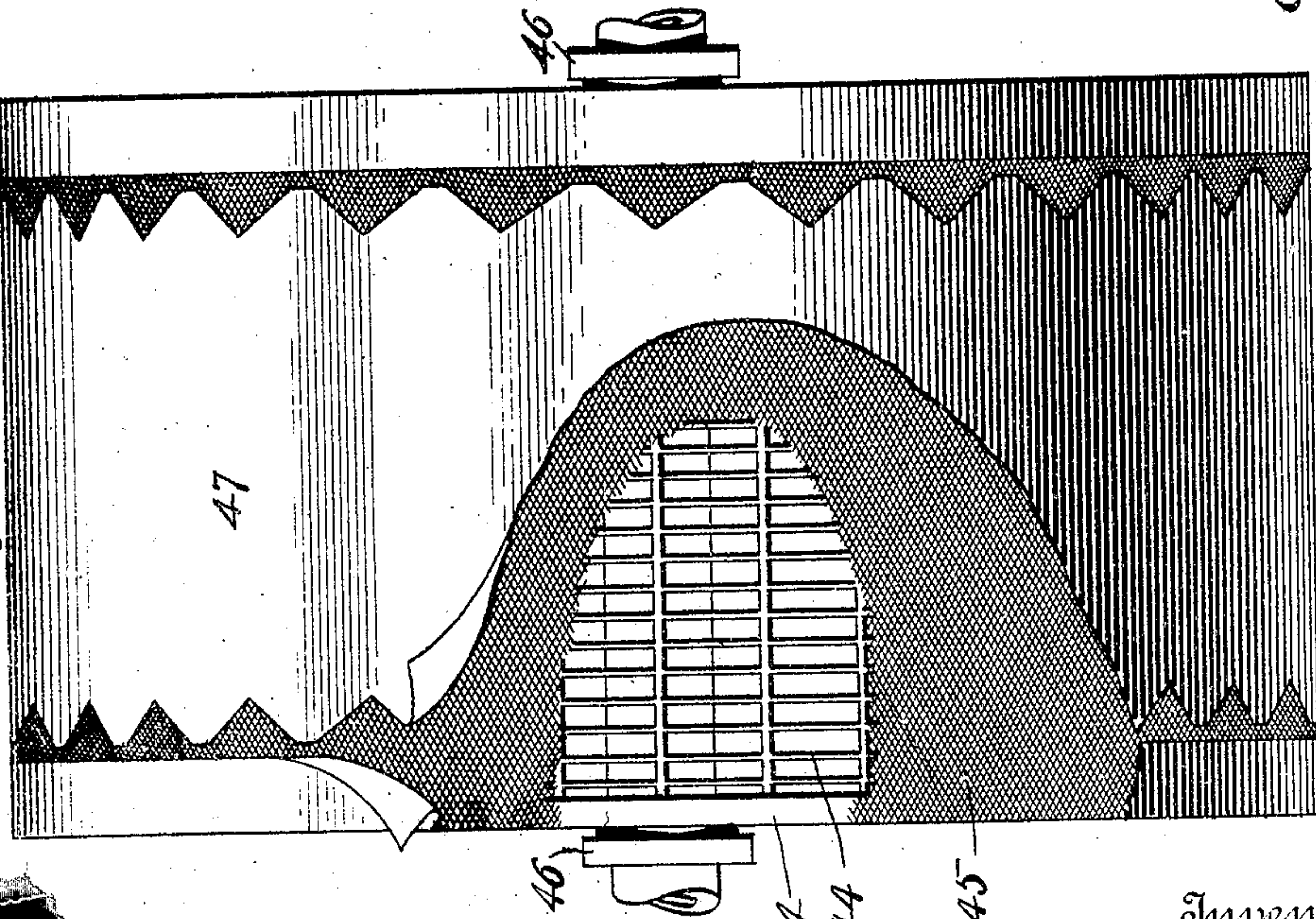


Fig. 6.



Fig. 5.



Witnesses
J. S. Ober
J. M. Meehan

Inventor
Robert Binns
By his Attorneys
R. B. Binns & H. M. Meehan

UNITED STATES PATENT OFFICE.

ROBERT BINNS, OF SOUTH WINDHAM, CONNECTICUT.

PAPER-MAKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 775,511, dated November 22, 1904.

Application filed February 23, 1904. Serial No. 194,787. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BINNS, a citizen of the United States, residing at South Windham, in the county of Windham, State of Connecticut, have invented certain new and useful Improvements in Paper-Making Apparatus, of which the following is a full, clear, and exact description.

My invention relates to paper-making machinery, my purpose being to provide certain improvements therein hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a side elevation of a paper-making machine constructed to embody my invention. Fig. 2 is a plan view thereof. Fig. 3 is a side elevation of a part of the machine with the side broken away to show the water-levels within the same. Fig. 4 is a relatively enlarged plan view, partly in section, of the water-discharge pipe. Fig. 5 is a relatively enlarged front elevation of one of the cylinders detached, portions being broken away to illustrate details of construction. Fig. 6 is a sectional view of the surface of the cylinder shown in Fig. 5 slightly modified. Fig. 7 is a vertical section of a cylinder of modified form.

In the drawings the apparatus in many respects corresponds to the ordinary cylinder paper-making machine—that is to say, it comprises a long tank 1, which may be partitioned off to form separate cylinder-chambers in each of which beaten pulp is introduced by water after the usual manner. The water in each section is maintained at a suitable level, usually near the top of the tank.

2 2 are partitions.

3 3 represent current-breakers.

4 4 are hollow screened cylinders revolubly mounted in a tank 1. When the machine is in operation, the pulp is deposited in web form on the screened surface of the cylinders 4 4 after the usual manner.

5 is an endless apron, of felt or other suitable material, which traverses the several cylinders and over suitable rollers, usually including a tension-roll 6 and pressure-rolls 7 7. The rollers 7 7 press the apron 5 into contact with the screened surface of the cylinders 4 4, so that the pulp will be taken up by the apron

and conveyed along to the next cylinder, where another layer of pulp is deposited on the first layer, and so on. The web thus formed is finally discharged at 8.

The features of improvement in the paper-making machine comprise novel means for mounting the cylinders for maintaining the desired water-level therein. In the particular form of my invention the screened portions of the cylinders are suitable for making a web which may be of increased thickness at certain predetermined points. Obviously the machine may also be employed to make a web of uniform thickness.

The paper-making cylinder 4 is hollow and is provided with closed ends 41 41.

42 is the hub of the cylinder.

9 is a hollow shaft upon which the hub of the cylinder rotates.

43 43 are passages through the hub 42, arranged to register with passages 91, which tap into the hollow shaft 9. If desired, the bore of the hub 42 may be cored out adjacent to these passages 91 in the shaft 9, so that the outflow of water will be continuous when the machine is in operation. The face of each cylinder 4 in its usual form is cut through to form a grid 44, upon which is supported a fine wire-gauze screen 45. One end of the hollow shaft 9 may be closed, while the other end may be fitted with a discharge-pipe 10, mounted so that it can be tilted at any desired angle.

101 is a valve which may be employed in the discharge-pipe, if desired. In Fig. 1 the discharge-pipes 10 are shown as pitched at an angle, so that the outlet end of each discharge-pipe is above its respective shaft 9. When water is let into the tank 1, it will rise up around the sides and ends of the cylinders 4 and will flow through the screened passages therein, depositing any pulp that may be in suspension in said water upon the gauze screen 45.

In operation the water-level in the tank should be above that within the cylinder 4. I accomplish this and maintain the desired level by changing the angle of inclination of the discharge-pipe 10, the open end of the discharge-pipe determining the level within the

cylinder. The water-level in the tank being above that in the cylinder, it is obvious that the water flows into the cylinder and keeps up a continuous deposit of pulp on the screened passages thereof. The rotation of the cylinder by the apron 5 causes this thin web of pulp to be conveyed to the apron, which latter takes it off and conveys it on to the next cylinder, and so on. The force of the current of water flowing into the cylinder may be modified by changing the water-level within the cylinder, which, as explained, is varied by changing the angle of inclination of the discharge-pipe 10. While the valve 101 may be employed, its presence is of course not essential, since the discharge-pipe 10 may be of such a length that when it is projected vertically its upper end will be above the highest possible water-level within the tank, thus effectively preventing circulation of water through the cylinder.

In Fig. 3 I have indicated conventionally water-levels within tank 1 and within the cylinder 4.

Heretofore it has been common to term the sections of the tank in which the cylinders are placed "vats," and the cylinders such as used in the past have not been mounted centrally upon an axle or shaft, which itself may constitute the outlet for the water; but, on the contrary, the cylinders have been open-ended and mounted in a long circular bearing packed with suitable material and arranged near the periphery of the cylinder to engage an annular flange projecting from the end of the cylinder. Such an arrangement is not only less effective than the present arrangement, in that it is difficult to so pack the joint as to prevent circulation of water through the end of the cylinder, but the old means of support offers substantial resistance to the turning of the cylinder, putting undue and unnecessary strains upon the apron and wasting the power. By my invention there is no possibility of leak through the heads of the cylinders, and the resistance to the turning of the cylinder is as little as possible, since the cylinder is mounted entirely upon a central shaft or arbor—the simplest possible construction. 46 46 are stuffing-boxes in which a suitable packing may be introduced at each end of the hub of the cylinder where it takes onto the shaft 9.

In making a plain web of paper unreinforced and of uniform thickness throughout its entire width I provide the surface of the cylinder throughout substantially its entire width with the wire-gauze screen 45 and with the gridwork or perforated portion underneath to allow of the free circulation of water.

To make a reinforced web, certain points at equal intervals apart being built up or thickened, I first form a plain web with a cylinder such as I have previously described, which makes what I may term the "base-web" of uni-

form thickness throughout. When this base-web is conveyed to the next cylinder, on it is deposited at predetermined points, spots, or bands of regular or irregular shape, as desired, the same being formed by depositing pulp upon correspondingly-shaped screened passages of the face of the next cylinder. (For example, see the outline of the screened face of the cylinder shown in Fig. 5.) In this figure I have illustrated my improved cylinder having the central portion covered with an annular pattern of impervious material 47, the edges of which may be straight or fluted as indicated, so as to expose only a portion of the gauze screen to the circulation of water carrying pulp in suspension. It is therefore on this portion of the gauze screen only that the pulp is deposited. Hence as the base-web traverses this cylinder there will be deposited thereon a second layer of pulp of a configuration corresponding to the shape of that part of the wire-gauze on said cylinder which received the pulp. A third cylinder may have a screened portion of still a different shape upon which may be deposited pulp which is finally transferred to the partially-reinforced basic web to still further build up the reinforced portions.

In Fig. 6 I have indicated the pattern-strip of impervious material 47^a as located between the two screens of the cylinder. In this figure the pattern-strip merely appears in section. I have shown Fig. 6 for the purpose of illustrating that the place of location of the pattern-strip is immaterial, its function being rather to prevent the circulation of water through the screened face of the cylinder excepting at the portions where pulp is to be deposited. It should therefore be understood that the pattern-strip may be located outside or inside or between the screens of the cylinder. In other respects section Fig. 6 corresponds to the cylinder shown in Figs. 5 and 7.

In Fig. 2 I have illustrated four cylinders. The one indicated at the left-hand end of the figure forms the basic web, the next adjacent cylinder applies a reinforcing-strip along opposite edges of the basic web. The third cylinder deposits another layer of reinforcing pulp, and the fourth still another layer or border strip.

In Fig. 7 I have shown a slight modification of the cylinder, which is arranged to deposit the border-strips or reinforcing portions on the basic web. This cylinder differs from the cylinder shown in Fig. 5 in that only those portions of the face of the cylinder upon which the web is to be deposited are cut through. In such an arrangement the cut-through portions may or may not be provided with the gridwork shown in Fig. 5, depending entirely upon whether or not it is necessary to reinforce or support the wire-gauze screen from within. It will be seen that within the barrel portion of the cylinder shown in Fig. 7 there are trans-

verse webs 48 extending from the spokes laterally. The incisions made through the face of the cylinder near the ends thereof cut through the surface and only part way into the webs. Hence the ends of the cylinder are not separated from the intermediate portion, but are connected thereto by the solid portion of said transverse webs. Since the modification of Fig. 7 over what is shown in Fig. 5 merely relates to the shape of the screened opening through the face of the cylinder, similar reference-numerals have been used in each view.

What I claim is—

15 1. In a paper-machine, a cylinder having a screened face the ends of said cylinder being closed and a hollow shaft supporting said cylinder and means of communication from within said cylinder into said hollow shaft whereby the latter may act as the outlet for the water contained within the cylinder, and means for varying the level of water within the cylinder relatively to the level of the water surrounding said cylinder, said means comprising a tilting discharge-pipe located at the end of said hollow shaft.

2. In a paper-machine, a tank, a cylinder en-

tirely within the same, a hollow shaft mounted in said tank and affording a support for both ends of the cylinder, the ends of the cylinder being closed, an outlet-passage from within the cylinder into said hollow shaft, a discharge-outlet at one end of said hollow shaft and means for varying the size of said discharge-outlet, the periphery of said cylinder being screened.

3. In a paper-machine, a tank, a cylinder entirely within said tank, a support for said cylinder comprising a hollow shaft mounted in said tank and independent of said cylinder, the ends of the cylinder being closed, the periphery of the cylinder being screened, and outlet-passages located between the ends of the cylinder and means for controlling the discharge of water through the outlet-pipe for controlling the level of water within the cylinder relatively to the level of water surrounding said cylinder.

Signed at South Windham, Connecticut, this 9th day of February, 1904.

ROBERT BINNS.

Witnesses:

GEORGE W. MELONY,
S. ARNOLD PECKHAM.