

H. GAARA.  
PAPER MAKING MACHINE.  
APPLICATION FILED MAY 11, 1907.

951,183.

Patented Mar. 8, 1910.  
3 SHEETS—SHEET 1.

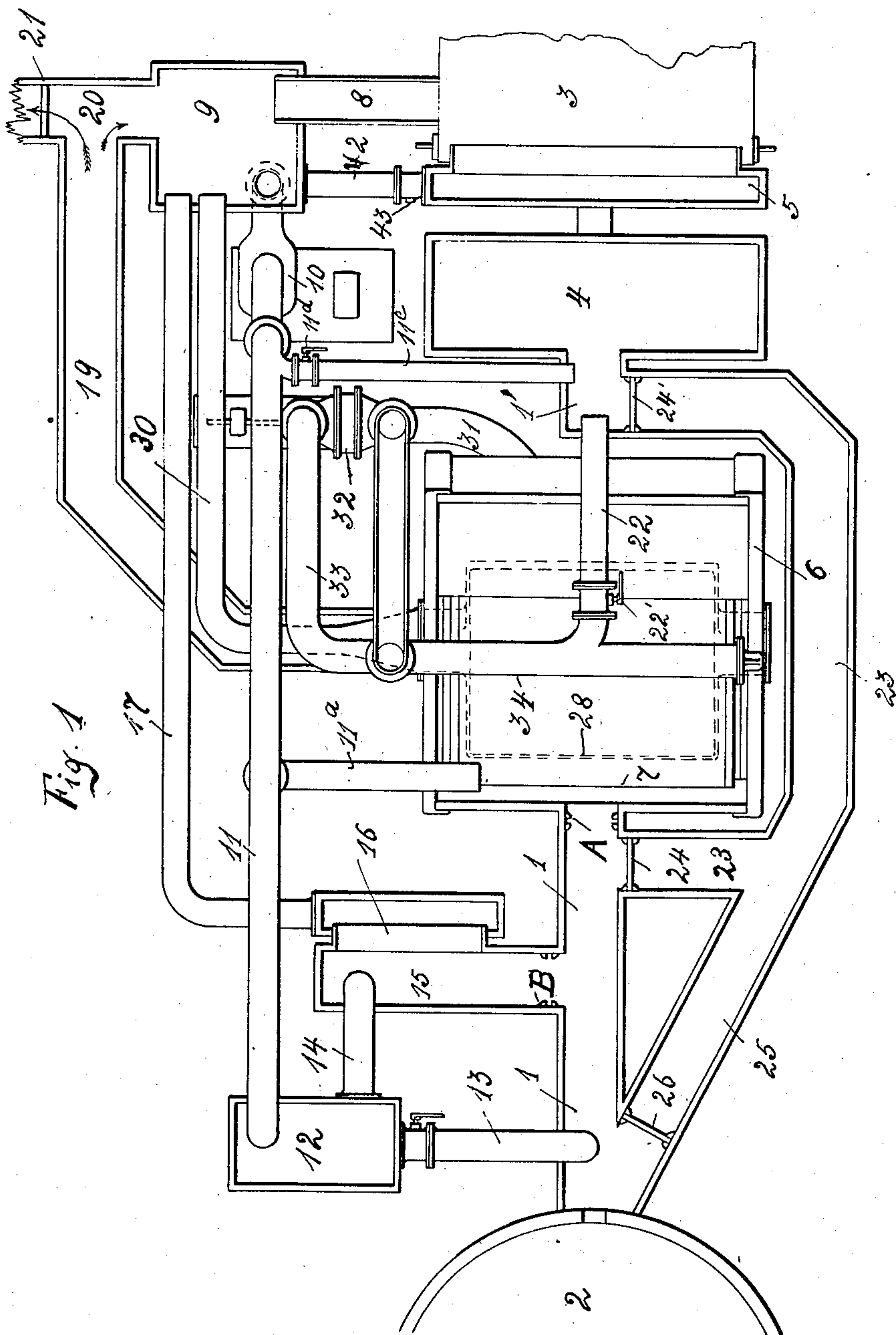


Fig. 1

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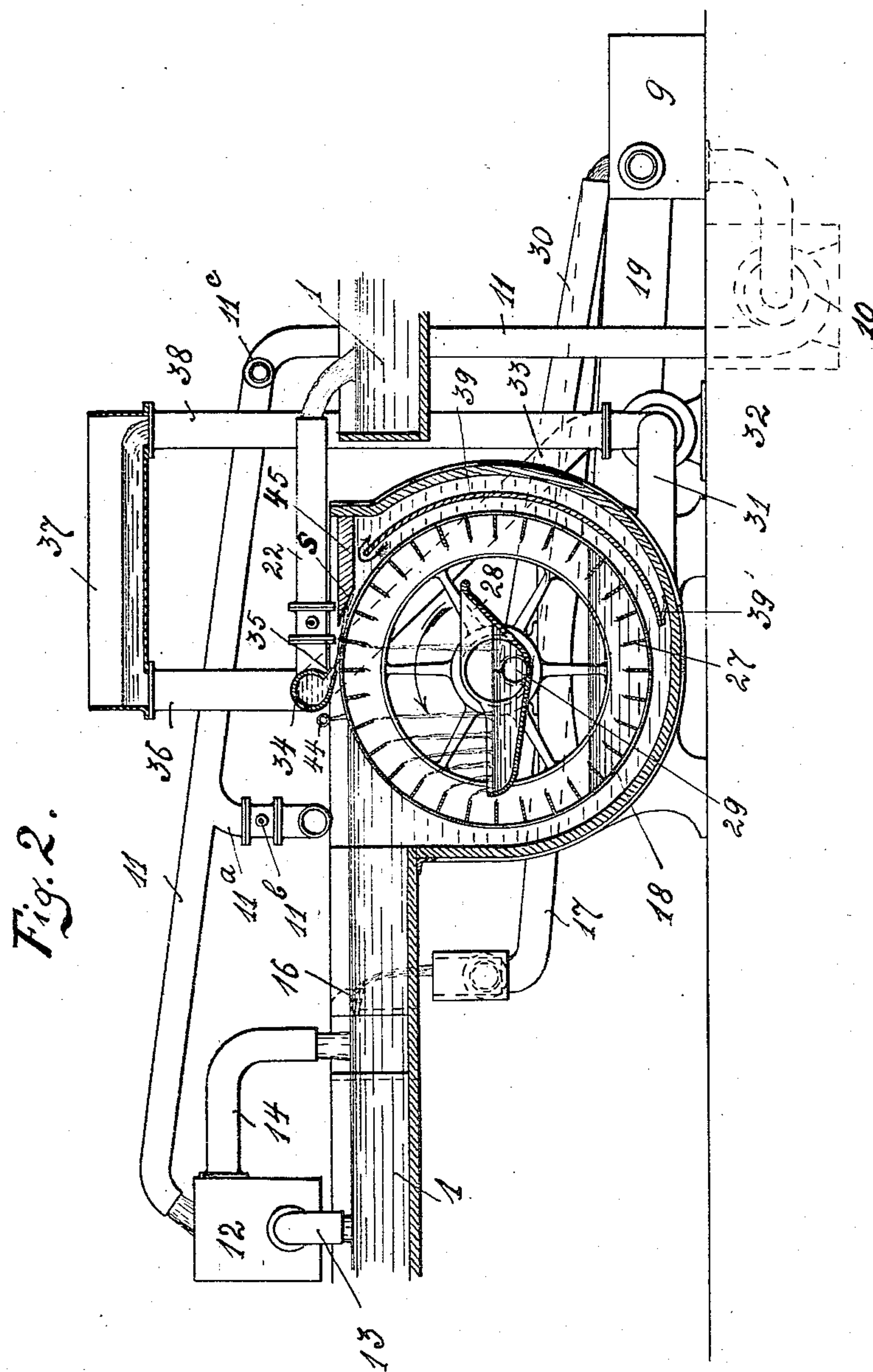


Fig. 2.

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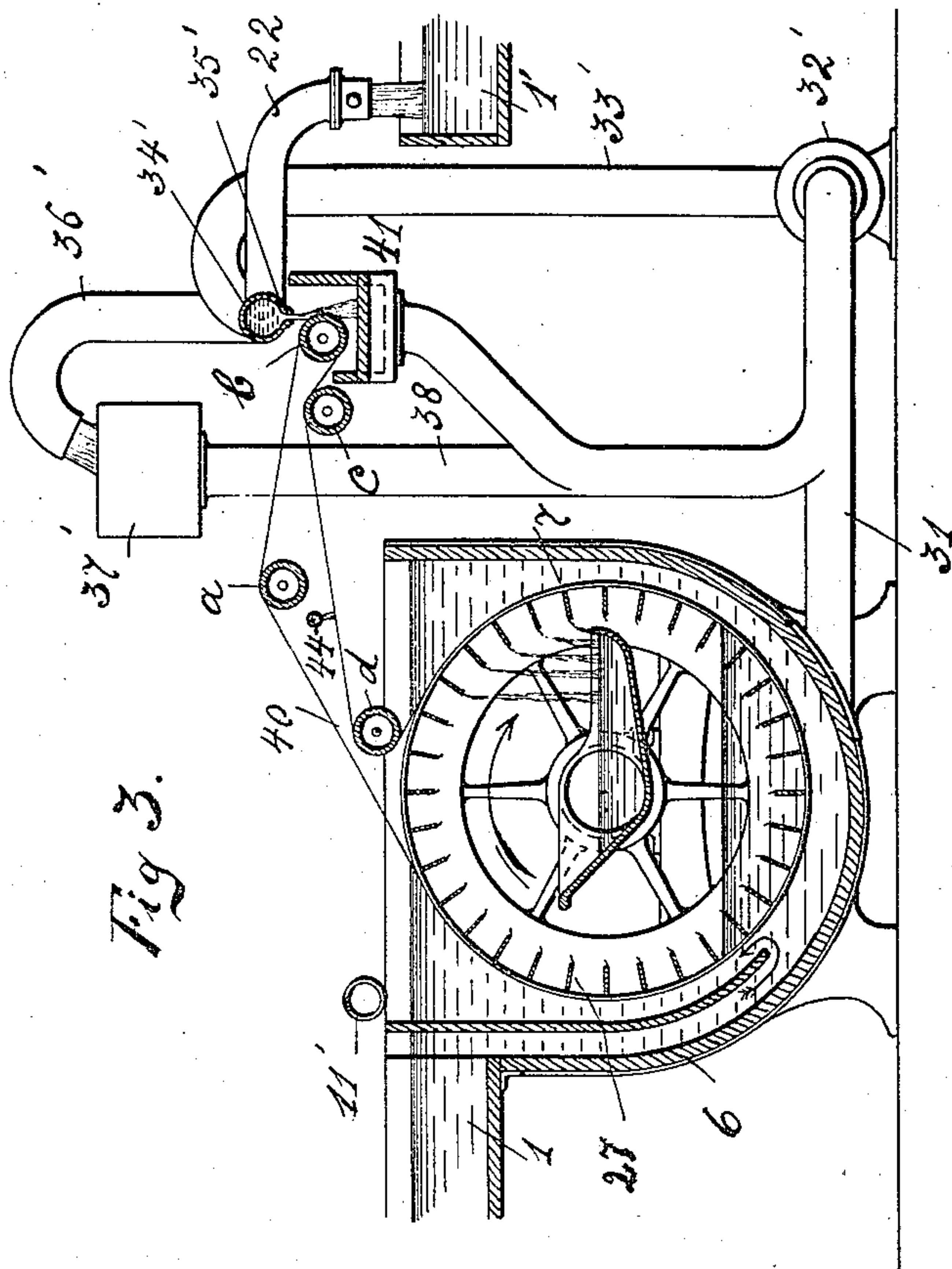


Fig 3.

WITNESSES:  
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# UNITED STATES PATENT OFFICE

HALVOR GAARA, OF NEW YORK, N. Y.

## PAPER-MAKING MACHINE.

951,183.

Specification of Letters Patent.

Patented Mar. 8, 1910.

Application filed May 11, 1907. Serial No. 873,166.

*To all whom it may concern:*

Be it known that I, HALVOR GAARA, a subject of the King of Norway, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Paper-Making Machines, of which the following is a specification.

My invention relates to the manufacture of paper and the object of my invention is to provide means whereby practically all the fibrous substances in the pulp, while the latter passes on to the wire cloth, are saved. For this purpose, cylinders covered by a cloth have been used, which were arranged in such a position that the water draining from the wire cloth had to pass a vat in which said cylinder is rotatably mounted. With these cylinders; however, a considerable amount of the short fibers of the pulp is lost by passing through the pores or openings in the cloth surrounding the cylinder. This loss of short fibers may be reduced by the employment of a very fine cloth, but the effect of such cloth is soon destroyed, as the fine pores in said cloth become clogged up after a short time. According to my present invention, these disadvantages may be entirely overcome by arranging the cylinder for catching the fibers in the path of flow of the pulp on its way to the wire cloth in such a manner, that not only is all or a part of the pulp coming from the pulp vat forced to pass through the tank containing the cylinder, but also the water drained through the meshes of the wire cloth. Previously, the fiber catching cylinders were so arranged, that only the water drained from the wire cloth passed through said cylinders. This water, however, contains only a small amount of long fibers, and most of the short fibers passing through the cloth surrounding the cylinder are lost thereby. By reason of the arrangement of the fiber-catching path of cylinder in the flow of the pulp on its way to the wire-cloth, as in accordance with my invention, a portion of the long fibers will be deposited on the cloth surrounding the cylinder, while during the rotation of said cylinder the cloth dips into the water-tank in which said cylinder rotates. The long fibers thus deposited on the cloth, form on the outer surface thereof a filtering layer, whereby the short fibers are prevented from passing through the pores or openings of the cloth during the rotation of the cylinder.

For the purpose of more clearly setting forth my invention and pointing out the different features of the new arrangement, reference is made to the accompanying drawings, in which—

Figure 1 is a diagrammatic plan view, showing the location of the fiber-catching cylinder, whereas Figs. 2 and 3 are sectional views of the cylinder, with some of the co-operating parts, showing two different forms of the cylinder.

Referring first to Fig. 1, 1 and 1' indicate the conduits or channels for conducting the pulp from the agitating vat 2 to the wire cloth 3 of the paper machine, the usual screen 4 and distributing box 5 being interposed. 6 designates the tank, in which the fiber-catching cylinder 7 is rotatably mounted. The water draining through the wire cloth 3 is conducted through a passage 8 to a receptacle 9, from which it is pumped by a pump 10 of any desired construction through a pipe 11 into the vessel 12. From said vessel either all the water, or part of it, is returned by a pipe 13 to the conduit or channel 1, where it again is mixed with the pulp flowing from the vat 2. Part of the water pumped into the vessel 12 may be allowed to escape through a pipe 14 into a trough 15, which trough is in unobstructed communication with the said conduit 1, but is provided with an overflow 16, whereby the level in the said conduit and in the cylinder-tank 6 is kept uniform. The water passing the overflow 16 is returned by a pipe 17 to the tank 9, where it again mixes with the water draining through the wire cloth 3. The water 18 (Fig. 2) which is separated from its fibers by the cylinder 7, passes through a passage 19 (Fig. 1) into a passage 20, the latter being provided with an overflow 21, so arranged, that part of the water flowing from passage 19 into passage 20 can be discharged back into the tank 9, while the water passing the overflow 21 is allowed to run away.

22 indicates a pipe, through which the pulp caught by the cylinder 7 and removed therefrom is carried into the conduit 1', in a manner described later. The flow through said pipe 22 can be regulated by a valve 22', so that a uniform proportion of water in the pulp flowing to the wire cloth 3 can be maintained.

In communication with the conduit 1 there is arranged a passage 23, passing out-



side of the cylinder tank 6. A gate or slide 24 is provided at the point where the said passage 23 branches off from the conduit 1. If the gate or slide 24 is removed from its place and placed in the conduit 1, at A, all the pulp discharged from the vat 2 will flow through passage 23 outside of the tank 6 into the conduit 1' behind the tank 6 without first passing through the tank 6. As seen in Fig. 1, a second gate or slide 24' is arranged in the passage 23, where it opens into the conduit 1'. Said gate 24' will be removed to B, when gate 24 is removed and will be replaced again, after gate 24 has been replaced. An extension 25 of said branch conduit 23 connects the latter directly with the vat 2, and a gate or slide 26 similar to the gates 24 and 24' is so arranged, that either the whole, or part, of the pulp from the vat 2 together with the water from the pipe 13 can flow directly through the conduit 23 into the box 4.

In Fig. 2 a preferable form of a fiber-catching cylinder is shown. As seen from said figure, the cylinder is provided on its inner periphery with a row of ribs or shelves 27, which rotate with the cylinder, directing the water passing through the pores or openings in the cylinder cloth into a stationary pan 28. The latter extends through the entire length of the cylinder and is provided with a hollow shaft 29, supported in bearings provided in the walls of the tank 6. To one end of the said shaft 29, around which the cylinder 7 rotates, is connected a pipe 30 (see Fig. 1), so that the water collected in the pan 28 and passing from said pan into the hollow shaft 29 flows through the pipe 30 into the tank 9. The pulp carrying water which is discharged from the bottom of the cylinder tank 6 through a pipe 31 is lifted by a pump 32 through a pipe 33 into a pipe 34 arranged above the cylinder 7 and extending across the same. The said pipe 34 is provided with a longitudinal slot 35, through which a sheet of water is forced in a tangential direction against the cloth fastened to the periphery of the cylinder 7, whereby the fibers deposited on said cloth are washed off, as clearly seen in Fig. 2. As shown in said figure, a shield 39 is arranged in the tank 6, partly surrounding the cylinder 7. The purpose of this shield is to create a current from the bottom of the tank 6, so as to well mix the water in said tank with the fibers washed off from the cloth of the cylinder. At the lower end of the said shield 39 is arranged a flap-valve 39' of leather or other suitable material, which, if the level of the water in the tank 6 falls below a certain height, will open automatically to permit the water to be drawn from the tank past said valve. Part of the water forced by the pump 32 into the pipe

34 is lifted through a vertical branch 36 into a small elevated tank 37, from which it is returned through a fall pipe 38 to the suction side of said pump 32. A large portion of the pulp carrying water pumped into pipe 34 flows from said pipe through pipe 22 into the conduit 1', and screen 4 and on to the wire cloth 3.

According to the arrangement shown in Fig. 3, the cloth 40 surrounding the cylinder 7 is not fastened thereto, but leaves the same near the top end and is guided over rollers *a*, *b*, *c* and *d*. The roller *b* is located in a channel 41 and while the cloth passes over and around said roller on to roller *c*, a stream of water is directed against the cloth, as in the arrangement shown in Fig. 3. The water used for this purpose is the pulp-carrying water drawn off from the bottom of the tank 6 through pipe 31'. As in Fig. 2, water is forced by pump 32' through pipe 33' into pipe 34', which is provided with a longitudinal slot 35', through which the water is forced against the cloth passing around roller *b*. The excess of water lifted by pump 32' is forced through a pipe 36' into a small tank 37' from which it is returned through a pipe 38' to the suction side of the pump. Also the pulp in the channel 41 is carried together with the water forced out of the pipe 34' back to the suction side of the pump 32', whereas a large amount of water in pipe 34' passes on through pipe 22' into the conduit 1.

As seen from Fig. 1, a pipe 42 is provided connecting the distributing box 5 with the tank 9, but normally the said pipe 42 is closed by a valve or slide 43. If, however, for some reason the paper machine is stopped, the said slide 43 is opened to let the pulp-carrying water pass from the said box 5 directly into the tank 9.

44 in Figs. 2 and 3 designates a pipe, connected with some water supply and provided with a row of perforations through which fresh water is directed onto the cloth surrounding the cylinder 7.

In Fig. 2 a board 45 is shown, which is removably secured to one wall of the cylinder tank 6 in such a position, as to be on a level with the water in said tank. The said board extends across the entire length of the cylinder tank in close connection therewith except for a narrow space *s* near the cylinder to permit the water to pass through. The purpose of said board 45 is to prevent the periodic rising and falling of the level in tank 6.

Pipe 11, through which the water is pumped from tank 9 into the vessel 12, is provided with a branch 11<sup>a</sup> which is normally closed by a valve 11<sup>b</sup> (Fig. 2). By opening said valve, the water passing through pipe 11, or part of it, can be re-



turned directly to the cylinder-tank 6. Besides, pipe 11 is provided with a branch 11<sup>c</sup>, whereby some of the water passing through pipe 11 on its way to the vessel 12 can be discharged at a point into the conduit 1' between the cylinder tank 6 and screen 4. The purpose of this arrangement is to add water to the pulp flowing on to the wire cloth 3, if necessary. A valve 11<sup>a</sup> is provided in said branch 11<sup>c</sup> to regulate the amount of water discharged therefrom.

What I claim and wish to secure by Letters Patent is:—

1. In a paper-making machine or the like, the combination with the stuff-chest and the machine-wire, of a tank containing a straining-cylinder interposed in the path of flow of the pulp-water from said chest to said wire and means to conduct some of the water, after its passage through said wire, back into said tank.

2. In a paper-making machine or the like, the combination with the stuff-chest and the machine-wire, of a tank to receive the pulp-water coming from said chest, a rotary straining-cylinder in said tank, a pump 32, to draw the water from the bottom of said tank, a pipe connected to said pump to convey the water, to said wire, and a pump 10, to draw some of the water, after its passage through said wire and return it to said tank.

3. In a paper-making machine or the like, the combination with the stuff-chest and the machine-wire, of a tank to receive the pulp-water coming from said chest, a rotary straining-cylinder in said tank, a pump 32, which draws the water from said tank and delivers some of it to said wire and some onto said cylinder, and a pump 10, to draw some of the water, after its passage through said wire and return it to said tank.

4. In a paper making machine, the combination with a pulp vat, and a wire-cloth arranged to receive the pulp from said vat, of a tank arranged in the flow of the pulp carrying water, a fiber-catching cylinder rotatably mounted in said tank, means for drawing off the pulp-carrying water from said tank and conducting it to the said wire-cloth and a supplementary conduit connected with the said conduit and passing outside of the said tank to conduct the pulp-carrying water directly to the said wire-cloth, and means for regulating the amount of pulp-carrying water passing through said supplementary conduit.

5. In a paper making machine, the combination with a pulp vat, and a wire-cloth arranged to receive the pulp from said pulp vat, of a tank arranged in the flow of the pulp carrying water, a fiber-catching cylinder arranged in said tank and adapted to rotate therein, means for drawing off the pulp water at the bottom of said tank and

passing it on to the wire-cloth, and means located above said cylinder to wash off the fibers adhering to the surface thereof and mixing them with the water drawn off at the bottom of said tank.

6. In a paper making machine, the combination with a pulp vat, and a wire cloth adapted to receive the pulp from said vat, of a tank arranged in the flow of pulp from the vat to the said wire-cloth, a fiber-catching cylinder immersed in said tank and adapted to rotate therein, means for drawing off the pulp-water from said tank, means located near the upper portion of the said cylinder to remove the fibers adhering to its surface, and a shield arranged in said tank and partly surrounding the said cylinder and adapted to produce an upward flow of the pulp water in said tank, thereby mixing with the same the fibers removed from the surface of said cylinder.

7. In a paper making machine, the combination with a pulp-vat and a wire-cloth adapted to receive the pulp from said vat, of a tank arranged in the flow of pulp water from the said vat to the said wire cloth, a fiber-catching cylinder immersed in said tank and adapted to rotate therein, means for drawing off the pulp-water from said tank, means located near the upper portion of the said cylinder to remove the fibers adhering to its surface, a shield partly surrounding said cylinder and adapted to produce an upward flow of the pulp-water in said tank, thereby mixing with the same the fibers removed from the said cylinder, and a valve at the lower end of said shield normally preventing the circulation of water around said lower end and adapted to open automatically to permit the water in the tank to be drawn off past the said lower end, if the water in said tank falls under a certain level.

8. In a paper making machine, the combination with a pulp vat and a wire-cloth arranged to receive the pulp-water from said vat, of a tank located in the flow of said water, a fiber-catching cylinder arranged in said tank and adapted to rotate therein, a pump to draw off the pulp-water at the bottom of the tank and lifting the water to a pipe arranged above the said cylinder in the tank and provided with a longitudinal slot to discharge a sheet of water against the outer periphery of said cylinder thereby washing off the fibers adhering thereto, and a pipe in connection with said first pipe to conduct the pulp-water to the wire-cloth.

9. In a paper making machine, the combination with a pulp vat and a wire cloth arranged to receive the pulp-water from said vat, of a tank located in the flow of said water, a fiber-catching cylinder in said tank adapted to rotate therein, a pump to draw off the pulp-water at the bottom



of said tank and lifting the water to a pipe arranged above the said cylinder in the tank and provided with a longitudinal slot to discharge a sheet of water against the  
5 outer periphery of said cylinder thereby washing off the fibers adhering thereto, a pipe in connection with the said first pipe to conduct the pulp-water to the wire-cloth, and a tank in connection with the said first  
10 pipe to receive the excess of the pulp-water lifted by said pump, and means connected with said tank to return the water therein to the suction side of said pump.

10. In a paper making machine, the combination with a pulp vat and a wire cloth  
15 arranged to receive the pulp from said pulp vat, of a tank arranged in the flow of

the pulp-carrying water, a fiber-catching cylinder arranged in said tank and mounted to rotate therein, means for drawing off  
20 the pulp-water from said tank and passing it on to the said wire cloth, means to remove the fibers adhering to the surface of the said fiber-catching cylinder and mixing them with the water drawn off from  
25 the said tank, and means for regulating the level of the pulp carrying water in said tank.

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

HALVOR GAARA.

Witnesses:

ALFRED MILLER,  
LOUISE H. STAADEN.