

Aug. 23, 1955

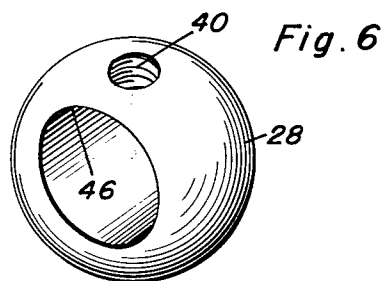
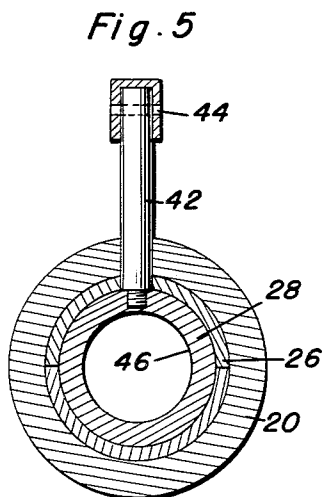
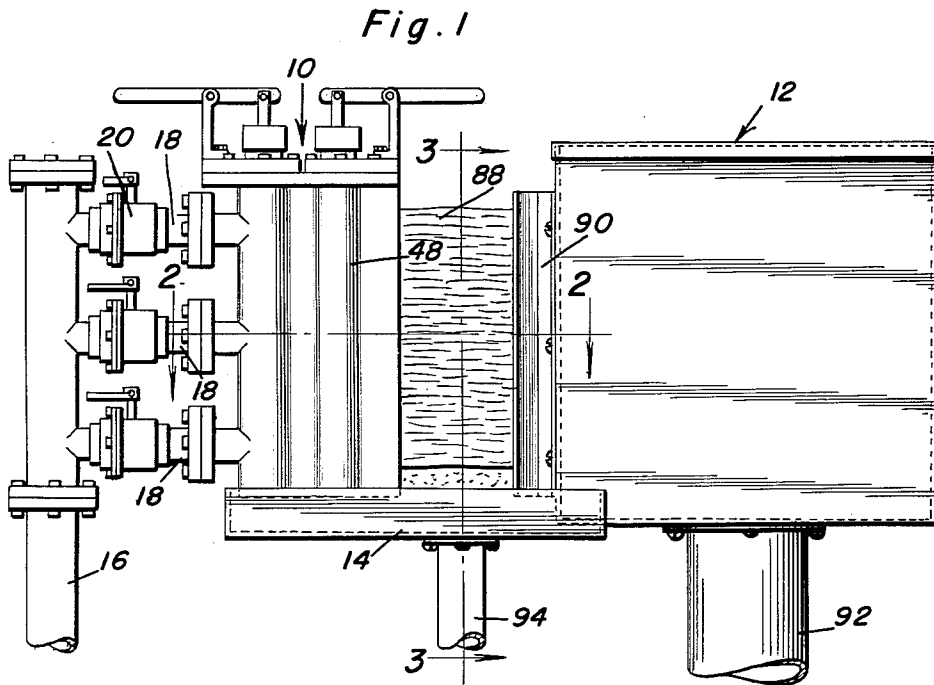
T. M. WALTERS

2,715,860

PULP CLEANER

Filed July 2, 1954

3 Sheets-Sheet 1



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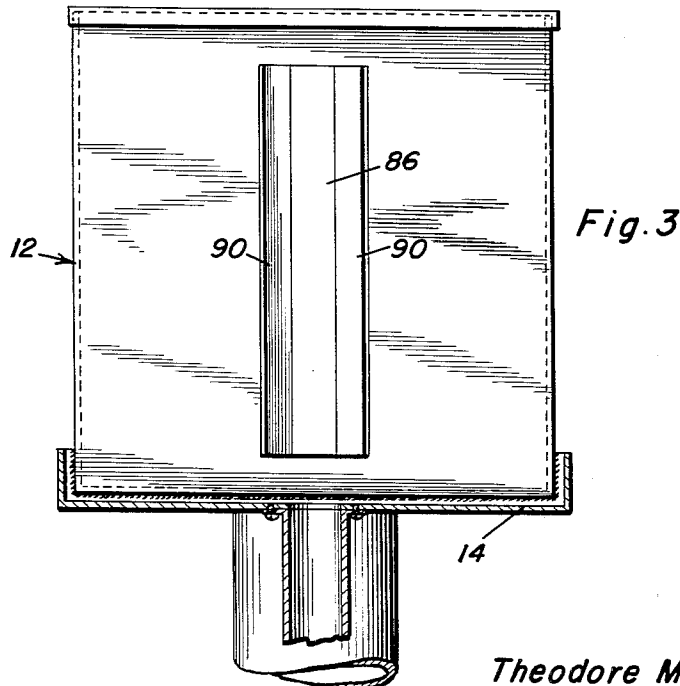
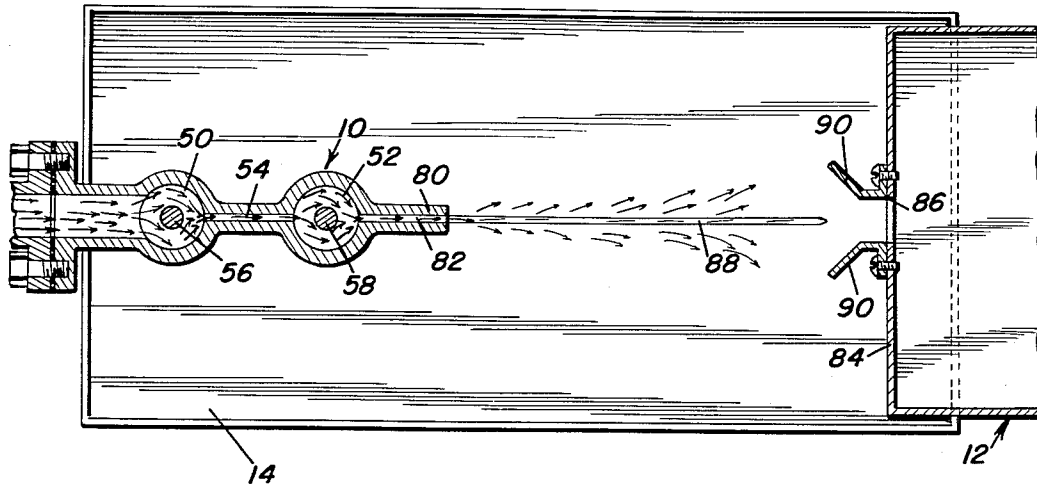
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Fig. 2



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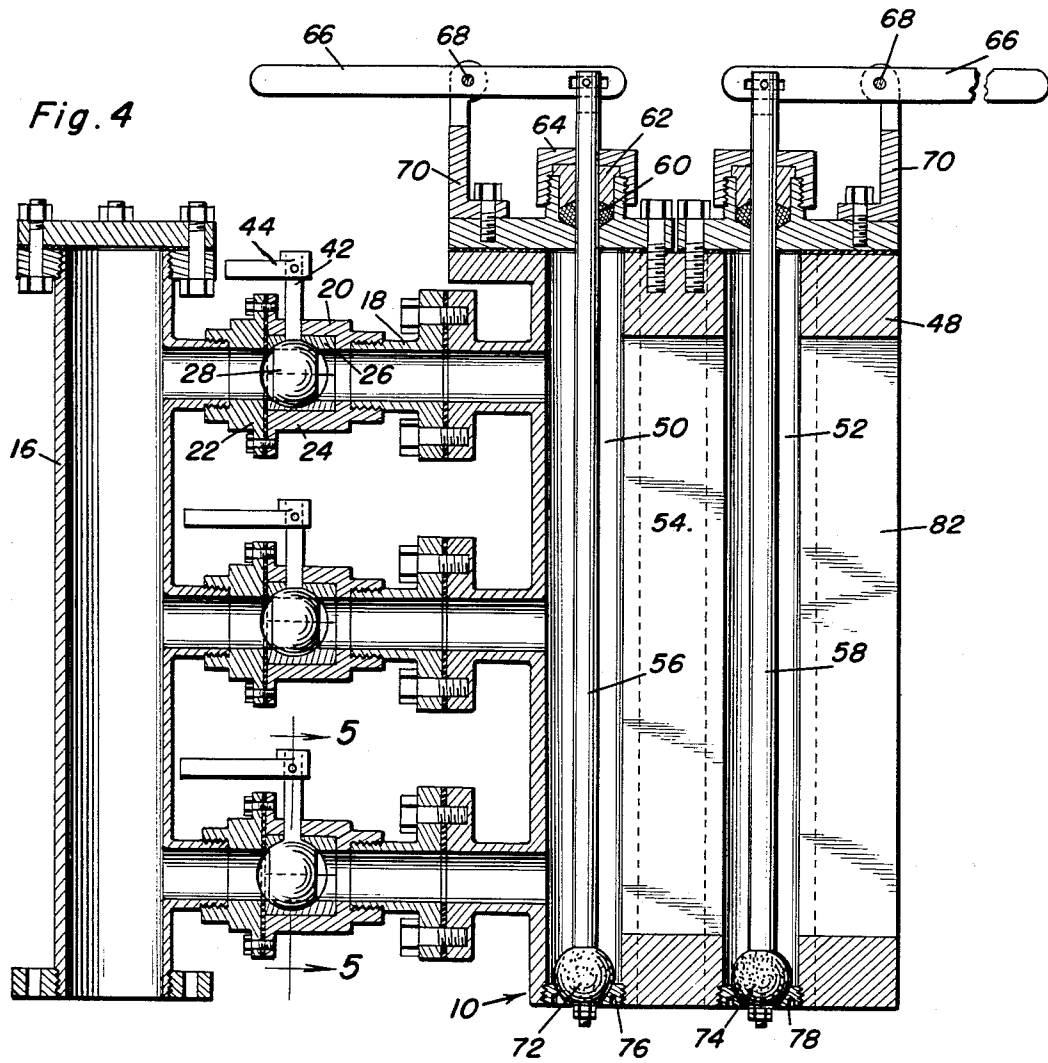
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2,715,860

PULP CLEANER

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9 Claims. (Cl. 92—28)

This invention relates generally to the manufacture of paper and pertains more particularly to a pulp cleaner mechanism.

A primary object of this invention is to provide an extremely efficient pulp cleaning mechanism which incorporates a minimum number of parts and which is generally endowed with simplicity of operation so as to provide both effective and trouble-free operation.

Another object of this invention is to provide a pulp cleaning mechanism for separating dirt and foreign material from pulp by means of causing the foreign material to be disposed on the outer side surfaces of a sheet of pulp issuing from an ejector device and flowing therefrom into a pulp receiver whereby the frictional drag of the atmosphere on the heavier foreign particles will cause them to fall away from and be separated from the sheet issuing from the ejector assembly.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a side elevational view of the improved pulp cleaner;

Figure 2 is an enlarged horizontal section taken substantially along the plane of section line 2—2 in Figure 1;

Figure 3 is a vertical transverse section taken substantially along the plane of section line 3—3 in Figure 1;

Figure 4 is an enlarged longitudinal section taken through the ejector assembly;

Figure 5 is a further enlarged vertical section taken substantially along the plane of section line 5—5 in Figure 4; and

Figure 6 is a perspective view of one of the valve devices shown in Figure 4.

Referring now more particularly to Figure 1, the assembly will be seen to consist essentially of an ejector assembly 10, a pulp receiver assembly 12 and a trough 14 for receiving the particles of foreign material. Reference numeral 16 indicates an inlet pipe by means of which the mixture of pulp fiber, foreign material and water is fed into the ejector assembly by means of the short inlet lines 18 which incorporate the valve mechanisms 20.

As shown most clearly in Figure 4, the valve assemblies 20 are all of identical construction, and each incorporates a two-piece body assembly including the end cap 22 and the valve housing 24. Each housing is provided with a sleeve member 26 within which a valve 28 is mounted, this valve being of spherical configuration and provided with a threaded aperture 40 for receiving the lower end of a valve stem member 42 having a lever 44 at its upper end for control of the valve 28. Additionally, each valve 28 is provided with a diametrical bore 46 by means of which flow through the lines 18 may be throttled from a

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full shut-off position to a full open position, as will be readily apparent.

The lines 18 are detachably secured to the ejector assembly 10, as will be readily apparent, and the ejector assembly will be seen to consist of a vertically elongated body 48 having first and second collector chambers 50 and 52 therein with the collector chambers interconnected by means of the relatively narrow passage 54. Each collector chamber is of enlarged circular configuration, and these chambers are provided with the deflector rods 56 and 58, respectively, vertically disposed therein in concentric relation thereto. The deflector rods are vertically slidable within the chamber, passing outwardly through the upper end of the ejector through the packing material 60, packing sleeve 62 and end cap 64 in the manner set forth. Operating handles 66 are pivoted about pins 68 carried by brackets 70 mounted on the ejector, and the lower ends of the rods 56 and 58 carry resilient ball members 72 and 74, respectively, seating on the apertured plugs 76 and 78 provided at the lower ends of the chambers 50 and 52. It is to be understood that the pulp and water mixture is fed through the inlet 16 under pressure such that the pressure will normally maintain the valves 72 and 74 in contact with their plugs 76 and 78, that is, in a closed position.

The free end of the ejector assembly is provided with a nozzle 80 having a vertically elongated, relatively narrow passage 82 therein through which the pulp fiber and water mixture is ejected in sheet-like form. The trough 14 is mounted such that one end thereof is disposed below the ejector assembly 10 with its opposite end spaced some distance therefrom, and it will be seen that the pulp receiver 12 is in the form of a tank having one wall 84 thereof facing the ejector assembly 10 and provided therein with a vertically elongated opening or slot 86 through which the sheet 88 of pulp mixture issuing from the ejector 10 is targeted.

Catch vanes 90 may be provided on the outer surface of the wall 84 in convergent relation to the slot 86 so as to minimize waste should the sheet 88 have a tendency to diffuse as it approaches the slot 86.

The clean pulp is educted from the receiver 12 through the discharge line 92 and foreign material is educted from the trough 14 through the discharge line 94.

In operation, as will be seen most clearly in Figure 2, the pulp fiber, water and foreign material mixture is introduced into the first chamber 50 and strikes the deflector rod 56 therein which will tend to move the heaviest particles, namely, the foreign material, to the region of the bounding surfaces of the chamber 50 wherein some will fall by gravity to the lower portions of this chamber adjacent the valve 72 and foreign material which continues in its movement with the pulp and water mixture will be disposed adjacent the opposite sides of the communicating passage 54 and will be further deflected upon entrance into the chamber 52 by means of the rod 58 such that more foreign material will settle within this chamber and the remaining foreign material will be issued out through the nozzle opening 82 adjacent the opposite sides thereof and will be disposed on the outer side faces of the sheet 88 issuing from the nozzle whereby the retarding force of the atmosphere will act quickest and most drastically on the heavy foreign material particles causing them to drop off and separate themselves from the sheet 88 to fall into the trough 14 and permit only clean pulp fiber and water mixture to enter the receiver 12 through the slot 86. Under some conditions, it may be necessary to operate two units serially to effect a proper cleaning of the pulp and fiber and water mixture.

Periodically, the valve levers 66 may be manipulated to blow down any foreign material which will have collected in the chambers 50 and 52, such blow-down being dis-

charged directly into the trough 14, as will be readily apparent.

It is, of course, to be understood that the valves 28 are provided to control the exit velocity of the sheet 88 issuing from the nozzle 80 to effect the optimum velocity condition which will permit the maximum of foreign material to be separated from the pulp fiber and water mixture and yet which will allow substantially all of the pulp fiber and water mixture to reach the receiver through the opening 86 therein. In this respect, it has been found that relatively low velocities are generally much more desirable than higher velocities, and it is generally not necessary to provide an unreasonably high inlet pressure for the mixture.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A pulp cleaner comprising an ejector assembly including a vertically disposed elongated nozzle member having a vertically disposed slotted opening adapted to issue a vertical sheet-like stream of pulp fiber and water mixture into the atmosphere, means disposed below said ejector assembly and extending therebeyond for receiving dirt and foreign matter separated from the sheet-like stream of pulp fiber and water, and a clean pulp fiber receiver spaced downstream from said nozzle member, said receiver having a vertically disposed elongated slot therein opening to the atmosphere in alignment with the vertically disposed slotted opening in said nozzle member for receiving the sheet-like stream of pulp fiber and water mixture.

2. A pulp cleaner comprising an ejector assembly including a vertically elongated nozzle member adapted to issue a sheet-like stream of pulp fiber and water mixture, a trough disposed below said ejector assembly and extending therebeyond, and a clean pulp fiber receiver spaced from said nozzle, said receiver having a vertically elongated slot therein adapted to receive a sheet-like stream of pulp fiber and water mixture, said ejector assembly also including a pair of spaced parallel collector chambers, each of said chambers being vertically elongated and interconnected by a relatively narrow passage, said nozzle member communicating with one of said chambers.

3. In a pulp cleaner, a vertically elongated housing, said housing having a pair of spaced, parallel, vertical chambers therein interconnected by a relatively narrow passage, said housing also having a nozzle portion communicating with one of said chambers and provided with a vertically elongated discharge opening adapted to issue a sheet-like stream of pulp fiber and water mixture therefrom, said chamber being provided with annular plug members at their lower ends, a deflector rod disposed concentrically within each of said chambers and mounted in said housing for vertical sliding movement, a resilient valve body secured to the lower end of each of said deflector rods and normally seated on said plug members, and means for manually moving said rods in a vertical direction.

4. A pulp cleaner comprising an ejector assembly including a vertically elongated nozzle member adapted to issue a sheet-like stream of pulp fiber and water mixture, a trough disposed below said ejector assembly and extending therebeyond, and a clean pulp fiber receiver spaced from said nozzle, said receiver having a vertically elongated slot therein adapted to receive a sheet-like stream of pulp fiber and water mixture, said ejector assembly also including a pair of spaced parallel collector chambers,

each of said chambers being vertically elongated and interconnected by a relatively narrow passage, said nozzle member communicating with one of said chambers, each of said chambers being provided with a concentrically disposed deflector rod.

5. A pulp cleaner comprising an ejector assembly including a vertically elongated nozzle member adapted to issue a sheet-like stream of pulp fiber and water mixture, a trough disposed below said ejector assembly and extending therebeyond, and a clean pulp fiber receiver spaced from said nozzle, said receiver having a vertically elongated slot therein adapted to receive a sheet-like stream of pulp fiber and water mixture, said ejector assembly also including a pair of spaced parallel collector chambers, each of said chambers being vertically elongated and interconnected by a relatively narrow passage, said nozzle member communicating with one of said chambers, an annular plug member at the lower end of each of said chambers, a vertically disposed deflector rod positioned concentrically of each of said chambers, a resilient valve body secured to the lower end of each of said deflector rods and normally seated on said plug members, and means for manually moving said deflector rods in a vertical direction.

6. A pulp cleaning machine comprising a supply line adapted to contain a mixture of pulp fiber and water, an ejector assembly, a series of inlet pipes connecting said supply line to said ejector assembly and each having a manually controlled valve therein, said ejector assembly including a vertically elongated nozzle member having a vertically disposed slotted opening adapted to issue a vertical sheet-like stream of pulp fiber and water mixture into the atmosphere, means disposed below said ejector assembly and extending therebeyond for receiving dirt and foreign matter separated from the sheet-like stream of pulp fiber and water, and a clean pulp fiber receiver spaced downstream from said nozzle, said receiver having a vertically disposed elongated slot therein opening to the atmosphere in alignment with the vertically disposed slotted opening in said nozzle member for receiving the sheet-like stream of pulp fiber and water mixture.

7. A pulp cleaning machine comprising a supply line adapted to contain a mixture of pulp fiber and water, an ejector assembly, a series of inlet pipes connecting said supply line to said ejector assembly and each having a manually controlled valve therein, said ejector assembly including a vertically elongated nozzle member adapted to issue a sheet-like stream of pulp fiber and water mixture, a trough disposed below said ejector and extending therebeyond, and a clean pulp fiber receiver spaced from said nozzle, said receiver having a vertically elongated slot therein adapted to receive a sheet-like stream of pulp fiber and water mixture, said ejector assembly also including a pair of spaced parallel collector chambers, each of said chambers being vertically elongated and interconnected by a relatively narrow passage, said nozzle member communicating with one of said chambers.

8. A pulp cleaning machine comprising a supply line adapted to contain a mixture of pulp fiber and water, an ejector assembly, a series of inlet pipes connecting said supply line to said ejector assembly and each having a manually controlled valve therein, said ejector assembly including a vertically elongated nozzle member adapted to issue a sheet-like stream of pulp fiber and water mixture, a trough disposed below said ejector and extending therebeyond, and a clean pulp fiber receiver spaced from said nozzle, said receiver having a vertically elongated slot therein adapted to receive a sheet-like stream of pulp fiber and water mixture, said ejector assembly also including a pair of spaced parallel collector chambers, each of said chambers being vertically elongated and interconnected by a relatively narrow passage, said nozzle member communicating with one of said chambers, each of said chambers being provided with a concentrically disposed deflector rod.

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9. A pulp cleaning machine comprising a supply line adapted to contain a mixture of pulp fiber and water, an ejector assembly, a series of inlet pipes connecting said supply line to said ejector assembly and each having a manually controlled valve therein, said ejector assembly including a vertically elongated nozzle member adapted to issue a sheet-like stream of pulp fiber and water mixture, a trough disposed below said ejector and extending therebeyond, and a clean pulp fiber receiver spaced from said nozzle, said receiver having a vertically elongated slot therein adapted to receive a sheet-like stream of pulp fiber and water mixture, said ejector assembly also including a pair of spaced parallel collector chambers, each of said chambers being vertically elongated and interconnected by a relatively narrow passage, said nozzle member communicating with one of said chambers, an

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annular plug member at the lower end of each of said chambers, a vertically disposed deflector rod positioned concentrically of each of said chambers, a resilient valve body secured to the lower end of each of said deflector rods and normally seated on said plug members, and means for manually moving said deflector rods in a vertical direction.

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