Nov. 16, 1965 S. O. VALTANEN ETAL 3,217,987

DEVICE FOR SUPPLYING WATER FOR THE FURTHER ALLUVIATION OF FIBRES IN STRAINERS

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Fig. 1

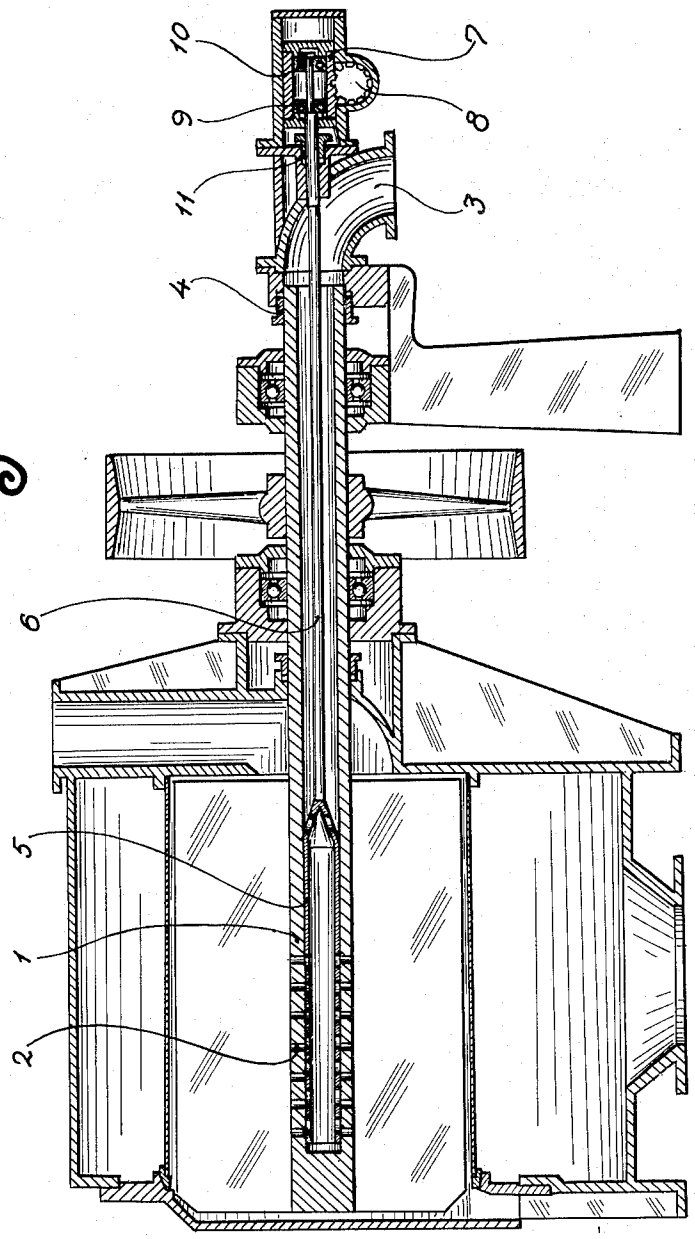

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Fig. 2

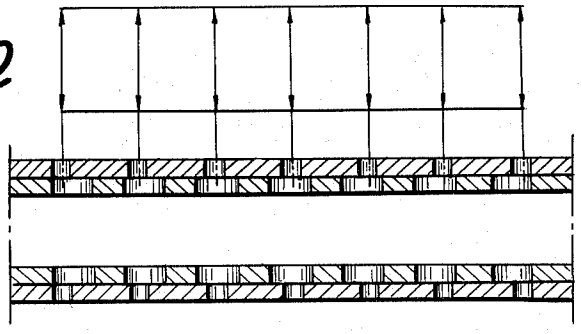


Fig. 3

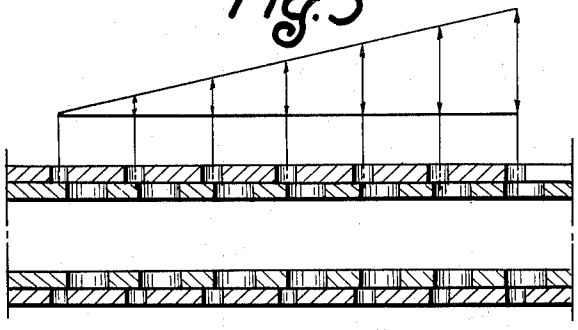
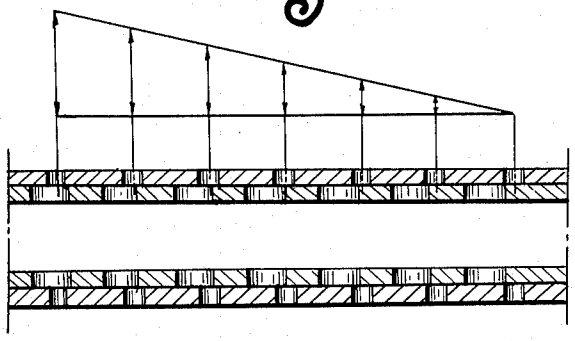


Fig. 4



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3,217,987

DEVICE FOR SUPPLYING WATER FOR THE FURTHER ALLUVIATION OF FIBRES IN STRAINERS

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6 Claims. (Cl. 239—539)

The following invention consists of a device for supplying water for the further alluviation in strainers of fibres, such as cellulose pulps. It is intended particularly for centrifugal strainers, and its purpose is to distribute the water supplied in the manner desired longitudinally along the strainer, and to ensure that the distribution device can be adjusted during the operation.

Similar devices for supplying water for alluviation, in which the rotor shaft has been bored hollow along its length and supplied with radial holes through which the water flows into the strainer, are prior known. By carefully selecting the size and the position of the holes, the exact distribution of fresh water required for a particular condition of operation can be achieved, but it is impossible to alter this distribution during operation. So that the supply of fresh water can be adjusted to a certain extent, the device has also been divided into sections enabling the ratio between the quantities of water in the different sections to be varied, but even here, the distribution within each section remains constant during the operation, and cannot be modified.

The purpose of the present invention is to achieve greater adjustability in the supply of water for the further alluviation of fibres in strainers by means of a hollow rotor shaft furnished with holes. The principal characteristic of the invention is that in or around the hollow shaft lies a sleeve provided with holes running axially and and movable in an axial direction, the holes in the shaft and sleeve being arranged in coincident axial rows but having different dimensions, at least in the axial direction, while the centres of the holes reckoned from the middle point of the rows towards both ends are displaced in relation to each other so that when they are in a position in which the middle points of the rows of holes in both the shaft and the sleeve coincide, the flow through each pair of holes is of equal magnitude, but when the sleeve is displaced in either direction, said flow varies in different degrees through each pair of holes in the row. The distance between the centres of the holes in the sleeve in the direction of the shaft is best obtained from the following formula:

$$L+x/n$$

in which L is the distance between the centres of the holes at the outer ends of the row in the rotor shaft, x is the nominal value of the difference between the axial dimensions of the holes in the shaft and sleeve, and n is the number of holes minus 1 in a row; when the holes in the sleeve are bigger than those in the shaft, x is taken to have a + sign when the outer edge of the larger holes at the farther ends extends beyond the outer edge of the smaller holes at the farther ends, and x is taken to have a — sign when the outer edge of the outer holes in both rows coincide. When the holes in the shaft are bigger, the signs of x are the reverse of those given under the above two conditions.

One embodiment of the invention adapted for a centrifugal filter is shown as an example in the accompanying drawing:

FIG. 1 is a longitudinal section of a centrifugal strainer in a device according to the invention;

FIGS. 2–4 shows the distribution of alluviation water through three different arrangements of the holes in the sleeve in relation to the holes in the rotor shaft.

No. 1 in FIG. 1 is the rotor shaft, bored hollow longitudinally and provided with holes 2. Alluviation water enters through the inlet 3. The quantity of this water can be regulated in a manner which need not be described here. The inlet 3 is joined to the shaft 1 by a packing box 4. Inside the shaft is a sleeve 5, which is provided with holes and can be moved axially. The sleeve 5 is joined by a spindle 6 to a socket 7 which is furnished with cogs running along its length. The end of the spindle 6 is carried in bearings 9 and 10 inside the socket 7, and rotates with the shaft 1. No. 11 is a packing box.

The holes in the sleeve 5 are placed at slightly different intervals from those in the shaft 1, as can be seen in FIGS. 2–4. FIG. 2 shows the axially movable sleeve in such a position that all its holes are fully open. If the shaft holes are distributed evenly and are of equal size, the quantities flowing through are evenly distributed along the shaft, as shown in the graph above FIG. 2. FIGS. 3 and 4 show the sleeve in positions in which the outer holes at one end of the row of holes in the shaft are fully closed, while those at the other end are fully open and the intermediate holes are opened in varying degrees. Thus the open-hole area and flow of liquid through the shaft holes varies longitudinally, as can be seen from the graphs.

The holes in the shaft and sleeve can be of different dimensions and distributed in different ways along their length. Any distribution of fresh water quantities that is desired can thus be obtained, for example, by fully opening one or more holes at one end of the row of holes in the shaft, while all the others are fully closed. The shaft holes can lie in a direction other than a radial one.

The invention is not limited to the construction described above and shown in the drawings, but can be varied in many different ways. For example, the sleeve can be placed around the rotor shaft and provided with cogs lying side by side running peripherally in the direction of the shaft, the cogs being in contact with a cogwheel which enables the sleeve to be moved in either direction.

What we claim is:

1. An improvement in a pulp screen including an annular screen and a rotary impeller, a pulp stock inlet located axially with respect to said impeller, a hollow drive shaft having a series of axial rows of holes in its surface area and means to supply dilution water to said hollow shaft, a sleeve having telescoped relationship with and axially movable along said shaft and provided with axial rows of holes coinciding in radial axial planes with rows of holes in said shaft, there being the same number of holes in the rows thereof in the sleeve and in the rows of holes in the shaft, and means to move said sleeve axially along said shaft, the holes in the sleeve having different dimensions in the direction axially of the sleeve and shaft compared to the holes in the shaft, while the centers of the holes reckoned from the middle point of the rows towards both ends are displaced in relation to each other in such a way, that when they are in a position in which the centers of the holes in the axial center of the rows of holes in the shaft and sleeve coincide, the flow of dilution water through each pair of holes is of equal magnitude, but when the sleeve is displaced in either direction with respect to the shaft, said flow varies in different degrees through the communicating pairs of holes in the rows in the shaft and sleeve.

2. An improvement in accordance with claim 1 in which said sleeve is located inside of said hollow shaft.

3. An improvement in accordance with claim 1 in which said sleeve is located around said hollow shaft.

4. An improvement in accordance with claim 1,

wherein the holes in the shaft are similar and are spaced equal distances along the length of the shaft, and wherein the holes in the sleeve are similar and are spaced equal distances along the length of the sleeve.

5. An improvement in accordance with claim 4, in which the distance between the centers of the holes in the sleeve in the direction of the shaft is disposed according to the formula $L+x/n$ in which L is the distance between the centers of the holes at the outer ends in the rows of holes in the shaft, x the difference between the axial dimensions in the holes of the shaft and sleeve, and n the number of holes minus 1 in a row, so that, when the holes in the sleeve are bigger in an axial direction than those in the shaft, x has a + sign when the outer edge of the larger holes at said farther ends extend beyond the outer edge of the smaller holes at said farther ends, and has a — sign when the outer edge of the holes at said farther ends in both rows coincide.

6. An improvement in accordance with claim 1, comprising a spindle connected to the sleeve, said spindle extending beyond said rotor shaft, to a socket provided with a rack gear along its length connected to the spindle, and a cogwheel in mesh with the rack, whereby the said spindle together with said sleeve can be shifted in either direction while the shaft is rotating.

References Cited by the Examiner

UNITED STATES PATENTS

201,986	4/1878	Bishop.	
1,614,357	1/1927	Gamper.	
1,843,715	2/1932	Gavino	239—417
3,032,239	5/1962	Whitley et al.	222—486

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