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B. COWAN ET AL
ROTARY PULP SCREENS

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2 Sheets-Sheet 1

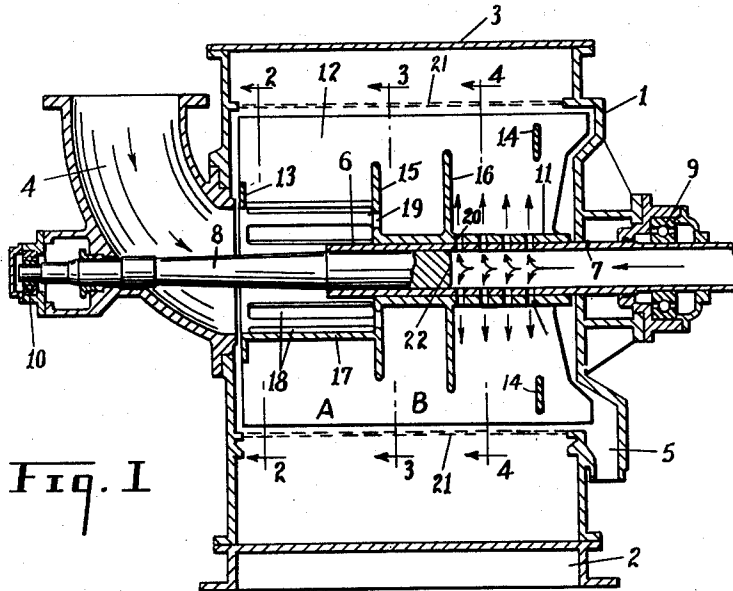


Fig. 1

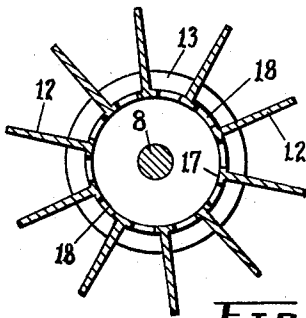


Fig. 2

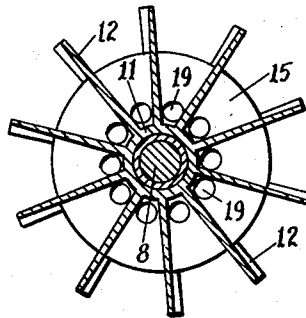


Fig. 3

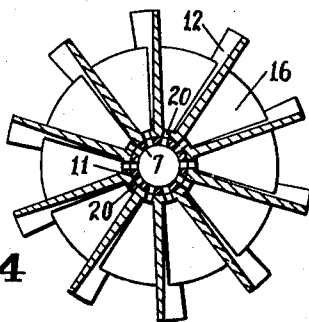


Fig. 4

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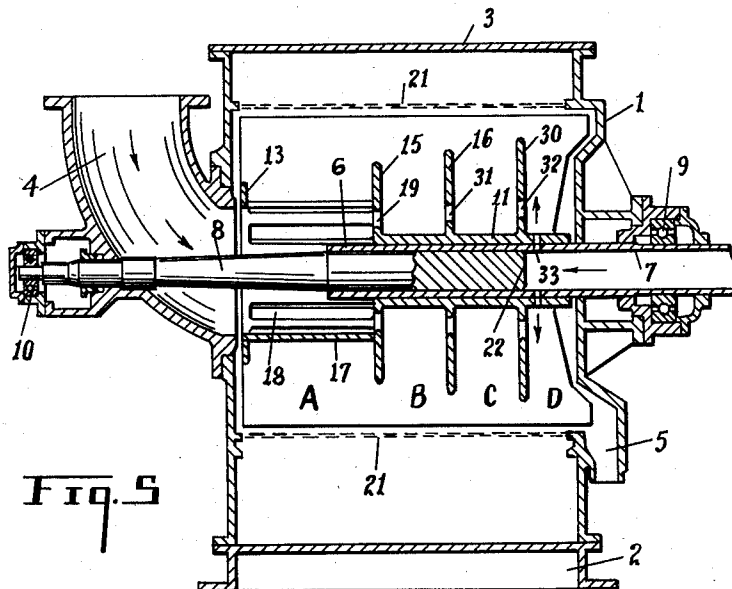


Fig. 5

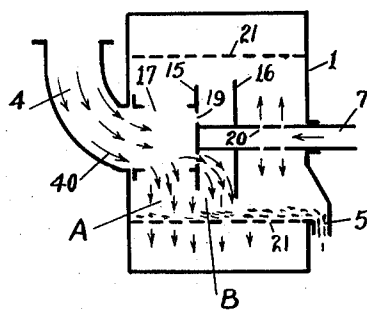


Fig. 6

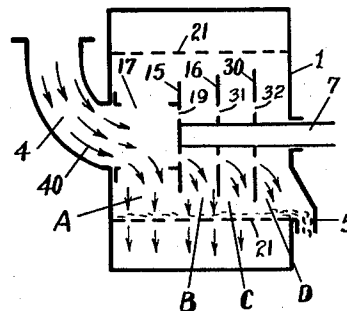


Fig. 7

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ROTARY PULP SCREENS

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5 Claims. (Cl. 210—219)

This invention relates to rotary pulp screens and more particularly to the horizontal type in which the rotating element or impeller is sectionalized by baffles disposed at right angles to the axis of rotation of the impeller, the baffles being provided with apertures which allow a portion of the incoming stock to pass through from one section to another to assist in diluting the thickening fibres in the screen which accumulate towards the discharge end of the screen.

The invention consists essentially in the provision of a rotary impeller which is sectionalized by baffles disposed at right angles to the axis of rotation of the impeller, the baffles being provided with apertures which allow a portion of the incoming stock to pass through from one section to another to assist in diluting the thickening fibres in the screen which accumulate towards the discharge end of the screen.

The incoming pulp stock is prepared having a desired consistency, and with the screens heretofore used, only the first portion of the screen functioned efficiently with the fibres matting on the screen in ever increasing thickness towards the discharge opening. In order to overcome this matting of the pulp, fresh or white water has had to be introduced in an attempt to break up the matting pulp. This may or may not be satisfactory depending on working conditions, but in any case, contributed to uncontrolled dilution of the pulp stock with resulting decrease in efficiency. This difficulty has been overcome in the present invention where a portion of the initial pulp stock is by-passed directly to a second or more stages thereby giving a more even distribution of the pulp stock, in its original state of dilution, over a greater length of screen so that the pulp screening will be evenly distributed over a greater length of the machine and will not tend to build up a pulp mat as has been the case heretofore. Any diluent which may have to be added is merely to ensure that the tailings will be cleared from the end portion of the rotary screen and carried out through the discharge opening.

The primary object of the invention therefore is to maintain the consistency of the incoming pulp stock over the full length of the rotary screen and thereby eliminate to a large extent uneven matting on the screen surface.

A further object of the invention is to sectionalize the impeller of a rotary pulp screen and to bypass a portion of the incoming pulp stock to each section without further dilution.

A further object of the invention is to provide a rotary pulp screen in which the screening of the pulp is carried out uniformly over the greater part of the length of the screen.

A further object of the invention is to provide a rotary pulp screen in which the rejects or tailings can be carried away in an even flow without carrying with them a large portion of the prime pulp stock.

A further object of the invention is to provide a rotary pulp screen in which dilution water need only be added

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to assist in the removal of the rejects or tailings without in any way diluting the main stock flow.

These and other objects will be apparent from the drawings in which—

5 Fig. 1 is a vertical section elevation of a rotary screen having a primary and one secondary screening zone.

Fig. 2 is a cross section of the impeller taken on the line 2—2 of Fig. 1.

10 Fig. 3 is a cross section of the impeller taken on the line 3—3 of Fig. 1 and showing the pulp stock by-pass openings in the baffle.

Fig. 4 is a cross section of the impeller taken on the line 4—4 of Fig. 1 and showing the supplementary dilution apertures, if required.

15 Fig. 5 is a vertical section elevation of a rotary screen with additional secondary screening zones and limited dilution water apertures, if required.

Fig. 6 is a diagrammatic sketch showing the main stock flow in the rotary screen shown in Fig. 1.

20 Fig. 7 is a diagrammatic sketch showing the main stock flow in the rotary screen shown in Fig. 5.

Referring to the drawings and particularly to Figs. 1, 2, 3, 4 and 6. The rotary pulp screen is of the horizontal type and comprises a circular casing 1 mounted on the base 2 and closed around its periphery by the cover 3. The casing 1 is provided with a large diameter pulp stock inlet 4 and a rejects or tailings outlet 5. The drive shaft 6 comprises a sleeve shaft 7 and a stub shaft 8 sealing the inner end of the sleeve shaft. The sleeve shaft 7 is journaled in the bearing 9 on the side of the casing 1 while the stub shaft 8 is journaled in an extension bearing 10 built onto the wall of the stock inlet 4.

35 The impeller of the rotary screen is built up on the sleeve hub 11 secured to the drive sleeve 7 for rotation therewith. The impeller is composed of a series of blades 12 set at a slight angle longitudinally of the hub sleeve 11 and radiating therefrom and are held rigidly by means of the end rings 13 and 14 and by the intermediately disposed baffle plates 15 and 16.

40 A sleeve 17 extends between the end ring 13 and the baffle plate 15 and has an internal diameter equal to and concentric with the stock inlet 4 at its point of entry to the casing 1. This sleeve 17 is provided with a series of longitudinal slots 18 through which the stock flows from the inlet 4 into what may be called the primary screening zone A of the screen.

45 The baffle plate 15 is provided with a series of apertures 19 set at a radius within the diameter of the sleeve 17 and serves to by-pass directly, a flow of pulp stock from the inlet 4 through the sleeve 17 to the space between the baffles 15 and 16 which may be called the secondary screening zone B.

50 The sleeve shaft 7 and the hub sleeve 11 in the length between the baffle plate 16 and the discharge end of the rotary screen, is provided with a series of apertures 20 connecting the bore of the shaft sleeve 7 with the interior of the rotary screen to provide a series of water jets. The number and spacing of these apertures 20 will depend on the volume of diluent water required to break up any fibrous matting tending to form on the screen 21 towards the discharge end and to assist in carrying off the rejects or tailings out through the discharge opening 5. The stub shaft 8 is fitted longitudinally in the sleeve shaft 7 so that its end 22 provides a plug to the sleeve 7 at a point adjacent the inner circle of apertures 20.

65 In Fig. 5 of the drawings a modified form of the rotary screen is shown. In this form an additional baffle 30 is shown which, acting in conjunction with the baffle 16, provides an additional secondary screening zone C. In this modification the baffle 16 is provided with a series of apertures 31, and the baffle 30 has similar apertures 32. The apertures 19, 31 and 32 are preferably set

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at an angle with respect to the axis of the rotary screen, the angle spreading out towards the rear end of the screen. The baffle 30 together with the end wall of the casing 1 sets up another secondary screening zone D and it will be noted in Fig. 5 that the end 22 of the stub shaft 8 is brought into line with the baffle 30. The apertures 33 passing through the sleeve shaft 7 and hub 11 connect in this case the bore of the sleeve 7 with the screening zone D. The purpose of these apertures 33 is merely to ensure that the rejects or tailings are carried out through the discharge opening 5. However, these apertures 33 can be dispensed with, as shown in Fig. 7, if the flow of primary pulp stock from the inlet 4 and carried through the sleeve 17 and apertures 19, 31 and 32 is made adequate to carry out the final screening in the zone D and carry away the rejects or tailings through the discharge opening 5.

In the operation of this invention, reference is made to Figs. 6 and 7 of the drawings, Fig. 6 is a diagrammatic representation of the rotary screen shown in Fig. 1 while Fig. 7 is a diagrammatic representation of the screen shown in Fig. 5.

In Fig. 6 the flow of pulp stock is shown by the arrows 40 as passing from the inlet 4 into the sleeve 17 where a large portion of the stock is passed into the primary screening zone A, where little or no matting of the pulp takes place on the screen 21. As the pulp matting tends to build up towards the discharge end of the screen, this tendency will be greatly reduced by the flow of the stock from the sleeve 17 through the apertures 19 into the secondary screening zone B. The flow of stock directly onto the screen 21 in the area of the zone B will ensure a maximum passage through the screen of screenable stock and further reducing the matting tendency in this area. The diluent required to be passed into the rotary screen through the apertures 20 will be reduced to a minimum and will only be sufficient to reduce matting to a minimum and carry off the tailings to the discharge outlet 5.

In Fig. 7 it will be seen that the stock is directed into all screening zones A, B, C and D so that the pulp fibres are screened evenly over the whole length of the screen 21. With such a spread of the pulp stock little or no diluent needs to be added to the zone D, and if it is added it is only for the purpose of speeding up the discharge of the tailings through the discharge opening 5.

The rotary pulp screen as described above ensures that a maximum of screening will be effected over a longer period of time without having to stop for cleaning purposes. In addition the screening can be carried out using only a minimum of diluent or none at all depending on the number of secondary screening zones used in the screen.

What we claim is:

1. In a rotary pulp screening machine including a screen and a rotary impeller, a pulp supply inlet located axially with respect to said impeller, said impeller being sectionalized along its length by baffles set transversely of the axis of the impeller, an axial sleeve in the first section of the impeller, said sleeve being approximately the same diameter as the said axial pulp supply inlet, said sleeve having a series of longitudinal slots allowing a large portion of the pulp stock supply to be directed onto said screen, the said baffles having a series of apertures through which the remainder of the pulp stock from said sleeve passes into the various sections of the impeller to spread the pulp stock over a greater area of the screen.

2. In a rotary pulp screening machine including a screen and a rotary impeller, a pulp supply inlet located axially with respect to said impeller, said impeller having

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a series of blades set longitudinally for the length of said impeller and radiating from the axis thereof and sectionalized along its length by baffles set transversely of the axis of the impeller, an axial sleeve in the first section of the impeller, said sleeve being approximately the same diameter as the said axial pulp supply inlet, said sleeve having a series of longitudinal slots allowing a large portion of the pulp stock supply to be directed on to said screen, the said baffles having a series of apertures through which the remainder of the pulp stock from said sleeve passes into the various sections of the impeller to spread the pulp stock over a greater area of the screen.

3. In a rotary pulp screening machine including a screen and a rotary impeller, a pulp supply inlet located axially with respect to said impeller, said impeller having a series of blades set longitudinally for the length of said impeller and radiating from the axis thereof and sectionalized along its length by baffles set transversely of the axis of the impeller, an axial sleeve joining the walls of the baffles forming the first section of the impeller, said sleeve being approximately the same diameter as the said axial pulp supply inlet and in communication therewith, said sleeve having a series of longitudinal slots located between the blades of the impeller and allowing a large portion of the pulp stock supply to be directed onto said screen, said baffles being provided with a series of apertures through which the remainder of the pulp stock from said sleeve to pass through said baffles into the various sections of the impeller to spread the pulp stock over a greater part of the screen.

4. In a rotary pulp screening machine as set forth in claim 3, wherein the apertures in the various baffles are set at a slight angle longitudinally with respect to the axis of the impeller and opening out towards the discharge end of the screening machine.

5. In a rotary pulp screening machine including a screen and a rotary impeller, a drive shaft for said impeller said drive shaft being partially hollow into which is fed a supply of diluting water, a pulp supply inlet located axially with respect to said impeller, said impeller having a series of blades set longitudinally for the length of said impeller and radiating from the axis thereof and sectionalized along its length by baffles set transversely of the axis of the impeller, an axial sleeve joining the walls of the baffles forming the first section of the impeller, said sleeve being approximately the same internal diameter as the said axial pulp supply inlet, said sleeve having a series of longitudinal slots allowing a large portion of the pulp stock supply to be directed onto said screen, means to pass the remainder of the pulp stock from said sleeve through said baffles into the various sections of the impeller, to spread the pulp stock over a greater area of the screen, said drive shaft having a series of apertures in its hollow section allowing a flow of diluent water into the last section of the impeller.

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