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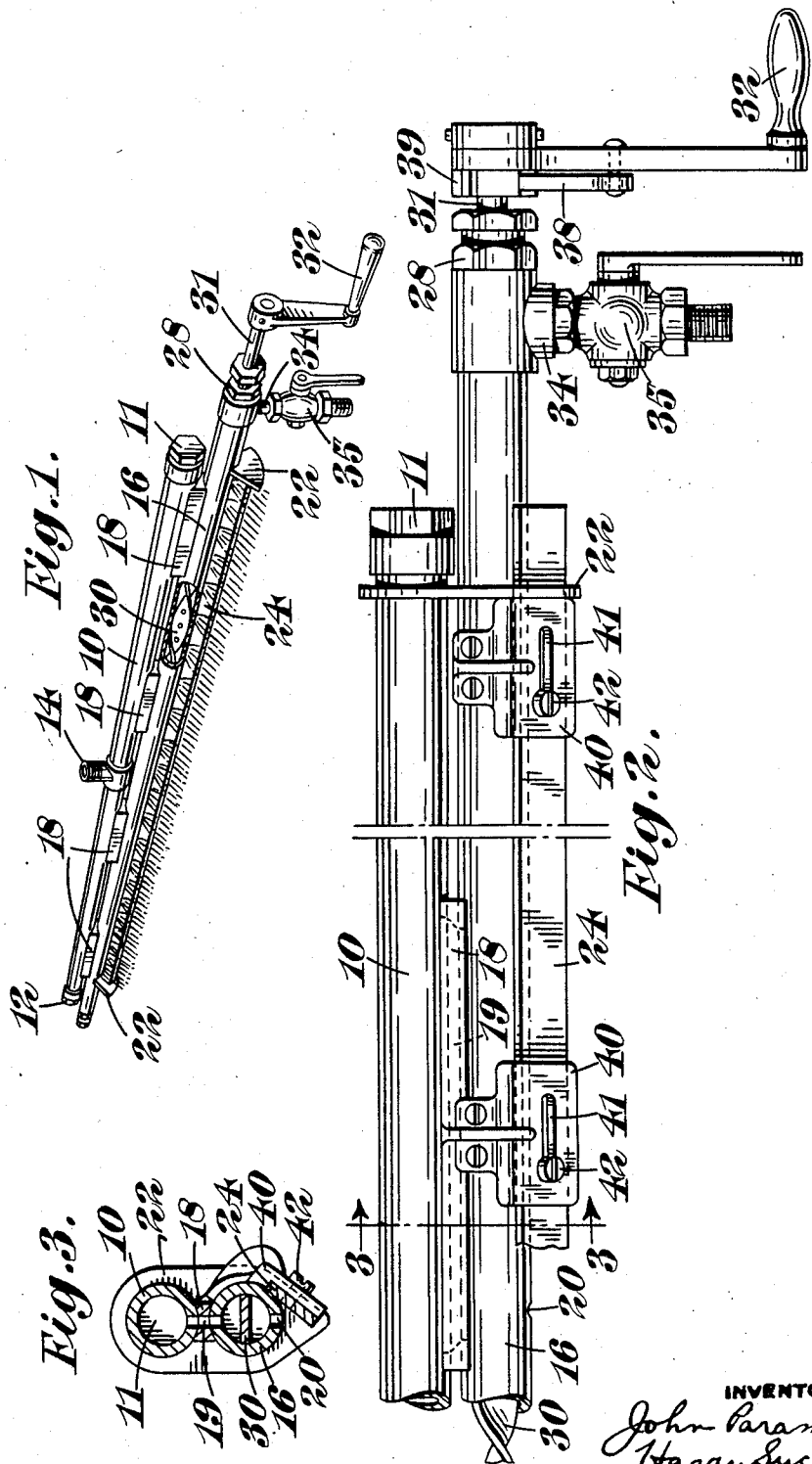
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WASHING DEVICE COMPRISING SHOWER PIPES

Filed Aug. 21, 1934

3 Sheets-Sheet 1



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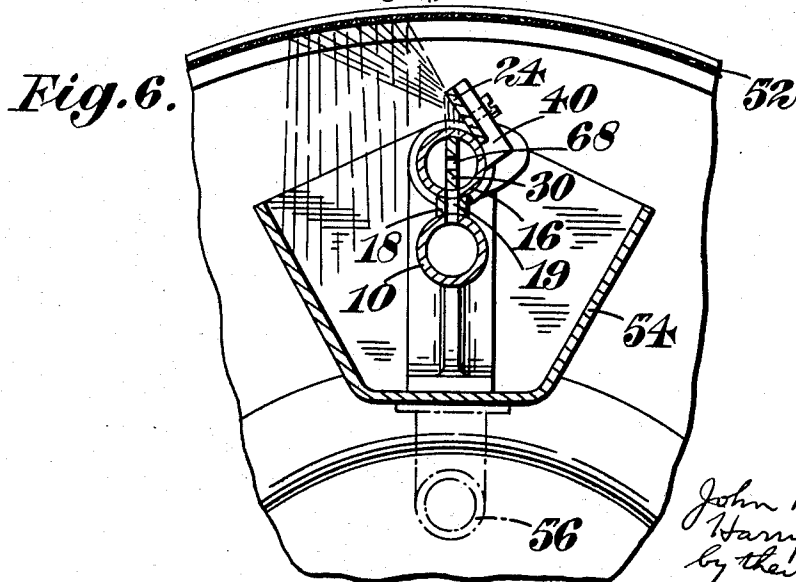
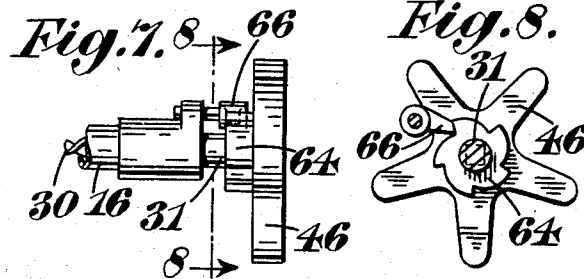
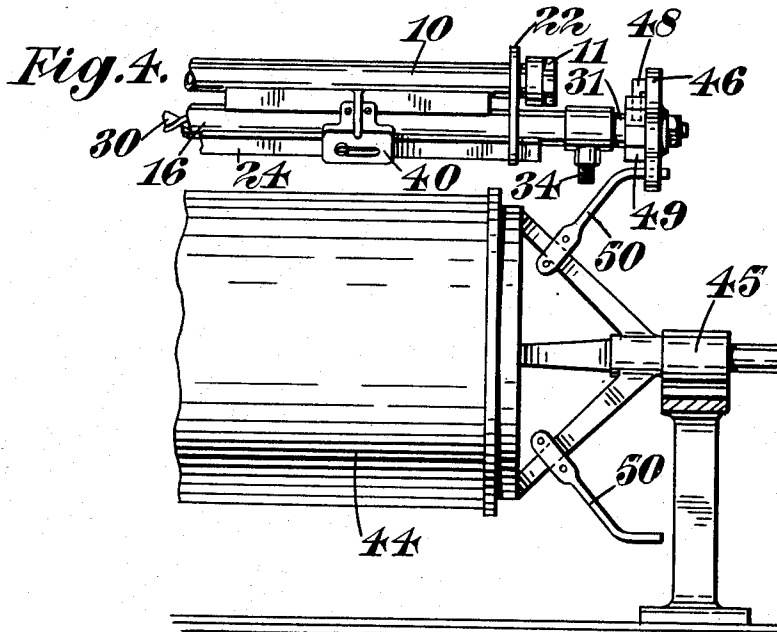
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WASHING DEVICE COMPRISING SHOWER PIPES

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3 Sheets-Sheet 2



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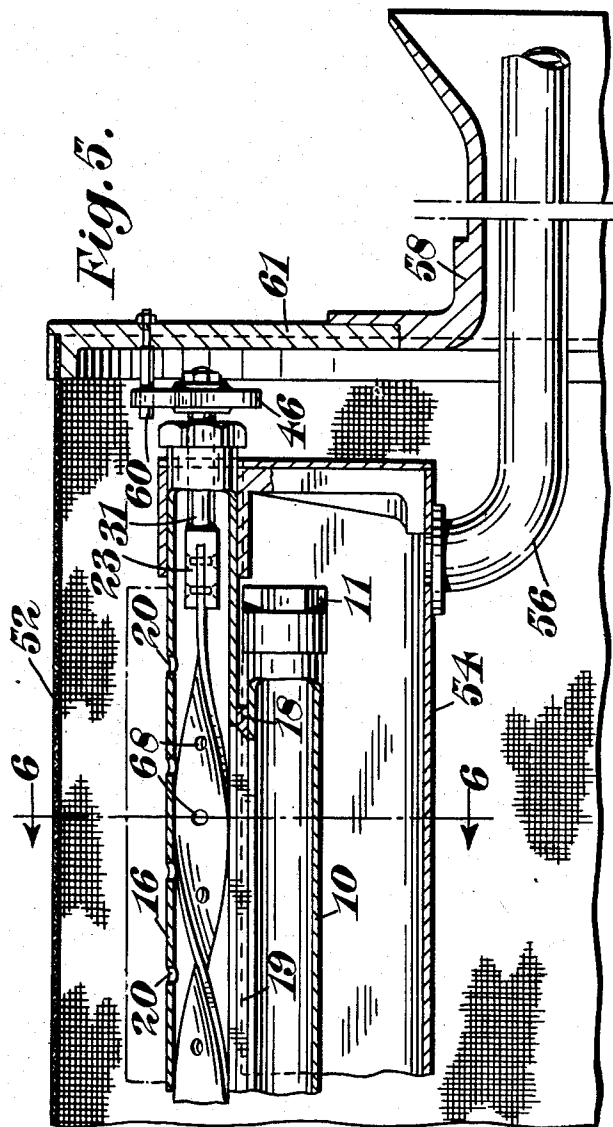
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WASHING DEVICE COMPRISING SHOWER PIPES

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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WASHING DEVICE COMPRISING SHOWER
PIPES

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6 Claims. (Cl. 92—50)

This invention relates to washing devices comprising shower or washing pipes such as are used for washing strainers, felts and the like in paper mills and other industries, and the particular type of washing device to which the invention relates is that wherein a delivery pipe has a plurality of outlets for jets of liquid spaced apart in a row in the direction of its length, a cleaning device movable in the pipe serves for cleaning the outlets, and a longitudinal baffle is so arranged parallel with said pipe that the jets will impinge thereon and be converted into a film or solid curtain of liquid.

In one construction of washing device of the type described used heretofore, in which the delivery pipe was carried by a feed pipe in spaced relation therewith by means of a plurality of slotted saddles or union members of elongated form spaced apart one from another in the direction of length of the pipes, the feed pipe was connected at the middle of its length to a supply pipe for water, e. g. backwater from a paper-making machine, and the cleaning device comprised a rod carrying disc-shape scrapers or annular cutters in the delivery pipe, which rod extended through a stuffing box at one end and could be reciprocated by operating a handle member outside the pipe. In this known washing device, in order to economize water for the shower, the perforations in the delivery pipe were holes of small diameter and close pitch, and were liable to be stopped up if "thick" shower water, e. g. backwater containing fibre, were used. Moreover, it was found that when the rod became dirty, it was difficult to work the cleaning device as the rod did not draw readily through the packing in the stuffing box; also, during use, the dirt collected between the cutters on it, as the only outlet was by way of the perforations delivering the washing water which was very detrimental to the perforations.

The present invention has for one of its objects to obviate these defects and to provide an improved construction of washing device of the type described which shall provide an evenly distributed shower, and shall prevent sediment from collecting in the delivery pipe from the moment of starting the device working, and shall be generally more satisfactory in use than those proposed heretofore.

According to the invention there is provided a washing device of the type described wherein the cleaning device is rotatable in the delivery pipe for the purpose of cleaning the outlets by means of a rotary motion.

According to a feature of the invention, the cleaning device may have the form of a screw-conveyor that is rotatable in the delivery pipe and, when rotated, conveys sediment towards one end of the pipe. This arrangement ensures that the sediment is not removed through the outlets for the jets, whereby those outlets are not damaged by the removal of sediment through them, and the sediment is prevented from reaching the surface on to which the liquid is being projected.

Preferably, the screw-thread of the conveyor is of coarse pitch and the screw-conveyor may be constituted by a strip of material twisted about its central longitudinal axis into the form of a spiral that is of a diameter substantially equal to the internal diameter of the delivery pipe, and is connected to a driving spindle at only one end.

In order to provide for an even delivery of the washing liquid when the cleaning device is being used and also when it is stationary, the screw-thread of the conveyor may have perforations situated at or near its axis of rotation.

According to a feature of the invention, one end of the screw-conveyor may carry driving means comprising a toothed member arranged to be rotated intermittently. This toothed member may be a star wheel arranged to be driven step by step by a rotary member to which liquid is supplied from the washing device.

According to another feature of the invention, the baffle may be mounted to be adjustable endwise and so as to be readily detachable and replaceable in a reverse position, for arranging that the jets shall impinge not always on the same parts thereof.

One embodiment of the invention and modifications thereof are diagrammatically illustrated by way of example in the accompanying drawings, wherein:—

Figure 1 is a perspective view showing one form of washing device according to the invention, partly broken away,

Figure 2 is a side elevation showing a modified form partly broken away, and

Figure 3 is a transverse vertical section taken on the line 3—3 in Figure 2.

Figure 4 is a side elevation showing another modified form of washing device partly broken away arranged to be driven by a rotary cylindrical member;

Figure 5 is a longitudinal section showing a further modified form of washing device partly broken away, accommodated within a rotatable screen, and

Figure 6 is a transverse vertical section taken on the line 6-6 in Figure 5;

Figure 7 shows a modified form of driving device of the cleaning device, and

- 5 Figure 8 is a vertical section taken on the line 8-8 in Figure 7.

Like reference characters designate like parts throughout the several views.

Referring to the drawings, the washing device shown in Figure 1 comprises a feed pipe 10 closed at its ends by closure members 11, 12 detachable for cleaning purposes, and having at the middle of its length a branch pipe 14 for connection to a supply pipe for water, e. g. backwater from a paper-making machine. A delivery pipe 16 is carried by the feed pipe in parallel relation therewith by a plurality of saddles or union members 18 of elongated form spaced apart one from another between the pipes 10, 16 each of which saddles has a longitudinal slot 19 (see Figure 2) extending in the direction of length of the pipes and placing the same in open communication one with the other. The delivery pipe 16 has a plurality of outlets 20 (see Figure 3) for jets of liquid spaced apart in a row in the direction of its length in its side opposite the feed pipe 10. Two end plates 22 fixed on the underside of the pipe 16 at its ends carry a baffle plate or fin 24 which lies parallel with the pipes 10 and 16 and is so arranged inclined at an angle to the plane containing the longitudinal axes of the pipes 10, 16 that the jets of liquid issuing from the perforations will impinge on the baffle and be converted into a film or solid curtain of liquid. Such a film or curtain exercises a chisel-like action when playing upon a strainer, drum or felt and is more effective in washing the same than separate jets without a baffle or fin, because when the wash water issues from circular perforations in the form of jets having each approximately the same diameter as the perforation, such jets impinge always upon the same spot on a fixed member, while the curtain impinges upon an entire line. A cleaning device in the delivery pipe 16 has a spindle 31 extending through a stuffing box 28 at one end of the pipe and can be operated by a handle member outside the pipe. As described so far, the washing device is known in itself and has the defects referred to above.

50 In order to prevent the dirt and sediment from controlling at the outlets for the jets, according to the invention, the cleaning device has the form of a screw-conveyor that is rotatable in the delivery pipe and, when rotated, conveys sediment towards one end of the pipe. As shown most clearly in Figure 5, the screw-conveyor is constituted by a strip 30 of material, e. g. brass, twisted about its central longitudinal axis into the form of a spiral that is of a diameter substantially equal to the internal diameter of the delivery pipe 16, and is secured to the driving spindle 31 at only one end by a slot and rivet connection, as shown at 23. The screw-thread of the conveyor constituted by the strip 30 is of coarse pitch and may have one turn or less per foot length. For example, when the twisted strip is about 7 feet long, the pitch may be about 9 inches. When the screw-conveyor 30, 31 is rotated by a crank-handle 32 fast on the outer end of the spindle 31, sediment in the delivery pipe 16 is conveyed towards the same end of the delivery pipe which is provided at 34 with an outlet controlled by a stop valve 35 which, when
75 opened, allows the washing water containing the

sediment to escape without its having to pass through the outlets 20 for the jets.

In the washing device shown in Figures 2 and 3, the crank-handle 32 is freely rotatable on the spindle 31 and pivotally carries a pawl 38 which co-acts with a ratchet-wheel 39 that is fast on the spindle 31 and drives the latter when the crank-handle is rotated in one direction but not in the other, whereby it is ensured that the conveyor shall always be rotated in a direction to feed the sediment towards the outlet 34. In this construction the end plates 22 are slotted; the baffle or fin 24 extends slidably endwise through them, and is carried by brackets 40 that are fixed at spaced intervals to the delivery pipe 16 and have longitudinal slots 41 which extend parallel with the baffle which is detachably secured in position by means of screws 42 extending through the slots. This arrangement not only enables the baffle or fin 24 to be moved endwise for subjecting different parts of it to the action of the jets, but also permits it to be removed and replaced in the reversed position, either side for side or end for end.

In the apparatus shown in Figure 4, in which the washing device is arranged for delivering water or other liquid on to a rotary cylindrical member 44, such as a screen mounted to rotate in a bearing 45 about a horizontal axis, a toothed member in the form of a star wheel 46 is free to rotate on the spindle 31 of the cleaning device and pivotally carries on one side a pawl 48 that co-acts with a ratchet wheel 49 fast on the spindle 41. Immediately the screen 44 commences to rotate one or more dogs 50 mounted on its end rotate the star wheel 46 intermittently step-by-step and drive the screw-conveyor which operates as described above with reference to Figure 1.

Figures 5 and 6 show the washing device mounted within a rotary cylindrical member in the form of a screen 52 so as to project liquid against the upper part of its internal periphery. Liquid which falls back from the periphery is caught by a tray 54 which delivers it by way of a waste-pipe 56 outside the screen. This waste-pipe extends through the trunnion 58 of the screen, and a supply pipe for supplying water to the feed pipe 10 may enter an opposite trunnion and be attached to the adjacent end of the feed pipe 10. One or more dogs 60 carried by the end wall 61 of the screen are arranged to rotate a star wheel or like toothed member 46 on the spindle 31 of the cleaning device.

Instead of driving the cleaning device as described above, driving mechanism as shown in Figures 7 and 8 may be used comprising a star wheel 46 that is fast on the spindle 31 and is formed or provided on one side with a ratchet wheel 64, with which a pawl 66 co-operates that is carried by a part, such as the pipe 16, which is fixed in relation to the spindle 31. When the star wheel 46 is rotated intermittently in any convenient manner, it rotates the twisted strip 30 which, owing to its length, is resilient and after its driven end has been rotated, tends to return in the opposite direction. The holding pawl 66 prevents such rotation in the opposite direction and holds the conveyor in the position into which it has been moved angularly by the driving member.

As clearly shown in Figure 5, the screw 30 of the conveyor may have perforations 68 formed in it at or near its axis of rotation, for ensuring a free flow of liquid from the slotted members 18

to the outlets 20 during the rotation of the screw-conveyor and when the latter is stationary, so that the delivery of liquid from the washing device shall be substantially constant at all times whether the cleaning device is in operation or not and when commencing to operate the cleaning device or when stopping its operation. Such constant delivery is frequently important, particularly in the paper-making industry.

The outlets 20 for the jets may be of larger diameter and spaced further apart than heretofore, thereby allowing "thick" shower water to be used without any risk of the holes becoming stopped up.

The invention is not restricted to the precise constructional details enumerated. For example in some cases the cleaning device may have a multiple thread, and the outlet of the delivery pipe may be at its end remote from that at which the cleaning device is driven. Also, the feed pipe may be supplied from either end, and the screw-conveyor may be driven continuously, as by a pulley and belt.

We claim:

1. A washing device of the character described, comprising in combination a feed pipe, a delivery pipe having a plurality of outlets for liquid spaced apart in a row in the direction of its length, a plurality of union members supporting the delivery pipe from the feed pipe in parallel relation, which union members are spaced apart from one another and have each a longitudinal slot extending in the direction of length of the pipes and place the latter in open communication one with the other, a longitudinal baffle arranged parallel with the delivery pipe for converting the jets into a film or curtain of liquid, and a cleaning device in the form of a screw-conveyor rotatable in the delivery pipe for cleaning said outlets, which conveyor has perforations situated at its axis of rotation for providing an even distribution of fluid from the feed pipe to the outlets.

2. A washing device of the character described, comprising in combination a delivery pipe having a plurality of outlets for jets of liquid spaced apart in a row in the direction of its length, a cleaning device movable in the pipe for cleaning said outlets, and a longitudinal baffle arranged parallel with said pipe for converting the jets into a film or solid curtain of liquid, which cleaning device has the form of a screw-conveyor that is rotatable in the delivery pipe and, when rotated, conveys sediment towards one end of the pipe, and driving means comprising a toothed member arranged to rotate the screw-conveyor intermittently.

3. A washing device of the character described, comprising in combination a delivery pipe having a plurality of outlets for jets of liquid spaced

apart in a row in the direction of its length, a cleaning device movable in the pipe for cleaning said outlets, and a longitudinal baffle arranged parallel with said pipe for converting the jets into a film or solid curtain of liquid, which cleaning device has the form of a screw-conveyor that is rotatable in the delivery pipe and, when rotated, conveys sediment towards one end of the pipe, and driving means comprising a star wheel arranged to rotate the screw-conveyor a rotary member to which the liquid is to be supplied by the delivery pipe and means carried by the rotary member for intermittently rotating said star wheel.

4. A washing device of the character described comprising in combination a delivery pipe having a plurality of outlets for jets of liquid spaced apart in a row in the direction of its length, a cleaning device movable in the pipe for cleaning said outlets, and a longitudinal baffle arranged parallel with said pipe for converting the jets into a film or solid curtain of liquid, which cleaning device has the form of a screw-conveyor that is rotatable in the delivery pipe and, when rotated, conveys sediment towards one end of the pipe, driving means comprising a toothed member arranged to rotate the screw-conveyor intermittently in one direction at one end thereof, and holding means arranged at the same end of the conveyor for holding that end against rotation in the opposite direction.

5. A washing device of the character described, comprising in combination a delivery pipe having a plurality of outlets for jets of liquid spaced apart in a row in the direction of its length, a cleaning device movable in the pipe for cleaning said outlets, and a longitudinal baffle arranged parallel with said pipe for converting the jets into a film or solid curtain of liquid, which cleaning device has the form of a screw-conveyor that is rotatable in the delivery pipe, and, when rotated, conveys sediment towards one end of the pipe, and driving means comprising a spindle for rotating the conveyor, a rotary driving member, and pawl-and-ratchet mechanism operatively connecting the driving member with said spindle for rotating the latter in only one direction.

6. A washing device as claimed in claim 5, wherein the rotary driving member is freely rotatable on the spindle, a ratchet wheel is fast on the spindle, a driving pawl pivoted on the rotary driving member is arranged to drive the ratchet wheel in one direction of rotation, and a holding pawl pivoted in fixed relation to the spindle is arranged to hold the ratchet wheel against rotation in the opposite direction.

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