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APPARATUS FOR AUTOMATIC PERIODIC CLEANING OF STRAINING MEMBERS

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FIG. 1.

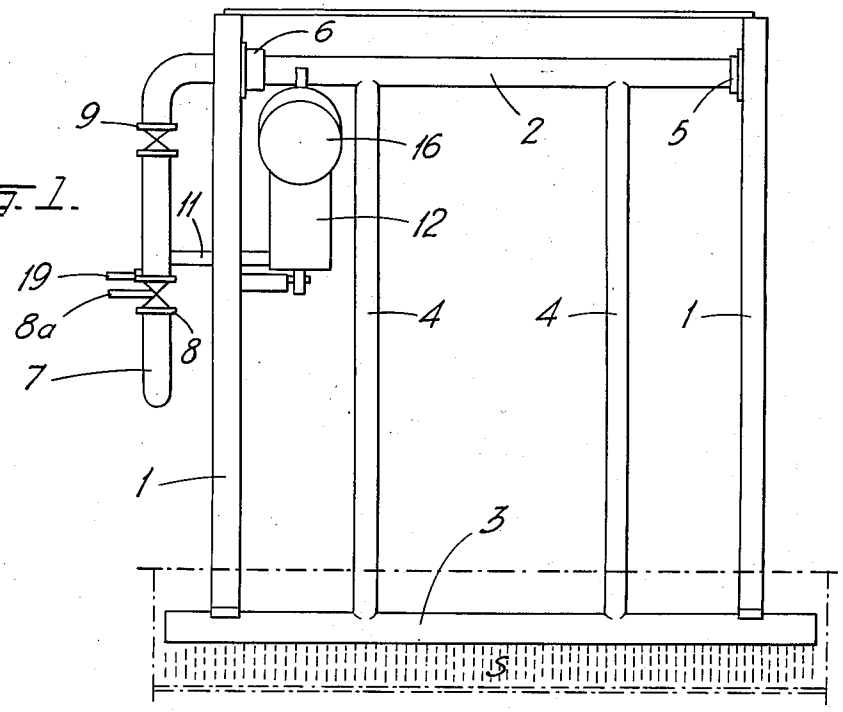


FIG. 2.

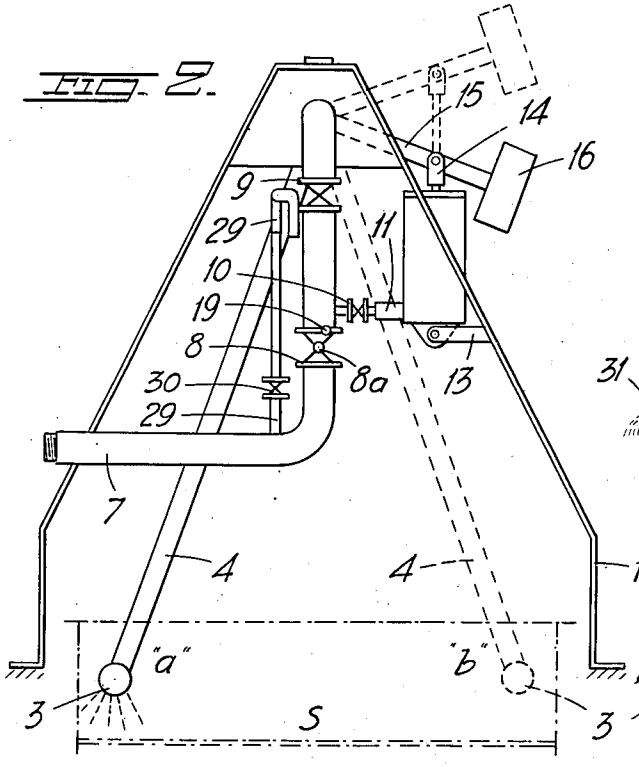
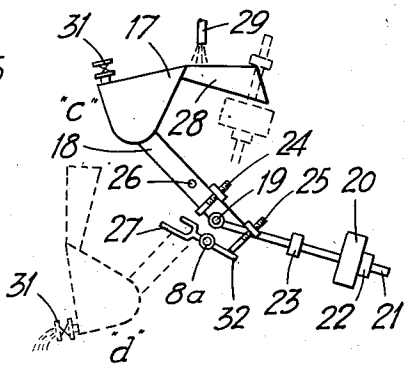


FIG. 3.



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APPARATUS FOR AUTOMATIC PERIODIC CLEANING OF STRAINING MEMBERS

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This invention relates to cleaning of strainer members of the type commonly used for wet treating fibrous suspensions, particularly paper pulp.

One of its objects is to provide an improved apparatus for automatically and periodically cleaning such members.

Another object is to provide such an apparatus which for its operation solely requires connection to a source of water under pressure.

Still another object is to provide a cleaning apparatus of the type referred to in which the duration of the cleaning periods and the intervals therebetween may be adjusted by simple expedients.

The invention consists in the novel apparatus hereinafter fully described and particularly pointed out in the claims hereunto appended.

The invention is diagrammatically illustrated by way of example on the annexed drawing in which

Fig. 1 is a side elevation of my improved apparatus, the strainer member to be cleaned thereby being diagrammatically indicated by dash- and dot-lines at the bottom of said figure.

Fig. 2 is an end elevation of the apparatus shown in Fig. 1 some components thereof being shown by dash-lines to illustrate two different positions of said components.

Fig. 3 is a fragmentary side elevation of an automatic valve control device, for the sake of simplicity shown detached from the apparatus illustrated in Figs. 1 and 2 although associated therewith, some components of said device being shown in dash-lines to illustrate an alternative position of said components.

The cleaning apparatus illustrated on the drawing comprises a frame 1 mounted on a base (not shown) and supporting a main tube 2 for supplying water to a sprinkle tube 3 via suitable number of branch lines 4 interconnecting tubes 2 and 3. Main tube 2 is closed at one end which is journalled in a bearing 5 mounted in frame 1. At its opposite end main tube 2 by means of a stuffing box 6 mounted in frame 1 is connected to a line 7 for supplying water under pressure to main tube 2 and sprinkler tube 3 via branch lines 4. Line 7 is provided with a throttle valve 8 adapted to be automatically controlled in a manner hereinafter described, and also with a regulating valve 9 for adjusting the water pressure in sprinkler tube 3 to proper value.

From the foregoing it appears that sprinkler tube 3 by means of branch lines 4 and main tube 2 is suspended as a pendulum in frame 1. For

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driving said pendulum I use a hydraulic power unit comprising a cylinder 12 to which water under pressure is supplied via a line 11 provided with a regulating valve 10 and branched from main line 7 posterior to throttle valve 8. Cylinder 12 is carried by frame 1 by means of a bracket 13 and a piston (not shown) mounted therein is provided with a rod 14 pivoted to a lever 15 which at its outer end carries a counterbalance weight 16 and is secured to main tube 2.

In the embodiment shown the automatic control device for throttle valve 8 comprises a scoop 17 carried by a lever 18 mounted for rotation on a stud 19 projecting from throttle valve 8. Scoop 17 is counterbalanced by means of a weight 20 mounted on a lever 21 secured to lever 18, and shiftable along lever 21 between two suitable spaced stop members 22 and 23. Mounted on lever 18 are two adjustable screws 24, 25 and a fixed stud 26, these members being adapted to cooperate with a forked member 27 secured to spindle 8a of throttle valve 8, in a manner hereinafter fully described. Associated with scoop 17 is a filling trough 28 to which water is supplied by a continuously open pipe 29 having a regulating valve 30 (Fig. 2) and branched from supply line 7 at a point anterior to throttle valve 8. As may be seen from Fig. 3 the bent-over discharge end of line 29 is situated above filling trough 28 when the latter is in the position shown by full lines in Fig. 3 and denoted by "c." Associated with scoop 17 is an outlet with a regulating valve 31 for the water supplied to scoop from filling trough 28.

The apparatus described operates as follows:

Assuming that valve 8 is closed, scoop 17 is being filled from filling trough 28 in position "c" and sprinkler tube 3 is in position "a" then during the course of the filling of scoop 17 the latter overbalances counterweight 20 situated at stop member 22 and initiates a slow turning movement of scoop 17. During this movement the water in filling trough 28 is turned out into scoop 17 whereby the turning movement thereof is accelerated. In the continuation of the turning of scoop 17 weight 20 slides inwards towards and into engagement with stop member 23 whereby the moment of weight 20 with respect to stud 19 decreases so that the turning movement of scoop 17 is still more accelerated.

During the course of the descending movement of scoop 17 above described pin 26 on lever 18 enters the forked member 27 and is pressed against the lower leg thereof whereby spindle 8a is rotated thereby opening valve 8.

The descending movement of scoop 17 is stopped in position "d" by screw 24 which engages spindle 8a as may be readily seen although not specifically shown on the drawing. Valve 8 is now fully open and discharge of the water contained in scoop 17 through valve 31 starts.

In the open position of valve 8 water under pressure is supplied both to sprinkler tube 3 and to the hydraulic cylinder 12 which causes sprinkler tube 3 to swing slowly to position "b" while cleaning the strainer member diagrammatically shown at S. When sprinkler tube 3 reaches position "b" scoop 17 is empty and weight 20 is now able to swing scoop 17 upwards, pin 26 then acting upon the upper shorter leg of forked member 27 whereby the closing movement of throttle valve 8 is initiated and thereafter completed by screw 25 acting upon an extension 32 of forked member 27. Scoop 17 is thus restored to position "c" and during this restoring movement weight 20 slides outwards into engagement with stop member 22.

Water under pressure being no longer supplied to sprinkler tube 3 and cylinder 12 the former is returned from position "b" to position "a" by means of counterweight 16, the water in cylinder 12 being then discharged through line 11 and sprinkler tube 3. When sprinkler tube 3 has been restored to position "a" the cleaning apparatus has completed its cycle of operation which is then automatically repeated in the manner described.

From the foregoing it may be seen that by my invention I have provided a cleaning apparatus in which both the supply of water for the cleaning operation and the swinging movement of the sprinkler tube are effected periodically and properly coordinated. Besides, my improved apparatus for its operation need only be connected to an existing source of water under pressure. Finally, the duration of the cleaning periods and the intervals therebetween may be regulated to suit all requests met in practise simply by adjusting valves 10, 30 and 31.

Although only one form of the invention has been described it is to be understood that the invention is not restricted to the apparatus illustrated but the latter may be modified in many respects without departing from the principle of the invention.

What I claim is:

1. An apparatus for cleaning strainer members comprising in combination a sprinkler tube suspended as a pendulum, a source of water under pressure, connections between said source and said sprinkler tube, a valve in said connections, an automatic control device operably connected with said valve comprising a swingable scoop, a counterweight for counterbalancing said scoop, means for supplying water to said scoop to cause it to overbalance its counterweight and swing downwardly and thereby open said valve for supplying water to said sprinkler tube, a hydraulic power unit actuated by water from said valve for swinging said sprinkler tube over said strainer member to clean the latter by water discharged from said sprinkler tube, the downward swinging of said scoop causing it to tip and discharge the water contained therein, whereupon the counterweight swings the scoop upwardly and closes said valve so as to cut off the supply of water to said sprinkler tube.

2. An apparatus for cleaning strainer members comprising in combination a sprinkler tube suspended as a pendulum, a source of water under pressure, connections between said source and said sprinkler tube, a valve in said connections, an automatic control device operably connected with said valve comprising a swingably mounted scoop having a counterweight, means for supplying water to said scoop to cause it to overbalance its counterweight and swing downwardly and thereby open said valve for supplying water to said sprinkler tube, said supply means comprising a filling trough secured to said scoop and adapted to discharge its contents into said scoop in the initial descending movement thereof to accelerate the further downward swinging movement of said scoop, and a hydraulic power unit actuated by water from said valve for swinging said sprinkler tube over said strainer member to clean the latter by water discharged from said sprinkler tube, the downward swinging of said scoop causing it to tip and discharge the water contained therein, whereupon the counterweight swings the scoop upwardly and closes said valve so as to cut off the supply of water to said sprinkler tube.

3. An apparatus for cleaning strainer members comprising in combination a sprinkler tube suspended as a pendulum, a source of water under pressure, connections between said source and said sprinkler tube, a valve in said connections, an automatic control device for said valve, comprising a swingable lever, a scoop supported by said lever, counterweight for counterbalancing said scoop slidably mounted on said lever, means for supplying water to said scoop to cause it to swing downwardly and thereby open said valve for supplying water to said sprinkler tube, said means comprising a filling trough secured to said scoop and adapted to discharge its contents into said scoop in the initial descending movement thereof to accelerate the further downward swinging movement of said scoop in response to which said weight is caused to slide on said lever for decreasing its movement as compared with that of said scoop to further accelerate the downward swinging movement of said scoop, and a hydraulic power unit actuated by water from said valve for swinging said sprinkler tube over said strainer member to clean the latter by water discharged from said sprinkler tube, the downward swinging of said scoop causing it to tip and discharge the water contained therein, whereupon the counterweight swings the scoop upwardly and closes said valve so as to cut off the supply of water to said sprinkler tube.

4. An apparatus for cleaning strainer members comprising in combination a sprinkler tube suspended as a pendulum, a source of water under pressure, connections between said source and said sprinkler tube, a valve in said connections, an automatic control device for said valve comprising a swingable scoop, a counterweight for counterbalancing said scoop, means for supplying water to said scoop to cause it to swing downwardly and thereby open said valve for supplying water to said tube, an adjustable outlet for said scoop for discharging the contents of said scoop to allow the latter to rise under the influence of its counterweight, thereby moving said valve towards closed position, and thus stop the supply of water to the sprinkler tube.

5. An apparatus for cleaning strainer members comprising in combination a sprinkler tube suspended as a pendulum, a source of water under pressure, connections between said source and said sprinkler tube, a valve in said connections, an automatic control device for said

valve comprising a swingable scoop, a counterweight for counterbalancing said scoop, means for supplying water to said scoop to cause it to swing downwardly and tip and discharge and then swing upwardly under the influence of the counterweight, a forked member associated with said valve, a member movable with said scoop and adapted to alternately engage the respective legs of said forked member to move said valve towards open position to supply water to the sprinkler tube and to closed position to shut off the water supply to the sprinkler tube.

6. An apparatus for cleaning strainer members comprising in combination a sprinkler tube suspended as a pendulum, a source of water under pressure, connections between said source and said sprinkler tube, a valve in said connections, an automatic control device for said valve comprising a swingable scoop, a counterweight for counterbalancing said scoop, means for supplying water to said scoop to cause it to swing downwardly and tip and discharge and then return upwardly under the influence of the counterweight, a forked member associated with said

valve, a member movable with said scoop and adapted to alternately engage the respective legs of said forked member to move said valve towards open and closed position respectively, and a second member movable with said scoop and connected to operate said valve at the end of the upward movement of said scoop to shut off said valve and shut off the supply of water to the sprinkler tube.

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