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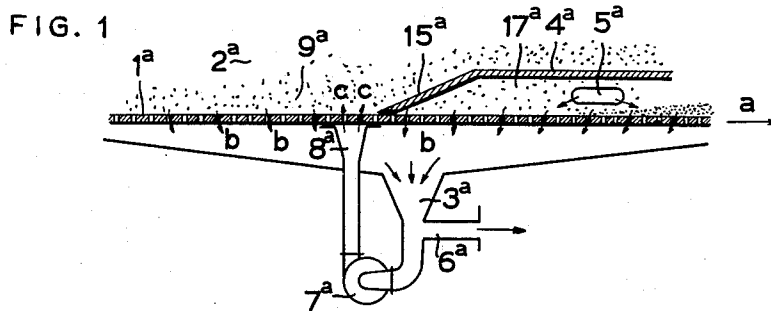
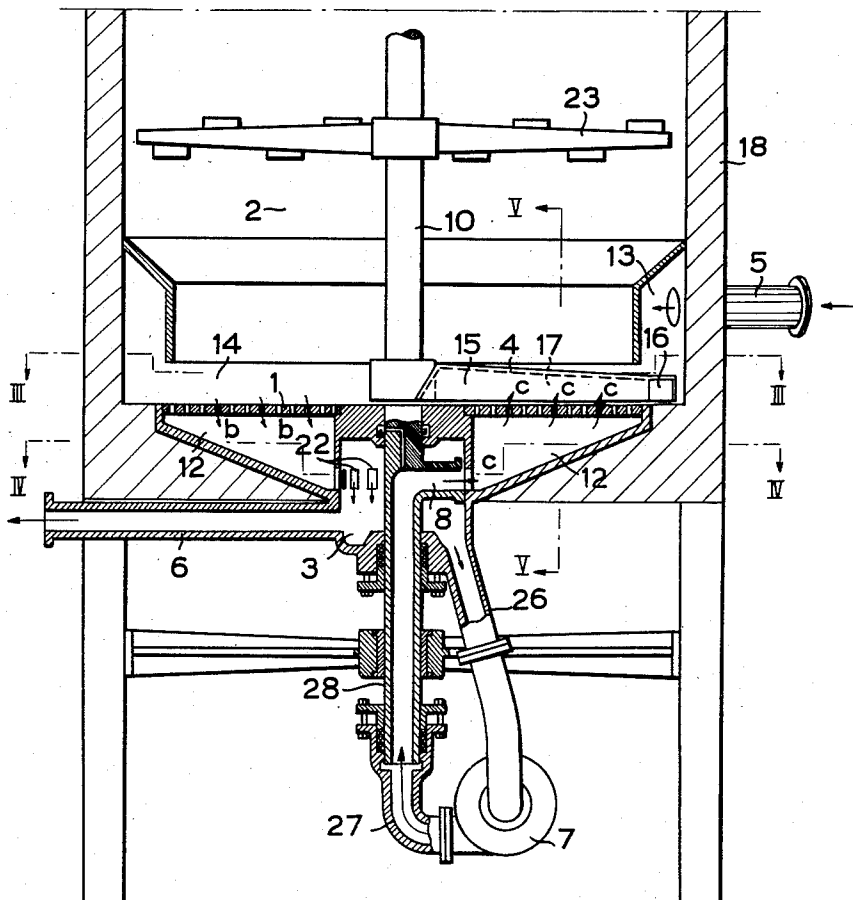


FIG. 2



INVENTOR:

MATTI. JOHANNES JALKANEN

BY:

BY: Michael J. [Signature] agt

May 13, 1958

M. J. JALKANEN
STRAINER APPARATUS

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Filed May 12, 1954

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FIG. 3

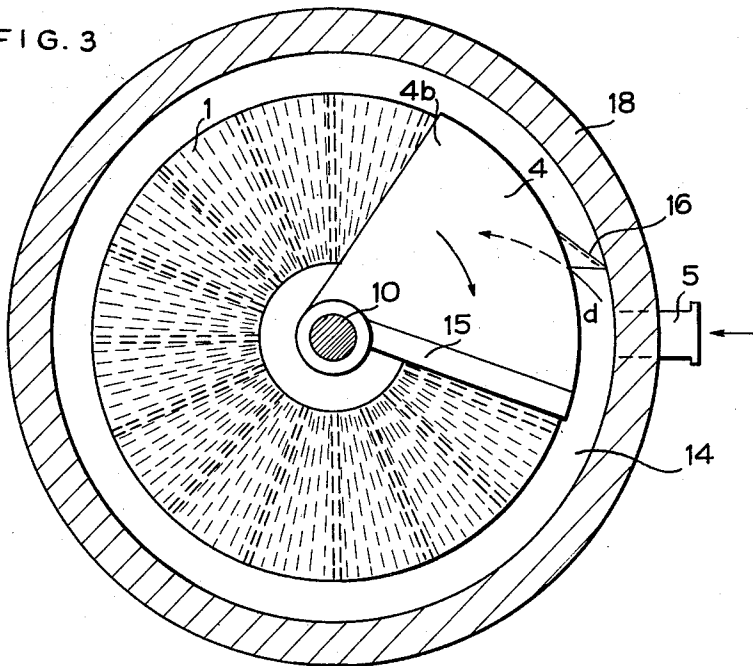
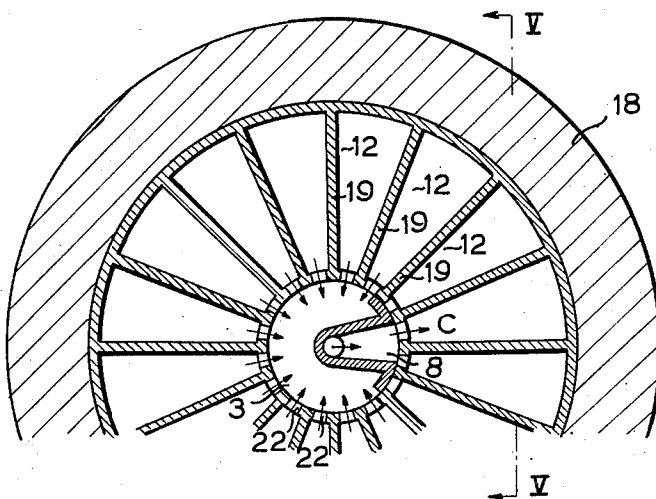


FIG. 4



INVENTOR:
MATTI JOHANNES JALKANEN
BY:
M. Jalkanen
agf

May 13, 1958

M. J. JALKANEN
STRAINER APPARATUS

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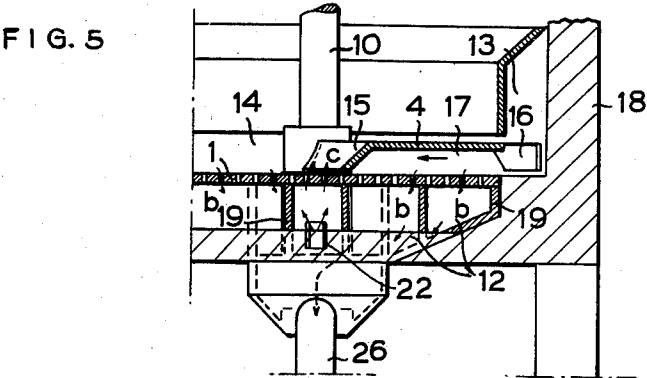


FIG. 6

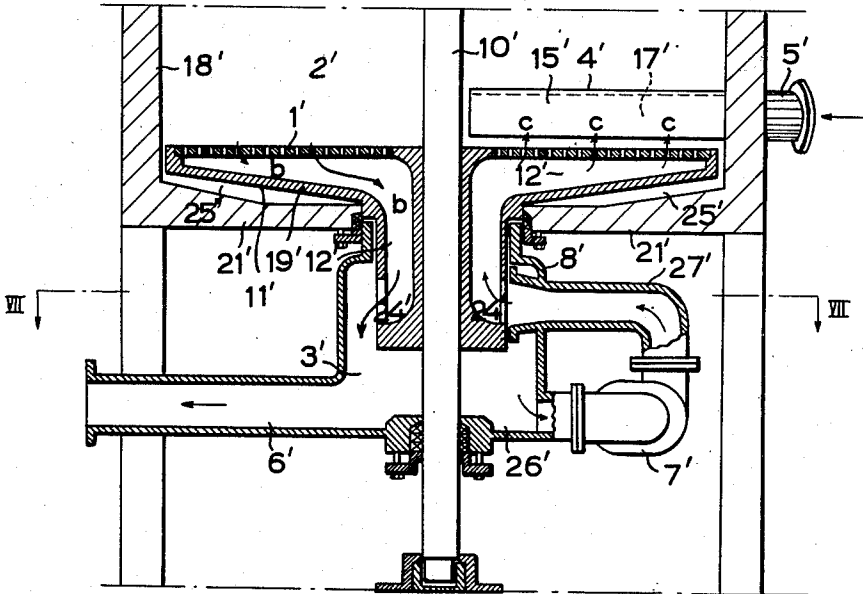
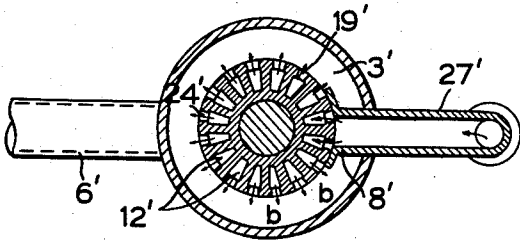


FIG. 7



INVENTOR:

MATTI JOHANNES JALKANEN

BY:

Michael J. Jalkanen

May 13, 1958

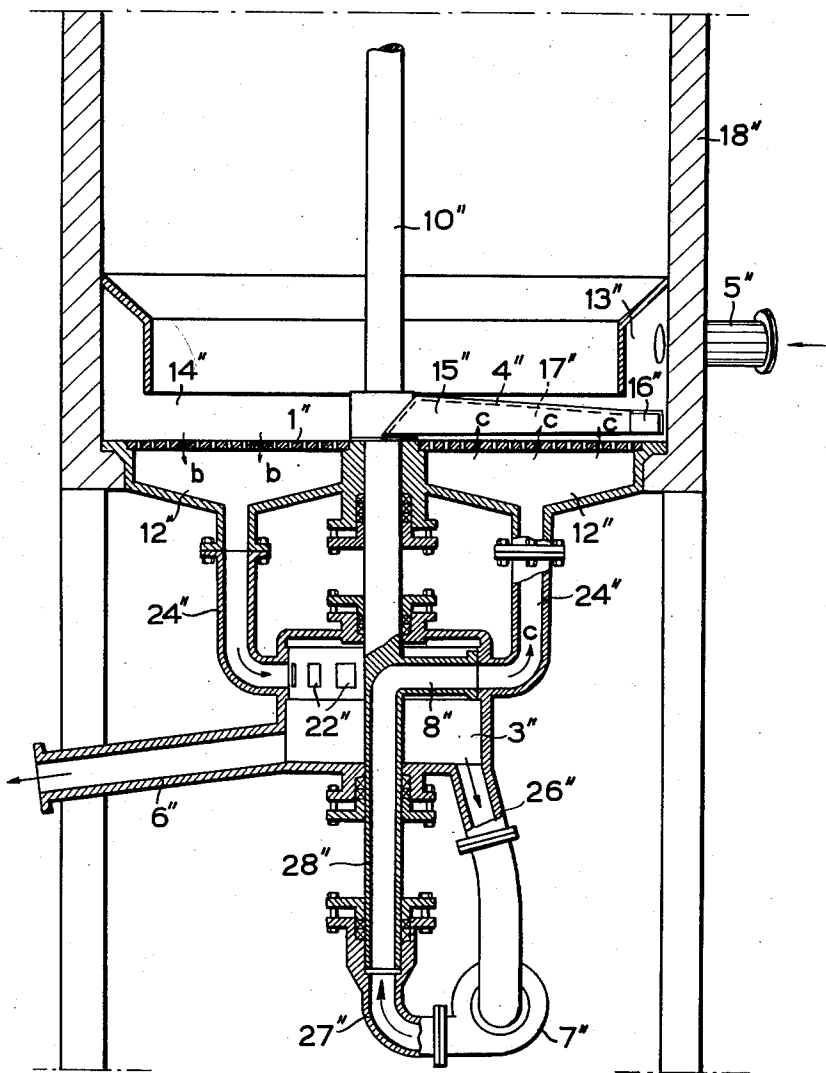
M. J. JALKANEN
STRAINER APPARATUS

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Filed May 12, 1954

4 Sheets-Sheet 4

FIG. 8



INVENTOR:

MATTI JOHANNES JALKANEN
BY:

[Handwritten signature]

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2,834,474

STRAINER APPARATUS

Matti Johannes Jalkanen, Rauma, Finland, assignor to Rauma-Repola Oy, Rauma, Finland

Application May 12, 1954, Serial No. 429,308

Claims priority, application Finland May 28, 1953

20 Claims. (Cl. 210—408)

The present invention relates to strainer apparatus. More particularly, the invention relates to counter-current wash towers, counter-current thickener towers or counter-current bleaching towers adapted for treating slurries of fibrous matter such as a suspension of material as pulp and paper stock.

Washer and thickener devices of the above type are disclosed in applicant's co-pending application, Serial No. 324,934, filed December 9, 1952, now Patent No. 2,802,572, of which this application is a continuation-in-part, the present invention being an improvement on such types of washers and thickeners.

It is an object of the present invention to provide strainer devices in apparatus of the above types in which means are provided for freeing the strainer of deposited solid material which tends to clog the strainer.

It is another object of the present invention to provide for improved straining in apparatus of the above types.

With the above objects in view, the present invention relates to a strainer apparatus which comprises, in combination, strainer means having a first face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through the strainer means to the second face thereof and a deposit of solid material remaining on the first face of the strainer means, doctor means arranged adjacent the first face of the strainer means and having a cleaning edge extending along the same, moving means moving one of the means relative to the other with the cleaning edge of the doctor means moving relative to and along the first face of the strainer means, and loosening means for forcing filtrate which has passed in the one direction through the strainer means back in the opposite direction from the second face through the strainer means to the first face thereof and in front of the cleaning edge of the doctor means, the loosening means being mounted in a position fixed relative to the doctor means for forcing filtrate out of the first face of the strainer means at a constant distance from the cleaning edge of the doctor means during movement thereof relative to the strainer means, so as to thereby loosen the deposit of solid material on the first face of the strainer means.

In accordance with the invention, either the doctor means may be rotated relative to a stationary strainer means, or the strainer means may be rotated relative to a fixed doctor means.

The strainer means in the device constructed in accordance with the invention is preferably formed with wall portions enclosing the second face thereof so as to form a plurality of cells communicating with different portions of the first face thereof, the loosening means including conduit means communicating successively with the plurality of cells during relative movement of the strainer means and the doctor means.

In accordance with the invention, a filtrate chamber is preferably arranged adjacent the strainer means for collecting the filtrate passing therethrough, the loosening

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means being connected to the filtrate chamber for reintroducing a portion of the filtrate therein back through the strainer means, and the filtrate chamber having an outlet for discharging the remainder of the filtrate.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a diagrammatic view illustrating the cleaning principle in accordance with the invention;

Fig. 2 is a vertical sectional view of one embodiment of an apparatus constructed in accordance with the invention;

Fig. 3 is a horizontal sectional view taken along the line III—III of Fig. 2;

Fig. 4 is a horizontal sectional view taken along the line IV—IV of Fig. 2;

Fig. 5 is a vertical sectional view taken along the line V—V of Fig. 2;

Fig. 6 is a vertical sectional view of another embodiment of the invention;

Fig. 7 is a horizontal sectional view taken along the line VII—VII of Fig. 6; and

Fig. 8 is a vertical sectional view of still another embodiment of the invention.

Referring now to the drawings, and particularly to Fig. 1, there is shown in the latter figure a strainer wall 1a and a doctor means 4a, the strainer wall 1a being movable in the direction of the arrow a relative to the doctor means 4a. Arranged on one side of the strainer wall 1a is a slurry receiving container means 2a in which there is shown thickened solid matter 9a deposited on the upper face of strainer wall 1a. A slurry inlet 5a serves to conduct slurry into the container 2a and beneath the doctor means 4a, via inlet channel 17a. On the other side of strainer wall 1a there is arranged a filtrate collecting chamber 3a, having an outlet 6a connected thereto and a conduit in which pump 7a is arranged for returning part of the filtrate back to the strainer wall 1a via a shoe or spout member 8a.

When slurry is introduced via inlet 5a into the inlet channel 17a and therefrom into the container means 2a, liquid will pass through the strainer wall 1a into the filtrate collecting chamber 3a as indicated by arrows b, while solid matter, e. g., fibrous material, will thicken and form a layer on the surface of the strainer wall 1a.

In accordance with the invention, one part of the liquid collecting in the chamber 3a is discharged to the outside via outlet 6a, while a second part of the liquid is reintroduced in reverse flow by means of the pump 7a and the spout member 8a into the slurry container 2a through that portion of the strainer wall 1a which is positioned directly in front of the leading edge 15a of the doctor means 4a, as is shown by arrows c. When the pump pressure is so selected that it always overcomes the pressure prevailing in the slurry container 2a, the recycled cleaning liquid will be forced through the strainer wall portion in front of the leading edge 15a, and in doing this it will lift the solid matter collected thereon onto the leading edge 15a of doctor means 4a, and from this point the solid material will slide over the top surface of the doctor means and upon the fresh slurry fed continuously onto the clean portion of the strainer wall 1a.

In the embodiment shown in Figs. 2-5, the strainer wall 1 within the tower 18 is stationary while the spout member 8 for distributing the recycled cleaning liquid

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and the doctor means 4 are arranged for movement with the rotatable vertical shaft 10 which is provided with agitator arms 23. The strainer wall 1 rests on supporting walls 19 arranged so as to form a series of cells 12 under the strainer wall 1. The strained liquid passing through strainer wall 1 is adapted to be conducted through the cells 12 into the filtrate collecting chamber 3 which is also located beneath the strainer wall 1 and is encircled by the filtrate collecting cells 12, the filtrate chamber 3 having apertures 22 in the wall thereof communicating with the individual cells for the passage of liquid therethrough.

The spout member 8 is arranged to rotate with the shaft 10 and to communicate with the filtrate collecting chamber 3 via the tubular lower end 28 of the shaft 10, the pump 7, the pressure pipe 27 and the suction pipe 26. Spout member 8 during such rotation moves within the chamber 3 so that each of the cells 12 consecutively communicates via the apertures 22 with the outlet end of the spout member 8, while the rest of the cells 12 all communicate with the collecting chamber 3.

As shown more clearly in Fig. 3, the doctor means 4 when viewed in plan is sector-shaped. The leading part of doctor means 4 consists of an inclined surface 15 serving as a blade or doctor proper and a top surface 4b, the surfaces 15 and 4b with strainer wall 1 defining an inlet channel 17 within the doctor means 4 for accommodating the slurry. For the purpose of introducing slurry into the inlet channel 17, an annular slurry inlet duct 13 is arranged in the bottom part of tower 18 above the strainer wall 1. Inlet conduit 5 serves to introduce slurry into the duct 13, from which it is discharged through slot 14 in the bottom part of duct 13 into the slurry inlet channel 17 within doctor means 4, as indicated by arrow d in Fig. 3. A projecting member 16 is secured to the periphery of doctor means 4 and during rotation of the doctor means serves to guide the movement of fresh slurry introduced into annular duct 13 underneath doctor means 4.

The above-described apparatus operates as follows:

When a slurry or other suspension of solid material, e. g., pulp stock, is fed into the doctor means 4, it spreads within the container formed by tower 18 upon strainer wall 1 while liquid separates therefrom through the strainer wall 1 and passes therethrough via cells 12 into the filtrate collecting chamber 3. The most effective liquid separation and deposition of fibrous matter occurs at that portion of the strainer wall which is cleaned by the doctor blade 15, and the filtered liquid issues from under doctor blade 15 when the same moves forward along the strainer wall 1. When the doctor means 4 passes further over the strainer wall 1, thickened fibrous matter will remain deposited on the strainer wall and is subjected to the pressure of the pulp already in the tower 18, and liquid will continue to separate therefrom and pass into filtrate chamber 3 for the reason that when doctor means 4 moves forward, previously deposited matter will glide along and over the top surface of doctor means 4 until it drops over the trailing edge of the doctor means and settles upon the new layer of matter issuing from the inlet channel 17 within the doctor means 4.

The annular duct 13 may be replaced by an inlet pipe arranged to pass through vertical shaft 10 and terminating in the inlet channel 17 of doctor means 4.

In the embodiment shown in Figs. 6 and 7, the strainer wall 1' is secured to the drive shaft 10' and arranged to rotate relative to the stationary doctor means 4' and the spout member 8'. Between the bottom structure 21' and the portion 11' of the strainer surface supporting structure 19' which inclines toward the shaft 10' there is arranged a narrow liquid chamber 25' in order to compensate, by hydraulic pressure, a part of the load on the supporting structure 19' in shaft 10'. The vertically extending part of each cell 12' is provided with an aperture 24' so that during rotation of the strainer wall 1'

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together with its supporting structure 19' each cell 12' will consecutively communicate with the spout member 8', while the remainder of the cells 12' will concurrently communicate with the filtrate collecting chamber 3' which encircles the apertured cell portions.

As in the first-described embodiment, here also one part of the filtrate collected in chamber 3' is discharged to the outside via pipe 6', while a second part of the filtrate is recycled, by means of the pump 7' and the spout member 8', in the manner previously described through the strainer wall 1' into the slurry container. Fresh slurry is introduced via the inlet conduit 5' directly into the inlet channel 17' of the doctor means, the slurry passing therefrom into the container means 2', because the rotatably mounted strainer wall 1' renders the annular slurry inlet duct 13' superfluous.

The embodiment shown in Fig. 8 differs from the one shown in Figs. 2-5 in that the filtrate collecting cells 12'' which are located underneath the strainer wall 1'' are connected by conduits 24'' to a separate filtrate collecting chamber 3''. The advantage of this embodiment resides in the relative simplicity of its construction, the arrangement of the parts thereof rendering it easy to manipulate and maintain in operation.

The embodiment shown in the drawings and described above are given only by way of example merely to illustrate the concept involved in the invention, and it is to be understood that the invention is not limited to the embodiments shown. Thus, for example, the strainer wall means may be arranged in a manner other than as described above, as, for instance, by utilizing as a strainer wall a cylindrical screen arranged in a vertical position within the container means. In such a form, the doctor means is advantageously arranged within the cylindrical screen while recycled liquid under pressure is re-introduced into the cylindrical screen through ducts arranged between the the screen cylinder and the filtrate collecting chamber.

The invention also contemplates the arrangement of the strainer means in the upper portion of the container means, or, if the container means is horizontal, the strainer means could be arranged in one end of the container means while any suitable means is employed for producing the pressure differences required for liquid transfer.

The invention also contemplates the use of one or more doctor means as well as a plurality of spout members arranged to cooperate with one and the same strainer structure and the associated parts.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of apparatus for treating suspensions of solid matter differing from the types described above.

While the invention has been illustrated and described as embodied in a strainer apparatus for treating slurry, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to

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be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for forcing filtrate which has passed in said one direction through said strainer means back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

2. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for forcing filtrate which has passed in said one direction through said strainer means back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal front face.

3. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating said doctor means relative to said strainer means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for forcing filtrate which has passed in said one direction through said strainer means back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accu-

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mulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

4. In a strainer apparatus, in combination, an upright
5 container; strainer means arranged near the bottom of
said container and having a horizontal first upwardly
directed face on which a suspension of solid material to
be strained is deposited, the filtrate passing in one direc-
10 tion through said strainer means to the second face there-
of and a deposit of strained solid material remaining
on said first face of said strainer means; doctor means
arranged adjacent said first face of said strainer means
and having a cleaning edge extending along the same;
15 rotating means rotating said strainer means relative to
said doctor means with said cleaning edge of said doctor
means moving relative to and along said first face of said
strainer means; and loosening means for forcing filtrate
which has passed in said one direction through said
20 strainer means back in the opposite direction from said
second face through said strainer means to said first face
thereof and in front of said cleaning edge of said doctor
means, said loosening means being mounted in a position
relative to said doctor means for forcing filtrate out of
25 said first face of said strainer means in front of the clean-
ing edge of said doctor means, during movement thereof
relative to said strainer means, so as to thereby loosen
said deposit of solid material on said first face of said
strainer means whereby the strained solid material accu-
30 mulates in said upright container to apply pressure to the
suspension of solid material deposited on said horizontal
first face.

1. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

6. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells com-

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municating with different portions of the first face thereof; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

7. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; filtrate chamber means arranged adjacent said strainer means communicating with said cells thereof for receiving filtrate passing through said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means communicating at its inlet end with said filtrate chamber means and at its outlet end communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

8. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof

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and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; filtrate chamber means arranged adjacent said strainer means communicating with said cells thereof for receiving filtrate passing through said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative and along said first face of said strainer means; loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means communicating at its inlet end with said filtrate chamber means for receiving a portion of the filtrate therefrom and at its outlet end communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face; and outlet means communicating with said filtrate chamber means for discharging the remainder of the filtrate therefrom.

9. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating said doctor means relative to said strainer means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for or facing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means having an outlet portion rotatable with said doctor means and communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said rotatable outlet portion of said conduit means, so as to thereby loosen said deposit of solid material on said

first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

10. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating said strainer means relative to said doctor means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising stationary conduit means communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

11. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; stationary filtrate chamber means arranged adjacent said strainer means communicating with said cells thereof for receiving filtrate passing through said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating said doctor means relative to said strainer means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means having an outlet portion rotatable with said doctor means and communicating at its inlet end with said filtrate chamber means and at its outlet end communi-

cating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said rotatable outlet portion of said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

12. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; stationary filtrate chamber means arranged adjacent said strainer means communicating with said cells thereof for receiving filtrate passing through said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating said doctor means relative to said strainer means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means having an outlet portion rotatable with said doctor means and communicating at its inlet and with said filtrate chamber means for receiving the portion of the filtrate therefrom and at its outlet end communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said rotatable outlet portion of said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face; and outlet means communicating with said filtrate chamber means for discharging the remainder of the filtrate therefrom.

13. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; stationary filtrate chamber means arranged adjacent said strainer means communicating with said cells thereof for receiving filtrate passing through said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the

same; rotating means rotating said strainer means relative to said doctor means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; and loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising stationary conduit means communicating at its inlet end with said filtrate chamber means and at its outlet end communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

14. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; stationary filtrate chamber means arranged adjacent said strainer means communicating with said cells thereof for receiving filtrate passing through said strainer means; doctor means arranged adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating said strainer means relative to said doctor means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; loosening means for receiving filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising stationary conduit means communicating at its inlet end with said filtrate chamber means for receiving a portion of the filtrate therefrom and at its outlet end communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communicating with said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face; and outlet means communicating with said filtrate chamber means for discharging the remainder of the filtrate therefrom.

15. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly

directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means; container means extending around said first face of said strainer means for receiving a suspension of solid material to be deposited on said strainer means; inlet means connected to said container means for introducing a suspension of solid material therein; doctor means arranged in said container means adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; loosening means for forcing a portion of the filtrate which has passed in said one direction through said strainer means back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, so as to thereby loosen said deposit of solid material on said first face of said strainer means; and outlet means for discharging the remainder of said filtrate whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face.

16. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means; container means extending around said first face of said strainer means for receiving a suspension of solid material to be deposited on said strainer means; inlet means connected to said container means for introducing a suspension of solid material therein; doctor means arranged in said container means adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; filtrate chamber means for receiving filtrate from said strainer means; loosening means for forcing a portion of the filtrate in said filtrate chamber means which has passed in said one direction through said strainer means back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, so as to thereby loosen said deposit of solid material on said first face of said strainer means; and outlet means connected to said filtrate chamber means for discharging the remainder of said filtrate therein whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first place.

17. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remain-

ing on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; container means extending around said first face of said strainer means for receiving a suspension of solid material to be deposited on said strainer means; inlet means connected to said container means for introducing a suspension of solid material therein; doctor means arranged in said container means adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; loosening means for receiving a portion of the filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face; and outlet means for discharging the remainder of said filtrate.

18. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; container means extending around said first face of said strainer means for receiving a suspension of solid material to be deposited on said strainer means; inlet means connected to said container means for introducing a suspension of solid material therein; doctor means arranged in said container means adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating said doctor means relative to said strainer means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; loosening means for receiving a portion of the filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face; and outlet means for discharging the remainder of said filtrate.

19. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; container means extending around said first face of said strainer means for receiving a suspension of solid material to be deposited on said strainer means; inlet means connected to said container means for introducing a suspension of solid material therein; doctor means arranged in said container means adjacent said first face of said strainer means and having a cleaning edge extending along the same; rotating means rotating said strainer means relative to said doctor means with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; loosening means for receiving a portion of the filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said strainer means, said loosening means comprising conduit means communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face; and outlet means for discharging the remainder of said filtrate.

20. In a strainer apparatus, in combination, an upright container; strainer means arranged near the bottom of said container and having a horizontal first upwardly directed face on which a suspension of solid material to be strained is deposited, the filtrate passing in one direction through said strainer means to the second face thereof and a deposit of strained solid material remaining on said first face of said strainer means, said strainer means having wall portions enclosing said second face thereof and forming therewith a plurality of cells communicating with different portions of the first face thereof; container means extending around said first face of said strainer means for receiving a suspension of solid material to be deposited on said strainer means; inlet means connected to said container means for introducing a suspension of solid material therein; filtrate chamber means arranged adjacent said strainer means communicating with said cells thereof for receiving filtrate passing through said strainer means; doctor means arranged in said container means adjacent said first face of said strainer means and having a cleaning edge extending along the same; moving means moving one of said means relative to the other with said cleaning edge of said doctor means moving relative to and along said first face of said strainer means; loosening means for receiving a portion of the filtrate which has passed in said one direction through said strainer means and forcing it back in the opposite direction from said second face through said strainer means to said first face thereof and in front of said cleaning edge of said doctor means, said loosening means being mounted in a position relative to said doctor means for forcing filtrate out of said first face of said strainer means in front of the cleaning edge of said doctor means during movement thereof relative to said

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strainer means, said loosening means comprising conduit means communicating at its inlet end with said filtrate chamber means and at its outlet end communicating successively with said plurality of cells during relative movement of said strainer means and said doctor means, and pump means in said conduit means for forcing the filtrate received by said conduit means back through said strainer means via the respective cell in communication with said conduit means, so as to thereby loosen said deposit of solid material on said first face of said strainer means whereby the strained solid material accumulates in said upright container to apply pressure to the suspension of solid material deposited on said horizontal first face; and outlet means connected to said filtrate chamber means for discharging the remainder of said filtrate.

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