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SCRAPER MEANS

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FIG. 1

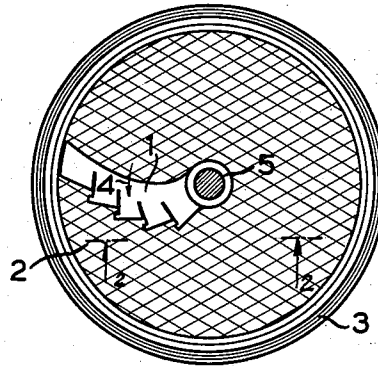


FIG. 2

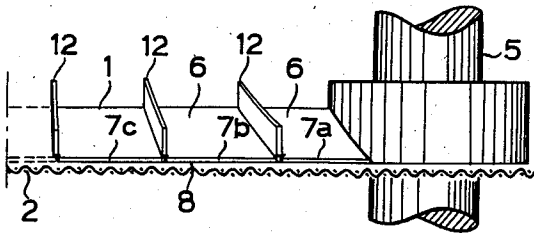


FIG. 3

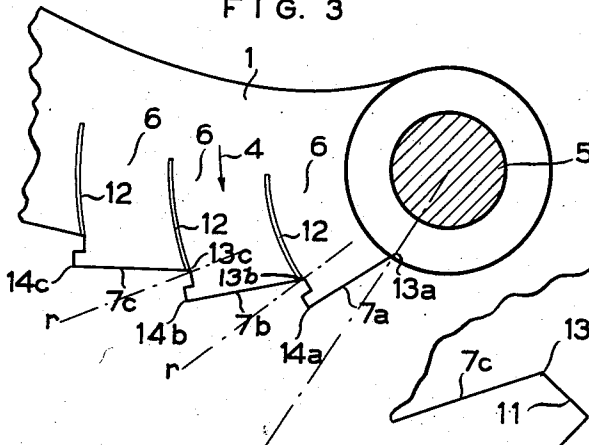
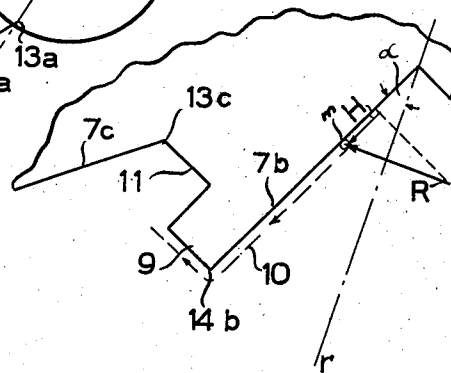


FIG. 4



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1

2,901,763

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6 Claims. (Cl. 15—246.5)

The present application relates to scraper means and more particularly to scraper means used to scrape particles or fibers from the top of a strainer surface.

Scraper means of this type are extensively used, for instance in the pulp and paper making industries for removing a layer of solid particles or fibers from the surface of a strainer in order to increase the efficiency of and to provide for the proper operation of such a strainer. One of the difficulties encountered in the operation of such scraper means on top of a strainer surface is that when the scraper blade moves over the surface of the strainer, some of the particles or fibers tend to wedge themselves between the strainer and the leading edge of the scraper blade and are moved along by the scraper blade on top of the strainer surface. In this case such wedged particles tend to rub against the strainer surface and cause considerable wear on the blade and the strainer surface and increase also the friction between the blade and the strainer surface.

One object of the present invention is to overcome the above mentioned disadvantages.

Another object of the present invention is to form the scraper means in such a way that the particles or fibers will move along the leading edge of the scraper blade instead of being wedged between the scraper blade and the strainer.

It is a further object of the present invention to construct the scraper means in such a way that the fibers or particles will move along only part of the leading edge of the scraper blade so as to reduce the path of these particles or fibers along the strainer surface.

It is yet another object of the present invention to facilitate the movement of the particles and fibers over the scraper blade while the scraper blades move over the strainer surface.

With the above objects in view, the scraper means of the present invention mainly consists in support means, and a scraper blade mounted on the support means for movement in one direction for scraping a surface, the scraper blade having a stepped portion leading in the one direction of movement, the stepped portion including a plurality of leading edge portions, each of the edge portions being inclined to the one direction of movement, each of the edge portions having one end leading in the direction of movement and one end trailing in the direction of movement, the leading end of each of the edge portions trailing in the one direction of movement the trailing end of the edge portion adjacent thereto.

In the preferred embodiment of the invention, the scraper blade is rotated about an axis in one direction of movement and the leading stepped portion includes a plurality of overlapping leading edge portions inclined to said direction of movement, each of the edge portions having an inner end leading in said direction of movement and an outer end trailing in said direction of movement, each of the edge portions being also inclined to a line passing through the leading end thereof and extending radially from the axis of rotation.

2

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 top view of the scraper means according to the present invention mounted on top of a strainer surface;

Fig. 2 is a fragmentary sectional view taken along the line 2—2 of Fig. 1 in the direction of the arrows;

Fig. 3 is a fragmentary top view of the scraper means; and

Fig. 4 is a fragmentary diagrammatic top view of the scraper blade.

Referring now to the drawings and more particularly to Fig. 1 of the same, the scraper blade 1 is shown extending laterally from one side of a shaft 5 and being supported by the shaft for movement about the shaft axis in one direction indicated by arrow 4 for scraping the surface of a strainer 2. This strainer surface 2, formed for instance by a wire mesh, extends in a plane normal to the shaft axis on the bottom of a cylindrical container or tower 3.

The strainer blade 1 shown in detail in Figs. 2 and 3 has a top surface 6 which is inclined to the plane in which the strainer 2 is located. The blade 1 is rotated in the direction of the arrow 4 and is formed with a stepped portion 8 leading in the direction of the movement. The stepped portion 8 includes a plurality of leading edge portions 7a, 7b, 7c which are in contact with the strainer surface and which are inclined to the direction of movement indicated by the arrow 4. Each of the edge portions has an inner end and an outer end, the inner end of the edge portion 7a being designated with 13a and the outer end with 14a, whereas the inner ends of the edge portions 7b and 7c are respectively designated with 13b and 13c and the outer ends thereof respectively with 14b and 14c. It is evident from Fig. 3 that the inner end 13b of the edge portion 7b trails the outer end 14a of the edge portion 7a when the blade is rotated in the direction of the arrow 4. The edge portions 7a, 7b, 7c are respectively inclined to the direction of movement indicated by the arrow 4 and also inclined to line r passing respectively through the leading ends 13a, 13b, 13c and extending radially from the shaft axis. The edge portions 7a, 7b, 7c, include with the respective line r an angle which is preferably the same for all of said edge portions. The outer end of each edge portion is connected to the inner end of the adjacent edge portion by connecting edge portion 9, which is formed adjacent the inner or leading end of each leading edge portion with an undercut recess 11 as shown in Fig. 4 so that the leading edge portions overlap slightly. A plurality of guide wings 12 are fixed to the top surface 6 of the scraper blade 1. These guide wings 12 extend, respectively, substantially normal to the top surface 6 and substantially parallel to the direction of movement from the inner end of each of the leading edge portions.

The scraper means as described above will work as follows:

When the blade 1 is rotated by the shaft 5 over the surface of the strainer 2 most of the particles or fibers forming a cake or layer on the top of the strainer surface 2 will be lifted by the blade 1 and pass over the inclined top surface 6 of the same. Some of the fibers will not follow this lifting movement but will tend to stick to the leading edge portion 8 of the blade. Such a particle m will be pressed against the leading edge portion with a force indicated by the vector R in Fig. 4 which is

3

parallel to the direction of movement and due to the inclination of the leading edge portion to this direction of movement, the force indicated by the vector R can be divided into a component normal to the edge portion and in a component H parallel to the edge portion. The force acting in the direction of the component H will force the particle *m* to move along a path 10 indicated in broken lines in Fig. 4, the particle will therefore move along one of the leading edge portions toward the outer end of the same and along the connecting edge portion 9 to the inner end of the adjacent leading edge portion. To assure that the particle is not caught in the corner in which the connecting end portion 9 meets the adjacent leading edge portion, the connecting end portion 9 is undercut at 11. The particle will therefore become disengaged from the connecting end portion 9 and will move upon further rotation of the blade onto the leading edge portion of the adjacent blade edge portion and be lifted by the same over the top surface of the blade.

When a blade according to the present invention is rotated over the strainer surface, most of the particles or fibers resting on the strainer surface will be lifted by the blade and moved over the top surface of the blade towards the rear of the blade. The guide wings 12 prevent thereby a transverse movement of these lifted particles and guide the particles in parallel streams over the blade. Any particles tending to stick to the leading edge of the blade will be moved as described above along said stepped leading edge portions of the blade. Due to the recesses 11 provided in each of the connecting edge portions 9 of the blade, these particles will become disengaged from the connecting edge portions and come upon further rotation of the blade in contact with the adjacent leading edge portion of the blade. Any wedging of particles or fibers between the strainer surface and the leading edge portions is thereby prevented and the paths of each fiber moving along the leading edge portions is thereby shortened.

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 scraper means differing from the types described above.

While the invention has been illustrated and described as embodied in a scraper means used to scrape particles or fibers from the top of a strainer surface and having a stepped leading edge, 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 the 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. Scraper means comprising, in combination, a shaft; and a scraper blade means extending laterally from one side of said shaft and being supported by the same for movement about the shaft axis in one direction for scraping a surface located in a first plane normal to said axis, said scraper blade means having a stepped edge leading in said one direction of movement, said stepped edge including a plurality of leading edge portions all located in a second plane adjacent to and parallel to said first plane, each of said edge portions located in said second plane being inclined to said one direction of movement, each of said edge portions having an inner end leading in said direction of movement and an outer end trailing in said direction of movement, said inner end of each of said edge portions trailing in said one direction

4

of movement the outer end of the edge portion adjacent thereto, each of said edge portions being also inclined to a line passing through the leading end thereof and extending radially from said axis, said scraper blade means having a substantially smooth top surface extending rearwardly and inclined at an acute angle to said second plane upwardly from said leading stepped edge.

2. Scraper means comprising, in combination, a shaft; and a scraper blade means extending laterally from one side of said shaft and being supported by the same for movement about the shaft axis in one direction for scraping a surface located in a first plane normal to said axis, said scraper blade means having a stepped edge leading in said one direction of movement, said stepped portion including a plurality of leading edge portions all located in a second plane adjacent to and parallel to said first plane, each of said edge portions located in said second plane being inclined to said one direction of movement, each of said edge portions having an inner end leading in said direction of movement and an outer end trailing in said direction of movement, said inner end of each of said edge portions trailing in said one direction of movement the outer end of the edge portion adjacent thereto, each of said edge portions being also inclined to a line passing through the leading end thereof and extending radially from said axis, said leading edge portions including respectively with said respective lines equal angles, said scraper blade means having a substantially smooth top surface extending rearwardly and inclined at an acute angle to said second plane upwardly from said leading stepped edge.

3. Scraper means comprising, in combination, a shaft; and a scraper blade means extending laterally from one side of said shaft and being supported by the same for movement about the shaft axis in one direction for scraping a surface located in a first plane normal to said axis, said scraper blade means having a stepped edge leading in said one direction of movement, said stepped edge including a plurality of leading edge portions all located in a second plane adjacent to and parallel to said first plane and a plurality of connecting edge portions, each of said leading edge portions located in said second plane being inclined to said one direction of movement, each of said leading edge portions having an inner end leading in said direction of movement and an outer end trailing in said direction of movement, said inner end of each of said leading edge portions trailing in said one direction of movement the outer end of the edge portion adjacent thereto, each of said leading edge portions being also inclined to a line passing through the leading end thereof and extending radially from said axis, each of said connecting edge portions connecting the outer end of one of said leading edge portions with the inner end of the leading edge portion adjacent said one leading edge portion and being formed with an undercut recess adjacent said inner end of the respective adjacent leading edge portion, said scraper blade means having a substantially smooth top surface extending rearwardly and inclined at an acute angle to said second plane upwardly from said leading stepped edge.

4. Scraper means comprising, in combination, a shaft; a scraper blade extending laterally from one side of said shaft and being supported by the same for movement about the shaft axis in one direction for scraping a surface located in a plane normal to said axis, said scraper blade having a top surface and having a stepped edge leading in said one direction of movement, said stepped edge including a plurality of leading edge portions, each of said edge portions being inclined to said one direction of movement, and adapted to extend along said plane, each of said edge portions having an inner end leading in said direction of movement and an outer end trailing in said direction of movement, said inner end of each of said edge portions trailing in said one direction of movement the outer end of the edge portion adjacent

5

thereto, each of said edge portions being also inclined to a line passing through the leading end thereof and extending radially from said axis; and a plurality of guide wings, each of said guide wings being fixed to said top surface, extending substantially normal to said top surface and substantially in the direction of said movement of said scraper blade.

5. Scraper means comprising, in combination, a shaft; a scraper blade extending laterally from one side of said shaft and being supported by the same for movement about the shaft axis in one direction for scraping a surface located in a plane normal to said axis, said scraper blade having a top surface and having a stepped edge leading in said one direction of movement, said stepped portion including a plurality of leading edge portions, each of said edge portions being inclined to said one direction of movement, and adapted to extend along said plane, each of said edge portions having an inner end leading in said direction of movement and an outer end trailing in said direction of movement, said inner end of each of said edge portions trailing in said one direction of movement the outer end of the edge portion adjacent thereto, each of said edge portions being also inclined to a line passing through the leading end thereof and extending radially from said axis; and a plurality of guide wings extending respectively through the inner ends of said edge portions, each of said guide wings being fixed to said top surface, extending substantially normal to said top surface and substantially in the direction of said movement of said scraper blade.

6. Scraper means comprising, in combination, a shaft; a scraper blade extending laterally from one side of said shaft and being supported by the same for move-

6

ment about the shaft axis in one direction for scraping a surface located in a plane normal to said axis, said scraper blade having a top surface and having a stepped edge leading in said one direction of movement, said stepped edge including a plurality of leading edge portions, said leading edge portions adapted to move in a plane normal to said shaft axis, said top surface being inclined to said plane, each of said edge portions being inclined to said one direction of movement, and adapted to extend along said plane, each of said edge portions having an inner end leading in said direction of movement and an outer end trailing in said direction of movement, said inner end of each of said edge portions trailing in said one direction of movement the outer end of the edge portion adjacent thereto, each of said edge portions being also inclined to a line passing through the leading end thereof and extending radially from said axis; and a plurality of arcuate guide wings, each of said guide wings being fixed to said top surface and having guide faces substantially normal to said top surface and substantially concentric with said shaft.

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