

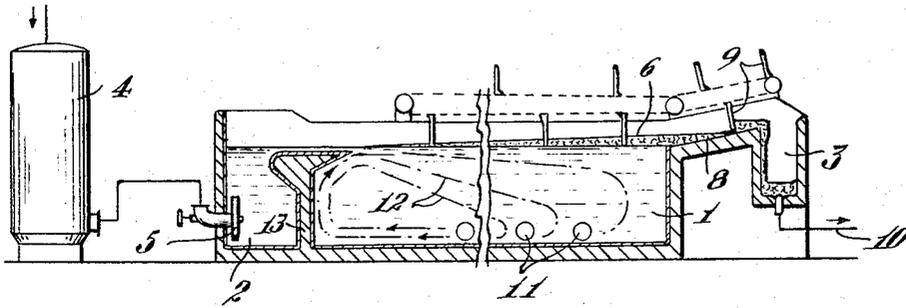
Nov. 22, 1966

F. JUELL

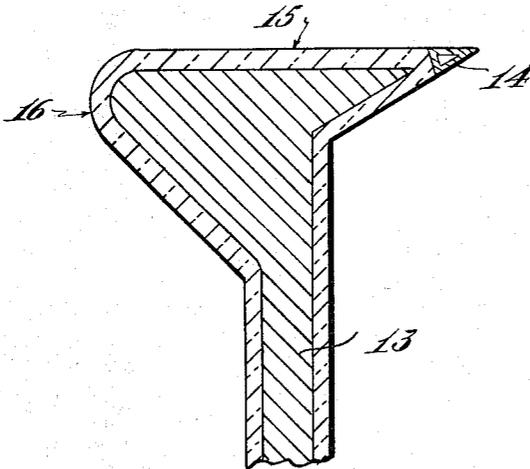
3,286,844

FIBER FLOTATION APPARATUS

Filed Sept. 26, 1963



*Fig. 1*



*Fig. 2*

INVENTOR.

*Fredrik Juell*

BY

*Roberts, Cushman & Grover*

ATT'YS

1

3,286,844

## FIBER FLOTATION APPARATUS

Fredrik Juell, Oslo, Norway, assignor to E. D. Jones Corporation, Pittsfield, Mass., a corporation of Delaware

Filed Sept. 26, 1963, Ser. No. 311,898

2 Claims. (Cl. 210—523)

This invention relates to fibre recovery apparatus of the type disclosed in my prior Patent 2,765,919, granted October 9, 1956, in which the fibres in, as my way of example, white water from paper making machines are recovered by means of flotation. Flotation plants are known in which the white water or another fibre suspension to be treated is introduced in an inlet chamber to an open elongated basin at one end thereof. During its flow along the basin the introduced fibre suspension is subjected to a successive flotation of inherent fibres to the liquid surface where the fibres form a thickened layer that by means of scrapers or rakes can be removed at the opposite end of the basin. However, one has found that a circulating flow of the contents of the basin is created in the space between a vertical partition wall of the inlet chamber and the opposite end wall of the basin. The circulating flow is such that the suspension of the liquid level moves in a direction from the inlet chamber while, at the bottom of the basin, where discharge tubes for cleaned water are arranged, the suspension moves toward said partition wall. At said partition wall a vertical upwardly directed stream appears which strikes the incoming fibre suspension at right angles. Hereby, the incoming suspension will be subjected for a stirring action and possible destruction of built-up fibre flocks.

The invention has for its purpose to attain an improved efficiency of the flotation process and a more rapid thickening of the floated fibre layer.

For this purpose the fibre recovery apparatus according to the invention is characterized in that the partition wall between the inlet chamber and the flotation basin is at its top inclined forwardly in the flow direction of the incoming fibre suspension. Preferably said partition wall also forms a surface elongated in the flow direction and at a small depth below the liquid level in the flotation basin. Moreover, the upper portion of said partition wall is advantageously well rounded towards the inlet chamber for giving an effective guidance to the fibre suspension flowing over said partition wall.

In the following the invention will be described in more details with reference to the accompanying drawing showing a preferred embodiment of the invention.

FIG. 1 is a longitudinal section of a fibre recovery apparatus according to the invention;

FIG. 2 is a detail of the same in an enlarged scale.

On the drawing 1 designates a basin at one end of which an inlet chamber 2 for fibre suspension and at the other end of which an outlet chamber 3 for thickened recovered fibre mass are arranged.

Fibre suspension, such as white water from paper making machines, is supplied to the inlet chamber 2 through an air absorption vessel 4 and a valve device 5. The air absorption vessel may be of any suitable construction, as for example that disclosed in the patent to Meyer, 3,100,810, granted August 13, 1963. When entering into the inlet chamber 2 from said valve device 5 air dissolved in the suspension is released in the shape of an immense number of fine bubbles adhering to fibres and fibre flocks respectively and rising the same to the liquid level in the basin 1 where said fibres and fibres flocks are gathered together in a layer 6 successively moved along the basin by means of scrapers or rakes 9 immersed into said layer 6. The thickened layer 6 is moved to a slightly inclined table 8 over which said

2

scrapers or rakes 9 move the thickened fibre mass to the outlet chamber 3. From the last mentioned chamber 3 the thickened fibre mass is removed through a tube system 10. Clear water is discharged through perforated tubes 11 extending along the bottom of the elongated basin 1 and transversely thereto. The discharge volume flowing through said tubes 11 is regulated suitably by means of spillways (not shown).

Practical tests have shown that the flow in the basin 1 takes place generally as shown by arrows 12 and a rising returned stream of cleared liquid is formed at the outer side of the vertical partition wall 13 of the inlet chamber 2. This flow is caused by the stream of liquid flowing over the wall 13 and thence along the top of the liquid in basin 1, this stream exerting a frictional drag on the body of liquid in the basin. The water flowing out through tubes 11 also helps to produce this circulation. As is easily understood said return stream will collide with the fibre suspension streaming over the partition wall 13 from the inlet chamber 2. In known devices said partition wall 13 is usually entirely vertical so that at its upper edge two mutually perpendicularly streaming liquid flows strike against each other with a demolition effect on the fibre suspension while being thickened.

This essential drawback has been removed by the invention due to the fact that the upper edge of the partition wall 13 is inclined forwardly in the flow direction of the suspension so that said two streams, that is the return stream and the incoming stream, move substantially parallel and the stream of cleared liquid forms a carrier for the incoming fibre suspension while successively decreasing the velocity of the latter during non-turbulent flow conditions. This measure has proved to give a surprisingly improved flotation process with a much more rapid thickening of the floated fibres. Further one has found that the tip 14 of said inclined portion of the partition wall 13 has an evident influence on the process and that very smooth surfaces of said tip and a sharp edge additionally improved the already to a high degree improved results with respect to the thickening of the fibre suspension at a liquid level in the basin to previously unachieved concentrations. Suitably the tip 14 is a detachable part as shown in FIG. 2 so that said part 14 can be machined separately to desired smoothness of the surface and desired sharpness of the edge.

According to the invention the upper side of the partition wall 13 is made with a relatively long smooth surface 15 located such that a thin incoming liquid layer is obtained resulting in a parallel or a substantial laminar flow to the fibre suspension entering into said inlet chamber 2 under strong turbulence. Practical observations have proved that flocculation and flotation of fibres start already during the flow over said surface 15 and at the decelerated flow of the suspension in the very basin 1 form the basis for an intimately bound-up fibre layer 6 successively strengthened under continued thickening by flotation. Moreover it should be noticed that due to the fact that the surface 15 extends into the inlet chamber 2 with a well rounded guide surface 16 the creation of an undisturbed flow over the surface 15 is supported.

From the above description it is apparent that by the invention an essential improvement of described fibre recovery apparatus is attained resulting in a more rapid flotation process with consequent reduction of the size of the apparatus for a given flow capacity and an earlier desired but unattained concentration of recovered fibres, which also results in the fact that the fibre mass can be collected with much more simple means.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention

3

includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. Fibre recovery apparatus comprising an inlet chamber and a flotation chamber, the inlet chamber having an inlet for introducing aerated fiber suspension and the flotation chamber having an outlet for floating fibers, means in said flotation chamber for removing clarified water, a partition wall separating said chambers from one another and extending upwardly and terminating below the level of said outlet in a wide top surface, leaving a shallow liquid passage over the top surface of the partition throughout the length and width of the partition, and a scraper for moving the material floating in the flotation chamber towards said outlet, characterized in that the upper end of the side of said partition wall in the flotation chamber inclines upwardly and inwardly of the flotation chamber and said partition increases in thickness upwardly to provide said wide top surface.

4

2. Fibre recovery apparatus according to claim 1 wherein the upper edge of the partition in the inlet chamber is rounded.

#### References Cited by the Examiner

##### UNITED STATES PATENTS

2,330,589	9/1943	Juell .....	210—221 X
2,532,457	12/1950	Morgan et al. ....	210—525
2,574,685	11/1951	Baxter et al. ....	210—220 X
2,746,605	5/1956	Baum .....	210—526 X
2,765,919	10/1956	Juel .....	210—526 X
2,793,185	5/1957	Albrektsson et al. ....	210—44
2,852,140	9/1958	MacLaren .....	210—320 X

REUBEN FRIEDMAN, *Primary Examiner.*

HERBERT L. MARTIN, *Examiner.*

J. DE CESARE, R. A. CATALPA, *Assistant Examiners.*