Sept. 11, 1962 N. G. LEFFLER 3,053,069

TOWERS FOR BLEACHING PULP MATERIAL, ESPECIALLY CELLULOSE PULP

Filed Dec. 29, 1959 2 Sheets-Sheet 1

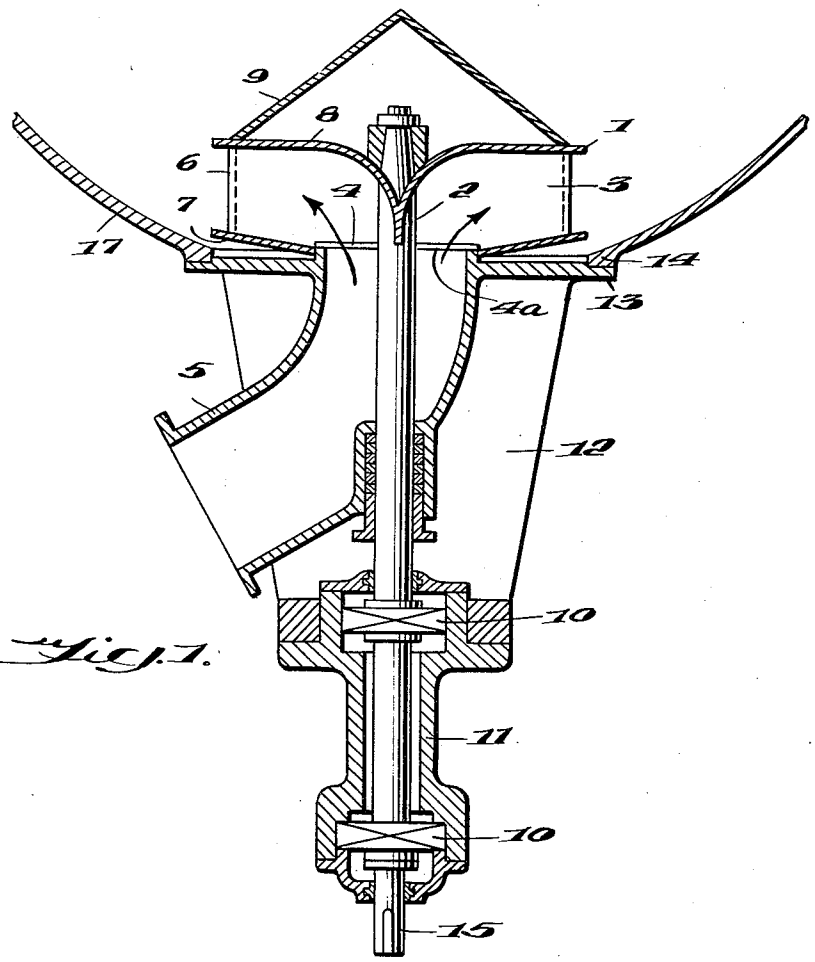


Fig. 1.

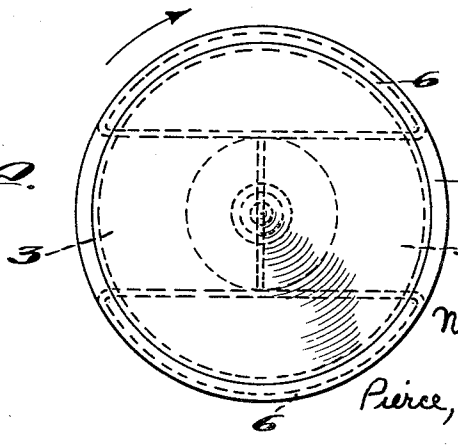


Fig. 2.

INVENTOR

Nils Gustav Leffler

by

Pierce, Scheffler & Parker

ATTORNEYS

Sept. 11, 1962 N. G. LEFFLER 3,053,069

TOWERS FOR BLEACHING PULP MATERIAL, ESPECIALLY CELLULOSE PULP

Filed Dec. 29, 1959 2 Sheets-Sheet 2

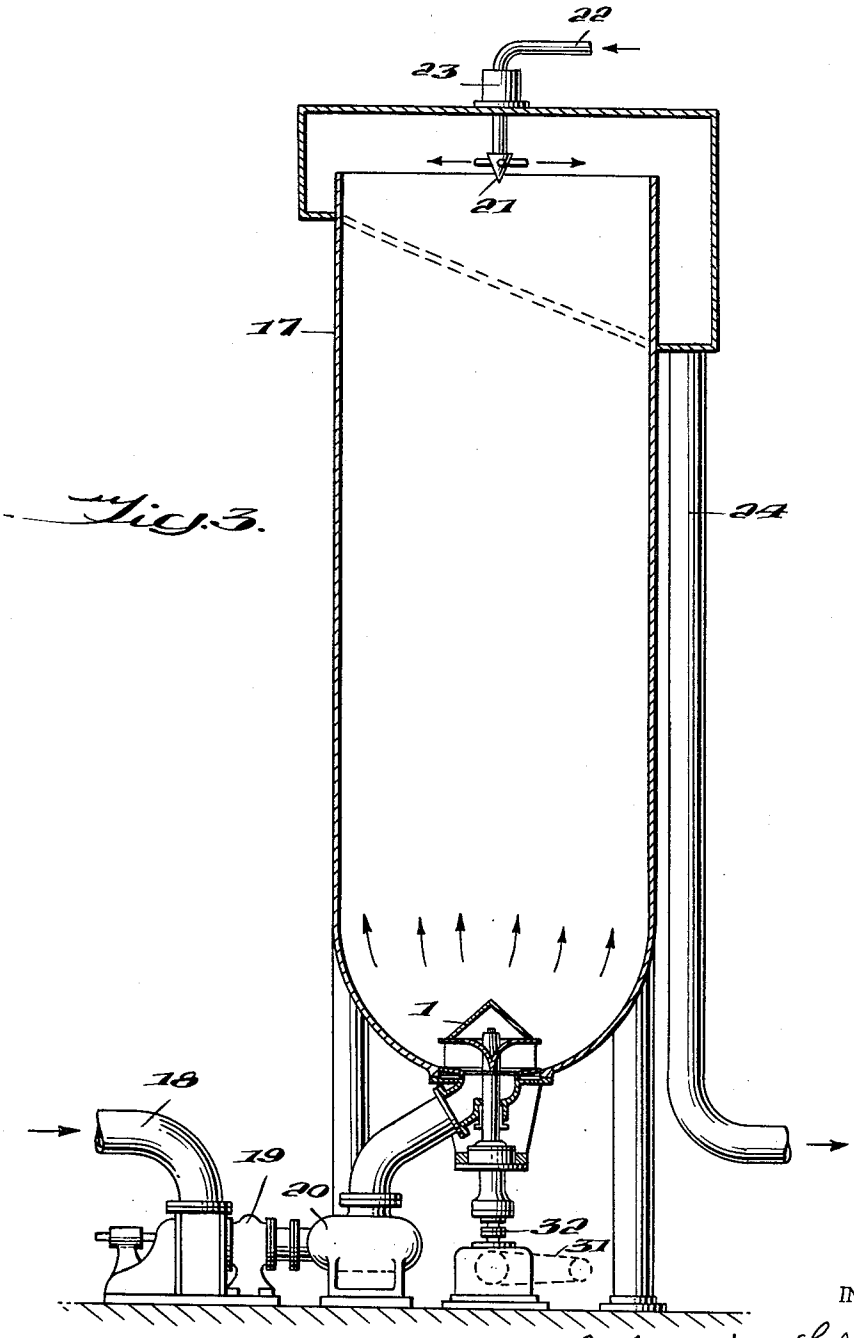


Fig. 3.

INVENTOR

Nils Gustav Leffler

BY Pierce, Scheffler & Parker

ATTORNEYS

United States Patent Office 3,053,069 Patented Sept. 11, 1962

3,053,069

TOWERS FOR BLEACHING PULP MATERIAL, ESPECIALLY CELLULOSE PULP

Nils Gustav Leffler, Sundsbruk near Sundsvall, Sweden, assignor to Sunds Verkstader Aktiebolag, Sundsbruk (near Sundsvall) Sweden

Filed Dec. 29, 1959, Ser. No. 862,621
Claims priority, application Sweden Aug. 21, 1957
1 Claim. (Cl. 68—181)

The present invention relates to the art of bleaching pulp material, and this application is a continuation-in-part of my prior filed application, Serial Number 756,091, filed August 20, 1958.

In continuously bleaching pulp material, for instance, cellulose pulp, in a tower, the pulp is fed into the tower at the bottom thereof and is discharged at the top of the tower or the pulp is fed in the opposite direction, i.e. from above downwards. The first mentioned system is commonly used when pulps of low concentrations are concerned, the last-mentioned system having been used for concentrations above about 8%.

However, the system of feeding the material from below upwards involves apparent advantages in connection with the bleaching of cellulose pulp of a concentration above about 8%. There is no risk of the pulp "hanging" in the tower and dilution of the ready-treated pulp, in order to make possible the further conveyance thereof by means of a pump, is more easily done and controlled at the top of the tower than at the bottom thereof.

In order to obtain a uniform flow inside a bleaching tower, in which pulp of a relatively high concentration is fed from below upwards, it is, however, necessary to provide for an effective charging and distribution of the pulp at the bottom of the tower. The present invention relates to an arrangement for creating such effective charging and distribution of the pulp. The invention mainly consists in that the stationary inlet opening located preferably centrally at the bottom of the tower is combined with a pulp feed distributing device which is rotatable about a vertical or substantially vertical axis and is adapted, through two opposed passages and associated openings, provided in said distributing device, to conduct the pulp in radial or substantially radial directions out into the tower, said discharge openings of the distributing device being located at the bottom of the tower.

The invention will be described below with reference to the accompanying drawings. In the drawings FIG. 1 shows a vertical sectional view of a distributing device according to the invention; FIG. 2 is a top plan view of the distributing device; and FIG. 3 is a vertical sectional view of a bleaching tower, provided with a distributing device according to the invention.

The distributing device **1** is secured to a rotary shaft **2** in such a manner that its discharge openings **3** for the pulp are radially, or substantially radially, directed outwards and preferably somewhat upwards, so that the direction of motion of the pulp will substantially coincide with the direction of the bottom of the tower near the discharge openings **3**. By modifying, to some extent, the direction of said openings the quantity of pulp fed outwards to the periphery of the tower can be controlled relatively to that quantity which begins to move upwards immediately after having emerged from the discharge openings. The more the openings are directed upwards the larger is the quantity of pulp supplied to the central zone of the tower.

Referring to FIG. 1 the pulp will be pressed outwards towards the cylindrical part of the tower within a zone located relatively close to the bottom of the tower, and

the pressure created and maintained there will generate an upward force, which is evenly distributed over the whole cross sectional area of the tower, a uniform upward flow being obtained within said cross sectional area without "channeling" occurring.

The inlet opening **4** of the distributing device is tightly connected to the inlet pipe **5** and should have at least approximately the same diameter as the latter. The connection between the distributing device **1** and the inlet pipe **5** may consist of a narrow slot *4a*.

In order to reduce the need of effective power for rotation of the distributing device **1** said distributing device may be provided with a cylindrical shell **6** and with end portions **7** and **8** along with a covering cone **9** or the like. The latter will help in preventing pulp from remaining on the end portion **8**. The surface of the covering cone **9** extends substantially in the direction of flow of the pulp, due to which pulp cannot accumulate on this surface.

The rotary shaft **2** carrying the pulp feed distributing device **1** is mounted in two roller bearings **10**, **10**, mounted in a housing **11**. The housing **11** is formed with brackets **12**—one at each side of the inlet pipe **5**—and a flange **13**, which, for instance, by means of bolts (not shown), is secured to a flange **14** at the bottom of the tower. The opening within the flange **14** should be so large as to permit the downward removal of the entire distributing device without taking it to pieces. The driving power for the shaft may be transmitted from an electric motor or some other source of power (not shown) to the journal **15** by means of a cone belt drive **31** and an elastic or a rigid coupling **32**. In the latter case the drive assembly is to be mounted below the distributing device.

The direction of the opening of the pulp feed distributing device may be varied. Said opening may curve backwards, counting in the direction of rotation. In the embodiment in which the discharge openings curve backwards the driving device for the shaft **2** may be omitted under certain circumstances and the distributor driven by the outflowing pulp. The speed of rotation of the distributing device could then be controlled, in case great demands are made on a uniform flow being obtained in the tower. It should also be pointed out that it may be advantageous not to control the speed of rotation of the distributing device, in which case a larger quantity of pulp will be distributed in that radial direction in which the pressure is lowest, resulting in a balancing of the pressure in the tower. As is shown in FIG. 2 similar and opposite discharge openings **3**, **3** may be provided.

The main features of the distributing device according to the invention having been described, there will now be explained in what way the distributing device may be arranged in a bleaching tower and what further equipment may be advantageously combined with the distributing device. In FIGS. 1 and 3 the distributing device is indicated by **1** and the bleaching tower by **17**. Normally, the bleaching tower is of a cylindrical shape. The pulp to be treated is supplied through a pipe line **18**. The pulp may come from a filter, not shown, which may be positioned either high up—for instance above the top of the tower—or at the bottom plane. Through said pipe line **18** the pulp is conducted into a thick stock pump **19**, which preferably may be of the gear pump type. Also, some other conventional charging device could be used instead. A desirable, very uniform feeding is, however, obtained with the type of a pump just mentioned. From said pump the pulp is then pressed further through a mixer **20** to the distributing device **1** and further upwards through the tower **17**. At the top of the tower there may be provided a conventional removing device or scraper

(not shown) for removing the treated pulp. In such a case the removing device or scraper may be driven from a common shaft, which preferably is located centrally in the tower. In the drawing, however, there is shown another alternative of removing the pulp, viz. by means of a rotating water spout **21** with a supply pipe **22** for water under pressure and driven by a motor **23**. An arrangement of this kind is simpler and cheaper than a scraper, and the water spout may serve for effecting both the removal of the pulp and the dilution thereof to a suitable concentration. The treated pulp finally is led away through a pipe **24**.

Due to the fact that bleaching agents and/or vapour are added in a separate mixing device **20** outside the tower, said mixing device being specially constructed for that purpose, an effective admixing is obtained. Furthermore, it is easy to control the dosages by taking samples. However, if it is desired to save the cost of a separate mixing device, the bleaching agent, for example, chlorine gas, and/or the vapour may be added at the periphery of the distributing device. The invention also includes embodiments having an oval or a cylindrical opening of the distributing device.

A distributing device in accordance with the invention provides for a controlled feeding of pulp into the tower, substantially in radial direction, bringing about a controlled flow in axial direction.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

Apparatus for bleaching pulp material comprising a vertically disposed cylindrical tower, a circular opening in the lower end of said tower and substantially coaxial with the axis thereof, a closed pulp supply pipe extending outside the tower and having its discharge end connected

to said opening in the lower end of said tower, the central axis of said discharge end substantially coinciding with the central axis of said tower, a distributing member mounted to rotate within said tower around the axis thereof, an opening in the bottom of said distributing member communicating with said pulp supply pipe, said distributing member comprising a plurality of passages located on only one imaginary diametrical line, each of said passages having top, bottom and side-walls forming a passage having an even and smooth curvature for facilitating the flow of pulp through said passages, pulp discharge orifices in said distributing member, each orifice being connected to its respective passage and each orifice extending circumferentially over only a part of the imagined circular line along which the outermost portion of the distributing member moves upon rotation of same, an outlet at the opposite end of the tower for discharging the stock without recirculation thereof through either the distributing member or the tower, a shaft substantially coaxial with said tower and journaled below the bottom thereof and extending into said supply pipe and said tower and rotatably supporting said distributing member.

References Cited in the file of this patent

UNITED STATES PATENTS

2,383,684	Richter	Aug. 28, 1945
2,764,011	Richter	Sept. 25, 1956
2,774,654	Reed	Dec. 18, 1956
2,873,600	Demaret	Feb. 17, 1959
2,990,710	Burling	July 4, 1961

FOREIGN PATENTS

529,983	Belgium	July 15, 1954