

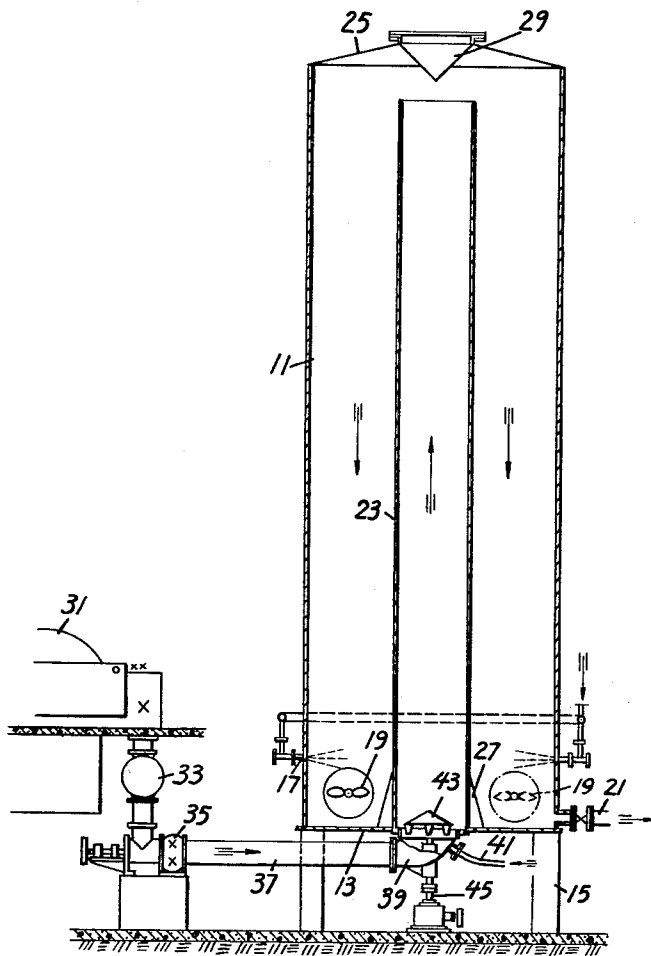
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DEVICE FOR CONTINUOUS BLEACHING OF CELLULOSE

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3,138,947 DEVICE FOR CONTINUOUS BLEACHING OF CELLULOSE

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This invention relates to improvements in apparatus for the continuous bleaching of cellulose.

Continuous cellulose bleaching plants comprise reaction containers which nowadays usually are made as standing cylindrical sheet metal containers or concrete towers. These are often of such a great size that they preferably are placed in the open air without any surrounding building or, when such buildings are present, the tops of the containers or towers extend above the building. When the container is arranged for downward feed of the cellulose pulp, it has hitherto been usual to supply the cellulose pulp mixed with bleaching agents to the top of the container through a supply tube extending vertically at the side of the container and connected by means of a tube bend of 180 degrees into the top of the container. In order to reduce the heat losses of the pulp while passing through the tube, the tube must be insulated and furthermore, the device has the drawback that the tube bend sets up considerable flow resistance, particularly when the pulp is of high consistency.

The object of the present invention, therefore, is to eliminate these and other drawbacks of prior art arrangements, and to create a bleaching plant, the design of which is simpler and better suited for location wholly or at least partially in the open air.

According to the invention, there is provided within the reaction container, a straight, imperforate tube opened at its top for supplying cellulose mixed with bleaching agents to the reaction container. In this arrangement, the supply tube is effectively protected against heat losses and also against atmospheric attacks, and furthermore, the construction is simplified and the plant given a more pleasing appearance.

Further objects and advantages of the invention will be in part obvious and in part pointed out hereinafter.

The novel features of the invention may be best made clear from the following description and accompanying drawings wherein an embodiment of the invention is shown in an elevational view and partly in vertical section.

Referring to the drawing, numeral 11 designates a bleaching tower having the shape of an upright cylindrical sheet metal container having a flat bottom 13 and supported by struts 15. Container 11 may be circular in transverse cross-section and is intended for performing a reaction between cellulose pulp and bleaching agents mixed therewith while the pulp continuously flows through the container in a vertical downward direction, as will be understood. The pulp is supplied to the upper end of the container in a manner to be described in detail hereinafter, and moves slowly and without stirring towards the bottom of the container where the pulp is diluted with dilution liquid suitably supplied thereto, as through spray nozzles 17. The pulp is circulated around the axis of the container by means of one or more stirring impellers 19, arranged so that their axes are horizontal and are disposed tangentially, that is, the axes of impellers 19 are perpendicular to radii drawn from the vertical axis of the container and intersecting the impeller axes. The diluted pulp is discharged from the container through an outlet tube 21 connected to the side of the container immediately above the bottom 13.

The invention contemplates provision of a vertical pulp supply tube 23 which is centrally located within the container 11 and extends coaxially therewith from the bottom of the container to the vicinity of its top, which is covered by a lid 25, as shown. The tube 23 may be circular in cross-section and extends through the center of the bottom 13, being suitably secured thereto, as by welding, and supported by radial triangular stiffening plates 27. The diameter of the tube, which is uniform over the entire length of the tube, preferably is 0.3 to 0.1 of the diameter of the container, but may be still less. The tube 23 is imperforate and the upper end is open for communication with the interior of the reaction container. Attached to the lid 25 is a conical body 29 serving to deflect the pulp flowing out of the upper end of the tube so as to distribute the same evenly over the cross-sectional area of the container.

In the embodiment shown in the drawing, the pulp, which should be bleached in the container, is taken from a conventional wash filter 31 and then passed through a steam mix 33 where it is heated to the temperature suitable for the bleaching reaction. By means of a pump 35, the pulp is pumped therefrom into the horizontal tube 37 which by means of a tube bend 39 of 90 degrees, is connected to the tube 23 located inside the bleaching container. In this tube bend 39, the cross-section area for flow is widened, as shown, so as to facilitate the transfer of the pulp from tube 37 to tube 23. A tube 41 is shown as opening into the wall of the tube bend 39, and through which a bleaching agent, e.g., chlorine, hypochlorite or the like, may be introduced into the pulp. At the spot where the tube bend 39 is connected to the tube 23, i.e., approximately at the level of the container bottom 13, there is arranged a rotary stirring apparatus 43 including a disk provided with blades and attached to a motor-driven vertical shaft 45 which is coaxial to the tube 23 and extends through the wall of the tube bend 39, as shown. This stirring device which may be of the design shown in the U.S. Patent No. 2,674,011 also operates to feed the pulp and counteract the flow resistance that would otherwise be present due to the change of the direction of flow of the pulp.

When the bleaching plant comprises a series of reaction containers with wash filter connected between them, several or all of said containers may be designed in the manner above-described.

The just described embodiment is merely an example of the application of the invention, and various modifications thereto may be made, as will be evident. Thus, for instance, the bleaching agent may be supplied at another spot than in the tube bend 39. In such case, the stirring apparatus 43 may also be arranged at a different location, or omitted, if desired. The bottom of the reaction container may be of another shape, for example, it may be in the shape of a truncated cone or hemisphere, or it may be provided with a flume surrounding the tube 23 and having a rounded bottom, the inner edge of which merges into said tube, while its outer edge merges into the wall of the container 11 without forming any sharp corners.

The present invention will thus be seen to completely and effectively accomplish the objects enumerated hereinabove. It will be realized, however, that various changes and substitutions may be made to the specific embodiment disclosed herein for the purpose of illustrating the principles of this invention, without departing from these principles. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following claims.

What is claimed is:

1. A device for continuous bleaching of cellulose pulp comprising: an upright cylindrical reaction container hav-

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ing an outlet for bleached pulp at its bottom; an imperforate upright tube projecting through the bottom of said container and extending essentially the length of said container and terminating at its upper end adjacent the top of the container, said tube being open at its upper end and communicating with said container only through said open upper end; a pulp supply pipe of smaller cross section than said tube for continuously feeding pulp mixed with bleaching agent into the lower end of said tube and upwardly therethrough for discharge into said container through said open end; a connector member joining said pipe to the lower end of said tube; a bleaching agent supply line opening into said connector member; and means for mixing the pulp and bleaching agent adjacent the joint of said connector member and the lower end of said tube.

2. A device for continuous bleaching of cellulose pulp comprising: an upright cylindrical reaction container; outlet means near the bottom of said container constructed to discharge pulp mixed with liquid from said container; an imperforate upright tube means constructed to discharge pulp mixed with bleaching agent into said container, said tube being arranged generally concentric within said container and terminating in an open upper end providing the only communication between said tube and said container; first conduit means communicating through one of its ends with the lower end of said tube means and terminating at its other end exteriorly of said container for feeding pulp and bleaching agent into the lower end of said tube means; means connected to said other end of said first conduit means for delivering pulp there-

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into; second conduit means connected to said first conduit means for delivering bleaching agent thereinto; and stirring means associated with said first conduit means for mixing the pulp and the bleaching agent.

3. The structure defined in claim 2 wherein spray nozzles are provided for introducing a diluting liquid into the bottom of the container and an impeller arranged in the bottom of said container for causing a circumferential flow of material around said tube, said impeller having its axis substantially at a right angle to a radius of said container.

4. The structure defined in claim 2 wherein said tube and said container are circular in transverse section, the diameter of the tube being one to three tenths of the diameter of the container.

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