Dec. 17, 1935. A. F. WENDLER 2,024,711

SHREDDER

Filed April 23, 1932

Fig. 1.

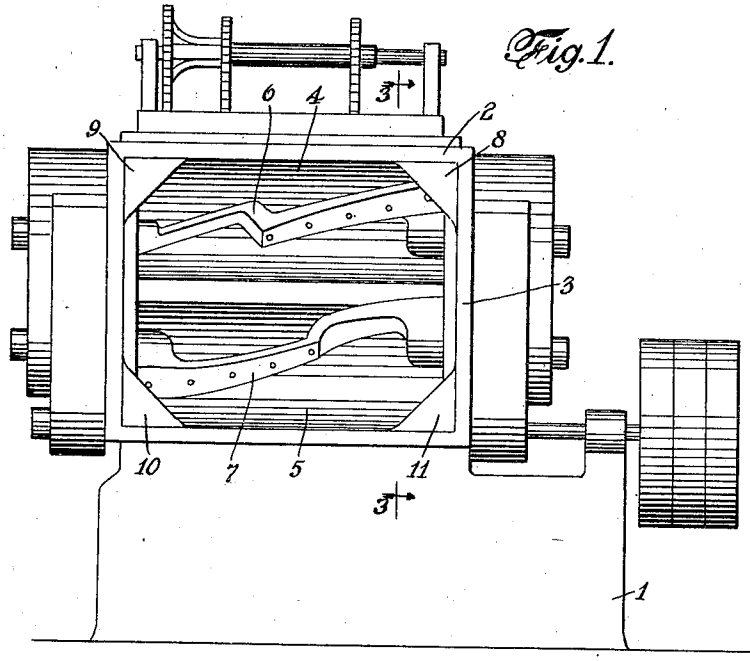


Fig. 3.

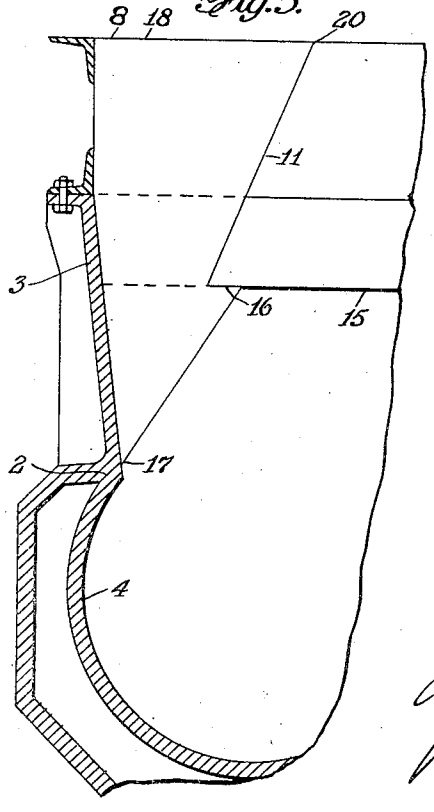


Fig. 2.

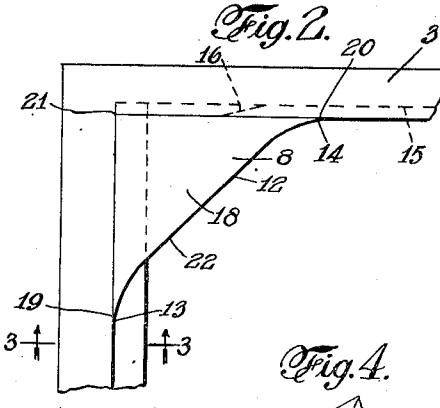
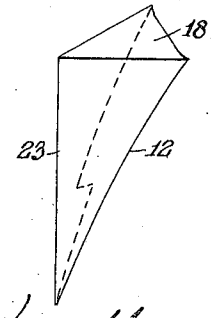


Fig. 4.



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SHREDDER

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Application April 23, 1932, Serial No. 607,041

2 Claims. (Cl. 146—122)

This invention relates to shredding, disintegrating and mixing machines, and more particularly to machines for shredding alkali cellulose to be employed in the manufacture of a viscose solution.

In one common method utilized for the manufacture of viscose, sheets of wood pulp after being steeped in an alkali solution and pressed to remove the excess solution are usually subjected to a shredding or grinding treatment to reduce the alkali cellulose to a finely divided state suitable for subsequent treatment. This shredding operation is usually performed in a shredding or mixing machine having mixing blades mounted on horizontal rotary shafts with a hopper located above the mixing blades, whereby the charge is introduced into the shredding machine.

During the operation of the shredder there is a decided pocketing action of the alkali cellulose in the corners of the hopper of the shreddler, which pocketing action increases with the size of the shredder charge. This pocketing action results in an incomplete and non-uniform shredding with the result that relatively large pieces of cellulose pass on to the subsequent operations. The presence of relatively large pieces of cellulose in the xanthating operation results in an improper and incomplete action of the xanthating agent. These improperly xanthated pieces do not dissolve properly and cause serious difficulty, particularly at the time of filtration of the viscose solution.

To prevent these objectionable results due to pocketing, it has been the practice to restrict the size of the charges introduced into the shredder and to give the hopper of the shredder frequent manual cleanings. Restricting the size of the charges necessitates an increased number of charges for the production of a given quantity of viscose with consequent increase in the cost of overhead and handling charges and decrease in efficiency of the machine as a unit of production. The time required for manual cleaning holds up the operation of the machine during the cleaning process and causes considerable difficulty in maintaining the uniform temperature necessary in the production of high-grade viscose.

I have found that by so constructing the hopper of the shredder that there are no sharp corners or pockets where an accumulation of charge material can take place, the pocketing action is prevented or inhibited, with the consequence that a large increase can be made in the quantity of the hopper charge, thus resulting in an increase in production of uniformly shredded material.

It is therefore an object of this invention to so construct the hopper of a shredding or mixing machine as to substantially prevent pocketing of the material being worked, thus providing a more uniform product and permitting larger charges of material being properly worked in the machine.

The above and other objects will appear from the following description, appended claims and accompanying drawing forming a part of this specification and in which:

Figure 1 is a front elevation of a shredding machine with the trough tilted to discharging position.

Figure 2 is an enlarged view of one of the fillets shown in the hopper in Figure 1, at right angles to the position of the fillet in Figure 1.

Figure 3 is a fragmentary sectional view on line 3—3 of Figures 1 and 2 showing part of the trough and hopper and one of the fillets.

Figure 4 is a perspective view illustrating the general shape of the space occupied by a corner fillet.

Referring to the drawing which discloses one embodiment of the invention and wherein like reference numerals designate like parts, the reference numeral 1 designates the base of an existing type of shredding machine on which is mounted a trough 2, the upper portion 3 of which constitutes a hopper functioning as a reservoir not only to supply or feed the material into the zone of action of the shredder but also to retain at least an appreciable quantity of the material after it has been shredded. The trough and hopper constitute a box-like construction whose normal position during operation is at approximately right angles to that shown in Figure 1, with the top of the hopper in horizontal position. The trough 2 is provided with circular curved portions 4 and 5 past which respectively sweep the shredding or mixing blades 6 and 7 suitably mounted in the trough on horizontal shafts.

The four corners of the hopper are provided respectively with the fillets 8, 9, 10 and 11 (Figure 1).

The fillet 8, like the others, is formed by means of a front plate 12 having its side edges 13 and 14 welded to the hopper as shown. As the wall of the particular hopper 3 illustrated contains an offset 15 (Figure 2), the front plate 12 is provided with an extension 16 to be warped to fit into the offset 15 in the wall of the hopper. The upper part of the face of the fillet formed by the front plate 12 overhangs the trough 2 and slopes inwardly as it extends downwardly

until it vanishes at 17. To enclose the space between the front plate 12 and the corner of the hopper, a top plate 18 is welded in place around its edges to the hopper and the front plate 12, as shown in Figure 2.

Figure 4 illustrates the general shape of the space occupied by a corner fillet. Where the fillets are made of separate cast inserts, they may be made of the shape illustrated in Figure 4, but where the fillets are made of sheet metal welded in place as described concerning Figures 2 and 3 they would consist only of the front plate 12 and the top plate 18 without any rear portion at 23.

While it is not to be considered as limitative of this invention, the following example will serve to illustrate a practical application of the invention:

An existing shredder of the type illustrated in the drawing and having a capacity of 200 gallons, with the internal length of the hopper being 52 inches and its width 42 inches and the depth to the bottom of the trough 43 inches, was provided with fillets as shown. The points 19 and 20 (Figure 2) at the upper sides of the fillet are located 14 inches from the corner 21 of the hopper. The upper front edge 22 of the fillet is 8 inches from the corner 21. A shredder modified with fillets as shown and described is capable of handling a batch or charge of 1000 pounds of alkali cellulose and producing a satisfactorily shredded product, whereas the average charge which can be properly handled by an unmodified shredder hopper is approximately 600 to 700 pounds.

Shredders employed prior to this invention and which were not equipped with fillets made in accordance with this invention unless manually cleaned at frequent intervals produced a partially shredded material which frequently amounted to as much as 1% of the charge, whereas with a shredder constructed in accordance with this invention, i. e. the fillets in place, uniform shredding is obtained even when the charge is increased 50 to 75% over that used in the prior apparatus. Moreover, better shredding is obtained with a large charge in the filleted shredder than with a small charge in a non-filleted shredder.

The hopper may be constructed in various ways so as to have no sharp corners or pockets where accumulation of the charge material can take place. The hoppers of existing shredders can be modified by means of fillets made in various ways, depending upon the type of hopper. The fillets may be made, for example, of sheet metal welded in place as shown in the present drawing or as cast inserts bolted or otherwise secured in place. If desired, the hopper can be originally constructed with integral cast fillets or constructed of a shape having no corners or pockets where accumulation of charge can take place.

Since it is obvious that various changes and modifications may be made in the above description without departing from the nature and spirit thereof, this invention is not restricted thereto except as defined in the appended claims.

I claim:

1. A shredder for producing substantially uniformly comminuted alkali cellulose comprising a shredding trough normally open only at the top thereof and containing a shredding mechanism to continuously operate on a batch of alkali cellulose under treatment to comminute the same, and a hopper open at the bottom thereof and having a plurality of sides forming a plurality of corner locations disposed in cooperative relationship with said shredding mechanism and trough constituting a reservoir which supplies the alkali cellulose to be shredded and receives and retains at least a portion of the alkali cellulose after it has been shredded, said hopper having a fillet of substantial size in each of said corner locations to prevent pocketing of the alkali cellulose being shredded, each of said fillets having a frontal face which slopes inwardly in a downward direction and terminates in a point adjacent the top of the said trough.

2. A shredder for producing substantially uniformly comminuted alkali cellulose comprising a shredding trough normally open only at the top thereof and containing a shredding mechanism to continuously operate on a batch of alkali cellulose under treatment to comminute the same, and a hopper open at the bottom thereof and having a plurality of sides forming a plurality of corner locations disposed in cooperative relationship with said shredding mechanism and trough constituting a reservoir which supplies the alkali cellulose to be shredded and receives and retains at least a portion of the alkali cellulose after it has been shredded, said hopper having an overhanging fillet of substantial size in each of said corner locations to prevent pocketing of the alkali cellulose being shredded, each of said fillets having a frontal face which slopes inwardly in a downward direction and terminates in a point adjacent the top of the said trough.

ADOLPH F. WENDLER.