Jan. 24, 1933. E. MORTERUD 1,895,266

WOOD PULP DIGESTER WITH INTERNAL CIRCULATION CONDUIT

Filed July 16, 1932

Fig. 1.

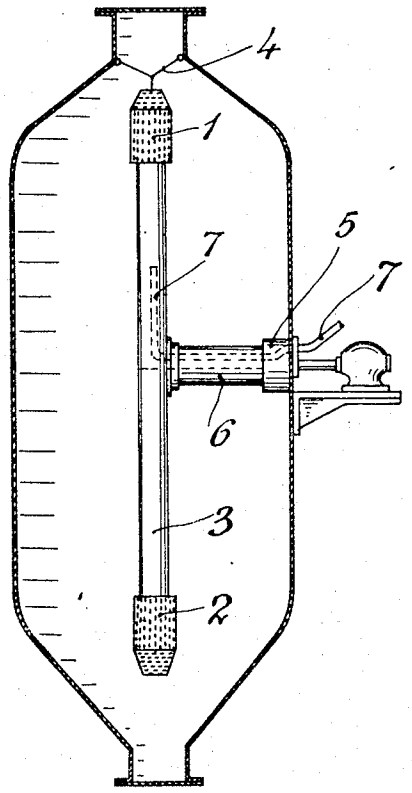
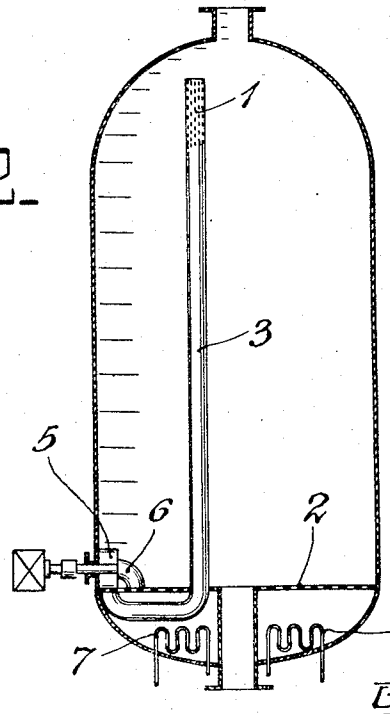


Fig. 2.



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WOOD PULP DIGESTER WITH INTERNAL CIRCULATION CONDUIT

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An application has been filed in Germany July 14, 1931.

The present invention relates to the kind of wood pulp digesters in which there is provided in the interior of the digester a circulation conduit, through which the liquor is driven by means of a pump placed on the interior wall of the digester from a sieve located near the bottom to a sieve located near the top of the digester or vice versa.

In pulp digesters of this type it is very important that the liquor passing through the pulp in the digester is as evenly as possible distributed over the whole cross sectional area of the digester, and does not form channels, through which the liquid may pass without acting on the wood splinters.

In the known digesters of this type the circulation conduits as well as the heating device, pump etc. connected therewith is located on or adjacent to the wall of the digester, and in this type of the digester it has now been proved that channels for the passage of liquor are formed adjacent to the circulation pipe or between the same and the digester wall owing to the fact that the pulp does not get very good access to the spaces round and behind the circulation pipe.

These channels formed in the pulp lie parallel to the direction of flow along the wall of the digester and also along the underside of the inclined pipes in the digester which serve as connections with the upper and lower sieves therein.

In accordance with the present invention these drawbacks are avoided by locating the circulation conduit in or near the axis of the digester in the form of a vertical pipe, so that the axis of the circulation pipe is substantially parallel to the direction of flow of liquor in the digester. With a circulation conduit arranged in this manner the inclination of the liquid to form channels in the pulp is substantially reduced owing to the fact that the pulp is permitted to be evenly distributed all around the exterior surface of the circulation pipe.

In pulp digesters with a direct steam heating and no circulation pipe it has been suggested to conduct the steam and the currents of liquor in the digester by means of baffles or the like in such a manner as to obtain a circulation of the liquor, but no suggestion has been made about locating circulation pipes adjacent the axis of the digester in order to avoid the formation of channels near the surface of the circulation pipe or between the circulation pipe and the digester wall.

In accordance with the invention it is preferred to connect the circulation pipe with the circulation pump by means of pressure and suction pipes placed horizontally, i. e. perpendicular to the direction of current in the digester, whereby it is obtained that no channels should be formed adjacent these pipes, which may lead the current of liquor upwards or downwards. The suction and pressure pipe may preferably be made in the form of one single tube with a longitudinal division wall and this tube may also be adapted to take up the tube by means of which heating steam is introduced in the axially placed circulation pipe.

On the drawing two preferred embodiments of the invention are illustrated,

Fig. 1 showing an axial sectional view through one embodiment and

Fig. 2 showing a similar sectional view of a second embodiment.

The upper sieve 1 and the lower sieve 2 are connected with each other by means of a tube 3, which is suspended substantially coaxially with the digester.

The tube in accordance with the embodiment on Fig. 1 may preferably be suspended by means of stays 4 from the neck of the digester. The circulation pump 5 is placed in the usual manner on the inner wall of the digester, and the suction and pressure side of the pump are connected with a circulation pipe by means of a double channelled tube 6 passing in a horizontal direction from the pump to a point adjacent the middle of tube 3, the latter tube being provided with a cross wall dividing the tube in an upper and lower section.

The heating takes place by means of steam introduced through tube 7 located in the pres-

sure pipe of the pump and opening into the upper part of tube 3.

In case it is desired to heat the liquor indirectly a heating device of the usual type is placed in the interior of tube 3, said heating device being provided in the usual manner with steam heated elements, in which case the condensate may be removed through an outlet placed in tube 6. In accordance with this embodiment no channels for the liquor can be formed in the pulp along the surface of pipe 3, as the pipe is placed in a vertical position and at a long distance from the digester walls, whereby the pulp is allowed to be distributed evenly about the tube.

The channel which is likely to be formed on the underside of tube 6 passes in horizontal direction and therefore cannot serve as a passage for the liquor from an upwards or downwards direction in the digester.

In accordance with the embodiment illustrated on Fig. 2 the lower sieve 2 is made in the form of a stationary bottom screen, whereas the upper sieve is located at the upper end of the vertical circulation tube 3, which extends vertically from the bottom screen.

The pump 5 is located on the lower side wall of the digester and serves to convey liquor through tube 6 from the space below the bottom screen 2 upwards through the circulation tube 6. In the embodiment illustrated on Fig. 2 it is presumed that the liquor be heated indirectly by means of steam heating coils 7, but it will be understood that even in connection with this form of the invention there may be used heating devices adapted to operate directly or indirectly and located inside the circulation tube 3.

I claim:

1. In a pulp digester a circulation pump located inside the digester adjacent the wall thereof, sieves in the upper and lower part of the digester respectively and a circulation pipe for conveying liquor from one of said sieves to the other, said circulation pipe being located substantially coaxially with the digester.

2. In a pulp digester a circulation pump located inside the digester adjacent the wall thereof, sieves in the upper and lower part of the digester respectively and a circulation pipe for conveying liquor from one of said sieves to the other, said circulation pipe being located substantially coaxially with the digester and horizontal pipes leading from the circulation pump to a point intermediate the upper and lower ends of said circulation pipe.

3. In a pulp digester suction and pressure sieves located near the top and bottom of the digester respectively, a circulation pipe having its axis substantially parallel to the axis of the digester and located adjacent the axis of the digester for connecting said upper and lower sieves with each other, a circulation pump mounted on the interior wall of the digester and suction and pressure pipes respectively passing from the circulation pump to the vertical circulation pipe in a direction substantially perpendicular to the current of liquor in the digester.

4. In a pulp digester a circulation pipe substantially coaxial with the digester, said circulation pipe comprising an upper and lower section separated from each other by means of a transverse wall, sieves connected with the free ends of said circulation pipe, a circulation pump mounted on the interior wall of the digester and suction and pressure pipes leading from said circulation pump to opposite sides of the said transverse wall in the circulation pipe.

5. In a pulp digester a circulation pipe substantially coaxial with the digester, said circulation pipe comprising an upper and a lower section separated from each other by means of a transverse wall, sieves connected with the free ends of said circulation pipe, a circulation pump mounted on the interior wall of the digester and suction and pressure pipes leading from said circulation pump to opposite sides of the said transverse wall in the circulation pipe, and a pipe for supplying heating steam to the liquor in said circulation pipe, said steam supply pipe being located inside the pressure conduit from the circulation pump to the circulation pipe.

In testimony whereof I affix my signature.

EINAR MORTERUD.