Sept. 23, 1930. E. MORTERUD 1,776,761

METHOD FOR BLOWING OUT PULP DIGESTERS

Filed Oct. 16, 1928

Fig. 1.

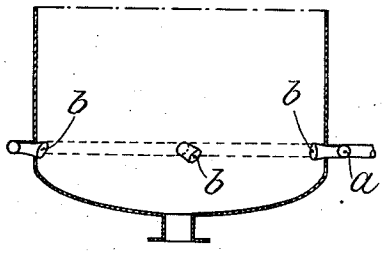


Fig. 3.

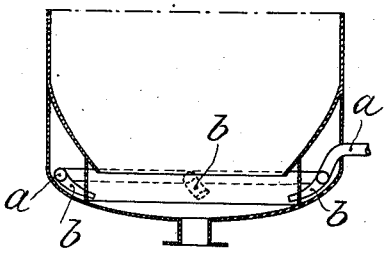


Fig. 2.

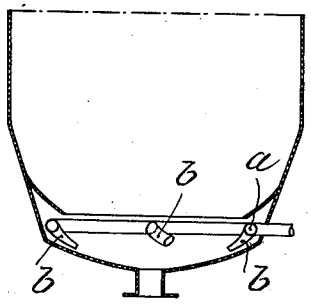


Fig. 4.

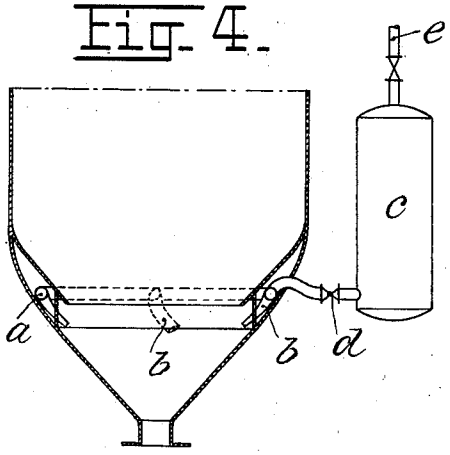
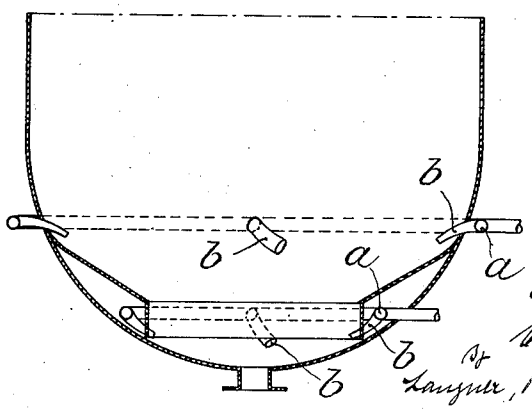


Fig. 5.



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Patented Sept. 23, 1930 1,776,761

UNITED STATES PATENT OFFICE

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METHOD FOR BLOWING OUT PULP DIGESTERS

Application filed October 16, 1928, Serial No. 312,895, and in Norway April 2, 1928.

When the digesting process in a digester has been concluded it is customary to remove the finished product by blowing the same out of the digester under pressure and accumulate the same in a tank.

It is very important in this process that the digester should be completely emptied without necessitating extra supply of steam or liquid.

This result can be obtained by giving the bottom of the digester a suitable form.

In the digesters the form of which is not well adapted for the blowing process it is customary to make use of extra steam supply, and in some cases even extra supply of liquor in order to empty the digester completely.

In many cases the digesters are not completely emptied and quantities of digested pulp remain in the digester from one digesting process to another, which is obviously not good economy.

It has been suggested to pump liquor into the top part of the digester during the blowing process. This liquor acts to remove and carry with it particles of pulp adhering to the walls of the digester. A comparatively large quantity of liquor is necessary for this purpose, and the pump work involved is considerable owing to the fact that the liquor has to be introduced under high pressure. Finally there is caused a considerable loss of heat and pressure in the digester owing to the fact that the temperature of the liquor introduced is considerably below the temperature prevailing in the digester.

The present invention has for its object an improved method for emptying digesters utilizing a small quantity of liquor introduced during the blowing process in such a manner that appreciable losses of heat, steam or energy as well as appreciable increase in the quantity of liquor is avoided.

The method consists in supplying to the bottom part of the digester during the blowing process a fluid, such as hot liquid, steam or gas, so as to form between the pulp charge and the bottom part of the digester a thin film serving to decrease the friction between the pulp charge and the bottom of the digester. The fluid in question may be introduced continuously or intermittently and will have the same direction of flow as the pulp charge which is moving towards the outlet.

On the drawing some suitable arrangements for carrying out the invention is illustrated diagrammatically.

Figs. 1, 2, 3, 4 and 5 show diagrammatic, axial sections through the bottom part of various types of digesters.

The simplest arrangement is illustrated on Fig. 1. An annular tube *a* is provided with short outlet tubes projecting through the wall of the digester opening into the interior of the latter in order to supply a current of liquid, steam or gas along the bottom part of the digester.

According to the arrangement illustrated on Fig. 2, the annular tube *a* is located inside the digester, being protected by means of a roof or auxiliary bottom which guides the pulp charge past the annular tube on to the bottom proper, to which a film of fluid is supplied through the jets *b*.

According to the arrangement illustrated on Fig. 3, the annular tube *a* is located in the space behind the bottom screen which is usually mounted in digesters with circulation devices.

In digesters in which the blowing process is to serve the purpose of defibering the digested charge, the liquor introduced in the manner above referred to must have a temperature sufficiently high to not prevent the defibration, said defibration being due to the fact that the digested particles of wood when being let out into the charge tank explode owing to development of steam inside the particles by the sudden drop of pressure to which the said particles are exposed upon being blown out.

A suitable arrangement for this purpose is illustrated on Fig. 4. When a charge has been completely digested, a certain quantity of liquor is passed from the digester into vessel *c*. This vessel may already contain a quantity of liquor having a lower temperature and especially adapted to provide a good "lubrication effect" (in alcalic digesting this kind of liquor is termed soapy liquor). By means of

the hot liquor from the digester the mixture is heated to the desired temperature.

When the pressure of the digester has then been lowered to a point which is suitable for the blowing process, the outlet or blowing valve is opened, and at the same time or later, valve *d* is opened so as to let the liquor from vessel *c* into the digester. The pressure in vessel *c* is maintained at a suitable height for instance by means of steam introduced at the top through tube *e*. The introduction of this auxiliary liquor may take place continuously or intermittent.

It will be understood that in accordance with the method here described it is not necessary to use a large quantity of extra "blowing out liquor". The main part of the liquor used for blowing consists of liquor taken from the digester itself, said liquor being transferred to an auxiliary vessel in order to be utilized in a manner which is more effective than would be the case if the same liquor be left in the digester.

In order to further increase the effect of the said supply of liquid, the auxiliary liquid may be used at a temperature higher than the temperature prevailing in the digester during the blowing process, the development of steam caused thereby acting to further increase the breaking up of the charge and the carrying out of the blowing process.

On Fig. 5 an arrangement is illustrated, in accordance with which auxiliary blowing out liquor is introduced through two annular tubes mounted above each other. The said arrangement is utilized where there are particular difficulties about the blowing process, for instance in the case of large digester diameters, small quantity of liquor, low blowing pressure or large resistance in the blowing out tube.

Claims.

1. In a method for blowing out the contents of a pulp digester after completion of the digesting process the step which consists in supplying to the inside surface of the digester a current of liquor which has been previously transferred from the digester to a storage vessel, said liquor forming between the bottom of the digester and the pulp charge a film of liquid moving in the direction of the outlet opening.

2. In a method for blowing out the contents of a pulp digester after completion of the digesting process the step which consists in transferring part of the digester liquor to a pressure vessel and introducing the same again into the digester during the blowing out process so as to form between the bottom of the digester and the pulp charge a film of liquid moving in the direction of the outlet opening.

3. In a wood pulp digester means comprising one or more annular tubes having inwardly projecting jets or mouthpieces for supplying liquid to the interior wall thereof so as to form a film of liquid between the charge and the digester wall.

4. In a wood pulp digester means comprising one or more annular tubes located inside the digester in the lower part thereof, said annular tubes having inwardly projecting jets or mouthpieces for supplying liquid to the interior wall thereof so as to form a film of liquid between the charge and the digester wall.

5. In a method for blowing out the contents of a pulp digester after completion of the digesting process, the step which consists in supplying to the inside surface of the digester adjacent the lower end of the cylindrical part thereof, currents of liquid distributed over the circumference of the digester and directed towards the outlet opening thereof for the purpose of providing a lubricating film between the pulp and the bottom of the digester.

In testimony whereof I affix my signature.

EINAR MORTERUD.