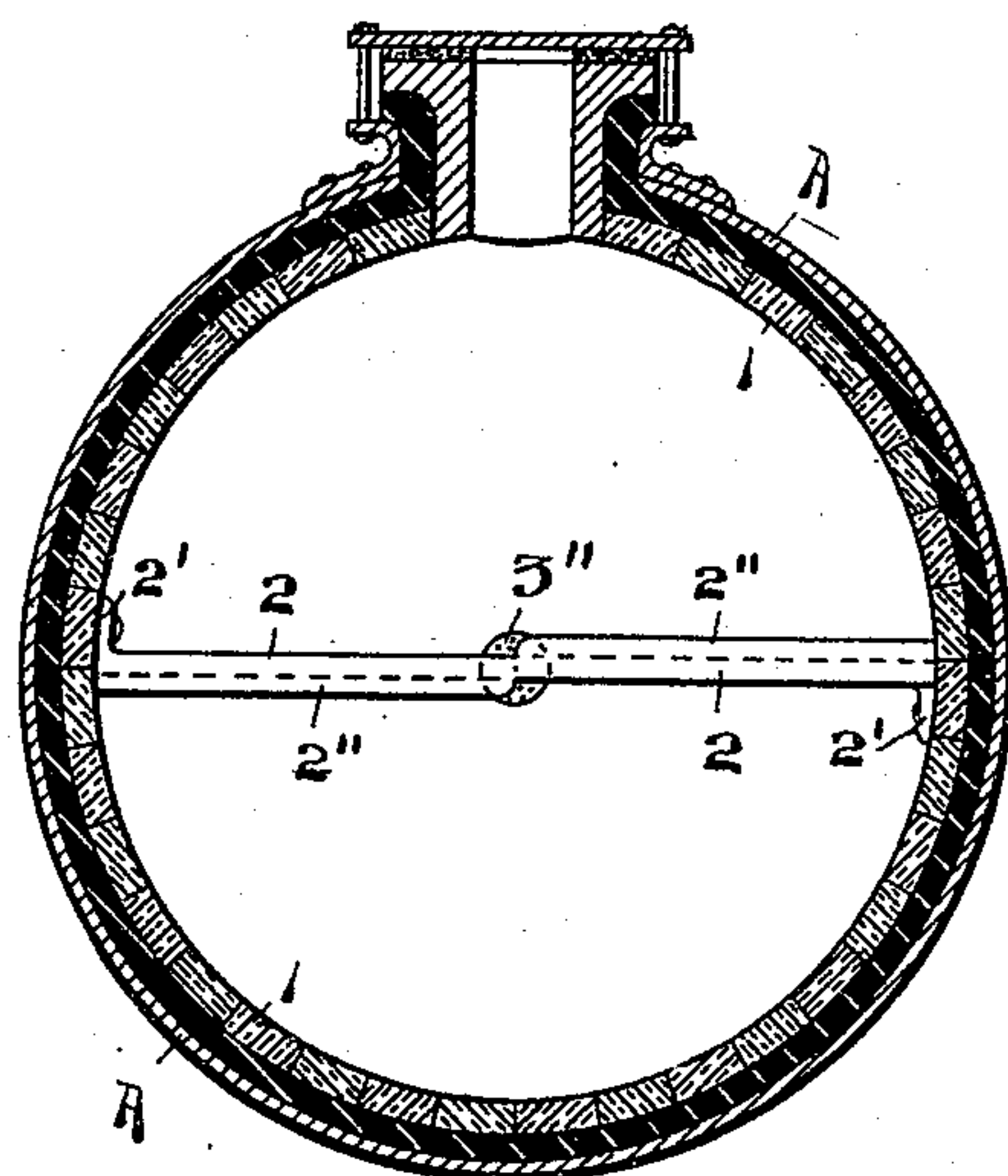
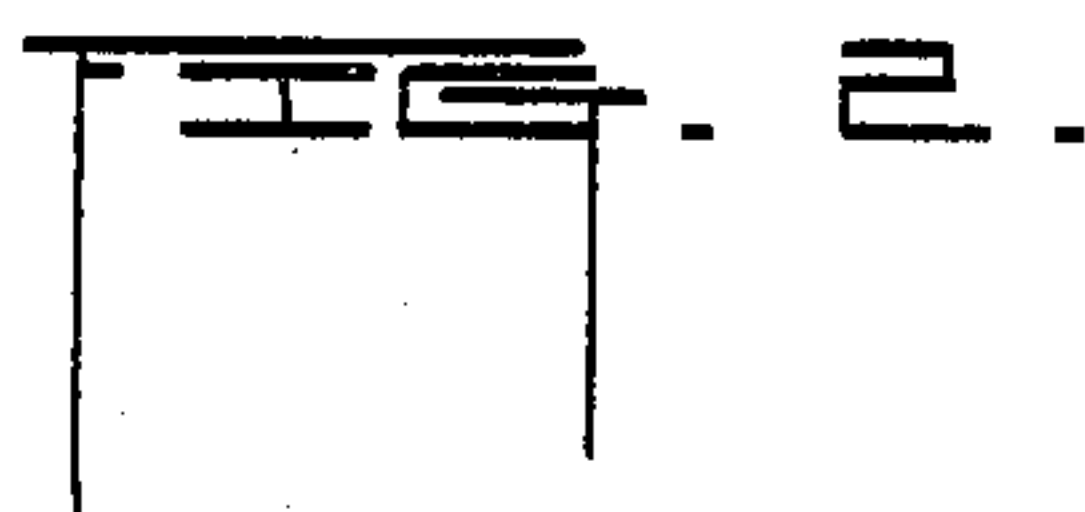
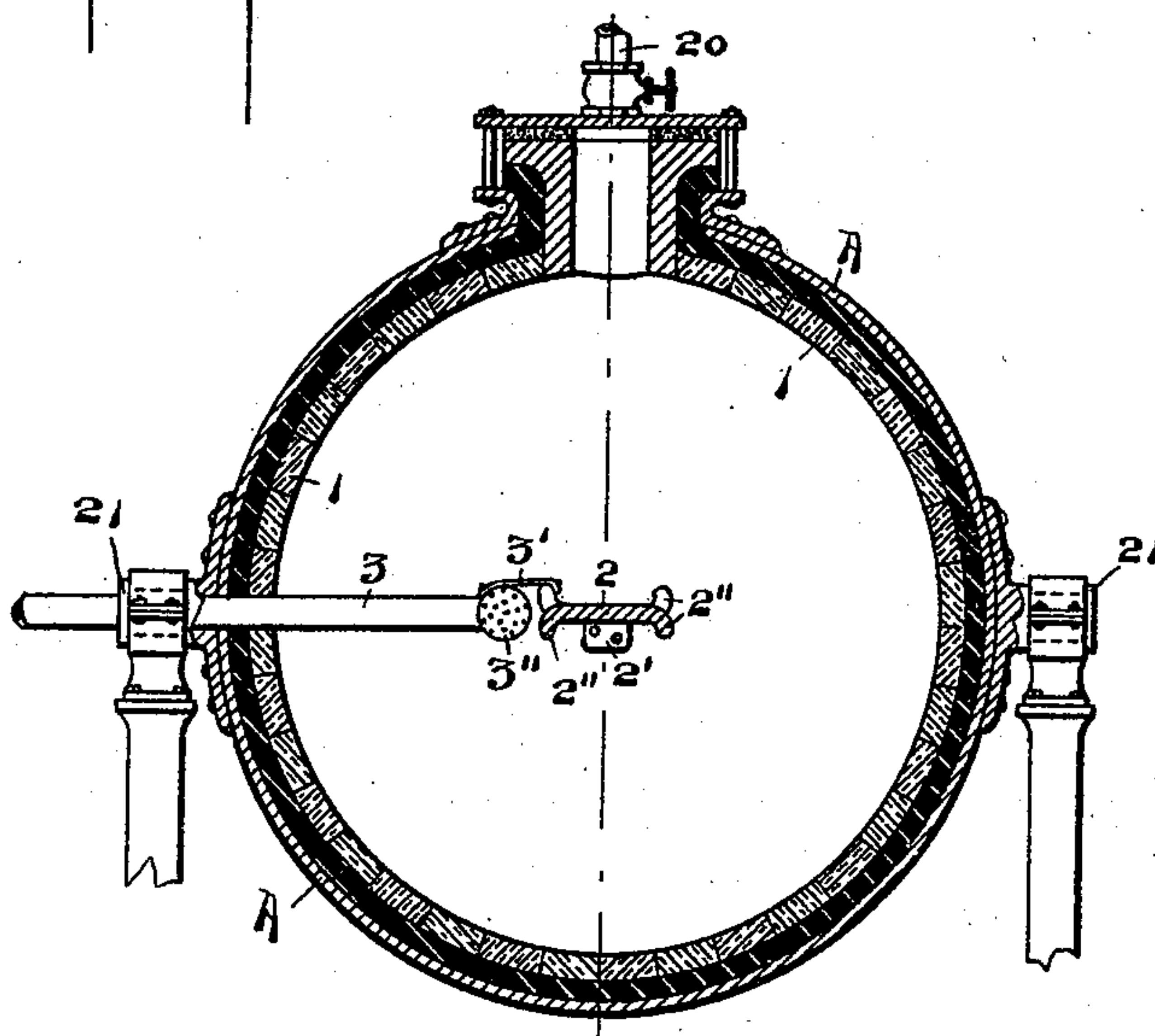
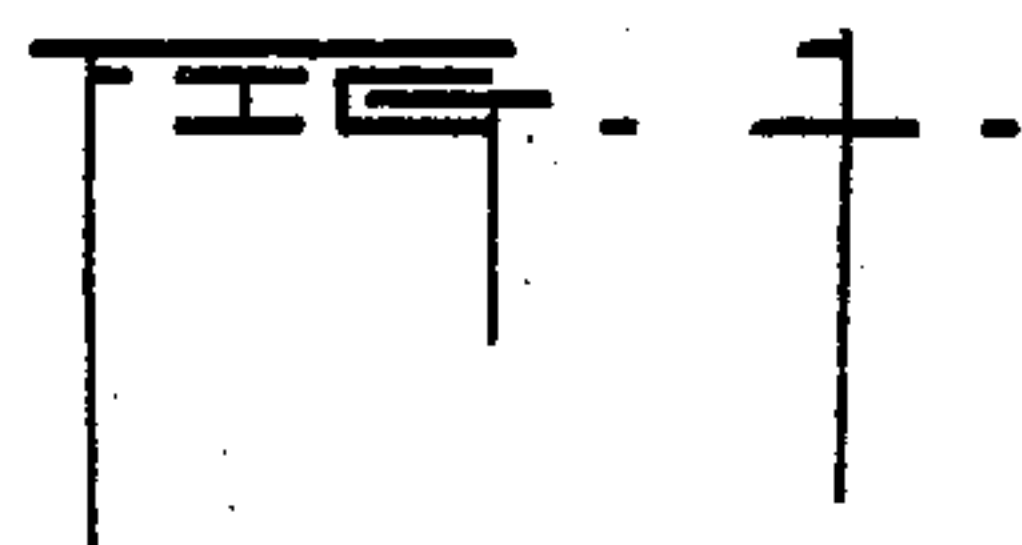


(No Model.)

**J. NORTON, Jr.**  
**PULP DIGESTER.**

No. 496,275.

Patented Apr. 25, 1893.



Witnesses

Arch. M. Cattin.  
A. D. Bessière.

Inventor

Joshua Norton Jr.  
by

Benj. R. Catlin Attorney



# UNITED STATES PATENT OFFICE.

JOSHUA NORTON, JR., OF CHATHAM, CANADA.

## PULP-DIGESTER.

SPECIFICATION forming part of Letters Patent No. 496,275, dated April 25, 1893.

Application filed October 9, 1891. Serial No. 408,211. (No model.)

*To all whom it may concern:*

Be it known that I, JOSHUA NORTON, Jr., a resident of Chatham, in the Province of New Brunswick, Canada, have invented certain  
5 new and useful Improvements in Pulp-Digesters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use  
10 the same.

The object of my invention is the production of fiber for paper from the waste of saw and planing mills and the like. The improvements are adapted to either the acid or alkali  
15 process, and to the use of chips of wood such as are commonly used by the various acid and alkali processes. It is however more especially intended for the utilization of saw dust and planing mill shavings by the acid or sulphite process. Heretofore experiments made  
20 with saw-dust and mill shavings by either acid or alkali processes have been defective and practical failures by reason of the uneven or partial "cooking" of the material. It has  
25 been found that the wood near the shell of the digester was fairly well cooked while the larger portion contained in the center was but partially acted upon by the chemicals. This  
30 apparently has been caused by the fineness of the dust or shavings and by the tendency of the gum in the wood to become sticky when first heated, and by the swelling and close  
35 packing caused by absorption of water. A compact mass is formed and becomes so firmly gummed together by the action of heat and other agencies that the reducing solution can not penetrate it.

Figure 1 is a central section of an improved digester and Fig. 2 is a similar view at right  
40 angles to the view in Fig. 1.

A denotes a digester preferably of the "globe" type provided with an acid resisting lining 1. This globular digester is provided with journals 21 adapted to revolve in suitable bearings as usual. The revolution of  
45 the digester keeps most of its contents in motion, but to prevent packing near its axial line where such motion is at a minimum, the following means are provided.

50 3 denotes a steam inlet pipe which passes through one or both of the journals to near

the center of the digester where it is by preference attached to a partial diaphragm or breaking plate 2 by means of an extension 3' or otherwise.

3'' indicates a discharge nozzle. The breaking plate is secured at each end to the shell of the digester by means of brackets 2' or otherwise. It is provided with curved flanges 2''  
55 to facilitate its passage through the contents of the digester and to add to the quantity of pulp "lifted" or acted upon. This breaker combined with a steam inlet pipe extending to near the center of the digester is an important feature. The steam is centrally discharged and operates at the points where its  
60 action is most desired and the centrally located breaker co-operates with said inwardly extended pipe in loosening and opening the central parts of the mass of fiber. Furthermore the pipe and breaker are attached and  
65 stay and support each other.

The apparatus is operated as follows: The saw-dust or shavings having been sifted to remove the fine non-fibrous dust, and dirt, are  
70 put into the digester and well packed. A proper quantity of sulphite liquor is then introduced, the cover secured, steam let on and the digester set in motion. The cooking begins and the revolving motion causes the  
75 breaking plate 2 to continually separate the contents of the digester. This together with the action of the steam in its continuous passage from center to outside keeps up sufficient agitation to prevent the formation of balls or  
80 large bodies of solid material at the critical time when the gum has been softened but not destroyed. During the process of cooking the usual attention is required but as the wood is in much smaller particles than heretofore  
85 customarily employed about one half the usual time is required to cook it. In the commoner grades eight hours has been found to be sufficient and a considerable increase in output results. Acid of about 5° Baumé of density and  
90 of about 26° to 30° strength by the iodine test is preferred. This is about one third less than the strength of acid ordinarily used, and its use is found in practice to produce a stronger  
95 fiber at a reduced expense. When the wood has been sufficiently cooked, the revolution of the digester is stopped with the cover 19 up-  
100

permost and is relieved of its steam pressure through the outlet pipe 20 suitably provided with a cock. The digester is then turned half over and the spent liquor discharged through 5 the same outlet. The cover is then removed and the contents of the digester emptied.

Having described my invention and explained my process, what I claim is—

10 1. In a revolving digester, the breaking plate situated at the diameter of the digester, and fixed to its walls lengthwise in the plane of rotation; substantially as set forth.

15 2. In a revolving digester, the breaking plate situated at the diameter of the digester, and fixed to its walls lengthwise in the plane of rotation, said plate having curved flanges upon one side of its center and oppositely

curved flanges on the other side of the same; substantially as set forth.

3. In a revolving digester the breaking 20 plate situated at a diameter of the digester and fixed to its walls lengthwise in the plane of rotation and combined with the steam inlet pipe arranged transversely to the breaking plate and having its discharge end at- 25 tached to the said plate near the center of the digester; substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOSHUA NORTON, JR.

Witnesses:

G. B. FRASER,

J. K. GOGGIN.