

(No Model.)

N. M. JONES & M. A. CRAFT.
BLOW-OFF TANK FOR PULP DIGESTERS.

No. 540,916.

Patented June 11, 1895.

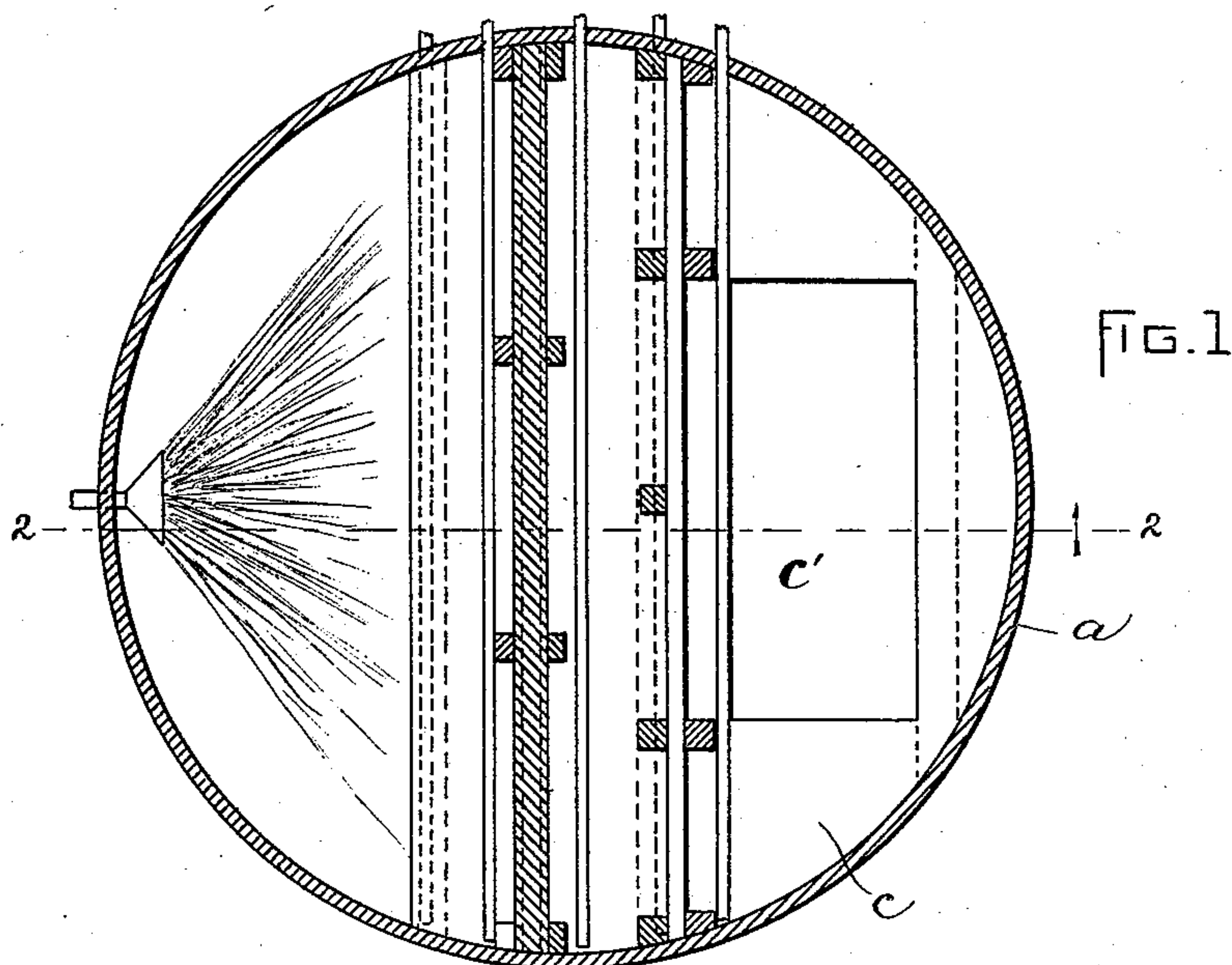


FIG. 1

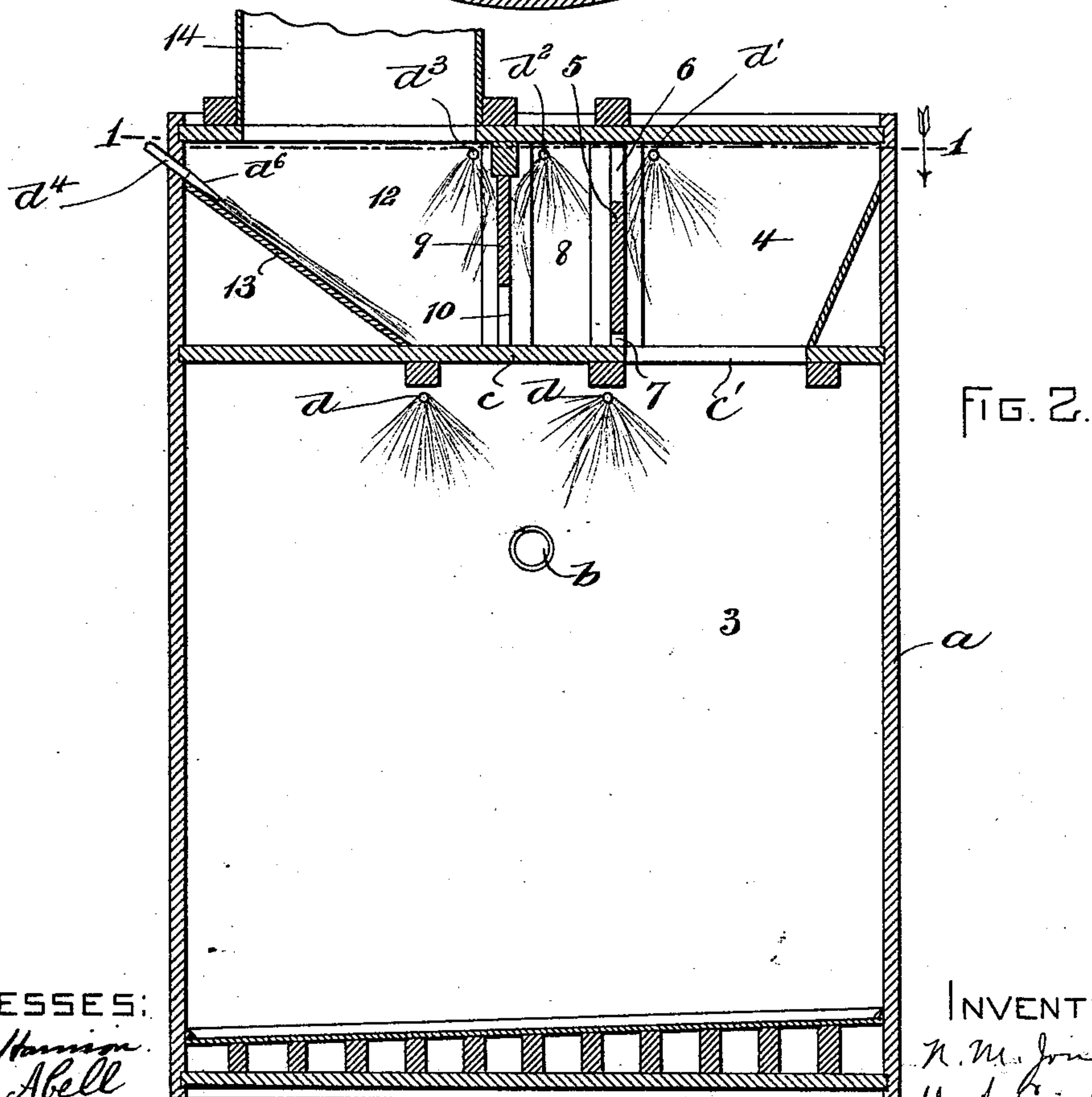


FIG. 2.

WITNESSES:

A. D. Harrison
William Abell

INVENTORS:

N. M. Jones
M. A. Craft

by highborn & Dunbar
Attys.

UNITED STATES PATENT OFFICE.

NATHANIEL M. JONES AND MARK A. CRAFT, OF HOWLAND, MAINE, ASSIGNORS TO THE NEW ENGLAND SULPHITE DIGESTER COMPANY, OF BOSTON, MASSACHUSETTS.

BLOW-OFF TANK FOR PULP-DIGESTERS.

SPECIFICATION forming part of Letters Patent No. 540,916, dated June 11, 1895.

Application filed December 3, 1894. Serial No. 530,697. (No model.)

To all whom it may concern:

Be it known that we, NATHANIEL M. JONES and MARK A. CRAFT, of Howland, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Blow-Off Tanks for Pulp-Digesters, of which the following is a specification.

This invention relates to tanks into which the contents of pulp digesters are forced or blown by the high steam pressure present in the digester, said pressure usually ranging from forty to one hundred pounds and carrying with great force the cooked pulp and the liquor with which the pulp is saturated. Blow-off tanks of this class are provided with an outlet for the steam, and are constructed with a view to preventing as far as possible the escaping steam from carrying with it any considerable quantity of the pulp.

Heretofore no construction has been devised, so far as we are aware, which will effectually prevent the loss of a considerable quantity of the finer and more valuable parts of the pulp, the same being carried away with the escaping steam and either scattered in the air or lodged in inaccessible places, from which it cannot be well removed.

Our invention has for its object to provide an improved construction of blow-off tank whereby the escape of pulp with the steam may be practically prevented or reduced to the minimum; and to this end, the invention consists in the improvements which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a horizontal section of a blow-off tank embodying our invention, said section being taken on the plane of line 1 1 of Fig. 2 and showing a plan view of the parts below said line. Fig. 2 represents a vertical section on the plane of line 2 2 of Fig. 1.

The same letters and numerals of reference indicate the same parts in both figures.

In the drawings—*a* represents a tank, preferably of cylindrical form, and *b* represents the blow-off pipe which connects said tank with a pulp digester and through which the contents of the digester are blown into the tank by high steam pressure.

c represents a partition in the tank above

the blow-off tank. Said partition forms the top of the main chamber 3 of the tank, and has near one side of the tank an opening *c'* communicating with a smaller chamber 4 above the chamber 3, said opening being much smaller than the diameter of the tank, so that the tank is covered by a considerable extent and differs in this respect from an ordinary blow-off tank, the top opening of which is of the same diameter as the body of the tank. The chamber 4 is closed at all points except at one of its sides, which is composed of a vertical semi-partition 5 having a comparatively wide opening 6 at its upper portion, and a comparatively narrow opening 7 at its lower portion, the opening 6 having a much greater area than the opening 7 for a purpose hereinafter set forth.

Adjoining the chamber 4 is a second chamber 8, also located above the partition *c*. One side of the chamber 8 is formed by the partition 5, and the opposite side is formed by a partition 9 closed at its upper portion and having an opening 10 at its lower portion, the chamber 8 being closed at all other points.

12 represents a third chamber communicating with the chamber 8 and provided preferably with an inclined side 13 and with an opening communicating with the steam escape flue or pipe 14.

d d represent a perforated pipe connected with a source of water supply and arranged to sprinkle or distribute water in the upper portion of the chamber 3 above the blow-off pipe, and *d'* *d*² *d*³ represent similar pipes located respectively in the chambers 4, 8, and 12.

*d*⁴ represents a pipe connected with a source of water supply and provided with a nozzle arranged to supply water to the inclined partition 13.

The operation is as follows: The steam under high pressure, and the pulp carried thereby, enter the main chamber 3 through the blow-off pipe. A considerable portion of the pulp is deposited in said chamber, and a portion of the steam is condensed by the water from the pipe *d d*. The uncondensed steam still at a high pressure escapes through the opening *c'* into the chamber 4, carrying with it portions of the pulp. The pulp is caused

to impinge against the surfaces of the chamber 4, so that portions of it are left on said surfaces by the steam and fall therefrom by gravitation with the water of condensation, returning to the chamber 3 through the opening c' . A portion of the steam is condensed in the chamber 4 by the water from the pipe d' . The remaining steam and such pulp as is carried thereby enter the upper portion of the chamber 8 through the opening 6. A small quantity also passes through the opening 7, but owing to the comparatively small size of the said opening, the quantity is inconsiderable compared with that which passes through the opening 6 into the upper portion of the chamber 8. The steam and pulp escaping from the chamber 4 are therefore introduced mainly into the upper portion of the chamber 8, where they meet the solid walls of said chamber and are deflected downwardly, the steam being partially condensed by water from the pipe d^2 and portions of the pulp deposited upon the surfaces of the chamber 8, from which they fall to the bottom of said chamber and flow from thence through the narrow opening 7 to the opening c' . The steam escaping through the opening 10 carries with it little or no pulp, and said steam is further condensed by water from the pipe d^3 , such pulp as may be arrested by the water falling to the bottom of the chamber 12. The remaining steam escapes through the flue 14. Water may be admitted through the pipe d^4 to wash from the inclined surface 13 of the chamber 12 any pulp that may be deposited thereon, the water passing from said surface along the bottom of the chambers 12 and 8 and washing the pulp therefrom, carrying it through the opening 7 and returning it to the main chamber 3.

It will be seen that the steam and the pulp carried thereby are caused to pass in a sinuous course from the main chamber to the external air, and that the walls of the respective chambers forming said sinuous course are arranged to cause the maximum separation of the pulp from the steam and the convenient return of the separated pulp to the main chamber, so that before the steam escapes into the external air the greater portion of the pulp has been deposited and saved.

We do not limit ourselves to the exact arrangement of the various partitions here shown, and may increase the number of chambers above the main chamber if desired.

We do not limit ourselves to making the elevated chambers as parts of the same tank that contains the receiving chamber 3, as said elevated chambers may be made in a separate structure connected with the chamber 3 by a suitable duct or flue connecting the chambers 3 and 4.

We claim—

1. The combination of a receiving chamber 3 having an outlet c' and a series of elevated chambers forming a sinuous open course or passage from said outlet to the external air, the first of the series communicating with the outlet c' while the last chamber of the series communicates with an escape flue to the external air, the lower portion of each elevated chamber communicating with the outlet c' .

2. The combination of a receiving chamber 3 having an outlet c' and a series of elevated chambers forming a sinuous open course or passage from said outlet to the external air, the first chamber of the series communicating with the outlet c' while the last chamber of the series communicates with an escape flue to the external air, each chamber having in its lower portion an opening for the return of the steam-deposited pulp to the chamber 3.

3. The combination of a receiving chamber 3 having an outlet c' and a series of elevated chambers forming a sinuous open course or passage from said outlet to the external air, the first chamber of the series communicating with the outlet c' while the last chamber of the series communicates with an escape flue to the external air, and condensing pipes located in said chambers.

4. The combination of a receiving chamber 3 having an outlet c' , a chamber 4 located over the outlet c' and having at one side an upper opening 6 and a relatively small opening 7, a chamber 8 connected by said openings with the chamber 4 and having an outlet 10, and a chamber 12 communicating with the outlet 10 and having a steam escape opening 14.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 30th day of November, A. D. 1894.

NATHANIEL M. JONES.
MARK A. CRAFT.

Witnesses:

J. F. CRAFT,
B. W. COBB.