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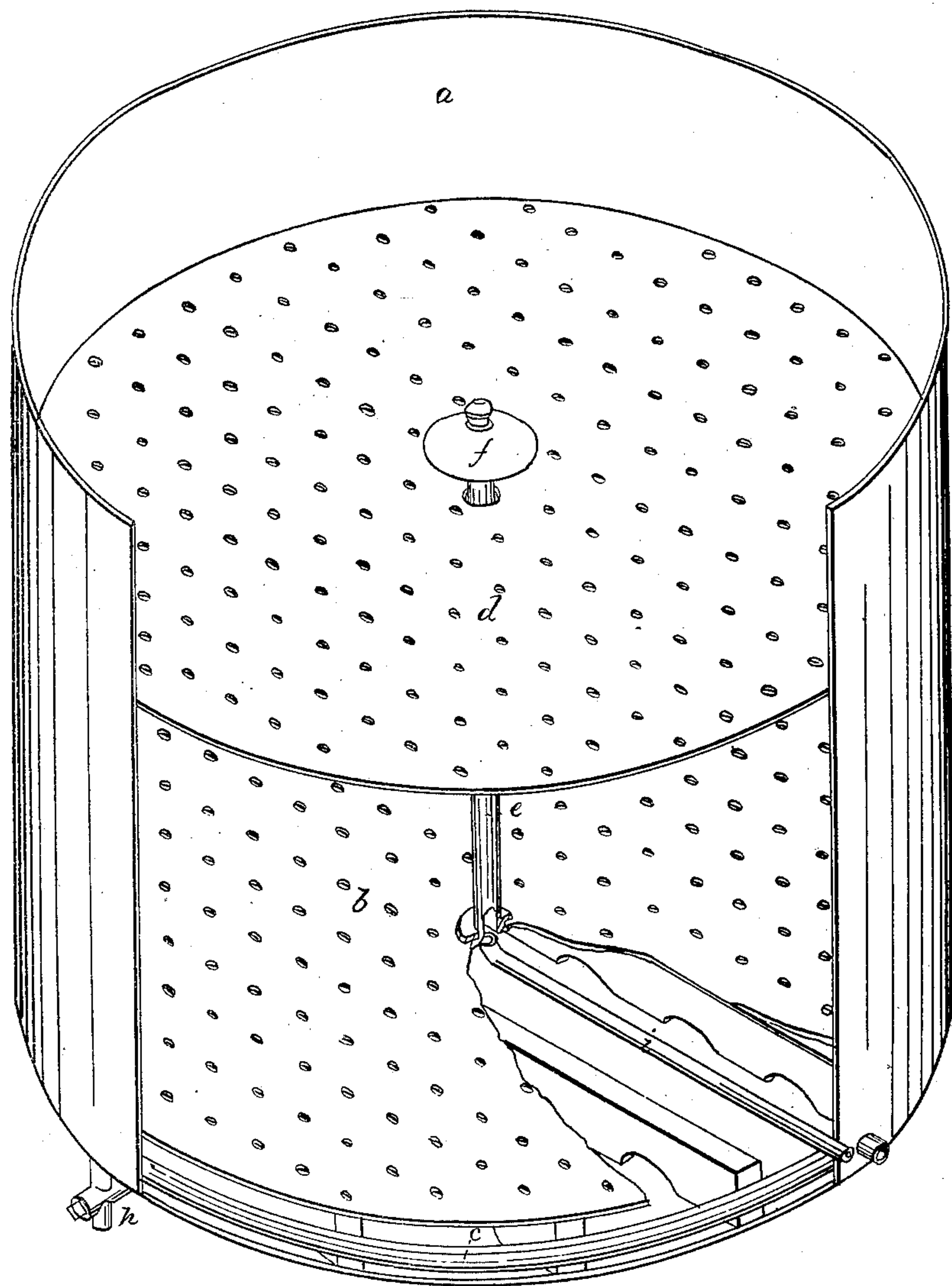
M. Nixon.

Paper Making Mach.

Nº 20,294.

Patented May 18, 1858.

Fig 1.



Sheet 2, 4 Sheets

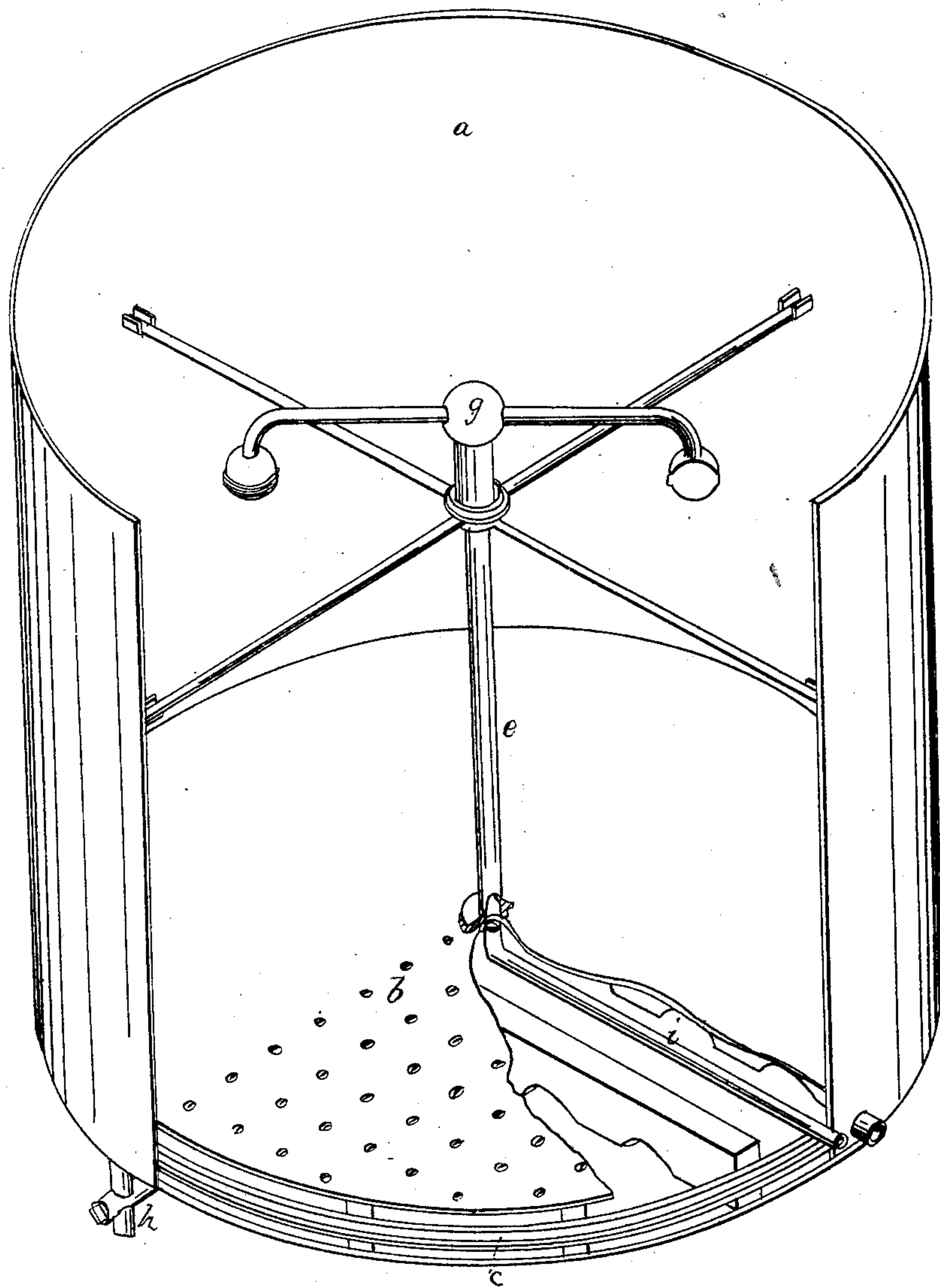
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Fig. 2.



Sheet 3, 4, Sheets.

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Paper Making Mach.

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Patented May 18, 1858.

Fig. 4.

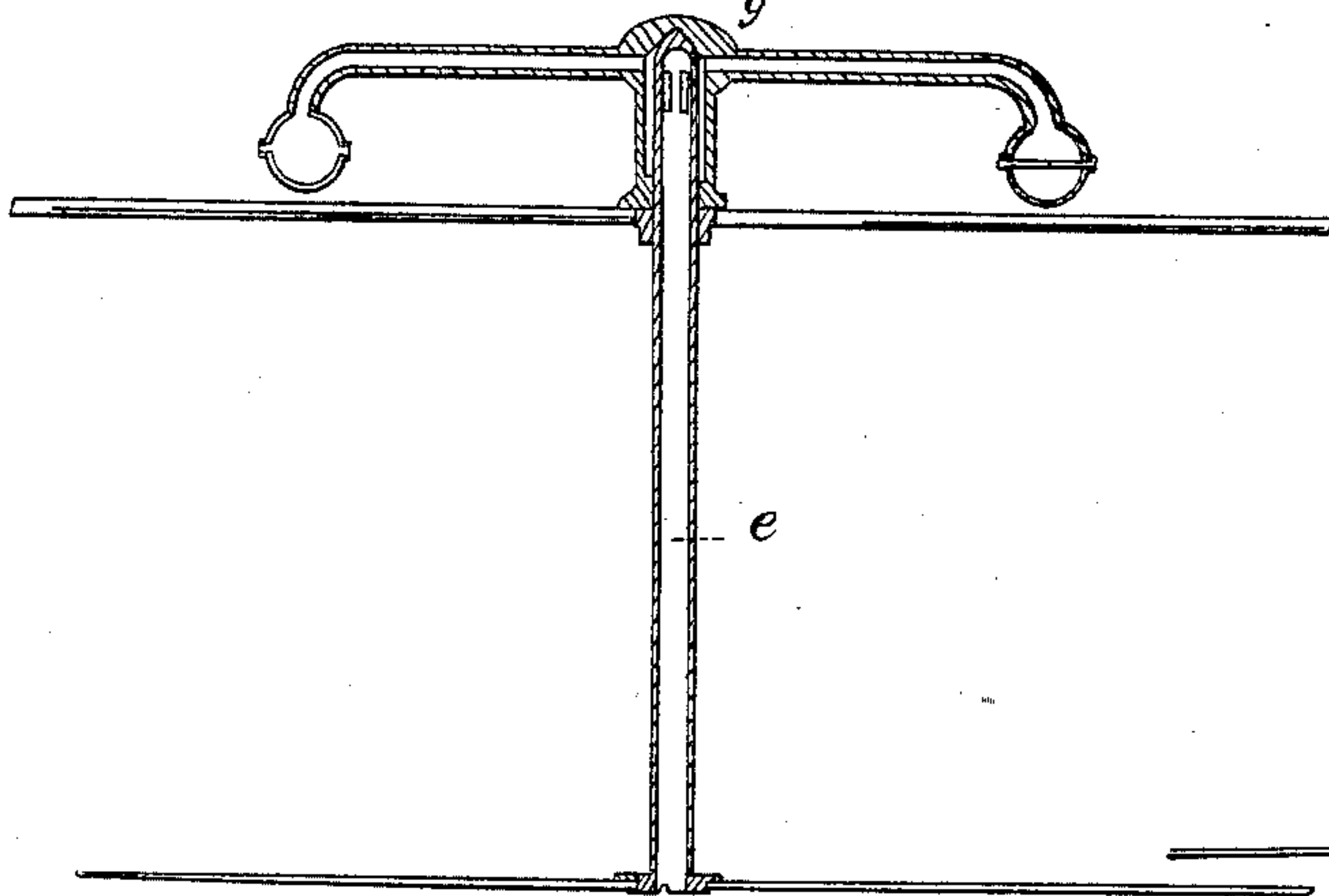


Fig. 5.

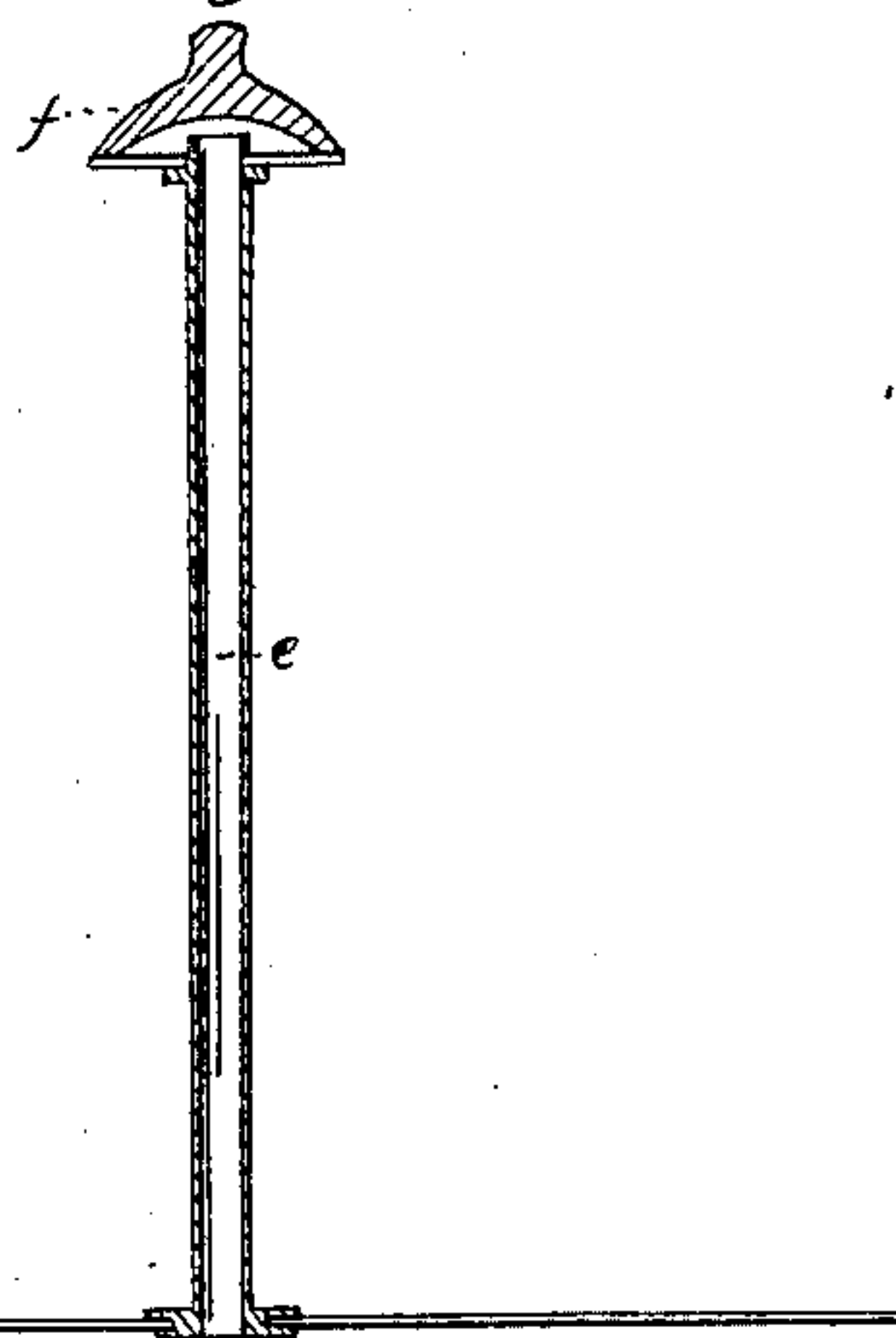
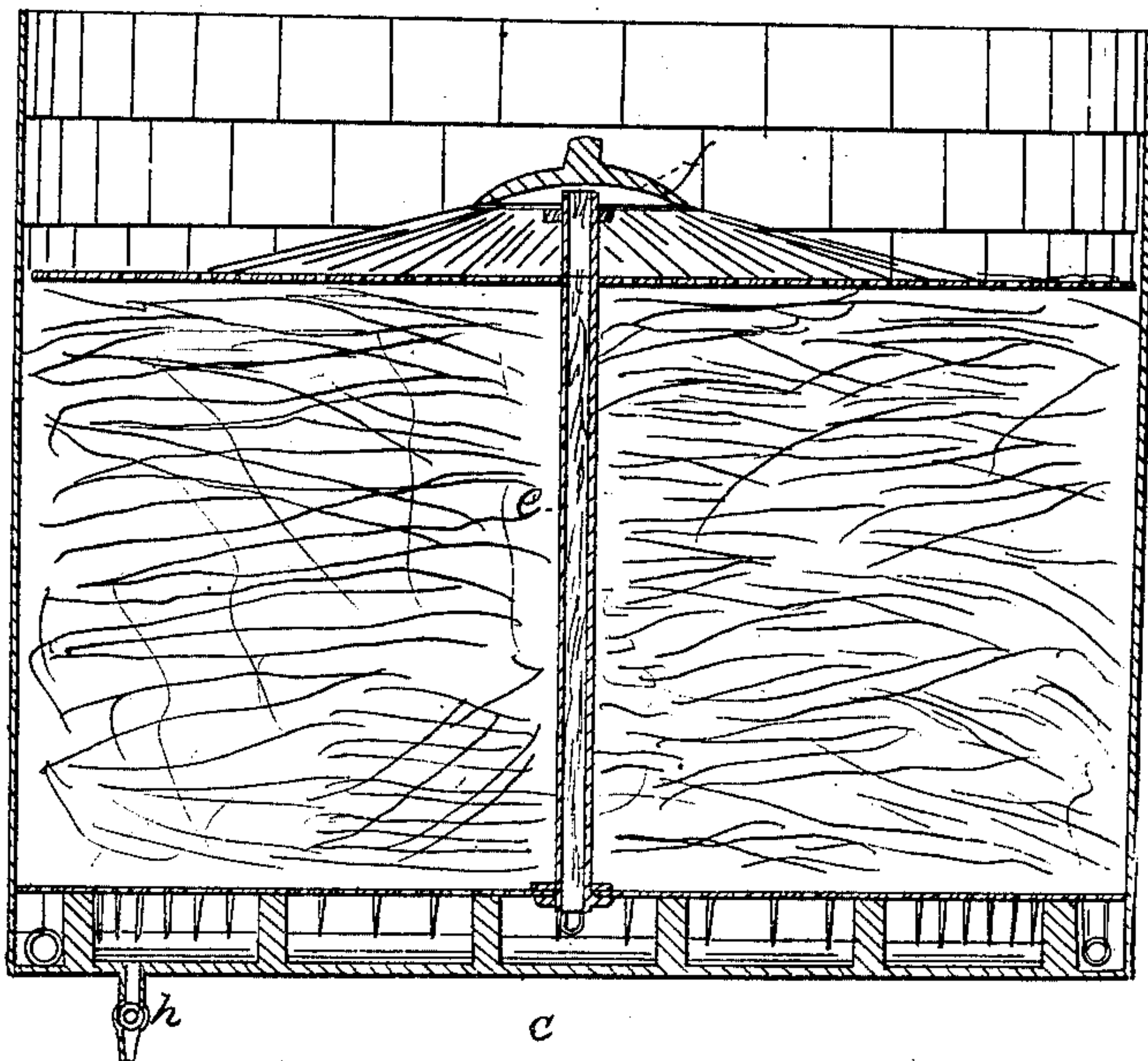


Fig. 3.



Sheet 4, 4 Sheets.

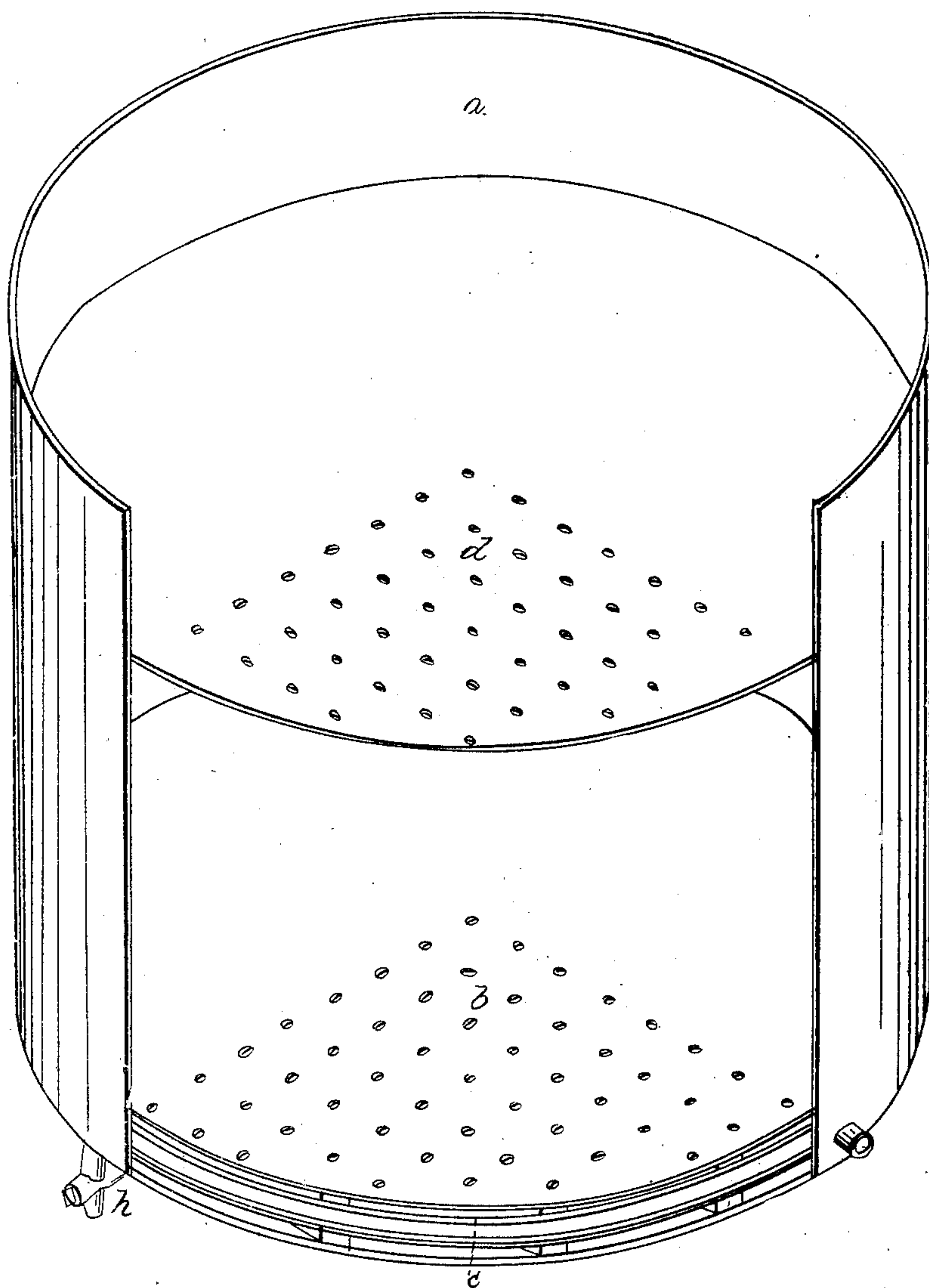
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Fig. 6.



UNITED STATES PATENT OFFICE.

MARTIN NIXON, OF PHILADELPHIA, PENNSYLVANIA.

PREPARATION OF FIBER FOR PAPER-PULP.

Specification of Letters Patent No. 20,294, dated May 18, 1858.

To all whom it may concern:

Be it known that I, MARTIN NIXON, of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Paper-Pulp from Straw and Like Substances; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, making part of this specification.

The prominent distinguishing feature of this invention consists in a method of boiling which involves less labor and results in a better yield of pulp in quantity and quality than is attainable by any other process known to me.

In the accompanying drawings Figures 1, 2, and 6, exhibit in perspective, various modifications of my boiling tub. Fig. 3, is an axial view of Fig. 1. Figs. 4, and 5, exhibit two forms of the alkalizing nozzle or nose.

My process is as follows: I put whole straw in its natural state into a tub or tank *a*, provided with a perforated floor or false bottom *b*, on which the straw is supported. The space beneath the floor *b*, is filled with an alkaline solution about 3° Baumé in strength, and in quantity from 30 to 35 gallons to every 100 lbs. of straw. The bottom angle of the tub beneath the floor *b*, is occupied by a steam pipe *c*, perforated at intervals of about two feet with apertures about one eighth of an inch in diameter to permit the escape of jets of steam toward the center of the tub.

d, is a perforated cover which rests on the mass of straw.

e, is a pipe extending axially from beneath the floor *b*, to a short distance above the cover *d*, where it may be surmounted with an inverted bowl *f*, or with a centrifugal spreader or rose *g*, but when the latter is used the cover *d*, may be dispensed with.

h, is a draw off cock, of which there may be one or more in the bottom of each tub.

i, is a pipe discharging a current of steam into the mouth of the axial pipe *e*, which serves to impel a portion of the alkaline solution upward through said pipe and deliver it in a heated state in a continuous spreading shower upon the top of the straw (or upon the perforated cover where one is used) from whence it percolates downward through the mass of straw. At the same time the steam which escapes into the space beneath the

floor *b*, rises through the straw. Thus there are constantly passing through the straw a descending stream of hot alkaline solution and an ascending volume of steam.

The following are among the advantages resulting from the above described method of boiling.

1st. The mass of straw is preserved in a light and porous condition, free from needless matting and bruising, enabling the deglutenizing agent to circulate freely throughout without being unduly retained in any part. The knotty portions of the straw are thus effectually reduced so as to prevent the existence of yellow pimples and specks which so often deface straw paper; and at the same time the extensive waste of the finer portions of the fiber, incident to severe and repeated washings and stirrings during the deglutenizing process is avoided.

2nd. The condensation of steam causes the alkaline solution to decrease in strength as the work of disintegration progresses.

3rd. A vast amount of laborious and costly manipulation is avoided.

4th. The chemical agents are economized to the greatest possible extent.

For reasons above stated it is my aim to avoid cutting or bruising the straw before the close of the alkaline treatment, preferring to keep it as nearly as possible in its natural form until the washing out of the alkali. The charge of straw for a tub ten feet in diameter and eight feet deep is about four thousand pounds. The deglutenizing process under ordinary circumstances occupies about twelve hours.

When the straw is "cooked" I drain off the liquor, and employ it to "break down" a new batch of straw in another tub. I then run in upon the straw in the first tub a stream of cold water, to wash out the alkali, gluten &c., and to cool the straw. I then transfer the straw into a straw or rag washer and then into a rag engine; or direct into the engine, where it is washed thoroughly by the action of the roll and cylinder washer until the water runs clear therefrom. I then put in about 1 lb. oil vitriol to the 100 lbs. straw and let it mix well with the fiber, which under the action of the roll takes about five minutes, and then wash out. I then "let down" the roll and "open" the straw into "lint" or "fiber." The engine is then again washed down, and afterward clear bleach liquor is

drawn in from a reservoir, until all the water in the engine is of proper strength to bleach, the strength used by me being $\frac{1}{4}^{\circ}$ to 1° Baumé according to the grade of book news or writing paper for which the stock is intended, using for fair newspaper about $\frac{1}{2}^{\circ}$ Baumé.

From the engine the stock may be let down into bleach boxes or vats; or the washed and fibered straw may be let down into drainers and drained and then brought back and put into bleach liquor in the engine and afterward let down into bleach boxes or vats; or it may be washed and opened into fiber in the engine and let down into vats containing bleach liquor. I have operated it in different ways but prefer the mode first described of applying the bleach liquor in the engine. The bleaching being accomplished the stock may be worked up in the usual way for "half stuff."

Pulp made by the above process, works well in any proportion with rag stock, and I make an excellent tough and white paper of straw only. I also manufacture by my process—omitting the bleach—a tough arti-

cle of paper having the natural color of the straw.

I am aware that a process has existed, whereby the alkaline solution, is by the agency of steam, heated in a separate vessel and delivered on top of the straw in intermittent showers. This I do not claim, neither do I claim any process in which cutting of the straw is a prerequisite; but

I claim as new and of my invention—

1. The described manner of applying the steam, whereby the solution is automatically and continuously delivered on top of the straw as set forth.

2. The process of boiling whole straw by the combined action of an upward current of steam and a downward current of alkaline solution permeating the mass and acting upon it in conjunction substantially in the manner and for the purpose explained.

In testimony of which invention I hereunto set my hand.

MARTIN NIXON.

Attest:

GEO. H. KNIGHT,
JAS. H. GRIDLY.