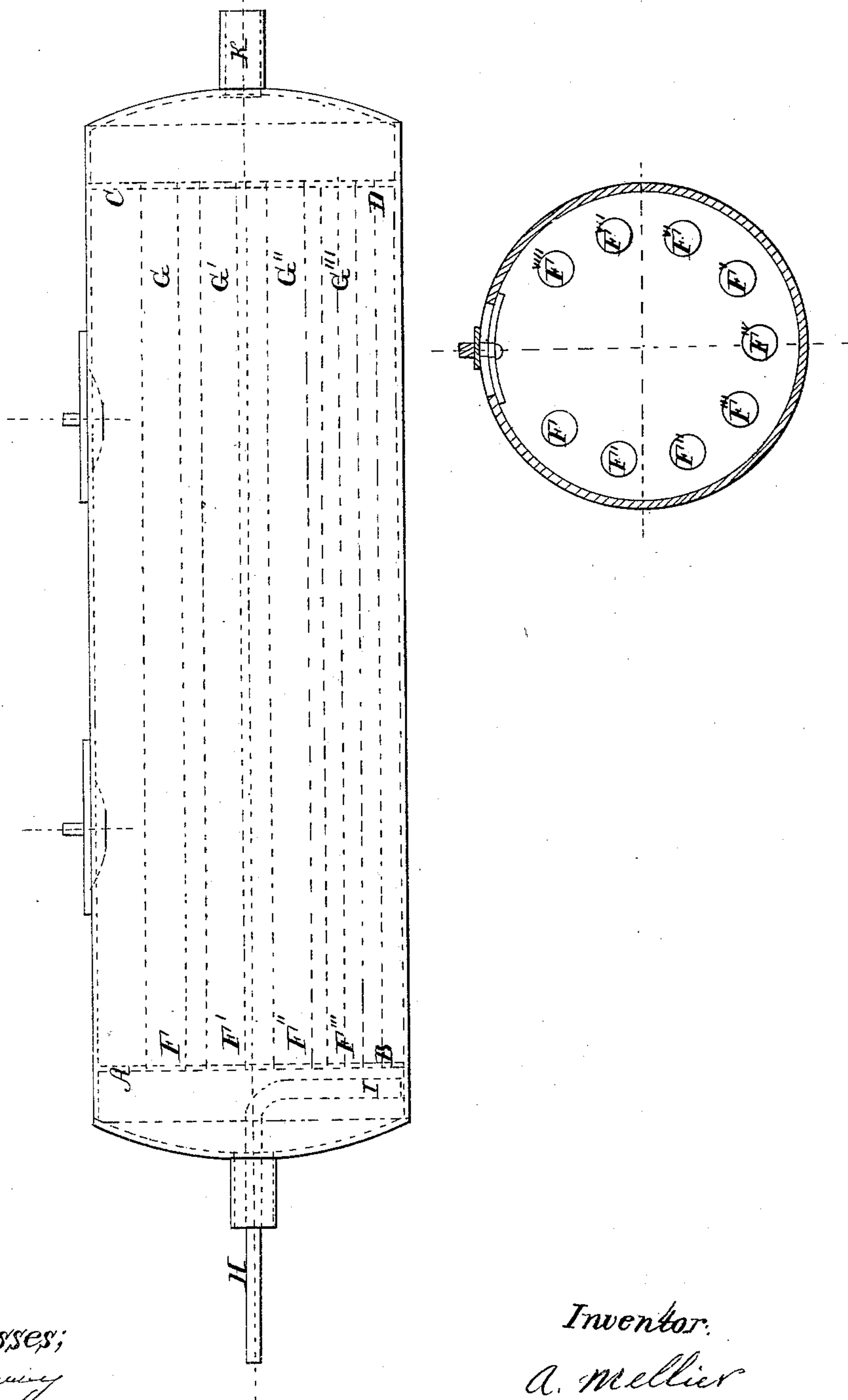


M. A. C. Mellier.
Pulp Digester.
Nº 17,387. Patented May 26, 1857.



Witnesses;
Subscribing
C. S. Buchanan

Inventor.
A. Mellier
V. Beaumont
attorney

UNITED STATES PATENT OFFICE.

M. A. CHARLES MELLIER, OF PARIS, FRANCE.

MAKING PAPER-PULP.

Specification of Letters Patent No. 17,387, dated May 26, 1857.

To all whom it may concern:

Be it known that I, MARIE AMÉDÉE CHARLES MELLIER, of Paris, in the Empire of France, have made an invention for an
5 Improvement in the Manufacture of Paper; and I do hereby declare that the following is a full and exact description.

The invention has for its object a peculiar process for the treating of straw, and other
10 vegetable fibrous materials requiring like treatment, preparatory to the use of such fibers in the manufacture of paper; and the improvement consists in subjecting straw or such other fibrous materials to a pressure of
15 at least seventy pounds on the square inch when boiling such fibrous matters in a solution of caustic alkali. For this purpose the straw or fibrous matters are cut into short lengths, soaked in warm water and washed.
20 They are then placed in a suitable boiler, and I use for such purpose a rotatory boiler provided with a coil or coils of steam pipe for the purpose of heating the contents; and I prefer that the boiling should be carried
25 on at a temperature to produce at or above 80 lbs. on the square inch in the boiler where are the fibrous materials to be acted upon, but so high a temperature is not absolutely necessary but I have found by experi-
30 ment that it is essential that a temperature equivalent to seventy pounds on the square inch must be employed. The quantity of alkali used is at the rate of about 16 per cent. of caustic soda or potash of the straw
35 or fibrous substances under process. The fibers may then be bleached by the use of a comparatively small quantity of bleaching powder, or chlorid of lime.

To enable others skilled in the art to make
40 and use my invention, I will proceed to describe more fully the manner of using the same.

The straw or other fibrous material requiring a like process to prepare the same
45 for the paper manufacture, is first, as heretofore, to be cut in a chaff-cutting or other machine into short lengths, and to be freed from knots, dirt and dust, and then steeped for a few hours in hot water. The straw or
50 fibrous materials and a weak solution of caustic alkali are then to be placed in a suitable closed boiler heated by steam as hereafter explained, and the heat is to be raised to such a degree as to attain and maintain
55 for a time a pressure internally of the boiler equal to or exceeding seventy pounds on the

square inch, that is about 310° of Fahrenheit; by which means a considerable saving of alkali, as well as time and fuel, results, as compared with the means of using a hot
60 solution of caustic alkali, as now practiced in preparing straw and other fibers for paper-makers.

The boiler employed for the purpose and the manner of heating it by steam may be
65 varied; but 1st it must have a rotatory motion either on its long or on its small axis by means which are very well known; and 2dly I prefer not to send the steam directly into the liquid in which the materials are
70 immersed, but to pass it either in a jacket around the boiler, or through a coil or a system of steam pipes inside of it, so that the steam does not mix with the caustic alkaline solution in the middle portion of the
75 boiler, but is kept separate and does not therefore in condensing dilute the caustic alkaline solution used.

The plan of construction of the boiler I would recommend would be, if the boiler
80 is to rotate vertically on its small axis, as very well known, to cover it with a jacket so that the steam could circulate from one end to the other between the two plates; or rather if it is to revolve horizontally or
85 upon its long axis, as is equally very well known, to fix near each end of the boiler, and inside of it, a diaphragm or partition, which partitions are connected together by
90 numerous tubes, which are arranged in a circle near the outer circumference of each partition. By this arrangement the steam is introduced through the hollow axis at one end of the boiler, and it passes through
95 the steam pipes, and thence into the compartment at the other end of the boiler, where it and the condensed steam are conveyed away as is well understood through the other hollow axis.

In adopting the plan of not sending di-
100 rectly the steam into the boiler I found the three following advantages: 1st not to dilute, as I have already said, the alkaline solution; 2dly to avoid the trouble of having sometimes the end of the steam-pipe
105 in the boiler choked with straw, and to prevent, in case that by one cause or another the pressure in the steam boiler would fall under the degree of the pressure in the straw boiler, the priming of the first by the
110 second, viz, the absorption of straw and alkaline solution from the straw boiler into

the steam boiler; 3dly the greater facility of cooling the straw-boiler, when the pressure has been maintained for a sufficient length of time, by means of turning off the steam at one end, letting it at the other end out of the jacket or of the coils or steam-pipes just described, and passing through the same a stream of cold water, which, at the same time that it cools the mass, furnishes a quantity of cold water which can be received in convenient vessels and will be found very useful for washing the straw or other fibrous materials after boiling.

By means of submitting the straw or similar fibrous material to a pressure of between 70 to 84 pounds on the square inch inside of the boiler, I can reduce considerably the proportion of alkali and the solution which I prefer to use is to be from two to three degrees of Baumé or of a specific gravity of from 1.013 to 1.020, and at the rate of above 70 gallons of such solution to each cwt. of straw or other fibrous vegetable matters requiring like treatment.

The boiler is to be filled with straw and alkaline solution and then closed fluid and steam tight. The boiler is made to revolve slowly, say, about one or two revolutions per minute, and the steam is to be admitted. I find it desirable to keep up the heat and pressure during about three hours after the pressure above mentioned has been obtained, when the process of boiling is complete. A steam gage properly fixed upon the boiler will enable one to ascertain when the pressure has attained the required degree.

When the apparatus and the fibers under process have been cooled by the means hereinbefore mentioned or rather when the pressure has been reduced to nothing, I open

the man holes of the boiler, empty the materials in suitable vessels, and wash them, first with hot water, then with cold water, until the liquor runs perfectly clear. I then steep the fiber for about an hour in hot water acidulated with a quantity of sulfuric acid equal to about 2 per cent. of the weight of the fibers under process and finally the washing is completed with cold water. The straw or fiber may then be bleached in the ordinary manner and it will be found to be accomplished by a comparatively small quantity of chlorid of lime.

Having thus described the nature of my said invention and the manner of performing the same I would have it understood that I do not claim the general use of caustic alkaline solutions nor the employment generally of a close boiler for boiling straw or other vegetable fibrous substances; but

What I claim as my invention and desire to secure by Letters Patent is—

1. The use of a solution of caustic soda (NaO) in a compartment of a rotary vessel separate from that which contains the steam heat substantially as described.

2. I also claim the within described process for bleaching straw, consisting in boiling it in a solution of pure caustic soda (NaO) from 2 to 3° Baumé, at a temperature not less than 310° Fahrenheit, after it has been soaked and cleaned and before submitting it to the action of a solution of chlorid of lime from 1 to 1½ degrees substantially as described.

M. A. CHARLES MELLIER.

Witnesses:

ALLERME,
AMASZIE.