

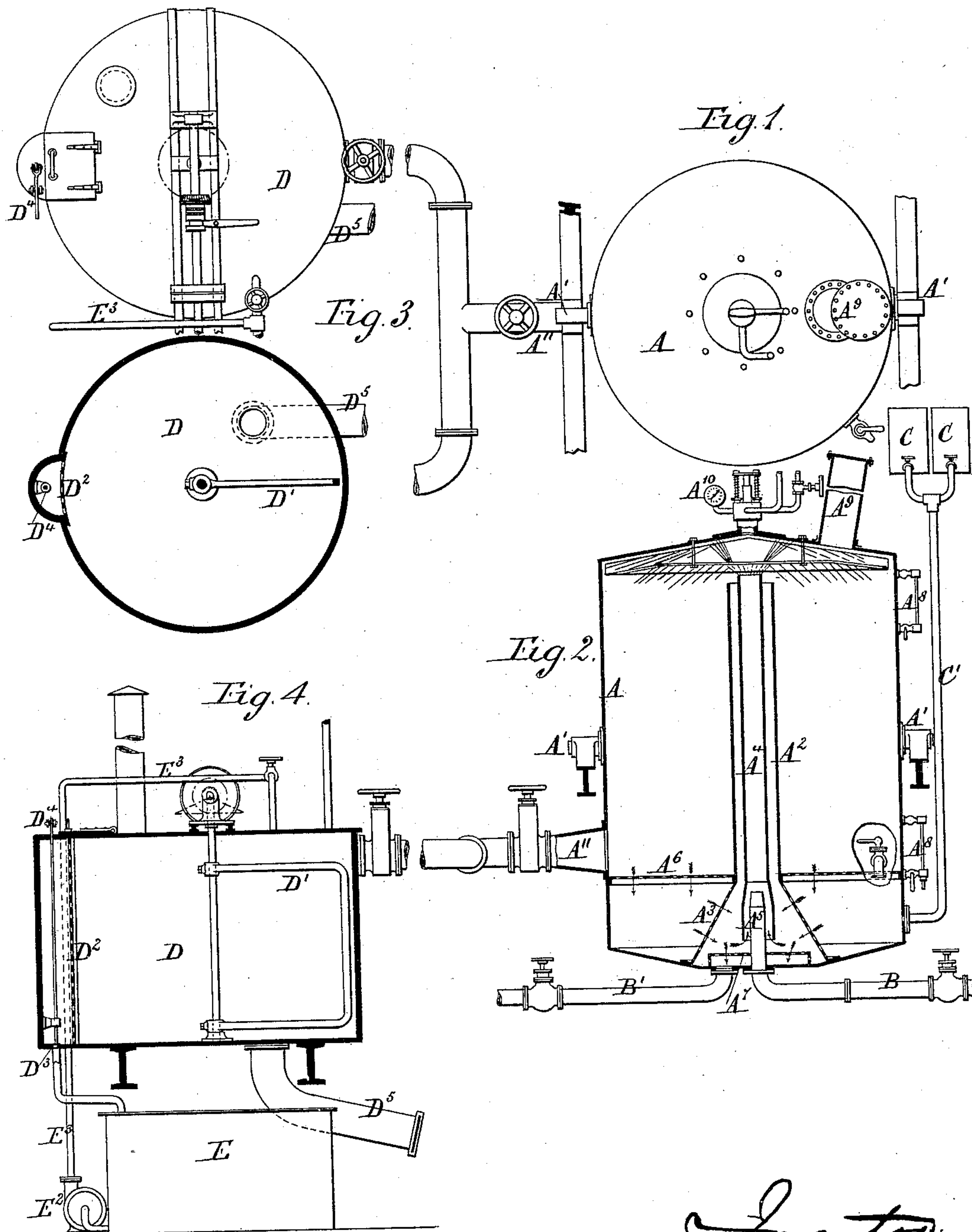
(No Model.)

C. RAMSEY.

PROCESS OF MANUFACTURING AND BLEACHING PULP.

No. 429,097.

Patented May 27, 1890.



Witnesses:
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PROCESS OF MANUFACTURING AND BLEACHING PULP.

SPECIFICATION forming part of Letters Patent No. 429,097, dated May 27, 1890.

Application filed April 9, 1889. Serial No. 306,585. (No model.) Patented in England February 1, 1889, No. 1,834, and in Norway April 4, 1889, No. 1,281.

To all whom it may concern:

Be it known that I, CHARLES RAMSEY, a citizen of England, residing at New Wortley, Leeds, county of York, England, have invented a new and useful Process of Manufacturing and Bleaching Pulp, (for which I have obtained patent in Great Britain, No. 1,834, dated February 1, 1889, and in Norway, No. 1,281, dated April 4, 1889,) of which the following is a specification.

My invention relates to a process of manufacturing and bleaching wood, straw, rag, and other pulps for paper-making and such like purposes. The process naturally divides itself into two parts or operations, the one being the preparation of the crude pulp, the other the bleaching of the crude pulp. Usually the crude pulp is first prepared and this is afterward bleached. In many cases, however, fibers, chips, rags, &c., adapted for pulp-making may be bleached in the first instance, and the bleached material may be afterward made into pulp. I shall describe these two operations separately, and in order that they may be better understood I illustrate by the accompanying drawings an arrangement of apparatus whereby the two operations can be conveniently carried on either separately or consecutively.

Figure 1 is a plan, and Fig. 2 a vertical section, of a pulping-boiler. Fig. 3 is a plan of two bleaching-vessels, one of them shown in section; and Fig. 4 is a vertical section of one of them.

Referring first to Figs. 1 and 2, A is a boiler, which is preferably mounted on trunnions A', so that it can be turned obliquely or inverted to give convenience for repairs. In the center of the boiler there is a vertical pipe A², open at the top and terminating at the bottom in a perforated cone A³. Within the pipe A² is an inner pipe A⁴, which is open at the top and the bottom, and within its lower end there is a jet-nozzle A⁵ for steam. Near the bottom of the vessel A is a perforated floor A⁶, and nearly close to the bottom is a perforated filter-plate A⁷. The vessel A is provided with water-gages A⁸, a man-hole A⁹, safety-valve and pressure-gage A¹⁰, and a discharge-outlet with valve A¹¹. A steam-pipe B with valve leads to the jet-nozzle A⁵, and a blow-off pipe B' with valve leads from the

bottom of the boiler A. Above the top of the vessel A are situated two or more tanks C, containing the chemical substances which I employ, these tanks communicating with the bottom of the vessel A by a pipe C', having a branch from each tank provided with a stop cock or valve.

I operate with this apparatus for making pulp in the following manner: Having charged the boiler A up to nearly the top of the pipe A² with the wood or other vegetable material in chips, fragments, or small pieces, I let saturated lime-water flow from one of the tanks C into the bottom of the vessel A till it rises a little above the perforated floor A⁶. I then admit steam to the jet-nozzle A⁵, and thereby cause the lime-water to flow up the central pipe to impinge against the cover or against a spreading plate under the cover, by which the current of lime-water is broken and distributed over the pulp material. The liquid percolating through the interstices of the material returns to the bottom compartment, is again caused to flow up the pipe and so on continuously for six or eight hours until it is ascertained by sampling that the material has undergone sufficient treatment. The steam-supply is then cut off, the liquid is run off by the pipe B', and, if necessary, water can be passed through the material to wash it. The washing-water having been withdrawn, the bottom compartment is charged with a solution of hypochlorite of magnesia, formed by mixing sulphate of magnesia and chloride of lime. These may be used in various proportions with water, according to the character of the material operated on. I find a good proportion for most ordinary pulp materials to be a solution of the strength of about 3° Baumé, consisting of about seventy per cent. of sulphate of magnesia to about thirty per cent. of chloride of lime. This solution is caused to circulate by means of the steam-jet for about six to eight hours. The hypochlorite solution having been run off, the material may again be washed with water, and it can then be discharged by the outlet-valve A¹¹, ready for being beaten up into pulp.

In most cases it is desirable to bleach the pulp material prepared as above described, and for this purpose it may be run direct into

either of the bleaching-vessels shown by Figs. 3 and 4. Each of those vessels D is of cylindrical form, having within it a revolving agitator D'. At one side of the vessel is formed
 5 a pocket, having in front of it a perforated plate D², and having at its bottom a valve D³, which can be opened by a lever D⁴, mounted on the cover. A tank E contains a strong solution of hypochlorite of magnesia, which
 10 may consist of equal parts of sulphate of magnesia and chloride of lime. This tank E communicates with the valve-opening D³, and through a rotary pump E² and pipe E³ with either of the vessels D. The pulp in the ves-
 15 sel D is kept agitated for several hours by the revolution of the agitator D', while the hypochlorite of magnesia is kept circulating through it by means of the pump E². The bleached pulp is then run off by the pipe D⁵.
 20 Although I have described the bleaching in vessel D as being applied to the crude pulp delivered from the boiler A, pulps otherwise prepared—such as those prepared by treatment with soda, sulphate of soda, or sulphite
 25 of lime—may be similarly bleached; also, fibers, fine chips, rags, and the like can be bleached, as described, before being made into pulp.

Having thus described the nature of my invention and the best means I know of carrying it out in practice, I claim—
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1. The process of manufacturing bleached pulp by causing to circulate through the pulp material first lime-water, then a solution of sulphate of magnesia and chloride of lime, and afterward agitating the material thus
 35 treated while a solution of sulphate of magnesia and chloride of lime is caused to circulate through it, substantially as described.

2. The process of manufacturing partially-bleached pulp by causing to circulate through
 40 the pulp material first lime-water, and then a solution of sulphate of magnesia and chloride of lime, substantially as described.

3. The process of bleaching pulp or pulp material by agitating it while a solution of
 45 sulphate of magnesia and chloride of lime is caused to circulate through the material, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of
 50 two subscribing witnesses, this 20th day of March, A. D. 1889.

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