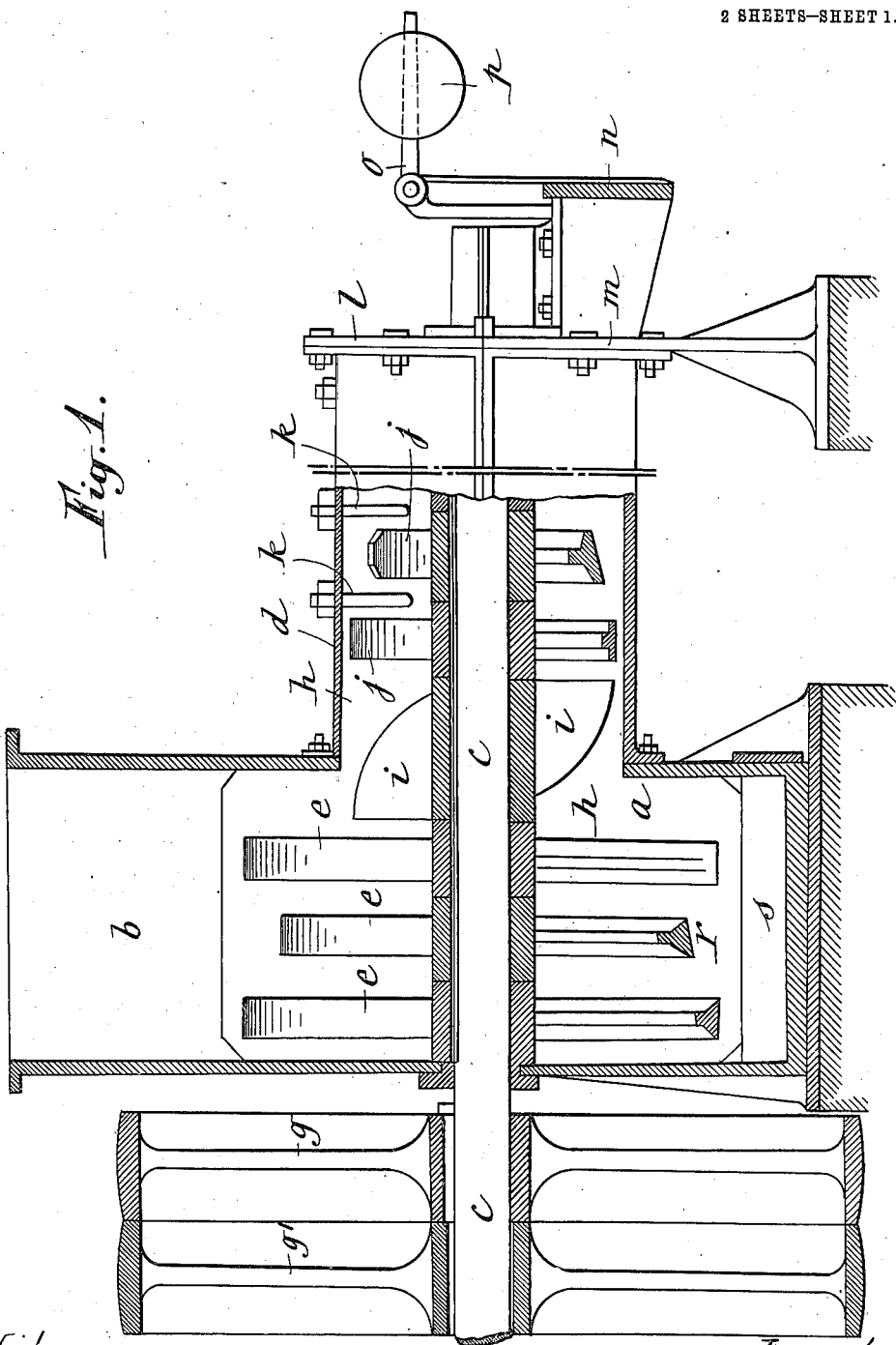


A. LANNOYE.
 APPARATUS FOR TREATING OLD PAPER AND THE LIKE.
 APPLICATION FILED JULY 14, 1908.

989,370.

Patented Apr. 11, 1911.

2 SHEETS—SHEET 1.



Witnesses:

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Inventor:

By *Auguste Lannoye,*
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2 SHEETS—SHEET 2.

Fig. 3.

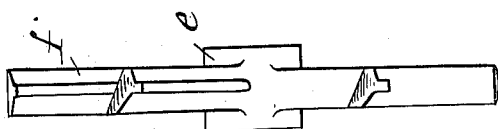


Fig. 4.

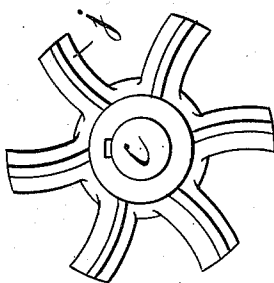


Fig. 2.

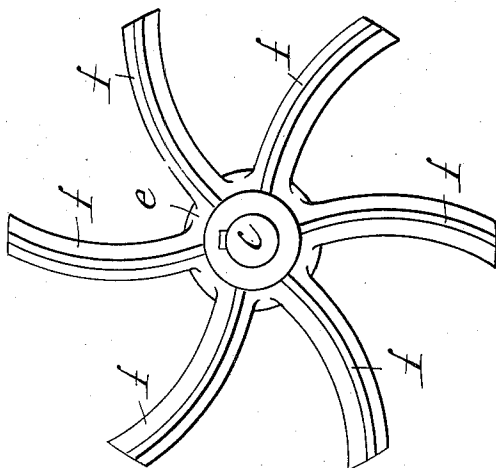
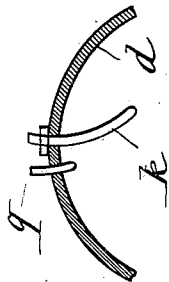


Fig. 5.



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UNITED STATES PATENT OFFICE.

AUGUSTE LANNOYE, OF GENVAL, BELGIUM.

APPARATUS FOR TREATING OLD PAPER AND THE LIKE.

989,370.

Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed July 14, 1908. Serial No. 443,559.

To all whom it may concern:

Be it known that I, AUGUSTE LANNOYE, a subject of Belgium, residing at Genval, in the Kingdom of Belgium, have invented new and useful Improvements in Apparatus for Treating Old Paper and the Like, of which the following is a specification.

For the treatment of old paper, and the like, with the view to its again being utilized in paper making, apparatus have already been designed comprising cylindrical or conical vats in which rotates a horizontal shaft carrying arms or blades to work up the material and effect its continuous movement forward in the apparatus. In such apparatus however it has only been the object to effect the division and energetic working up of the material in order to tear up the fibers. For this reason apparatus of the type in question must necessarily work at a high speed in order to throw the material by centrifugal force on to fluted surfaces, tearing plates, etc., against which the material is divided and ground under the action of movable blades, rotating in front of the fluted surfaces or fixed plates, with respect to which they only leave a small space into which the material is drawn and worked up energetically. These apparatus grind up the material without attaining a sufficient saturation of water.

The present invention has for its object to provide an apparatus in which a receptacle or cylindrical vat is used containing a horizontal shaft carrying working members but the action of which is based upon a method of working absolutely different from that of the above mentioned apparatus.

I have found that to obtain, with a minimum of energy and under economical working conditions, a complete and rapid dissolution of old papers, card board and the like it is not necessary to submit these materials to an energetic process of subdivision; the dissolution is on the contrary obtained much more perfectly by steeping the material for a sufficiently long period; subjecting the same to heat, and completing the operation by stirring up the mass and subjecting the same to a certain compression. In regard therefore to the method of working, the apparatus forming the object of the present invention approaches more nearly to the old

pulping or dissolving apparatus known under the name of "Barbottes" than to the tearing or grinding apparatus above mentioned.

I make use of an apparatus which will be hereinafter fully described.

Figure 1 is a side view of the apparatus with the steeping chamber and a part of the compression chamber shown in section. Fig. 2 is a separate view of one of the agitators situated in the steeping chamber. Fig. 3 is an edge view of the agitator showing in section the shape of the arms. Fig. 4 is a front view of the wheels situated in the compressing apparatus. Fig. 5 is a partial transverse section of the compression chamber showing the parts which coöperate with the wheels situated in the compression chamber to facilitate the working up of the material under treatment.

As shown by Fig. 1 the apparatus as a whole comprises a horizontal cylinder *a* which forms the steeping chamber and into which the material is introduced through a hopper *b*; the cylinder *a* is traversed by a shaft *c* which extends into a cylindrical receptacle *d* of a smaller diameter than the cylinder *a* and connected thereto in axial alinement therewith.

The shaft *c* carries, inside the steeping chamber *a*, agitators *e* suitably spaced apart to permit the material to fall freely to the bottom of the cylinder *a*. These agitators *e* are each formed (Fig. 2) of a wheel with six arms *f*. In the example shown in Fig. 1 use is made of three similar wheels and each of them is displaced one twelfth of its circumference with respect to the one in front and the one following.

The shaft *c* which is provided outside the steeping chamber *a* with a driving pulley *g* and loose pulley *g'*, carries in the opening forming the communication between the cylindrical chamber *a* with the cylindrical receptacle *d*, a screw *i* projecting about half way into the steeping chamber *a* and into the cylinder *d*. In the latter the shaft carries wheels with blades *j* displaced, with respect one to the other, by one-twelfth of the circumference and the face of each of which arms forms a helicoidal plane of suitable pitch.

Between the arms of two consecutive

wheels *j* a steel rod *k* is solidly bolted to the casing of the cylinder *d*, and to the extremity of the cylinder *d*, which contains a suitable number of these wheels *j* (ten for example) is bolted an endplate *l* provided at the lower part with an opening *m* closed by a door *n* opening outward under the pressure of the pulp. This door is kept closed by a lever *o* carrying a counter-weight *p* suitably regulated so as to only allow the opening of the door *n* when a predetermined pressure is reached in the cylinder *d*.

In the upper part of the cylinder *d* are arranged one or two small air tubes *q* for the purpose of allowing the escape of air which might collect in the apparatus and thus prevent perfect contact between all the fibers.

The action of the apparatus is as follows: The material introduced into the cylinder of largest diameter, the steeping chamber *a*, through the hopper *b* falls freely into the water *n* contained in the lower part of this cylinder and which is raised to a sufficiently high temperature by a steam jet (not shown). The blades *e* in slowly turning tear up the paper, etc., and aid the steeping operation; during this operation any heavy and hard impurities which might accompany the material to be treated are collected in a false bottom *s* provided at the lower part of the cylinder *a*. The arms of the agitators *e* being curved and somewhat conical strings and pieces of rag are easily detached. When the steeping chamber *a* is sufficiently full of paper the latter, with the steeping water flows into the cylinder *d* being forced therein by the screw *i*. The pressure in the cylinder *d* is the resultant of the friction which the mass has to overcome in the whole of its travel and of the pressure produced by the door *n*, a pressure which can be adjusted as desired according to the result which it is required to obtain. The screw *i* on the one hand and the agitators *j* on the other hand, produce the forward movement and induce a rotating and mixing movement of the pulp which is retarded by the rods *k*. As soon as the apparatus is filled and at the desired pressure the door *n* is automatically raised and allows the perfectly trituated material to pass out.

Owing to the arrangement described the material, contrary to what is the case with apparatus at present employed, is submitted to as complete a saturation as possible; this saturation is effected with the expenditure of a minimum amount of energy due to the relatively high temperature of the water contained in the steeping chamber *a* which temperature is regulated by the steam jet above mentioned; the division of the material treated is already very complete in the steeping chamber *a*, in consequence of the combined action of the agitators *e*, of the high temperature, and of the time spent on

the operation owing to the slow speed of rotation of the shaft *o*.

The compression produced in the cylindrical casing *d* separates the fibers one from the other and completes the dissociation of these fibers by the pulling action in reverse directions exerted thereon by the coöperation of the wheels or agitators *j* and the projecting rods *k*. The rapid and complete dissolution of old papers, cardboard, etc., is consequently effected without submitting these materials to subdividing or grinding action by means of parts rotating at a particularly high speed and absorbing considerable energy.

Having thus described my invention, what I claim is:

1. In an apparatus of the class described, a steeping chamber, agitating mechanism therein, a pulping chamber connected with the steeping chamber for receiving material therefrom and means whereby material may be compressed in the pulping chamber.

2. In an apparatus of the class described, a steeping chamber, a pulping chamber connecting therewith, and means coöperating with said pulping chamber whereby the material being treated therein may be subjected to any suitable degree of compression.

3. In an apparatus of the class described, a pulping chamber, an outlet therefrom, agitating and feeding mechanism operating with said chamber, means for normally closing said outlet, and a device coöperating with said closing means whereby the outlet is opened when the compression of the material reaches a certain predetermined degree.

4. In an apparatus of the class described, a pulping chamber provided with an outlet, agitating and feeding mechanisms within said chamber, a door normally closing said outlet, and adjustable mechanism coöperating with said door whereby the outlet remains closed until a predetermined degree of pressure is attained in the pulping chamber.

5. In an apparatus of the class described, a steeping chamber, a pulping chamber communicating therewith, an outlet from the pulping chamber, means within the steeping chamber for agitating the material therein, means for feeding and agitating the material within the pulping chamber, and mechanism coöperating with the feeding and agitating mechanism for regulating the compression of the material under treatment in said chamber.

6. In an apparatus of the class described, a steeping chamber, a pulping chamber communicating therewith, an outlet from the pulping chamber, means within the steeping chamber for agitating the material therein, agitating means positioned within the pulping chamber, feed mechanism coö-

erating with the steeping chamber and the
pulp- ing chamber, an outlet from the pulp-
ing chamber, a door for normally closing
the outlet, and means for retaining the door
5 in a closed position until a predetermined
degree of pressure is attained in the pulp-
ing chamber.

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

AUG. LANNOYE.

Witnesses:

GEORGE BEDE,
G. PHELAN.