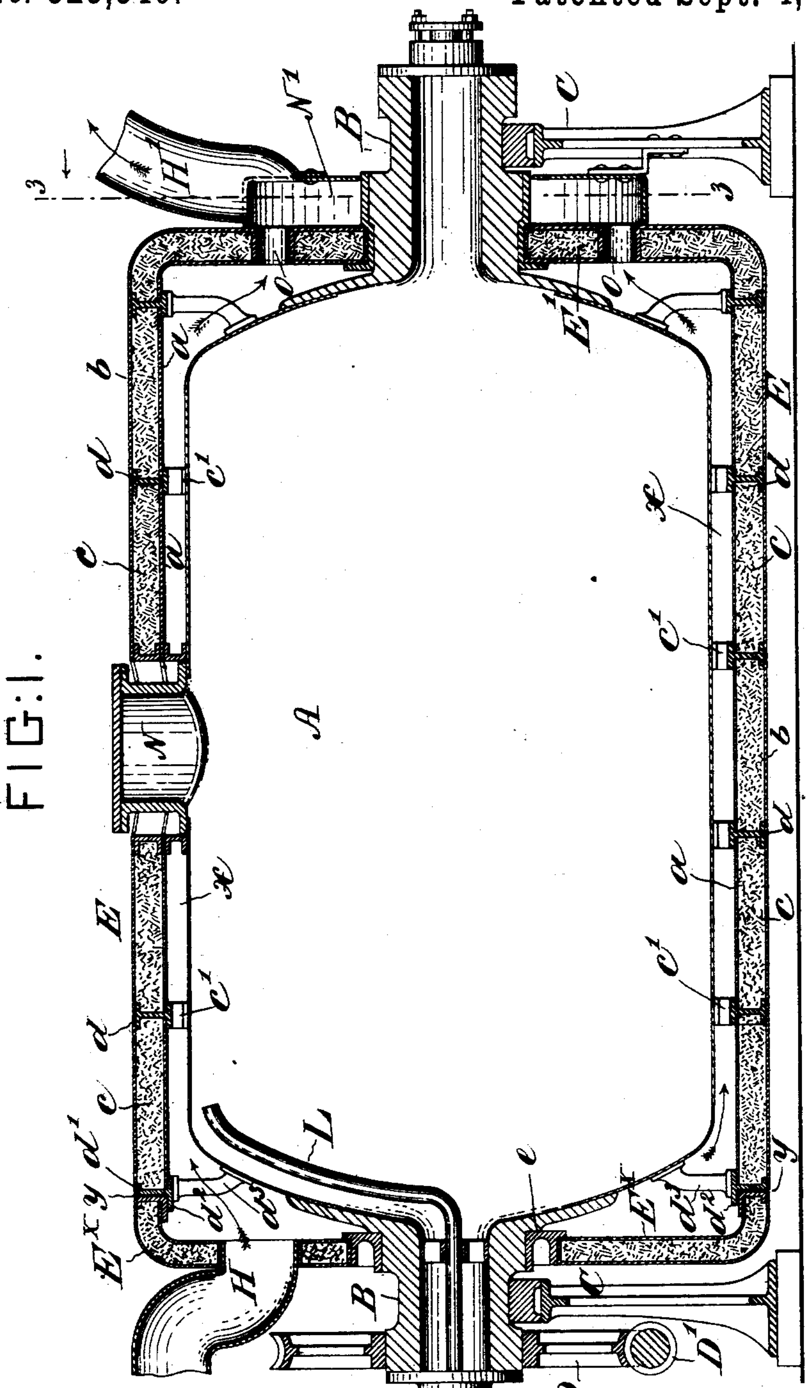
(No Model.) 2 Sheets—Sheet 1.

C. W. FLODQUIST.

APPARATUS FOR THE MANUFACTURE OF CELLULOSE.

No. 525,540. Patented Sept. 4, 1894.



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Inventor:
Carl W. Flodquist
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his Attorney

(No Model.) 2 Sheets—Sheet 2.

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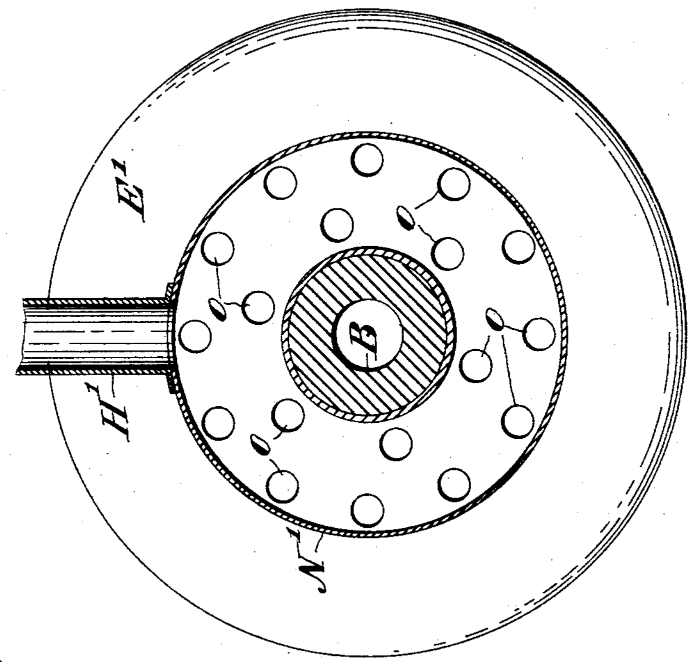

FIG:3.

FIG:4.

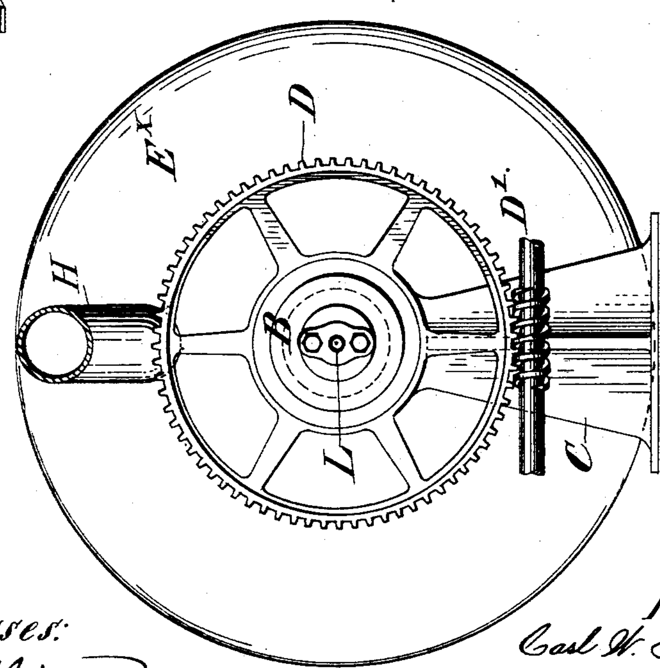

FIG:2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CARL WALDEMAR FLODQUIST, OF STOCKHOLM, SWEDEN.

APPARATUS FOR THE MANUFACTURE OF CELLULOSE.

SPECIFICATION forming part of Letters Patent No. 525,540, dated September 4, 1894.

Application filed March 8, 1893. Serial No. 465,161. (No model.)

To all whom it may concern:

Be it known that I, CARL WALDEMAR FLODQUIST, a subject of the King of Sweden and Norway, residing in Stockholm, in the Kingdom of Sweden, have invented certain new and useful Improvements in Apparatus for the Manufacture of Cellulose, of which the following is a specification.

My invention relates to boilers used in the manufacture of sulphite cellulose, wherein the wood fibers or particles must be boiled or digested.

In the production of sulphite cellulose, the boiling has hitherto, in general, been effected by means of steam in such a way that the steam has been conducted either into the boiler itself, or into a casing surrounding the boiler. The first method has the inconvenience that the boiling lye is diluted, whereby the boiling is retarded and also rendered unequal, as the lye will be mainly diluted in the top layer of the mass. The latter method requires, on the other hand, a jacket or casing strong enough to resist a considerable pressure, as rapid boiling requires a temperature of the steam which ought not to be below 150° centigrade. Such a casing is expensive, particularly if, as is almost necessary, it is made in parts which can be separated in order that the boiler shall be accessible from without. The use of the present apparatus implies, on the contrary, no dilution of the lye, requires no strong casing, one of the weakest kind being sufficient, and still the boiling may be effected at a temperature far higher than that first mentioned. This apparatus employs a jacket, and hot air instead of steam for the boiling. The air is heated to the desired temperature, say 300° centigrade by means of a suitable heating apparatus, and is led into the casing or jacket surrounding the boiler at one end of the former; it flows through the jacket-space and is let out at the other end of the casing, whence it is conducted either into the open air, or back to the heating apparatus. The air need not be pure, but may be mixed with, or substituted by gases, as for instance those from the furnace in the heating apparatus, provided these gases are only so pure as not to cause such a deposit of soot, or the like, in the casing, as to render a frequent cleaning of the same necessary. As the hot air or gases need not exercise any material pressure in the casing, this latter may be made of very thin plate, but properly protected against radiation. As the joints need not be very tight, the casing can be composed of sections or parts. These are so fastened to the boiler and to each other that they may be easily taken apart, all parts of the boiler shell being thus made readily accessible from without. The boiler may have a cylindrical shape and the joints of the casing may extend either transversely or longitudinally, but preferably the former.

In the accompanying drawings I have shown an embodiment of the invention.

Figure 1 is a longitudinal, axial section of the apparatus. Fig. 2 is an end elevation of the left-hand end of the apparatus seen in Fig. 1. Fig. 3 is a transverse, vertical section on line 3, 3, in Fig. 1, at the right-hand end of the casing seen in Fig. 1. Fig. 4 is a detail view of the angle-irons in the jacket-space between the boiler and casing.

A represents the cylindrical boiler, which is provided with tubular journals, B, at its ends. These journals have rotative bearings in pillow blocks, C. The boiler may be rotated through the medium of a worm-wheel, D, seen on the journal B at the left-hand end in Fig. 1, and a worm or screw, D′. The boiler is furnished with a manhole, N, and has a steam-gage pipe, L, which latter enters the boiler through the hollow of a journal B.

The boiler is inclosed in a casing or jacket, the body, E, of which is secured to the boiler through the medium of angle-irons, c', one of which is seen detached in Fig. 4. These angle-irons form distancing pieces and occupy the jacket-space, x, about the boiler. In order to prevent or retard radiation of heat from the jacket-space the jacket or casing is made double, that is of two shells, a and b, one within the other, and the space between them is filled with some non-conducting material, c, as asbestos, mineral wool, &c.

The construction of the casing, as illustrated, is as follows: **I**-irons, d, are bent in the form of hoops or rings and extend roundwise of the jacket, and the inner series of plates, a, rest on the outer faces of the inner flanges of the rings d; the outer series of plates rest on the outer faces of the outer flanges of said rings, the plates being all secured detachably to the rings, as by screws for example. This construction enables any plate or section to be readily removed in order to get access to the boiler shell.

The casing extends over the respective ends of the boiler, and the hot air and gases are admitted to the jacket-space through one of the ends of the casing and escapes through an outlet in the other end thereof. I will first describe the construction at the left-hand end where the gases enter. The end portion, $E^{\times}$, of the casing is non-rotative and has in it a collar, *e*, which embraces the rotating journal of the boiler. This end portion of the casing is made of two sets of plates with interposed non-conducting material, similar to the body portion, and fits snugly up to an end-ring, d', on the latter at *y*, where the joint between the rotating and non-rotating parts is situated. At this point the body E is furnished with a circular bearing lip or flange, d^2, which projects to form a rabbet which receives the adjacent margin of the non-rotative end-portion $E^{\times}$. The ring d', is supported by struts, d^3, the bases of which rest on the shell of the boiler. The hot air or gas enters the jacket-space through the end-portion $E^{\times}$, by way of a pipe, H, flows through the jacket-space and escapes through the end-portion E′, of the casing to a breeching, N′, and outlet pipe, H′.

At the end of the apparatus seen at the right in Fig. 1, the end-portion E′ of the casing is continuous with the body-portion E, and of course rotates with the latter. In this end-portion are a number of apertures, *o*, for the escape of the hot gases from the jacket-space into the stationary breeching N′, which fits up snugly to the apertured face of the end-portion E′, inclosing said apertures; said breeching closely embraces the journal B.

In the construction shown the **I**-irons *d* extend roundwise of the casing, like hoops, as stated, but it will readily be understood by any one skilled in the manufacture of such structures how they might be made to extend longitudinally of the casing, the plates *a* and *b* then forming segments of the cylinder.

As it is not important that the joints shall be steam tight, or the casing be able to withstand any notable internal pressure, the plates *a* and *b* may be quite thin, and each plate may extend only part way round the cylindrical casing; or in other words, the plates extending about the casing may each be made up of several segments secured together at their edges.

Having thus described my invention, I claim—

1. The combination with the rotatively mounted boiler having a jacket or casing, the body portion of which is secured to and rotates with the boiler, of the non-rotative end-portion $E^{\times}$, of the casing, fitting closely to the end of the body of the casing, the said casing being provided at its respective ends with an inlet and outlet for said gases, substantially as set forth.

2. The combination with a rotatively mounted boiler having a jacket or casing, the body portion of which is secured to and rotates with the boiler and is provided with apertures *o*, in its end, of the stationary breeching N′, at the end of the casing and inclosing said apertures, said breeching being provided with an outlet for gases, as set forth.

3. The combination with the rotatively mounted boiler A, having hollow journals to provide access for determining the internal pressure, of the casing E, $E^{\times}$, E′, about said boiler, said casing having an inlet for hot gases at one end and an outlet for said gases at the other end, substantially as set forth.

4. The combination with the boiler, of the non-conducting casing E, comprising a series of ring-like, flanged **I**-irons, *d*, an inner series of plates *a*, resting on and secured to the outer faces of the inner flanges on said irons, the outer series of plates *b*, resting on and secured to the outer faces of the outer flanges of said irons, the non-conducting packing material *c*, the flanged end rings d', and the struts d^3, supporting said ring, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CARL WALDEMAR FLODQUIST.

Witnesses:
CARL CICICLE,
CARL TH. SUNDHOLM.