

W. E. WOODBRIDGE.

Processes of Separating Vegetable Fibers.

No. 140,333.

Patented June 24, 1873.

Fig. 1.

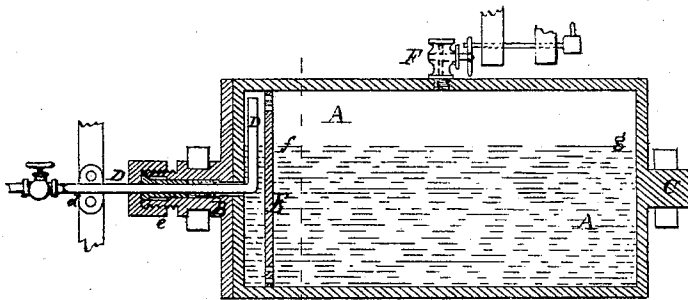


Fig. 2.

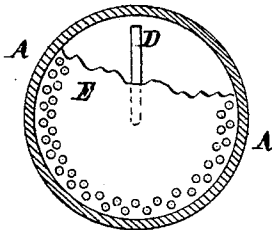
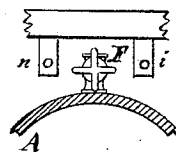


Fig. 3.



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WILLIAM E. WOODBRIDGE, OF LITTLE FALLS, NEW YORK.

IMPROVEMENT IN PROCESSES OF SEPARATING VEGETABLE FIBERS.

Specification forming part of Letters Patent No. **140,333**, dated June 24, 1873; application filed August 14, 1872.

To all whom it may concern:

Be it known that I, WM. E. WOODBRIDGE, of Little Falls, in the county of Herkimer and State of New York, have invented an improvement in the construction and use of revolving heating-drums employed in W. E. Woodbridge's Process for Separating Vegetable Fibers, of which the following is a specification:

The nature of my invention consists in providing such drums, or the rotary boilers commonly employed in paper-mills, with suitable attachments for regulating and controlling the escape of steam therefrom and the admission of alkaline liquors thereto, and in the manner of employing the same in the application of desiccative heat to the fibrous material subjected to the process secured to me by Letters Patent dated 15th day of September, 1863.

In the specification of my patent above mentioned I suggest that it may, in some cases, be desirable to apply the quantity of alkali, chemically sufficient for the separation of the fibers, in a solution more dilute; and, therefore, in larger volume than can be fully absorbed in the pores of the wood or other material under treatment, and that the solution should be concentrated and reduced to the volume which may be absorbed in the presence of the material and within the revolving heating-drum employed in that connection.

In order to apply most advantageously the method thus suggested, which is recommended by simplicity of operation, it becomes necessary that the walls or sides of the heating-drum should, like "rotary bleachers" commonly employed in rag and straw mills, be tight, (which is unnecessary in other methods of applying the before-mentioned process,) and, in order that it may be filled to its utmost working capacity, provision must be made for the escape of steam only from that part of the vessel which is for the time uppermost.

The manner in which this provision may be made I will now describe, reference being had to the accompanying drawings.

Figure 1 represents a longitudinal section of the heating-drum. Fig. 2, a transverse section on *a b*, giving also an interior view. Fig. 3 is a partial transverse section with elevation of escape-cock.

In each figure corresponding parts are indicated by the same letters.

The drum *A A* is mounted and revolves on its journals *B C*. Through the journal *B* is inserted a tube, *D*, large enough to carry off the steam, which tube is turned upward so as nearly to reach the side of the drum, and is open at the end. By attachment to a proper support, as at *d*, this tube is maintained in this position while the drum is in rotation.

An ordinary stuffing-box and packing, as at *e*, or other method of making a tight joint between the tube and the hollow journal may be employed.

It is evident that by this arrangement the drum may be filled with liquid, or commingled liquid and the solids to be acted on, to the height represented by the dotted line *f g* without loss, through this pipe, the mouth of which is constantly above that level, while steam escaping from its surface may pass off freely or under regulated pressure, and be utilized for heating or otherwise in some of the ordinary methods.

In order to protect this tube when the drum is rotating with a charge of chips or similar material, it may be shielded by a perforated disk of metal, *E*, attached, near its margin, to the drum. (In Fig. 2 this disk is represented as partially cut away to show the tube *D*.)

This is not new, nor do I claim it as of my invention; but the following, which is new and is of my invention, is—

Another means of securing the escape of steam only from the space above the rotating contents of the drum or treating-vessel, which is recommended by the facility with which it may be applied to rotary boilers already in use, consists in inserting an escape cock or valve in an aperture in the side of the vessel, as shown at *F*, and providing for its being opened and closed at proper times during the rotation.

The cock may be of the ordinary form, and the opening and closing may be effected by substituting for the ordinary handle four short levers, (see Fig. 3,) attached to the perforated plug of the cock at right angles, and providing stationary pins (supported from the floor above the heating-vessel, or as may otherwise be convenient) so placed, as at *n i*, that before the cock reaches the highest point in its revolution one of them shall be struck by a lever of the cock, giving its plug a quarter rotation,

and throwing open the passage through the cock, and the other pin so placed that when the cock shall have passed the highest point it shall, in similar manner with the first, impart another quarter turn to the plug, closing the cock for the remainder of the revolution of the drum.

It is evident that if but one cock is attached to the heating-drum, and there is no other means of escape, the steam will issue intermittently; but a sufficient number may be attached at proper intervals around the drum to have one, at least, constantly open, if desired.

In order that the operation of the cocks may be suspended and restored when desired, the pins by which they are operated may be arranged to slide in their supports, (in a manner which will be understood by an inspection of the drawing,) so as to be withdrawn from the path of the levers on which they act, or returned to their former position.

The particular form of valve or stop-cock employed in this connection is not essential, and any known form capable of being operated by equivalent means may be substituted.

If the solution of alkali to be concentrated is comparatively weak, it may be necessary to add successive portions as the evaporation progresses. This may be conveniently done by temporarily interrupting the flow of steam through the pipe D, and using it as a channel for the introduction of such an amount of alkaline solution as may be proper. It is obvious, also, that the same pipe may be conveniently used for conveying the original charge of liquor.

The methods of directing the ingress and egress of fluids by means of branching pipes, valves, and other connections, are so well understood and practiced in the arts, as also the methods of applying heat to revolving heating vessels, that no description of such details is necessary here.

In adapting my before-mentioned patented process to the use of the rotary boilers commonly found in paper-mills, it is desirable to economize their capacity as much as may be, on account of their comparatively small size. This leads to filling them so full that, with the ordinary slow rate of rotation, there is but slow interchange of the position of the parts of its solid contents, and this interchange is almost unavailable for the conveyance of heat and its proper distribution. It is, therefore, desirable to retain in the heating-vessel so much of the steam produced during the heating and desiccation of the saturated fibrous material as may be necessary to serve as a distributing vehicle for the heat applied. The amount requisite for this purpose may be estimated at about one pound in weight for every six cubic feet of the capacity of the heating-vessel, which should be filled with saturated steam at the temperature employed in the process, without completely exhausting the moisture capable of being expelled by that

heat from the fibrous material. The amount of water remaining in the vessel at any given time, whether in the form of water or of steam, may be accurately determined, if the original quantity is known, by condensing the escaping steam into water and ascertaining its quantity, as, of course, the latter quantity subtracted from the original will leave the amount yet in the vessel. But no nice determination of this point is necessary. It will be sufficient to determine, by practice, how long the steam may be allowed to escape, under the uniform application of heat, without retarding essentially the period when the proper temperature, measured by one of the thermometric appliances mentioned in my patent before referred to, shall be attained by the inclosed mass.

To a person acquainted with my patented process upon which this improvement is based the foregoing description will have conveyed, it is believed, a sufficiently-distinct knowledge of each part of the invention to enable him to put the same into practical use. It may not be amiss, however, to state concisely the simple routine of operation.

Such a quantity of wood or other material to be operated on is inclosed in the treating-vessel as will nearly fill it. A solution containing an amount of alkali previously determined to be requisite, is also introduced into the same vessel and heat applied to its contents, the whole being put in rotation. If a dilute solution has been used, steam must be allowed to escape until the solution has been reduced to the volume which may be absorbed in the pores of the material. Whether this may have been the original volume of the liquor, or the result of evaporation, the escape of steam is allowed to continue for a further time to be ascertained in the manner already indicated, when the outlets are closed to retain the steam desirable for the distribution of heat, and the contents are brought to the temperature employed in the process. The after management of the fibrous material and the solution obtained from it may be the same as that indicated in the specification of the patent already mentioned. The same method of desiccation and distribution of heat may be employed in vessels not rotated, especially if there is considerable space between the pieces of material operated on, though in some respects not so advantageously.

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

1. The method herein described of securing the escape of steam from the space above the rotating contents of the drum or treating-vessel, by the employment of any suitable number of escape cocks inserted within the drum, and operated substantially in the manner hereinbefore set forth.

2. The modification of my previously-patented process herein described as being adapted to the use of the boilers commonly

found in paper-mills—that is to say, the employment of an alkaline solution and desiccative heat in connection with the retention of so much of the steam produced during the heating and desiccation of the saturated fibrous material as may be desirable to serve as a distributing vehicle for the heat applied,

whether the heating-vessel be rotary or stationary.

WM. E. WOODBRIDGE.

Witnesses:

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