

L. HERZ.
 APPARATUS FOR TREATING WASTE VEGETABLE AND TEXTILE FIBER FOR THE
 MANUFACTURE OF PAPER.

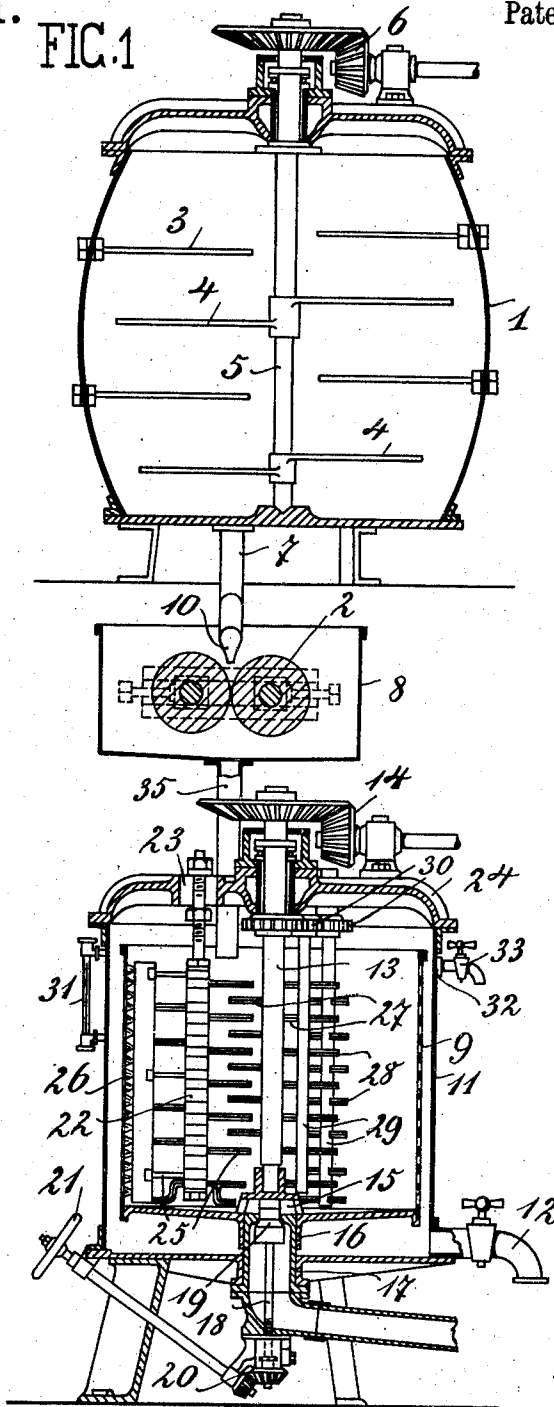
APPLICATION FILED AUG. 4, 1910.

1,039,941.

Patented Oct. 1, 1912.

2 SHEETS-SHEET 1.

FIG. 1



Witnesses:
 M. Schr. id.
 J. Rabinowitz

Inventor
 Ludwig Herz
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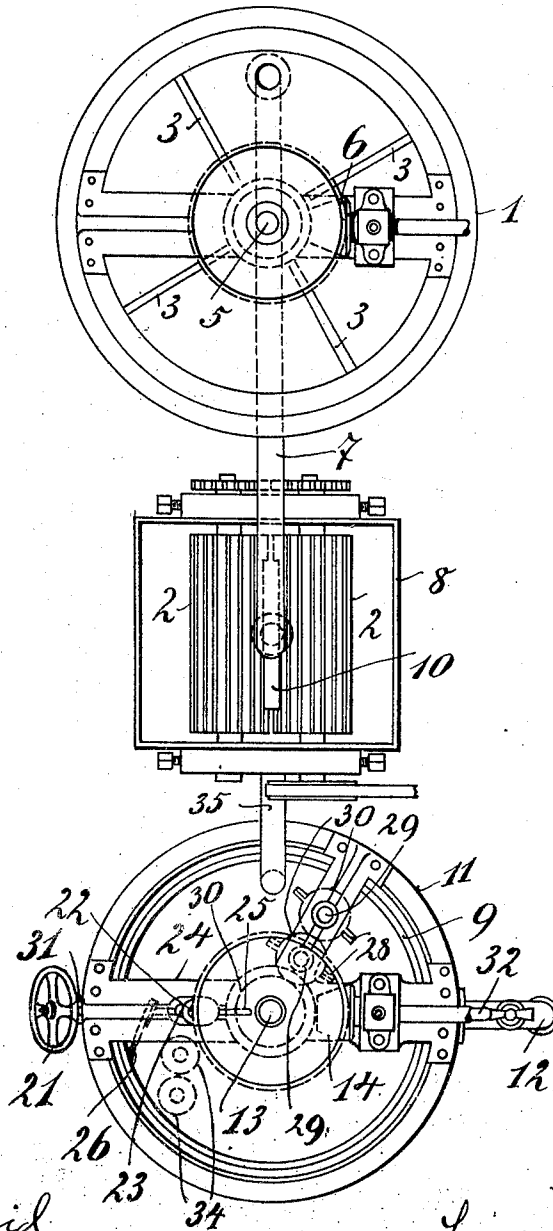
APPLICATION FILED AUG. 4, 1910.

1,039,941.

Patented Oct. 1, 1912.

2 SHEETS-SHEET 2.

FIG. 2



Witnesses:

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UNITED STATES PATENT OFFICE.

LUDWIG HERZ, OF NUREMBERG, GERMANY, ASSIGNOR TO THE FIRM PAPETERIE DE LA SEINE, OF NANTERRE SUR SEINE, FRANCE.

APPARATUS FOR TREATING WASTE VEGETABLE AND TEXTILE FIBER FOR THE MANUFACTURE OF PAPER.

1,039,941.

Specification of Letters Patent.

Patented Oct. 1, 1912.

Application filed August 4, 1910. Serial N 575,516.

To all whom it may concern:

Be it known that I, LUDWIG HERZ, subject of Germany, residing at Nuremberg, Bavaria, Germany, have invented certain new and useful Improvements in Apparatus for Treating Waste Vegetable and Textile Fiber for the Manufacture of Paper; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a process and device, with the help of which vegetable and textile fiber, waste paper and wood can be rapidly and by cold treatment converted into a bleachable paper material.

According to the present invention the material to be treated is first soaked in a receptacle filled with a solution of caustic soda and water and then passed between press rollers into a churn or centrifugal machine. Any larger bodies or fibers remaining in the mass are crushed by the rollers before entering the centrifugal machine; in the latter the mass is then churned by suitable beaters in order to loosen it and gradually washed by the passage of water which removes the soda and all substances not necessary for paper-making. The resulting mass is now ready for further engine or hand treatment and may, if necessary, be bleached in known manner. During the treatment of the mass in the churn or centrifugal machine fresh material is introduced into the soaking receptacle, which will be sufficiently soaked by the time the first lot is churned and washed, so that work can be continued without interruption. If the soaking requires a greater length of time than the churning and washing, it will be advisable to provide two or more soaking receptacles for each churn, so that the work can be continued without interruption. If necessary, the mass may be passed between rollers a second time in the centrifugal machine.

For treatment by the process the following materials are, for instance, suitable: Grass-wrack, forest-hay, reeds, maize and sugar cane, jute, asparagus stalks and all other cheap vegetable substances having a fibrous structure; further, rags and waste paper of any kind and in any condition.

For instance, the rags may be oily or greasy, and the paper may be colored, printed on, or written on.

As soaking solution the following has been found suitable: 8 grams of caustic soda to 1 liter of water to which may be added 0.01 liter of aqua ammonia to prevent a possible crystallization of the soda. Hard and tough materials may be soaked for several hours in this solution. The churning and washing in the centrifugal machine will, however, be accomplished in a much shorter space of time.

It must be mentioned that most of the above-mentioned materials can only be bleached after treatment according to the present invention.

In the soaking receptacle rotating arms for stirring the mass may also be provided, in order to keep the mass in constant movement and to begin the work of disintegration.

Reference being had to the accompanying drawings Figure 1 shows the apparatus for working the process according to the present invention in vertical section; Fig. 2 is a plan view, in which, for the sake of clearness, the soaking receptacle 1, rollers 2 and churn 9, 11 are shown beside each other and not one above the other. In practice, it will obviously be advisable to arrange these parts more or less in vertical alinement.

The soaking receptacle 1 is provided with radial fixed arms 3, between which the arms 4 rotate; these latter are arranged on the axis 5, driven by a conical or other gear. From the soaking receptacle the mass is fed by a pipe 7 to the press rollers 2; said pipe may be arranged either at the side or below the receptacle and is fitted with a suitable closure means, for instance, a plug. The rollers 2 are arranged either above a funnel leading to the churn 9, 11, or in a box 8, having a pipe 35, communicating with the inner rotating cylinder 9 of the centrifugal machine. The rollers 2 may be provided to advantage with adjustable bearings and have a ribbed surface. The pipe 7 is provided with a broad flat nozzle 10, so that the mass is fed onto the rollers in the form of a broad stream.

The cylinder 9 of the churn is rotatable and provided with lateral holes, through which the liquids can pass into the outer

cylinder 11; from the latter they pass off through a cock or valve 12. Cylinder 9 is fixed to an axis 13, rotated by a suitable conical or other gear 14. In the center of the bottom of cylinder 9 is arranged an outlet 15. The hub 16 of the cylinder is arranged to rotate about the valve-box 17. Said outlet 15 can be closed by the valve 19, arranged on the valve-rod 18, and actuated by a gearing 20 and hand-wheel 21.

In the cylinder 9 are arranged several rakes 22, having arms 25 and radially adjustable in the slits 23 of the bearing-supports 24. In the drawing only one such rake is shown. The outer arms of the rake carry a brush 26, touching the sides of the cylinder 9, and arranged at an angle to said sides. The axis 13 is further provided with radial arms 27. If necessary, additional churn shafts 29, provided with arms 28, may be arranged in the cylinder 9, and rotated by a pinion gear 30 connecting with the axis 13.

The outer cylinder 11 is provided with a water-gage glass 31 and an overflow 32, advantageously having a tap or the like 33, so that said overflow can be closed when it is necessary to fill the cylinder to the brim for purposes of cleaning.

The manner of working is as follows: The rotation of the cylinder 9 throws the liquid mass against the sides, where the liquid separates from the mass and passes out through the holes into the outer cylinder 11. At the same time the arms 25 of the rake 22 and if such are provided, the arms 28 of the shafts 29, churn the mass and tear it asunder. The brush 26 removes any substance sticking to the sides of the cylinder and forces it toward the center.

A second set of press-rollers 34 may be arranged vertically inside the cylinder 9, as shown by the dotted lines in Fig. 2. Advantageously these rollers will be placed in the way of the mass scraped off the sides by the brush 26. These rollers will then be connected by gearing with the axis 13, similarly to the shafts 29.

It is obvious that the rake 22 may be given any other desired form. Also, the sides of the cylinder 9 may be provided with large holes or slits and a fine sieve on the inside. Further, the pipe 7 may be provided with a valve and operating gear similar to the cylinder outlet 15.

If desired, the soda contained in the liquid leaving the cylinder may be by suitable treatment again regained.

The material resulting from the process here described is very suitable as an insulating medium, for instance, instead of cork. For this purpose, the mass remaining in the centrifugal machine is taken out, mixed with chromic acid and size and then pressed. A good proportion is: 200 kilograms of the mass, 0.5 kilograms of chemi-

cally pure chromic acid and 4 kilograms of size. It must further be mentioned that this process and apparatus may also be used for cleaning linen or wool waste and the like. For this purpose, the materials to be cleaned are placed in the above-mentioned soaking solution for a suitable period and then washed until all traces of soda are removed. Also here it will be found advisable to soak the material under treatment in one receptacle and then to remove the soda in a second receptacle and to keep the material in constant movement by means of rotating arms in both receptacles.

I claim—

1. In combination with a receptacle for chemically treating waste material, a centrifugal machine for the further treatment of said material, means for conveying material from said receptacle to said centrifugal machine, and rollers for crushing the material arranged in the path of travel of said material before it enters the centrifugal machine.

2. In combination with a receptacle for chemically treating waste material, a pair of rollers arranged beneath said receptacle, a flat nozzle connected with said receptacle and arranged between said pair of rollers whereby the material may pass from said receptacle and between said rollers, a centrifugal machine located beneath said rollers, and means of communication for the material from said rollers to said centrifugal machine.

3. In combination with a receptacle for chemically treating waste material, a pair of engaging rollers arranged beneath said receptacle, a flat nozzle arranged between and slightly above the plane of engagement of said rollers to feed material between said rollers, said nozzle extending nearly the entire length of said rollers, a passage-way connecting said receptacle and said nozzle, a centrifugal machine located beneath said rollers, and means of communication for the material from said rollers to said centrifugal machine.

4. In combination with a receptacle for chemically treating waste material, a tank arranged beneath said receptacle, a pair of engaging rollers arranged in said tank, a flat nozzle arranged between and slightly above the plane of engagement of said rollers to feed material between said rollers, said nozzle extending nearly the entire length of said rollers, a passage-way connecting said receptacle and said nozzle, a centrifugal machine located beneath said tank, and a pipe connecting the bottom of said tank and said centrifugal machine and discharging into the upper part of the latter.

5. In combination with a receptacle for chemically treating waste material, a pair of engaging rollers arranged beneath said re-

ceptacle, a flat nozzle arranged between and slightly above the plane of engagement of said rollers to feed material between said rollers, said nozzle extending nearly the entire length of said rollers, a passageway connecting said receptacle and said nozzle, and a centrifugal machine located beneath said rollers comprising an outer casing, an inner casing having perforated walls, means for rotating said inner casing, a rake depending within said inner casing and a member carrying a plurality of brushes fixed to said rake said brushes contacting with the walls of the said inner casing, and means of communication for the material from said rollers to said centrifugal machine.

6. In combination with a receptacle for chemically treating waste material, a pair of rollers arranged beneath said receptacle, a flat nozzle connected with said receptacle and arranged between said pair of rollers whereby the material may pass from said

receptacle and between said rollers, a centrifugal machine located beneath said rollers comprising an outer casing, an inner casing having perforated walls, a frame located above said casings, a central shaft for rotating said inner casing, said central shaft being provided with teeth, a churning member arranged within said inner casing and operated from said central shaft, a rake depending within said inner casing, and a member carrying a plurality of brushes fixed to said rake said brushes contacting with the walls of the said inner casing, and means of communication for the material from said rollers to said centrifugal machine.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

LUDWIG HERZ.

Witnesses:

OSCAR BOCK,
HERMANN DOEHLEMANN.