(No Model.)

T. E. SCHIEFNER.

PROCESS OF AND APPARATUS FOR DISSOLVING AND REMOVING THE GUM FROM NETTLE AND OTHER PLANT FIBERS.

No. 353,468. Patented Nov. 30, 1886.

FIG. 2.

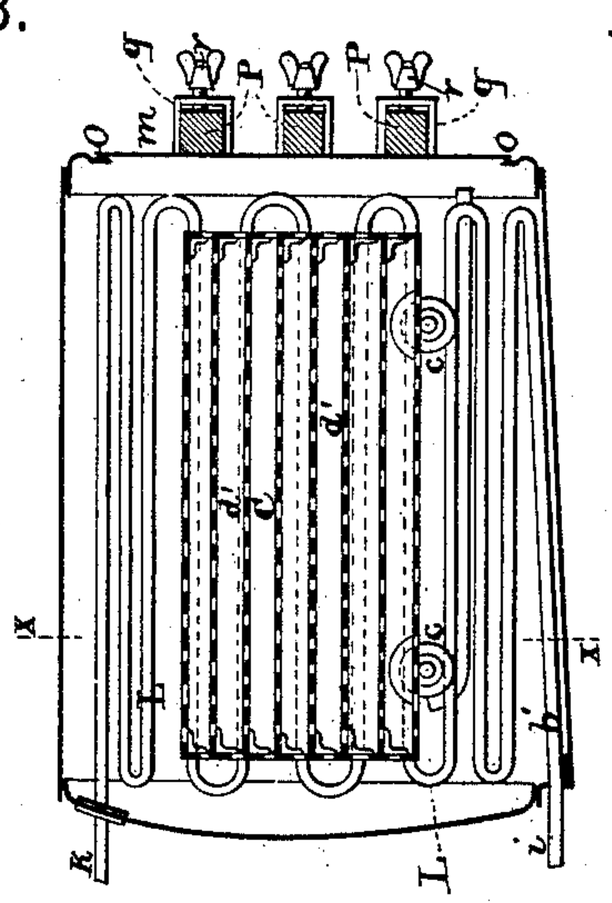

FIG. 4.

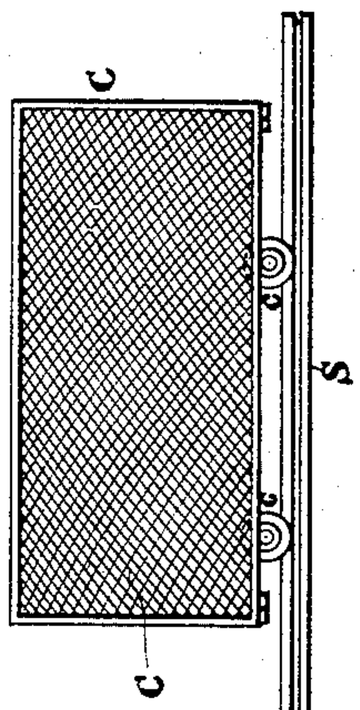

FIG. 5.

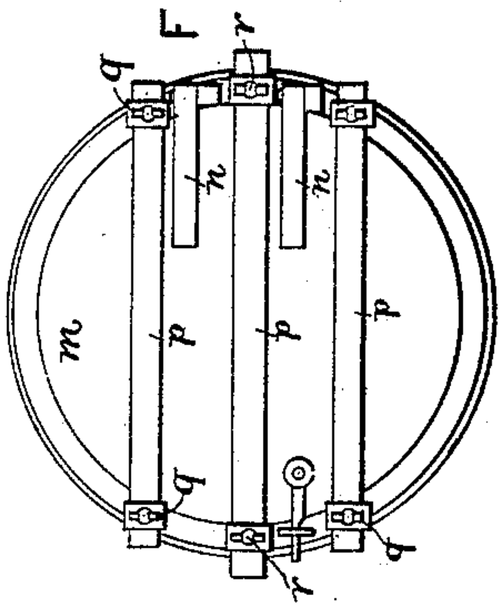

FIG. 3.

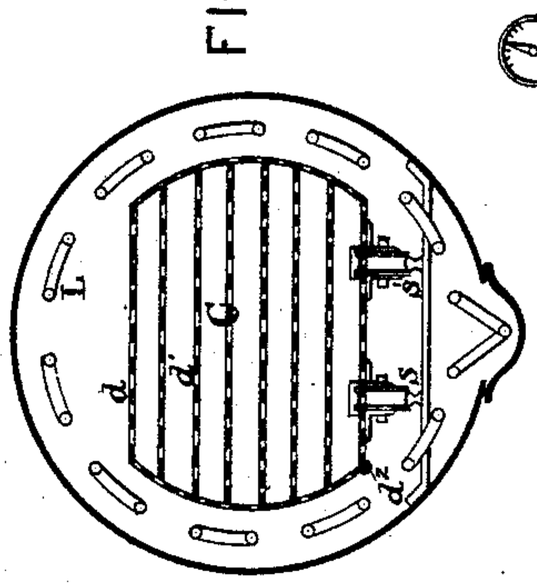

FIG. 1.

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PROCESS OF AND APPARATUS FOR DISSOLVING AND REMOVING THE GUM FROM NETTLE AND OTHER PLANT FIBERS.

SPECIFICATION forming part of Letters Patent No. 353,468, dated November 30, 1886.

Application filed February 20, 1886. Serial No. 192,618. (No model.) Patented in France December 12, 1885, No. 172,882.

To all whom it may concern:

Be it known that I, THÉODORE EUGÈNE SCHIEFNER, director of a spinnery at Essonnes, Department of Seine-et-Oise, France, have invented a certain new and useful improvement in dissolving and removing the gum from nettles (china-grass) and from other plant-fibers used in the textile industry in order to make these fibers fit for bleaching and fine spinning; (for which I have obtained Letters Patent of France, for fifteen years, dated December 12, 1885, No. 172,882;) and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings.

This invention relates to an apparatus and a process for dissolving and removing the gum from the nettles and from other plant-fibers used in the textile industry, in order to make these fibers fit for bleaching and fine spinning, and has for its object to obviate altogether the numerous inconveniences of the apparatus and methods employed hitherto for this purpose.

The nettle known under the name of "china-grass," (ramie,) when freed from its ligneous elements, contains not only much gum and dust-particles, but is generally not sufficiently decomposed to be advantageously carded and spun. This nettle, freed from its ligneous elements, wants further wholly the requisite luster and softness as well as the bleaching, which latter operation with the nettle is effected most advantageously before being spun. All means hitherto employed for that purpose have proved to be tiresome and expensive. They require too much manipulation and hand-work, washings, and repackings, whereby the fibers are entagled and felted, undergoing thus quantitative and qualitative losses; and, moreover, they are treated unproportionately—that is, they are unequally acted upon by the solution, so that there is a more or less insufficient decomposition of the fibers, and consequently a material of less value. By the new or improved process and apparatus all the said inconveniences are obviated. The fibers are treated with a proportionate action of the vapors and solutions, and all entanglement and felting of the fibers, as well as the repacking of this material, are avoided by leaving the same during the whole operation in the same undisturbed position. This apparatus, moreover, permits a rapid action, at a high temperature, of the vapors and solutions, which is absolutely necessary for the treatment of this material, (china-grass, or ramie,) whereby it is made possible to perform all necessary chemical operations in about six to eight hours, with an absolute assurance of an equal action and a good result, and without removing the material from its place. With the apparatuses and methods hitherto used, the working and finishing of five hundred kilograms of fibers would require five workmen during one day. By the new system only one workman would be required for the same quantity of material and for the same time.

It may further be observed that by the continual circulation of the chemical substances which are used in this process, and are returned again and again, any loss of the same is avoided, as well as the inconvenience of a disproportioned division of the fibers; also the material of the fibers is protected against felting and loss, the material being lodged loosely and in convenient proportions, and remaining undisturbed on its place during the whole chemical treatment.

On the annexed drawings, Figure 1 is a view of the whole apparatus; Fig. 2, a longitudinal section of the apparatus B; Fig. 3, a transverse section on X X of Fig. 2; Fig. 4, a view of the carriage for receiving the fibers; Fig. 5, a front view of the door.

The apparatus in its entirety consists of a reservoir, A, Fig. 1, for producing the vapors and appropriate solutions, a reservoir or apparatus, B, Figs. 1, 2, 3, 4, serving for the action of the vapors and solutions upon the fibers, and a particularly-constructed carriage C, Fig. 4, running on rails, which carriage serves to receive and to hold the fibers, and to be inclosed with them in the apparatus B during the whole chemical treatment, Figs. 2 and 3. The reservoir A, made of wrought-iron, and, preferably, round-shaped, is provided with a steam-tight man-hole, a steam-gage, *x*, a steam-conduit, *g*, outlet-cock *y*, and

an upper water-conduit, *h*, and, further, with a circulation-pipe, *i*, and a connection-socket, *k*, provided with cock *k'*. The interior surfaces of reservoir A are strongly galvanized, and the whole reservoir A is tested under a steam-pressure of five atmospheres. The whole reservoir A reposes on a base of stone, *z*.

The apparatus B is an oval horizontal reservoir made of strong wrought-iron and tested under a steam-pressure of five atmospheres. Its interior surfaces are also galvanized. In this apparatus B are disposed, in connection with the connection-pipe *k*, a range of copper pipes, L, placed at a distance of about ten centimeters from the walls of the reservoir, each pipe being 1,400^{mm} long and of a diameter of 50^{mm}, all pipe ends joining together, Figs. 1, 2, 3. The end pipe runs into the water-collecting trough *b'*, and is connected with the circulation-pipe *i*, which, by means of the pressure in B, brings again up to the reservoir A the vapors or solutions. The copper pipes L in the apparatus B are provided on that side which is turned exactly toward the center of the apparatus B with holes of about 1.5^{mm} diameter, these holes being placed so near to each other that a single pipe is provided with about three hundred and fifty of such holes. Through all these holes the vapors and solutions are conducted exactly to the center of the apparatus B.

The apparatus B is provided with a door, *m*, which is suspended on the hinges or pivots *n*. The space at the edge of the door is packed with india-rubber, and by means of the bars *p*, inserted into the clamps *q*, which are forged to the apparatus, the door may be solidly and tightly closed. In order to press the bars close to the door, and this latter firmly into the india-rubber packing, screws *r* are tapped through the clamps and bear at the ends against the bars. Inside the tank B are rails S', and outside there are rails S in line therewith. To allow the carriage C to run from one to the other, a short length, S^2, of movable track is interposed.

On top the apparatus B is provided with a steam-gage, *t*, a safety-valve, *u*, and an outlet-cock, *v*, and at the bottom of the apparatus with the outlet-cock *w*.

The carriage C, serving for the reception of the fibers, runs upon four wheels, and is provided with six movable compartments or hurdles, *d*, made of galvanized iron-wire work. These compartments or hurdles are filled with fibrous material, then inserted into the carriage and retained in place therein by the supports *d' d'*, Figs. 2, 3, 4. The opening of the carriage is effected at the side, as its form is an oval one, Fig. 3. This lateral opening by the side wall, which is movable around hinge *d*^{2}, permits a ready insertion of the compartments or hurdles *d*, and facilitates the filling of the same with fibers. The carriage being filled, it is pushed into the apparatus, the movable piece of rail S^2 is taken away, and the door closed. Now commences the chemical treatment and the working of the apparatus, as hereinafter described. The vapors and solutions are formed in the reservoir A after closing the cocks *k* and *y*.

The preparation of the solutions and liquids is effected in a cement reservoir, and by means of a pump they are conducted through the pipe *h* into the reservoir A. Then steam is let in by pipe *g*, after opening the cock *g'*, and then the vapors and solutions are conveniently produced in reservoir A. Thereupon cock *k* is opened, the vapors and solutions enter by communication socket *k* into the pipes L, and by the central range of holes they are delivered upon the fibers. The latter then are worked and penetrated by the vapors and solutions, which finally run down to the water-collecting trough *b'*. If the chemical agents are solutions or vapors, they go by virtue of the pressure existing in the reservoir B out of the trough *b'*, and passing through the circulation-pipe *i* they arrive back into the reservoir A, and then may recommence their circulation. The fibers are thus worked during two to three hours under a pressure up to three to four atmospheres. Then, according to necessity or convenience, the substance of the solutions or vapors may be modified by letting out through cocks *y* and *w* those that are wasted or being restored by additions of other substances, they are in combination with the same used again.

I claim—

1. The continuous process of dissolving and removing the gum from the nettle or china-grass and other plant fibers, in order to divide the fibers to give them a silky appearance and to fit them for bleaching and fine spinning, the said process consisting in conducting the appropriate chemical agents—such as solutions and vapors, separate or mixed—from a reservoir into an apparatus containing the plant fibers, and there causing them to act upon said fibers, and then returning said agents to the reservoir for a new circulation, the strength of the solutions or vapors being restored or their composition modified from time to time as occasion may require, and the plant fibers remaining undisturbed in the apparatus, so that entanglement and felting of the fibers and the sources of loss in general are avoided, substantially as described.

2. The apparatus for treating nettle or china-grass and other plant fibers to dissolve and remove the gum, as specified, the said apparatus consisting of the reservoir for the chemical agents, the apparatus for containing the fibers, the carriage provided with perforated or wire net-work hurdles or compartments for supporting the fibers, and the pipes for conducting the agents from the reservoir into the apparatus and delivering the same upon the fibers therein, and for then returning the same into the reservoir for a new circulation, substantially as described.

3. The reservoir provided with steam-pipe

and water-pipe, in combination with the apparatus for containing the material to be treated, provided with pipes at top and bottom, respectively, the perforated serpentine pipes in said apparatus, the pipes for conducting the chemical agents from the reservoir and returning them into the same, and the carriage provided with perforated hurdles or compartments for supporting the fibers in the said apparatus, substantially as described.

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Witnesses:
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