H. JAKOB.

WASHING DEVICE FOR GUNCOTTON AND SIMILAR PRODUCTS.

APPLICATION FILED APR. 1, 1916.

**1,211,450.**

Patented Jan. 9, 1917.

*Fig. 1.*

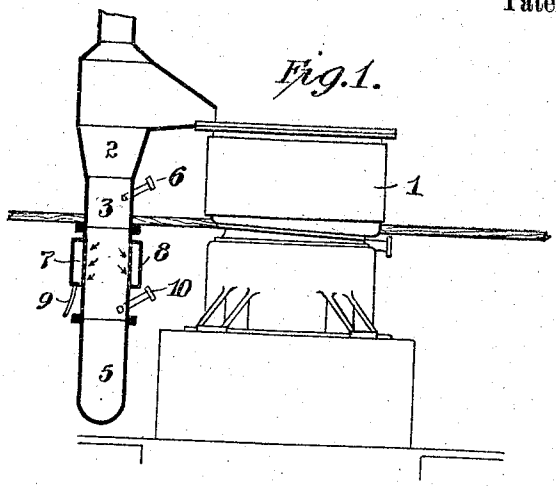



*Fig. 2.*

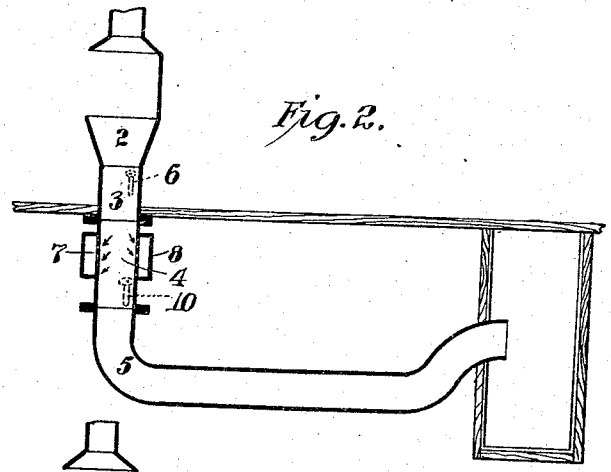
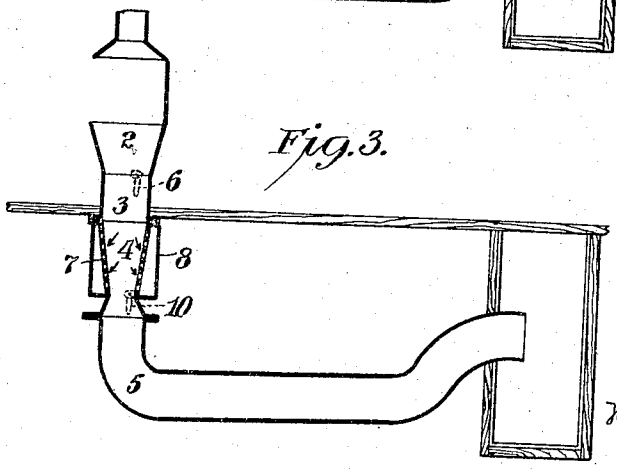



*Fig. 3.*




WITNESSES:

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BY

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# UNITED STATES PATENT OFFICE.

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## WASHING DEVICE FOR GUNCOTTON AND SIMILAR PRODUCTS.

1,211,450. Specification of Letters Patent. Patented Jan. 9, 1917.

Application filed April 1, 1916. Serial No. 88,421.

*To all whom it may concern:*

Be it known that I, HANS JAKOB, a subject of the German Emperor, and a resident of Ebenhausen, in the Kingdom of Bavaria, Empire of Germany, have invented certain new and useful Improvements in Washing Devices for Guncotton and Similar Products, of which the following is a specification.

In the manufacture of gun-cotton, not only removing from the product the nitric acid or mixed acid employed in the nitrating phase is of importance, but also the recovery of the one or the other of the valuable acids. There are processes known which relate to the recovery of the acid from the washing waters, for instance, by enriching the latter with acid by using the same water a plurality of times, and by then recovering from the thus acidulated water highly concentrated nitric acid by well known methods as soon as a certain strength of acid has been reached. As these processes prove profitable only with a certain definite strength of acid in the washing water, a preliminary strong enriching of the acid is indispensable.

Since now in the ordinary washing operation, in which one and the same quantity of water is employed for freeing the nitrated product from the acid, as well as for continuing the conveyance of said product, the water takes up, as a matter of course, the main part of the acid during the acid-removing phase which commences immediately after the material has been thrown into the water, and the added water necessary for continuing the conveyance of the material causes a dilution there results from such a procedure washing waters with but a small percentage of acid that are not suited for further treatment for the purpose stated.

According to the present invention this drawback is obviated by introducing the water at two places and discharging and collecting separately that amount of water, which first has come into contact with the nitrated product thrown into the apparatus, whereas the other amount of water which acts upon the product at another place effects the further conveyance of the same and is finally discharged together with the same into the final purifiers. The first amount of water, *i. e.* that employed for freeing the product from the nitric acid, contains such a quantity of the acid that its further treatment is rendered profitable, the reason being, that it has been separately discharged prior to its getting mixed with the second amount, as already stated.

In order to make my invention clearer, I refer to the accompanying drawing, in which:

Figure 1 is a vertical section through one form of construction of my improved apparatus; Fig. 2 is another vertical section through the same, this section being taken at right angles to that of Fig. 1; and Fig. 3 is a section similar to Fig. 2, but showing a slightly modified form of construction.

Referring to Fig. 1, the gun-cotton is conveyed from the nitrating vessel 1 to the hopper 2 which is in communication with the watering tube 5, the communication being effected by a non-perforated intermediate piece 3 and a perforated intermediate piece 4. The piece 3 is connected with a water pipe 6, the arrangement at the place of connection being preferably such that the water enters the tube 3 tangentially and in a downward direction so as to circulate quickly within said tube, as well as within the tube 4 and the tube 5. The guncotton which generally is introduced in lumps is thereby divided, being compelled to join in the whirling movement of the water, as well as in the various speeds in this movement, whereby the lumps are broken up and subdivided as necessary for the process.

In the form of construction shown in Figs. 1 and 2, the tube 4 has a perforated portion 7 which is surrounded by a casing 8 extending downward somewhat below the perforations so that a circular gutter or channel is formed in the lower end of said casing; at this gutter or channel commences a pipe 9 and below the casing 8 there is connected with tube 4 a pipe 10, the arrangement of which is similar to that of the pipe 6, viz. tangentially and in downward direction, as shown in the Figs. 1 and 2.

The manner of operation of this form of construction of my improved apparatus is

as follows: The water entering the tube 3 through the pipe 6 flows within and through the same downward in a substantially spiral path, forming, however, first a kind of funnel or hopper which receives the gun-cotton to be treated. Owing to the centrifugal force of the circulating water, the gun-cotton is thrown outward to and against the inner wall first of the tube 3 and then of the tube 4, and at the same time the gun-cotton is subdivided and freed from its acid. The washing water that has taken up, and is mixed with, the acid, and has thus become strongly acidulated, passes through the perforated wall 7 into the casing 8 and flows away through the pipe 9 for the recovery of the nitric acid. As the lower part of the casing 8 has no perforations at its inner wall, but forms a gutter or channel, as already stated, the acidulated water entering the lower end of the casing 8 cannot reënter the tube 4 but is conducted off through the pipe 9.

In the form of construction represented in Fig. 3, the perforated portion 7 of the second intermediate tube 4 is not cylindrical, but conical, the perforated portion forming an inverted truncated cone, as shown. Owing to this change, a larger quantity of the water coming from above flows away through the cone 7 (and, of course, also through the outlet pipe not represented in this figure).

The parts 3 and 4 need not be made in two pieces but may consist of one piece, and instead of but one pipe 9 (Fig. 1), a plurality of such pipes may be made use of. All parts of the device, the main parts as well as the additional ones, must consist of pottery, and one of the devices thus constructed may be employed for a plurality of nitrating apparatus.

Although it is, indeed, very advantageous for the purpose in view to make the washing water enter tangentially, as described, because this facilitates the exit of the acid-containing water from the tube 4, *i. e.* into the casing 8, as the water is automatically caused to circulate, as described, still, it appears possible, especially in connection with the form of construction shown in Fig. 3, to let the water enter through the pipe 6 in a radial direction, and the same applies to the pipe 10; particularly in such a case, two or more of one or the other of the pipes in question (*i. e.* 6 or 10, or 6 and 10) may be employed.

Having now described my invention, what I desire to secure by a patent of the United States is:

1. In a washing device for gun-cotton and similar products, the combination, with the conveying passage for the material to be treated, of two water supplies situated one after the other with respect to the conveying direction of said material, and a drainage place located between said two places of supply, substantially as described.

2. In a washing device for gun-cotton and similar products, the combination, with the conveying passage for the material to be treated, of two water supplies situated one after the other with respect to the conveying direction of said material; a chamber provided between said two supplies, and a drainage pipe communicating with said chamber, substantially as described.

3. In a washing device for gun-cotton and similar products, the combination, with the conveying tube for the material to be treated, of two water supply pipes terminating into said tube one after the other with respect to the direction of conveyance of said material; a chamber provided between said two water supply pipes; a perforated wall located within said chamber and forming part of the conveying passage, and a drainage pipe commencing at said chamber outside of said perforated wall, substantially as described.

4. In a washing device for gun-cotton and similar products, the combination, with the conveying tube for the material to be treated, of two water supply pipes terminating tangentially in said tube one after the other with respect to the direction of conveyance of said material, and a drainage pipe commencing at the said tube between said two water supply pipes, substantially as described.

5. In a washing device for gun-cotton and similar products, the combination, with the conveying tube for the material to be treated, of two water supply pipes terminating tangentially and in an oblique direction downward in said tube one after the other with respect to the direction of conveyance of said material, and a drainage pipe commencing at the said tube between said two water supply pipes, substantially as described.

6. In a washing device for gun-cotton and similar products, the combination, with the conveying passage for the material to be treated, of a water supply pipe terminating tangentially in said passage; a drainage pipe communicating with the passage at a place beyond said supply pipe with respect to the direction of conveyance of said material; and another water supply pipe terminating beyond said drainage pipe, substantially as described.

7. In a washing device for gun-cotton and similar products, the combination, with the conveying passage for the material to be treated, of a water supply pipe terminating tangentially in said passage; a chamber provided between said two water supply pipes;

a perforated wall located within said chamber and forming part of the conveying passage; a drainage pipe commencing at said chamber outside of said perforated wall; and another water supply pipe terminating in the said passage below the said chamber, substantially as described.

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

HANS JAKOB.

Witnesses:
FRITZ VENNER,
HCH. HOFFMANN.