

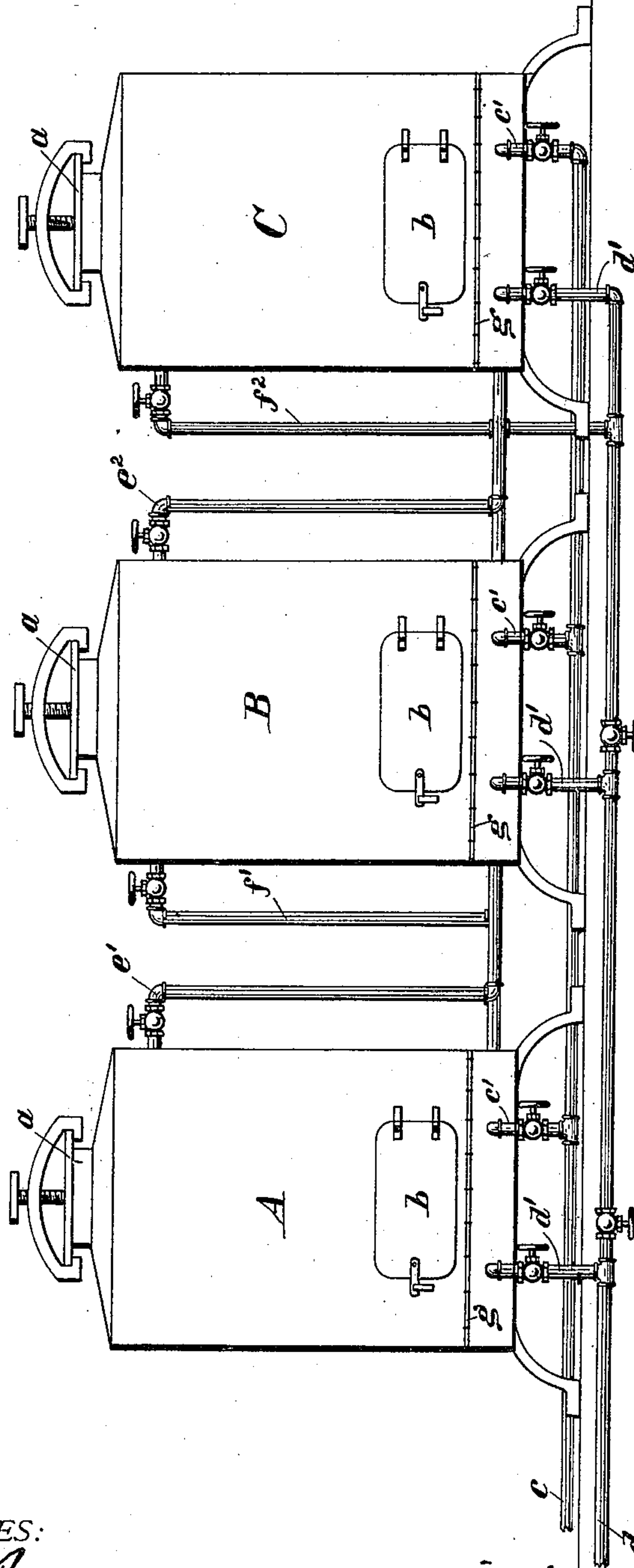
(No Model.)

W. L. DUDLEY & N. W. PERRY.

## REMOVING FIBER FROM COTTON SEED.

No. 344,951.

Patented July 6, 1886.



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# UNITED STATES PATENT OFFICE.

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## REMOVING FIBER FROM COTTON-SEED.

SPECIFICATION forming part of Letters Patent No. 344,951, dated July 6, 1886.

Application filed April 24, 1885. Serial No. 163,355. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM L. DUDLEY and NELSON W. PERRY, citizens of the United States, residing at Covington, Kentucky, and Cincinnati, Ohio, respectively, have invented new and useful Improvements in Processes for Removing the Fiber from Cotton and other Seeds, of which the following is a specification.

Our invention relates to an improved process for separating the residual fibrous material attached to and covering certain seeds—such as cotton-seed—after the operations of “ginning” and “linting.” Cotton-seed, as is well known, after the separation of the cotton fiber in the processes of ginning and linting, nevertheless remains covered with a residual covering of fiber, completely enveloping the hull, which for many reasons, not only relating to the shipment and transportation of cotton-seeds, but also to the subsequent manipulations of the seeds in the arts, particularly in the extraction of its oil and the operations connected therewith, it is desirable to remove. Many attempts have heretofore been made to effect this removal, but without satisfactory results, chiefly on account of the expense attending the same. Among these the treatment of the seed by mechanical appliances and manipulations has practically proved a failure, it being almost impossible to remove the fiber thoroughly by any known mechanical means without a practical destruction of the seed. As a substitute for these mechanical operations, cotton-seed in this condition has more recently been subjected to the action of sulphuric acid in solution; but the great expense of its treatment in this manner, and the destructive effects of the acids employed upon the apparatus, besides the excessive cost and size of the apparatus necessary to conduct operations upon a commercial scale, have prevented the successful introduction of the process.

The object of our invention is to meet these difficulties and furnish a process by which the fiber can be removed successfully, expeditiously, and economically upon a commercial scale to any desired extent, and, by rendering

the process continuous, with apparatus of great simplicity and comparatively little cost.

The essential principle of our invention consists, therefore, in subjecting seed in the described condition to the action of gases or vapors having a chemical reaction, in such manner and under such conditions that a corrosive or destructive agent is formed in or in connection with the fiber itself, to such an extent as will permit its ready removal by simple mechanical appliances and operations. While many such gases well known to chemists might be used for this purpose, and the form of the apparatus is not material, yet practical experience has led us to prefer certain of these, and a certain mode of treatment, by which the desired result is produced in the most practicable and economical manner.

The following description will indicate the nature and details of the process: The cotton-seed, after the ginning and linting processes, usually contains in the enveloping fiber sufficient moisture to render further moistening unnecessary; but in case the same should be dry a preliminary moistening will be necessary, which may be accomplished by means of a steam-jet, water-spray, or any other convenient means, in order to thoroughly dampen or moisten the fiber, and the seed is then dumped into a suitable tank or receiving-vessel, which may be of wood or metal, preferably coated with asphaltum or paraffine, of any convenient form or size, preferably having a false bottom perforated for the passage of the gases, as hereinafter described. Chlorine gas, for example, may be then admitted to the vessel and allowed to displace the air contained in and about the fiber, and after being permitted to remain in contact a sufficient length of time to thoroughly permeate and be dissolved by the moisture present sulphur dioxide or sulphurous-acid gas is introduced, and is allowed to displace the unabsorbed chlorine, and this gas is allowed to remain until hydrochloric and sulphuric acids are formed and held in solution by the moisture; or nitrogen trioxide may be used instead of the chlorine, which, combining with the sulphur dioxide,



produces sulphuric and nitric acids, nitrous acid, and nitrogen dioxide. The order for the admission of the gases is not material; but that mentioned has been found the most effective. In either case, as will be readily understood, the moisture contained in and about the fiber absorbs a portion of the gas first introduced, with which in such solution the succeeding gas readily combines, the chemical product still remaining in solution in and upon the fiber. In the same manner ozone or nascent oxygen may be combined with the sulphur dioxide, forming a sulphur trioxide, which with the moisture forms sulphuric acid, the only objection being that of expense. After thus treating with gases, a sufficient time being allowed for the proper action of the resulting destructive agent upon the fiber, which is most effective at the root or junction of the fiber with the shell of the seed, the contents of the tank are dumped and, if necessary, suitably dried, and run into revolving screens, or otherwise mechanically treated, by which the partially-decomposed fiber is readily removed by attrition. By employing a tank or containing-vessel having two or more connecting-divisions and suitable means for passing the contents of one into another the process may be carried on continuously. Many well-known forms of apparatus for subjecting material of this nature to continuous treatment may be employed. Should any acid remain upon the seed, it may be neutralized and removed by moistening with a suitable alkaline solution.

A preferred form of apparatus devised by us for carrying out the above-described process is illustrated in the drawing constituting a part of this specification, a description of which, with the mode of operation, is as follows:

The drawing represents in vertical elevation three cylindrical tanks, A, B, and C, of metal suitably prepared to resist the corrosive acids, which are provided with man-holes *a* at the top, for charging with the seed, and with doors *b* at the bottom, for removing the seed when treated. Each tank contains a false perforated bottom, *g*, upon which the seed rests, leaving a chamber below, into which the gases are admitted, as hereinafter described. Each tank communicates with the next by pipes *e'* and *e''*, extending from near the top of the first to the space beneath the perforated false bottom of the second, and similarly from the second to the third; and similar pipes, *f'* and *f''*, connect the tanks reversely—that is, from near the top of the second to the lower space of the first, and similarly from the third to the second. A pipe, *c*, is provided to conduct the chlorine gas from the place of its manufacture, and deliver the same by the branch pipes *c'* to the lower spaces of the tanks successively. A similar pipe, *d*, conducts the combining gas (as sulphur dioxide) and delivers the same into

the tanks by branch pipes *d'*. Suitable stop-valves are provided with each of these pipe-connections, to regulate the flow as may be desired. Supposing, now, the three tanks to be charged with seed suitably moistened, the chlorine is admitted by the pipe *c* and its branch *c'* into the tank A, and allowed to flow in until the contained air is displaced, which may be ascertained by the escape of gas at the top of the tank, for which purpose a suitably-governed aperture may be provided. The escape of the gas may be readily distinguished by color or odor, or by any of the well-known tests. When sufficient gas has thus passed in to fill the tank, the combining gas is admitted by the pipe *d* and its branch *d'* and allowed to displace the chlorine, which passes over by the connecting-pipe *e'* into the tank B, any deficiency being supplied directly by the pipe *c* and its branch *c'* into the tank B. The combination of the gases is practically immediate, and involves no delay beyond the time required to fill the tank with the gases successively. The time required for treatment with each gas is only such as required in filling the tank, and depends, naturally, upon the facilities for supplying the gas. In our practice about fifteen minutes are required to each ton of seed for each gas; but with better facilities for supplying the gases this period can be reduced. No special conditions of temperature are required, as ordinary atmospheric temperatures are practicable throughout. When the desired combination has taken place in the tank A, the connections are closed and the tank emptied and filled for the repetition of the process. The chlorine already in tank B may be, by the admission of the combining gas to that tank, driven back into the tank A; or it may be driven into the third tank, C, and so on through any number of tanks provided in series. In the case illustrated the residual chlorine may be returned from the tank C by means of a pipe, *f''*, and a connection, *f''*, and thence through pipe *d* back to the tank A; but in general the more convenient arrangement is to use but two tanks in series operating alternately in the manner indicated. In using the gases in this manner it will be found desirable to employ with them an admixture of air, the proportion being soon ascertained by trial, depending largely upon the condition of the seed and other local circumstances.

The above description, together with the illustration, is sufficient for the explanation of the process, and includes the main features of the apparatus, which we design making the subject of a separate application for Letters Patent, and therefore do not deem it necessary to describe the same in further detail.

We claim as our invention and desire to secure by Letters Patent of the United States—

1. The process of removing the fibrous envelope of cotton and other seeds, consisting in subjecting the seed in a suitably-moist condi-



tion to the successive action of combining gases, whereby a compound chemically destructive of the fiber is formed in the same.

2. A process of treating cotton-seed for the  
5 removal of its residual fibrous envelope, consisting in subjecting the seed to the action of chlorine or nitrogen trioxide, and then to the action of sulphur dioxide, and afterward removing the partially-decomposed fiber by me-  
10 chanical attrition, substantially as set forth.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

WILLIAM L. DUDLEY.  
NELSON W. PERRY.

Witnesses:

G. M. CASSATT,  
ABRAM MAY.