

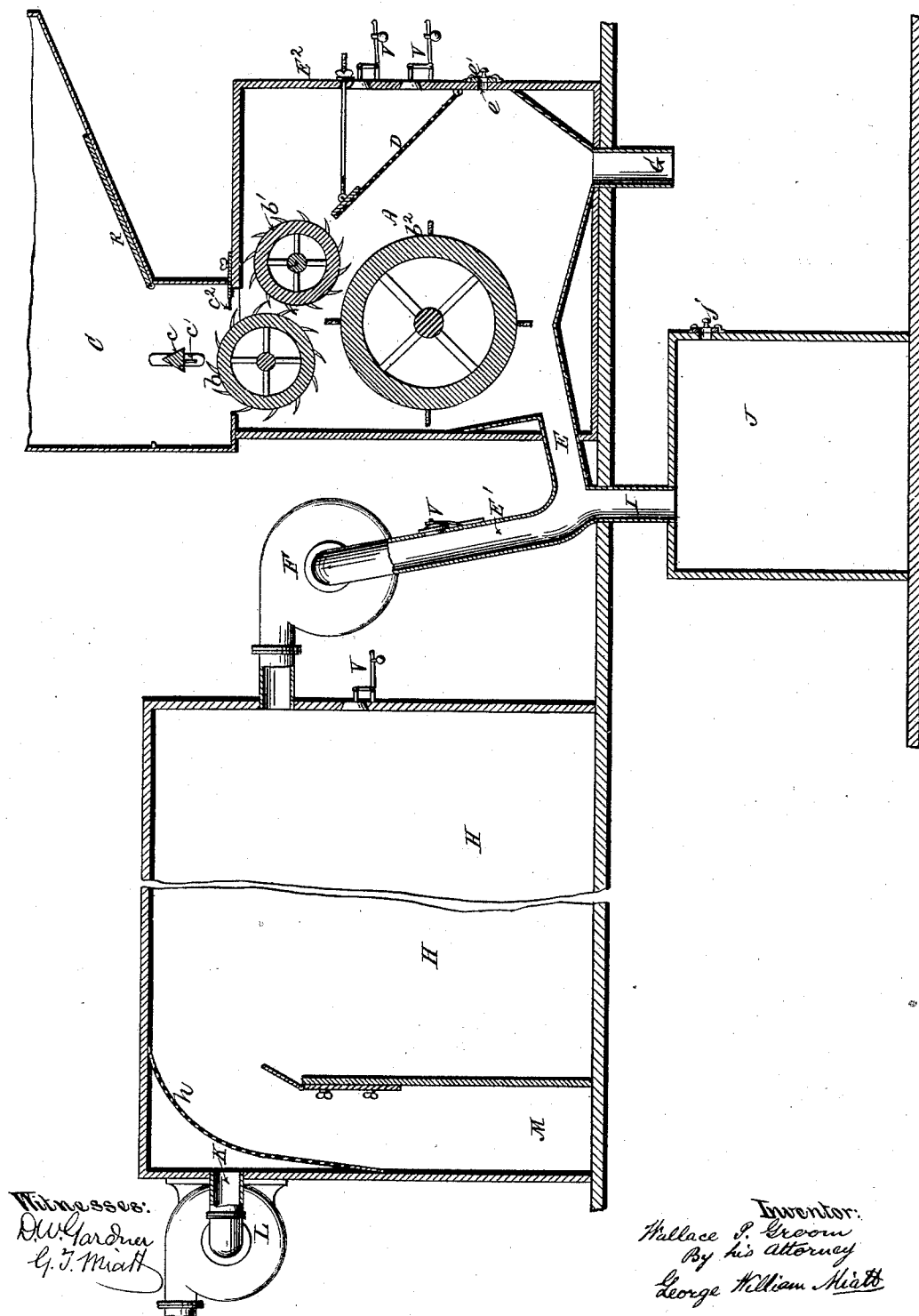
(No Model.)

W. P. GROOM.

APPARATUS FOR AND PROCESS OF CLEANING SEED COTTON.

No. 469,560.

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UNITED STATES PATENT OFFICE.

WALLACE P. GROOM, OF BROOKLYN, NEW YORK.

APPARATUS FOR AND PROCESS OF CLEANING SEED-COTTON.

SPECIFICATION forming part of Letters Patent No. 469,560, dated February 23, 1892.

Application filed June 1, 1891. Serial No. 394,690. (No model.)

To all whom it may concern:

Be it known that I, WALLACE P. GROOM, a citizen of the United States, residing in the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Apparatus for and Processes of Cleaning Seed-Cotton, of which the following is a description sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My invention relates to the treatment of seed-cotton as received from the "planter" or producer, and is designed to cleanse and purify the same by removing it from hulls, (or bolls,) twigs, leaf, sand, and other foreign matter with which it may be contaminated. Heretofore this has been only imperfectly accomplished by machines which agitate and beat the seed-cotton under the conditions of ordinary atmospheric pressure.

The distinguishing feature of my invention consists in passing loosened-up seed-cotton through a chamber from which the air is exhausted sufficiently to reduce the pressure or tension therein below that of the atmosphere and in carrying off the seed-cotton from said chamber and away from the heavy impurities by means of a current or currents of air admitted to the chamber in such manner as to lift and separate the lighter material from the heavier. In carrying out this feature of my invention the seed-cotton may be loosened up and whipped directly within the exhaust-chamber, or it may be transferred to the said chamber from an independent opener or beater. I prefer, however, to open and whip the seed-cotton in the exhaust-chamber under the conditions of partial vacuum maintained therein, and although this is a secondary or incidental feature of my invention it is important in practice, as it enables me to handle and control the material and process more satisfactorily and economically.

Another feature of my invention consists in connecting with the eduction - passage, through which the seed-cotton is drawn off from the exhaust-chamber, an inclosed pocket or drop-flue, through which air is admitted to the main passage. The air thus admitted is not sufficient in quantity to impair the required degree of vacuum, but sufficient to

create a current that will raise and float away seed-cotton from impurities which pass over with the seed-cotton from the exhaust-chamber.

Still another feature of my invention consists in introducing the seed-cotton from the exhaust-chamber into a settling-chamber, from which the lighter impurities and impalpable dust are separated from the seed-cotton and carried off.

In carrying out my improved process the apparatus employed is of secondary importance, although there are certain essential mechanical features which form a part of my invention, as hereinafter described and claimed. I do not, however, confine myself to the identical form and construction of parts shown in the accompanying drawings, since it is obvious that various modifications in minor details and arrangements may be made without departing from the spirit and intent of my invention.

The drawing represents, diagrammatically, a vertical longitudinal section of the essential parts of apparatus suitable for carrying out my improved method of loosening up and cleaning seed-cotton.

As hereinbefore stated, the seed-cotton may be loosened up in other independent apparatus preparatory to its introduction into the exhaust-chamber A. I prefer, however, to situate the loosening and whipping mechanism wholly or partially within the vacuum of exhaust-chamber A, as indicated in the drawing. Such mechanism may be of any suitable or preferred form and arrangement, that shown in the drawing consisting of a slowly-revolving feed-cylinder *b*, by which the seed-cotton is withdrawn from the hopper C, from which it is in turn removed by the more rapidly rotating intermediate cylinder *b'*, from the periphery of which it is whipped by the cylinder *b''*, which rotates at a still higher rate of speed.

For the purpose of regulating the combing out of seed-cotton from the mass fed into the hopper C, I arrange an adjustable bar *c* above the said feed-cylinder *b*, extending longitudinally with relation thereto and having its under side provided with a series of teeth *c'*. By means of this bar *c* I also prevent a forward movement in a body of the mass of

seed-cotton lying in the hopper immediately above the rotating feed-cylinder. I also arrange a similar bar or comb c^2 at the bottom of the hopper C, in front of the feed-cylinder b , to hold back the seed-cotton from clogging or entering too freely into the exhaust-chamber. This horizontal comb c^2 is preferably made adjustable with relation to the feed-cylinder. This adjustment may be effected by set-screws c^{25} , as indicated in the drawings, or by other well-known means. The seed-cotton is loosened up by the successive action of the combs c' c^2 , feed-cylinder b , and intermediate cylinder b' . The whipping-cylinder b^2 drives it from the intermediate cylinder b' and throws it toward and against the fender D. The fender D is perforated, reticulated, or otherwise so formed as to permit the passage through it of air drawn in, under the action of the exhaust-fan or equivalent device F, through the apertures $e e$ in the wall E^2 of the exhaust-chamber A. The amount of air admitted through the apertures e is regulated by suitable valves or dampers e' and is not sufficient in quantity to impair the prescribed degree of vacuum maintained by the exhaust device F. The air-current thus established through the fender meets and floats off the seed-cotton from the heavier impurities, which fall out of the exhaust-chamber A through the discharge-passage G. In falling through the said discharge-passage G the impurities encounter a strong entering current of air induced by the exhaust F, which current sifts out and carries upward and back into the exhaust-chamber the seed-cotton carried down with the heavier impurities, which consist of the hulls (or bolls) of the cotton, twigs, sand, nails, &c., with which the seed-cotton is contaminated during the harvesting and which are therefore delivered, together with the seed-cotton, into the hopper C. From the exhaust-chamber A the seed-cotton separated from the heavier impurities is drawn through the eduction-passage E under the influence of the air-exhausting device F. An ordinary rotary exhaust-fan may be conveniently used for withdrawing the air and seed-cotton from the exhaust-chamber A and eduction-pipes E E' and for delivering it into the settling-chamber H. The eduction-passage E is preferably slightly inclined downward for a portion of its length after leaving the exhaust-chamber A for the purpose of facilitating the separation of the seed-cotton from the comparatively light impurities carried over from the exhaust-chamber A. The impurities thus carried over are light as compared with those from which the cotton is separated in the exhaust-chamber A and discharge-passage G, but are still heavier than the loosened-up seed-cotton. To let out the impurities from which the seed-cotton separates in the eduction-passage E, I connect therewith a drop-flue I, through which the impurities descend into the inclosed chamber J. Since, however, the seed-cotton as well as the

impurities would descend into the drop-flue I, I create a current by admitting air into the chamber J through a suitable regulator or valve j , which air, flowing up through the drop-flue I, because of the partial vacuum within the eduction-flues E E', lifts up and carries away from the impurities most of the seed-cotton encountered in its ascent, returning the said seed-cotton to the eduction-passages E E' to be delivered into the settling-chamber H. A portion of the eduction-passage E' is preferably vertical, or substantially so, the lower end of this upright passage E' coinciding with the entrance to the drop-flue I, so that twigs, sand, or other impurities dropped by the seed-cotton on its way to the settling-chamber H can fall back and down through the said drop-flue I and into the collecting-chamber J.

Under certain conditions in practice a single exhaust-fan or equivalent device communicating with the settling-chamber H may be sufficient to create and maintain the prescribed degree of vacuum and cause currents of sufficient strength through the eduction-flues E E', drop-flue I, collecting-chamber J, and exhaust-chamber A. If preferred, however, and where the conditions of use require it, a rotary fan F is interposed between the upper end of the eduction-flue E' and the entrance to the settling-chamber. In either case the seed-cotton entering the enlarged space constituting the settling-chamber H is distributed or diffused through it in such manner that the impalpable dust, light fragments of leaf, &c., accompanying it into the chamber H are separated therefrom and are drawn off by the exhaust device L, while the seed-cotton settles upon the floor of said chamber.

To facilitate the action of drawing off the light impurities and the impalpable dust commingled with the seed-cotton, a part of the upper portion and end of the chamber H may be partitioned off more or less by a perforated or reticulated screen h , interposed between the main portion of the chamber H and the exhaust-flue K and suction device L. On the side of the chamber next the exhaust-flue K the screen h is inclined downward, so that portions of the leaf, &c., coming in contact therewith may fall or settle into a compartment M, separate from the clean seed-cotton in the main compartment.

Automatic vacuum-valves V are arranged at appropriate points in the apparatus, as in the side of the exhaust-chamber A and in the eduction-pipe E', to guard against too great a reduction of atmospheric pressure within the apparatus.

It is to be understood that the air-exhausting mechanism employed is of sufficient power and capacity to maintain the requisite degree of vacuum in the apparatus, notwithstanding the currents of air admitted at various points for the purpose of lifting out and carrying away the seed-cotton from the impurities. All the inlets are provided with adjustable

devices by which the currents of air drawn in may be regulated with accuracy, according to the condition and requirements of the material under treatment.

5 It will be noticed that by my improved method of treating the seed-cotton it is loosened up and put into the most favorable condition for facilitating its separation from com-
 10 mingled hulls, (or bolls,) sand, and other impurities, and that it is lifted out of and carried away from the impurities by gentle con-
 15 trollable receding currents of air, which sift out the seed-cotton and carry it to the settling-chamber H. A small percentage of seed-cot-
 20 ton still contaminated with foreign matter may be left in the inclosed chamber J, while most of the heavy worthless stuff is discharged from the apparatus through the discharge-
 25 passage G.

30 In my concurrent application, Serial No. 393,755, filed May 22, 1891, I set forth and claim a process of ginning and cleansing cotton in vacuo. In the present application I
 35 limit myself to the treatment of "seed-cotton"—i. e., cotton-seed before the removal of its hair (or "cotton-wool") by the process known as "ginning."

40 A cover or trap-door R is provided in the hopper C for the purpose of excluding the air from the exhaust-chamber A when the
 45 hopper is nearly emptied of seed-cotton.

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

35 1. The process, substantially as herein described, of cleaning seed-cotton, which consists in loosening up and whipping the seed-cotton and simultaneously subjecting said
 40 seed-cotton to the action of currents of air in a partial vacuum.

45 2. The process, substantially as herein described, of cleaning seed-cotton, which consists in loosening up and whipping the seed-cotton and simultaneously subjecting the
 50 seed-cotton to the action of currents of air in a partial vacuum and then subjecting the cotton to the action of light currents of air for removing the dust and allowing the cot-
 55 ton to settle.

3. In apparatus for cleaning seed-cotton, substantially as described, the combination
 60 of an exhaust-chamber, means for feeding seed-cotton to said exhaust-chamber, the side walls of the latter formed with orifices for admitting air to said exhaust-chamber, a dis-
 65 charge-conduit from said exhaust-chamber opening at its lower end into the atmosphere, and an eduction-flue and air-exhausting mechanism for creating and maintaining a partial vacuum within the apparatus and withdrawing the seed-cotton therefrom, sub-
 70 stantially in the manner and for the purpose set forth.

4. In apparatus for cleaning seed-cotton, substantially as described, the combination
 75 of an exhaust-chamber, means for feeding seed-cotton to said exhaust-chamber, mechanism for drawing the seed-cotton into said

exhaust-chamber and loosening it up and whipping it therein, the walls of the exhaust-
 80 chamber formed with orifices for admitting air to the said exhaust-chamber, a discharge-
 85 conduit from said exhaust-chamber opening at its lower extremity into the atmosphere, and an eduction-flue and air-exhausting
 90 mechanism for creating and maintaining a partial vacuum within the apparatus and withdrawing the seed-cotton therefrom, sub-
 95 stantially in the manner and for the purpose described.

5. In apparatus for cleaning seed-cotton, substantially as described, the combination
 100 of an exhaust-chamber, mechanism for feeding seed-cotton to said exhaust-chamber, the walls of the exhaust-chamber formed with in-
 105 lets for admitting air to said exhaust-chamber, a discharge-conduit from said exhaust-chamber opening at its lower extremity into
 110 the atmosphere, an eduction-flue and air-exhausting mechanism for creating and main-
 115 taining a partial vacuum within the apparatus, and a drop-flue connected with said edu-
 120 cation-passag, said drop-flue being formed with an air-inlet, for the purpose and substantially in the manner described.

6. In an apparatus for cleaning seed-cotton, substantially as described, the combination,
 125 with the exhaust-chamber, mechanism for feeding seed-cotton to said exhaust-chamber, the eduction-passag, and air-exhausting
 130 mechanism, of the walls of the apparatus, formed with adjustable air-inlets for controlling the admission of air to the interior of the
 135 apparatus, substantially in the manner and for the purpose described.

7. In apparatus for cleaning seed-cotton, substantially as described, the combination,
 140 with the exhaust-chamber, mechanism for feeding seed-cotton to said exhaust-chamber, eduction-passag, and air-exhausting mechanism,
 145 of the walls of the apparatus formed with vacuum-valves arranged to limit the degree of vacuum within the apparatus, substantially
 150 in the manner and for the purpose described.

8. In apparatus for cleaning seed-cotton, substantially as described, the combination
 155 of the exhaust-chamber, mechanism for feeding seed-cotton to the said exhaust-chamber, the walls formed with inlets for admitting
 160 air to said exhaust-chamber, a discharge-passag from said exhaust-chamber opening at its lower extremity into the atmosphere, an
 165 eduction-flue and air-exhausting mechanism for creating and maintaining a partial vacuum within the apparatus, and a settling-com-
 170 partment to receive the cleansed seed-cotton, substantially in the manner and for the purpose described.

9. In apparatus for cleaning seed-cotton, substantially as described, the combination
 175 of the exhaust-chamber, mechanism for feeding seed-cotton to said exhaust-chamber, the walls of said chamber formed with inlets for
 180 admitting air to said exhaust-chamber, a discharge-conduit from said exhaust-chamber

opening at its lower extremity into the atmosphere, an eduction-flue and air-exhausting mechanism for creating and maintaining a partial vacuum within the apparatus, a settling-chamber for receiving the cleansed seed-cotton, and mechanism for drawing off and separating dust, &c., from the seed-cotton with-

in the settling-chamber, substantially in the manner and for the purpose described.

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Witnesses:

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