

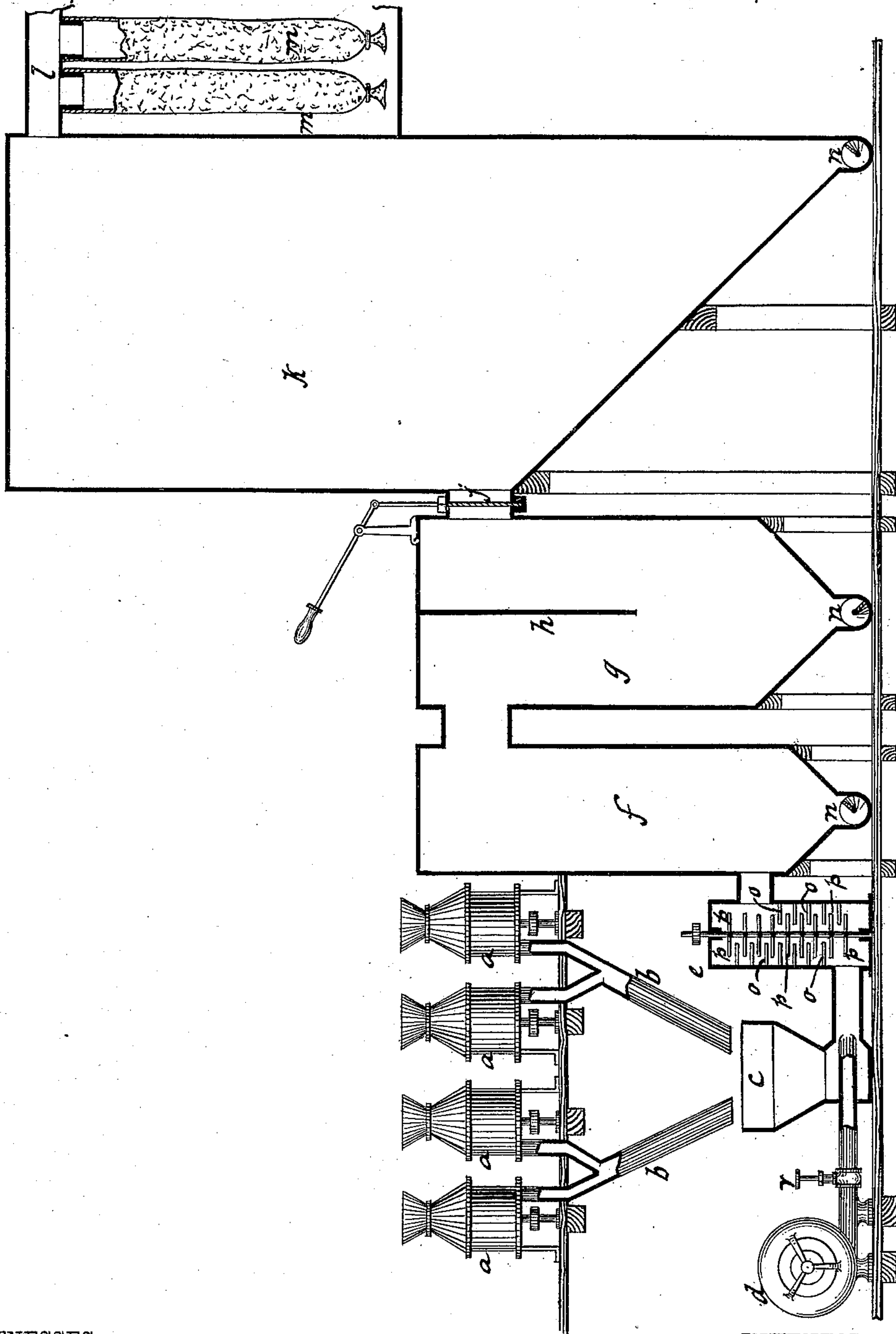
(No Model.)

G. E. MOORE.

PROCESS OF TREATING COTTON SEED HULLS.

No. 357,089.

Patented Feb. 1, 1887.



WITNESSES:

William Miller
A. Fisher du. Faurgn

INVENTOR

Gideon E. Moore

BY
Vansant and Hauff
his ATTORNEYS

UNITED STATES PATENT OFFICE.

GIDEON E. MOORE, OF NEW YORK, N. Y.

PROCESS OF TREATING COTTON-SEED HULLS.

SPECIFICATION forming part of Letters Patent No. 357,089, dated February 1, 1887.

Application filed August 27, 1885. Serial No. 175,495. (No specimens.)

To all whom it may concern:

Be it known that I, GIDEON E. MOORE, a citizen of the United States, residing at New York, in the county and State of New York, have invented a new and useful Improvement in Processes of Treating Cotton-Seed Hulls, of which the following is a specification.

Cotton-seed after it has been separated from the cotton is surrounded by a hull to which is attached a considerable quantity of cotton fiber that can only be removed with great difficulty. When these hulls, together with the adhering fibers, are removed from the oil-bearing portions or kernels of the seed, they constitute a mass, which in the following description will be designated the "husks," and which consists of portions of the broken hulls and of the fibers adhering to these broken hulls.

The object of my invention is to utilize these husks by separating the fibers from the broken hulls and rendering them available for paper-pulp.

The mechanism which may be used in carrying out my invention is illustrated in the accompanying drawing, which represents a longitudinal section.

I first take the husks and grind them in a mill or stamp-battery of any suitable construction until the fibers have become, as far as possible, detached from the broken hulls and the latter have become reduced to a suitable degree of fineness. In practice it is convenient to grind successively to different degrees of fineness, sifting the material from time to time. In this way much of the non-fibrous portion may be made to pass through the sieve while the fibers ball together and remain on the sieves. The grinding and sifting may be done either wet or dry and by the use of sieves or screens of any known or suitable construction. When sufficiently ground, the mass is composed of more or less finely-ground particles of the hulls and of loose fibers. It possesses a strong tendency to ball together, felt, or agglomerate into lumps.

For the purpose of effecting the separation of the fibrous from the non-fibrous portions I subject the ground husks to the following treatment: The sufficiently-ground mixture, if moist or wet, after previous drying, is, either

with or without previous sifting, treated by an injected air-current, which loosens the mixture and forces it onward into a moving body of compressed air in a series of chambers, wherein the current is made to impinge on the walls or sides of the chamber or other suitable deflecting-surfaces, so that the suspended particles may strike thereon and rebound. The angular or rounded particles of the hulls possess a much smaller surface in proportion to their mass than the fibrous particles, and their mass is as a rule greater. They therefore strike with greater force against the deflecting-surfaces, rebound farther, and, losing their momentum, subside sooner than the fibrous particles, which, on account, also, of their greater surface, are carried farther by the air-current than the particles of non-fibrous form.

When the blast of air, carrying with it the suspended particles, enters the first chamber of the series, the compressed air suddenly expands, whereby the tendency of the material to pack or agglomerate into masses is counteracted, and any such that may have formed are again broken up and the particles of which they are composed are diffused throughout the air. In working with large quantities of material it is convenient that no subsidence should take place in the first chamber, and for this reason the said chamber may be provided with one or more beaters. The first chamber is by this means transformed into a beating-machine, whereby the action of the blast in diffusing the particles through the air is sustained and promoted. The blades or teeth of the beating-machine may be set at any convenient angle.

From the first chamber or expansion-chamber, which under circumstances may also be the beating-machine, the air with the suspended particles passes through one or several following chambers, wherein the current is made to impinge on the sides or roof of the chamber or other deflecting-surfaces so as to cause the non-fibrous particles to subside, while the fibrous particles are carried forward by the current of air. As the current of air with its suspended particles recedes from the point of entrance into the series of chambers, the momentum of the particles diminishes and their subsidence is facilitated so that at last

a point is reached where the suspended particles are chiefly of fibrous character, except for a certain proportion of fine dusty particles of ground hulls. At this point, if the air-current be allowed to escape into a large chamber wherein it may freely expand, the suspended fiber will subside from the air and may be collected and removed by any suitable means.

When the force of the air-blast has been suitably adjusted to the size and weight of the particles contained in the mixture and to the size of the chambers or compartments used, the material that settles in the first chamber will be found to consist, chiefly, of the refuse of the hulls and other non-fibrous material, while the fibrous particles are carried farther and deposited in the more remote chambers or compartments. In this operation, instead of a series of chambers, a single chamber divided by walls or partitions conveniently placed may be used. The expansion of the air-blast is controlled either by the progressive increase in the size of the chambers or compartments or by the valves placed at the points of entrance or exit of the blast into or from the chambers, or both means may be used in combination, as desired. The fiber so obtained is dark in color and only adapted to the manufacture of articles more or less coarse—as, for example, the coarser kinds of paper. To purify it still further, I treat it by digesting it with or without the aid of heat, and with or without pressure, with a solution of caustic or carbonated alkali, preferably with a caustic soda solution of about 5° Baumé, whereby the coloring-matter and other impurities are to a large extent rendered soluble in water, and may be removed by washing with water, leaving a product of light color, that may be rendered very white by bleaching with chloride of lime or other suitable bleaching agent. After washing and drying, the product is then a pure white fiber adapted to paper-making and the other industrial applications of ground cotton fiber. If it should be found, however, that the washed and dried product be not entirely free from colored specks, it may be re-blown, whereby a pure white product may be obtained.

In the accompanying drawing, the letters *a a a* represent mills, of any suitable or well-known construction, in which the husks, either previously more or less separated by grinding and sifting or not, are ground. *b b* are the chutes by which the ground husks are conveyed to the bin *c*, where they meet the current of air from the fan or blower *d*, and are carried therewith into the beating-machine *e*, where the solid particles and air are intimately mixed by rotating beaters *p p* playing between the projections *o o* on the sides of the machine.

In the drawing the contents of the bin *c* are represented as being drawn into contact with the blast from the blower by suction. When the character of the material does not admit of this action, the material may be fed

to the blast by a screw-feed or other suitable device opening either into the chamber or enlargement of the blast-pipe or applied at any other suitable part of the machine.

From the beating-machine the current enters the chamber *f*, where the coarser and heavier particles subside to the bottom, while the current carrying the finer particles next enters the chamber *g*, where it strikes against the partition *h*, passing downward and under the partition and again ascending until it reaches the outlet, which can be provided with a valve, *j*, by means of which the pressure of the air is regulated and the rate of subsidence in the chamber *g* is controlled. In the chamber *g* the finer and lighter non-fibrous substances are deposited, while the current, carrying now chiefly the purified fibers, enters the chamber *k*, where most of the fiber subsides. From the chamber *k* the current passes through one or more pipes, *l*, provided with a number of bags of flannel, *m m*, or other porous material, in which more or less fiber that may fail to subside in the chamber *k* is caught while the air filters through the cloth and escapes; or in lieu of these bags the air from the chamber *k* may pass through a chamber, where it may be washed by a jet or jets of water or by allowing steam to condense therein, so as to remove any fiber that it may carry with it. The bottoms of the chambers *f g k* are inclined and can be provided with troughs in which endless screws *n n n* are placed. These screws receive the deposited substances and convey them out of the chamber into suitable receptacles. By means of weighted valves on the tubes or spouts, into which the screws *n n n* force the deposited substances, the escape of air from the chambers can be prevented and the action of the screws *n n n* automatically controlled.

In my process the grinding to which the husks are subjected also grinds the fibers, and by exposing the ground husks to the air-floating process above described the fiber is obtained almost free from any foreign material. It is at once ready for such purposes as, for instance, making paper-pulp, and it needs no further preparation than may be required to break up the lumps and disseminate the fiber through the water in the paper-machine.

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

1. The within-described process of treating the husks of cotton-seed, which consists in first grinding the same, then causing the particles of the ground mixture to float in a current of air, then precipitating them from this current at different places so as to effect a separation of the non-fibrous from the fibrous particles, and finally subjecting the fibrous particles to the action of an alkali and a bleaching agent, substantially as described.

2. The process herein described for treating cotton-seed hulls for the manufacture of paper-pulp, which consists in grinding the hulls with the attached fiber, injecting the

ground mixture by a blast of air into a moving body of compressed air, beating up the same with the air, and conducting the mixture of air and ground material into a suitable chamber or arrangement of chambers wherein the air is controlled in its movements and escapes, so as to permit of the separate subsidence of the fibrous and non-fibrous particles, substantially as described.

10 3. The process herein described for treating cotton-seed hulls for the manufacture of paper-pulp, which consists in grinding the hulls with the attached fiber and treating the same by an injected air-current, which loos-

ens the mixture and forces it onward into a moving body of compressed air in a suitable chamber or arrangement of chambers, wherein the air is controlled in its movements and escapes, so as to permit of the separate subsidence of the fibrous and non-fibrous particles, substantially as described. 15 20

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

GIDEON E. MOORE. [L. S.]

Witnesses:

WM. C. HAUFF,

E. F. KASTENHUBER.