P. G. GRANT.

PROCESS OF TREATING COTTON SEED HULLS.

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907,340. Patented Dec. 22, 1908.

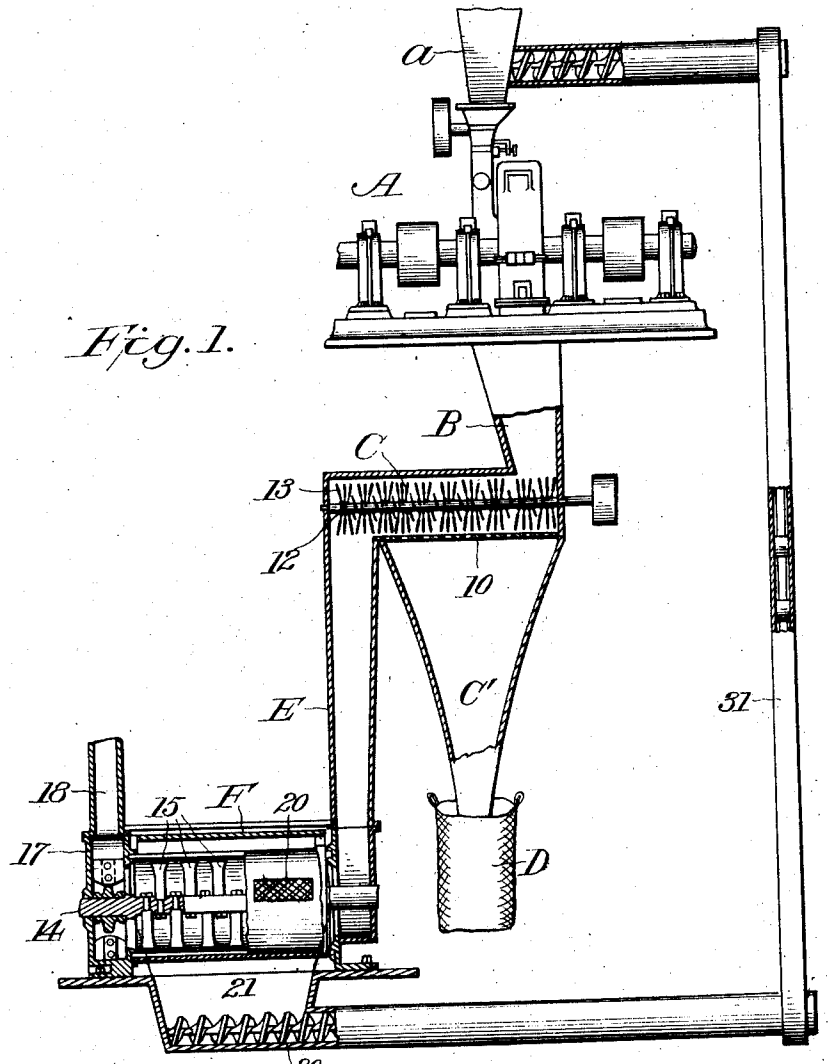


Fig. 1.

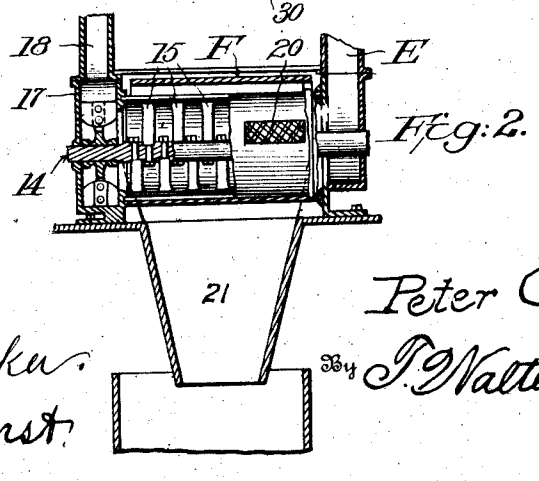


Fig. 2.

Witnesses

C. M. Walker.

A. B. Ernst.

Inventor

Peter G. Grant

By P. Walter Fowler

his Attorney

UNITED STATES PATENT OFFICE.

PETER G. GRANT, OF MEMPHIS, TENNESSEE, ASSIGNOR TO DANIEL GRANT, OF MEMPHIS, TENNESSEE.

PROCESS OF TREATING COTTON-SEED HULLS.

No. 907,340. Specification of Letters Patent. Patented Dec. 22, 1908.

Application filed March 7, 1908. Serial No. 419,749.

To all whom it may concern:

Be it known that I, PETER G. GRANT, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented new and useful Improvements in Processes of Treating Cotton-Seed Hulls, of which the following is a specification.

My invention relates to a process for disintegrating, agitating, and separating various substances and particularly cotton-seed hulls, from the lint or fiber with which they are usually associated; the object of the invention being to simplify and cheapen the known processes for treating cotton-seed hulls and to eliminate the lint therefrom in a more expeditious, facile and economical manner, and to convert the substance into bran and fiber, and segregate these materials and collect them in separate receptacles.

My invention consists of the process which I will hereinafter describe and claim.

In the accompanying drawing:— Figure 1 represents a part elevation and part sectional view of one form of apparatus or group of machines by which my process may be carried out. Fig. 2 shows a fragment of a modified part of the apparatus.

Referring to the drawing, Fig. 1, which, as before stated, is illustrative of one form of apparatus I may use to carry out my process, A represents any suitable and approved form of attrition mill, or grinding machine, of which there are various types suitable for my purpose. Into this mill the hulls with the adherent fiber are delivered through a chute, *a*. After being subjected to a grinding action of the mill, A, the ground product is delivered through a chute, B, into one end of a suitably inclosed beater, C, having a perforate bottom, 10, and internal shaft, 12, with radial beater-arms, 13. The ground mass is thoroughly agitated and beaten in this machine, and the loosened bran particles of the mass are discharged through the perforated bottom and conveyed by a spout or chute, C', into a sack or receiver, D, or carried away by any well known conveying means to such a point as may be desired. The remaining hulls together with the lint or fiber adhering thereto are delivered from the beater through the chute, E, of a beater-casing into the feed-end of a cylinder, F, having an internal shaft, 14, with radial beater-arms, 15, the inner circumference of said cylinder being adapted to cooperate with the beater-arms, 15, to effect a disintegration of the material. This machine is designed to rub the fiber from the hulls, and by a blast created through the machine by a fan located outside of, or operable in a case, 17, at one end, the loosened fiber is blown through a pipe, 18, to a baling room or other receiver, not shown.

The hard particles of hull are delivered from the cylinder, F, through the screened peripheral opening 20, in the side of the cylinder, and may be conducted by a chute, 21, into a suitable receiver, as in Fig. 2, and thence conducted to a separate grinding mill; but if desired, I may discharge the hard particles of hull with whatever lint may remain adhering thereto through the peripheral opening 20, and into a suitable case having a conveyer, 30, which operates in connection with other conveyers, 31 leading back to the original grinding mill whereby the said particles of hull and remaining lint will be carried back to the original grinding mill to be mixed with fresh hulls being fed thereto. When the said hull particles are carried to the fresh hulls and passed through the original grinding mill, the process becomes continuous until the hulls are converted into two parts, making what is known as hull bran and hull fiber.

I have discovered that cotton-seed hulls having a cup shape tend to offer little resistance to a grinding process and that to overcome this the small particles of hulls after some fiber has been taken off when dropping into the original hull, tend to fill up the concaved portion of the hull and form a mass of sufficient resistance to materially assist the grinding at the primary attrition mill. By my process, therefore, the hulls are subjected to the several operations described, with the result that the fiber is extracted through the delivery chute or spout, 18, while the separated bran is collected in appropriate receivers.

By my method of first grinding the hulls in an attrition mill, I reduce the size of the hard husky part and thereby enable the cylinder F, and its components to more easily perform their work. The purpose of introducing the beater, C, between the attrition mill and the cylinder, F, which beater may represent any shaker or screen, is due to the fact that if the hulls are ground in the attrition mill and passed immediately to the

cylinder F, some fine particles of bran resulting from the grinding operation pass through the cylinder F, and are delivered by the chute or spout 18, together with the fiber, thereby making a bad quality of fiber.

I am aware that it is not new to disintegrate and separate cotton-seed hulls by delivering the hulls with the adherent fiber directly into one of the cylinders which is provided with internal beaters adapted to disintegrate the hulls and deliver the crushed particles thereof from said cylinder, the cylinder being substantially of the type shown by the cylinder, F, of the drawing herein used for illustrative purposes, said cylinder being connected with a fan-case or chamber by which the loosened fibers are discharged from the cylinder and delivered to a pneumatic or other type of collector. I am further aware that it is old to pass the hulls from one attrition mill through a beater which beats out part of the bran produced by the grinding in the aforesaid mill, and then conduct the residue to second, third, and succeeding attrition mills and after grinding it in each of these mills pass the material to corresponding beaters to remove more of the bran. The process last described is, however, a reduction process pure and simple, as a part of the bran is removed after each grinding, and the grinding continues until no bran remains. Such a process requires an enormous waste of power or energy owing to the regrinding of the cotton or fiber each time.

In disintegrating cotton-seed hulls I have found from years of experience and experiment, that it is almost impossible to accomplish the desired result without handling the product over and over again thereby reducing it. I believe the difficult part of the operation is in regrinding the cotton which is adhering to the hulls and therefore I propose to improve the known processes by subjecting the hulls to a preliminary grinding whereby the cotton is practically eliminated on the first grinding and that the only subsequent grinding is of the hull itself to take away the small particles of remaining cotton. In my process, I merely grind the hulls in an attrition mill or other grinding machine and then run this ground mass through a beater or other machine which extracts such bran or finely ground particles of hulls as are loosened up, and then taking the residue of the beater to the cylinder F, or to any suitable machine using an air current against gravity, to remove the lint or fiber, leaving the balance of the ground mass in the form of a finished product of bran.

Under my process there is no subsequent grinding. The hulls are ground in the attrition mill, passed through the beater and from there to the fiber machine where instead of grinding, the mass is subjected to a violent agitation simply loosening up the ground mass and rubbing off the fiber which has been already loosened up by the grinding in the attrition mill. The fiber is then taken out by the air current against gravity and the remainder being bran passes through the opening in the side of the cylinder F.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The process herein described for continuously separating the lint from cotton-seed hulls which consists in first grinding the hulls, then beating the ground mass and screening out a portion of the hull particles, then agitating the residue in the presence of an air blast against gravity, to separate a portion of the freed lint, and then returning the remaining residue to be treated in the same cycle of operations.

2. The process herein described for continuously separating the lint from cotton-seed hulls which consists in first grinding the hulls, then beating the ground mass and screening out a portion of the hull particles, then agitating the residue against rubbing surfaces in the presence of an air blast against gravity, to separate a portion of the freed lint, and then returning the remaining residue to be treated in the same cycle of operations.

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

PETER G. GRANT.

Witnesses:
J. C. RONEY, Jr.,
M. RUTSCHMAN.