No. 656,246. Patented Aug. 21, 1900.

F. W. FEE.

HULLER.

(Application filed Feb. 14, 1898.)

(No Model.)

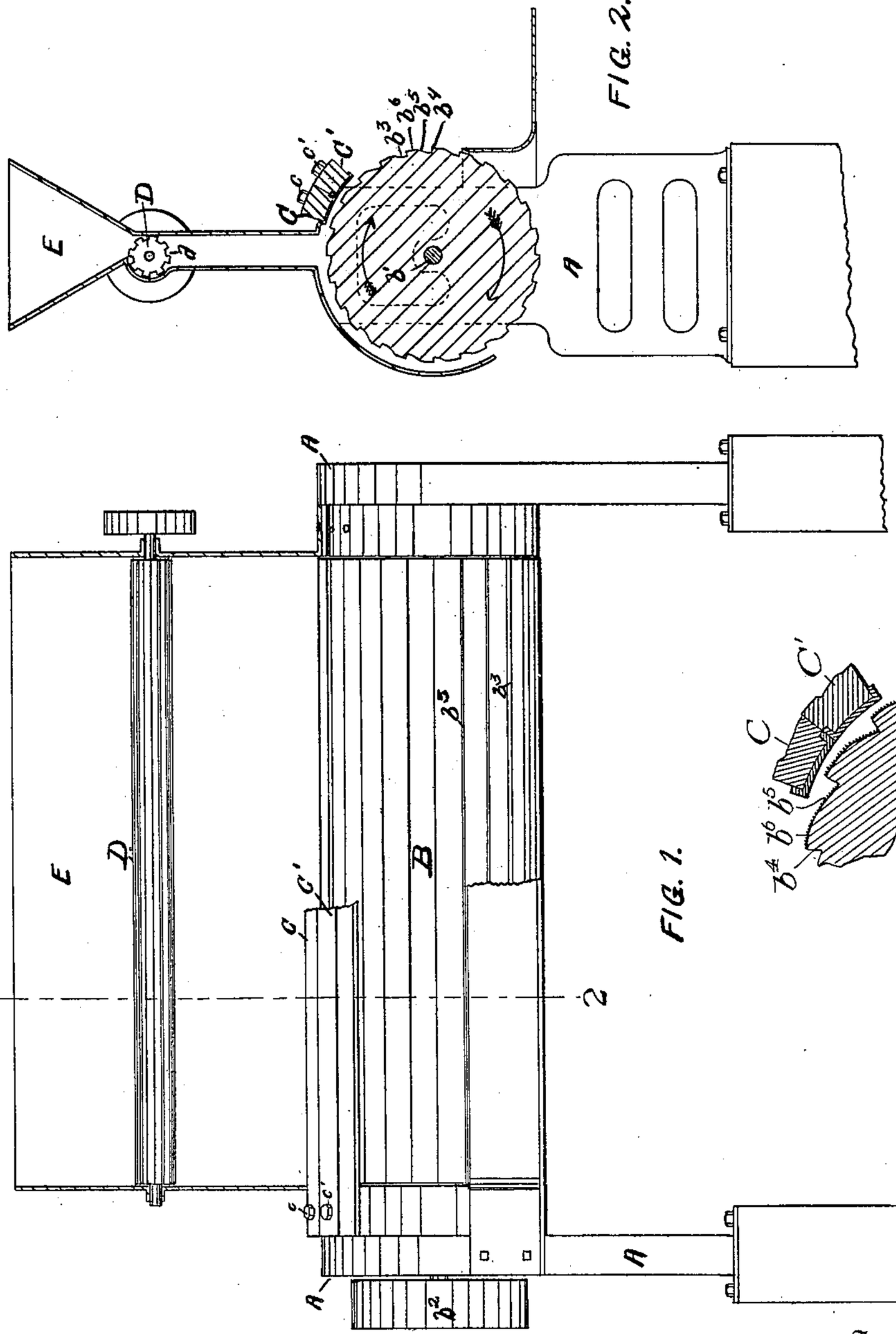

FIG. 1.

Fig. 3.

FIG. 2.

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UNITED STATES PATENT OFFICE.

FRANKLIN W. FEE, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO GUY MALLON, OF SAME PLACE.

HULLER.

SPECIFICATION forming part of Letters Patent No. 656,246, dated August 21, 1900.

Application filed February 14, 1898. Serial No. 670,198. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN W. FEE, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Hullers, of which the following is a specification.

My invention is especially designed for hulling rice, although it may be used for hulling other products.

The usual plan for hulling rice by machinery is to subject the grains to a rubbing or abrading action. One of the earlier plans was to pass the rough rice between rotating millstones. Later machines consist of grooved or serrated cylinders which cause the rough rice to travel between themselves and stationary rubbing-surfaces; but, so far as I am aware, all of these machines deal with the rice in mass and depend upon the decorticating effect of friction or friction and grinding for accomplishing their work, as in dealing with grains with closely-adhering hulls. Owing to the frangible nature of the rice-grains this mode of treatment results in breaking a very large percentage of the grains, thereby largely decreasing the value of the product. I find that if a slight blow be struck upon the opposing longitudinal angles of the hull the hull may be readily split without danger of breaking the grain.

The object of my invention is to provide mechanism whereby the unhulled grains are disposed lengthwise at right angles to their path of travel and given a rotation on their longitudinal axes, whereby their opposing angles are brought in contact with the hulling-block and split by a single stroke or contact without being subjected to frictional or abrading action.

My invention consists in the combination and arrangement of mechanism hereinafter described and claimed.

In the drawings, Figure 1 is a front elevation, partially in section, of a device embodying my invention. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a sectional detail, on an enlarged scale, showing the hulling-surfaces.

The letter A denotes supporting-brackets. B is a hulling-cylinder; C C′, hulling blocks; D, a feed-regulator, and E a hopper.

The supporting-brackets A are provided with journals, in which the axle b' of cylinder B is mounted. At one end the axle b' extends through the journal and is provided with a pulley b^2, which is adapted to be driven by a belt, and so drive the cylinder B. The cylinder B is preferably iron coated with some substance, as flour or emery, to increase the roughness of its surface, which is longitudinally furrowed or grooved, as shown in Fig. 1. Each furrow or groove b^3 is deep enough to receive a limited number of the unhulled grains and has a steep or abrupt side b^4 and a gradually-inclined side b^5, leading up and becoming practically tangent to the circumference of the cylinder, and between it and the next groove is a hulling-surface b^6.

Mounted upon the supporting-brackets A and in close proximity to the hulling-cylinder B are hulling-blocks C C′, preferably held in place by screw-bolts c c', whereby the distance between them and the hulling-cylinder may be adjusted. The hulling-blocks are faced with rubber or some other material, preferably elastic, which will afford a considerable frictional or clinging resistance to bodies passing and contacting with it. I prefer to use two or more of these hulling-blocks, and they may be mounted at successively-smaller distances from the hulling-cylinder in order to insure hulling of all sizes of grain.

It is desirable to have the feed of rice from the hopper E regular and uniform, and to this end I provide the feed-regulator D, which revolves in the bottom of the hopper E. The feed-regulator consists of a cylinder with longitudinal grooves d, which are filled with rice as they pass the opening in the bottom of the hopper E and discharge onto the cylinder B.

The operation of my device is as follows: As the grains are dumped on the cylinder B, which revolves rapidly in the direction indicated by the arrow in Fig. 2, their inertia and the resistance of the air tend to make them lag behind the cylinder in its revolution. The effect of this lagging behind is that each grain is rolled on the inclined surface b^5 before it reaches the hulling-surface b^6, where

it contacts with the hulling-blocks C C′, which are adjusted to strike an unhulled grain rolling on the surface b^6, but not to strike a hulled grain thereon. Owing to the peculiar shape of the unhulled grains they tend to assume a position lengthwise of the cylinder—that is, their longest dimension is parallel to the axis of the cylinder. It will be seen that as the hulling-surface b^6 is more exposed to the resistance of air and the recess b^3 is more or less protected from this resistance the tendency of the grains to lag behind the cylinder will be greater on the surface b^6 than on the surface b^5 or recess b^3. The effect of this is that when the grains first fall on the cylinder they tend to congregate in the recesses b^3, from which they roll up the surface b^5 and along the surface b^6, where in the course of their revolution their angles are pressed between the hulling-surfaces of the cylinder and the hulling-blocks and the hulls split open, the clinging surface of the hulling-blocks tending to insure revolution. In this manner the rice is hulled with little or no danger of breaking. This is the action at slow speed and small output; but experience shows that with increased speed and a proportionate increase in the distance between the hulling-cylinder and the hulling-block the grains arrange themselves in layers in which the rice-grains are revolved by their contact with the hulling-surfaces and with each other and the grains are hulled in the same manner without danger of breaking.

I am aware that hulling or scouring cylinders have been used with furrows having an inclined face, that hulling-blocks with yielding and unyielding faces have been employed for rubbing or abrading grains, and that reversed serrations have been used to impart rotation to coffee-berries to increase the abrading action; but I am not aware that any attempt has heretofore been made to provide mechanism for disposing grains with angular hulls transversely to their line of travel and imparting to them an axial rotation before they come into hulling contact and hulling by a single compressive stroke upon opposing angles of the hull without affecting the inclosed grain.

I claim—

The combination of a rotatable cylinder formed with grooves, having abrupt front walls and inclined rear walls, and intervening surfaces or lands having sloping faces connecting with the inclined rear walls; a hulling-block faced with an elastic material presenting a frictional surface, and means for feeding the seed upon the cylinder, substantially as and for the purpose set forth.

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