2 Sheets—Sheet 1.

C. A. LOWBER.

Cotton Seed Huller.

No. 26,372. Patented Dec. 6, 1859.

Fig. 2.

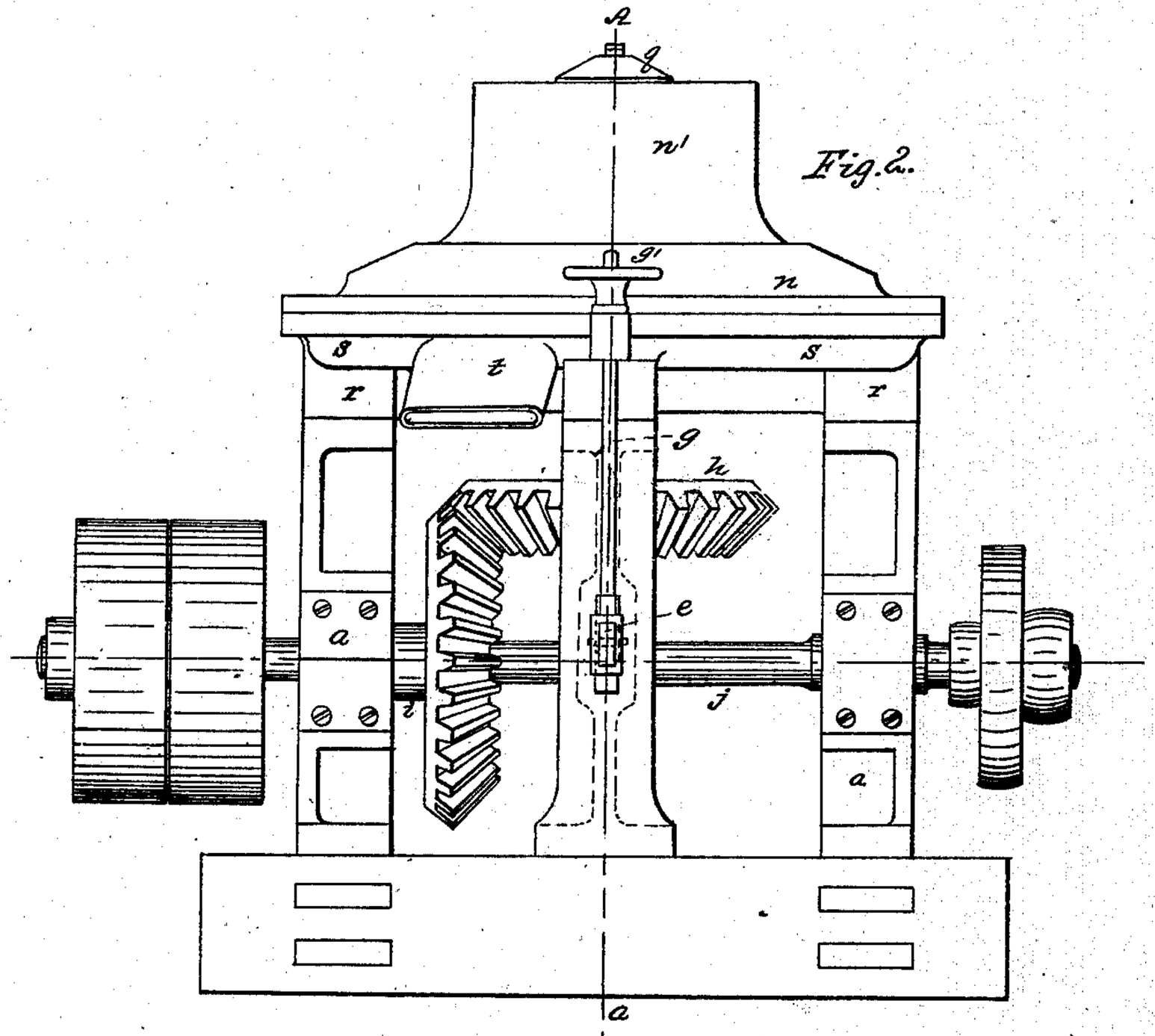
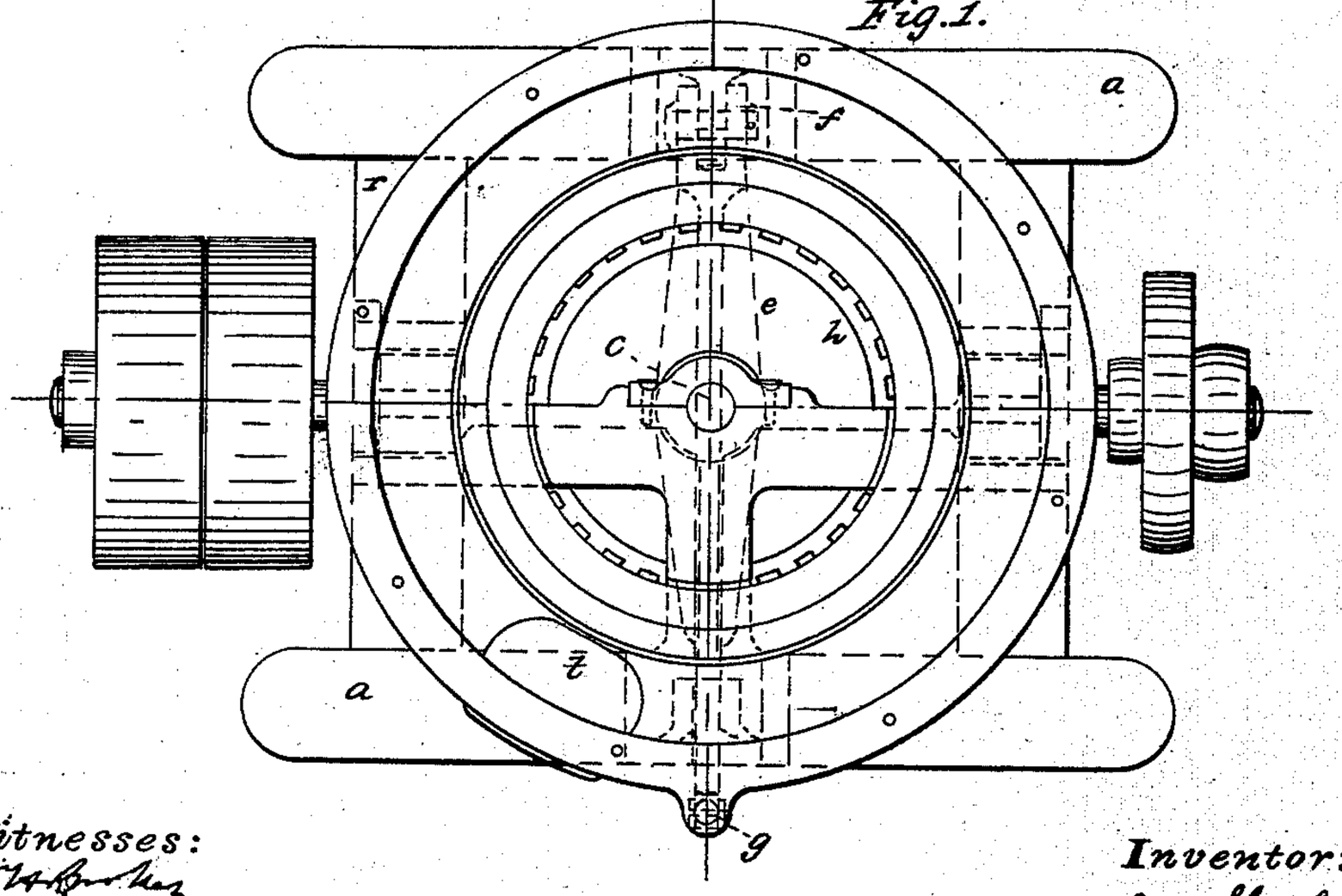


Fig. 1.



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Andrew de Lacy

Inventor:
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Fig. 3. Aa

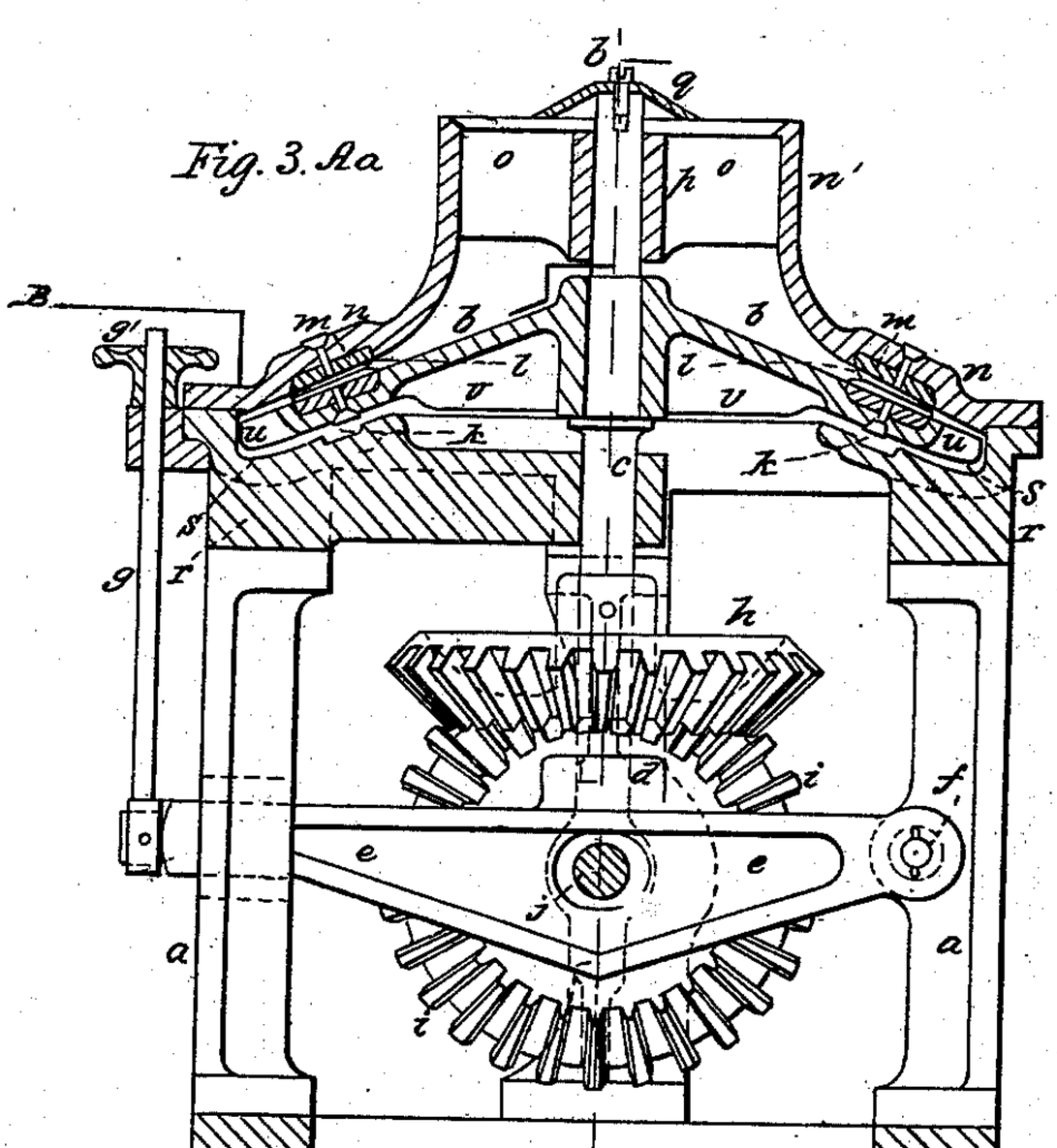


Fig. 4 B b

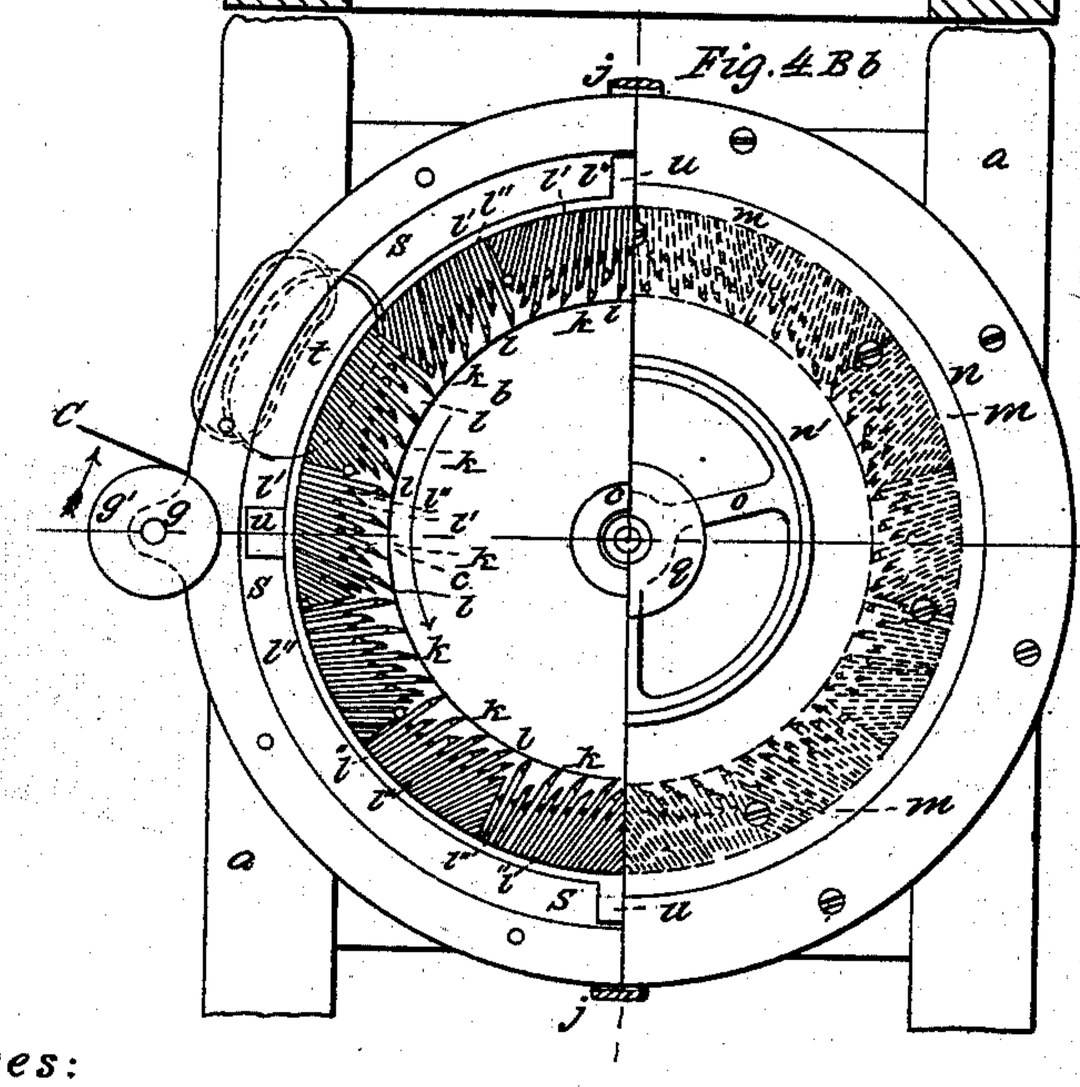
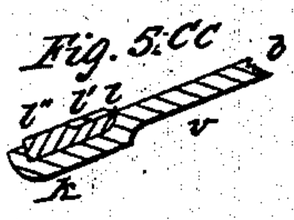


Fig. 5. C c



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UNITED STATES PATENT OFFICE.

CHARLES A. LOWBER, OF MEDINA, NEW YORK.

IMPROVEMENT IN COTTON-SEED HULLERS.

Specification forming part of Letters Patent No. **26,372**, dated December 6, 1859.

To all whom it may concern:

Be it known that I, CHARLES A. LOWBER, of Medina, Orleans county, and State of New York, have invented a new and useful Machine for Hulling Cotton-Seed; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan; Fig. 2, a side elevation; Fig. 3, a vertical section taken at the line A *a* of Fig. 2; Fig. 4, another section taken at the line B *b* of Fig. 3; and Fig. 5, a section taken at the line C *c* of Fig. 4, to represent the form of the teeth.

The same letters indicate like parts in all the figures.

The object of my invention is to remove the hull from cotton-seed without expressing oil from the kernel. There have been many attempts to produce a machine which would accomplish this desirable purpose; but, so far as I am informed, without success. All the machines which have been tried for this purpose prior to my invention have failed of success because the mode of operation was not adapted to the peculiar properties of cotton-seed, the kernel of which is wax-like and readily yields its contained oil when subjected to pressure or attrition. To effect the desired purpose the mechanism must act on the hull only, and not on the kernel, for when this is broken or is made to yield any portion of its oil, not only is the seed injured for commercial purposes, but the mechanism soon becomes so much clogged that its operation must be necessarily suspended until cleansed, which is attended with serious difficulties, to say nothing of the waste of time. All these difficulties are avoided by my invention, as hereinafter described.

In the accompanying drawings, *a* represents a suitable frame, and *b* a metallic runner on a vertical shaft, *c*, the lower journal of which turns in a step, *d*, in an adjustable cross-tree, *e*, one end of which turns on a fulcrum-pin, *f*, in the frame, and the other end connected with a rod, *g*, the upper end of which is fitted with an adjusting-nut, *g'*, by means whereof the elevation of the runner can be readily and accurately adjusted. This shaft is provided with a bevel-wheel, *h*, the cogs of which engage the cogs of a corresponding bevel-wheel, *i*, on a horizontal driving-shaft, *j*, provided with a fast and loose pulley, or other suitable means for communicating motion. The upper surface of the runner *b* is conical from the hub to the periphery, and at a short distance from the periphery it is formed with an annular groove to receive segment-plates *k*, which I prefer to make of steel. These plates are secured in place by screws, which pass through holes in the runner, and are tapped into the said segment-plates, so that they can be readily taken out and replaced by others. The upper surface of the segment-plates is formed with a series of teeth or furrows, *l*, which in the cross-section represent the form of saw-teeth. There are three sets of such teeth in each segment-plate, one set, *l*, extending the whole width of each plate, the second set, *l'*, a little shorter, and the third set, *l''*, still shorter—that is to say, extending about two-thirds the width; and these three sets I prefer to arrange as represented in Fig. 4—that is, first one long one, *l*, then a short one, *l''*, then a medium one, *l*, then a short one, *l''*, and then a long one, *l'*, and so on to the end of each segment-plate; and these teeth are arranged in sections, as represented—that is, beginning at the rear end of each section, the first tooth is radial, and the others, instead of being radial or parallel with the first, are each in succession inclined a little more, so that the last in each section is tangent to a circle of about half the diameter of the runner, thereby making the furrows or channels a little wider at the inner than at the outer end, the parallelism of the cutting-edges and of the surface of the runner and of that part of the plate *n* which is armed with cutting-edges being only deviated from in a very slight degree to correspond with the gradual reduction of the size of the seeds as the hull is being stripped off; but these edges and surfaces may be parallel, if desired. Each segment-plate I usually make in length equal to about one-seventh of the circumference of the runner, and there are two sections of teeth in each segment-plate, although the number of segment-plates and number of sections may be increased or decreased at pleasure. Above this runner there is a corresponding series of segment plates, *m*, let into and secured in an annular groove made in the under surface of a circular plate, *n*, of larger diameter than the runner, that its edges

may be secured by suitable means—such as screws or bolts—to the upper end of the frame. The under surface of this plate, from the outer periphery thereof to the inner periphery of the segment-plates, is a hollow core the reverse of the runner, and provided in like manner with segment-plates, with teeth similar to those on the runner, and from the inner periphery of the segment-plates inward it is curved, and then forms a short cylinder, as at *n'*, to form the eye, and provided with arms *o* and a central hub, *p*, in the bore of which the upper journal of the shaft *c* is fitted to turn, a conical cap-plate, *q*, being secured thereto to deflect the cotton-seed and guide it properly from any suitable hopper into the eye of this plate, which corresponds with the upper fixed grinder of a mill. The upper part, *r*, of the frame I prefer to make of metal, secured to the wooden frame, unless the entire frame be made of metal. The upper surface of this part of the frame forms a circular trough, *s*, in which the periphery of the runner is placed, and in which the kernels and broken hulls of the cotton-seed are received as delivered from the runner. At *t* this trough is provided with a discharge-spout, and the runner is provided with four (more or less) wings, *u*, projecting from its periphery, and running close to the bottom of the trough, without touching it, to drag what is collected in the trough and discharge it at the spout, from whence it is conducted to a suitable receptacle. The surface of this trough is conical, like the runner, and extends inward about as far as the inner periphery of the segment-plates of the runner, leaving an open space between it and the under part of the runner for the passage of a current of air, which is forced into this trough and passes in at the periphery between the runner and plate *n*, to check the discharge of the seed, the top of the trough being closed, as represented, to cause the current of air to pass up between the runner and the plate *n*. The under surface of the runner is provided with radial arms *v*, to act as vanes, and extending from the hub to within a short distance of the inner periphery of the trough, to blow a current of air into the trough below the runner. The cotton-seed to be hulled is fed into the eye, falls onto the conical surface of the runner, and is carried by the inclination of that surface, aided by centrifugul force due to the rotation outward, until it reaches the teeth on the segment-plates. It first enters the spaces between the long teeth *l* of the runner, and is by them carried around under the inner ends of the corresponding long teeth of the upper plate, the edges of which cut into the hull and strip it off without cutting into the wax-like kernel; and as the inclination of the teeth above and below cross each other the seed is carried in the furrows between the teeth, this action having the effect to turn the seeds as they are carried outward to present in turn every part of the hull to the stripping action of the teeth above and below; and as the distance of the runner from the surface of the plate above is adjusted so as to permit the kernels to roll in the furrows between the teeth, the hull is all stripped off without crushing or cutting the kernels, which are delivered, with the fragments of hull, into the surrounding trough, from whence they are dragged to and discharged from the spout at *t*. The seed, when the hull is stripped off, is very liable to stick, by reason of its wax-like nature, and readily yields its contained oil when subjected to pressure or attrition. In consequence of these properties the trough would soon become clogged and the machine be thereby stopped and the seed injured. This is prevented by the current of air which is forced into the trough by the vanes or wings *v* below the runner, the current thus induced at all times keeping the kernels and hull in the outer portion of the trough, that the wings *u* may discharge them through the spout before any accumulation takes place, such as would induce clogging. The current of air thus forced in and passing around the periphery of the runner checks the movement of the seeds and hulls, and thus effectually prevents the too rapid discharge. The inclination of the conical surface of the runner is important to insure the supply of the seed to the teeth, and this, together with the inclination of the opposing set of teeth, would cause the seed, when stripped of the hull, to be delivered too soon; but this is checked by the current of air before described.

I would remark that although all the features above described are important to insure the best result, I do not wish to be understood as limiting my claims of invention to the use of all of them in combination, as a good result may be obtained, notwithstanding the omission of some of them—such, for instance, as the making of the teeth of different length—and it may be found that some of the essential features may be replaced by other and equivalent means.

Instead of making the teeth on segment-plates fitted and secured to the runner and the plate above, they may be made directly on these surfaces; but the cost of original construction will be seriously increased thereby, and the cost of repairs increased in much greater proportion, as the edges of the teeth soon become worn, and if made part of the runner and the plate above, these will have to be renewed frequently, instead of simply renewing the segment-plates, which can be readily done and at little cost.

I am aware that mills or machines have been made prior to my said invention for the purposes of grinding bark, and for crushing and grinding corn, and also for crushing and grinding other substances, consisting of two surfaces armed with teeth and with interposed furrows, and in some instances with long cutting-edges having interposed furrows, and that in some instances the teeth and the cutting-edges have been arranged flat, and

also on conical surfaces; but in all such instances the teeth or the cutting-edges and the interposed furrows have not been adapted to or been made suitable for the purpose of hulling cotton-seed; and therefore I do not wish to be understood as making claim, broadly, to the employment of two surfaces formed with rings of teeth and interposed furrows, or oppositely-inclined cutting-edges with interposed furrows, but limit my claims of invention, as hereinafter specified. Nor do I wish to be understood as claiming, broadly, the combination of a surrounding trough or curb with a runner and plate armed with teeth to receive the material as discharged from the grinding or cutting surfaces, as a trough or curb has been so employed in mills for grinding corn and other substances.

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

1. Making the runner with the surface next to the shaft smooth to receive the cotton-seeds from a suitable hopper, and cause them to be properly distributed thereon and to be carried toward the periphery, and with that part of the surface within the periphery and outside of the smooth part armed with teeth in the form of long cutting-edges, having continuous channels or furrows between them of sufficient size to receive a cotton-seed and permit it to pass and roll therein, substantially as described, in combination with an upper plate surrounding the eye or aperture for the passage of the cotton-seed to the smooth part of the surface of the runner, the under surface of the said plate being parallel with the surface of the runner and armed with a ring of teeth in the form of long cutting-edges, and formed with interposed channels or furrows, similar to those of the runner, but of reversed inclination, substantially as and for the purpose specified.

2. Making the said teeth of long cutting edges and surrounding the smooth surface of the runner, of varying lengths as described—that is, having some of them approaching the shaft nearer than others—that the seeds, while traveling outward on the smooth surface of the runner, may arrange themselves and properly enter the furrows or channels one by one, as described.

3. Surrounding the periphery of the runner and upper plate with a trough which extends within the periphery of the runner, leaving an open space or air-passage between, substantially as described, in combination with the vanes or equivalent means for blowing in a current of air, substantially as and for the purposes specified.

C. A. LOWBER.

Witnesses:
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