H. B. STEVENS.

APPARATUS FOR HULLING AND POLISHING COFFEE.

No. 190,453. Patented May 8, 1877.

Fig. 1.

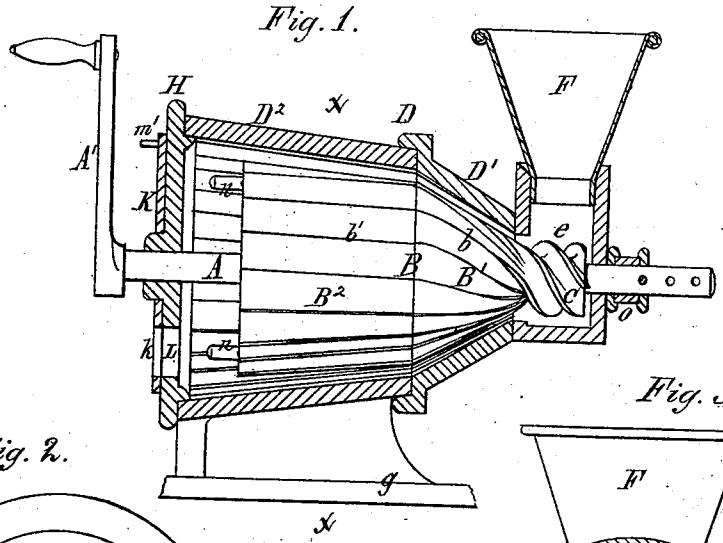


Fig. 2.

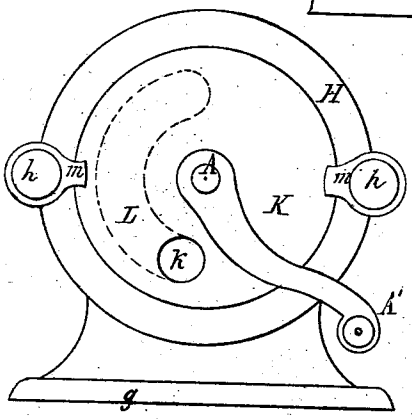


Fig. 3.

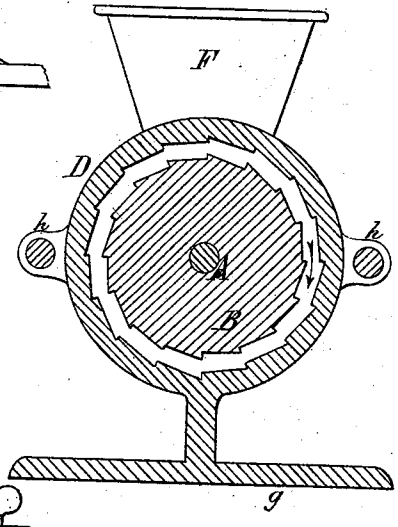
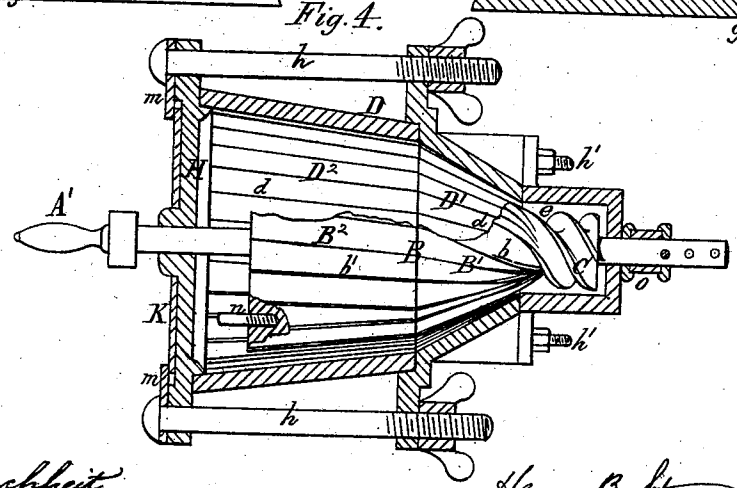


Fig. 4.



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IMPROVEMENT IN APPARATUS FOR HULLING AND POLISHING COFFEE.

Specification forming part of Letters Patent No. **190,453**, dated May 8, 1877; application filed January 11, 1877.

To all whom it may concern:

Be it known that I, HENRY B. STEVENS, of the city of Buffalo, in the county of Erie and State of New York, have invented certain Improvements in Machines for Hulling, Polishing, and Grinding Coffee and other Grains and Seeds, which improvements are fully set forth in the following specification, reference being had to the accompanying drawing.

Heretofore, machines for hulling coffee and other grains and seeds have generally been incapable of hulling and polishing at one operation. The object of my invention is to produce a simple machine by which coffee, &c., can be hulled and polished at a single continuous operation, so as to discharge the finished product in a continuous stream, and which can be driven by hand, or by power derived from any suitable motor. The nature of my invention will be fully understood from the following description.

In the accompanying drawing, Figure 1 is a sectional elevation of my improved machine. Fig. 2 is a view of the discharge end of the machine. Fig. 3 is a cross-section in line *x x*, Fig. 1. Fig. 4 is a horizontal section with a portion of the revolving drum broken away.

Like letters of reference designate like parts in each of the figures.

A represents the driving shaft or spindle of the machine, and B the metallic drum secured thereto. As shown in the drawing, the drum B is composed of two parts or sections, having the form of truncated cones, the angle or taper of the forward part B^1 being greater than that of the rear part B^2. C represents the feed-screw, arranged at the forward end of the drum B, for conveying the material to the latter. D represents the case or concave surrounding the drum B. It is composed of two portions or sections, D^1 D^2, the angles of which correspond with the angles of the respective portions of the drum which they inclose. *e* is the feed-opening or throat of the case D, surrounding the feed-screw C; and F, the feed-hopper arranged above the throat *e*. *g* is a flange or base-plate, cast with the portion D^2 of the case D, for securing the same to any suitable fixed object. H is a circular plate or head, closing the discharge end of the case D, and provided with a central opening, through which passes the driving-shaft A. L is a curved opening or slot, formed in the plate H so as to extend from the lower portion to the top thereof on one side of the driving-shaft, and concentric therewith, as clearly shown in Fig. 2. K is an adjustable disk or circular plate, arranged on the outer side of the plate H, so as to turn on the hub thereof. It is provided with a circular opening, *k*, arranged at a distance from the driving-shaft equal to that of the slot L, so that by turning the plate K the opening *k* can be made to travel over the entire length of the slot L. The portions D^1 D^2 of the case D and the plate H are secured together by bolts *h*, and the throat portion *e* is attached to the portion D^1 by bolts *h'*, as clearly shown in Fig. 4. The shaft A is provided with a hand-crank, A', or with a suitable pulley, when the machine is to be driven by power. The adjustable plate K is held against the stationary plate H by two overlapping washers, *m*, and is provided with a projection, *m'*, for conveniently turning it. *n* represents one or more agitating-pins screwed into the rear end of the drum D, so as to revolve in the space between the latter and the plate H, whereby the clogging of the material at that point is prevented.

The drum D is provided with a number of screw-holes in its rear end, so that any desired number of agitating-pins may be secured thereto, as the nature of the grain operated upon may require. *o* represents a spring or rubber block, arranged on the shaft A at either end of the machine, so as to keep the drum in the proper position with reference to the concave, and at the same time to allow the drum to yield or accommodate itself to grains of a large size, so as to prevent clogging or breakage of the parts. The spring *o* is secured to the shaft A by suitable collars, held in place by pins, nuts, or set-screws, so as to be adjustable on the shaft, in order to regulate the position of the drum with reference to the size of the grains operated upon.

The portion B^1 of the drum adjacent to the feed-screw is provided with a number of spiral grooves, *b*, one starting from the end of each thread of the feed-screw, and the remainder arranged intermediate thereof, and equidistant at the base of the portion B^1. *b'* represents straight grooves, arranged on the por-

tions B^2 of the drum so as to connect with the grooves *b* of the portion B^1. The portions D^1 D^2 of the inclosing case are each provided with straight grooves *d*, as clearly shown in Figs. 3 and 4. The grooves or corrugations of the drum and concave or inclosing case are of a long low bevel, arranged in the direction in which the drum revolves, so that the grains are rolled over and wedged in passing through the machine, instead of being cut and broken, as they would be if the bevel of the grooves were arranged in the opposite direction. The two sections D^1 D^2 of the concave are so arranged with reference to the two sections B^1 B^2 of the drum that the space between the first section B^1 of the drum and the inclosing section D^1 of the concave is less than the space between the second portion B^2 of the drum and the inclosing section D^2 of the concave, so that the first section of the drum and concave will hull or grind the grains, as the case may be, while the remaining sections will perform the polishing or kneading operation. Owing to the small taper of the second section B^2 of the drum, the latter may be adjusted in the concave so as to increase or lessen the space between the first sections B^1 D^1 of the drum and concave with reference to the size and nature of the grain operated upon without materially changing the space between the polishing sections B^2 D^2 of the drum and concave. As shown in the drawing, the drum D is composed of only two distinct sections or cones of different degrees of taper, as for ordinary work two are sufficient; but, if desired, intermediate sections may be employed, decreasing in angle or taper from the feed end of the drum toward the discharge end thereof, while the space between the different sections of the drum and the surrounding case gradually increases from the feed end toward the discharge end of the machine.

The material to be operated upon is introduced into the hopper F, whence it is taken by the screw C and conveyed between the grinding-surfaces. In hulling coffee the berries are rolled over repeatedly, and pressed or rubbed against each other and against the metallic surfaces in passing through the narrow space between the first section B^1 of the drum and the corresponding section D^1 of the concave, whereby the husks or skins enveloping the berries are crushed and separated therefrom. In passing through the larger space between the rear sections B^2 D^2 of the drum and concave the berries are thoroughly polished. By turning the plate K the discharge-opening *k* can be arranged at any desired height, and, by placing the opening *k* partially past the end of the slot L, the size of the discharge-opening can be reduced to any desired extent, so as to retard the discharge of the material, and retain the same in the machine a sufficient length of time to thoroughly finish the material before it is discharged. The resistance at the discharge end of the machine resulting from the elevation or contraction of the discharge-opening, together with the action of the feed-screw, forcing the material between the rubbing-surfaces, produces a pressure upon the kernels or grains operated upon which materially assists in the abrading and polishing process.

When the machine is used for grinding parboiled corn, the grinding or crushing of the kernels is accomplished between the first sections B^1 D^1 of the drum and concave, while the remaining sections operate to knead the crushed material to a thin paste or dough. It is obvious that by properly adjusting the drum the machine may be used for grinding dry grain.

In the drawing, the driving-shaft of the machine is represented as being arranged horizontally; but, if desired, the shaft may be placed vertically, with the feed-screw either at the top or bottom, when the required pressure upon the grain operated upon is produced by decreasing the size of the discharge-opening.

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

1. The combination of a grinding or hulling drum, having the taper or angle of its grooved surface decreasing from its feed end toward its discharge end, with a similarly-inclined concave, the drum being made axially adjustable, so that the space between the drum and concave can be increased or lessened near the feed end without materially changing the space near the discharge end, substantially as and for the purpose set forth.

2. The combination, with a grinding or hulling drum, composed of two or more sections decreasing in angle or taper toward the discharge end, of a surrounding case or concave composed of a corresponding number of similarly-inclined sections, so constructed that the spaces between the corresponding sections of the drum and concave increase in width from the feed end toward the discharge end of the machine, substantially as and for the purpose hereinbefore set forth.

3. The combination, with the concave D, of the fixed tail-plate H, provided with curved slot L, and adjustable plate K, provided with opening *k*, substantially as and for the purpose hereinbefore set forth.

4. The combination, with the drum B and feed-screw C, of the concave D, tail-plate H, slot L, adjustable plate K, and opening *k*, substantially as and for the purpose hereinbefore set forth.

5. The grinding-drum B, composed of the conical grinding or hulling portion B^1, provided with spiral grooves *b*, and polishing or kneading portion B^2, made less tapering, and provided with straight grooves *b'*, substantially as hereinbefore set forth.

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