(No Model.)

F. A. GARDNER.

Coffee or Rice Mill.

No. 234,019. Patented Nov. 2, 1880.

FIG. 1

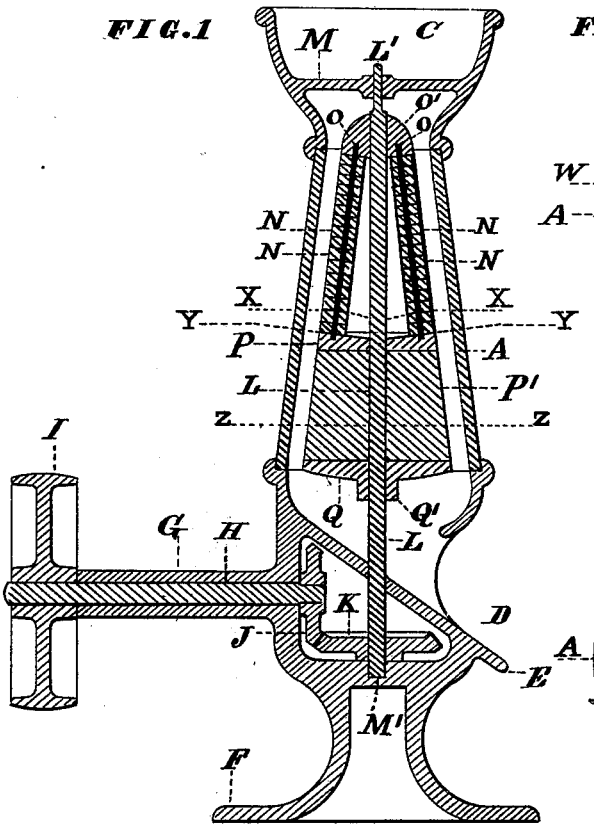

FIG. 2

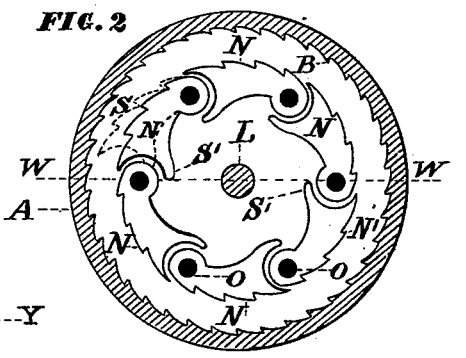

FIG. 3

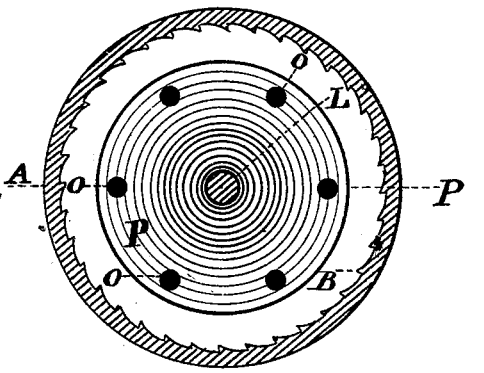

FIG. 4

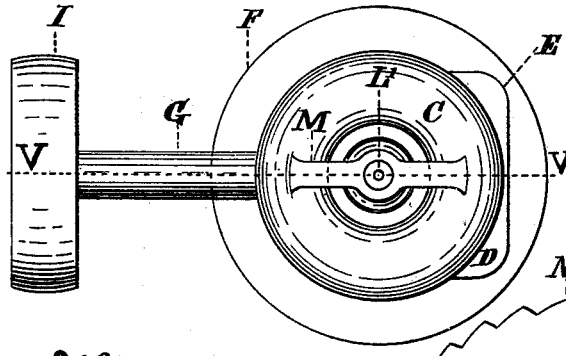

FIG. 5

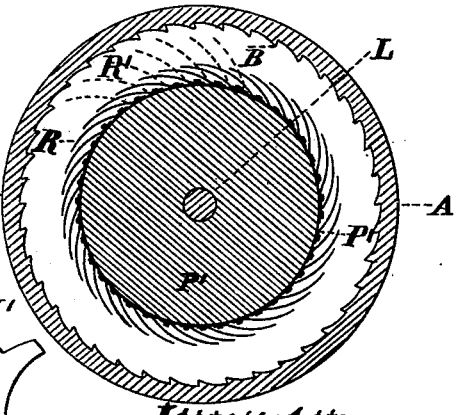

FIG. 6

FIG. 7

Witnesses.
Hugh Sangster,
Joseph G. Chenk.

Inventor:
Frederick A. Gardner,
By James Sangster,
Atty.

UNITED STATES PATENT OFFICE.

FREDERICK A. GARDNER, OF BUFFALO, NEW YORK, ASSIGNOR TO HIMSELF AND R. DUNBAR & SON, OF SAME PLACE.

COFFEE OR RICE MILL.

SPECIFICATION forming part of Letters Patent No. 234,019, dated November 2, 1880.

Application filed April 14, 1880. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. GARDNER, a subject of the Queen of Great Britain, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Mills for Hulling Coffee or Rice, of which the following is a specification.

The first part of my invention relates to the devices for removing the hulls from coffee, rice, or other similar material; and it consists of a mill in which the hulling mechanism is composed of a number of hulling-arms having their outer or rubbing faces serrated or otherwise roughened, and the whole jointed together one above the other and arranged in a series of columns in the form of a frustum of a cone. The arrangement is such that the rotary movement of the hulling mechanism will cause the ends of the arms to be moved outward by centrifugal force toward the sides of the mill, which is also serrated or otherwise made rough, a stop being connected with each arm to prevent it moving out too far, as and for purposes which will be more clearly hereinafter shown.

The second part of my invention relates to the polishing mechanism; and it consists of a wooden frustum of a cone, or a short cylinder arranged below the hulling-arms, so as to rotate with them on the same shaft, and having a series of flaps or strips of leather or other suitable flexible material nailed or otherwise fastened at one side to the periphery of the same, in combination with the mill-case in which it is placed, and a suitable means for operating it, as will be more clearly shown by reference to the drawings, in which—

Figure 1 is a vertical central section through line V V, Fig. 4. Fig. 2 is a section through the mill horizontally on line X X, Fig. 1. Fig. 3 represents a horizontal section through the mill on line Y Y, Fig. 1. Fig. 4 is a plan or top view of a mill complete. Fig. 5 represents a horizontal section through the body of the mill on line Z Z, Fig. 1; and Figs. 6 and 7 represent a top and back view of one of the hulling-arms enlarged. Figs. 2, 3, and 5 are also enlarged, so as to show the small parts more clearly.

A represents the case or body of the mill. It is serrated on the inside, as at B in Figs. 2, 3, and 5, which grooves and teeth run vertically up and down the case.

C is the mouth into which the material to be hulled or polished is placed, and D represents the opening through which the material passes from the mill into a receptacle after being hulled and polished.

E is an inclined table down which the material slides as it leaves the mill.

G represents a pipe-box in which the shaft H turns, and I represents the driving-pulley.

F is the base of the mill. The driving-shaft H is connected by gearing J K to the vertical shaft L, to which is secured the hulling and polishing mechanism. The shaft L is fastened in place at the top, so as to turn easily, by a cross-brace, M, through which the end L′ passes, as shown in Fig. 1. The lower part passes through the inclined plate E and into a bearing, M′, below the gear-wheel K. (See Fig. 1.)

N represents the hulling-arms. They are provided with teeth N′, (see Figs. 2 and 6,) and are jointed so as to swing on rods O, as shown in Figs. 1 and 2, Fig. 1 representing a section through two of said rods and the hulling-arms connected thereto, which section cuts through the arms and rods in line W W, Fig. 2, showing the rods and the arrangement of the arms one above the other, and Fig. 2 showing the arrangement of the rods and arms from a top view.

The number of rods and arms may be greater or less than the number shown, and for some purposes the teeth N′ and B may be dispensed with.

Instead of arranging the hulling-arms in the form of a cone or frustum, they may be arranged in the form of a cylinder. The rods O are secured in place at the top by a metal cap, O′, the ends of each passing into a hole or depression in said cap, and at the bottom by a base-plate of metal, P, into which the lower ends pass, as shown in Fig. 1. Both the cap and base-plate are keyed or otherwise securely fastened to the shaft L, and the base-plate P is secured to the wooden polishing-cylinder or frustum P′, which is also fastened to the shaft

L and secured thereto by a circular metal plate, Q, which is either keyed or fastened by a set-screw in the hub Q′ to the shaft L.

To the wooden frustum or cylinder P′ is fastened a series of leather or flexible flaps or strips, R. (See Fig. 5.) These flaps are nailed or tacked onto the wood P′, one side only of each being fastened vertically on said wood, thereby leaving the opposite side free, so that when the machine is in operation they will be thrown outward by centrifugal force toward the inner sides of the mill-case, as shown by dotted lines R′ in Fig. 5. The hulling-arms are also forced outward in a similar way, as shown by dotted lines S in Fig. 2, and are provided with stops S′, to prevent them from swinging out too far.

The operation of my invention is simple and easily understood. Motion being given to the driving-pulley I, the hulling-arms and polishing device are made to rotate rapidly by means of the gearing J K. When the material is put in it is first acted on by the hulling-arms, the centrifugal force causing them to move or swing out with sufficient power, and it is then acted on by the polishing or cleaning mechanism, which cleans the nut or grain after the hulls are off. For some kinds of material the polishing device may be left off and the hulling mechanism used alone; and the hulling-arms, instead of being jointed to rods, as described, may be arranged on plates and made to slide in grooves therein radiating from the central shaft L; but I prefer the arrangement substantially as described.

I claim as my invention—

1. A grinding-mill provided with an outer internally-serrated case and an inner revolving cone consisting of a series of serrated metal arms pivoted to the main shaft, said arms being provided with projections or stops to limit their movement, and arranged to operate in connection with the case, as set forth.

2. In a grinding-mill, the combination, with the main shaft and casing, of a series of serrated metal hulling-arms arranged on shafts around said main shaft and having their respective ends interlocked, as shown, to limit their movement, as set forth.

3. In a grinding-mill, the combination, with the serrated case and main shaft, of a revolving cone consisting of serrated arms arranged on a series of shafts around said main shaft, the retaining-cap O′, plate P, polishing device P′, and hub Q′, substantially as set forth.

FREDERICK A. GARDNER.

Witnesses:
JAMES SANGSTER,
HUGH SANGSTER.