No. 655,805. Patented Aug. 14, 1900.

L. C. SHELLABARGER.

GRINDING MILL.

(Application filed July 24, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

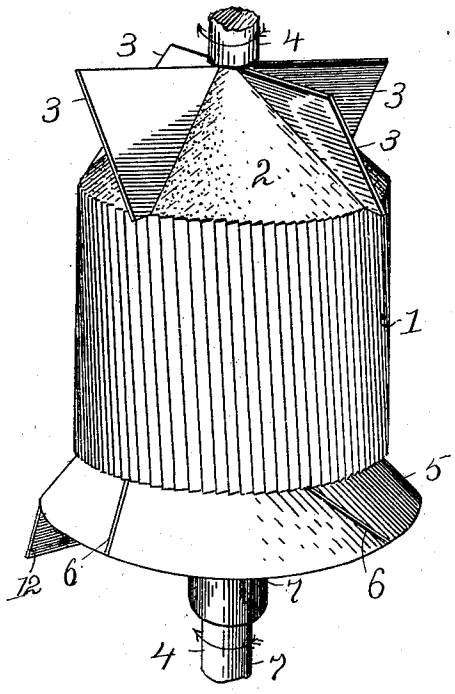
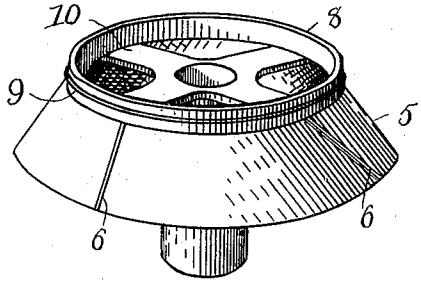


Fig. 2.



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Fig. 3.

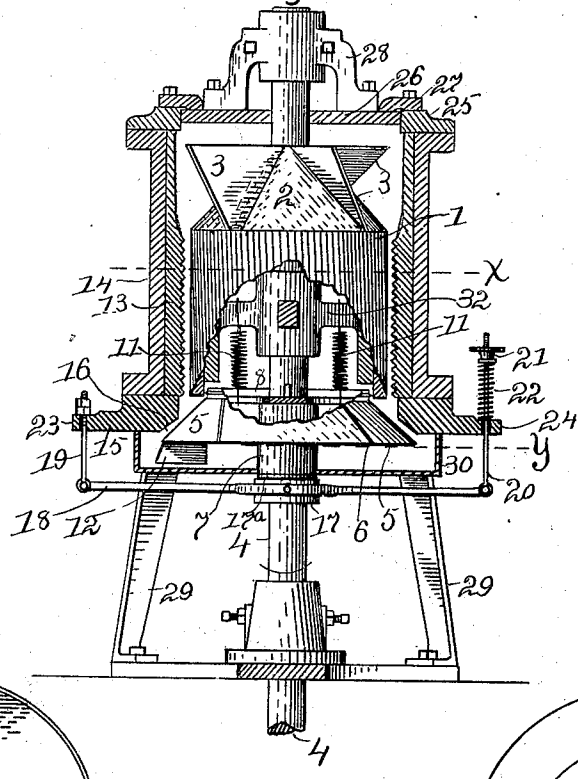


Fig. 5.

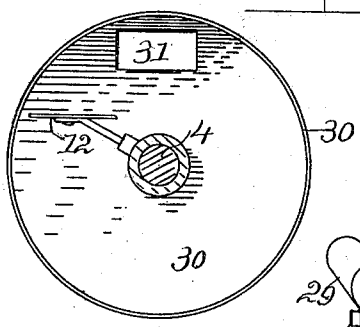


Fig. 6.

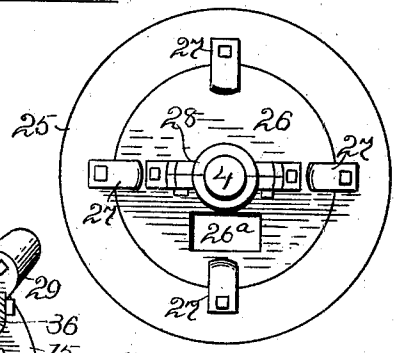
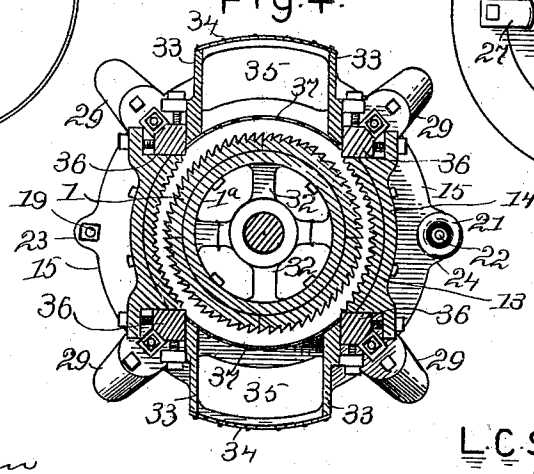


Fig. 4.



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UNITED STATES PATENT OFFICE.

LUCIEN C. SHELLABARGER, OF DECATUR, ILLINOIS.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 655,805, dated August 14, 1900.

Application filed July 24, 1899. Serial No. 724,984. (No model.)

To all whom it may concern:

Be it known that I, LUCIEN C. SHELLABARGER, of the city of Decatur, county of Macon, and State of Illinois, have invented certain new and useful Improvements in Mills for Breaking, Degerminating, and Scouring Cereals, of which the following is a specification.

My invention is particularly applicable to hominy-mills. It is exemplified in the structure hereinafter described, and it is defined in the appended claims.

In the drawings forming part of this specification, Figure 1 is a perspective representation of a feeding-cone, a discharge-cone, and an interposed cylinder. Fig. 2 is a perspective representation of the conical discharge-controller. Fig. 3 is a vertical section through the shell and frame of a mill, showing the cylinder and discharge-controller broken away to expose details therein. Fig. 4 is a transverse section on line *x* in Fig. 3. Fig. 5 is a plan of the discharge-pan, the shaft and the hub of the discharge-controller being shown in cross-section on line Y in Fig. 3. Fig. 6 is a plan of the top of the mill.

The mill is of the vertical type, and the breaking, degerminating, scouring, or grinding mechanism comprises a cylinder and a shell constructed in any desirable manner and provided with suitable roughened, protuberant, or corrugated surfaces. In this instance the cylinder 1 is corrugated and the shell or concave 13 has inwardly-extending protuberances, preferably of conical shape; but this may be varied to suit different requirements. On the upper end of the cylinder is fixed or formed a cone 2, which is provided with feed-wings 3, which are fixed on the cone, with their extended sides inclined forward or in the direction of the rotation of the cylinder and cone. The wings may be described geometrically as right-angled triangles, with their hypotenuses in contact with the cone 2, their sides in a horizontal plane coincident with the top of the cone, and their bases extended beyond the periphery of the cylinder. The corners of the wings are cut off or omitted at the conjunction of the cone with the cylinder, and the upper corners are inclined forward, as shown and described. This is the preferred form; but I do not confine myself to geometrically-accurate construction, and the form and disposal of the wings may be varied somewhat without departing from the essential peculiarities defined in the claims. It is the function of the cone to provide inclines down which the cereal to be treated may travel to the space between the cylinder and the shell, and it is the purpose of the wings to force the cereal downward and outward by inclined-plane action beyond the base of the cone. The cereal is supplied to the upper end of the machine above the cone, the shaft 4 is rotated in the direction indicated by arrows in the drawings, carrying the cylinder and the cone with it, and the feeding is effected as described.

The discharge from the cylinder is controllable, so that the cereal may be submitted to the action of the cylinder and shell for the time required to produce best results, and the means employed to control the discharge are embodied in a frustum of a cone 5, which rotates with shaft 4 and is vertically shiftable thereon, and an annular bearing in the bottom of the mill with which the cone coacts to form a variable passage-way. The cone 5 is splined onto shaft 4, and its weight is preferably sustained by springs, as 11 in Fig. 3, which are in this instance connected with the spider 32 of the cylinder and the spider of the cone. The inner lower edge of the base-plate 15 of the shell is chamfered, as shown at 16, forming an annular bearing-surface opposed to the upper surface of cone 5 and diverging slightly downward from such surface. The frustum 5 has on its diminished end a vertical ring 8, which fits inside the lower end of the grinding-cylinder, and a circumferential rib or ribs, as 9 in Fig. 2, are formed on the outer surface of the ring. The cone 5 also has ribs, as 6, on its upper surface, the purpose of which is to prevent the crushed cereal discharged over the cone from becoming packed in the discharge-passage, and they are preferably disposed with their upper ends in advance of their lower ones. The purpose of the circumferential rib or ribs 9 is to prevent dust from accumulating and packing in the space between the ring 8 and the adjacent inclosing wall of the cylinder, and the vertical motion of the ring is relied on to keep the space clear through the agitation imparted to the rib. The cone 5 has a downward-

extended sleeve 7, through which it is splined to the shaft, and an adjusting-lever 18 connects with a collar 17 below it in a manner to provide vertical adjustment for the cone. An antifriction-collar 17ª is placed between the collar 17 and the sleeve. One end of the lever is fulcrumed on a rod 19, which depends from a lug 23 of the base-plate of the grinding-shell, and the other end is pivotally connected with a rod 20, which extends upward through an opening in lug 24 of the base-plate of the grinding-shell. The upper end of rod 20 is threaded and provided with a finger-nut 21, and between the finger-nut and the lug is placed a compression-spring 22. The purpose of the lever, the adjusting-rod, and the nut is to vary the approach of the cone toward the bearing 16 of the plate 15, and the purpose of the spring is to aid in effecting such adjustment and to make the positions yielding and to some extent automatically adjustable. The discharge passage-way extends entirely around the bottom of the mill, giving clearance on all sides and obviating the useless expenditure of force applied to dragging the stock to an opening placed in some particular location and the injurious effect on the stock incident to such dragging or forcing. The space is kept sufficiently large to permit free discharge of properly-treated stock and small enough to retain the stock until it is properly treated. The tendency of the feeding-wings is to force the stock through the mill, a tendency to which gravity contributes, and the spring 22 is made to yieldingly resist this pressure with just enough force to produce the required result, closing up the discharge-space when the quantity of stock in the mill becomes reduced and enlarging it when an accumulation of stock requires such action. When the stock passes from the grinding-compartment, it falls into a pan 30, which has an opening 31, as shown in Fig. 5, which may communicate with a chute. A scraper 12 is formed on the bottom of cone 5, as suggested in Fig. 3, or fastened to the sleeve of the cone, as shown in Fig. 5, and the function of such scraper is to force the stock toward outlet 31.

The details of construction of the mill apart from the novel features specifically claimed are not essential; but I prefer to make them as shown in the drawings, where two grinding-spaces and two relieving-spaces are alternated. The grinding-surfaces of the cone are formed on plates attached to a cylinder 1ª, and the cylinder is mounted on the shaft 4 through a spider 32. Four posts 36 rise from the base-plate 15 and divide the exterior of the frame into four equal spaces. In two opposite spaces plates 14 are set and connected with the posts by adjusting-bolts, and on the inner surfaces of the plates are fastened grinding-plates 13, preferably supplied with inward-extended conical protuberances. In the other spaces between posts are placed perforated plates 37, through which a part of the stock treated in the grinding compartment next preceding may pass. These perforated plates are also connected with the posts by means of adjusting-bolts, and from their frames vertical ribs 33 extend outward to form side walls of passage-ways for the stock escaping through the perforations. To complete such passage-ways, imperforate plates 34 are fastened to the outer surfaces of ribs 33 and openings 35 are formed in the base-plate. Legs 29 are used to support the mill at proper height, and the upper end of the mill is inclosed by ring 25 and disk 26, which is fastened to the ring through lugs 27 and which has an inlet-opening 26ª. On the disk 26 is mounted a bracket 28, which forms a bearing in which the upper end of shaft 4 is journaled, and another bearing for the shaft is formed in the lower end of the frame. The disk 26 may be placed in different positions on the mill, so as to vary the relative location of the inlet-opening, and the same is true of pan 30 with reference to the discharge-opening.

What I claim is—

1. A mill for treating cereals, comprising a vertical concave or casing, a vertical shaft concentric with the casing, a cylinder fixed on the shaft, a conical valve below the cylinder turning with the shaft and having free motion lengthwise thereof and a spring-support for the valve, whereby the space between the valve and the casing depends on the relation of the downward pressure of the cereal to the upward pressure of the spring and the rotation of the valve distributes circumferentially.

2. A mill for treating cereals comprising a vertical concave or casing, a vertical shaft concentric with the casing, a cylinder fixed on the shaft, a conical valve below the cylinder splined on the shaft to rotate therewith and having vertical motion thereon and springs connected with the cylinder and with the valve to approximately sustain the valve.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

LUCIEN C. SHELLABARGER.

Witnesses:

WM. T. CUSSINS,

L. P. GRAHAM.