

(No Model.)

2 Sheets—Sheet 2.

F. WILSON.
GRINDING MILL.

No. 292,524.

Patented Jan. 29, 1884.

Fig. 4.

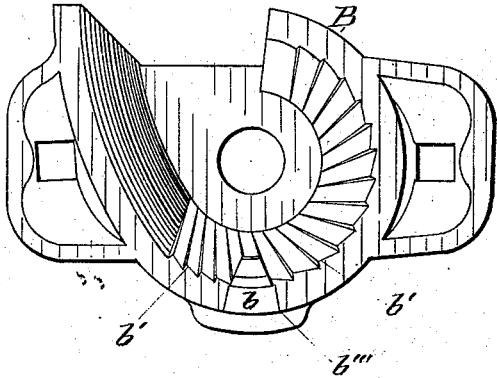


Fig. 6.

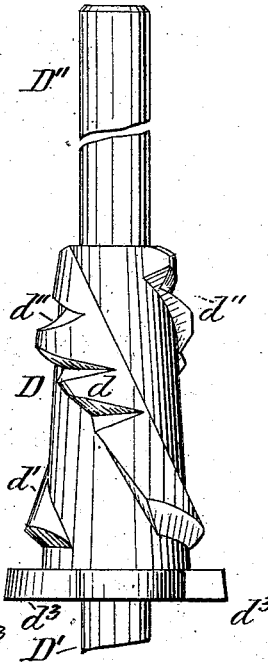


Fig. 5.

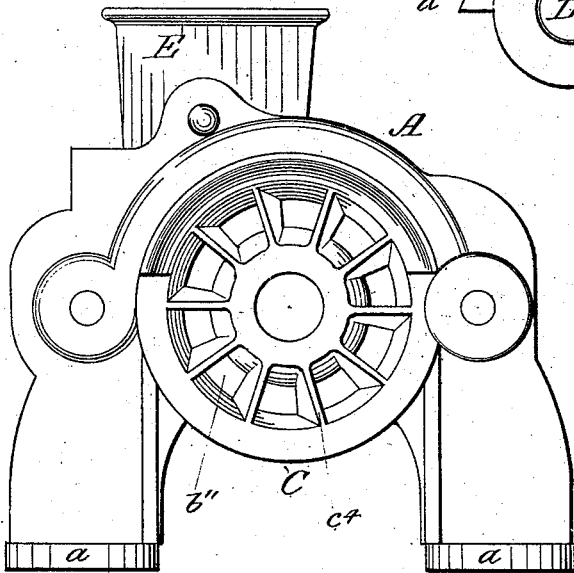


Fig. 7.

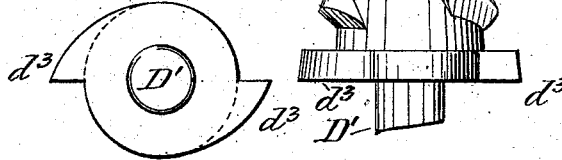


Fig. 8.

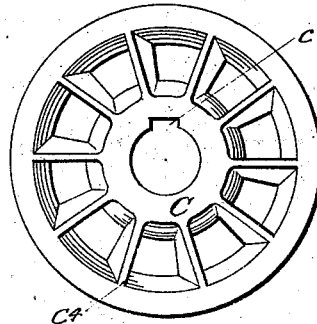


Fig. 9.

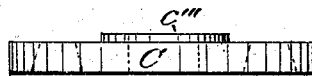
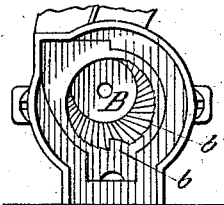


Fig. 10.



WITNESSES

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FRANK WILSON, OF EASTON, PA., ASSIGNOR OF TWO-THIRDS TO JOHN L. WILSON AND JAMES E. WILSON, BOTH OF SAME PLACE.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 292,524, dated January 29, 1884.

Application filed November 14, 1883. (No model.)

To all whom it may concern:

Be it known that I, FRANK WILSON, a citizen of the United States, and a resident of the city of Easton, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a full, clear, and exact description.

The invention relates to a mill which is adapted for grinding animal and vegetable substances, but which may be employed in disintegrating some varieties of mineral substances also; and the invention consists in certain novel elements or combinations of elements, as will appear from the description and claims.

In the drawings, Figure 1 is a vertical longitudinal central section, the parts which are adapted to be revolved being shown in elevation. Fig. 2 is a vertical longitudinal central section, portions being broken off, of a modified form of construction. Fig. 3 is a perspective end elevation, showing the discharge end of the machine. Fig. 4 is an end view of the shell or non-revoluble portion of the machine. Fig. 5 is an elevation of the outer end portion of the mill as detached from the shell. Fig. 6 is an elevation of the conical grinding-shaft. Fig. 7 is an end view of the large end of the grinding-cone. Fig. 8 is an elevation showing the outer face of the disk as constructed when such disk is made detachable. Fig. 9 is a plan view of the detachable disk. Fig. 10 is an end view, drawn to a reduced scale, of the frame and shell, the grinding-cone being removed, showing the manner in which the two parts are sometimes made separately and afterward united.

A is the body or frame of the machine, and *a a* are perforated lugs by which it is adapted to be secured upon any suitable support.

B is the conical shell or receptacle for the substance which is to be ground, provided, as shown in Figs. 1, 2, 4, and 10, with a tooth, *b*, arranged centrally in the bottom thereof and at or near the larger end, as shown, and with a series of serrations, *b'*, extending along the bottom of the shell and to a point below the feed-supply opening, and extending on the side opposite the feed-opening to the top or nearly to the top of the shell.

C is a grinding and discharging disk, which is either cast with the body or frame of the mill, as in Figs. 1 and 5, or separately therefrom for subsequent attachment, as in Figs. 2, 3, 8, and 9, to the end of a conical grinding-shaft. The disk is constructed somewhat after the manner of a spider-wheel; but it will be noted that the inner edges of its bars or webs *c'*, which are sharp, are placed in a direction opposed to that which is given to the material which is being ground, and that the orifices *b''* enlarge outwardly.

D is the conical grinding-shaft, which is adapted to be placed by its ends *D' D''* in the journal-bearings *B' B''* of the shell and the disk. Upon its surface are arranged, preferably spirally, as shown, crushing and cutting ridges *d*, two or more in number, as may be desired. These crushing or grinding ridges, divided into teeth *d'* by the notches or grooves *d''*, may extend from end to end of the cone; or they may terminate at a short distance from the large end of the cone, as shown in Figs. 1, 2, and 6. When the latter form is used, arms or teeth *d'' d'''*, arranged tangentially to the periphery of the cone, as shown in Figs. 1, 2, 6, and 7, will be provided at its larger extremity, the cutting-face of the teeth being perpendicular, or substantially so, to the axis of the cone. When the separate cutting and discharging disk C is employed, it will be provided with a recess, *c*, to receive a spline, *c'*, the lower or inner portion of which will engage with a corresponding slot or groove formed in the face of the journal *D'* of the cone *D*, as represented in Fig. 2. This detached disk will be secured against displacement by a cross-bar, *D³*, which is provided with an orifice at its mid-length, by which it is passed over the end *D'* of the shaft, and with end orifices, by which it is bolted to the frame or supporting portion of the machine.

When the mill is of small dimensions, the larger end of the shell may rest on a suitable ledge, *e*, as in Fig. 1, and the shell may be secured to the disk portion by means of a suitable bolt, *e'*, which engages with the upper or hopper portion, *E*, of the shell. If desired, the shell may be composed of two distinct conical parts, one of which is adapted to fit

within the other, as in Fig. 10; but it is immaterial, except as a matter of convenience in casting the parts, of how many sections the shell is composed.

5 The tooth *b* is ordinarily made detachable, its lower portion enlarging downwardly, as shown in Fig. 4 and in full lines in Fig. 10.

10 The detachable disk *C* may be provided with a projecting perforated portion, *c''*, to increase the bearing-surface upon the journals.

15 Ordinarily all the parts will be composed of iron; but the tooth *b* when made detachable and adapted to fit within a cavity, *b''*, and, if desired, other crushing-surfaces, may be of steel.

20 In operation, a crank, *F*, will be applied to the end *D''* of the shaft, and secured by means of a set-screw, *f*; but, if desired, the end of the shaft may be squared to receive the crank in the ordinary manner. Material being supplied through the hopper *E*, such portions thereof as are adapted to be engaged by the projections on the inner surface of the shell and by the spiral projections on the surface of the conical portion of the grinding-shaft will be crushed thereby, while the larger portions will be gradually moved along the downwardly-inclined interior bottom surface of the shell until they are brought into position to be operated upon by the central tooth, *b*, and the other contiguous crushing-surfaces at the discharging end of the machine, the ground material being continuously discharged through the orifices *b''* in the disk.

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

40 1. The combination, with the shells of a grinding-mill, of a central crushing-tooth placed in the lower portion of the shell and projecting upwardly to a considerable distance above the plane of the upper extremities of the serrations upon the contiguous inner surface of the lower portion of the shell.

2. The combination, with the shell of a grinding-mill, the infer surface of which is provided with a series of serrations, of a central crushing-tooth located at the bottom of the discharging end of the shell and projecting upwardly above the general surface of the interior bottom portion of the same.

3. The combination, with the shell of a grinding-mill, of a crushing-tooth which is centrally located in the bottom of the shell, at one end thereof, and a revoluble cone which is provided with crushing arms or teeth which are adapted to move unground material against the centrally-located crushing-tooth.

4. The combination of a grinding-shell which has interior serrations, and an upwardly-projecting tooth, with a revoluble cone which has spiral grinding-ridges and end crushing arms or teeth.

5. The combination, in a grinding-mill, of a shell the interior surface of which is provided with a series of serrations and an end crushing-tooth, and the larger end of which is provided with a disk which has a series of discharge-openings, with a revoluble grinding-cone which has upon its sides spiral ridges and upon its larger end crushing arms or teeth, substantially as described.

6. The combination, with the shaft or journal of a grinding-mill, of a detachable disk, such disk being provided with cutting-surfaces and with outwardly-enlarging orifices, through which the ground material is ejected when the mill is in operation.

7. The combination, in a grinding-mill, of a shell the interior surface of which has a series of serrations, a revoluble cone which has spirally-arranged ridges and end crushing arms or teeth, and a disk which has outwardly-enlarging discharge-orifices.

FRANK WILSON.

Witnesses:

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