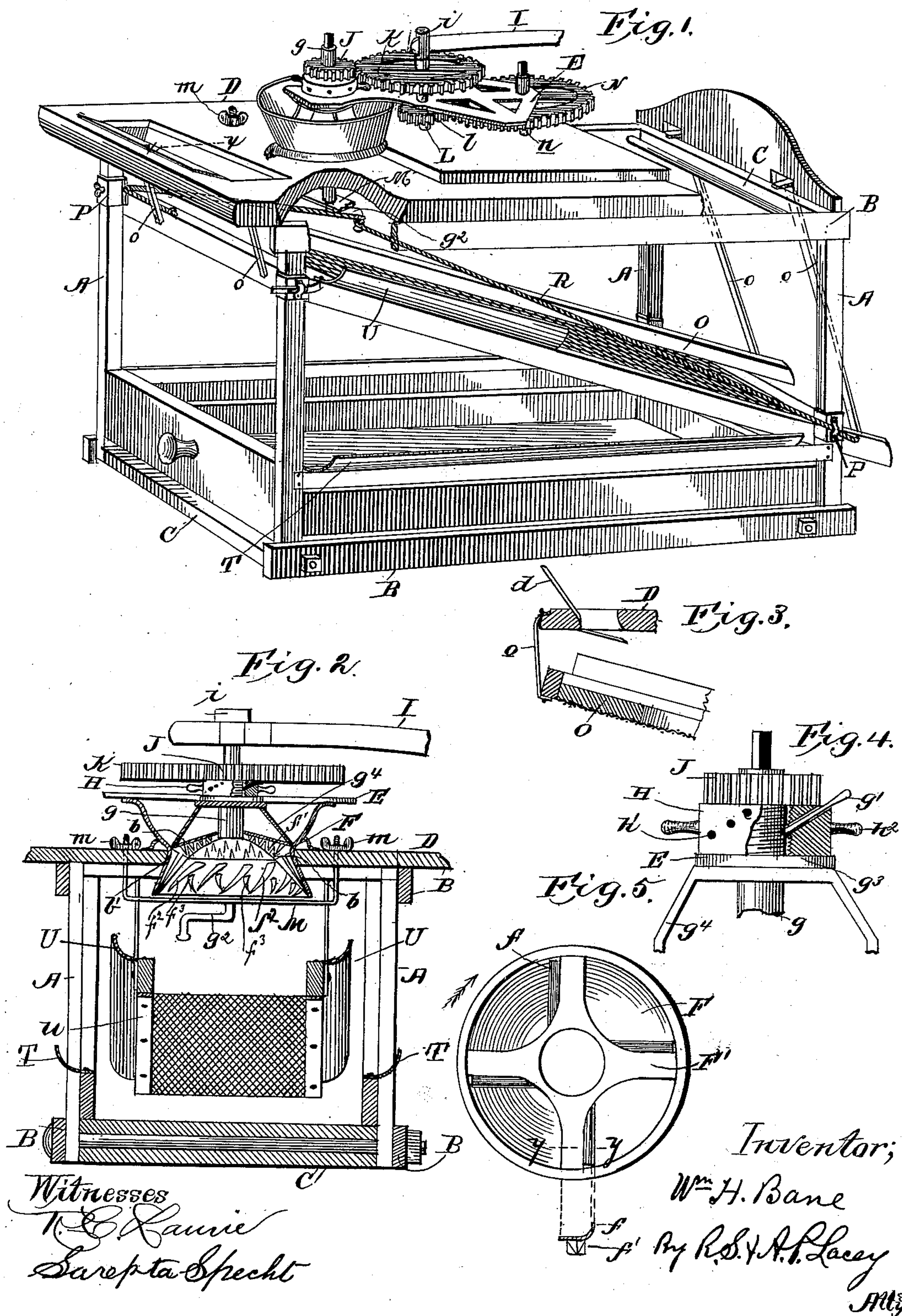


(No Model.)

W. H. BANE.
CRUSHING AND GRINDING MILL.

No. 359,659.

Patented Mar. 22, 1887.



UNITED STATES PATENT OFFICE.

WILLIAM H. BANE, OF GALLIPOLIS, OHIO.

CRUSHING AND GRINDING MILL.

SPECIFICATION forming part of Letters Patent No. 359,659, dated March 22, 1887.

Original application filed December 19, 1885, Serial No. 186,071. Divided and this application filed May 15, 1886. Serial No. 202,242. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BANE, a citizen of the United States, residing at Gallipolis, in the county of Gallia and State of Ohio, have invented certain new and useful Improvements in Crushing and Grinding Mills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to grinding-mills for crushing and reducing ear-corn, grain, feed, and fertilizers.

It consists in the novel features more fully hereinafter described, claimed, and shown in the annexed drawings, in which—

Figure 1 is a perspective view, parts being broken away, of a machine provided with my improvements. Fig. 2 is a detail sectional end view, parts being broken away. Fig. 3 is a detail section on the line X X of Fig. 1, parts being broken away. Fig. 4 is an enlarged view in elevation of the upper portion of the cone-shaft and support, showing the means for adjusting the shaft and the cone mounted thereon. Fig. 5 is a plan view of the shell, showing a section of one of the arms on the line Y Y.

The frame of the machine comprises corner-posts A, upper and lower side and end bars, B and C, respectively, and the table D. A mill of the cone shell and type is supported on one end of the table in the usual manner, and driven by a train of gear-wheels, the shafts of which project above said wheels, to afford a means for the application of a shiftable lever, I, having a socket-casting, *i*, to fit the ends of the several shafts *g*, *L*, and *n*, provided with the intermeshing gear-wheels J, K, *l*, and N, respectively, whereby speed may be applied as occasion may require. For grinding or crushing substances requiring great power—such as ear-corn—the power is applied directly to the cone through its extended crank-shaft *g* by means of the lever I. When it is desired to grind substances not requiring so much power

and a higher rate of speed, the lever is applied to the shaft *L*. To obtain a still higher rate of speed, as when grinding fertilizers or similar substances not requiring great force, the power is applied to the shaft *n* by means of the lever I.

The several shafts have their upper bearings in a plate, E, of diamond shape, having an extending arm projecting from one of its corners. In the outer end of this corner the cone-shaft is journaled. The other shafts are journaled one at or near the junction of the arm with the plate and the other in the diametric opposite corner. In this manner the shafts are all in line.

The shaft *g*, which may be an integral part of the cone, or separate and keyed thereto and projecting below the shell F, terminates in a crank, *g*². The upper portion, which extends above the bearing-plate E, is threaded and provided with an adjusting-collar, H, for regulating the distance between the cone and shell for various grades of grinding. Handles *h*², extending from the collar, serve as a means for rotating the collar when adjusting it.

A pin, *g*¹, passing through one of a series of openings, *h*¹, obliquely formed in the collar at different levels, and extending into a vertical groove, *g*³, in the side of the shaft *g*, holds the collar in adjusted position. The collar rests upon the arm of the bearing-plate, and the latter is strengthened by a bracket or brace, *g*⁴, having its lower ends secured to the inside of the shell.

The lower end of the shaft *g* is supported by a stirrup, M, by which the cone can be independently adjusted, and for this purpose its ends are bent at right angles, threaded, projected through the table, and provided with thumb-nuts *m*.

The shell is downwardly and outwardly flared from the medial line of the hopper and grinder, or the upper or hopper portion may be separate from and fitted to the lower or grinder portion. The shell is provided with radial arms F', having flanges *f* extending from their forward edges, with which the grain catches in the operation of grinding, and is directed between the cone and said arms F'. The arms incline from the shell toward the

shaft in an upward and inward direction, and the teeth on their under sides gradually grow longer as they recede from the shaft, and act in opposition to corresponding upwardly-projecting teeth, *b*, on the cone. The inside of the shell is provided with teeth *b'*, which increase in thickness as they recede from the lower edge. Corresponding teeth, *f*², on the lower portion of the cone, diminish in thickness as they approach the base. The teeth may be straight or curved, the latter being preferred, as it gives the best results. Smaller teeth, *f*³, are interposed between the larger teeth, *f*², on the cone to fill up the spaces which would otherwise be left.

A shaking-screen, *O*, is suspended beneath the table *D* by hangers *o*, of rubber, leather, chains, or other flexible material. Castings *P*, adjustably connected to a pair of diagonally-arranged corner-posts, have pulleys or guides, over which passes a cord or rope, *R*, having its ends attached to diagonally-opposite corners of the screen, said cord being in connection with and operated from the crank *q*² of the cone-shaft for giving the screen a side-to-side motion. The screen and its operating and supporting devices, although referred to and shown in the drawings, do not form a part of this invention, as the same are shown, described, and claimed by me in Patent No. 342,166, granted May 18, 1886, of which this is a division.

The table near one end is transversely slotted, and is provided with a board, *d*, forming a chute for delivering grain, &c., to the screen when it is desired to remove dust, &c.

The screen, as well as the lower side bars, is provided with guards *U* and *T*, respectively, to prevent the loss of grain.

From the foregoing description and the accompanying drawings, the operation of the machine can be readily understood; hence a detailed description is deemed unnecessary.

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

1. In a grinding-mill, the combination of a cone and shell, a train of gear-wheels, the shaft of each wheel projecting upward above the same, and an operating-lever adapted to engage any of the gear-shafts, whereby the cone may be driven at any desired rate of speed, substantially as and for the purpose set forth.

2. The combination of the cone and shell, the cone-shaft having a threaded extension and being slotted or grooved on one side, the adjusting-collar provided with a series of openings at different levels, and a pin or key adapted to be passed through either of the openings and hold the collar in adjusted position, substantially as described.

3. The combination of the shell, the cone, the threaded cone-shaft slotted or grooved on one side, the adjusting-collar provided with a series of openings at different levels formed obliquely therethrough, and a pin for passing through either of the openings into the slot or groove in the cone-shaft, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. BANE.

Witnesses:

A. L. ROADARMOUR,
JOHN ROADARMOUR.