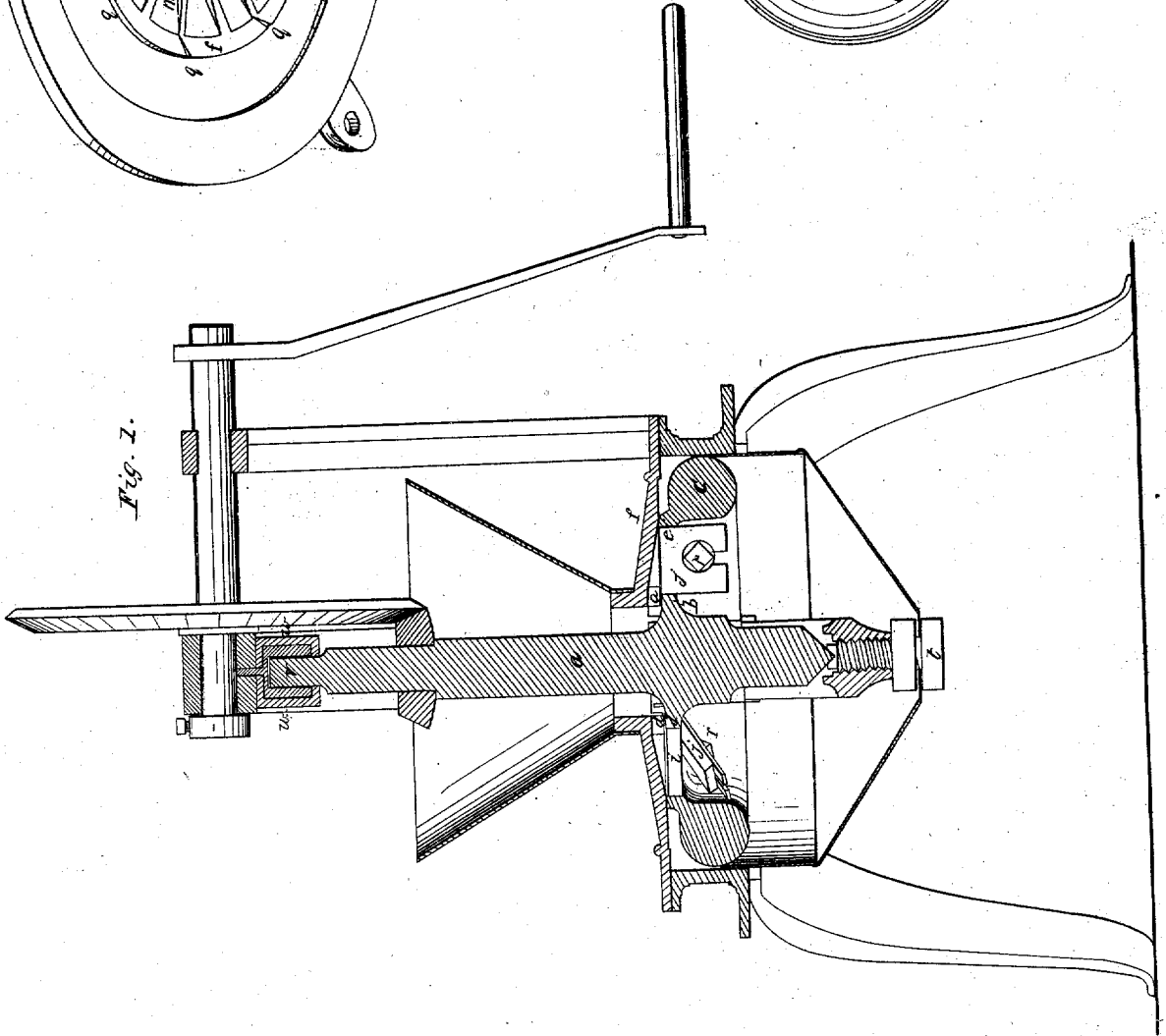
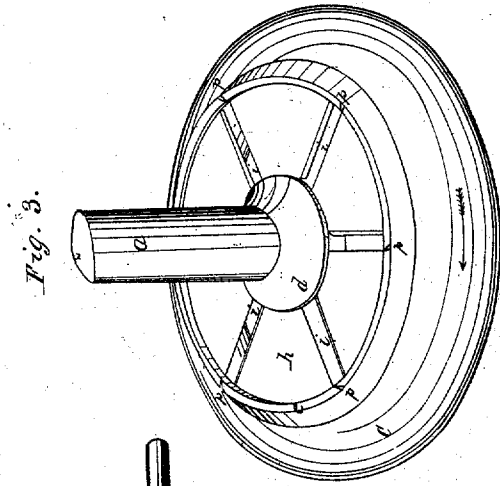
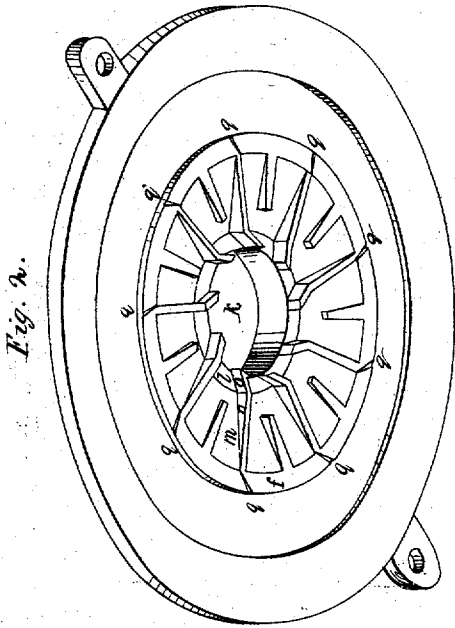


J. Burdge,
Flouring Mills,
No 15,060, Patented June 10, 1856.



UNITED STATES PATENT OFFICE.

JONATHAN BURDGE, OF CINCINNATI, OHIO.

CUTTING FLOUR-MILL.

Specification of Letters Patent No. 15,060, dated June 10, 1856.

To all whom it may concern:

Be it known that I, JONATHAN BURDGE, of Cincinnati, Hamilton county, Ohio, have invented new and useful Improvements in Flouring-Mills; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, making part of this specification.

My invention has for its objects, increasing the efficiency of that class of grinding mills in which (with less than one fourth of the power requisite for bur mill stones of equal efficiency) the grain is reduced to meal by the action of plane bits; producing a "rounder" better granulated and whiter meal, free from "grit" and in better condition for panary fermentation than that produced by the pulverizing and overheating action of mill stones.

In the annexed drawings Figure 1 is an axial section of my mill. Fig. 2 represents in perspective the under or working side of the counter plate. Fig. 3 represents in perspective the top of the revolving bit head.

The mill spindle (*a*) has projecting rectangularly from it, a disk (*b*) having a rim (*c*) of sufficient dimensions to perform the functions and supersede the necessity of an external fly wheel; thus rendering the mill very compact, and making the rapid motion of the head conducive to greater steadiness and evenness of action than is obtainable by a detached fly wheel. The momentum being right where you want it—at the work. The upper surface level of this bit-head consists of a central ledge (*d*) and a marginal ledge (*e*) the last named ledge being arranged to revolve parallel and in close proximity to a corresponding ledge (*f*) on the under side of the cover or counterplate; so as to prevent the escape of the grain between the said external ledges (*e f*) of the bit-head and the counterplate.

The portion (*h*) of the top surface of the head (*b*) situated between the ledge (*d*) and the ledge (*e*) is slightly depressed as represented, so as to prevent an annular lead surface, a little lower than the ledges (*d* and *e*). This indented portion (*h*) of the head is pierced by radial slots (*i*) which form the throats of plane bits (*j*). The inner and outer circles respectively of this annular depression correspond with the inner and outer limits of the sweep of the bits.

Through these throats the meal as it is made escapes; and hence their width should be a little greater than the distance which the bits, or cutters, project, in order that the particles of meal made by the cutters, may readily pass through said throats. The cutters should all be adjusted as near as possible to the same height; for if they should cut larger particles of meal than will pass through the throats, the mill would become clogged.

Immediately around a central aperture (*k*) in the counterplate is an annular level surface (*l*) around which another annular surface (*m*) extends outward and slightly downward in the represented obtusely conical form. This conical surface (*m*)—when in place—stands with its inner surface (*l*) at such a distance above the top of the bit disk as to afford free admission to the grain; and shoals out gradually to the ledge (*f*), opposite the extreme outer sweep of the bits, so as to contract the passage as the food in advancing becomes more and more reduced.

(*n o*) are spurs, ribs or ridges projecting inwardly across the conical cavity (*l m*) as far as the aperture (*k*). The lower faces of these ridges are in the same plane as the ledge (*f*). The inner ends (*o*) of these ridges are deflected sufficiently from a radial direction to act in conjunction with the revolving bits in gathering the grain; while that portion (*n*) of them which crosses the conical surface (*m*), being intended by means of its salient edges (*5*), to arrest and hold the grain for the action of the bits; has merely such draft (or deflection from the radial) as to impart a slight shear to said bit action. The food or grain as it is reduced to meal by the bits descends through the throats and escapes at a funnel or spout.

The ledges (*E F*) are intended to work so closely to each other, as to forbid any discharge of meal or food at the perimeter of the head, but in order to keep these surfaces constantly scoured free from such fine dust as will work in and would gum and clog the surfaces, I cut in said ledges minute nicks (*p q*) converging at their inner ends to a point (so as not to afford any additional outlet from the interior). The discharge of the dust from these nicks is facilitated partly by their being made outwardly flaring toward their vent; and partly by their being cut in oblique directions as rep-

resented. It is found that the nick edges on one ledge serve to sweep or scrape the dust from the opposing ledge.

The service of the recess (*h*) and inclosing ledges (*d*) (*e*) in setting the bits with a uniform projection and removed from the possibility of collision with the ribs of the counter plate, may be explained as follows: The bits being loosely screwed in their places in the head, a straight edge is applied to the tops of the inner and outer ledges, over each bit in succession which being gently advanced until its cutting edge touches the straight edge, is made fast to its place in the head by means of the nut (*r*) and the entire head being then placed with its spindle on the point of the set screw (*t*) is advanced by said screw, until the ledges (*d*) (*e*) of the head touch the ledges and ribs of the counterplate; and the bit-head and counterplate being by this means brought exactly in train the upper journal (*v*) of the spindle is permanently secured to its right position by simply filling the boxes (*w*) with antifriction metal, and the screw is then "slacked" just sufficient to permit the free rotation of the head, the journal (*v*) being of uniform diameter throughout its length the proper bearing and train of the grinding surfaces is always afterward maintained whether the cutting head be set to grind coarse or fine.

The form of the parts and the described mode of adjustment of the bits, makes it certain that no one of them will project beyond the ledges or raised inclosing surface of the head; they therefore (however close the head be raised to the plate) cannot come in collision with its ridges; and the depth of the depression, being—in the original construction—properly adapted to the desired depth of cut, a perfect and uniform action of the cutting edges is obtained.

Although a level bit head is here described and is preferred by me both in construction and operation, it is evident that the head may be made either conical or rounding, and perform substantially the same service.

Where the sweep of the cutting edges is (like mine) in a level plane, the centrifugal force feeds the grain to the bits, precisely in proportion to the rapidity of rotation of the cutting heads; and on this account also I find it preferable to a conical surface; the feed in the latter being accomplished more

by the undeviating impulse of gravity, and less by the centrifugal force of the rotating head itself.

I do not claim adjustable knives for the purpose of grinding grain; nor furrows cut in the grinding surfaces of mills; nor do I claim simply the arrangement of opposite grinding surfaces so that their teeth or cutters, can not be brought into contact; as such devices have been used before; but

What I claim as my invention and desire to secure by Letters Patent, is—

1. Forming the surface of the cutter head, with central and peripheral ledges *d*, *e*, and a plane, or level, depression *h*, between them, equal in width to the cutters, and in depth to the depth of cut required; for the purpose of easily setting the cutters all to an exact and uniform height, and of preventing the possibility of their being brought into contact with the counter plate above; and also for the purpose of preventing the escape of meal or particles of grain at the periphery, substantially as herein described.

2. I also claim the notches, or nicks, *p*, *p*, in the ledge *e*, of the cutter head, and the notches *q*, *q*, in the ledge, or surface, *f*, of the counterplate, said notches having the least possible width at their inner ends, and gradually widening, or flaring, outward; when the two sets are arranged in combination so as to cross each other, and thus mutually scrape outward, by their edges, any dust or glutinous substance which may have a tendency to adhere to the opposite surfaces of the ledges, substantially as herein set forth.

3. I also claim the peculiar construction and arrangement of the counterplate, with bent, gathering and retaining ridges *n*, running across from the inner, to the outer, peripheries of a conical concavity *m*, in its under side, the lower edges of said ridges being all in the same plane, and even with the surrounding surface *f*; when combined with the cutters *i* *i*, and operating in connection therewith substantially in the manner and for the purposes herein specified.

In testimony whereof, I hereunto set my hand before two subscribing witnesses.

JONATHAN BURDGE.

Witnesses:

GEO. H. KNIGHT,
J. B. BENNETT.