J. WARE.

Metallic Burr.

No. 2,733. Patented July 20, 1842.

Fig. 1.

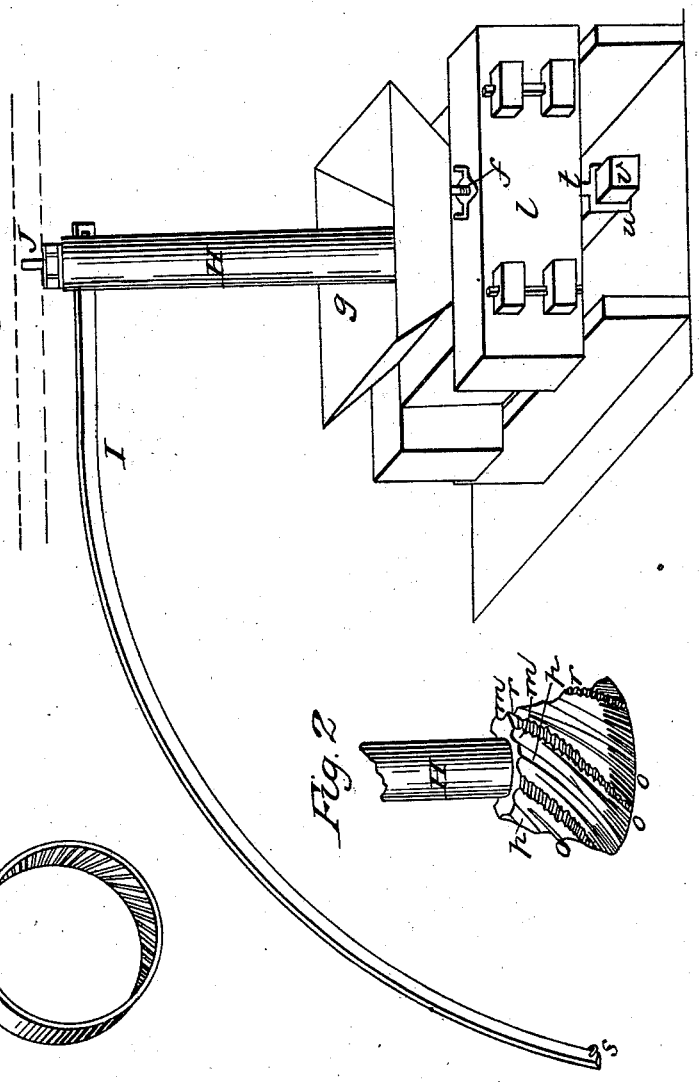


Fig. 2

Fig. 5.

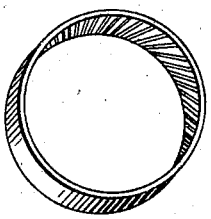


Fig. 4.

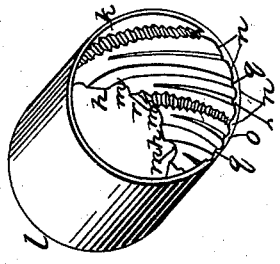
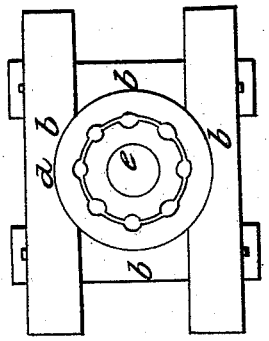


Fig. 3.



UNITED STATES PATENT OFFICE.

JUSTIN WARE, OF FARMINGTON TOWNSHIP, OHIO.

MILL FOR GRINDING ALL KINDS OF GRAIN FOR PROVENDER, &c.

Specification of Letters Patent No. 2,733, dated July 20, 1842.

To all whom it may concern:

Be it known that I, JUSTIN WARE, of the township of Farmington, in the county of Trumbull and State of Ohio, have invented a new and useful machine the use of which is as follows: It will grind all kinds of grain for provender, corn in the ear, peas, potatoes, beets, rutabagas, apples, and all other vegetables used for feeding cattle; also stone-coal and plaster for manuring land, and clay for making brick or earthenware; and I do hereby declare that the following is a clear, full, and exact description of the construction and operation of the machine, the different parts of which are clearly shown in the drawings and referred to by figures and letters in this specification.

To enable others to make and use this machine, I will proceed to describe its construction and operation.

There is an iron cylinder or concave (Figure 4) about twenty inches in diameter at the bottom and about fifteen inches at the top; the thickness of the metal at the bottom of the cylinder or concave is about half an inch, letter *k* (Fig. 4) and about two and a half at the top (*l*;) its depth is about nine inches. The inside of this concave or cylinder is made in flutes and ridges, the flutes are about four inches wide at the top, and about two inches deep, and made on a half circle (*m*) and descending in a spiral form, spreading in width at the bottom of the cylinder to about nine inches, and diminishing in depth to one eighth of an inch (*n*). In the center of these flutes is a small ridge commencing at the bottom of the cylinder where it is about half an inch wide (*o*) and terminates at a point about half way up. The main ridges are about two inches wide at the top (*p*) and about half an inch wide at the bottom (*q*). Every alternate ridge is notched so as to form cutters or breakers (*r*) the others operate as a screw to draw in substances to be ground. The main cylinder or concave has a separate part to be added at the bottom for the purpose of grinding dry substances, which can be taken off or put on at pleasure, and when worn out can be supplied with a new one. It consists of a hoop of cast iron about two inches wide (Fig. 5) is of the same diameter of the bottom of the main cylinder, and about half an inch thickness of metal. The inside of this hoop is furnished with floats or small teeth about one eighth of an inch deep and running in a spiral form, to agree with the inside of the main cylinder or concave.

The runner or convex (Fig. 2) that turns within the concave, is made of iron, and cast hollow for the purpose of receiving the upright shaft (H). The bottom of the runner is about twenty inches diameter, so as to exactly fill the caliber of the main cylinder at the bottom when both parts (Figs. 4 and 5) are put together; the top of the runner or convex is about fourteen and three fourths inches in diameter, or one fourth of an inch less than the caliber of the top of the concave or main cylinder as shown in Fig. 3. The length of the runner or convex is equal to that of the main cylinder when both parts are put together, so that the upper and lower ends of the convex and concave, respectively, will be even with each other. The runner or convex is formed with flutes (Fig. 2, letter *m*) and ridges (*p*), every alternate ridge formed into teeth or cutters (*r*), the depth of the flutes and height or size of the ridges corresponding with those in the cylinder, and winding around the runner in a spiral form in a direction opposite to the flutes and ridges in the cylinder, so that they will cross each other at nearly right angles. About two inches of the lower end of the convex is furnished with small floats or teeth about one eighth of an inch deep, as shown in Fig. 2, which operate with the small teeth in Fig. 5 in grinding grain and other dry hard substances. The small ridges about half an inch wide and terminating at a point about half way up the convex, are represented by letters (*o*) in Fig. 2, which correspond with those in the main cylinder as represented in Fig. 4, letter *o*.

The cylinder or concave above described, must be placed in a frame made of timber (Fig. 1) about 6 inches by 11½ inches. The frame to be three feet long and two and a half wide, with a circle cut in the center, of sufficient size to receive the concave as shown in Fig. 3, *b*, and there made fast.

The runner or convex is firmly fixed to a shaft Fig. 1, letter (H) the lower end of which is fitted to the inside of the convex. The ends of the shaft are furnished with gudgeons firmly set and secured with iron bands (Fig. 1, letter J) its length is about

six feet, and diameter eleven inches (H). In the upper end is a mortise to receive the sweep (I) which is about six inches square at the upper end, nine feet long and sufficiently crooked to reach within about three feet of the ground (S). Through each side of the frame (Fig. 1, *e*,) in which the concave is placed, is an iron bolt (*t*) with a loop at the lower end (*u*) to receive the bridge-tree on which the shaft (H) stands. The bride-tree (*v*) should be a piece of good timber about four inches square with tenons at each end to fill the loops (*u*) at the lower end of the bolts. On the upper end of these bolts which extend above the frame, is screw and nut (*f*) with handles, to raise or lower the runner for the purpose of grinding fine or coarse. The hopper (*g*) is put on the top of the frame, and is of sufficient size to hold two or three bushels.

The most convenient method for farmers to use this machine, is to place it in a common cider mill, as it is admirably calculated for grinding apples for making cider, or it may be placed out of doors, over a trough or vat, the upper end of the shaft being supported by a beam erected for the purpose.

I call this a two horse power mill, yet it is a light draft for one horse to grind stone coal, potters' clay and all soft vegetables, and may be used to good advantage for grinding provender with one good horse. One more important trait in the character of this machine, is that the wetter the grain the finer it will grind, and requires less power to propel it.

The principle of this machine is the combination of the screw principle of Paine & Russels patent apple grinder caused by the spiral flutes and ridges, the breaking principle of the corn-cracker by notching half of the ridges as described in the foregoing specification, and the coffee mill principle, in the floats or fine teeth at the lower part of the concave and convex.

Application of the principles.—All three of these principles are required in grinding corn in the ear, and other hard substances which need to be broken into small pieces, with the breaking principle it is broken into small pieces, with the screw principle it is kept pressed into the fine teeth at the bottom of the mill so as to cause it to grind fast and fine with a slow motion, and with the coffee mill principle or fine teeth it is ground fine. The screw principle and coffee mill principle only, are requisite in grinding shelled corn and other small grain.

By removing the separate part of the concave which contains the coffee mill principle, the screw principle acts alone in grinding apples and other soft vegetables the same as Paine & Russel's patent apple grinder, and by lowering the convex, may be used for shelling corn to great advantage.

What I claim as my invention and discovery, for which I desire to obtain Letters Patent, is—

The combining of the above mentioned principles, of the screw formed by the spiral flutes and ridges, the breakers by notching every alternate ridge, and the small teeth or floats at the bottom of the concave and convex; so as to perform with one machine the business of the common corn sheller, of the corn cracker in preparing ears of corn to grind, of the common grain mill in grinding it, and all other kinds of small grain for provender, of grinding stone coal, plaster and potters' clay, and by removing that part in the concave containing the small teeth, to grind apples and all other soft vegetables.

JUSTIN WARE.

Witnesses:

HARVEY W. COLLAR,

CRINDA COLLAR.