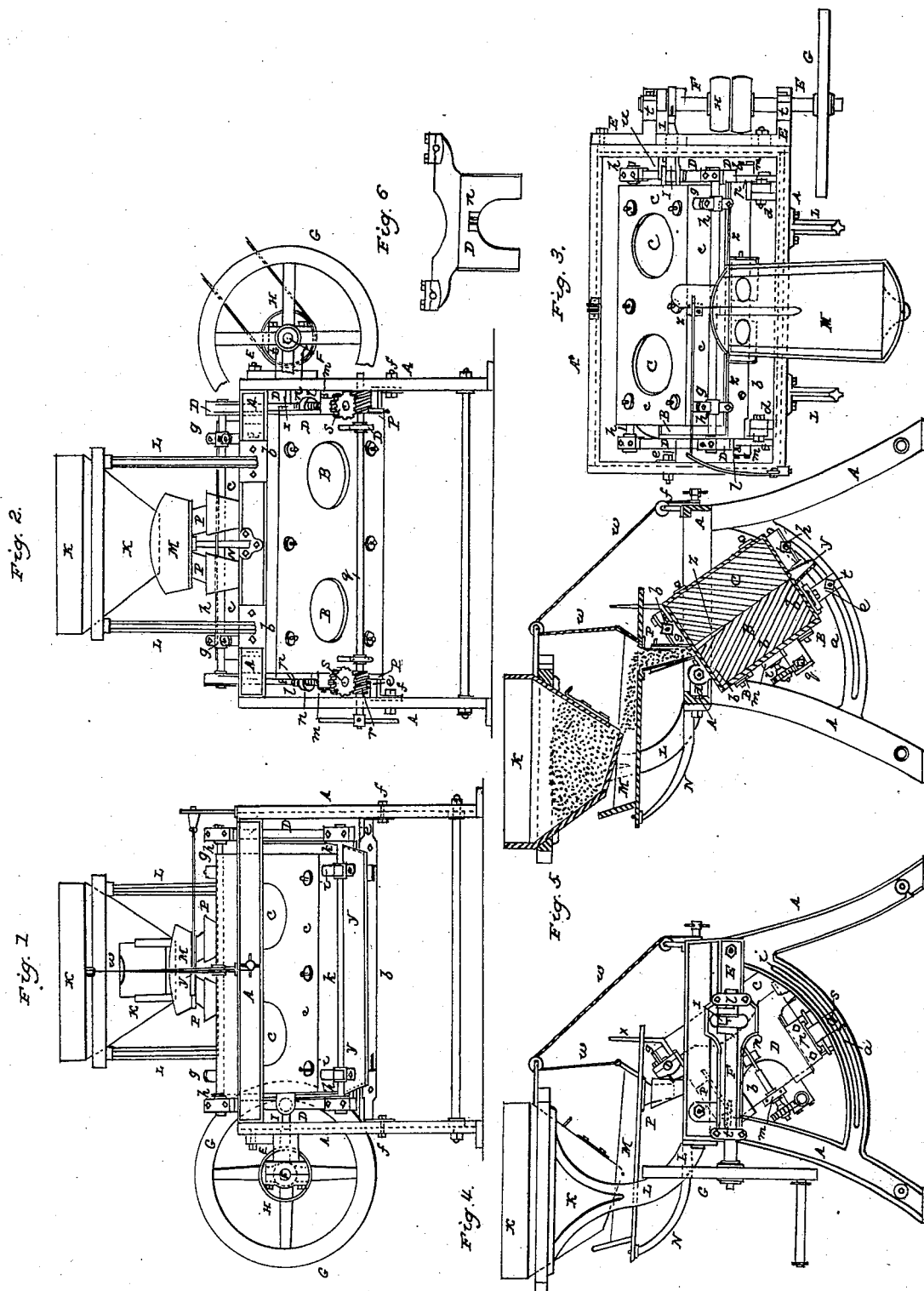


W. BROUGHTON.

Grinding Mill.

No. 4,473.

Patented April 25, 1846.



UNITED STATES PATENT OFFICE.

WILLIAM BROUGHTON, OF LONDON, ENGLAND.

GRINDING-MILL.

Specification of Letters Patent No. 4,473, dated April 25, 1846.

To all whom it may concern:

Be it known that I, WILLIAM BROUGHTON, of New Basinghall street, in the city of London and Kingdom of England, millwright, a subject of the Queen of Great Britain, have invented Improvements in Machinery or Apparatus for Grinding Grain, Drugs, Colors, or other Substances; and I do hereby declare that the following is a full and exact description of my said invention.

These improvements in machinery or apparatus for grinding grain, drugs, colors, or other substances consist in a novel construction and arrangement of machinery to be employed in place of the ordinary kinds of rotary mills used for pulverizing corn and other hard materials, the principal novel feature of which is that the upper grinding stone or at least one of the pair of stones receives a reciprocating lateral movement instead of a rotary movement as in ordinary kinds of flour mills.

A convenient mode of constructing and arranging the parts of such a mill is shown in the accompanying drawings.

Figure 1 is a front elevation of the improved mill. Fig. 2 an elevation representing the back of the same. Fig. 3 a horizontal view as it would appear when seen from above. Fig. 4 an end elevation, and Fig. 5 a vertical section taken transversely through the machine near the middle in the same direction as Fig. 4 in all which figures similar letters of reference indicate the same parts of the machine.

A, A A points out the framework and standards having a segmental slotted stretcher *a, a*, at each end seen in Figs. 4 and 5. B is the lower or what may be called the bedstone of the mill. C the upper or grinding stone. These stones I prefer to be of French burs but they may be of other suitable material. They are embedded in rectangular iron cases or boxes *b, b, b*, and *c, c, c*, by packings of plaster, but the forms of these boxes or cases may be varied according to the shape of the stones. The lower stone B is firmly fixed to the framework but is capable of adjustment as to its inclination, the upper stone C lies above and is parallel with the lower stone, and is made to slide laterally upon horizontal guide rods. The space *z, z*, between the faces of the two stones B and C as seen in Fig. 5 forms the channel for the

grain or other material to pass down, and from whence the flour or pulverized material is discharged through a spout *y*, at bottom. The case *b, b*, with the bed stone B is connected by joint pins to brackets affixed to the back longitudinal rail of the framework as seen at *d, d*, in Figs. 3 and 5 and upon which brackets it may be said to hang. The lower part of the said case *b*, and bedstone B is supported by arms *e, e*, having studs *f*, which are passed through and are capable of sliding in the curved slots of the segment stretchers *a, a*, at the ends of the framework. These studs have nuts screwed upon them for the purpose of fixing to the segment stretchers the box *b*, with its bedstone B at any desired angle of elevation and thereby making it fast in the framework in its required position. The case *c, c, c*, with the upper stone C is suspended by plumber boxes *g, g*, which slide upon a transverse horizontal rod *h, h*, mounted in the upper parts of the movable end plates D, D (one of which end plates is shown detached at Fig. 6) and the lower part of the said case *c*, and stone C is supported by similar sliding plumber boxes *i, i*, upon a corresponding transverse horizontal rod *k, k*, mounted in the lower parts of the said movable end plates D, D. One of these movable end plates D is attached to each end of the case *b*, of the lower stone B by means of a screw shaft *l*, mounted in a plumber box *m*, extending from the back of the case *b*, which screw shaft *l*, passes through a lug *n*, on the outer side of the plate D seen in Fig. 4. These end plates D, D are also supported by bracket pieces *p* attached to the ends of the cases *b, b*, and there are adjusting screws seen in Figs. 4 and 5 for regulating the positions of the plates D on which through the horizontal guide rods *h*, and *k*, the upper stone C is pendant. The coincidence of the faces of the two stones as shown in the section Fig. 5 being thus effected, their distance apart in order to enable them to grind different materials may be regulated by turning the screw shafts *l, l*, simultaneously which is done by means of the longitudinal shaft *q, q*, (seen in Fig. 2). This shaft is mounted in plumber boxes extending from the back of the case *b*, and has two worms *r, r*, upon it which severally take into the pinions *s, s*, fixed on the ends of the screw shafts *l, l*. A slight rotary movement of the longitudi-

nal shaft *g*, will by this contrivance cause the screw shafts to turn and the end plates D, D to be slid by which the faces of the stones will be made to approach toward or
 5 recede from each other, a mode of instant adjustment which is immediately under the command of the workman.

Having described a construction and arrangement of machinery suitable for mounting and adjusting mill stones to be worked on my improved principle I now proceed to show the means which I have found eligible for working the stones longitudinally. At one end of the frame or standards (seen
 15 best in Fig. 4) I attach an adjustable bracket E E with plumber blocks *t*, *t*, which carry a crank shaft F. This shaft may be driven by a winch or handle fixed in the fly wheel G or by an endless band from any
 20 first mover passed around a pulley H or by any other suitable means. To the crank of this shaft F an iron strap or link I is attached (as seen in Figs. 2, 3 and 4) the reverse end of which link is connected to
 25 the case *c*, of the upper stone C by a joint pin *v*, passed through lugs extending from the end of the case *c*. It will hence be perceived that by the rotations of the crank shaft the reciprocating longitudinal move-
 30 ments of the upper stone will be produced by which the grinding of the corn or other material under operation will be effected. For the purpose of feeding this mill I place a loose hopper K upon bracket arms L, L,
 35 extending from the upper part of the standard, into which hopper the corn or other material is to be introduced and discharged therefrom through an aperture below in the ordinary way. The corn or other material
 40 thence falls into a trough M which trough is supported at one side loosely upon a pin in the bracket arm N and at the other side is suspended by a cord *w*, passed over pulleys and made fast to an adjustable pin in

the front rail of the standard A by which 45 means the trough may be more or less inclined from the horizontal as may be desired. In order to furnish a constant supply of corn or other material to the stones the trough M should be agitated. This may 50 be done by means of a spring and cord *u*, which draws the trough in one direction while an upright pin *x*, fixed at the upper part of the case *c*, as the stone C moves to and fro in lateral directions is at every re- 55 turning movement made to strike against an arm extending from the front of the trough and by the concussion to shake the trough and cause the corn or other material to descend through an aperture into the 60 chute P which conducts it to the channel *z*, between the stones, and after being there ground it falls in a pulverized state through the spout *y*, into a receptacle below.

Having thus fully described the manner 65 in which I construct my apparatus for grinding grain, drugs, colors or other substances, what I claim therein as new, is—

The manner herein described of giving to the stones suspended in an inclined position and capable of adjustment in their degree of inclination, a longitudinal reciprocating motion instead of the revolving or curvilinear motion heretofore employed; the respective parts of the apparatus by 75 which this is effected being arranged, combined and operating substantially as herein made known.

In witness whereof I the said WILLIAM BROUGHTON have hereunto set my hand and 80 seal this twenty fourth day of September in the year of our Lord one thousand eight hundred and forty five.

WILLIAM BROUGHTON. [L. s.]

Witnesses:

F. M. PLATER,
 FRED WALKORN.