3 Sheets—Sheet 1.

C. H. BROWNE

Millstone Dressing-Machine.

No. 218,660. **Patented Aug. 19, 1879.**

Fig. 1.

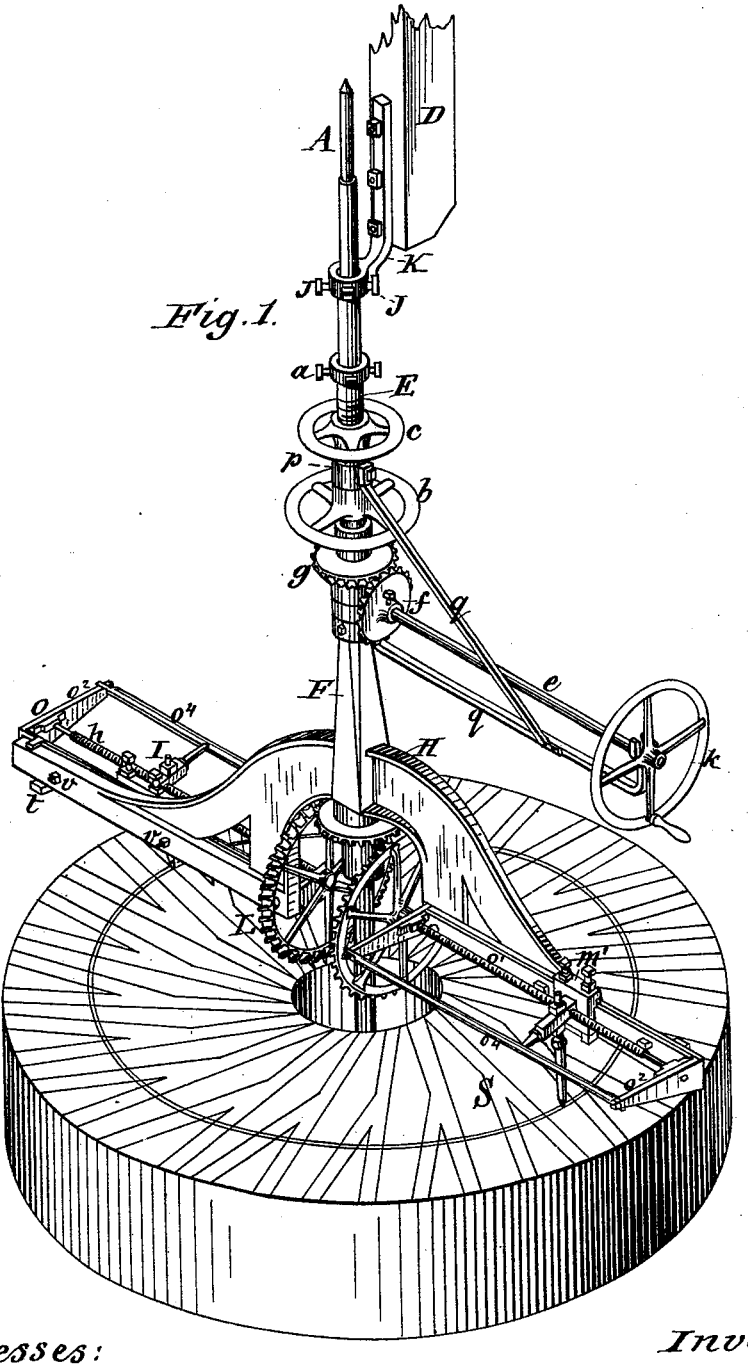

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Fig. 3.

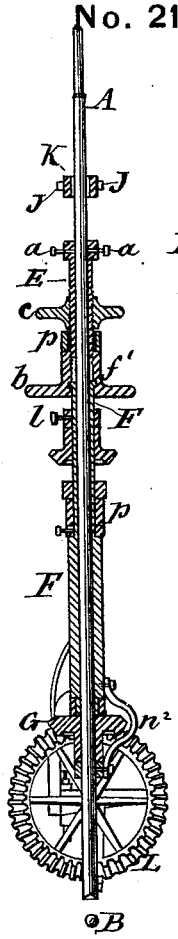


Fig. 2.

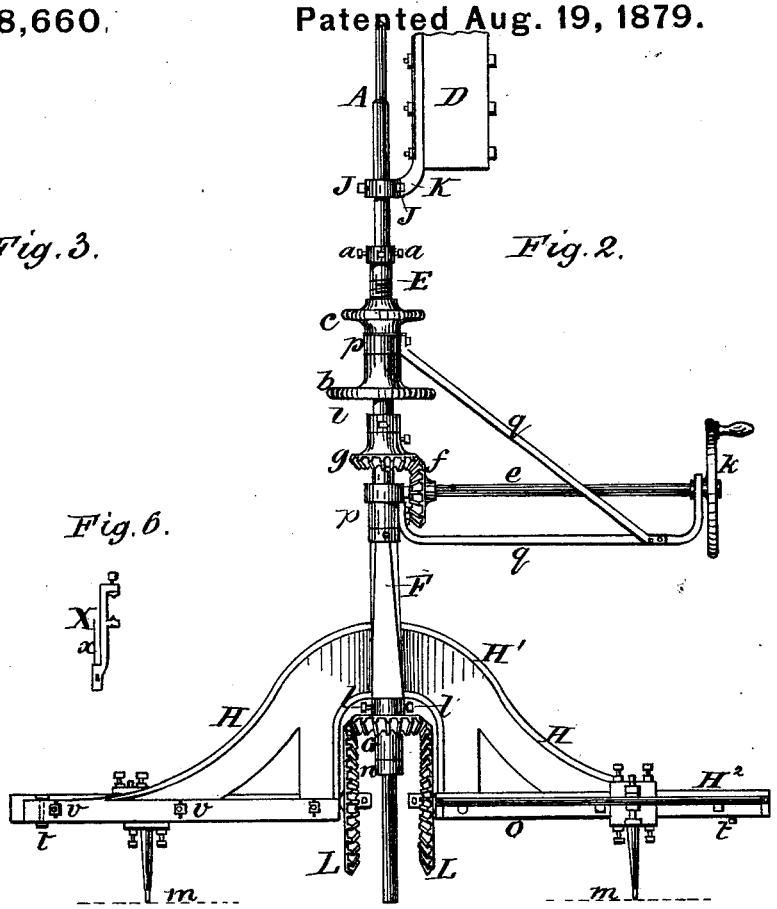


Fig. 6.

Fig. 4.

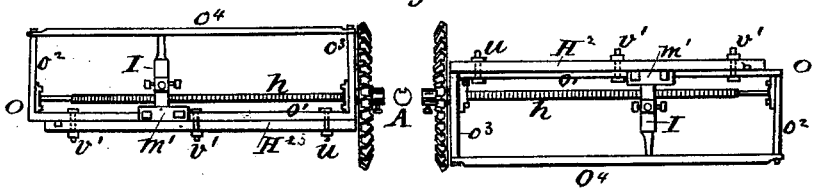
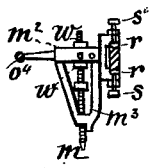


Fig. 5.



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3 Sheets—Sheet 3.

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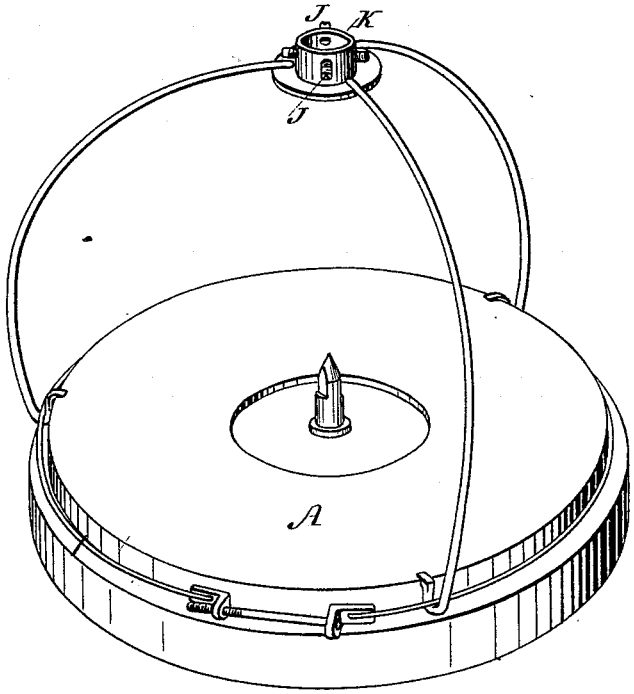
Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES H. BROWNE, OF JACKSON, MICHIGAN.

IMPROVEMENT IN MILLSTONE-DRESSING MACHINES.

Specification forming part of Letters Patent No. **218,660**, dated August 19, 1879; application filed December 31, 1878.

To all whom it may concern:

Be it known that I, CHARLES H. BROWNE, of Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Millstone-Dressing Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 letters of reference marked thereon, which form a part of this specification.

Figure 1 is a perspective view illustrating my improved cutting apparatus applied to a millstone. Fig. 2 is a vertical elevation of the cutting apparatus. Fig. 3 is a central vertical section. Fig. 4 is a plan view of the parts which support and operate the cutters. Fig. 5 is an elevation of a cutter and of the parts to which it is attached. Fig. 6 represents a gage. Fig. 7 is a perspective of a modified form of the devices for supporting the machine.

In the drawings, S indicates a stone that is being operated upon by the cutting mechanism.

A represents the shaft upon which the apparatus is mounted. It is rigidly supported on the central line of the stone perpendicular to the face that is to be cut.

I prefer to rest the lower end of the shaft on a ball, B, placed in the cockeye, and to secure the upper end to a beam, D, or other frame by means of an eye or collar, K, through which project set-screws J J for accurately adjusting the position of the shaft.

F is a sleeve loosely surrounding shaft A, and carrying the cutting apparatus. This sleeve is supported by means of the following devices:

E represents a short sleeve secured to shaft A, by means of set-screws *a a*, above the sleeve F. Sleeve E is screw-threaded on its outer face, engaging with a crank-nut, *b*, which surrounds the shaft, and is correspondingly screw-threaded on its inner face.

The nut *b* is provided near its lower end with an annular seat, into which is fitted the head *f'* of the sleeve F.

It will be seen that when thus supported the sleeve can be readily adjusted up or down to any desired position by rotating the crank-nut *b* in one or the other direction. After it has been adjusted it is held in position firmly by a lock-nut, *c*, engaging with the threaded sleeve E.

The sleeve F may be rotated by any of the well-known means. I prefer to rotate it by means of a bevel-pinion, *g*, mounted rigidly on the sleeve F, and meshing with a wheel, *f*.

The wheel *f* is secured to a shaft, *e*, mounted at its inner end in a collar surrounding the sleeve F, and at its outer end in a bracket supported by bars *q*, attached to collars *p p*, loosely surrounding the shaft A or the sleeve F.

Power may be applied to the shaft by means of the wheel *k*, or in any desired manner.

G represents a bevel-pinion mounted on the shaft A below the sleeve F. It is raised or lowered with the sleeve on the shaft by means of a collar, *u*, which surrounds the shaft loosely below the pinion, and which is secured to the sleeve F above the pinion by a U-shaped yoke or strap, n^2. Pinion G is thus free to rise and fall with the sleeve; but it is prevented from rotating therewith by means of a feather.

H H are the arms which carry the cutter-frames, preferably formed with a brace part, H^1, and a horizontal bar, H^2. They are rigidly secured to, or are formed in one piece with, the sleeve F, and rotate and rise and fall therewith. They are situated in parallel planes substantially equidistant from shaft A.

A rectangular way-frame, *o*, is attached to the inner side of each of the horizontal bars H^2. This way-frame is composed of the back plate, o^1, having on its upper edge a longitudinal groove and a similar groove on its lower edge, as shown in Fig. 5, the end pieces o^2 o^3, and the bar o^4, which latter bar, o^4, is provided on its inner side with a longitudinal groove, as shown in Fig. 1.

h h are screw-shafts mounted in the frames *o o*, and projecting through the end pieces o^3 o^3. Each of these screw-shafts carries at its inner end a bevel spur-wheel, L, meshing with the pinion G; and it will be seen that when sleeve F is revolving around shaft A, carrying with it wheels L L, the stationary pinion, engaging with the wheels, will impart a continuous rotary motion to the screw-shafts *h h*.

The cutter-carriages I are constructed to

travel longitudinally in the ways *o*. Each is constructed preferably with a head, m^1, a horizontal arm, m^2, and a stirrup, m^3.

The heads m^1 are secured to the plates o^1 of the ways *o* by means of set-screws *s s* bearing against gibs *r r*, carried by the heads m^1, and provided with tongues fitting into the grooves in the edges of said plate o^1. The outer end of each bar m^2 is fitted into and slides in the groove in the bar o^4.

m represents the cutter-shaft mounted in the above-described carriage. This shaft is adjusted relative to the bar m^2, and held in any desired position therein by jam-nuts *w w* engaging with the shaft, and situated one above, the other below, said bar m^2.

The shafts *m m* are provided at the lower ends with the cutting-points, preferably diamonds.

The screw-shafts *h h* engage with the cutter-carriages and pass through screw-threaded seats therein, and it will be seen that a continuous rectilinear motion is imparted to the carriages and cutters by said shafts *h h*, wheels L L, and pinion G.

The ways or frames *o o* are adjustably secured to the arms H H^1 H^2, as follows: *u* represents a fixed bolt passing through the arm H^2 and plate o^1 near the inner end of the latter, and operating substantially as a pivot between the arm H^2 and the frame *o*.

v v are slots in the arm H^2, situated at suitable points thereon. *v' v'* are bolts passing through the plate o^1 and through these slots *r r*.

By these devices I can readily raise or lower the outer ends of the frames *o o* (and therefore of shafts *h h*) independently of the inner ends of the same; and hence, as will be readily seen, I am enabled to cause the cutters to move toward or from the shaft A in a path inclined at any desired angle to said shaft, and that thus a surface can be produced of any required conformation.

In Fig. 6 I have shown a device, X, for accurately gaging the path of the cutters. It is adapted to engage with and move on the plate o^1, and to indicate by a needle, *x*, the position of the cutters.

Instead of the means already described for supporting the central shaft any other convenient or ordinary method of support may be employed. Thus it may be secured in position by a frame clamped to the stone, as shown in Fig. 7, although it will often be found (in the dressing of marble, &c.) convenient to support the machine from above, substantially as described before, in order to allow a free carriage-way under it.

If desired the machine may be rotated by pulleys instead of the gearing devices described, as shown in Fig. 7.

The operation of the machine is as follows: The shaft A is secured in a line perpendicular to the face which is to be produced. The ways *o o* are then adjusted on arms H^2 H^2. If it is desired to cut a plane surface the ways *o* should be secured upon the bars in such position that the screw-shafts *h h* shall be exactly perpendicular to the central shaft; but if it is desired to form a concave surface the outer ends of the screw-shafts must be elevated, so that they shall form an acute angle with the upper part of the central shaft, the angle of elevation depending on the desired radius of concavity; and, vice versa, if a convex surface is to be cut, the ways *o o* must be depressed at their outer ends below the perpendicular, the degree of convexity depending on the angle of depression. The cutting apparatus is then set at the proper distance from the stone. An approximate adjustment of the stone is obtained by means of the supporting-sleeve E and the set-screws *a a*. After this approximate adjustment the position of the cutters is accurately regulated by the crank-nut *b* and the lock-nut *c*.

After the various adjustments have been accurately made the machine is put into operation by rotating the sleeve F either with a belt or spur-gearing.

The rotation of the sleeve F results in the revolution of the cutters *m m* around the shaft A, and through wheels L L, in the rotation of the shafts *h h*.

Supposing the cutter-carriages to be near the eye of the stone, and the arms H H and the shafts *h h* to be rotated in the proper directions, it will be seen that the two motions (the rotary motion around shaft A and rectilinear motion in the ways *o o*) operate together at every instant upon each of the cutters, and cause it to move in a continuously spiral or helical path from the eye toward the skirt—that is, in a path no two points of which are equidistant from the center.

When the arms H H are rotated in the other direction the cutters follow a similar path, but move at every successive instant nearer to the eye.

Thus the cutters are made to traverse any desired area of stone, removing all that projects above the plane of their rotation, and leaving a perfectly true surface, which surface will be perfectly plane if the screw-shafts are set perpendicular to the shaft; but if they have been set away from the perpendicular the surface will be uniformly concave or convex.

To those acquainted with the manufacture of flour it is well known that the production of the best flour depends upon the evenness of the granulation, and that this evenness of granulation depends upon the evenness of the dress in the stone and upon the paths or directions of the incisions made in dressing.

The superior degree of evenness in my improved method is obvious, and I have found by experiment that the above-described continuously spiral incisions produce a much better granulation than do the dressers now in use.

When the screw-shafts *h h* are provided with right-hand threads the spiral incision will expand or widen in one direction relative

to the center, and when the threads are left-hand the incisions will expand or widen in the opposite direction; and it will be seen that when the bed-stone and the runner are both dressed by cutters traveling in one direction the incisions on their faces will intersect when they (said stones) are placed together. This intersecting of the spiral incisions gives to the stone a peculiar and advantageous cutting power; but as this cutting intersection depends upon the runner revolving in a given direction, and inasmuch as some stones are adapted to revolve in one direction and other stones in the opposite direction, it becomes necessary to sometimes cut the spirals in one direction around the center and sometimes in the other direction; and hence, as described above, the shafts which actuate the cutters must be threaded to the right or to the left, as the incisions require.

The shafts may, if desired, be provided with both right and left threads in any of the well-known methods.

The machine may be constructed without the supplemental way-frames *o o* by supporting the cutters directly upon the arms H H and making the said arms adjustable, so that the cutters can be caused to move to or from the center at any desired inclination.

What I claim is—

1. In a stone-dressing machine, the combination, with one or more revolving cutters, of a shaft about which said cutters revolve, and which is laterally adjustable at one end, substantially as set forth.

2. In a stone-dressing machine, the combination, with a central shaft, of one or more cutter-carriers revolving about said shaft, and adjustable longitudinally thereon, substantially as set forth.

3. In a stone-dressing machine, the combination of the following elements, namely: a central shaft, a counter screw-shaft, a wheel concentric with the central shaft, and a wheel mounted upon the screw-shaft meshing with said central wheel, substantially as set forth.

4. In a stone-dressing machine, the combination of the following elements, adapted to produce a continuously-spiral incision, namely: a vertical shaft, a counter screw-shaft, a stationary wheel upon the vertical shaft, and a rotating wheel upon the screw-shaft meshing with said stationary wheel, substantially as set forth.

5. In a stone-dressing machine, the combination, with a stationary shaft, of a sleeve surrounding said shaft, and carrying one or more cutters adapted to revolve around the shaft, substantially as set forth.

6. The combination, with the mechanism adapted to reciprocate the cutters and the central shaft, of a stationary wheel adjustable longitudinally on the shaft, as and for the purposes set forth.

7. The gage or index X, when constructed and operated as and for the purposes set forth.

8. The combination, with the cutting apparatus and the shaft A, around which the cutters revolve, of the sleeve E and the set-screws *a a*, adapted to support and adjust the whole mechanism on the central shaft, substantially as set forth.

9. The combination, with the revolving cutting mechanism and the shaft A, of the nut *b*, substantially as and for the purpose set forth.

10. The combination, with the stationary wheel G and the revolving sleeve F, of the collar *n* and the strap n^2, substantially as set forth.

11. The combination of the cutter-carriage m^1 m^2 m^3 and the grooved bar o^4, substantially as set forth.

12. In a stone-dressing machine, the combination of the following elements, adapted to produce a concave or a convex surface, namely: a central shaft, an arm constructed to revolve around said shaft, and a cutter-frame pivoted to said arm on that side of the central shaft on which the cutting-tool is mounted, substantially as set forth.

13. In a stone-dressing machine, the combination of the following elements, adapted to produce a concave or a convex surface, namely: a central shaft, a fixed wheel concentric with said shaft, a vertically-adjustable counter screw-shaft, and a revolving wheel mounted on said screw-shaft, and operated by the fixed central wheel, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHARLES H. BROWNE.

Witnesses:
J. C. BONNELL,
M. HARMON.