V. J. EMERY.

GRINDER.

APPLICATION FILED NOV. 8, 1915.

1,193,884. Patented Aug. 8, 1916.

Fig. 1.

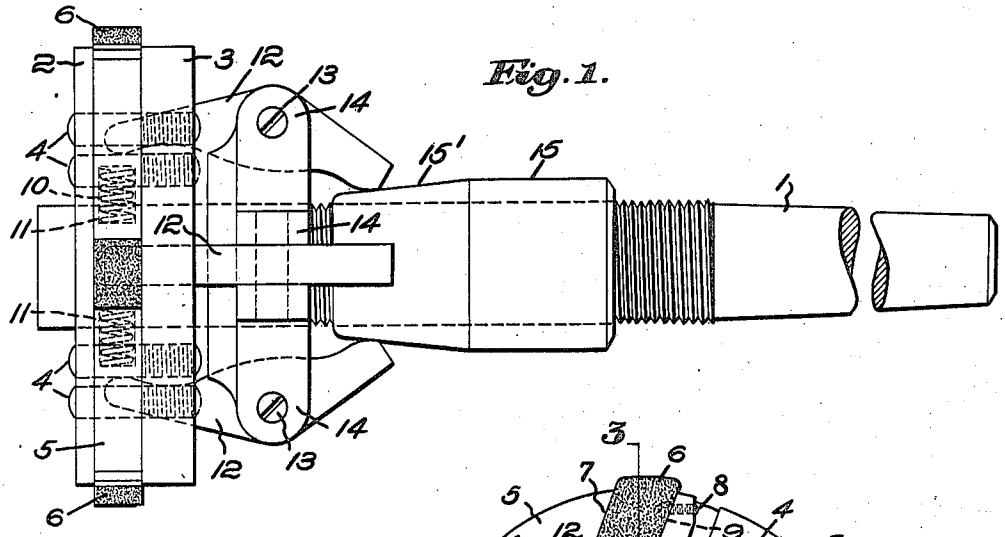


Fig. 2.

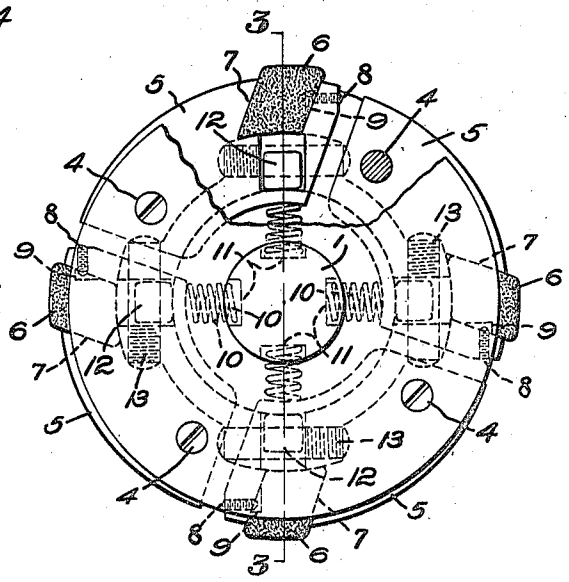
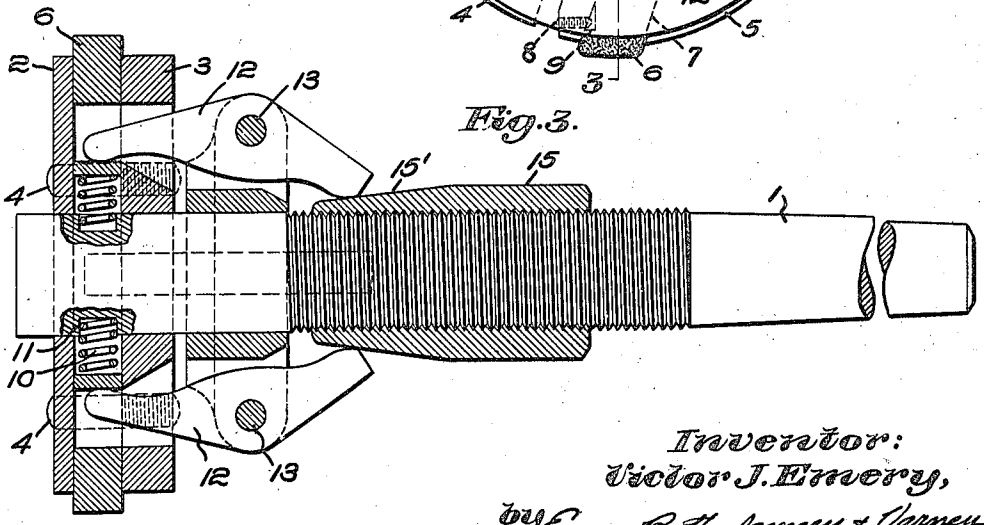


Fig. 3.



Inventor:
Victor J. Emery,
by Emery, Booth, Janney & Varney
Attys.

UNITED STATES PATENT OFFICE.

VICTOR J. EMERY, OF WOLLASTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO MELLEN N. BRAY, OF BOSTON, MASSACHUSETTS.

GRINDER.

1,193,884. Specification of Letters Patent. Patented Aug. 8, 1916.

Application filed November 8, 1915. Serial No. 60,179.

To all whom it may concern:

Be it known that I, VICTOR J. EMERY, a citizen of the United States, and a resident of Wollaston, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Grinders, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has for its object the provision of an improved device for grinding or lapping various materials.

My invention will be best understood by reference to the following description taken in connection with the accompanying drawing, wherein—

Figure 1 is a side view of a device illustrative of my invention, Fig. 2 is an end view from the left of Fig. 1, and Fig. 3 is a section on the line 3—3 of Fig. 2.

Referring to the drawings and particularly to Figs. 1 and 3, the embodiment of my invention there shown comprises a shaft 1 of any convenient length. On this shaft in planes transverse thereto are mounted the spaced disks 2 and 3 as shown at the left of Fig. 3 connected by the pins 4 which are supported at their ends by the disks. Between the disks and pivoted on the pins are arc shaped holders 5 in any desired number, four being shown, which carry at their free ends (see Fig. 2) the abrading members 6 which may conveniently be blocks of carborundum or the like. These abrading members may be mounted as shown in Fig. 2 in open sided slots 7 or recesses in the members 5 and held by any suitable means as by set screws 8 bearing against the shoes 9 disposed in recesses in the blocks 6. The holders 5 may swing in and out on their pivots to vary the distance of the outer or abrading faces of the blocks from the shaft. When the grinder is properly adjusted these faces all lie on a circumference the center of which is on the axis of the shaft 1 and, if the shaft 1 is rotated, each block will move in a circular path or orbit about said axis and grind uniformly any surface presented thereto. To more accurately present the faces of abrading blocks to the arc of the circumference and to facilitate the action thereof on the work, the blocks are preferably raked or inclined to radial lines as shown in Fig. 2.

To hold the abrading members in operative position and to adjust the same each holder 5 (see Fig. 2) is acted upon by a spring 10 which tends to swing it outwardly on its pivot. This spring is here shown (Fig. 2) as a helical spring seated in a suitable recess 11 in the shaft 1 and bearing against the outer end of the holder 5. The holders are moved to and held in any desired position against the resistance of the springs by adjustable detents which may take the form of longitudinal levers 12 pivoted on pins 13 transverse to and equidistant from the shaft 1, which pins may conveniently be mounted as shown in suitable ears formed on a collar 14 on said shaft. One end of each of these levers extends through a suitable opening in the disk 3 and is engaged with a holder member 5 in any desired manner as, for example, by entering a recess therein (see Fig. 3). It will be obvious that when the opposite end of the lever is moved inward toward or outward from the shaft the holder will be allowed to move outwardly therefrom under the action of the spring or will be pressed inwardly toward the shaft against the resistance of the spring, as the case may be, and it will further be apparent that, if each lever is moved the same distance, the abrading blocks 6 will all be adjusted to the circumference of the same circle.

For this purpose I have provided means whereby the ends of all the levers may be uniformly moved outwardly from the shaft to adjust the holders and in the form here shown this means comprises a sleeve 15 threaded upon the shaft 1 and having the conical wedging surface 15′ engaging the outer ends of the levers (see Figs. 1 and 3). When the sleeve 15 is rotated so as to move it to the left in Figs. 1 and 3 the right-hand ends of the levers will ride up the conical surface 15′ and cause the opposite or left-hand ends to swing inwardly toward the shaft 1 carrying with them the holders 5 and contracting the circle on which the abrading blocks lie. Similarly, when the sleeve 15 is retracted toward the right, the ends of the levers will be allowed to swing outwardly, each to the same extent, under the thrust of

the springs 10 and the abrading members 6 will lie on the circumference of a larger circle than before. Because of the movement of the levers by means of a screw a very delicate adjustment can be made.

In the use of my device the abrading members are adjusted to any desired position and the shaft rotated in any suitable way. The abrading blocks will then revolve in an orbit or closed path—in the embodiment shown a circle—and obviously will grind a surface of the same form as the path. For example, the shaft may be made of such form that it may be gripped in the chuck of a lathe and it may then be placed in the head stock and turned relatively to the work. The inside walls of cylinders and similar surfaces may thus be easily ground. Alternatively the shaft might be held in the tail stock and the work rotated.

The mounting of the abrading blocks is such that they are positively held by the detents or levers against outward movement and there is therefore no danger of removing an excessive amount of material. At the same time they are always resiliently pressed against the work and so can function to the best advantage. If any unusual resistance is encountered they may yield inwardly without imposing any strain on the device. Consequently unfinished articles with rough and uneven surfaces can be worked with safety and quickly brought to final form. The springs 10 will also absorb vibration and prevent chattering.

When necessary the abrading members are easily removed by releasing the detents 12 and swinging the holders out from between the disks 2 and 3. The set screws 8 may then be loosened and the abrading members withdrawn from the slots in which they rest. When the grinder is in use, however, the abrading members are very securely held and are supported by the disks 2 and 3 against lateral displacement.

I have described in detail one specific form of grinder which is illustrated in the drawings and have used specific descriptive words in so doing. It will be understood that I have done this merely in the interest of convenience and clarity and that the structure illustrated is not the only form of device in which my invention may be embodied and further that in speaking of it I have given the various parts certain names with an identifying or descriptive and not with a defining or limiting purpose.

What I claim as my invention is:—

1. A grinder comprising, in combination, an abrading member mounted for orbital movement, resilient means to hold said member from deflection from its orbit and means to change the orbit against the resistance of said means.

2. A grinder comprising, in combination, an abrading member mounted for orbital movement, held resiliently against inward and positively against outward deflection from said orbit.

3. A grinder comprising, in combination, a shaft and an abrading member mounted to revolve about the axis of said shaft and radially distant therefrom and a wedge to vary the radial distance.

4. A grinder comprising, in combination, a shaft and an abrading member mounted to revolve about the axis of said shaft and radially distant therefrom and a screw adjusted wedge to vary the radial distance.

5. A grinder comprising, in combination, a shaft, holders rotatable therewith and mounted to swing in a plane transverse thereto, abrading members carried by said holders and means to control the swinging thereof.

6. A grinder comprising, in combination, a shaft, abrading members rotatable about the axis thereof and radially distant therefrom, levers the position of which controls the radial distance and means for simultaneously and uniformly adjusting said levers.

7. A grinder comprising, in combination, a shaft, abrading members rotatable about the axis thereof and normally tending to move outward therefrom and adjustable detents restraining said movement.

8. A grinder comprising, in combination, a shaft, abrading members rotatable about the axis thereof and normally tending to move outward therefrom, detents to restrain said movement and means for simultaneously and uniformly adjusting said detents.

9. A grinder comprising, in combination, a shaft, abrading members rotatable about the axis thereof and radially distant therefrom, levers, the position of which controls the radial distance, and a wedge member to engage and actuate the levers.

10. A grinder comprising, in combination, a shaft, abrading members rotatable about the axis thereof and radially distant therefrom, levers, the position of which controls the radial distance, and a sleeve adjustable on said shaft to actuate the levers.

11. A grinder comprising, in combination, a shaft, abrading members rotatable about the axis thereof and normally tending to move outward therefrom, levers restraining said movement and an adjustable wedge to actuate the levers.

12. A grinder comprising, in combination, a shaft, abrading members rotatable about the axis thereof and normally tending to move outward therefrom, levers restraining said movement and a sleeve adjustable on said shaft to actuate the levers.

13. A grinder comprising, in combination, a shaft, holders pivoted to swing in a plane transverse thereto, abrading members

carried thereby, resilient means to resist inward movement of the holders and means to positively adjust the position of the holders against the resistance of said means.

14. A grinder comprising, in combination, a shaft, holders pivoted to swing in a plane transverse thereto, abrading members carried thereby, resilient means to resist inward movement of the holders, levers to move the holders against the resistance of said means and means simultaneously and uniformly to actuate said levers.

15. A grinder comprising, in combination, a shaft, holders pivoted to swing in a plane transverse thereto, abrading members carried thereby, resilient means to resist inward movement of the holders and adjustable detents to restrain said holders against said resilient means.

16. A grinder comprising, in combination, a pair of members, a holder disposed therebetween and an abrading member sustained by said holder and held against lateral displacement by said members.

17. A grinder comprising, in combination, a pair of members, a holder disposed therebetween and having a recess closed laterally by said members and an abrading member in said recess.

18. A grinder comprising, in combination, a pair of members, a holder pivoted to swing in and out between the same and having a recess closed laterally by said members when the holders lie therebetween, an abrading member in said recess and means to adjust the position of the holder.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

V. J. EMERY.

Witnesses:
L. G. MILLER,
ROBERT H. KAMMLEP