(Model.)

M. A. RICHARDSON.

Sharpening Dental-Burrs.

No. 226,110 Patented Mar. 30, 1880.

Fig. 1.

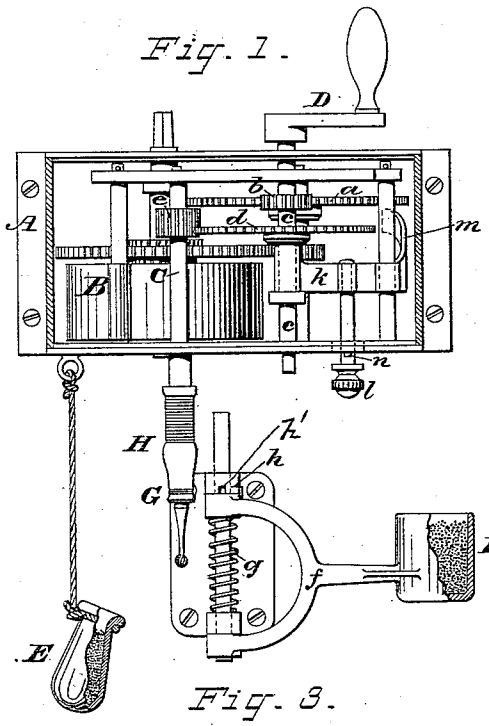


Fig. 2.

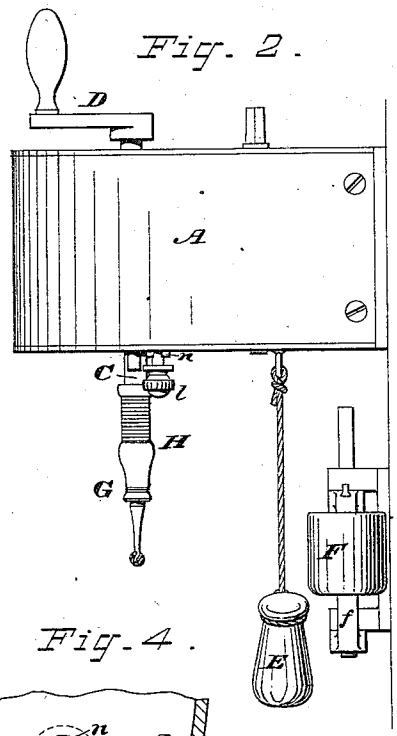


Fig. 3.

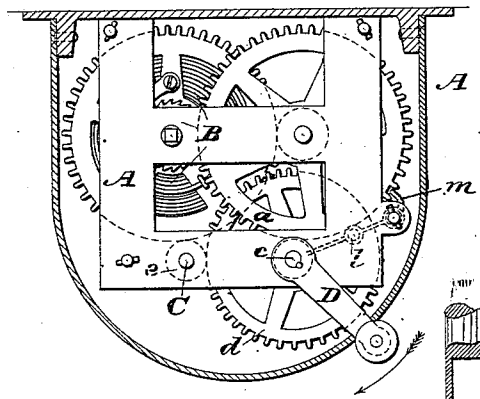


Fig. 4.

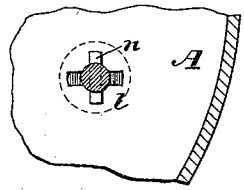
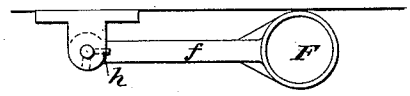


Fig. 5.



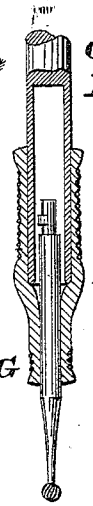


Fig. 6.

ATTEST:

Walter W. Scott.

George H. Fraser.

INVENTOR:

Milo A. Richardson,

by his attorneys

Burke, Fraser & Connett

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MILO A. RICHARDSON, OF BRIDGEPORT, CONNECTICUT.

SHARPENING DENTAL BURRS.

SPECIFICATION forming part of Letters Patent No. 226,110, dated March 30, 1880.

Application filed March 3, 1880. (Model.)

To all whom it may concern:

Be it known that I, MILO A. RICHARDSON, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented an Improved Process and Apparatus for Sharpening Dental Burrs and similar tools and instruments, of which the following is a specification.

The object of my invention is to provide dentists and others who use burrs and similar revolving cutting-tools having inclined teeth with a handy and rapid means of sharpening the same.

My process consists in revolving the tool backward while it is immersed in sand, corundum, or other abrasive powder or granulated substance.

My invention also consists in certain novel features in the construction of an apparatus for the practice of this process, as will be fully hereinafter set forth.

The cutting action of moving particles of sand, quartz-powder, corundum, and other abrasive powders and granulates upon hard bodies is well known, being fitly exemplified in the "sand blast."

My process depends for its success upon this action, and to render it most effective a very sharp and hard abrasive should be selected, granulated or powdered corundum being well suited to the purpose.

In practicing my process the abrasive material is placed in a suitable receptacle, and the dental burr or other tool to be sharpened is immersed therein, and then revolved in a backward direction, or the opposite of that which is given to it in use. The particles of abrasive material are thus actively agitated, and at their contact with the teeth of the tool they cut or abrade it sharply, thus removing the metal from the back of the tooth and bringing the latter to a smooth fine edge.

The revolution of the tool in the granulate causes the particles of the latter to move and roll across its surface, and to shift and change among themselves so as constantly to bring fresh sharp grains into contact with the metal, and their attrition cuts away the back of the teeth until a new edge is formed thereon, as described.

I prefer to divide the operation into two steps, the first that of grinding the tool or taking a coarse cut therefrom, and the second that of finely finishing and polishing the same.

To accomplish the first most rapidly and effectively the tool must be revolved in the abrasive material somewhat slowly, and the material firmly forced or pressed against its surface, preferably by lateral pressure.

The second step is performed by revolving the tool very rapidly in either the same or, as I prefer, a different and finer material, without pressure, thus completing the process.

The tool may be revolved by the use of the ordinary dental engine, or by other means, and any convenient vessel may be used as a receptacle for the abrasive substance; but I prefer for the practice of my process the apparatus shown in the accompanying drawings, in which—

Figure 1 is a front elevation, partly in section. Fig. 2 is a side elevation. Fig. 3 is a plan, the inclosing-case being in section. Fig. 4 is an enlarged detached detail view. Fig. 5 is a plan of a receptacle and its bracket, and Fig. 6 is a vertical section of the tool-holder enlarged.

Let A represent a suitable case or frame for the necessary mechanism; B, a clock-work as a whole; C, the spindle which bears the tool; D, a crank by which to rotate the spindle, and E and F receptacles for the abrasive powder or granulate. *a* is the last wheel of the train forming the clock-work proper, and it meshes with a pinion, *b*, on the spindle *c*, which bears the crank D.

The crank-spindle *c* may be identical with the tool-spindle C; but, as it is desirable that the latter should rotate faster than it is convenient to turn the crank, I prefer to make them separate, and to provide the former with a wheel, *d*, gearing with a pinion, *e*, on the latter spindle, as shown.

G is a suitable holder for the tool to be sharpened, and may consist of any convenient form of clutch, chuck, or socket arranged at the extremity of the spindle C, and capable of grasping the tool with sufficient force to prevent its falling out and to effect its rotation when immersed in the abrasive powder.

The holder G, if fixed rigidly to the extremity of the spindle C, must be accurately con-

centric therewith, as a very slight eccentricity on the part of the tool which is being operated upon will cause it to grind unevenly, wearing away upon one side more than upon the other. To obviate this difficulty I provide a flexible connection, H, between the tool and the spindle C, whereby the tool can be deflected from the axial line of the spindle without affecting its rotation and without causing it to wabble or rotate eccentrically. This may consist of a universal joint, or of any known form of flexible shaft, and may be either separate from the tool-holder G, or, as I prefer, made in one piece with the same, as shown. The construction of this part is best illustrated in Fig. 6, a tool being shown in its place in the elastic holder, which is formed of a simple piece of rubber tube fixed to the spindle C and projecting sufficiently below it to grasp the tool and to permit a sufficient deflection of the latter from the axial line of the spindle.

To accommodate tools of different lengths, the spindle may be made hollow for a short distance, that the shank of the tool may be thrust up into it, as shown; but the inside diameter of the spindle must somewhat exceed the outside diameter of the tool-shank, or the deflection of the tool will be prevented.

The receptacle E is made of some elastic material, that its walls may be pressed together between the thumb and finger, and I prefer that it be made with a contracted neck or throat, that its contents may not readily escape in use.

The receptacle F is a small cup of rigid material, and is preferably mounted upon a pivoted arm or bracket, *f*, so as to stand back out of the way when not needed, while it can be swung out under the tool when required.

The bracket should be capable of some vertical play, and be kept pressed upward by a spring, *g*, that it may be depressed to bring it under the tool, and it should be provided with a catch or stop, *h*, setting into a recess, *h'*, to keep it from swinging out of place when operating upon the tool.

The receptacles E and F may both be employed in the process of sharpening, or either of them may be used alone, the other being omitted.

To sharpen a dental burr or other tool by my machine I insert its shank in the holder G, fill the receptacle E with the abrasive substance, and, holding it in the left hand, apply it to the tool, so that the latter is immersed in its contents, and with the right hand rotate the crank D, thereby turning the tool backward in the abrasive substance, at the same time compressing the receptacle E so as to force the particles of abrasive closely against the revolving tool. This is continued for a short time until the tool has been roughly sharpened or ground down, and it is then finished by permitting the clock-work B to rotate it rapidly, the pressure upon the receptacle E being released, or, as I prefer, this receptacle being removed and the cup F substituted for it, the latter containing, by preference, an abrasive of finer grain; or, if a lateral compression is not required for the first operation, the receptacle E may be discarded and the cup F alone used.

If the clock-work were wound up before beginning the operation, the rotation of the tool by the crank would run down the spring to a considerable extent; and to avoid this the means shown for disconnecting them may be used.

The spindle *c* is capable of a slight vertical play controlled by a slider, *k*, operated by a button, *l*, and its swiveled stem. By raising the button *l* the spindle *c* is lifted until its pinion *b* is clear of the wheel *a*, the pinion *e* on the spindle C being long enough to retain the wheel *d* in engagement therewith. The apparatus, from the crank D to the spindle C, is now isolated from the clock-work; but to prevent the latter from running down when thus disconnected a stop or pawl, *m*, must be arranged to engage some part of the clock-work and be operated by or from the button *l*. This also serves to hold the clock-work while it is being wound up.

The button may be held up or down by a stop or pin, *n*, (shown in Fig. 4,) which permits the button-stem to move only when turned in one direction, as shown.

I claim—

1. The improved process of sharpening a dental burr or similar tool, which consists in immersing its toothed portion in sand or other powdered or granulated abrasive and revolving it backward therein, substantially as set forth.

2. The improved process for sharpening dental burrs and similar tools, which consists, first, in immersing the tool in an abrasive powder or granulate, forcing the same against the tool by lateral pressure, and revolving the tool backward therein at a comparatively low speed; and, second, in revolving the tool in the same or a finer abrasive without lateral pressure and at a comparatively high speed, substantially as and for the purposes set forth.

3. The improved machine for sharpening dental burrs and other similar tools, which consists of a suitable holder for the tool borne by a revolving spindle, in combination with a receptacle for sand or other abrasive powder or granulate, whose sides are capable of being forced toward each other by lateral pressure, substantially as set forth.

4. The combination, with a suitable receptacle for the abrasive substance, of a spindle, C, provided with a flexible connection, H, and tool-holder G, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

MILO A. RICHARDSON.

Witnesses:
ARTHUR C. FRASER,
HENRY CONNETT.