C. H. DAVIS.

GRINDING DEVICE.

APPLICATION FILED JULY 11, 1911.

1,210,052. Patented Dec. 26, 1916.

Fig. 1.

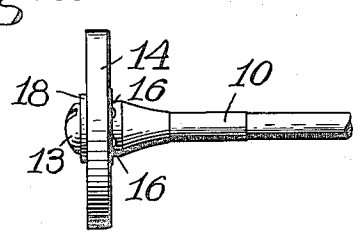


Fig. 2.

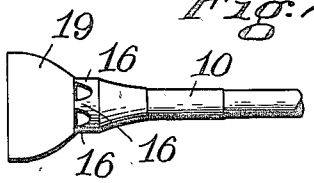


Fig. 3.

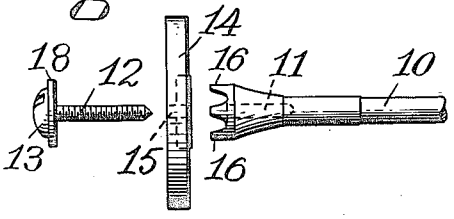


Fig. 4.

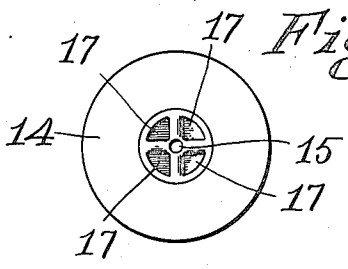


Fig. 5.

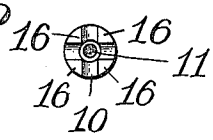


Fig. 6.

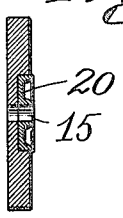


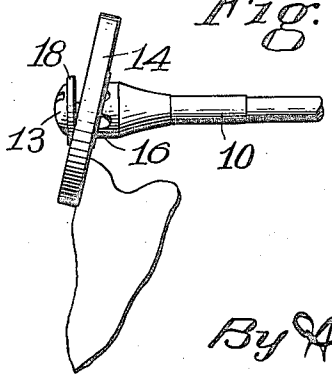
Fig. 7.



Fig. 8.



Fig. 9.



Witnesses

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GRINDING DEVICE.

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To all whom it may concern:

Be it known that I, CHARLES H. DAVIS, a citizen of the United States, residing at Worcester, in the county of Worcester, State of Massachusetts, have invented a certain new and useful Improvement in Grinding Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to grinding devices, but more particularly to such as are adapted for use in connection with dentistry.

Heretofore the abrasive disks have been secured to the flat extremity of a mandrel by means of a screw which is passed through a central orifice in the disk and enters a threaded hole in the mandrel; but this device could only be operated in one direction, as a revolution in the other direction caused the disk to unscrew the binding screw and thus release the former. Furthermore in this construction it was necessary to bind the disk tightly against the end of the mandrel to permit it to be used and thus the disk could only rotate in a plane perpendicular to the axis of the mandrel. This rigidity of the grinding device caused great difficulty in operating on the surfaces of teeth at points where the mandrel could not be held in a position perpendicular to the surface to be ground, and frequently such a device caused the teeth to be notched.

The object of the present invention is to provide a grinding device which may be operated in either direction and which is very flexible.

The many features and advantages of the invention will be hereinafter fully described and included in the claims.

Referring to the drawings, Figure 1, is a side elevation of the invention complete. Fig. 2, side elevation of a modification of the invention as will be described more fully hereinafter. Fig. 3, detail view of the parts of the invention. Fig. 4, rear view of the grinding disk. Fig. 5, end view of mandrel, as will be fully described hereinafter. Figs. 6–8, detail views of grinding disks and parts thereof. Fig. 9, same as Fig. 1 but with binding screw partially withdrawn to illustrate the operation of the disk at an angle to the axis of the mandrel.

In the drawings the invention is shown to consist of a mandrel 10 provided with a central threaded orifice 11 in which enters the threaded binding screw 12 provided with a head 13. This screw 13 is adapted to secure to the extremity of the mandrel 10 a grinding member 14 which is provided with a central orifice 15 to permit the passage therethrough of the screw 12. The extremity of the mandrel which contacts with the grinding member 14, is provided with a plurality of fingers 16 which are adapted to enter sockets 17 in the rear face of the grinding member 14.

Two forms of the grinding member have been illustrated in Figs. 6–8, inclusive, the one shown in Fig. 6 having an inserted hub with the indentations 17 in this hub, and the other form having the hub integral with the grinding member, as is shown in Figs. 7 and 8. Either form may be used, though it has generally been found to be less expensive to use the inserted hub.

In the embodiments shown in the drawing, the mandrel has been provided with four fingers, and therefore four sockets to correspond to each of these fingers have been constructed in the grinding member, but it will be clearly seen that the number of these fingers may be varied at will, though it is undesirable to have less than four if it is intended to use the device in the method illustrated in Fig. 9; as there might be times when no fingers would lie within the sockets and the grinding member would thus be liable to slip, causing an uneven operation. It has been found advisable to construct the fingers tapering on their inner and side faces to permit them to readily enter the corresponding sockets, and to also more firmly position the grinding member relative to the axis of the mandrel.

In the ordinary form of device of this type, where the extremity of the mandrel contacting with the disk or grinding member is flat, it has been found that after a short period of use the orifice through the disk becomes enlarged, and thus the device depends upon the friction of the extremity of the mandrel, to not only rotate the disk, but also to prevent the latter from transverse movement. In the present device, the orifice in the disk or grinding member need not fit the screw as the device does not depend upon this screw to center the disk, for this function is efficiently performed by the fingers on the mandrel. Furthermore, it is necessary that the

orifice through the disk should be of greater diameter than that of the binding screw if the device is to be operated in the method illustrated in Fig. 9.

To give additional flexibility and resiliency to the grinding disk, a rubber washer 18, or any other resilient member, may be used upon the device to act against this disk, though such a member is not necessary to the successful operation thereof.

The modification illustrated in Fig. 2 is similar in construction to that shown in the other figures, but a cup-shaped cleaning member 19 is held against the end of the mandrel instead of the abrasive disk disclosed in the other figures. As this cleaning member 19 is usually constructed of soft rubber, it has not been found necessary to provide the same with sockets such as are used in rigid grinding members, for the advancing of the binding screw forces the cleaning member against the fingers on the mandrel, and thus these fingers form their own seats or sockets in the member.

The inserted hub 20 in the grinding disk, one form of which is disclosed in Figs. 4 and 6, may be constructed of lead or any other suitable material, and may be cemented or otherwise secured therein or thereto.

Throughout the foregoing description, the device has been described as applied to dental instruments, but it should be clearly understood that the invention involved therein may be equally applied to any construction in which a wheel, disk or other form of member is to be secured upon a rotatable driving shaft.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a device of the class described, the combination of a driving shaft and a driven wheel carried thereby, with a plurality of projections on one of these members adapted to engage the other member, and means for resiliently retaining said members in engagement.

2. In a device of the class described, the combination of a driving shaft and a driven wheel carried thereby, with a plurality of fingers about the axis of one of these members adapted to enter corresponding sockets in the other member, and means for resiliently retaining said members in engagement.

3. In a device of the class described, the combination of a driving shaft, a driven disk mounted thereon and free to rock relative thereto, a plurality of fingers on one of these members adapted to enter corresponding sockets in the other member, and means for retaining said fingers within said sockets.

4. In a device of the class described, the combination of a mandrel provided at one extremity with a plurality of projections, a threaded hole in said extremity concentric with said mandrel, a wheel provided with a central orifice therethrough, a headed screw adapted to pass through said orifice and have a portion thereof fit within said threaded hole, and sockets in said wheel to receive the opposing projections on said mandrel.

5. In a device of the class described, the combination of a mandrel provided at one extremity with a plurality of tapering fingers projecting longitudinally therefrom and concentric therewith, a threaded hole in said extremity concentric with said mandrel, an abrasive disk provided with an inserted hub having a central orifice therethrough, a binding screw adapted to pass through said orifice and have a portion thereof fit within said threaded hole, and a plurality of sockets in said hub adapted to receive the opposing fingers on said mandrel and to be held in coactive relation therewith by said binding screw.

6. In a device of the class described, the combination of a mandrel provided at one extremity with a plurality of projections, a threaded hole in said extremity concentric with said mandrel, a disk provided with a central orifice therethrough, a binding screw adapted to pass through said orifice and have a portion thereof fit within said threaded hole, sockets in said disk adapted to receive the opposing projections on said mandrel, and resilient means on said screw adapted to act between the head thereof and the opposing face of said wheel or disk.

In testimony whereof I affix my signature, in presence of two witnesses.

CHARLES H. DAVIS.

Witnesses:
HARTLEY W. BARTLETT,
H. M. KENNEDY.