

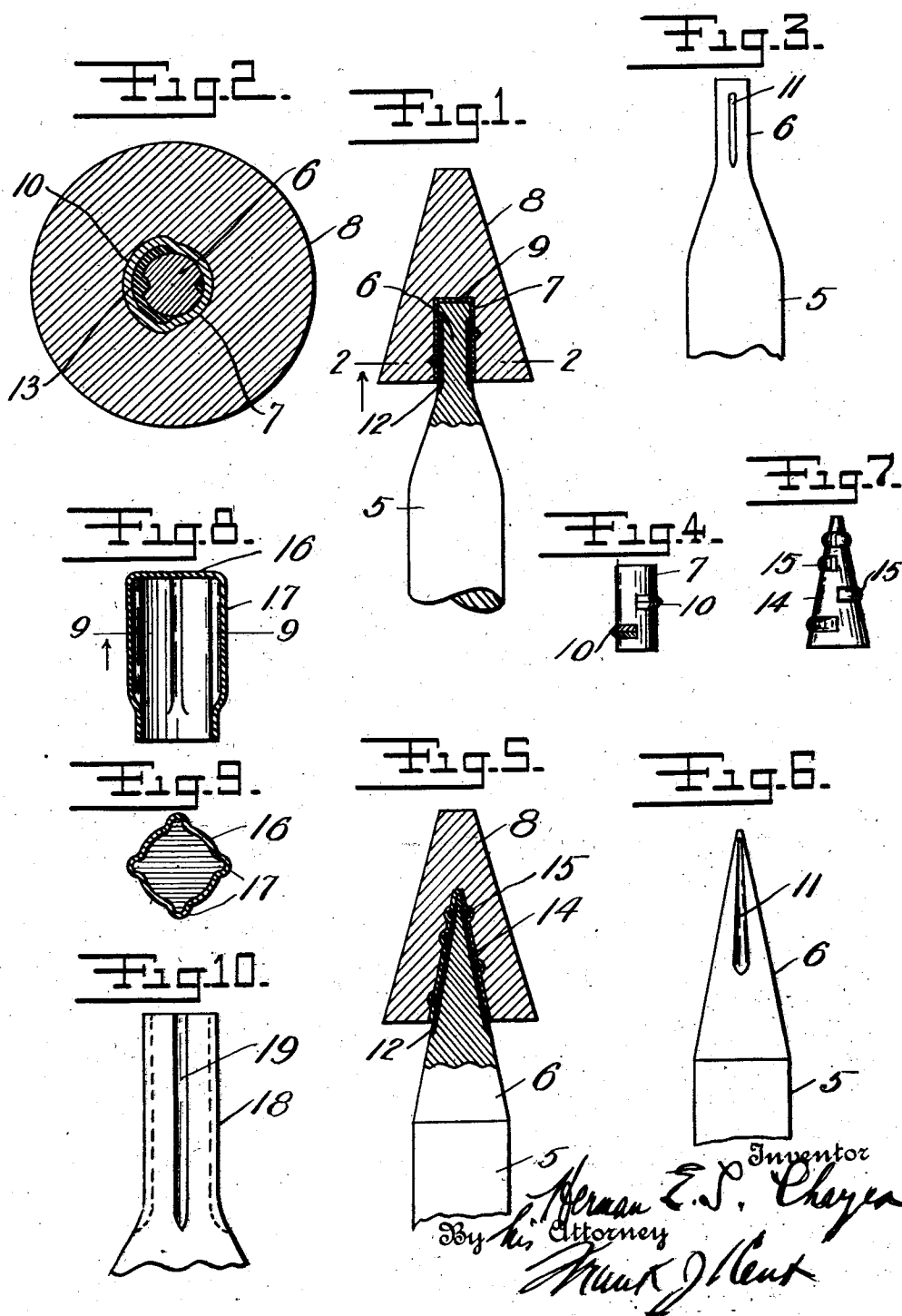
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GRINDER

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GRINDER.

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This invention relates generally to means for mounting rotatable tools and particularly grinding tools of the dental type.

It has been the practice to mount dental abrasive or grinding burs by forming an axially disposed opening or recess in the burr when the plastic mass of comminuted abrasive material and binder is shaped into the grinder formation preparatory to the baking or other hardening operation. The opening thus provided has ordinarily been formed to receive the end of an operating shaft with a loose fit to provide space between the exterior surface of the shaft and the inner surface of the opening to receive a mass of cement for holding the grinding burr in place on the shaft.

The construction thus described, although it has gone into extensive use, is open to an objection that the grinding wheels mounted in the manner described were in many cases badly centered so that they tended to produce a disagreeable eccentric rotation in operation. This eccentric disposition of the grinding wheel with the end of the shaft has been due to the extreme difficulty of properly centering the wheel on the shaft when the cementing operation is performed and also to the distortion of the shaft receiving recess in the baking operation which in many cases tended to deform the recess and interfere with its truly cylindrical formation. Another objection to this construction has been that when pressure was applied along the shaft the pressure tended to rupture the grinding burr or wheel since the end of the shaft bore directly against the material of the wheel at the inner or closed end of the recess.

It is an object of this invention to provide means for mounting grinding wheels on operating shafts that will obviate the objections referred to.

It has been found that these desirable results can be achieved by anchoring in the shaft receiving recess of the burr or wheel a closed bottom metal socket which can be formed to fit the end of the operating shaft and obviate any tendency for the wheel to be eccentrically displaced with relation to the shaft. The metal socket members are mounted in the grinding burs while they are still in a plastic condition and are so

formed that they will be permanently anchored in the material of the burr when the baking operation has been completed. The sockets are mounted against either longitudinal or rotative movement with relation to the burr, means being provided for soldering the end of the operating shaft directly to the inner surface of the metal socket. Other features of the invention will be hereinafter referred to.

In the drawings,

Figure 1 is a view in longitudinal section of a dental grinding wheel in connection with which is disclosed a preferred embodiment of the invention.

Figure 2 is an enlarged transverse section on the line 2—2 of Figure 1.

Figure 3 is a view in side elevation of the end of an operating shaft formed to have a grinder wheel mounted thereon in accordance with the invention.

Figure 4 is a side elevation of a form of socket which may be used in carrying out the invention.

Figure 5 is a view similar to Figure 1 showing a modified form of the invention.

Figure 6 is a view similar to Figure 3 showing a formation of operating shaft suitable for use with the embodiment of the invention shown in Figure 5.

Figure 7 is a view in side elevation of a socket member suitable for use with the form of operating shaft shown in Figure 6.

Figure 8 is a view in longitudinal section of a socket member adapted to form still another embodiment of the invention.

Figure 9 is a transverse section taken on the line 9—9 of Figure 8.

Figure 10 is a view in side elevation showing the formation of an operating shaft adapted to be used with the socket member shown in Figure 8.

Referring to the drawings for a more detailed description, in Figure 1 is shown an operating shaft 5 having a reduced cylindrical end section 6 adapted to enter and closely fit the interior of a socket member 7 anchored in the end of a grinder wheel or burr 8. The socket member 7 is formed of metal and has a closed inner end 9 as indicated. The socket member is mounted in position in a plastic condition of the grinder burr 8 and is provided with projections 10

which serve when the mass of material forming the grinder wheel has been solidified to prevent movement of the socket with relation to the grinder wheel in any direction.

When the socket member 7 has been mounted in position in the grinder wheel the wheel is trued or centered with relation to the socket so that the shaft receiving recess provided by the socket is accurately centered and axially anchored with relation to the wheel.

The reduced end 6 of the operating shaft 5 is then inserted in the recess provided by the socket 7. The end 6 of the operating shaft is preferably provided with grooves or recesses 11 which may be longitudinally arranged as indicated and which extend somewhat beyond the end of the socket, as indicated in Figure 1, to permit of the filling of the grooves with solder 12 as shown in Figure 1. The application of solder to the grooves 11 when the end of the shaft is in position within the socket 7 will, as is clearly indicated, firmly unite the shaft to the inner face of the socket, the area of contact of the soldered connection between the shaft and the socket being materially increased by the quantity of solder flowing into the circumferential or transverse recesses provided by the anchoring projections 10. This feature of the invention is clearly indicated in Figure 2 where a transverse or circumferential body of solder is indicated at 13.

In addition to the cylindrical formation of the socket member 7 shown in Figure 1 socket members of other formations may also be used. For instance, in Figures 5, 6 and 7 of the drawing there is shown a grinder wheel mounting in which a socket member of a conical formation 14 is employed. This conical socket member 14 is also provided with anchoring lugs or extensions 15 which may have a rounded formation rather than the angular formation shown in connection with the members 10 of Figure 4. It has been found that socket members of either the cylindrical or the conical formation provide an accurate fitting and centering of the grinder wheel on the operating shaft which it is difficult or impossible to obtain with the constructions heretofore employed.

While anchoring members of a specific formation have been shown it will be obvious that this feature forms no essential part of the invention and that the particular means employed for anchoring the socket members in position in the grinder wheels can be widely varied in actual practice.

The socket members thus provided between the ends of the operating shafts and the grinder wheels also serve as abutment

members to receive the end thrust of the shafts and prevent the direct application of the end thrust or pressure against the actual material of the grinder wheel in a restricted area. This construction by thus absorbing or receiving the direct thrust of the shafts distributes the pressure throughout the entire area of that portion of the wheel in contact with the socket and thereby prevents the rupture of the grinder wheels, a feature which is of frequent occurrence with mountings of the type in which the shaft is cemented directly to the material of the wheel.

Still another form of the invention is shown in Figures 8, 9 and 10 of the drawing, in which a socket member 16 is shown which has a generally cylindrical formation provided with anchoring lugs 17 having a longitudinally disposed relation rather than circumferentially disposed relation as in the forms of the invention already described. The anchoring members 17 do not extend the full length of the socket as is clearly indicated in Figure 8 thereby preventing the endwise as well as the angular movement of the socket in its seat. The shaft end 18 shown in Figure 10 is provided with solder receiving grooves 19 which extend wholly to the end of the shaft thereby providing a relatively substantial area of contact between the solder and the walls of the shaft and the socket.

What is claimed is:

1. In a rotatable grinder, a metal socket member for the grinder member, said socket member being provided with a hollow lateral projection for anchoring engagement with the grinder member, and a shaft member formed to fit the socket, said shaft being provided with channels and a fusible metal filling for the hollow projections and channels and attaching the socket to the shaft.

2. In a rotatable grinder, a metal socket member having hollow projections arranged in staggered relation to each other in the wall thereof to secure the socket to the grinder, an operating shaft formed to be seated in said socket and having grooves in its surface and a fusible metal filling for the grooves and hollow projections, to attach the socket to the shaft.

3. In a rotatable grinder, a metal socket member having parallelly arranged hollow anchoring projections for securing the socket to the grinder, an operating shaft formed to be seated in said socket member, and having grooves in its surface, and a fusible metal filling for the grooves and hollow projections, to attach the socket to the shaft.

In testimony whereof I affix my signature.

HERMAN E. S. CHAYES.