

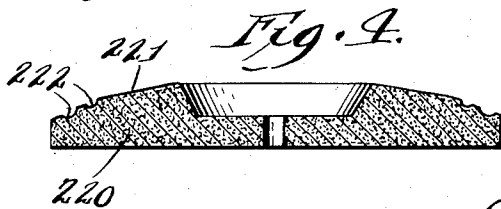
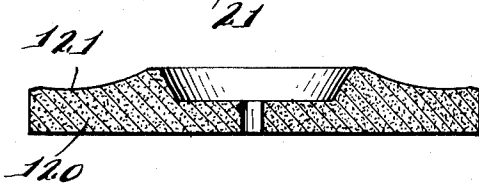
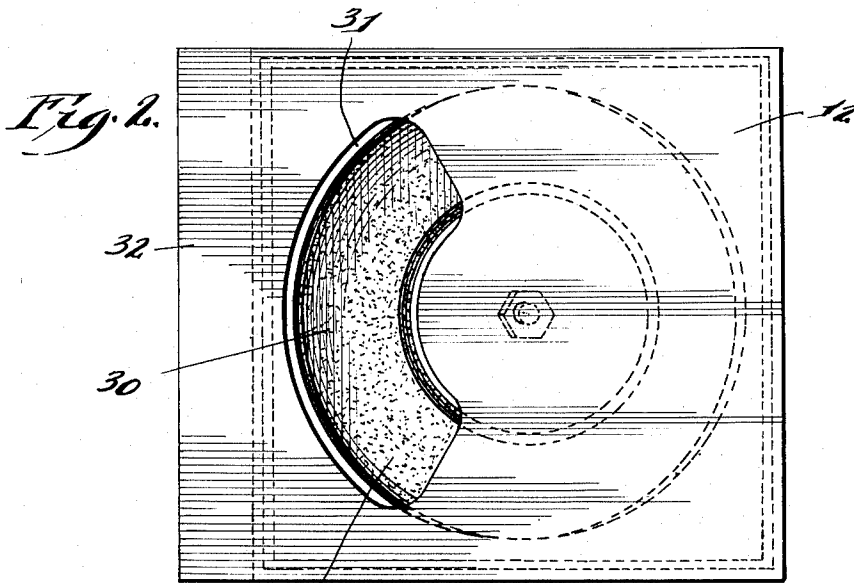
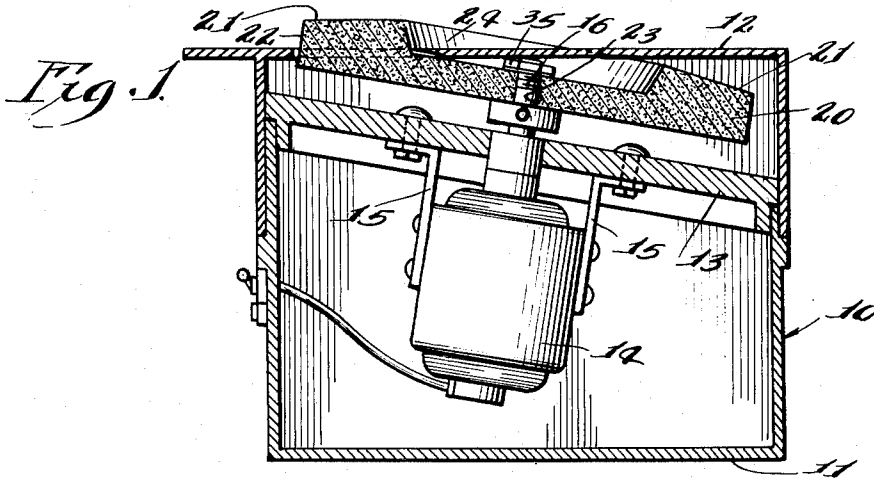
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ABRASIVE DEVICE

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ABRASIVE DEVICE

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2 Claims. (Cl. 51-109)

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This invention relates to an abrasive device, and more particularly to a rotary abrasive device for use in preparing the edges of instruments such as those made of high-grade surgical steel, as for example, those used by dentists and chiropodists.

A feature of this invention is to provide a new and improved abrasive device of the character described.

Another feature is the provision of a rotary abrasive wheel having a working surface on its side to provide an effective diameter of working surface larger than the diameter of the wheel itself.

Another feature is the provision of a device of the character described in which a side working surface on an abrasive wheel is accessible for abrading the edge of an instrument from either side of the working surface without interference from other parts of the wheel.

Another feature is the provision of a relatively small diameter abrasive wheel having a side working surface having an effective diameter much larger than that of the wheel, yet requiring less power to operate than a straight wheel of said effective diameter.

Another feature is that the side working surface provides a greater width of working surface for a wheel of a given thickness and amount of abrasive material.

A further feature is the provision of rotary abrasive wheels having a working surface on the side of the wheel corresponding in radial cross section to the cutting edge of the instrument to be abraded.

Other features and advantages will be apparent from the description of a particular embodiment of the invention illustrated in the accompanying drawings, in which:

Fig. 1 is an elevation, partly in section, illustrating an embodiment of this invention;

Fig. 2 is a plan view of the device illustrated in Fig. 1;

Fig. 3 is a vertical cross section through an abrasive wheel showing a varied form of working surface thereon; and

Fig. 4 is a vertical cross section through another wheel illustrating another working surface thereon.

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cal instrument such as used by dentists or chiropodists, it is preferred that the diameter of the abrasive wheel be such that the cutting edge of the instrument is not too deeply hollow-ground.

Ordinarily, a straight wheel, that is one in which the abrasive surface is around the periphery of the wheel generally normal to the sides of the wheel, is used to sharpen such instruments. It will be readily understood that with a decrease in diameter of such a straight wheel an increase in the amount of hollow grinding of the cutting edge of the instrument results, as does also an increase in the amount of "tearing" or "gouging" of the edge because of the angle of attack of the wheel to the edge being too great. Also with a relatively large diameter wheel more power is required to operate the wheel than is necessary with a much smaller diameter wheel.

This invention has provided a solution to the above difficulties wherein a relatively small diameter wheel may be used effectively and easily to abrade the instruments of the practitioner and the device may be placed in his office taking up relatively small space and utilizing a relatively small amount of power in its operation. The term "abrade" or "abrasive" as herein used is to be construed as meaning any operation characterized by the act of a wearing by friction, which may for example be any of the operations commonly called honing, sharpening, polishing, shaping, buffing, or the like.

The embodiment illustrated in Figs. 1 and 2 comprises generally a housing 10 having a bottom 11 supporting the housing and a top plate 12 enclosing at least a portion of the abrasive wheel all of relatively small size so that the dentist, chiropodist or other user may place the device at some convenient location where he may use it at any time to abrade the cutting edges of his instruments. Mounted within the housing 10 is a slanting support member 13 carrying a motor 14 by brackets 15. The motor 14 is operatively connected to a shaft 16 upon which the abrasive wheel 20 is securely mounted and is preferably a relatively slow speed motor, that is having a speed of between 60 and 200 revolutions per minute. The support member 13 is inclined within the housing 10 as will hereinafter more fully appear.

The abrasive wheel 20 may be of any of the

In order to abrade the cutting edge of a surgi-

general known structures having an abrasive material bonded together to make a homogenous wheel or it may be of any base composition having an abrasive surface secured thereto, as a coating, disk, or the like. The wheel 20 has a working surface 21 on its side adjacent the periphery 22 of the wheel and facing away from the axis of rotation of the wheel. Adjacent the working surface and centered about a center aperture 23 in the wheel is a depressed portion 24. It will be noted that the depressed portion 24 is on the same side of the wheel as the working surface 21. The working surface 21 is inclined to the plane of the wheel at a small angle, that is an angle less than 30 degrees and preferably from 10 to 15 degrees. The wheel illustrated in Fig. 1 has a working surface 21 inclined to the plane of the wheel at approximately 10 degrees and the shaft 16 upon which the wheel 20 is mounted is inclined within the housing at the same angle to the vertical so that the working surface 21 at the upper left hand portion of the wheel lies in a horizontal plane.

In providing a working surface on the side of the wheel and inclining the wheel, an effective diameter at the abrading position will be much larger than the diameter of the wheel itself. As an example, a wheel having a diameter of approximately 6 inches and a working surface at 15 degrees to the plane of the wheel, would have at an abrading position 30 an effective arc of working surface corresponding to the arc of a straight wheel approximately 14 inches in diameter. This would correspond to having a straight wheel of a diameter of about 14 inches and would require, as will be readily understood, a much greater power unit to operate than the 6 inch wheel utilizing the side working surface disclosed by this invention. A working surface on a 6 inch diameter wheel inclined at 10 degrees to the plane of the wheel would have a still larger effective diameter. Also a greater width of working surface may be had with the working surface on the side of the wheel than with the same diameter of straight wheel using the same amount of material in the wheel. In mounting the abrasive device in the housing 10 as described above, the top plate 12 provides a shield about the abrasive wheel protecting the fingers and hands of the operator. It will be noted that the top 12 has an opening 31 corresponding in configuration to an arcuate segment of the working surface 21 so that only a portion of the wheel projects above the level of the top 12. A ledge 32 beyond the outer periphery of the wheel, comprising an extension of the top 12, provides a hand rest for the operator when using the wheel to abrade an instrument.

In sharpening or otherwise abrading an instrument on a rotary wheel it is preferred by most practitioners that the wheel come into the blade in a direction from the back of the blade toward the cutting edge. In utilizing a straight wheel, that is one with the working surface on its outer periphery, no difficulty is encountered in sharpening an instrument because the handle of the instrument may be held on either the left hand or right hand side of the wheel without interference with the wheel itself. When the working surface is on the side of the wheel as in the present invention, ordinarily the working surface may only be approached from outside of the wheel. In the present invention the working surface 21 may be approached from either side thereof. For example, one side of the blade may

be sharpened by holding the handle of the blade over the ledge 32 of the top 12. In order to sharpen the other side of the blade the blade is turned over and the handle held over the center portion of the wheel so that the working surface may come into the cutting edge from the same direction as when sharpening the other side, the center depression in the wheel permitting a low enough mounting of the guard plate to avoid interference with the handle of the instrument. As will readily be seen from Figs. 1 and 2 the top 12 covers most of the wheel so that the hand of the operator would not be injured while holding the handle of the instrument generally over the center of the wheel in performing an abrading operation.

Many dental and chiropody instruments have a curved cutting edge rather than a straight one. When it is desired to sharpen such an instrument, an abrasive wheel 120, such as illustrated in Fig. 3, may be provided with a working surface 121 generally at a small angle to the plane of the wheel and curved along a radial cross section to correspond to the cutting edge of the instrument to be sharpened. The wheel 120 may be substituted for the wheel 20 in the device illustrated in Figs. 1 and 2 by simply removing the top 12 on the housing 10, loosening the nut 35 which retains the wheel 20 on the shaft 16 and then placing the wheel 120 in position on the shaft.

In Fig. 4 another wheel 220 is illustrated having a working surface 221 with annular grooves 222 in the working surface. Such a wheel may be used for sharpening instruments having a hooked portion and instruments with rounded cutting edges such as nucleus knives used by chiropodists. Other wheels having various shaped working surfaces may be provided as desired.

From the foregoing it is believed that this invention provides a new and improved abrasive device in which a relatively small diameter abrasive wheel may be used to obtain a requisite larger diameter effective working surface and which requires substantially less power to operate than a straight wheel having said effective working diameter.

While I have herein described certain embodiments of my invention, it is apparent that some changes may be made by those skilled in the art. However, the invention is not to be limited by the foregoing description but rather to be construed broadly within the spirit and scope of the appended claims.

I claim:

1. A rotary abrasive device comprising: a housing including a planar work supporting surface, said surface having an arcuate opening therein; a shaft supported adjacent said surface and at an angle of less than 30 degrees to a perpendicular to said surface; power means supported by said housing for rotating the shaft; an abrasive wheel mounted on the upper end of said shaft at substantially 90 degrees to said shaft, said wheel having an annular radial abrasive face surface positioned at an angle of less than 30 degrees to the plane normal to the axis of rotation of said wheel and the same as the first mentioned angle, with the surface facing away from said shaft and a depressed portion in the center of said wheel adjacent said abrasive surface, said inclination of said shaft being sufficient to rotate successive portions of the abrasive surface into positions substantially parallel to said planar sur-

face and extending through said arcuate opening, with the work support surface masking the remainder of said abrasive surface and the corresponding portions of said depression.

2. A device of the character claimed in claim 1, 5 wherein the angle of the shaft with respect to the perpendicular and the angle of the abrasive face surface with respect to the plane normal to the axis of rotation of the wheel are both between 10 and 15 degrees, and both the same angle. 10

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