

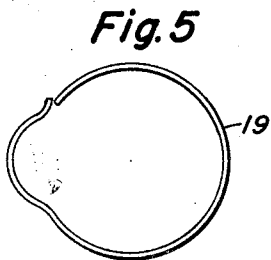
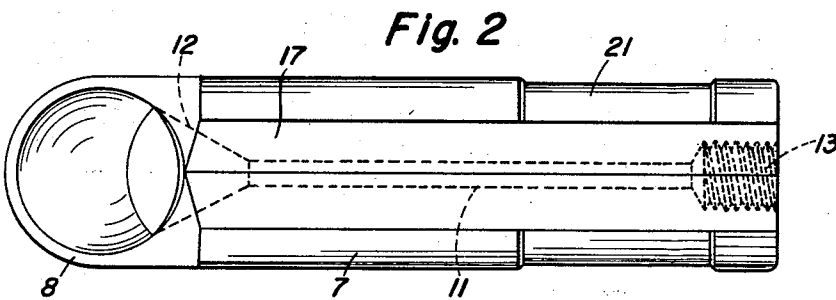
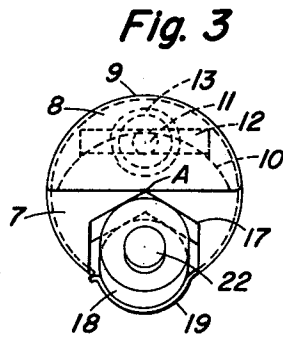
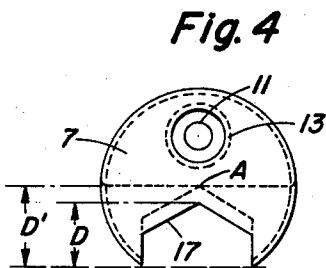
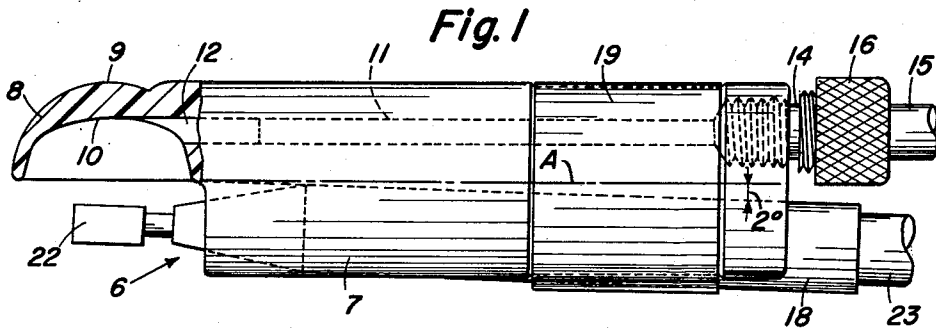
March 24, 1964

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3,126,021

GRINDING DEVICE

Filed Nov. 25, 1960



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3,126,021

GRINDING DEVICE

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Filed Nov. 25, 1960, Ser. No. 71,486

4 Claims. (Cl. 132-76.4)

This invention relates generally to cleaners, and more specifically to an improved grinding device for trimming nails and the like.

In the practice of podiatry, the podiatrist often resorts to a high-speed drill, particularly where it is necessary to trim or remove a portion of the patient's toe nail. In many instances, the toe nail becomes extremely hard and difficult to cut by normal nail-cutting tools. In cases of this type, the podiatrist will use the drill provided with a suitable burr or cutting tool to obtain the desired cutting action. The high-speed drill, in conjunction with a properly selected burr, provides an excellent tool for removing the nail, but suffers the serious disadvantage of producing minute dust particles which permeate the operating room and settle on the equipment, the toes and feet of the patient, and on the hands and person of the podiatrist. This dust, if inhaled by the patient or podiatrist, is believed to be detrimental to the health of the person involved, and in some instances is believed to be one of the causes of lung silicosis, or mycotic lung infection, particularly when the person is subjected to inhalation of the dust over a period of years. This is particularly believed to be the case where hypertrophied nails, mycotic or otherwise, are subjected to the drilling operation. The above-indicated serious disadvantage of the drilling operation is believed to be effectively reduced by applicant's invention to the point where it is no longer a hazard.

One of the objects of the present invention is to provide an improved grinding device for nails and the like that is of simple design and construction, thoroughly reliable and efficient in operation, and economical to manufacture.

Another object of this invention is to provide an improved grinding device containing a burr for grinding nails or the like in which substantially all of the dust produced thereby is captured.

Still another object of the invention is to provide an improved grinding device in which approximately 90 percent of the dust produced during a drilling operation is prevented from settling upon the equipment, the toes and feet of the patient, and on the hands and person of the operator, and from permeating and contaminating the air in the room.

A further object of this invention is to provide an improved grinding device for nails or the like which is believed to substantially eliminate any danger to the health of the operator.

A more specific object of the invention is to provide an improved grinding device for nails or the like having a transparent hood mounted over the burr, and vacuum means connected to the hood for removing the dust particles formed during the drilling operation.

Another specific object of this invention is to provide an improved grinding device for nails or the like having a transparent hood mounted over the burr of the drill that magnifies the nail and burr.

Still another specific object of this invention is to provide an improved grinding device for toe nails or the like including a transparent magnifying hood in register with a drill burr for magnifying the nail and burr and catching the dust developed during the drilling operation and guiding it to a vacuum source.

Another object of the invention is to provide an improved holding device for releasably supporting a grinding means including a burr at an angle with respect to the

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axis of the holding device to direct the dust developed during a grinding operation to the mouth of an opening connected to a vacuum source.

Objects and advantages other than those set forth above will be apparent from the following description when read in connection with the accompanying drawing, in which:

FIG. 1 is a side elevation view partially in section of a preferred embodiment of the grinding device of this invention;

FIG. 2 is a bottom view of the grinding device of FIG. 1 with the hose, hose fitting, clamp and drill removed for purposes of clarity;

FIG. 3 is a front end view of the grinding device of FIG. 2;

FIG. 4 is a rear end view of the grinding device of FIG. 2; and

FIG. 5 is a side elevation view of the clamp for releasably holding the drill to the cleaning head.

As seen in the drawing, the grinding device 6 essentially comprises an elongated cylindrical cleaning head 7 of a size adapted to snugly fit in the hand of the operator, and formed from a transparent moldable material such as Plexiglas or Lucite. One end of head 7 as seen best in FIG. 1 is molded to form a semi-circular hood 8 in which the radii of the top surface 9 is approximately 0.5" and the radii of the lower surface 10 is approximately 0.75". Consequently, hood 8 forms a deep meniscus lens or magnifying glass which when interposed between an object and the viewer serves to magnify the object. The head 7 further has an elongated opening 11 extending therethrough, and one end 12 thereof terminates at the lower surface of hood 8 and flares outwardly as seen in FIG. 2, and its opposite end 13 is threaded for receiving a threaded fitting 14 of any known type. A tube 15 has one end secured to threaded fitting 14 by a knurled nut 16, and its opposite end connected to any suitable source of vacuum, not shown, such as any commercially available vacuum cleaner. The cylindrical head 7 further has an elongated axially extending peripheral V-shaped groove 17 as best seen in FIGS. 2, 3 and 4, and the bottom or root of groove 17 is inclined approximately 2 degrees with respect to the axis designated "A" of head 7 as seen in FIG. 1, and the depth "D," of groove 17 at one end (see FIG. 2) is greater than the depth "D" at its opposite end for a purpose to be explained hereinafter. The root of groove 17 forms a seat for a drill 18 which is releasably held against the seat by a spring clamp 19, as seen best in FIGS. 1 and 5, encircling cylindrical head 7. The cylindrical head 7 has a peripheral recess 21 as seen in FIG. 2 into which spring clamp 19 seats for preventing movement of clamp 19 axially along head 7. The drill 18 is of any well-known commercial type in use in industry today, particularly in the dental profession, having means for releasably holding a burr 22 at one end, and drivingly connecting burr 22 by means of a flexible shaft 23 to a high-speed driving motor, not shown, for rotatably driving same. The drill 18 is manually slid along groove 17 underneath clamp 19 by the operator. A burr 22 is secured to drill 18 and the drill axially moved by the operator along groove 17 until burr 22 is properly centered under hood 8. By virtue of the inclination of groove 17, the axis of the burr 22 which is parallel thereto is inclined with respect to axis "A" placing the burr in a more favorable cutting position with respect to an object for throwing any dust produced by its rotation into engagement with the flared end 12 of opening 11. In addition, by virtue of the groove inclination, the burr is moved closer to the flared end 12 resulting in better dust removal from the object and less contamination of the surrounding air.

In the operation of this invention, the operator secures

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a burr 22 to drill 18, and then turns on the drive motor for rotatably driving the burr at a high rate of speed. The operator grasps cylindrical head 7 in one hand and manipulates the head bringing burr 22 into engagement with an object to be worked upon such as a nail of a patient's toe. The operator views the object through hood 8 giving him an enlarged picture of the object and the burr 22 to aid the operator in his work. The dust produced by burr 22 is thrown by the rotation of the burr into engagement with the flared end 12 of opening 11 and drawn by the vacuum source into some suitable receptacle, not shown. Consequently, very little of the dust escapes around the edges of hood 8.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinabove and as defined in the appended claims.

I claim:

1. A holding device for releasably supporting a grinding means including a burr, and further adapted to be connected to a vacuum source, comprising:

a substantially cylindrical unitary member having its outer periphery at one end forming a handle, and having a transparent suction hood at the opposite end adapted to overlie a burr and through which the operator can observe the grinding action;

said member having an axially extending longitudinal groove for receiving said grinding means with the root of said groove being inclined with respect to the axis of said unitary member so that the depth of said groove at the end of said member having said suction hood is greater than the depth of said groove at the opposite end of said member; and

said member further having passage means extending from the under side of said hood to said one end for connection with a vacuum source.

2. In a grinding device connectable to suitable power and vacuum sources, the combination comprising: grinding means including a burr connectable to a power source and adapted to be driven thereby; and

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support means for supporting said grinding means, said support means comprising:

a substantially cylindrical unitary member having its outer periphery at one end forming a handle, and having a transparent suction hood at the opposite end overlying the burr and through which the operator can observe the grinding action, said member having an axially extending longitudinal groove for receiving said grinding means with the root of said groove being inclined with respect to the axis of said member so that the depth of said groove at the end of said member having said suction hood is greater than the depth of said groove at the opposite end of said member; and

said support means further having passage means connecting the underside of said hood to a vacuum source whereby any dust particles produced during the grinding operation are caught by said hood and drawn to said vacuum source through said passage means.

3. The invention according to claim 2 wherein said hood forms a magnifying meniscus lens.

4. The invention according to claim 3 wherein said lens has an outer surface having a radius of approximately 0.5 inch, and an inner surface having a radius of approximately 0.75 inch.

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