

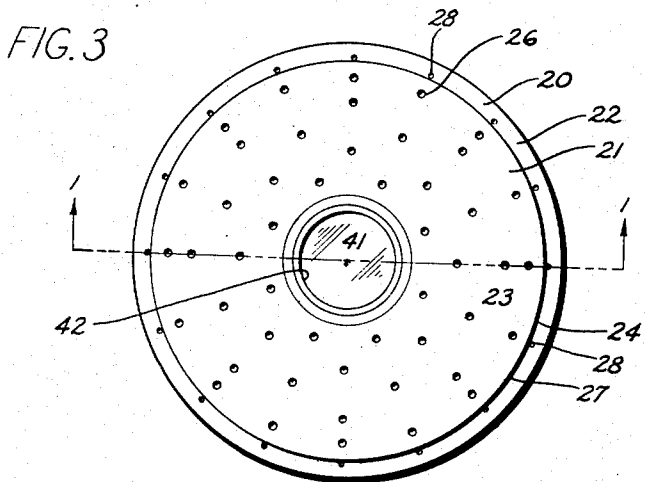
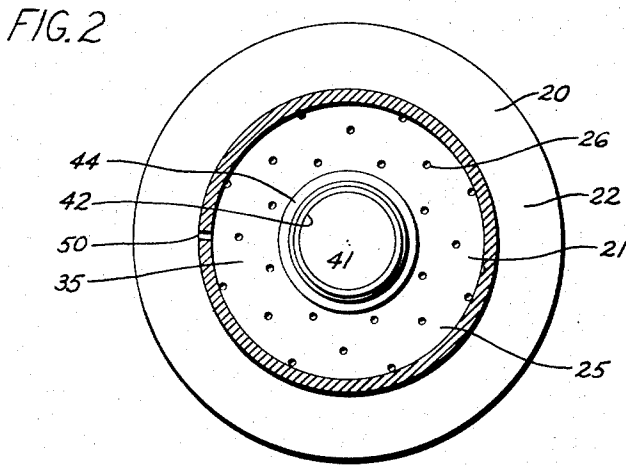
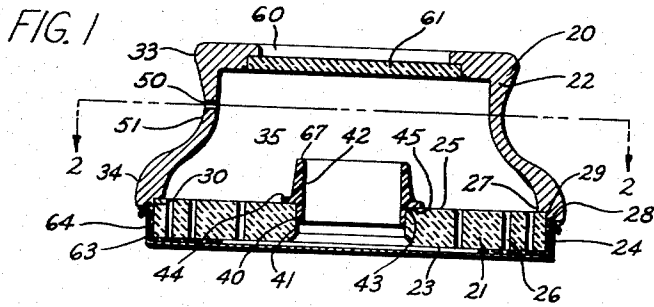
Aug. 13, 1957

H. D. STUCK

2,802,317

MANUALLY MANIPULABLE SELF LUBRICATING HONE

Filed Nov. 3, 1954



INVENTOR.
HAROLD D. STUCK
BY
Pearson & Pearson
ATTORNEYS

1

2,802,317

MANUALLY MANIPULABLE SELF LUBRICATING HONE

Harold D. Stuck, Andover, Mass., assignor to John W. Bolton & Sons, Inc., Lawrence, Mass., a corporation of Massachusetts

Application November 3, 1954, Serial No. 466,583

5 Claims. (Cl. 51—213)

This invention relates to devices for manually honing the cutting surfaces of machine knives.

It has heretofore been proposed to provide a manual hone of flat, round, disc shape as in U. S. Patent 1,059,566 to Rodgers of April 22, 1913. It has also been proposed to make such a hone of annular shape as in my co-pending application Serial No. 240,824 filed August 8, 1951, now U. S. Patent No. 2,723,515 of November 15, 1955. Such hones when of porous abrasive may be immersed in a bath of lubricant to become permeated therewith, whereupon the pores feed lubricant to the working surface during use. However, even with porous hones it is necessary to occasionally stop the honing operation in order to secure a resupply of lubricant and no variable control of the feeding of the lubricant during use is provided.

It is the object of this invention to provide a honing device for manual manipulation on machine knives in which lubricant may be continually supplied to the working face from a reservoir carried on the hone itself.

Another object of the invention is to provide a self feeding honing stone having a handle in the form of a knob with a single air aperture therethrough, the presence or absence of the operator's finger on the aperture controlling the flow of the lubricant.

A further object of the invention is to provide a self feeding honing stone having a plurality of straight capillary bores therein whereby the lubricant reservoir is filled through said bores and supplies lubricant to said bores.

Still another object of the invention is to provide a self feeding honing device having a flat annular honing stone of a diameter too large for gripping but carried by a metal handle of generally campanulate shape, the upper handle portion being easily grippable by the hand of an operator.

A still further object of the invention is to provide a self feeding honing device having an annular honing stone and an annular lubricant reservoir thereabove, whereby the control of air entering the reservoir not only controls the feed but also controls the vacuum at the centre of the working surface of the annular honing stone.

In the drawing

Fig. 1 is a side elevation in section on line 1—1 of Fig. 3 of the honing device of this invention.

Fig. 2 is a plan view in section on line 2—2 of Fig. 1 of the device.

Fig. 3 is a bottom view of the device shown in Figs. 1 and 2 with the cover removed.

The honing device 20 of the invention includes a honing stone 21 of any suitable abrasive material and a handle 22 of imperforate material such as metal.

Honing stone 21 is preferably in the form of a flat, round disc of substantial thickness having a flat working face 23 and other faces such as the circumferential face 24 and the back face 25. A plurality of minute capillary conduits, such as 26, extend entirely through honing stone

2

21 from the working face 23 to another face such as back face 25. Preferably, the capillary conduits 26 are straight bores perpendicular to working face 23 and spaced from each other according to a predetermined pattern such as the radial, or spoke, design shown.

Handle 22 is of inverted cup shape and honing stone 21 is fixed across and sealed within the rim, or edge portion, 27 of the cup shaped handle as by swages 28 or in any other suitable manner. A right angular groove 29 may be provided in rim 27 to seat the corresponding edge portion 30 of honing stone 21. Handle 22 is preferably campanulate, or bell shaped, whereby the knob portion 33 may easily fit in the hand of an operator while the base portion 34 flares outwardly to hold a honing stone of larger diameter than conveniently fits in the hand.

The handle 22 forms a receptacle with the honing stone 21 which receptacle defines a liquid lubricant reservoir, or cavity, 35, the reservoir being jointly formed by the handle and stone and communicating with the stone as by the back face 25. Handle 22 thus encases substantially all of honing stone 21 except the working face portion, the latter projecting beyond the rim 27 into a plane beyond and outside the plane of rim 27. A liquid lubricant, such as oil, in the reservoir 35 feeds through the capillary conduits, or bores, 26 to the working face 23 and lubricates the same continually during use without requiring constant re-immersion in an oil bath.

Preferably the honing stone 21 is annular, having an inner periphery 40 around a centrally disposed opening 41 of comparatively large diameter. The central opening 41 tends to relieve the vacuum at the centre of a lubricated flat hone and prevents a mound or depression from forming centrally of the flat working face 23 during use. A separate upstanding flange 42 of imperforate material such as metal, plastic or the like, is fixed around the inner periphery 40 of opening 41 and sealed thereto by suitable means such as adhesive. Flange 42 is exteriorly grooved at 43 to fit the corresponding edge portion of stone 21 there being an outwardly projecting, integral flange 44 therearound to overlie the adjacent area 45 of the stone. Flange 42 thus forms an inner wall for reservoir 35 which makes the reservoir annular in cross section.

An air inlet and outlet aperture 50 is provided in a wall of handle 22 preferably in the neck 51 thereof when the handle is of campanulate shape. Aperture 50 may thus be covered and uncovered by the tip of a finger of the operator while gripping the knob portion 33 to control the passage of air into the reservoir 35. The capillary action of the bores 26 in drawing liquid downwardly to the working surface 23 causes the liquid lubricant level in reservoir 35 to gradually lower thus creating a slight reduction in air pressure therein. Air does not enter the receptacle through opening 41, because the lubricant on the honing surface 23 seals the opening during use of the device on a substantially flat cutting surface of a machine knife. Thus, the operator may keep his finger tip over aperture 50 to check the discharge of lubricant over working surface 23, or remove the finger from the aperture if a free flow is desired.

A second opening 60 may be provided in handle 22, sealed by a transparent window 61 of glass or the like in order that the interior of the receptacle may be viewed by the operator. A cover 63 may be provided having a lining 64 of felt or the like, the cover being placed over the working surface area 23 when the device is not in use.

In operation the cover 63 is removed and the honing device 20 placed in a bath of liquid lubricant, with the working surface 23 facing downwardly. The liquid lubricant rises through the capillary bores 26 into the annular reservoir 35 formed between the flange 42 and the handle 22. The lubricant rises to the level of the upper rim 67

3

of flange 42 meantime forcing air out of the aperture 50. The device 20 may then be removed from the bath of lubricant and manually manipulated across the cutting faces of machine knives with lubricant feeding gradually from reservoir 35, through bores 26 to working face 23. The operator may keep his finger tip over aperture 50 if he desires, to slow down the flow of lubricant or aperture 50 may be kept clear if a free flow is desired.

Honing stone 20 is preferably of a very fine grit size such as 800-1200 and is so dense as to need porosity and lubricant to avoid suction and to cut rapidly. The lubricant used may be oil, water or other suitable liquid and it will be apparent that, if desired, the central opening 41 may be used as a filler hole for the lubricant by holding the device upside down during filling. While the honing device is especially useful on machine knives, it may also be used on the surfaces of other machine parts such as on valve seats of what are sometimes called harmonica valves or on the flat surfaces of the rotating discs of a lapping machine.

I claim:

1. A honing device for manual manipulation on machine knives, said device comprising a honing stone of substantial thickness, having a flat working face, a non working face, an axial bore of substantial diameter and a plurality of minute, capillary, lubricant conduits, said bore and conduits each extending therethrough from said working face to said non working face; an upstanding annular flange encircling said bore and extending well above said non working face and a handle of non porous material permanently fixed to said stone and encasing the non working face thereof, said handle having a free exterior face adapted to fit the hand of an operator and a hollow cavity therewithin, the non working face of said stone, said flange and the cavity in said handle jointly

4

forming an annular lubricant reservoir for receiving and discharging lubricant by capillary attraction through the capillary conduits in said stone.

2. A combination as specified in claim 1 wherein said handle includes a portion of transparent material for viewing said cavity.

3. A combination as specified in claim 1 plus a removable fitted cover for the working face of said stone, said cover being of imperforate sheet material for sealing said working face when not in use.

4. A combination as specified in claim 1 wherein said handle includes a minute aperture extending from the upper portion of said cavity through said non porous material to the free exterior face thereof and adapted to be selectively covered and uncovered by a finger of an operator to serve as an air vent for controlling air pressure above the level of any lubricant in said reservoir.

5. A combination as specified in claim 1 wherein said flange is a separate element sealed at its base within said axial bore and having an integral flange extending outwardly therefrom to overlie said stone in the area of said bore.

References Cited in the file of this patent

UNITED STATES PATENTS

412,548	Shufelt	Oct. 8, 1889
436,892	Harrington	Sept. 23, 1890
524,572	Beckert	Aug. 14, 1894
1,170,155	Hewitt	Feb. 1, 1916
1,898,170	Brown	Feb. 21, 1933
2,089,040	Shue	Aug. 3, 1937
2,499,933	Smul	Mar. 7, 1950
2,608,805	Utley	Sept. 2, 1952