Jan. 28, 1969 W. M. TUCKER ET AL 3,423,882

CYLINDRICAL CUP-KNIFE SHARPENING DEVICE

Filed Nov. 16, 1965

Fig. 1

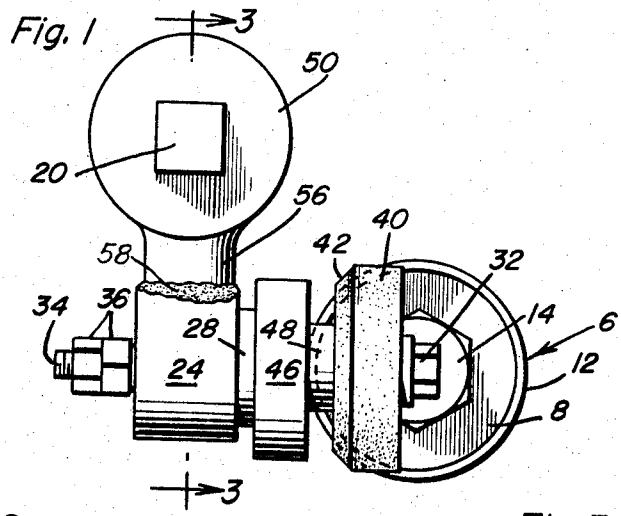


Fig. 2

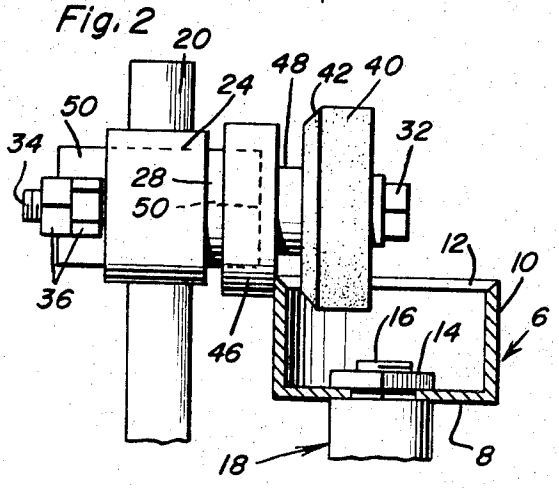


Fig. 3

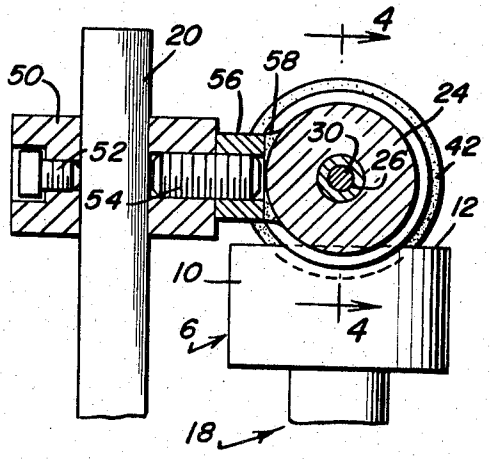
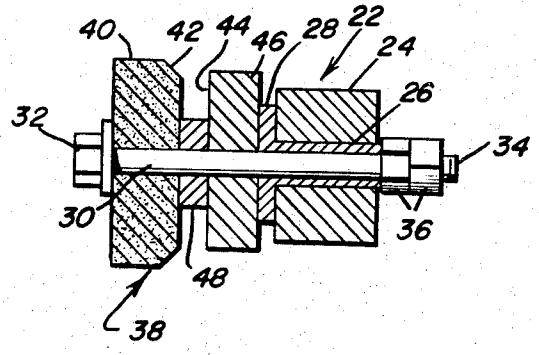


Fig. 4



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CYLINDRICAL CUP-KNIFE SHARPENING DEVICE

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ABSTRACT OF THE DISCLOSURE

A cylindrical cupped knife is operatively mounted atop a power shaft. A complemental stationary supporting shaft is located adjacent and parallel to said driven shaft. An adapter bracket is detachably adjustably mounted on the upper end of the supporting shaft and carries a bearing constituting a component part of novel knife sharpening means. This means comprises a turntable spindle or shaft supporting an abradant grinding wheel or stone and a companion hardened steel back-up wheel. As the grinding wheel revolves, it hones the knife to a fine edge. The back-up wheel stations the stone properly and keeps the wire-edge pushed in so that the stone hones it off.

The present invention relates to knife-blade sharpening and honing devices and has more particular reference to a special purpose sharpener, that is, one which is expressly designed and aptly constructed to grind, sharpen and hone the cutting blade or edge of a cylindrical cup-like knife which, according to prevailing or common practice, is rotatably supported in a vertical or upright position and rotated by a motor driven arbor so that when the cutting edge is brought into coordinating relationship with the grinding means it is expertly sharpened and honed.

It is common practice to apply sharpening means of one type or another against the endless cutting edge atop the rim of a cylindrical cupped knife and wherein the knife is clampingly held in an accessible rotating position on a motor driven shaft, arbor or the like. The object of the present invention is to provide improved sharpening means for the cutting edge or blade which is characterized, generally speaking by (1) a stationary vertical support or upright erected or located adjacent to and preferably parallel with the motor driven arbor (2) bearing means (3) a shaft which is journaled for rotation in the bearing means (4) means operatively bracketing or mounting the bearing in a satisfactorily poised and functioning position on the support or upright and (5) grinding, sharpening and honing expedients mounted on said shaft for idling rotation therewith.

One feature of the invention has to do with a non-circular, preferably a square, upright which is correctly positioned or stationed adjacent to and alongside of the knife supporting and turning arbor and which has its upper end extending to a level above the blade or cutting edge to provide a space for the attachment thereto of means which is employed to detachably and adjustably mount the shaft, bearing and wheel assembly on the upright.

More specifically, novelty is predicated on mounting means which comprises an adapter bracket or fixture which is detachably collared on the upper end of the upright and which is joined to and supports the bearing. Further, novelty is predicated on mounting the shaft for free rotation in the bracketed or supported bearing and so arranging the shaft that an end portion thereof supports two wheels, one an abrading or grinding wheel which sharpens and hones the beveled cutting edge of the workpiece, and the other or second wheel constituting a backing wheel and spaced from the confronting grinding wheel

with the space arranged to accommodate the rim and cutting edge.

More significantly, the second-named wheel, the backing wheel, is spaced by a shim or a washer from the abradant grinding wheel and while it is susceptible of being produced for certain results from stone or cast iron, it is preferably made from hardened steel of requisite weight and grade.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a top plan view of the overall combination, that is, an arrangement which includes the grinding, sharpening and honing dual wheel assembly, the upright or support for the bracketing or adapter fixture and the rotatably supported workpiece, that is the aforementioned cylindrical cup-like knife;

FIGURE 2 is a view in front elevation observing the structure appearing in FIG. 1 with the knife appearing in section in order to show how the cutting edge is sandwiched between the grinding wheel or stone and the backing wheel which is complemental thereto;

FIGURE 3 is a view in section and elevation taken on the plane of the section line 3—3 of FIGURE 1; and

FIGURE 4 is a view also in section and elevation taken on the plane of the section line 4—4 of FIGURE 3.

Referring now to the views of the drawing the aforementioned workpiece which is adapted to be ground, sharpened and finished to requisite nicety by honing is denoted at **6** and comprises a cup-like cylindrical knife having an apertured bottom **8** (see FIG. 2), an upstanding rim or annular wall **10** whose upper edge is adapted to be chamfered to the desired bevel and honed and finished to provide the endless upper end cutting edge **12**. The apertured bottom is clampingly secured as generally denoted at **14** to a motor driven or equivalently powered arbor or shaft **16**. The housing and motor means for the shaft are denoted generally at **18** and inasmuch as the power driven arbor and workpiece **6** are old and well known, it is not necessary to dwell upon the same beyond the scope of the disclosure herein relied upon.

The device or sharpener which is referred to generally as sharpening means is characterized in part by a suitable vertical stationary post-like upright **20**. This upright is appropriately mounted close to the supported and rotating cylindrical knife **6** or equivalent workpiece. In practice, it has been found desirable to use a solid rod which is preferably rectangular or square in cross-section as shown in FIG. 1. The upper end portion projects to a level above the workpiece **6** in desired close spaced proximity.

The several component parts which cooperate and make up the aforementioned grinding, sharpening and honing assembly are shown in FIGS. 1, 2 and 4 and the assembly as a whole is denoted by the numeral **22**. It comprises a rigid collar-like bearing **24** whose bore **26** is lined by an appropriately proportioned metal bushing **26**. The bushing is commensurate in length with the bore and is provided at the lefthand end as shown in FIG. 4 with a flange **28**. This bushed bearing provides a highly satisfactory support for the shaft **30**, said shaft having a head **32** on one end having its opposite threaded end **34** provided with assembling and retaining nuts **36**. The nut-equipped end bears against the righthand end of the bushing as shown in FIG. 4 and the headed end projects beyond the flanged end where it provides supporting and turning means for the two companion or complemental wheels one of which is designated as the abrading or grinding wheel **38** which has an endless marginal or peripheral surface **40** with a corner portion chamfered

to provide the desired beveled knife abrading, sharpening and honing edge **42**. This beveled end of the grinding wheel is spaced from a flat surface **44** of the backing wheel **46** by way of a shim or washer **48** which surrounds the shaft and is sandwiched or interposed between the two wheels **38** and **46**. It will be obvious that the shaft and wheels and coacting component parts constitute an assembly which is rotatable in the bearing **24** and that the bearing is bracketed to the upper end portion of the support or upright **20**. This bracketing step is accomplished by way of suitable adapter means comprising a ring **50** which is collared on the upright and is held in place by a setscrew **52** carried thereby. A stud **54** (see FIG. 3) is screwed into a threaded hole diametrically opposite the setscrew and in turn is screwed into a coupling or connecting member **56** which is welded at **58** to a peripheral surface of the bearing **24**. It is deemed advisable to provide an adapter means which can be slipped on and off the post or support member **20** and to also to provide a separable coupling or connection between the bearing and adapter means. On the other hand it is within the purview of the invention to interconnect these several component parts so that they are virtually one unit, that is wherein the stud means **54** could perhaps be eliminated. The wheel **46**, which has been experimentally used, has been made of stone and cast iron but primarily out of hardened steel of any satisfactory grade. The means **18** is referred to in the trade as a motor housing and the knife as a revolving cup knife and with the construction shown it will be evident that the cutting edge of the knife is sandwiched or interposed between the grinding stone or wheel **38** and backing wheel **46**. It will be further observed more particularly in FIG. 1 that the beveled edge **42** is shown, as is normally the case, contacting circumferentially spaced points of the cutting edge of the rim thus providing what is referred to in the trade as a two-point contact with the knife and providing a desired hollow ground edge. In operation it will be evident that as the cupped knife revolves it also revolves the grinding wheel. As the grinding wheel **38** revolves it hones the knife to a fine edge. The steel backup wheel **46** keeps the grinding wheel or stone positioned and also keeps the "wire edge" pushed in so that the stone will hone it off.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A cylindrical cup-knife sharpening device comprising, in combination, a stationary upright for readily accessible use in a spaced position adjacent and parallel with a motor driven arbor for rotating a cup knife, a cup knife grinding, sharpening and honing assembly embodying bearing means, adapter means for detachably, adjustably and operatively mounting said bearing means in a position on said upright, a shaft removably journaled for rotation in said bearing means, an abrasive grinding and honing wheel mounted on said shaft, a hardened metal back-up wheel complemental to said grinding wheel and also removably mounted on said shaft in alignment with and cooperative with said grinding wheel and spaced a predetermined constant distance from said grinding wheel, said grinding wheel and back-up wheel being simultaneously rotatable with but not normally slidable on said shaft, said back-up wheel being adapted to reside in freely rotatable contact with an exterior peripheral surface of the rim of said cup knife.

2. The combination defined in claim **1**, and wherein said bearing means comprises a collar having an axial bore lined with a bushing, said bushing having an outstanding spacing flange of predetermined thickness at one end which is interposed between the bearing and an adjacent face of said back-up wheel, said bushing and shaft being separably and independently mounted to facilitate assembling and adjustment needs.

3. The structure according to claim **1**, and wherein said back-up wheel being bodily applicable to and removable from said shaft, and a spacing and space regulating washer on said shaft and interposed between coacting opposed faces of said grinding wheel and back-up wheel, respectively.

4. The sharpening means combination according to claim **3**, and wherein the means which operatively mounts said bearing means in its given position is characterized by an adapter fixture comprising an annular ring having a non-circular center opening fitting removably and adjustably on said upright, said ring having a setscrew fastened against said upright and having a rigid peripheral connector integrally joined to and projecting from a coacting peripheral surface of said bearing.

5. In combination, a vertically disposed motor housing embodying a power-driven arbor, means for detachably and operatively mounting a cupped knife atop said arbor, a relatively stationary upright adjacent and parallel to said arbor and having an upper end projecting to a level above said cupped knife mounting means, an adapter bracket detachably and adjustably mounted on the upper end of said upright, a bearing means, a coupling member interposed between and connecting adjacent cooperating peripheral portions of said bracket and bearing, a grinding wheel shaft having one end removably mounted in said bearing means and the other end projecting beyond said bearing means, a grinding wheel operatively mounted on the last-named end of said shaft, a backing wheel opposed to and spaced in parallelism from a cooperating face of said grinding wheel, said backing wheel being made of wear-resisting metal, said backing wheel having one surface bearing against said bearing means, and a spacing washer surrounding said shaft and interposed between opposed adjacent faces of said grinding wheel and backing wheel respectively.

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