May 20, 1952 J. J. KILIAN 2,597,150

KNIFE BLADE SHARPENER

Filed June 16, 1948 2 SHEETS—SHEET 1

Fig. 1

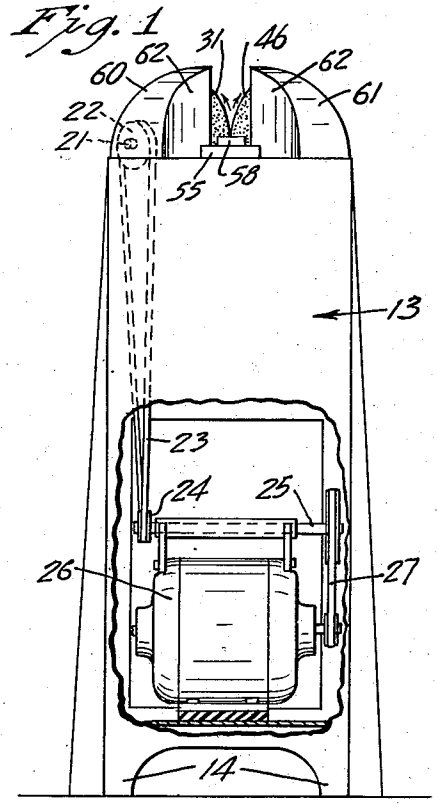


Fig. 2

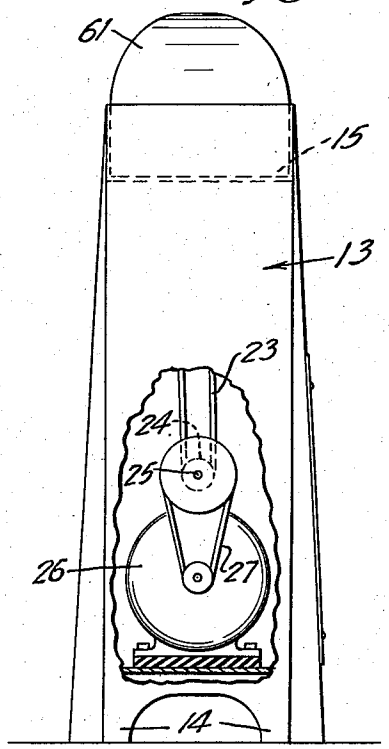


Fig. 3

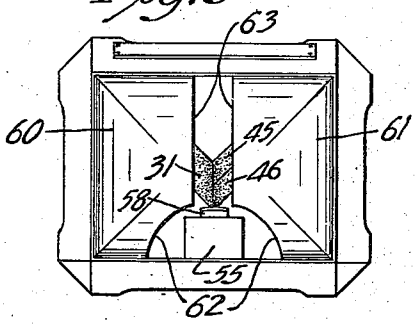


Fig. 4

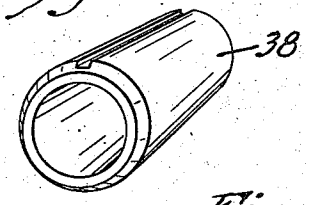


Fig. 5

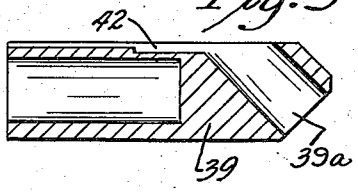
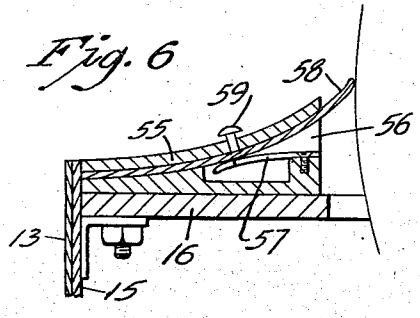


Fig. 6



Inventor
Jerome J. Kilian
By Williamson & Williamson
Attorneys

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Fig. 7

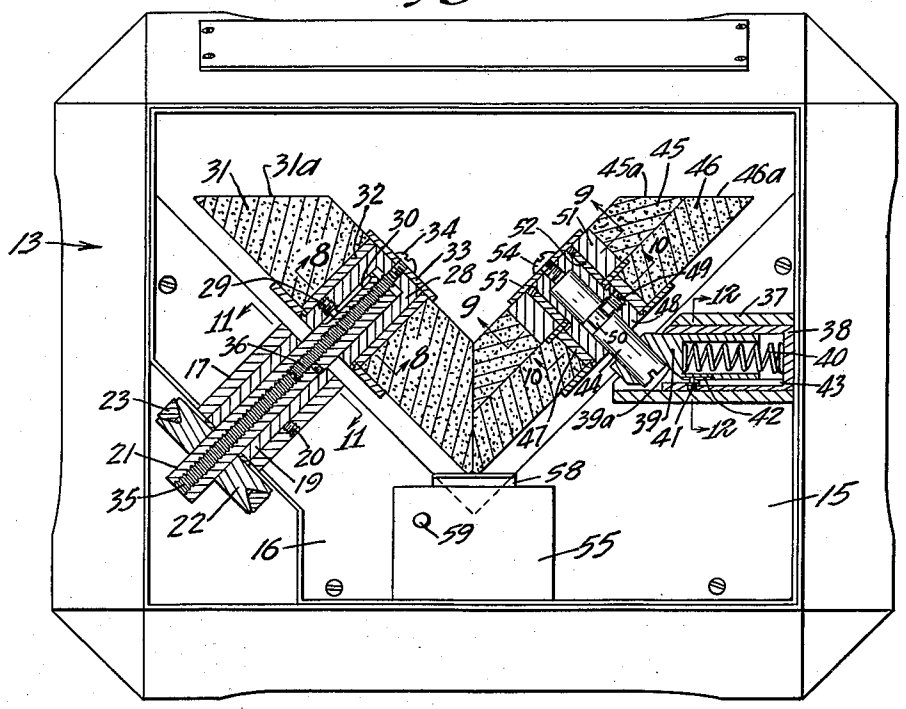


Fig. 8

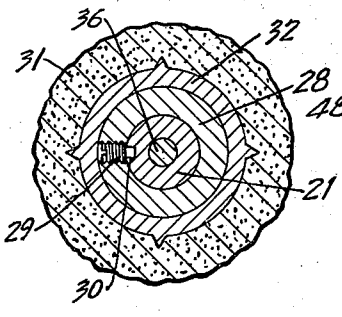


Fig. 9

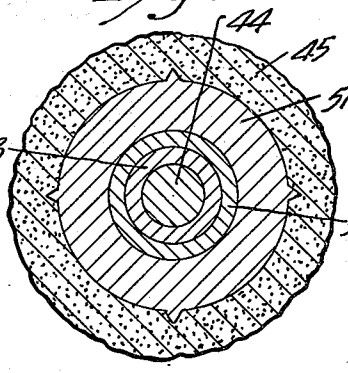


Fig. 10

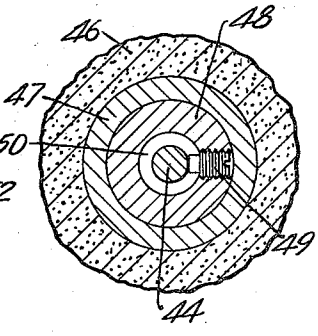


Fig. 11

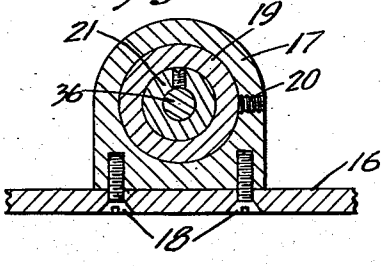
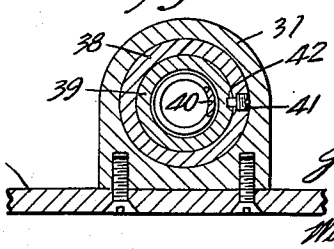


Fig. 12



Inventor
Jerome J. Kilian
By
Williamson & Williamson
Attorneys

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KNIFE BLADE SHARPENER

Jerome J. Kilian, Minneapolis, Minn.

Application June 16, 1948, Serial No. 33,363

3 Claims. (Cl. 51—80)

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This invention relates to grinding machines and more particularly to machines for grinding blades such as knife blades.

It is an object of the invention to provide a knife sharpener or the like which includes a pair of grinding wheel units having diagonal or frusto-conical peripheral grinding surfaces, wherein means is provided for urging the surface of one wheel into contact with the surface of the other so that the two wheel units will remain in frictional contact as the peripheral grinding surfaces wear so that a drive relationship is maintained between the peripheral surfaces at all times.

Another object of the invention is to provide a compactly arranged and conveniently constructed power driven unit of the type mentioned above.

A further object of the invention is to provide a knife sharpener including grinding wheels which are adapted to be run in oil and also to provide efficient means for encasing the wheels.

The above and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same parts throughout the views, and, in which:

Figure 1 is a front elevational view with a part of the casing broken away;

Figure 2 is a side elevational view with a part of the casing broken away;

Figure 3 is a top plan view;

Figure 4 is a perspective view of the cup in which the shiftable support for one of the grinding wheel spindles is mounted;

Figure 5 is a longitudinal vertical sectional view through the shiftable spindle support;

Figure 6 is an enlarged sectional view through the combined oil guard and wiper;

Figure 7 is an enlarged horizontal sectional view through the grinding wheel units and their mountings;

Figure 8 is an enlarged section taken approximately on the line 8—8 of Figure 7;

Figure 9 is an enlarged section taken approximately on the line 9—9 of Figure 7;

Figure 10 is an enlarged section taken approximately on the line 10—10 of Figure 7;

Figure 11 is an enlarged section taken approximately on the line 11—11 of Figure 7; and

Figure 12 is an enlarged section taken approximately on the line 12—12 of Figure 7.

The apparatus includes a casing 13 supported by legs 14 and having a pan 15 in its upper portion. The pan 15 is of relatively heavy sheet metal of sufficient strength to adequately support the grinding units as will be described below.

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The pan 15 has a wall portion 16 shown in the lower left corner of Figure 7 which supports a bearing member 17 by means of attachment bolts 18 as shown in Figure 11. Mounted in the bearing member 17 is a bearing sleeve 19 which is held by a set screw 20 shown in Figures 7 and 11. Rotatably in the bearing sleeve 19 is a spindle 21 which has a pulley 22 on its outer end as shown in Figure 7. Referring to Figure 1, the pulley 22 is connected by means of a belt 23 to a pulley 24 on a cross shaft 25 in the lower part of the casing 13. The cross shaft 25 is supported by a motor 26 to which it is connected by a belt 27 as shown in Figure 1.

The spindle 21 extends into the pan 15 and has a cup 28 mounted thereon. The cup 28 is connected to the spindle 21 by means of a set screw 29 whose inner end lies in a keyway 30 in the spindle. The cup 28 has a grinding wheel 31 mounted thereon, said grinding wheel having a sleeve 32 which is fitted to the cup 28. A retaining disc 33, of larger diameter than the cup 28 is connected to the cup by a short bolt 34 and overlies a part of the grinding wheel 31 to hold it on the cup.

The spindle 21 has an internally threaded bore unit 35 which contains a threaded stem 36 adapted to bear against the inner bottom portion of the cup 28 to limit the inward position of the grinding wheel 31 on the spindle 21.

At the right hand side of the pan 15 is mounted a bearing cap 37 which is cylindrical and into this is fitted a cup 38. A cup shaped spindle support 39 is slidable into the cup 38 as shown in Figure 7, the bottoms of the cups being in opposed relationship and a compression spring 40 being located in the two cups and pressed against the inner bottom portion of each. A set screw 41 is threaded through the wall of the cup 38 and its inner end rides in a keyway 42 in the cup-shaped spindle support 39.

The cup 38 is keyed to the bearing cap 37 by means of a key 43 shown in Figure 12 so that the cup 38 and the cup-shaped spindle support 39 cannot rotate relative to the bearing cap 37.

The cup-shaped spindle support 39 has a diagonal opening 39a through one end thereof as shown in Figure 7. Relatively tightly fitted in the opening 39a is a spindle 44 which supports a pair of cooperating grinding wheel elements 45 and 46 in the following manner.

The grinding wheel element 46 has a bushing 47 lining its central aperture. This bushing is rotatable on a sleeve 48 which is in turn rotatable on the spindle 44. A set screw 49 is threaded through the sleeve 48 and its inner end rides in a circumferential groove 50 approximately midway of the ends of the spindle 44.

The grinding wheel element 45 is provided with bushings 51 and 52, the inner bushing 52 being fitted on the end of the sleeve 48. A disk 53 is held against the outer face of the bushing 51 by means of a bolt 54 which connects said grinding wheel element to the sleeve 48. The grinding wheel element 45 is free to rotate relative to the spindle but cannot move longitudinally thereof since it is connected to the sleeve 48 and the sleeve is connected to the spindle by the set screw 49.

When the wheel 31 is rotated by means of its drive connection with the motor 26, this wheel is arranged to rotate the wheel sections 45 and 46 by means of a frictional drive relationship. The wheel 31 has a frusto-conical peripheral surface 31*a* and the wheel sections 45 and 46 have complementary frusto-conical peripheral surfaces 45*a* and 46*a*. As the device is shown in the drawings the spindles 21 and 44 lie at right angles to each other and on a common plane. The frusto-conical surfaces of the grinding stones are such that the lines disposed transversely of those surfaces from one face of the stone to the other are approximately 45° to the rotational axis of the stones as illustrated in Figure 7. The angle of the spindle 44 to its longitudinal slidable and spring pressed cup-shaped support 39 is such that as the peripheral surfaces of the wheels wear, thereby reducing the diameters of the wheels, the spring 40 will keep the peripheral surfaces of the two wheel units in contact. Rotation of the wheels is in a direction indicated by the arrows in Figure 1.

With grinding wheels mounted in the manner shown and described there is an automatic adjustment for wear and the right hand wheel units 45 and 46 will be pressed toward the wheel 31 in a direction along a line normal to a transverse line across the frusto-conical surface 31*a* on the wheel 31 where the two stone assemblies contact each other. The two stone units 45 and 46 are arranged for free rotation relative to each other since this has been found to greatly facilitate maintaining of the peripheral surfaces of the wheels on the true circles and to prevent them from becoming bumpy.

In Figure 6 there is shown a grinding wheel wiper which includes a casting 55 shown in Figures 1, 3, 6 and 7. This casting has a recess 56 therein as shown in Figure 6. Extending into the recess is a metal tongue 57. Inserted into the recess between the tongue 57 and the upper inner portion of the casting 55 is a tongue 58 of fairly flexible material such as a piece of fiber. A set screw 59 is threaded through the casting 55 to permit pressure to be placed on the tongue 57 to increase or decrease the pressure of the tongue against the fiber wiper 58. As illustrated in Figures 3 and 6, the wiper 58 is adapted to bear against adjacent corners of the grinding wheel 31 and the wheel units 45 and 46. The wheels are adapted to be run in oil which is placed in the pan 15. This oil prevents the stones from becoming glazed and produces a better sharpening action.

In order to prevent splattering of the oil, the pan 15 and wheel units 31, 45 and 46 are nearly

entirely covered by shields 60 and 61 which have curved cut out portions 62 and which are spaced as at 63 so that the bight formed by the grinding wheels is rendered accessible to a knife blade.

The wheels are rotated and the blade is placed in the bight above mentioned and the wheels turned upwardly toward the blade edge, sharpening it on both sides at once. The blade is turned longitudinally backward and forward during the sharpening operation.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What I claim is:

1. A knife sharpener comprising a wheel spindle supporting structure, a pair of wheel spindles having supporting portions mounted on said supporting structure and having wheel mounting portions extending outwardly from said supporting structure in converging relation one to the other, the wheel mounting portion of one of said spindles being disposed at less than a straight angle relative to the supporting portion thereof, a pair of beveled grinding wheels respectively mounted on the wheel mounting portions of said spindles and adapted to tangentially engage one another to define a line of contact therebetween, the supporting portion of the spindle having the wheel mounting and supporting portions thereof disposed at less than a straight angle being axially shiftable on its support along a line normal to a plane disposed tangent to both of said driving wheels through their line of contact.

2. A knife sharpener comprising a pair of rotary grinding wheels having cooperating beveled peripheral grinding surfaces, a spindle support for each of said grinding wheels, a pair of wheel mounting spindles each having a supporting portion and a wheel mounting portion and respectively carrying said wheels on the wheel mounting portions thereof, the supporting portion of one of said spindles being held against rectilinear movement to facilitate driving thereof and the wheel mounted thereon being fixed thereto to be driven thereby, the other spindle having the wheel mounting and supporting portions disposed at less than a straight angle and having the supporting portion axially shiftable on its support along a line disposed normal to the plane lying tangent to said two grinding wheels through their line of contact, said two grinding wheels tangentially engaging one another to define a line of contact therebetween when said shiftable spindle is urged toward the other grinding wheel, and resilient means for urging said shiftable spindle toward said other grinding wheel.

3. A knife sharpener comprising a wheel spindle supporting structure, a pair of wheel spindles having a wheel mounting portion and a supporting portion with the supporting portions thereof respectively mounted on spaced portions of said supporting structure and having their wheel mounting portions disposed in outstanding converging relation, the wheel mounting portion of one of said spindles being disposed at 135 deg. relative to the supporting portion to define a bend therein, a pair of rotary grinding wheels having the grinding surfaces thereof beveled at 45 degrees to the axis of rotation thereof, said wheels being respectively mounted on the wheel mounting portions of said spindles and adapted to tangentially engage one another to define a line of contact therebetween, the wheel mount-

ing portions of said spindles being disposed at right angles one to the other, the supporting portion of the bent spindle being axially shiftable on the supporting structure and the line of shifting movement being disposed normally of a plane through the line of contact between said grinding wheels tangentially thereof, and resilient means for urging said spindle toward said plane to maintain contact between said wheels during the grinding operation.

JEROME J. KILIAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
31,461	Hyatt et al.	Feb. 19, 1861
1,767,091	Millsap	June 24, 1930
1,973,626	Harrison et al.	Sept. 11, 1934
2,153,275	Schulze	Apr. 4, 1939
2,362,699	Kilian	Nov. 14, 1944

FOREIGN PATENTS

Number	Country	Date
46,315	Sweden	May 4, 1916