

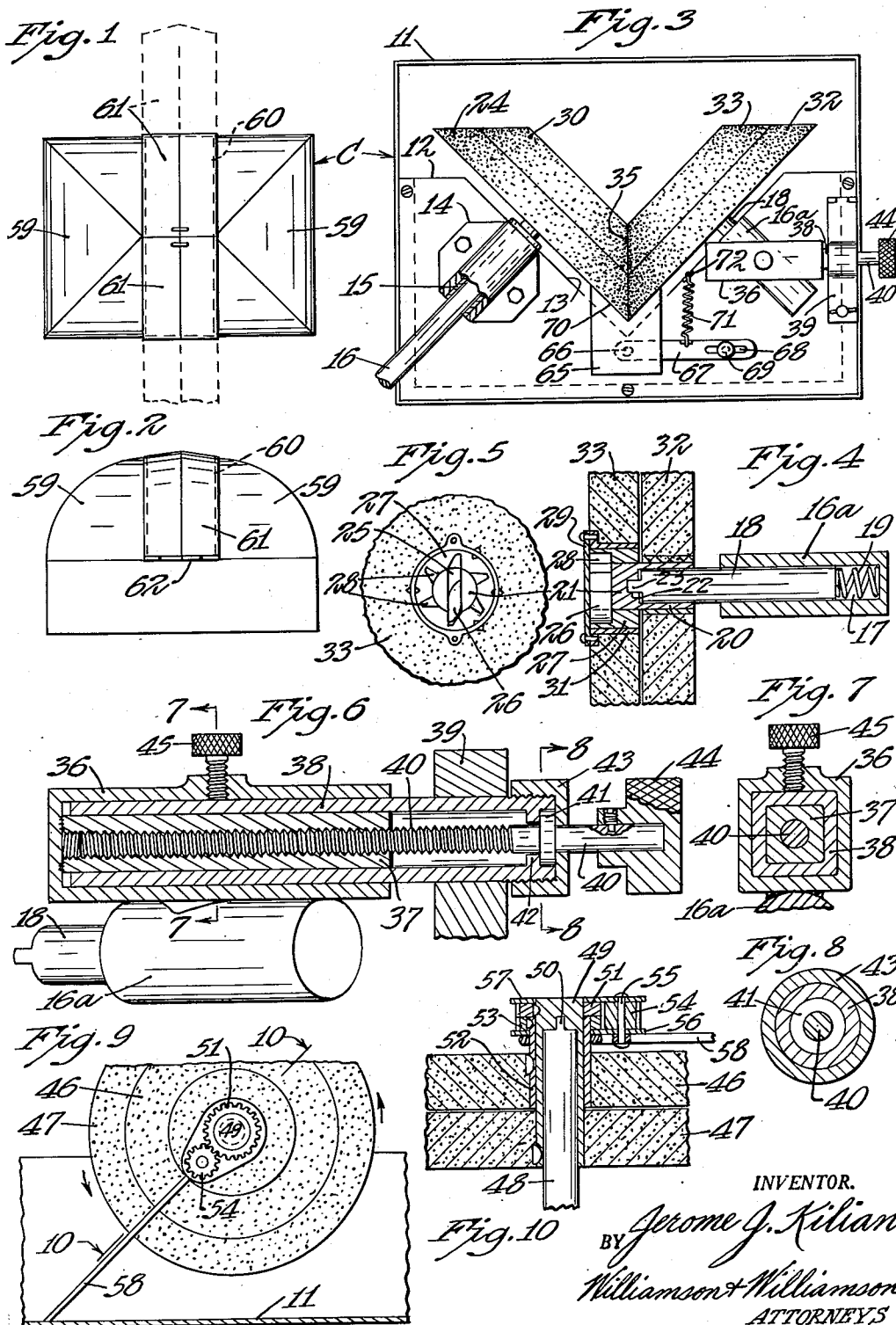
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BLADE SHARPENER

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BLADE SHARPENER

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4 Claims. (Cl. 51-80)

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This invention relates to blade sharpeners and more particularly to apparatus for sharpening blades used on knives.

It is an object of the invention to provide a rotary sharpening stone or the like which is made up of at least a pair of split sections which are rotatable relative to each other, and wherein means is provided for shifting one section about its rotational axis relative to the other, the shifting movement bringing different relative portions of the two sections together and maintaining roundness of the stone.

It is another object of my invention to provide knife sharpening apparatus which includes a pair of cooperating frusto-conical rotary sharpening units having their circular boundary surfaces in contact with a drive connection to one sharpening unit, the movement of the rotary unit being imparted to the other sharpening unit by such frictional contact, and wherein each sharpening unit is formed in two sections so interconnected that one section will rotate relative to the other periodically to maintain roundness of the sharpening unit.

A further object of the invention is to provide sharpening apparatus including rotary stones which are adapted to run in an oil bath and a casing therefor which provides a guard against wide spread splattering of oil picked up by the stones.

The present invention is an improvement on the structure shown and described in my prior Patent Number 2,362,699, issued November 14, 1944.

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 plan view of the casing with the movable closure shown in closed and opened positions in full and dotted lines respectively;

Figure 2 is a side view of the casing;

Figure 3 is an enlarged plan view of the apparatus with the casing in section;

Figure 4 is an enlarged fragmentary sectional view through a form of sharpening wheel spindle;

Figure 5 is a fragmentary detail in front elevation of the end of the spindle section shown in Figure 4 with the cover plate removed;

Figure 6 is an enlarged view partially in elevation and partially in vertical section of a sharpening wheel spindle support;

Figure 7 is a section taken approximately on the line I—I of Figure 6;

Figure 8 is a section taken approximately on the line 8-8 of Figure 6;

Figure 9 is a front elevational view of a modification showing a form of mechanism for shifting one section of a grinding wheel relative to a cooperating section thereof with the cover plate of the shifting mechanism removed; and

Figure 10 is an enlarged section taken approximately on the line 10-10 of Figure 9.

In Figure 3 there is shown the lower portion 11 of a casing C. Within the casing portion 11 is suitably mounted a base plate 12 having a V-shaped notch 13 formed therein. A bearing bracket 14 is mounted on the base plate 12 and it contains a bearing sleeve 15 which rotatably supports a drive shaft 16 extending outwardly of the casing portion 11 and adapted to be connected to a suitable power unit such as an electric motor. A housing 16a is illustrated in Figure 4 and is shown having a bore 17 extending inwardly from the end thereof to slidably receive a rotary stub shaft 18 which is normally urged outwardly by a compression spring 19. The stub shaft 18 fits into a cup 20 formed in a portion of a cylindrical element 21. The bottom of the cup 20 is provided with a slot 22 to receive a key 23 formed on the end of the stub shaft 18. A sharpening stone section 32 is mounted on the member 21 for rotation therewith. The outer end of the member 21 is provided with a kerf or slot 25 in which is slidably mounted a dog 26. About the outer end of the member 21 is an annular internal ratchet element 27 having recesses 28 adapted to removably receive the ends of the slidable dog 26. A cover 29 retains the slidable dog 26 against displacement from the kerf or groove 25 on the end of the member 21. A second grinding wheel section 33 is mounted on a collar 31 to which the annular ratchet 27 is secured. When the unit 32, 33 is started and stopped from time to time in sharpening different elements the slidable dog 26 will at times tend to center itself more or less in the slot or kerf 25 in the member 21, and when the sharpener is again started the dog 26 may find its way into any one of the sockets 28 formed in the member 27. As a result the two sharpening wheel sections 32 and 33 are periodically shifted relative to each other about their common rotational axis.

There is a second pair of sharpening elements forming a wheel and shown at 24 and 30. The sections 24 and 30 are mounted on the drive shaft 16 with a one way clutch arrangement such as shown in Figures 4 and 5.

It will be seen in Figure 3 that each grinding wheel made up of its respective sections is sub-

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stantially frusto-conical and that the circular boundary surfaces of the two wheels are in contact with each other as at 35. When the power shaft 16 is rotated the left hand wheel unit will frictionally drive the right hand unit and the rotation is such that the left hand wheel unit is run counterclockwise as viewed in Figure 3, and the right hand wheel unit is given a clockwise rotational movement.

A bearing housing 16a which supports the stub shaft 18 on which the right hand grinding wheel unit is mounted, is connected to and beneath a tubular housing 36 as shown in Figures 3 and 6. The tubular housing 36 has an inwardly concentric tubular element 37 shown in Figure 6, the interior wall of said element 37 being threaded as shown. Slidably fitting between the outer tubular casing 36 and the inwardly concentric tubular element 37 is a tubular element 38, and, as shown in Figure 7, the elements 36, 37 and 38 are square in cross section. The intermediate tubular element 38 extends to the right as viewed in Figure 6, and through a mounting bracket 39 formed in the right hand side of the base plate 12, as indicated in Figure 3. A partially threaded rod 40 extends into the right hand end of the intermediate tubular element 38 and is received by the internally threaded inner tubular element 37. A flange 41 on the threaded rod 40 abuts against an internal flange 42 formed inside the intermediate tubular member 38 adjacent the right hand end thereof and a threaded cap 43 is screwed on the right hand end of the intermediate tubular element 38 to retain the threaded rod 40 against endwise movement. A suitable knob 44 is mounted on the outwardly extending right hand end of the rod 40. When the knob 44 and rod 40 are rotated the inner and outer tubular elements 37 and 36 and the housing 16a which supports the stub shaft 18 will be moved longitudinally of the threaded rod 40 and intermediate tubular element 38. A set screw 45 is threaded through the outer tubular element 36 to releasably engage the intermediate stationary tubular element 38.

In Figures 9 and 10 there is shown another embodiment of the invention including a sharpening wheel unit made up of a pair of sections 46 and 47 which are comparable to the sharpening wheel sections 30 and 24 respectively. A shaft 48 corresponding to the drive shaft 16 extends through the two wheel sections and lies in a cup-like element 49 to which it is keyed as indicated at 50. Keyed to the outer end of the cup-like element 49 is a gear 51. A sleeve 52 has the wheel section 46 keyed thereto and said sleeve 52 is rotatable relative to the cup-shaped element 49 upon which it is mounted. The outer end of the sleeve 52 is keyed to a gear 53 which lies beside and is the same diameter as the gear 51. An idler gear 54 of twice the thickness of the gears 51 and 53 is meshed with both of said gears and it runs upon a pin 55 mounted between a pair of plates 56 and 57 relative to which the sleeve 52 and member 49 are rotated. The pin 55 upon which the idler gear 54 is rotatable has one end anchored in a rod 58 which, as shown in Figure 9, is of sufficient length to engage the bottom of the casing section 11.

It should be clearly understood that the gears 51 and 53 do not have the same number of teeth, it being preferred that one of said gears have one tooth less than the other. Consequently, when the shaft 48 is rotated it will tend to rotate the idler gear 54 with a planetary action, but the latter action is prevented by the rod 58 so that the

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idler gear 54 will have its rotational axis maintained in a stationary position. The gear 51 is driven directly by the cup-shaped element 49 on the drive shaft 48. This gear will rotate the idler 54 and it in turn will rotate the gear 53 on the sleeve 52. The latter sleeve will rotate the grinding wheel 46 while the cup-shaped element 49 on the drive shaft 48 will rotate the grinding wheel section 47. The wheel sections 46 and 47 will by reason of their frictional contact with a complementary wheel unit similar to that in Figure 3 impart rotary motion to said such complementary wheel sections.

In Figures 1 and 2 the casing portion 11 is shown provided with cover sections 59 at the ends thereof separated by an opening 60 which can be closed by a pair of closure elements 61, said elements being hinged as shown at 62. It will be noted that the closure elements 61, as shown, are generally trough-shaped and, as best indicated in Figure 2, the troughed-portion faces inwardly and downwardly when the closures are in casing closing position. When the closures are swung to the open dotted line position indicated in Figure 1 the bight between the two grinding wheel units is exposed so that the knife blade can be placed edge downward and into the bight. When the two wheel units are rotated, the left hand unit in Figure 3 in a counterclockwise direction and the right hand unit in a clockwise direction, the complementary sharpening surfaces of the two stone units will move upwardly and sharpen both sides of the knife edge.

The compression spring 19 in the socketed end of the housing 16a supporting the right hand grinding unit of Figure 3 tends to force the grinding or sharpening unit axially outwardly so that there will be a proper frictional engagement with the left hand sharpening wheel. However, when the stone has become worn to a considerable extent it is necessary to readjust their positions. This is done by turning the knob 44 and threaded rod 40 to move the entire bearing mounting of the housing 16a to the left or toward the left hand grinding wheel unit.

In Figure 3 there is shown a block 65, preferably of a fibrous material. It is pivotally connected at 66 to an arm 67. The latter is provided with a slot 68 to receive a pin or stud 69 which is mounted in the base plate 12. The block 65 has a V-shaped notch 70 to permit the block to lie against adjacent outer side surfaces of the sharpening wheel sections 24 and 32. A tension spring 71 connected between the arm 67 and an anchoring pin 72 on the base plate 12 keeps the block 65 in engagement with said sharpening wheel sections. The pivotal mounting of the block 65 and the slot and pin connection 68, 69 permit the block to assume different positions and follow the sharpening wheel sections as they wear and/or are adjusted.

The block 65 serves as a wiper to keep oil from spattering and also provides a stop to prevent the insertion of a knife blade in the bight at the under sides of the sharpening wheels.

It is important to note the one way clutch of Figures 4 and 5, and the transmission gear arrangement of Figures 9 and 10. These structures, as stated above, permit relative rotary movement of one grinding wheel section to its complementary section. With grinding or sharpening wheels formed in one piece it is practically impossible to operate one piece stones without having them soon become out of round.

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By making the stones or sharpening units in two sections, as shown and described, and providing for occasional and relative movement between them, it has been found that this disadvantage has been overcome and the stones will remain in an almost perfectly round condition.

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. In a blade sharpener, a pair of rotary sharpening units having contacting circular boundary surfaces, one of said units having a drive connection, the other of said units being driven through its contact with said first mentioned unit, at least one of said units being formed in a pair of coaxial sections having a connection between them, and said connection including means for rotationally shifting one section relative to the other.

2. The structure in claim 1, and one of said units being mounted on a support upon which it is axially shiftable relative to the other of said units.

3. The structure in claim 1, and one of said units being mounted on a support upon which it is shiftable to move its circular boundary surface toward the boundary surface of the other in a direction normal to a plane commonly tangent to said surfaces at their point of contact.

4. In a grinding device, a wheel support, a pair of coaxial grinding wheel sections carried by the support and individually rotatable one relative to the other, each of said sections having a frusto-conical shape and being of com-

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plementary relative sizes, the bottom of the smaller section being adjacent the top of the larger section and forming a continuous frusto-conical wheel, drive means for the wheel sections, the wheel sections having a positive connection between them, the connection including means for rotationally shifting one section relative to the other section.

JEROME J. KILIAN.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
108,822	Pitkin et al.	Nov. 1, 1870
425,628	Perry	Apr. 15, 1890
726,794	McLeran	May 5, 1903
1,198,646	Maddox	Sept. 19, 1916
1,243,241	Ames	Oct. 16, 1917
1,414,172	Brown	Apr. 25, 1922
1,767,091	Millsap	June 24, 1930
1,816,090	Page	July 28, 1931
1,909,953	Heald	May 23, 1933
1,925,108	Nagy	Sept. 5, 1933
1,952,653	Brown	Mar. 27, 1934
1,963,394	Yassenoff	June 19, 1934
2,153,275	Schulze	Apr. 4, 1939
2,177,025	LaChapelle	Oct. 24, 1939
2,197,119	Barsch	Apr. 16, 1940
2,228,385	Burns	Jan. 14, 1941
2,298,496	Metzger	Oct. 13, 1942
2,322,727	Cole et al.	June 22, 1943
2,362,699	Kilian	Nov. 14, 1944

FOREIGN PATENTS

Number	Country	Date
311,731	Great Britain	May 15, 1930