Nov. 27, 1945. C. S. ROSE 2,389,871

COMBINATION GRINDER AND TOOL DRESSER

Filed June 12, 1944 4 Sheets-Sheet 1

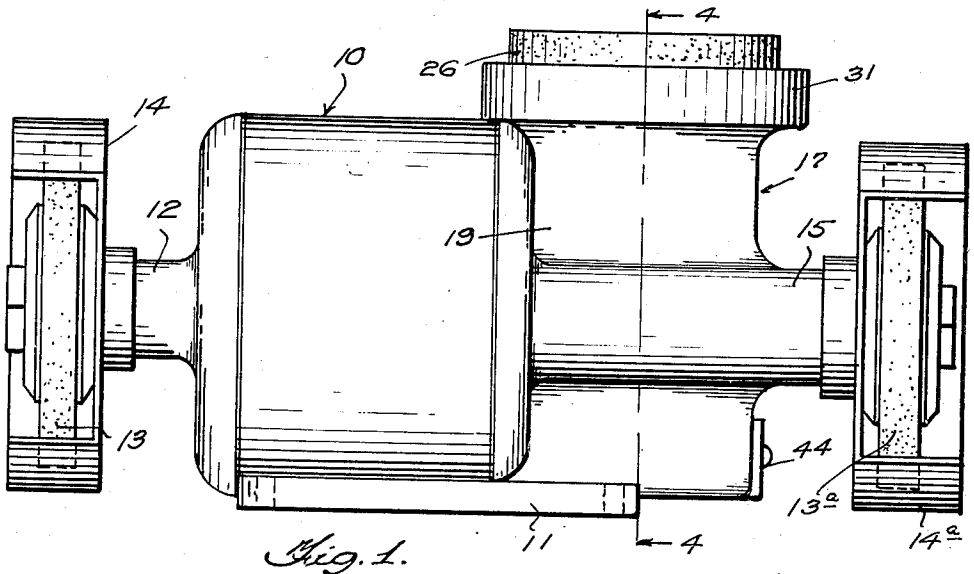


Fig. 1.

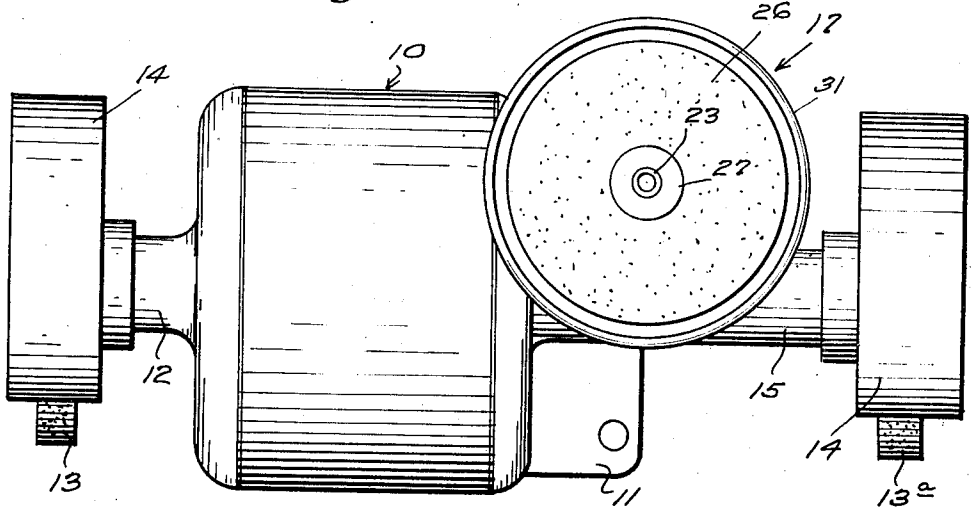


Fig. 2.

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Filed June 12, 1944 4 Sheets-Sheet 2

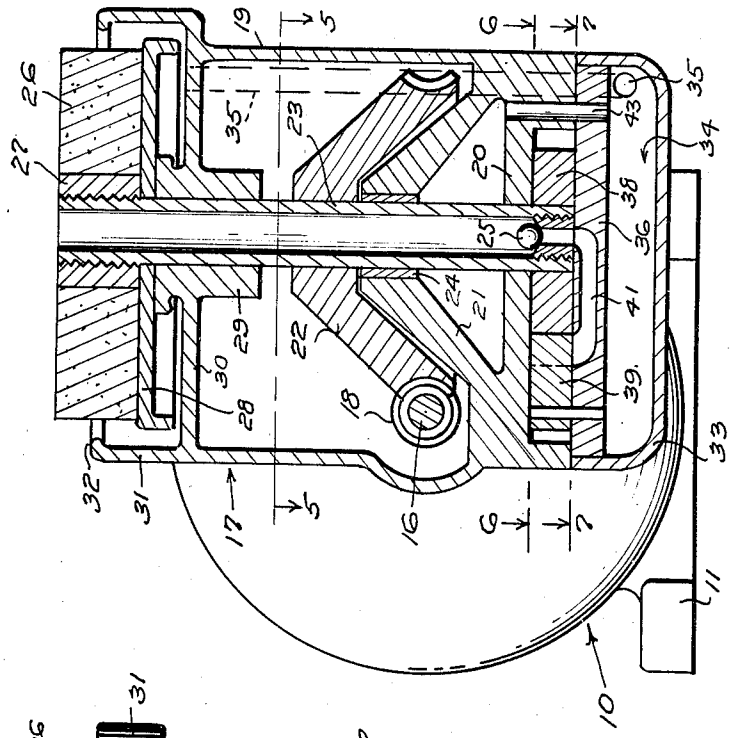


Fig. 4.

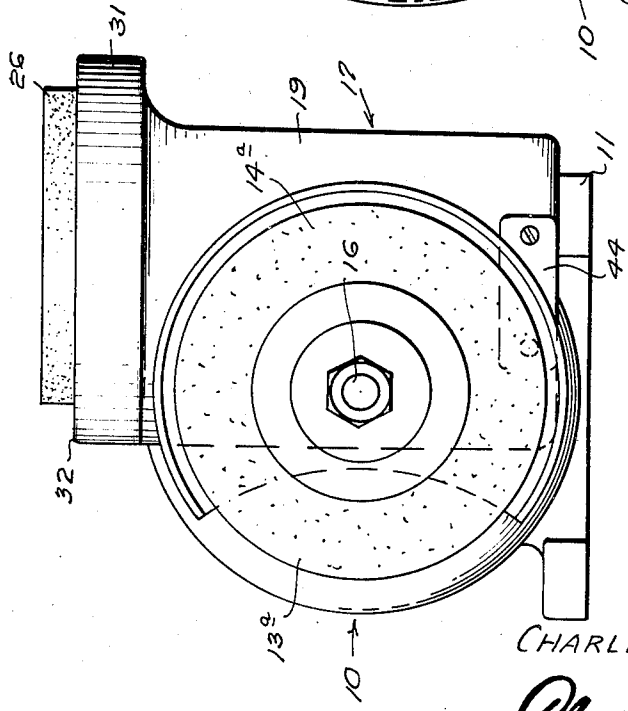


Fig. 3.

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COMBINATION GRINDER AND TOOL DRESSER

Filed June 12, 1944 4 Sheets-Sheet 3

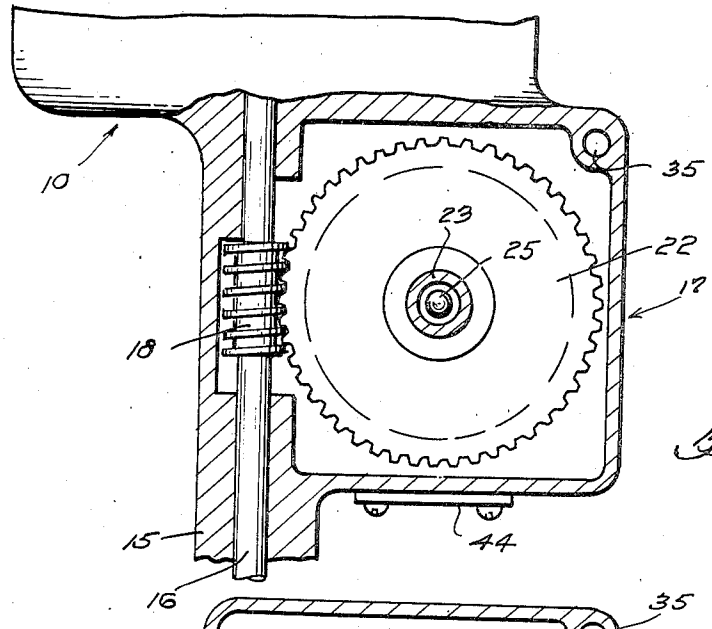


Fig. 5.

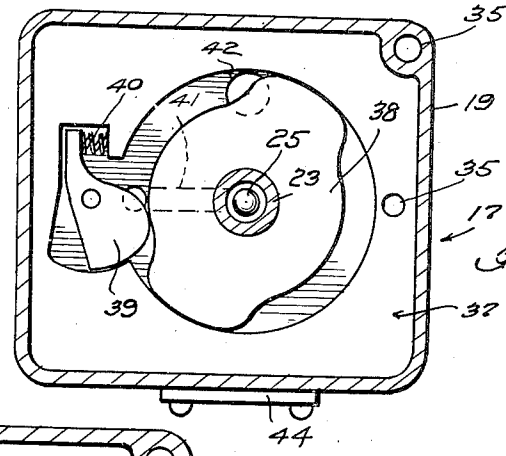


Fig. 6.

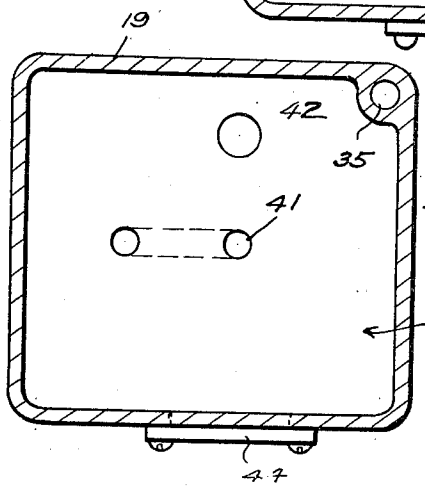


Fig. 7.

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Nov. 27, 1945. C. S. ROSE 2,389,871

COMBINATION GRINDER AND TOOL DRESSER

Filed June 12, 1944 4 Sheets-Sheet 4

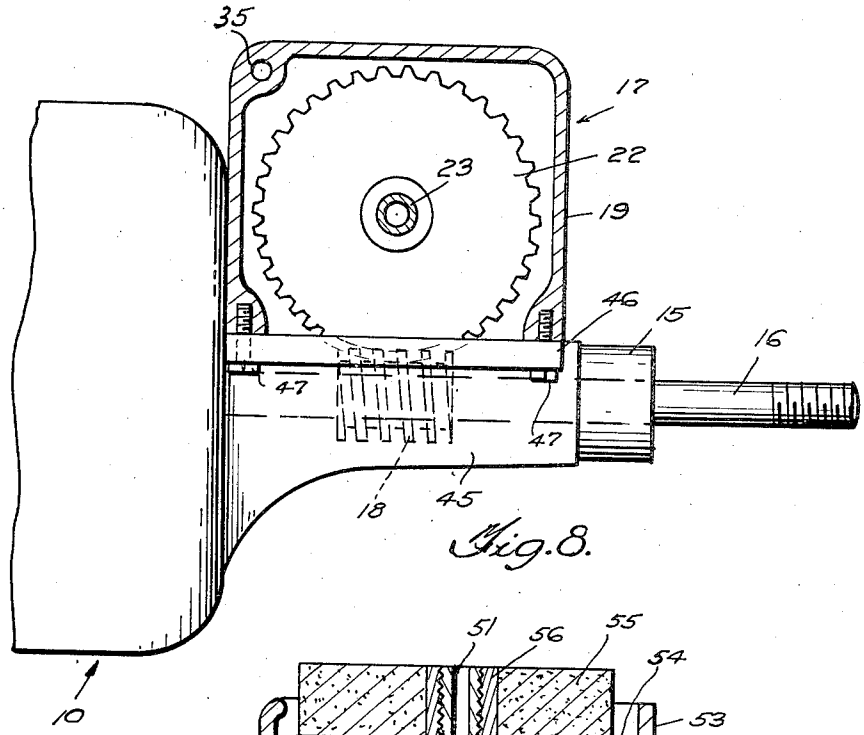


Fig. 8.

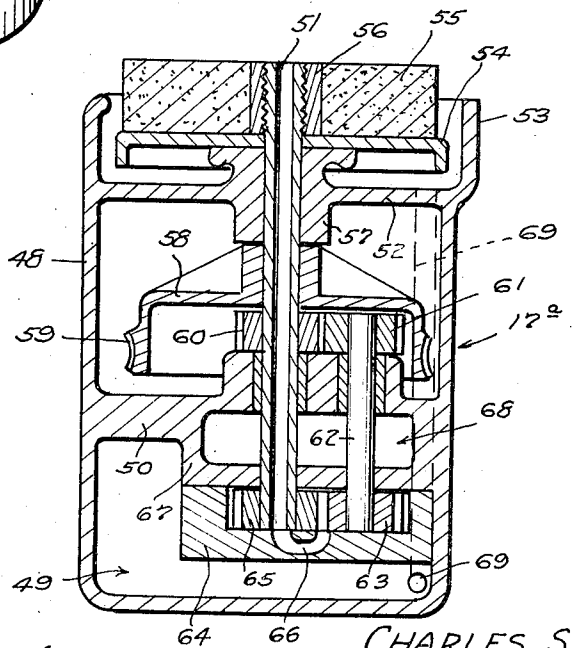


Fig. 9.

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UNITED STATES PATENT OFFICE

2,389,871

COMBINATION GRINDER AND TOOL DRESSER

Charles S. Rose, Agency, Iowa

Application June 12, 1944, Serial No. 539,837

12 Claims. (Cl. 51—166)

This invention relates to a multiple purpose machine of a combination type characterized by a single electric motor or equivalent prime mover and a plurality of shafts driven therefrom, said shafts being provided with selectively usable devices for grinding, sharpening and dressing various cutting tools and instruments.

More specifically, I have evolved and produced a comparatively simple, reliable and compact structural assemblage which lends itself admirably well to various requirements of widespread tool grinding, sharpening and finishing results.

In carrying out the preferred principles of the invention I have adopted a simple electric motor driving two axially aligned shafts carrying appropriate grindstones, one shaft being expressly elongated and provided with a worm, the latter to operate a novel whetstone unit.

Novelty is predicated upon the aforementioned whetstone unit, this characterized by a feasible and practicable oil pump and circulating system in which oil is pumped through the hollow turning shaft for the whetstone and is spilled over the surfaces thereof to provide the desired film and is then trapped and returned to the circulating pump.

Other features and advantages will become more readily apparent from the following description and the accompanying illustrative drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the same:

Figure 1 is a side elevational view of the single motor triple-grinder assemblage as constructed in accordance with the principles of this invention.

Figure 2 is a top plan view of the structure seen in Figure 1.

Figure 3 is an end elevation of the same.

Figure 4 is a central vertical section through the whetstone unit disclosing the internal construction thereof.

Figure 5 is a horizontal section on the plane of the line 5—5 of Figure 4, looking downwardly in the direction of the arrows.

Figures 6 and 7 are horizontal sections on the lines 6—6 and 7—7 of Figure 4.

Figure 8 is a view similar to Figure 5, that is, a horizontal section, this showing a slight modification in the arrangement and adjoining of parts.

Figure 9 is a central vertical section similar to Figure 4, showing a modified form of whetstone tool dresser unit.

Attention is directed first to the form of the invention depicted in Figures 1 to 7, inclusive.

Reference being had first to Figure 1, it will be seen that the overall assemblage is characterized by a motor, a pair of longitudinally spaced grindstones on opposite sides thereof and an intervening whetstone tool dresser unit.

The motor is denoted by the numeral 10 and is of any appropriate construction, the same being supported on a suitable base 11. At the left is an appropriate bearing 12 or short shaft, said shaft having a suitable grindstone 13 clamped thereon and said grindstone operating in a guard or shield 14. As shown in Figure 5, the elongated bearing 15 on the opposite side of the motor is provided with an extended shaft 16 which is provided with clamping means for grindstone 13*a* and an open guard or shield 14*a*.

I next direct attention to the whetstone unit which is an integral part of the casing structure and is denoted, generally speaking, by the numeral 17. This is driven by a power take-off worm 18 formed on the motor shaft (see Figure 5).

The construction of the unit 17 can best be seen in Figure 4 wherein 19 denotes a perpendicular cylindrical housing or casing having an elevated bottom 20 and a central frusto-conical mound 21 which serves as a bearing or mount for speed-reducing motion-transmitting gear 22. The gear corresponds in shape to the mount 21 and is keyed on a tubular central perpendicular shaft 23, this shaft extending through a bushing 24 and being provided at its lower end with a ball-check valve 25 coacting with an appropriate insert or seat. The upper end of the shaft is screw-threaded and serves to accommodate the whetstone 26. The whetstone is provided with a hub or collar 27 which is threaded on said shaft 23. Also the whetstone fits on a table 28 keyed on the shaft, this table resting on an end-thrust bearing 29 and having a marginal downturned flange. The bearing 29 is formed integral with the partition 30 above which is an upstanding annular shell 31 with an inturned anti-splash lip or flange 32, these parts defining an oil receiving and return trap. A cup 33 at the bottom is suitably fastened in place and constitutes an oil reservoir or sump 34. Incidentally, oil is returned from the trap to the sump by way of a gravity return duct 35. An end-thrust plate 36 in the oil sump coacts with the partition or false bottom 20 defining a simple pump chamber 37 (see Figure 6). The pump comprises a cam 38 keyed on the gear driven tubular shaft 23, the cam coacting with a valving element 39 suitably arranged and pressed against the cam by a coiled spring 40. The elements 38 and 39 serve to force

the oil slowly through the force-fed duct 41. Oil is delivered from the sump into the oil pump chamber by way of the inlet port 42.

There may be a tendency for oil to seep into the hollow space which surrounds the bearings in the walls 20 and 21 (see Figure 4) and, if so, a return drain 43 serves to deliver the oil back to the sump.

Assuming that the sump is charged with oil it is evident that as the worm gear 18 rotates the power take-off speed reducing gear 22 the latter rotates the hollow valved shaft 23. The shaft rotates the platform or table 28 and the whetstone 26. In addition, it drives the oil circulating pump. The oil is taken into the pump chamber 37 by way of the intake port 42 and is slowly fed under slight pressure through the duct 41 and into the bore of the shaft by way of the check-valve 25. As the oil rises in a column it spills and spreads over the surface of the whetstone and runs down over the marginal perimeter where it is retrieved in the trap 31. From the trap it is fed back into the sump as before indicated, by way of the return duct 35. Thus, a simple pump and sump arrangement serves to provide for circulation of oil to keep the stone sufficiently moist for tool dressing and finishing.

As before indicated, novelty is predicated on the triple-acting assemblage characterized by the centralized prime mover or motor 10, the simultaneously driven shafts and grind wheels 13 and 13*a*; these parts in conjunction with the whetstone unit, also receiving its power from the same motor. The numeral 44 in Figure 3 represents a clean-out plate for draining the oil. The cup can be filled either by removing it, or can be filled by way of the return duct 35.

In the figures so far described (see Figure 5 again) the whetstone unit is formed integral with the motor casing and bearing housing members. If desired, the unit can be made for detachable assemblage as brought out in Figure 8. Here, the shaft housing 45 is suitably pocketed to accommodate the worm gear and is left open on one side and provided with an adapter flange 46 to which the casing 19 is bolted as at 47.

A modified unit is indicated at 17*a* in Figure 9. Here, the cylindrical casing 48 has its lower end portion 49 fashioned into an oil reservoir or sump and is provided with a partition 50, this having bearings to accommodate the tubular oil delivery whetstone flushing shaft 51. The upper partitioned end 52 defines a trapping receptacle 53 in which the flanged table 54 rotates, said table carrying the whetstone 55 attached to the threaded shaft by a hub-collar or nut 56. The partition 52 is provided with a bearing 57 to accommodate the shaft and the shaft is provided with a speed-reducing gear 58 having marginal teeth 59 to coact with the worm (not shown). The gear 58 is of inverted cup-like form and houses a smaller gear 60 also keyed on said shaft 51 and driving a power take-off pinion 61 which, in turn, drives a suitably supported shaft 62. This shaft 62 serves to drive one of the elements 63 of a simple gear pump mounted in the gear pump housing 64. The other gear pump element 65 is on the shaft 51 and the U-shaped duct, which feeds the oil to the bore in the shaft 51 is indicated at 66. The numeral 67 designates an oil return or drain from the base 68 to the sump 49. The numeral 69 is the oil duct, that is, the return duct from the trap to the sump. Suitable means is provided to deliver the oil from the sump into the pump chamber.

In this arrangement the motor drives the gear 51 and the gear drives the shaft 52. The shaft, in turn, drives the gear pump by way of the coacting gear 60 and pinion 61. The shaft also drives the whetstone which is secured on the table 54 to the upper end thereof.

The structures herein shown and described constitute feasible and practicable means for grinding, sharpening and dressing tools and instruments of many different types and varieties. It is characterized by a carefully chosen arrangement and coordination of parts, the parts being ingeniously arranged to make for compactness and convenience from the standpoint of manufacture and use. Experience will be the best teacher as to the best modes and methods of using the selectively employable grinding and finishing elements. Therefore, I shall not dwell upon the commercial aspects of the invention.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Minor changes in the shape, size and arrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

Having described the invention, what is claimed as new is:

1. In a structure of the class described, an oil bathed whetstone unit comprising a casing having vertical vertically spaced bearings, a tubular shaft mounted for horizontal rotation in said bearings, a check valve on the lower end of said tubular shaft, a gear on said shaft for rotating the same, a motor including a shaft, an operating connection between the motor shaft and gear, a pump structure in the lower portion of said casing for feeding oil to the interior of the shaft through the check valve, an oil reservoir for feeding oil to the pump structure, an operating connection between said shaft and pump structure, and a whetstone on the upper end of said shaft.

2. In a structure of the class described, an oil bathed whetstone unit comprising a casing having vertical vertically spaced bearings, a tubular shaft mounted for horizontal rotation in said bearings, a check valve at the lower end of said tubular shaft operative to prevent the discharge of fluid from the lower end thereof, a gear on said shaft for rotating the same, a motor including a shaft, an operating connection between the motor shaft and gear, a pump structure in the lower portion of said casing, an oil reservoir for feeding oil to the pump structure, an operating connection between said pump structure and the check valve, and a whetstone on the upper end of said shaft, that portion of the casing surrounding the whetstone being fashioned into a trap and being provided with an oil return duct leading back to the reservoir.

3. In a whetstone unit of the class described, a casing provided at its top with a partition having a central bearing, and a portion projecting above said bearing and defining an oil trap, a tubular vertical shaft journaled for horizontal rotation in said bearing, a whetstone mounted on the upper end of the tubular shaft, a table on said shaft resting on said bearing and confined in said trap, a check valve at the lower end of the shaft, oil pump means in the lower portion of said casing for delivering oil to the interior of the shaft through the check valve whereby a

constantly upwardly flowing column of oil is maintained within the hollow shaft, means for rotating the shaft, means for driving the oil pump means from said shaft, an oil reservoir in the lower portion of the casing, and a return duct leading from said trap to said reservoir.

4. In a whetstone unit of the class described, a casing, bearing means in the lower portion of the casing, a tubular vertical shaft journaled for horizontal rotation in said bearing means, a speed-reducing gear keyed on said shaft, a motor driven shaft extending into said casing and having a worm in mesh with said speed-reducing gear, pump means built into the lower portion of the casing, an operating connection between the shaft and pump means, an oil reservoir associated with the pump means and embodied in the lower portion of said casing, the upper portion of the casing being provided with an end-thrust bearing, the adjacent portion of the shaft being mounted for rotation in said bearing, a plate on said shaft resting on said bearing, that portion of the casing surrounding said plate defining an oil trap, a return duct from said trap to the reservoir, a whetstone on the shaft, a valve in the lower portion of the tubular shaft, and a duct from the pump means to the valve.

5. In a whetstone unit of the class described, a casing provided at its bottom with an oil sump, a gear pump mounted in said sump and in communication with the sump, bearings mounted in said casing, a tubular shaft mounted in said bearings, a whetstone carried by the upper end of said shaft, oil trapping and return means surrounding the whetstone and formed in the upper portion of said casing, a power receptive gear keyed on said shaft, a smaller gear also keyed on said shaft, a pinion shaft, a pinion on said shaft in mesh with said gear, said pinion shaft serving to rotate one of the gear pump elements, the remaining gear pump element being carried by the lower end of said shaft.

6. A grinding device consisting of a vertical tubular shaft, bearings for supporting the same for rotation, a motor having driving engagement with the vertical tubular shaft, a pump housing enclosing the lower end of the vertical tubular shaft and provided with a pump rotor mounted to turn with the shaft, a grinding wheel mounted on the upper end of the shaft to turn in a horizontal plane, a receptacle enclosing said grinding wheel and provided with a drain communicating with the pump chamber at its lower end, said pump chamber having an inlet and an outlet, the outlet communicating with the lower end of the vertical tubular shaft, a check valve in said shaft, and a valve in said pump chamber automatically opened by said pump rotor to control the flow through said inlet.

7. A grinding device consisting of a housing having vertical bearings, a tubular shaft mounted to turn in said bearings, a grinding wheel mounted on the upper end of the tubular shaft, a pump chamber enclosing the lower end of the tubular shaft, a pump rotor mounted on said shaft and having a cam projection, said pump chamber having an outlet communicating with the tubular shaft and an inlet, and a spring closed valve controlling said inlet and arranged to be engaged by the cam projection of said pump rotor, whereby said valve will be automatically opened and closed as the rotor is turned.

8. A grinding device comprising a hollow tubular shaft mounted to rotate about a vertical axis, a whetstone mounted at the upper end of the shaft, means constantly to maintain a column of oil throughout the entire length of the tubular shaft and means upon rotation of the shaft to cause the oil column to flow upwardly and over the top surface of the whetstone.

9. A grinding device comprising a hollow tubular shaft mounted to rotate about a vertical axis, a whetstone mounted at the upper end of the shaft, a check valve at the lower end of the tubular shaft constantly to maintain a column of oil throughout the entire length of the interior thereof, and means upon rotation of the shaft to cause the oil column to flow upwardly and over the top surface of the whetstone.

10. A grinding device comprising a hollow tubular shaft mounted to rotate about a vertical axis, a whetstone mounted at the upper end of the shaft, means constantly to maintain a column of oil throughout the entire length of the tubular shaft, and a pump operable upon rotation of the tubular shaft to feed oil into the bottom of the tubular shaft and cause the oil column to flow upwardly and spread over the top surface of the whetstone.

11. In a combination grinder, a drive shaft rotatable on a horizontal axis, a hollow tubular shaft mounted to rotate about a vertical axis, grinding wheels carried by opposite ends of the drive shaft, a power takeoff intermediate the ends of the drive shaft, a tubular shaft rotatable on a vertical axis and driven by the power takeoff, a grinding wheel at the upper end of the vertical shaft, a pump at the lower end of the vertical shaft for feeding oil into the interior thereof, and means to retain a column of oil constantly within the vertical shaft.

12. In a combination grinder, a grinding device comprising a drive shaft mounted to rotate about a horizontal axis, grinding wheels carried by opposite ends of the drive shaft, a power takeoff intermediate the ends of the drive shaft, a tubular shaft rotatable on a vertical axis and driven by the power takeoff, a grinding wheel at the upper end of the vertical shaft, a pump at the lower end of the tubular shaft for feeding oil into the interior thereof, and a valve at the lower end of the vertical shaft to retain a column of oil constantly within the interior thereof.

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