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VENTING APPARATUS FOR MOTORS

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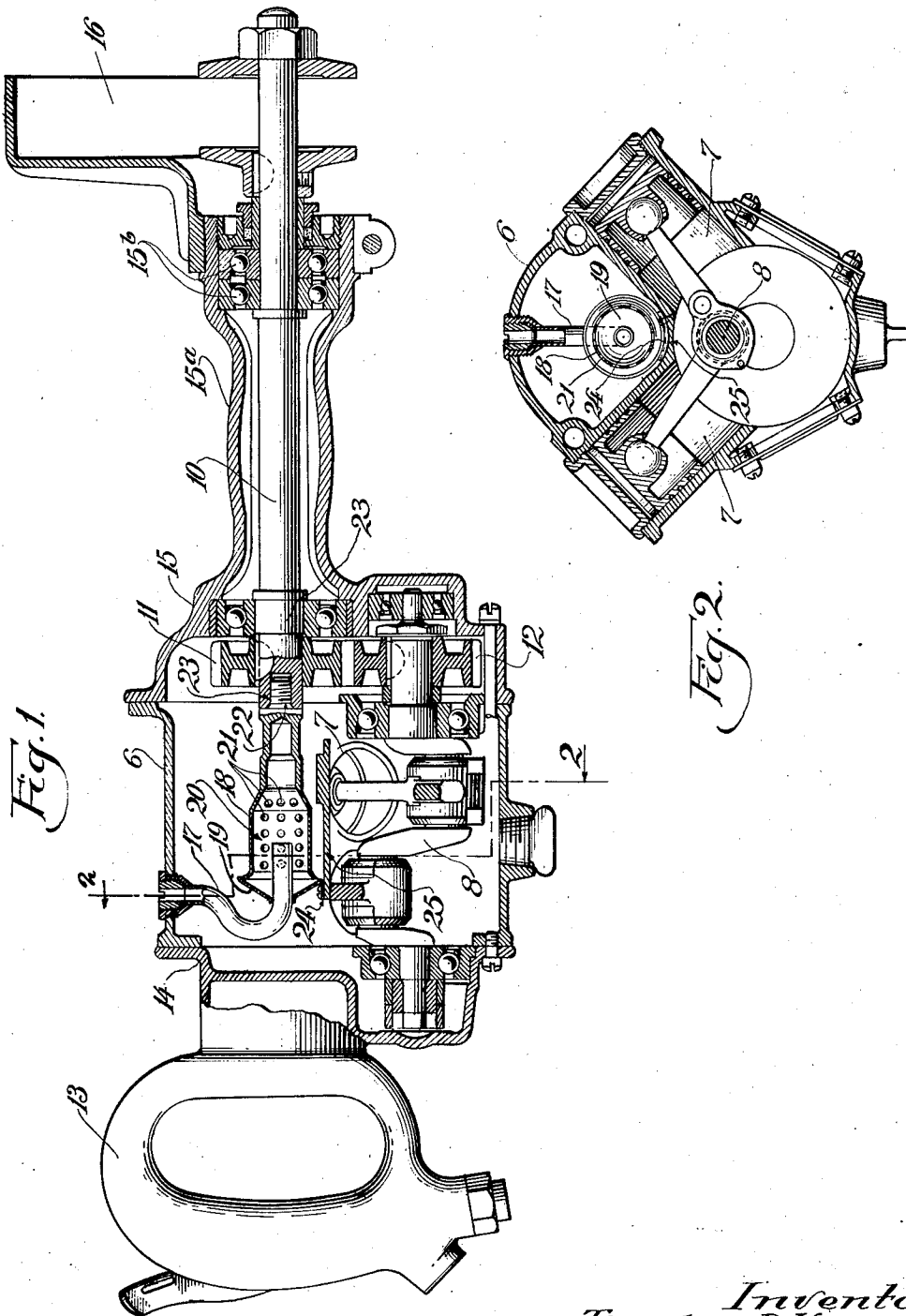


Fig. 1.

Fig. 2.

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UNITED STATES PATENT OFFICE.

THEODORE P. KIMMAN, OF CLEVELAND, OHIO, ASSIGNOR TO CHICAGO PNEUMATIC TOOL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

VENTING APPARATUS FOR MOTORS.

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To all whom it may concern:

Be it known that I, THEODORE P. KIMMAN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Venting Apparatus for Motors, of which the following is a specification.

My invention relates in general to motors and specifically to the motors of hand operated or portable tools, such as machines for grinding, polishing, buffing, brushing and the like, and more particularly to improved venting means for permitting escape or exhaust of air, compressed in the crank case, while preventing escape of the lubricating oil with the air. Pneumatically operated tools are necessarily operated at high speeds and therefore require constant and efficient lubrication, which is usually of the type in which the oil is splashed or thrown off by the crank shaft. Some of the compressed air, conducted to the cylinders to operate the pistons and hence the crank shaft, escapes past the pistons into the crank case, where the pistons tend to compress it. Venting means have been used prior to my invention to permit the excess air to be exhausted from the crank case, but such venting means have proven deficient and objectional, in that no provision has been made to prevent escape of the lubricating oil with the air.

The principal object of my invention is to provide means for effectually preventing the lubricating oil from being carried out of the crank case with the air escaping through the vent tube or conduit. To this end, I provide a simple, durable and highly efficient centrifugal device, which separates the oil from the air escaping through the vent tube.

With the above and incidental objects in view, the invention consists in certain novel features of construction and combinations of parts, the essential elements whereof are recited in the appended claims and the preferred form of embodiment of which is described in detail hereinafter and illustrated in full in the accompanying drawings, which form part of this specification.

Of said drawings, Fig. 1 is a sectional elevation of a pneumatic tool, embodying my invention, and Fig. 2 is a cross-section through the tool, as on the line 2—2 of Fig. 1.

Referring to the drawings, the pneumatic tool shown is of a well known construction

and may be used for grinding, polishing, buffing and similar purposes. It comprises in general the casing 6, opposed cylinders 7, arranged at an angle of 90° with respect to each other, a crank shaft 8, connected by connecting rods to the pistons in the cylinders, a handle 13 for holding the tool and controlling its operation, and a tool shaft 10, operated by the crank shaft through the medium of gears 11 and 12. The casing 6 comprises the central portion or body cast integral with the cylinders 7, and end caps or cases 14 and 15, which carry suitable bearings for supporting the crank shaft 8 and shaft 10. The gear case 15 is provided with a tubular extension 15^a for housing part of the shaft 10, and at its outer end carries a shield or guard 16 which is positioned around the wheel (not shown), which is mounted on the end of the shaft for performing the function for which the tool is to be used. The extension 15^a also carries bearings 15^b for the tool shaft 10. I have shown a tool of the type described for the purpose of illustration only and it is to be understood that my invention is susceptible of use in pneumatic tools or motors used for different purposes than those mentioned above, and that I do not intend to limit the application of my invention to pneumatic tools of any specific kind.

The means, constituting the subject matter of my invention, comprises a vent tube 17, a centrifugal oil separator 18 and a plate or cover 19 on the tube. The tube 17 is secured at its upper end and by any suitable means in an opening in the top of the tool casing and it is bent intermediate its ends so that its opposite end portion extends horizontally and into the separator 18. The separator is cylindrical in form and has a large chamber 20 in one end. The wall of the chamber 20 is provided with holes 21. The opposite end of the separator 18 is provided with a screw threaded projection 22 which is screwed into a screw threaded recess 23 in the inner end of the tool shaft 10, so that the separator is in axial alignment and rotated as a unit with the tool shaft 10. The dished disc or cup-like plate 19 is provided with a central opening through which the pipe or tube 17 extends and the disc 19 has a projecting bracket or foot 24 secured to a portion 25 of the tool casing 6 by any desired means such as

screws. It will be noted that the vent tube 17 and associated device, for preventing escape of oil, are positioned between the opposed cylinders, while the crank shaft 8 is positioned in the bottom of the apparatus.

From the above description, the operation of the mechanism, embodying my invention, will be apparent. It will be understood that the lubricating oil is to be maintained at the desired level in the crank case, and that the oil is splashed or thrown by the crank shaft and connections to lubricate the device. The air, which escapes from the cylinders, past the pistons and into the crank case, upon being compressed in the crank case escapes through the chamber 20 of the separator 18 and tube 17, out into the atmosphere. Because of the centrifugal action of the separator any oil carried into the chamber 20 by the air is thrown onto the inside wall of chamber and out through its perforations 21. The dished disc 17 partially closes the open end of the separator chamber and also prevents any lubricant from flowing or traveling along the tube 17 into the open end of the tube.

I have described above one form of embodiment of my invention, but it is to be understood that the invention is susceptible of various changes and modifications, all coming within the scope and spirit of my invention, as defined in the following claims.

I claim:

1. Means for venting the crank casing of a motor comprising a vent passage opening into a chamber within said casing, said chamber having a perforate wall adapted to be rotated when the motor is in operation whereby centrifugal force is utilized to restrain lubricant splashed about in the casing from entering said passage.

2. A venting device for the crank casing of a motor comprising a rotatable chamber within the casing, said chamber having an open end and openings in the walls thereof, a vent duct extending into the open end of said chamber, a deflector associated with

said duct adjacent the open end of said chamber, and means for rotating said chamber when the motor is in operation, whereby lubricant splashed into and upon said chamber or carried therein by the vented gases is returned by centrifugal force to the casing.

3. In a device of the class described, the combination of a casing, a crank shaft therein, lubricant in the casing, a perforated device open at an end to permit escape of the air but prevent escape of lubricant therewith, a conduit through which the air escapes, and a stationary plate over the open end of said device.

4. In a device of the class described, the combination of a casing, a crank shaft therein, lubricant in the casing, a perforated device open at an end to permit escape of the air but prevent escape of lubricant therewith, a conduit through which the air escapes, and a stationary plate over the open end of said device and through which the end of the conduit projects.

5. In a device of the class described, the combination of a casing, a crank shaft therein, lubricant in the casing, a tool shaft operated by the crank shaft, a perforated device secured to said tool shaft and open at one end to permit escape of the air but prevent escape of lubricant therewith, a conduit through which air escapes, and a stationary plate over the open end of said device.

6. A venting device for the crank casing of a motor comprising a rotatable chamber within the casing, said chamber having an open end and openings in the walls thereof, a stationary deflector closing the open end of said chamber, a vent duct extending through said deflector and terminating within said chamber, and means for rotating said chamber when the motor is in operation, whereby the lubricant splashed about in said casing is prevented from passing out through said duct with the vented gases.

THEODORE P. KIRMAN.