

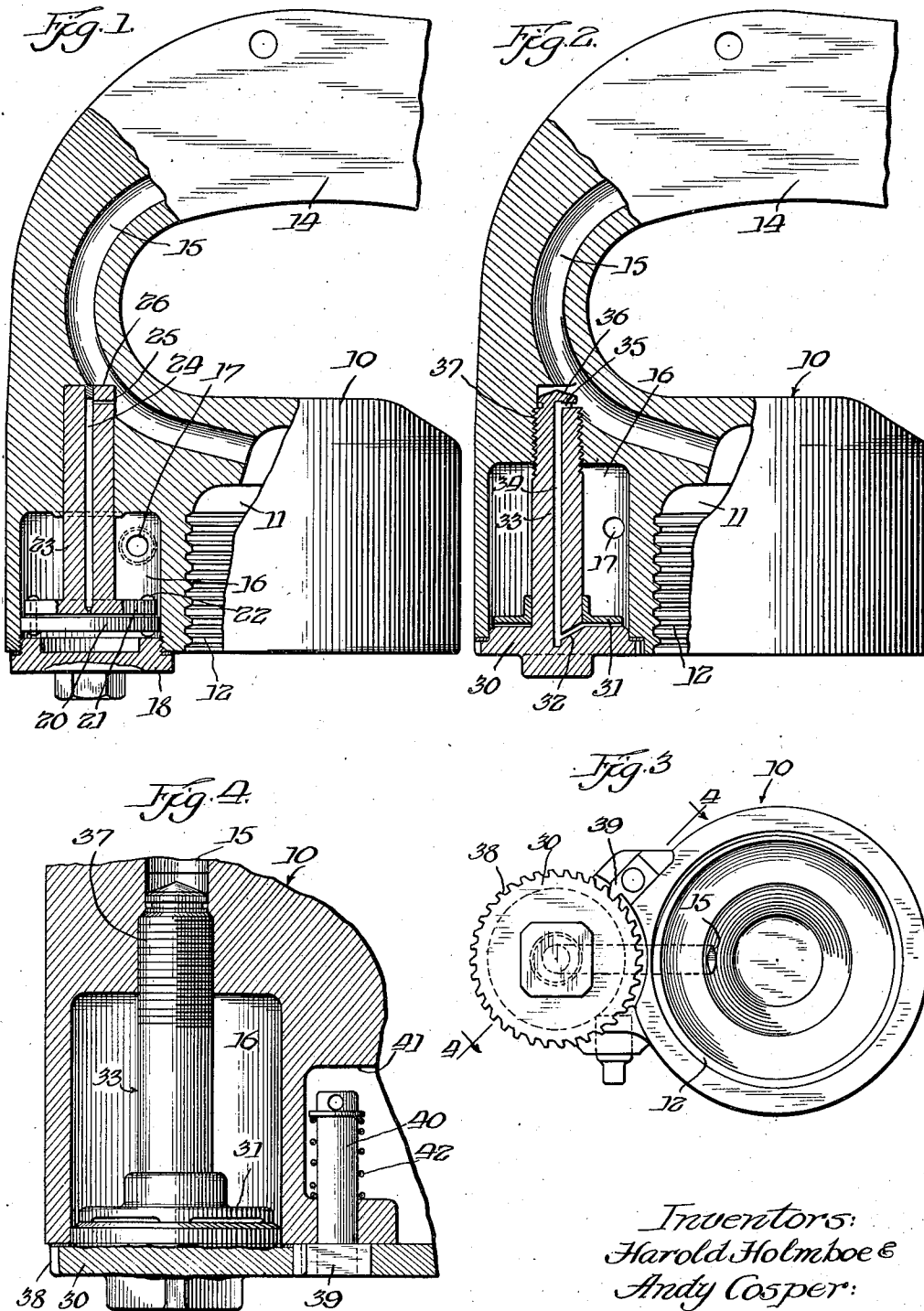
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ATOMIZING DEVICE

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ATOMIZING DEVICE

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7 Claims. (Cl. 184—55)

The invention relates to apparatus for atomizing liquids and has particular reference to an improved lubricating device for pneumatic tools and the like.

An object of the invention resides in the provision of an atomizing device for lubricating pneumatic tools which will be simple in construction, embodying relatively few parts, which can be inserted and removed as a unit from the reservoir of said tool, and which will effectively regulate the quantity of oil delivered to the air stream for lubricating the working parts of said tool.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawing and claims appended hereto.

In the drawing which illustrates an embodiment of the device and wherein like reference characters are used to designate like parts—

Figure 1 is an elevational view of the head of a pneumatic tool, parts being shown in section to better illustrate the construction and location of the atomizing device comprising the present invention;

Figure 2 is a view similar to Figure 1 but showing a modified form of atomizing device incorporated in the head of a pneumatic tool;

Figure 3 is a bottom plan view of the structure shown in Figure 2; and

Figure 4 is a sectional view taken substantially along line 4—4 of Figure 3.

Referring to the drawing, particularly Figures 1 and 2, the reference numeral 10 indicates the head portion of a pneumatic tool such as a chipping hammer which is provided with an interior recess 11 having threads 12 by which the head of the tool is secured to the body portion thereof. The handle 14 which is integral with the head portion of the tool is provided with a trigger or valve actuating lever, not shown, by which the supply of compressed air to the tool is regulated and which is delivered thereto through the compressed air passage 15 extending through handle 14 and into the head portion of the tool.

The head of the tool is recessed at 16, providing a reservoir for lubricating oil which is admitted to said recess through an inlet normally closed by the threaded member 17. The bottom of said recess or oil reservoir is closed by the nut 18. For lubricating the present pneumatic tool provision is made for supplying the oil from the reservoir to the air stream which forms a vehicle for the lubricating oil carrying the oil to the

moving parts of the tool. It is desirable that the lubricating oil be supplied to the tool in relatively small amounts and that the supply be continuous during the operation of the tool. The atomizing device of the invention effectively regulates the quantity of oil delivered to the air stream and maintains a constant supply during operation. This structure will now be described.

The atomizing device essentially consists of spaced discs or capillary members 20 and 21 which are secured to each other by securing means 22. It will be observed that the lower member 20 has a close fit within the base of the reservoir 16 and therefore this capillary member forms the bottom of the reservoir. The upper member 21 is somewhat less in diameter than the recess forming the oil reservoir and accordingly a space exists around the periphery of said upper member which is in communication with the capillary space between said members. The upper member 21 is integral with the stem 23 which extends upwardly into the handle portion 14 so that the upper end of said stem projects into the air passage 15. The bore 24 extends the length of the stem 23 having communication at its lower end with the capillary space and terminating in a horizontally disposed opening 25, which opens into the air passage 15.

In the operation of the pneumatic tool equipped with the atomizing device of the invention the flow of compressed air through passage 15 will be partly obstructed by the projecting end 26 of the stem 23. This end 26 of the stem has been purposely located within the air passage for obstructing the air stream and to thereby produce a suction effect at the opening 25 communicating with the bore 24, which in turn leads to the capillary space. Since the oil from the reservoir 16 is supplied to said capillary space at all points around its periphery the oil will be drawn into said space and as the suction continues said oil will be caused to enter the bore 24. Eventually the oil will be injected into the air stream flowing through passage 15.

In the drawing the space between the discs or capillary members 20 and 21 has been necessarily exaggerated for clearance since in the actual construction of the present lubricator the distance between said capillary members may be several thousandths of an inch. Therefore oil from the reservoir will flow into said space by capillary attraction and which therefore maintains just the proper quantity of oil for injection into the air stream and which is continuously supplied during the operation of the tool. The

present atomizing device therefore effectively regulates the supply of lubricating oil to the working parts of the pneumatic tool and which will function irrespective of the position of the tool since the capillary attraction provided by said members does not depend on whether the same are horizontally or vertically disposed. Since pneumatic tools of the type mentioned in this application are portable it follows that the oil within the reservoir will be in constant movement during operation and at times in a state of turbulence. Therefore, irrespective of whether the capillary members are located in the base of the reservoir or in the top of the reservoir they will be immersed in the oil intermittently or at least said members will be partly immersed at times during the operation of the tool. This contact of the capillary members with the oil is sufficient to maintain at all times an adequate supply of oil in the capillary space therebetween.

Figures 2, 3 and 4 show a modified form of atomizing device in which the lower capillary member 30 comprises the bottom closure for the oil reservoir and which has formed integral therewith the stem 33 extending into the handle portion 14. The upper capillary member 31 is fitted to stem 33 and properly spaced with respect to member 30 so as to form a capillary space therebetween. Passage 32 leads from this capillary space to the bore 34 in the stem and which terminates in the horizontally disposed opening 35 communicating with the air passage 15.

The operation of the modified form of atomizing device is the same as that described with respect to Figure 1. The compressed air flowing through passage 15 is partly obstructed by the end 36 of the stem 33 which projects into the passage and accordingly a suction effect is produced at the opening 35. This opening communicates with the capillary space through the vertical bore 34 and the passage 32 and therefore oil from said capillary space is caused to be injected into the air stream.

In the structure of Figure 1 the atomizing device is unitary and can be easily removed from the reservoir as a unit. Of course, the nut 18 must first be removed to provide access to the atomizing unit. In the modified structure of Figures 2, 3 and 4 the atomizer is likewise unitary. However, in this form the upper end of the stem 33 is threaded into the head of the tool as at 37 and in order to prevent inadvertent removal of the atomizing unit means are provided as shown in Figures 3 and 4 to lock the unit against rotation. Thus, it is impossible to rotate the stem in a direction to screw the stem outwardly from the head portion. The member 30 is notched around its periphery as at 38 and a spring pressed latch 39 is provided for engaging the said notches. Latch 39 is suitably fitted to the end of the stud shaft 40, Figure 4, which is positioned in the recess 41 formed in said tool so that the operator may have access thereto for depressing the said stud shaft against the tension of coil spring 42. Normally said coil spring maintains the latch in operative association with the notches on member 30. Therefore, during operation of the tool rotation of the member and thus the atomizing unit is prevented. However, when it is desired to remove the unit from the reservoir for purposes of repair or the like, it is only necessary for the operator to depress the stud shaft 40, thereby removing latch 39 from engagement with notches 38 on member 30, 75

whereupon the unit can be rotated in a direction to unscrew the stem from the handle portion.

The spaced capillary members of the present device function to maintain an adequate supply of liquid for injection into the air stream in the form of a mist or finely divided spray and which will automatically increase the quantity as the velocity of the air stream increases.

The invention is not to be limited to or by details of construction of the particular embodiment thereof illustrated by the drawing, as various other forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

What is claimed is:

1. In a pneumatic tool having an air passage through the head portion thereof, means for lubricating the working parts of said tool including a reservoir in said head portion in spaced relation to the air passage, means communicating with the air passage at one end and extending into the reservoir at its other end, and capillary means including spaced members located in the reservoir and associated with the end of said means extending into the reservoir, said means having a passage therethrough connecting the air passage with the capillary space formed by said spaced members, whereby said capillary means maintains a constant but limited supply of oil for delivery to the air stream flowing through said passage.

2. In a pneumatic tool having an air passage through the head portion thereof, means for lubricating the working parts of said tool including a reservoir in said head portion in spaced relation to the air passage, means communicating with the air passage at one end and extending into the reservoir at its other end, spaced members fixed to the end of said means extending into the reservoir and providing a capillary space, and said means having a bore extending therethrough connecting the air passage with said capillary space, the said air passage producing a suction effect by the flow of elastic fluid therethrough whereby oil is drawn from said capillary space and injected into said air passage.

3. An atomizer for lubricating a pneumatic tool or the like having an air passage in the body portion and also having an oil reservoir spaced from said air passage, spaced members located in said oil reservoir and providing a capillary space therebetween, said members being at least partly immersed in the oil in said reservoir whereby the oil is supplied to the capillary space at all points around the periphery of said space, and means having a bore extending therethrough communicating with the air passage at one end and extending into the reservoir at its other end, said spaced members having association with the extending end of said means whereby said capillary space is connected by said bore with the air passage.

4. An atomizer for lubricating a pneumatic tool or the like having an air passage in the body portion and also having an oil reservoir spaced from said air passage, spaced members located in said oil reservoir and providing a capillary space therebetween, said members being at least partly immersed in the oil in said reservoir whereby the oil is supplied to the capillary space at all points around the periphery of said space, a stem projecting into the air passage at one end and extending into the reservoir at its other end, said spaced members being

fixed to the extending end of said stem, and said stem having a bore therethrough connecting the air passage with said capillary space, the end of said stem projecting into the air passage being constructed and arranged to produce a suction effect by the flow of the elastic fluid through the passage to cause the oil in the capillary space to be injected into said air passage.

5. An atomizer for lubricating a pneumatic tool or the like having an air passage in the body portion and also having an oil reservoir spaced from said air passage, spaced members located in said oil reservoir and providing a capillary space therebetween, said members being at least partly immersed in the oil in said reservoir whereby the oil is supplied to the capillary space at all points around the periphery of said space, means having threaded engagement with the body portion, said means communicating with the air passage at one end and extending into the reservoir at its other end, said spaced members being associated with the extending end of said means, and said means having a bore therethrough connecting the air passage with the capillary space.

6. An atomizer for lubricating a pneumatic tool or the like having an air passage in the body portion and also having an oil reservoir spaced from said air passage, spaced members located in said oil reservoir and providing a capillary space

therebetween, said members being at least partly immersed in the oil in said reservoir whereby the oil is supplied to the capillary space at all points around the periphery of said space, means supported by said body portion and projecting into the air passage at one end and extending into the reservoir at its other end, one of said spaced members being integral with said means, and said means having a bore extending there-through whereby the air passage is connected to said capillary space, the end of said means projecting into the air passage being constructed and arranged to produce a suction effect by the flow of the elastic fluid through the passage to cause the oil from the capillary space to be injected into the air passage.

7. An atomizer, in combination, a body portion having an air passage and also having an oil reservoir spaced from said air passage, means extending from the air passage to the reservoir and having a bore therethrough, and spaced means fixed to the end of said means within the reservoir, said spaced means providing a capillary space having communication with the bore extending through said means whereby said capillary space is connected by said bore with the air passage.

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