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DIAMOND TOOL ASSEMBLY

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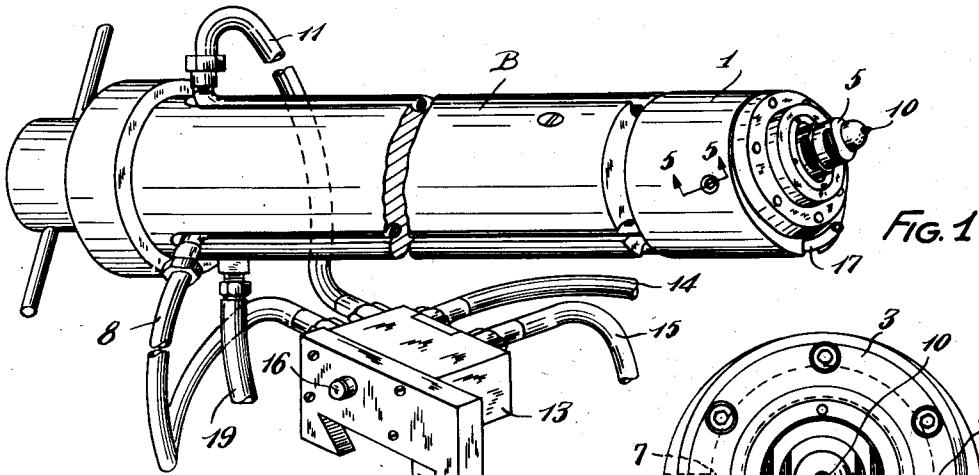


FIG. 1

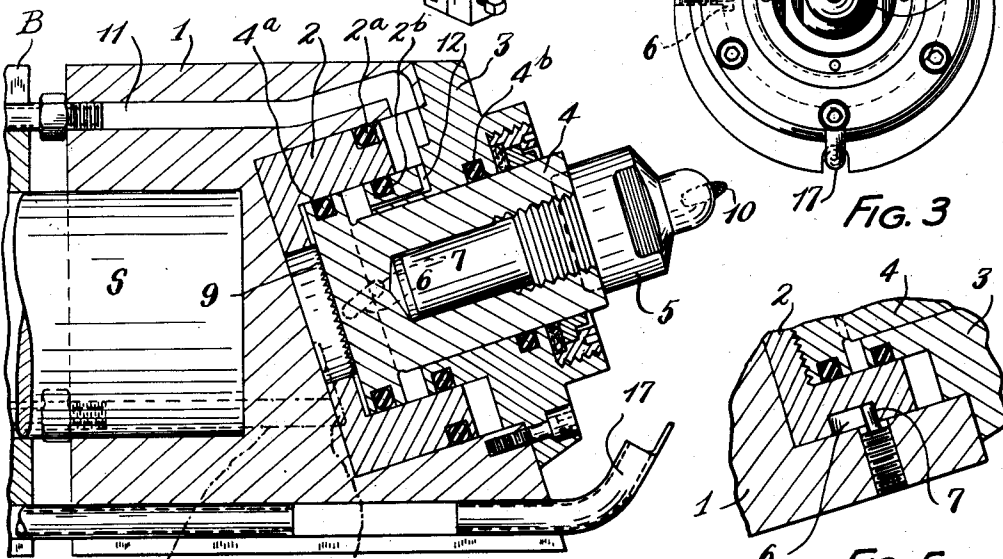


FIG. 2

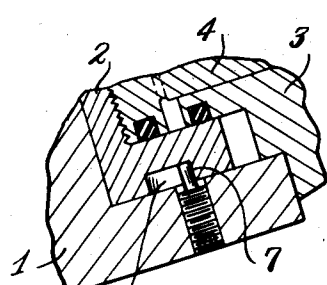


FIG. 3

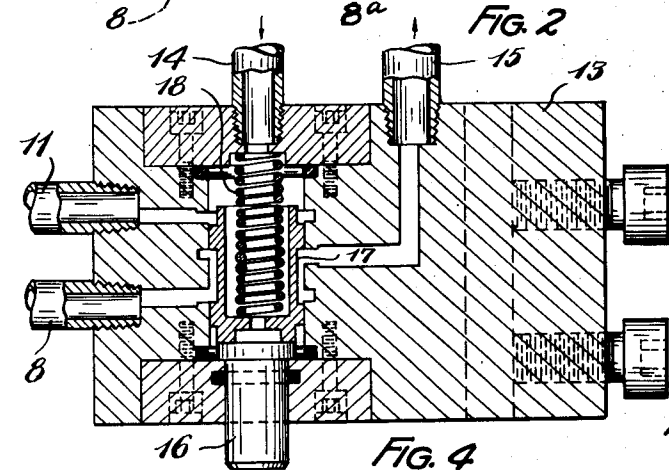


FIG. 4

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DIAMOND TOOL ASSEMBLY

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4 Claims. (Cl. 125—11)

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The present invention relates to an improved assembly of diamond tool for dressing grinding wheels and is related to my co-pending application Serial No. 62,449, filed November 29, 1948, now Patent No. 2,581,544, dated January 8, 1952.

As noted in the above co-pending application, it is regular practice to move a diamond tool at intervals into position for operative engagement with a grinding wheel for dressing the same; and the workman has been depended upon to turn the diamond tool in order to always present a new sharp point and to prevent the diamond from wearing unevenly. However, it has been found that the workmen fail to make such adjustments with necessary regularity and to the proper degree, if at all.

In the present invention, therefore, as in the above-noted application, the object is to devise an assembly in which the diamond tool may be moved to position for operative engagement with the grinding wheel and at the same time automatically turned slightly so as to always present a new sharp point of the diamond to the wheel and thus prevent uneven wear of the diamond. The present invention contemplates the employment of hydraulic means, as in the above-noted application.

A more specific object of my present invention is to provide such a device with means for converting straight-line movement of the diamond tool, in only one direction, into rotary movement so as to always ensure presentation of a fresh portion of the diamond to the grinding wheel.

Another specific object of my present invention is to provide such a device with a pin-and-inclined-slot arrangement for converting the straight-line movement of the diamond tool, in only one direction, into rotary movement so as to always present a fresh portion of the diamond to the grinding wheel.

A further object is to devise an efficient organization of my improved appliance and the dresser barrel to which it is applied, including the arrangement of the tubes for the hydraulic fluid.

Other objects will appear from the following description and claims when considered together with the accompanying drawing:

Fig. 1 is a perspective view of my present improved form of device;

Fig. 2 is a longitudinal sectional view thereof;

Fig. 3 is an end view thereof;

Fig. 4 is a sectional view of the valve mechanism which may be employed for controlling the flow of the hydraulic fluid; and

Fig. 5 is a view taken on line 5—5 of Fig. 1.

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It is to be understood that the present form of disclosure is merely for the purpose of illustration and that there might be devised various modifications thereof without departing from the spirit of my invention as herein set forth and claimed.

My present assembly may be mounted upon or attached to any type of grinder; for instance, the spindle shaft S of the dresser barrel B of such a machine may have this device mounted thereupon in the manner indicated in Figs. 1 and 2 of the present drawing. My present device is so designed as to be of substantially the same general cross-sectional form and diameter as the dresser barrel B so as to constitute virtually a continuation thereof in form and appearance. This arrangement has also a decided mechanical advantage with respect to the positioning of the hydraulic fluid tubes, as will appear from the following.

The turner body 1, which is mounted upon the spindle shaft S, has provided within the outer end thereof the larger piston or plunger 2 which is adapted for straight-line movement therewithin, there being suitable space allowed by the fixed end cap 3, and the annular wall of the plunger 2 being adapted for such movement in the space provided between the turner body 1 and the inwardly extending cylindrical portion of the end cap 3. As indicated in the drawing, the plunger 2 may be so mounted as to have its longitudinal axis at an angle to that of the body 1.

Mounted co-axially within the larger plunger 2 there is the smaller plunger 4, within the outer or forward end of which the tool 5 is removably mounted by means of screw-threaded engagement. The rear end of the smaller plunger 4 is of enlarged diameter and is adapted for straight-line movement within the space provided between the bottom of the larger plunger 2 and the inner end of the cap 3.

The side wall of the larger plunger 2 is provided with an inclined slot 6 for co-operation with the inwardly extending pin 7 which is mounted in the body 1, the purpose being to thereby effect a turning movement of the larger plunger 2 simultaneously with its forward and backward movements, as will be more fully explained.

Through the tube 8 and duct 8a there may be applied hydraulic pressure upon the rear end of the larger plunger 2 and smaller plunger 4 so as to effect a forward or outward movement of the same, the duct 8a providing communication between the end of the tube 8 and the opening in the bottom of the plunger 2, as indicated in Fig. 2

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of the drawing. Such movement of the larger plunger 2 will cause also a slight turning movement of the same by virtue of the pin and slot mechanism; and there will be forward and turning movement of the smaller plunger 4 also, which is carried with the larger plunger 2. In order to ensure the smaller plunger being carried with the larger plunger in the manner as just described, the adjacent surfaces of the rear wall portions of these two plungers 2 and 4 may be formed with annular series of radially extending ribs and grooves 9 which are adapted for interengagement with each other, as indicated in Fig. 2 of the present drawing. Such forward movement of the plungers is intended to bring the diamond 10 of the tool into operative position; and the purpose of the turning movement of the plungers is to turn the tool so as to bring a fresh portion of the diamond into operative position and thereby avoid uneven wear of the same.

Then, when it is desired to withdraw the diamond from operative position, the fluid pressure will be applied in reverse manner. That is, by means of suitable valve mechanism, to be hereinafter referred to, hydraulic fluid may be applied through the tube and passage 11 to the forward exposed annular surface portion of the larger plunger 2 which will be thereby moved rearwardly and turned back by the slot-and-pin means 6 and 7. But, since only the larger plunger 2 is at this moment exposed to the effective force of the hydraulic fluid, it alone will be moved rearwardly at first; that is, the smaller plunger 4 will not be moved rearwardly until there has been sufficient hydraulic fluid to pass through the bleed hole or duct 12 to effect rearward movement of the smaller plunger 4, and such rearward movement thereof will be in a straight line and without any turning. Instead of the bleed hole or duct 12, the clearance between the annular walls of the plunger 2 and the end cap 3 might be depended upon to serve the same purpose.

A small groove 8a in the bottom of the larger plunger 2 will permit escape of the fluid through tube 8 when the plunger 4 is moved rearwardly but will not interfere with the forward movement of the large and small plungers together.

With the manner of operation just described, the tool will be turned during each forward movement but not during its rearward movement; and thus the effective operative portion of the diamond point will have a turning movement in only the one direction.

Suitable sealing means is provided at the several points required in order to ensure effective operation in the manner herein outlined. For instance, there will be such sealing means provided at the points 2a, 2b, 4a and 4b.

Referring now to the arrangement of the hydraulic fluid tubes, the tube 8 may extend from the rear end of the body 1 and along and within the longitudinal groove in the side of the dresser barrel B to the rear end thereof, whence it may be connected to the valve body 13. Likewise the other hydraulic fluid tube 11 may extend from the rear end of the body 1 along and within a longitudinal groove in the opposite side of the dresser barrel B to the rear end thereof, whence it may be connected to the valve body 13, as will be more fully explained.

The hydraulic tubes 8 and 11 are connected to the one end of the valve body or housing 13 while the hydraulic tubes 14 and 15 for supply and draining, respectively, of the hydraulic fluid, will be connected to the side of the valve body 13

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opposite to the position of the valve presser spring button 16. There may be provided a reservoir for the hydraulic fluid, to which the tubes 14 and 15 may be connected so as to supply the fluid therefrom and to return the same thereto through the tubes 15 and 14, respectively. All of these four hydraulic tubes have communication with the chamber within the valve body or housing 13; and the slide valve 17, in one position, is adapted to establish communication between the supply line 14 and either tube 8 for forward movement or the tube 11 for rearward movement of the tool, as above explained. At the same time there will be established connection between the other one of the two tubes 8 and 11 and the drain tube 15. That is, if the valve 17 is set so as to establish operative connection between the supply line and the tube for forward movement, there will at the same time be established communication between the tube for rearward movement and the drain tube; and when valve 17 is set so as to establish operative connection between the supply line and the tube for rearward movement, there will at the same time be established communication between the tube for forward movement and the drain tube. As will be understood, the coil spring 18 normally holds the valve 17 in the position indicated in Fig. 4 of the drawing and the valve may be set in the desired position by means of the presser button 16. This valve construction is not new and hence its manner of operation will be understood without any further explanation, so it is believed.

The valve body 13 may be mounted at any convenient place upon the machine frame so as to be conveniently accessible, there being clamping means provided upon the valve body for this purpose, as indicated in the drawing.

For the purpose of cooling, I have provided a water tube 19 which may extend along a groove in the side of the dresser barrel B and thence through the body 1, the forward end of this water tube being inclined so as to supply in an efficient manner a cooling jet of water at the point of dressing, as indicated in Figs. 1 and 2 of the present drawing.

The advantages resulting from my present invention will readily suggest themselves to those who are familiar with the art to which this invention relates, especially in view of the foregoing description when considered together with the accompanying drawing and also in view of the following claims.

What I claim is:

1. In a device of the class described, the combination of a cylinder, a plunger within said cylinder and reciprocatable therewithin, a diamond tool for dressing grinding wheels carried by the outer end of said plunger, means connected to said cylinder for moving said plunger and tool forwardly and rearwardly and for effecting turning movement of said plunger and tool, a separate dresser barrel having grooves extending along the outside thereof and to the rear of said cylinder, said cylinder being of substantially the same diameter as said dresser barrel and being mounted upon the one end thereof, and hydraulic tubes connected to opposite sides of said plunger for operation thereof, said tubes extending along and within said grooves in said dresser barrel.

2. In a device of the class described, the combination of a cylinder, an actuator within said cylinder and adapted for reciprocatable movement therewithin and having operative con-

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nection with said cylinder for effecting turning movement of said actuator simultaneously with its reciprocatory movement, separate reciprocable tool-holding means having releasable engagement with said actuator for turning movement therewith and being adapted to be exposed with said actuator at their one ends to the force of hydraulic pressure for effecting straight-line and turning movements thereof together, means connected to said cylinder for applying the force of hydraulic pressure to said actuator and tool-holding means for effecting forward and reverse movements thereof, and said tool-holding means having means for retarding effective application of hydraulic pressure thereto for movement thereof in one direction so as to release said releasable engagement and permit turning movement of said actuator alone in said one direction.

3. In a device of the class described, the combination of a cylinder, an actuator within said cylinder and adapted for reciprocable movement therewithin and having pin and inclined slot connection with said cylinder for effecting turning movement of said actuator simultaneously with its reciprocatory movement, separate reciprocable tool-holding means having frictional engagement within said actuator for turning movement therewith and being adapted to be exposed with said actuator at their rear ends to the force of hydraulic pressure for effecting straight-line and turning movements thereof together, means connected to said cylinder for applying the force of hydraulic pressure to said actuator and tool-holding means for effecting forward and reverse movements thereof, and said tool-holding means having means for retarding effective application of hydraulic pressure thereto for rearward movement thereof so as to release said releasable engagement and permit turning movement of said actuator alone in its rearward movement.

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4. In a device of the class described, the combination of a cylinder, an actuator within said cylinder and adapted for reciprocable movement therewithin and having operative connection with said cylinder for effecting turning movement of said actuator simultaneously with its reciprocatory movement, separate reciprocable tool-holding means having releasable engagement with said actuator for turning movement therewith, means provided in said cylinder for effecting forward and reverse movements of said actuator and tool-holding means including hydraulic pressure supply connection for effecting movement of said actuator and tool-holding means in one direction, and said tool-holding means having means for retarding effective application of said hydraulic pressure thereto for movement thereof in said one direction so as to release said releasable engagement and permit turning movement of said actuator alone in said one direction.

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