Jan. 8, 1946. E. C. SHUGARS 2,392,780

PRECISION GRINDER FOR TOOLS AND THE LIKE

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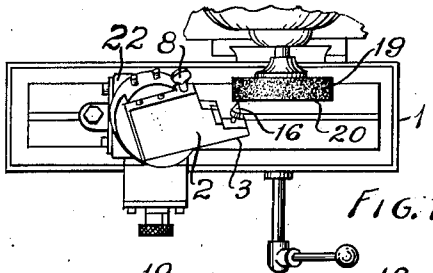


FIG. 1

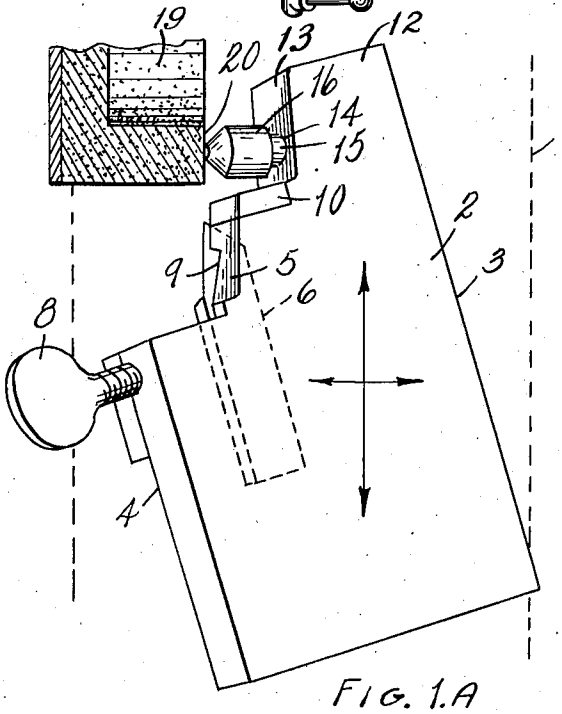


FIG. 1A

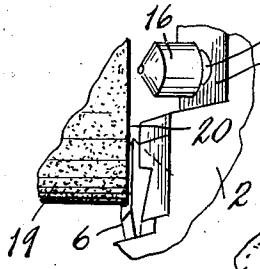


FIG. 4

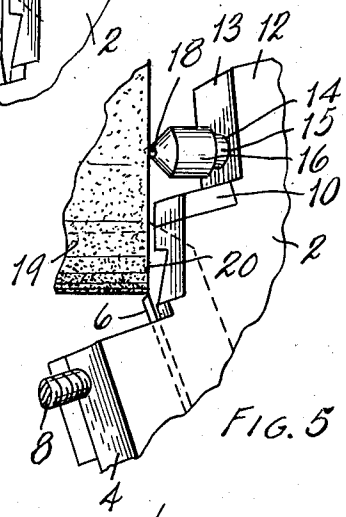


FIG. 5

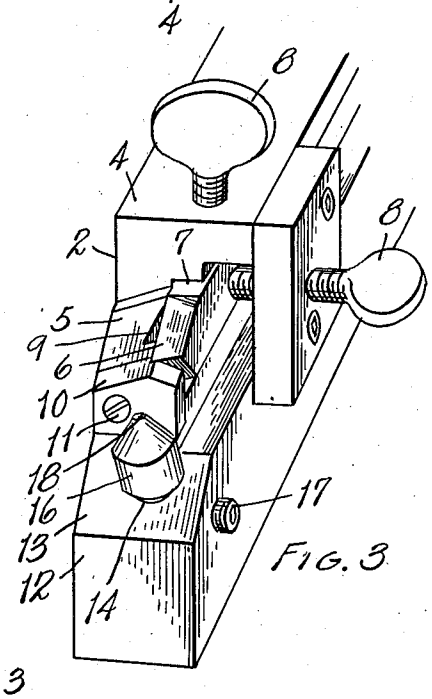


FIG. 3

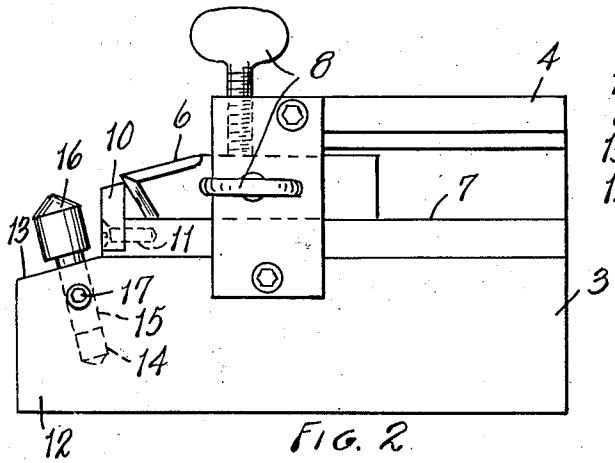


FIG. 2

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PRECISION GRINDER FOR TOOLS AND THE LIKE

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Application November 5, 1943, Serial No. 509,034

6 Claims. (Cl. 51—218)

This invention relates to improvements in precision grinders for tools and the like.

The main objects of this invention are:

First, to provide a precision grinder for tools and the like by means of which inexperienced operators may effectively and rapidly precision grind tools.

Second, to provide a machine of this type in which the wheel dressing tool or diamond can be adjusted to serve as a gauge to regulate the grinding of the tool.

Third, to provide a structure in which a plurality of tools may be successfully ground with accuracy without readjusting other than the general manipulation of the grinder.

Fourth, to provide a structure having these advantages which is simple and rugged and withstands severe usage.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary plan view of a structure embodying the features of my invention, certain of the parts being shown conventionally.

Fig. 1A is a fragmentary plan view of a structure embodying the features of my invention, parts being shown conventionally and only such portions of a grinding machine being illustrated or indicated as are deemed necessary for an understanding of my invention.

Fig. 2 is a side elevational view of the tool holder and illustrating the wheel dressing diamond and precision gauge member in its relation to the tool.

Fig. 3 is a front perspective view of the tool holder.

Fig. 4 is a partial plan view illustrating a preliminary step in the grinding, the clearance for the diamond being exaggerated.

Fig. 5 is a fragmentary plan view similar to that of Fig. 1 illustrating a finish grinding of the tool.

My invention relates primarily to improvements in tool holders and grinding gauges for grinding machines especially designed for use where a number of tools are to be ground to the same contour and dimensions. After the initial setting of the wheel dressing diamond and the tool holder has been adjusted to the desired height relative to the grinding wheel, any number of tools may be ground with precision without further adjustment other than the fitting of the tool to the grinding wheel. During the preliminary grinding of the tool, the dressing diamond remains out of contact with the grinding wheel but in the final or finish grinding of the tool, the wheel dressing diamond dresses the wheel or cuts away the wheel thereby preventing any further grinding of the tool. If the tool were continuously reciprocated across the grinding wheel the only result would be the dressing down of the grinding wheel without further grinding on the tool. It will be understood that if the diamond is set by a gauge for the desired cut, all of the tools ground with this setting will be identical. The grinding of tools with this device greatly facilitates the setting up of a plurality of tools on a multiple lathe, such for example as used for turning crankshafts, camshafts, and the like.

In the accompanying drawing, the reciprocating carriage 1 of a grinder is illustrated mainly in conventional form, the carriage being provided with a universal angle vise 22. These parts are shown mainly in conventional form and in their relation to the grinding wheel 19. My improved tool holder 2 is mounted on the angle vise.

On this carriage 1 mount my improved tool holder 2, this being adapted to be received by the universal angle vise not illustrated which is also well understood by those in the art.

The tool holder and grinding gauge of the embodiment illustrated comprises the base or body portion 3 and an upwardly projecting portion 4 having a tool bit side rest portion 5, the upper edge of which is outwardly beveled or inclined to insure clearance.

The tool 6 is placed in the seat 7 provided therefor and securely clamped or retained therein by means of the thumb set screws 8, one of these engaging the side of the tool and the other the top of the tool clamping it to its seat.

The tool side rest 5 is notched or recessed at 9 to accommodate tools of different shapes. The front tool rest 10 is clamped to the side rest 5 by means of the screw 11. These rests are positioned to firmly support the end of the tool as it is subjected to the grinding wheel and the tool projects somewhat above the upper faces of these members so that the tool may be ground.

The tool holder is provided with a forwardly projecting portion 12 having an inclined face 13 and provided with a bore 14 adapted to receive the stem 15 of the diamond support or post 16. This post is secured in its adjusted positions by means of the clamping screw 17. The diamond is indicated at 18.

In operation, the tool 6 is securely mounted in

the tool holder 2, which is mounted on the carriage 1 of the grinding machine. The universal angle vise 22 provides adjustment for properly presenting the tool to the grinding wheel. The angular position of the tool holder provides the necessary clearance and shape of the tool. The diamond point 18 is then adjusted to the desired height by a precision gauge. With the tool holder set up, the carriage is vertically adjusted to the grinding wheel 19 on a line horizontal to the axis of the grinding wheel. With the carriage in this position, it now reciprocates horizontally back and forth across the face 20 of the grinding wheel, as shown in Fig. 4. It will be noted that the diamond point 18 does not contact the grinding wheel during the preliminary grinding of the tool, but when the tool has been ground to the full dimension the diamond point dresses the wheel, and with any further reciprocation of the carriage the grinding wheel does not affect the tool, as the grinding wheel continues to be dressed off by the diamond point. Without any change in adjustment of the diamond point any number of tools can be sharpened with the same degree of accuracy and precision.

I have not illustrated various adaptations and embodiments of my invention to different types of grinders and grinding wheels as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a grinder, the combination with a cupped grinding wheel having an annular grinding face at right angles to the axis of rotation of the wheel, of a tool holder mounted to reciprocate in a path parallel to the plane of the grinding face of said grinding wheel, said tool holder being provided with a tool seat having a tool positioning rest at the front end thereof, means for clamping a tool on said seat with its front end in supported engagement with said tool rest, and an adjustable diamond supporting post mounted on said tool holder in advance of said tool positioning rest for adjustment laterally of the plane of the face of the grinding wheel so that on the work stroke of the tool holder a diamond carried by the post is moved in a line parallel to the plane of the face of the grinding wheel and across the grinding face thereof in advance of the tool mounted on the tool holder, the range of adjustment of said post relative to the plane of the face of the grinding wheel being such as to provide adjustment to a position in which substantially finished grinding of the tool results prior to the diamond being brought into dressing engagement with the grinding wheel whereby the diamond constitutes a gauge for limiting the grinding of the tool.

2. In a grinder, the combination with a grinding wheel having a grinding face at right angles to the axis of rotation of the wheel, of a tool holder mounted to reciprocate in a path parallel to the plane of the grinding face of said grinding wheel, said tool holder being provided with a tool seat, means for clamping a tool on said seat, and an adjustable diamond support mounted on said tool holder in advance of said tool seat for adjustment laterally of the plane of the face of the grinding wheel so that on the work stroke of the tool holder a diamond carried by the support is moved in a line parallel to the plane of the face of the grinding wheel and across the grinding face thereof in advance of the tool mounted on the tool holder, the range of adjustment of said post relative to the plane of the face of the grinding wheel being such as to provide adjustment to a position in which substantially finished grinding of the tool results prior to the diamond being brought into dressing engagement with the grinding wheel whereby the diamond constitutes a gauge for limiting the grinding of the tool.

3. In a grinder, the combination with a grinding wheel having a grinding face disposed at right angles to the axis of rotation of the wheel, of a tool holder mounted for reciprocation in a plane parallel to the plane of the face of the grinding wheel, and a diamond support mounted on the tool holder in advance of the tool support thereof so that on the work stroke of the tool holder a diamond carried by the diamond support is moved in a line parallel to the face of the grinding wheel and across the face of the grinding wheel in advance of the tool, said diamond support being adjustable relative to the plane of the face of the grinding wheel to a position in which the diamond is out of engagement with said grinding face at the beginning of the grinding of the tool and to a position in which the diamond constitutes a gauge for limiting the grinding of the tool at the completion of the grinding of the tool.

4. In a grinder, the combination with a grinding wheel having a grinding face disposed at right angles to the axis of rotation of the wheel, of a tool holder reciprocable in a plane parallel to the plane of the face of the grinding wheel, and a diamond support mounted on said tool holder in advance of the tool mounted thereon and so that on the work stroke of the tool holder a diamond carried by the diamond support is moved across the face of the grinding wheel in advance of the tool, said diamond support being adjustable on said tool holder relative to the plane of reciprocation thereof and relative to the tool thereon to a position in which the diamond is out of engagement with the grinding face at the beginning of the grinding of the tool by said grinding face and to a position in which it will dress the grinding wheel to such an extent as to constitute a gauge for limiting the grinding of the tool at the completion of the grinding of the tool.

5. In a grinder, the combination with a grinding wheel, of a tool holder reciprocable in a plane parallel to the grinding face of the grinding wheel, and a wheel dressing diamond mounted on said tool holder in advance of the tool carried thereby so that on the work stroke of the tool holder the diamond is moved across the face of the grinding wheel in advance of the tool on said tool holder, said diamond being positioned relative to the tool and said grinding face to be out of engagement with said grinding face at the beginning of the grinding of the tool and to be brought into dressing engagement with the grinding wheel at the completion of the grinding of the tool to constitute a gauge for limiting the grinding of the tool, said diamond being reciprocated across the grinding face of the wheel on each work stroke of the tool holder.

6. In a grinder, the combination with a grinding wheel, of a tool holder reciprocable across the grinding face of the grinding wheel, and a wheel dressing diamond mounted for reciprocation with said tool holder and in advance of the tool carried thereby so that on the work stroke of the

tool holder the diamond is moved across the face of the grinding wheel in advance of the tool on said tool holder, said diamond being positioned relative to the tool and said grinding face to be out of engagement with said grinding face at the beginning of the grinding of the tool and to be brought into dressing engagement with the grinding wheel only at the completion of the grinding of the tool and to constitute a gauge for limiting the grinding of the tool, said diamond being reciprocated across the grinding face of the wheel on each work stroke of the tool holder.

ELMER C. SHUGARS.