Feb. 16, 1954 E. A. WATSON ET AL 2,669,149

TOOL HOLDING BLOCK

Filed May 20, 1950

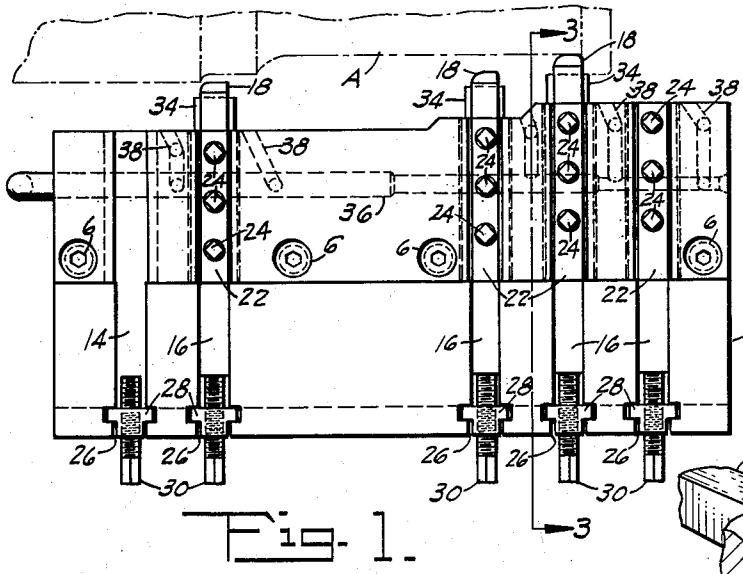


Fig. 1.

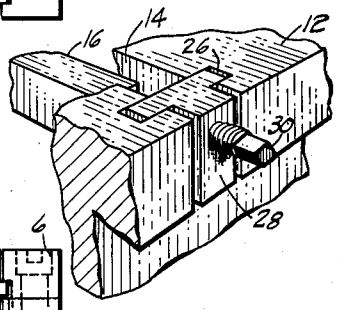


Fig. 4

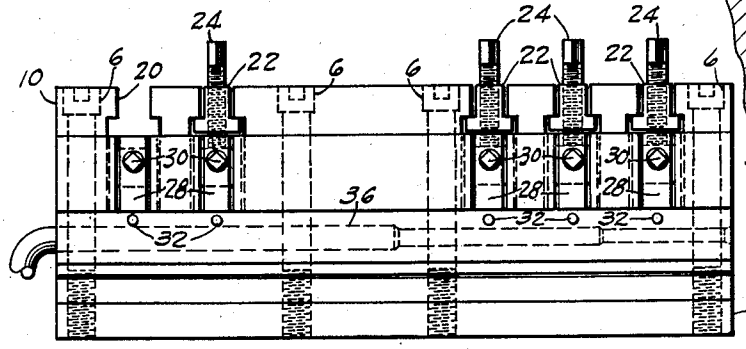


Fig. 2.

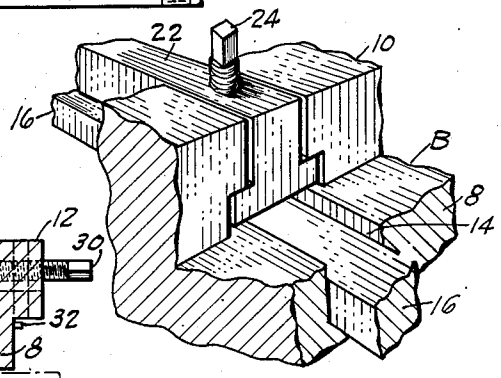


Fig. 5.

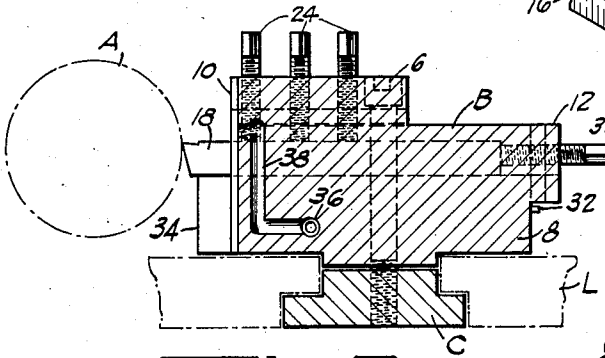


Fig. 3.

INVENTOR

George L. Preston

Edmund A. Watson

BY George R. Ericson ATTORNEY

Patented Feb. 16, 1954 2,669,149

UNITED STATES PATENT OFFICE

2,669,149

TOOL HOLDING BLOCK

Edmund A. Watson, Ridgewood, and George L. Preston, Montclair, N. J., assignors to American Car and Foundry Company, New York, N. Y., a corporation of New Jersey

Application May 20, 1950, Serial No. 163,314

11 Claims. (Cl. 82—37)

1

This invention relates to tool holding devices and particularly to an improved tool holding block adapted for use with axle turning and similar lathes.

In conventional devices of this kind, the tool is clamped in a groove by adjusting screws carried by one or more clamping members bolted or otherwise secured to the block. The groove is not easily accessible for inspection and cleaning which is often necessary prior to insertion of a replacement tool in the groove, since the clamping members must be unbolted from the block to sufficiently expose the groove for this purpose. In the case of multiple tool holders, when it is desired to inspect and clean only one of the tool seating grooves, removal of the tool clamping members from the block necessarily exposes all the grooves and disturbs the setting of the tools.

It is an object of the invention to provide a tool holding block in which the tool clamping member is itself slidably clamped in the block by the tool adjusting screws and which may be quickly and easily removed from the block to fully expose the tool seating groove by merely loosening the adjusting screws.

Another object of the invention is to provide a multiple tool holding block wherein each of the tools has its separate independent clamping means which may be slidably removed from the block as a unit without in any way disturbing the clamping means or the accurate setting of the other tools in the block.

Still another object of the invention is to provide a tool holding block in which the cutting heads of the tools are reinforced or buttressed against the heavy pressure to which they are subjected in service, thereby permitting the use of relatively light weight smaller sized tools with a consequent saving in the cost of expensive tool steel.

A further object of the invention is to provide a tool holding block formed with interior passageways for conducting a coolant to the cutting heads of the tools, thereby eliminating cumbersome exterior conduits or piping for this purpose.

These and other objects of the invention will be apparent to those skilled in the art from a study of the following description taken with the accompanying drawings in which:

Figure 1 is a top plan view of the tool holding block of the present invention, one of the tool clamping members being removed to more clearly disclose the structure.

Figure 2 is a rear elevational view of the tool holding block.

2

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary perspective view showing the arrangement at the rear end of one of the tool seating grooves.

Figure 5 is a view similar to Figure 4 showing the clamping hold-down member in position over a tool seating groove.

Referring now more in detail to the drawings, the tool holding block generally indicated at B is removably secured by any suitable means, such as the socket head cap screws 6, to the carriage C of a lathe, the bed of which is partially shown at L. The tool holding block B comprises a main portion 8, a raised top portion 10 and a rearwardly projecting back portion 12. The main portion 8 of the block is formed with a plurality of spaced tool seating grooves 14 in its upper surface extending transversely through the block beneath the raised top portion 10. The grooves are spaced to suit the requirements of the particular turning operation to be performed and are adapted to receive, preferably in close fitting relation, the shanks 16 of cutting tools 18 which are shown in Figures 1 and 3 as in position to work on the axle A. The cutting tools are adjustably clamped in the grooves 14 by means now to be described.

Slots 20 extend through the raised top portion 10 of the tool block in overlying relation to and communicating with the tool receiving grooves 14 and are adapted to slidably receive tool clamping bars 22. The slots and clamping bars in the instance shown are of inverted T-shape in cross-section whereby they mutually cooperate in retaining the clamping bars against displacement from the slots except by sliding them out endwise, as will clearly be seen from a study of Figure 5. However, this is merely by way of illustration as it will be obvious the slots and clamping bars may be of various different corresponding cross sectional forms, such for example as diamond or inverted V-shape, in cooperative engagement to slidably retain the bars in the slots against removal except in an endwise direction. Hold-down adjusting screws 24 are threaded through the tool clamping bars 22 at spaced intervals as shown in Figure 1 whereby the tool shanks 16 may be adjustably but firmly clamped in the grooves 14, the pressure exerted between the screws and tool shank forcing the bars 22 into cooperative bearing engagement with slots 20 to firmly clamp the bars in the slots. The rearwardly projecting back portion 12 of the tool block is similarly provided with a series of spaced slots 26 of inverted

T-shape in cross-section adapted to endwise slidably receive a plurality of correspondingly shaped back-up plates 28. The slots in the rearwardly projecting block portion 12 and the back-up plates slidably received therein are also shown as inverted T-shaped in cross-section, similar to the hold-down clamping bar arrangement previously described. Again this is merely for the purpose of illustration, since it will be apparent these parts may take various different corresponding cross-sectional shapes. Extending through each of the back-up plates 28 is an adjustable jack screw 30 adapted to bear against the rear end of the tool shank 16, the pressure between the screw and back-up plate serving to rigidly clamp the latter in the slot. Stops 32 are provided extending from the rear face of the tool block 8 beneath the slots 26 in the projecting portion 12 to limit vertical downward movement of the back-up plates 28 in the slots 26.

Projecting forwardly from the main portion 8 of the tool block B beneath and in reinforcing relation to the cutting heads of each of the tools 18 are buttressing plates 34. These buttressing plates 34 act to relieve much of the heavy pressure on the cutting face of the tools during the turning operation, thus making it possible to use a relatively small sized tool head resulting in only the minimum amount of expensive tool steel being required which, as will be obvious, reduces the cost of the cutting operation. Running through the tool block and connected with an outside source of cooling fluid (not shown) is an interior passage 36 provided with a plurality of branches 38 extending therefrom and terminating at points immediately adjacent the cutting faces of the tools 18. By this means, the coolant is conducted from its source through the main passage 36 and into the several branch passageways 38, thus insuring a constant flow of the coolant in contact with the cutting tools and eliminating cumbersome and bulky exterior tubing or piping ordinarily employed for this purpose.

It will be seen from the foregoing description that an improved multiple tool holding block has been provided in which each of the tools 18 may be easily and quickly adjusted by simply loosening the hold-down screws 24 and adjusting the jack screws 30 without disturbing the setting of the other tools. To remove any particular tool from the block for replacement it is only necessary to loosen the hold-down screws 24 and jack screw 30, and after sliding out the back-up plate 26, the tool 18 is free to slide out of the groove 14 in a rearwardly endwise direction. The new tool replacement is easily and quickly insertable by sliding it forward endwise into the groove 14. It will be seen that the adjustment or replacement may be accomplished separately and independently without in any way disturbing the accurate adjustment of the other tools. Further, as is frequently necessary, should it be desired to inspect and clean any one particular groove 14 prior to the insertion of the replacement tool, the groove is readily accessible by sliding the clamping bar 22 rearwardly as a unit from the block and similarly sliding the back-up plate 28 as a unit from the slot 26, thus fully exposing the groove for this purpose. It will be seen that any one particular tool seating groove may be completely exposed for visible inspection and cleaning when necessary without in any way disturbing the clamping members or setting of the tools seated in the other grooves of the block.

The inventon may be modified in various respects as will occur to those skilled in the art and the exclusive use of all such modifications as come within the scope of the appended claims is contemplated.

What is claimed is:

1. In a tool holding block for lathes having a tool seating groove extending therethrough between the sides and beneath the top face thereof, said block being formed with a slot in its top face overlying and communicating with said tool seating groove, a tool clamping bar adapted to be endwise slidably inserted in and removed from said slot covering the top of said groove, said clamping bar and slot having complementary cooperatively engaging side and wall portions, respectively, retaining the bar against displacement from said slot except in an endwise direction, and adjustable means carried by the clamping bar for clamping the shank of a tool in said groove and the clamping bar in said slot.

2. In a tool holding block for lathes having a groove extending therethrough between the sides and beneath the top face thereof adapted to receive the shank of a cutting tool, said block being provided with a first slot in its top face overlying and communicating with said tool receiving groove, a tool clamping bar endwise slidably insertable in and removable from said slot covering the top of said groove, said clamping bar and slot having complementary cooperatively engaging side and wall portions, respectively, retaining the bar against displacement from said slot except in an endwise direction, means carried by the clamping bar for adjustably clamping the shank of a tool in said groove, said block having a second slot therein extending vertically adjacent the rear end of said groove communicating therewith, a back-up plate slidable vertically endwise into and out of said last-named slot, said back-up plate and slot having complementary interengaging side and wall portions, respectively, retaining the plate against removal from said slot except in an endwise direction, and means carried by said back-up plate for applying pressure against the end of the tool shank clamped in said groove.

3. In a lathe tool holding block having a tool seating groove extending therethrough and a raised top portion above said groove, said block being provided with an open top slot in the face of its raised top portion overlying and communicating with said tool seating groove, a tool clamping bar slidable endwise into and out of said slot, said clamping bar and slot having complementary interengaging side and wall portions, respectively, retaining said bar against removal from the slot except in an endwise direction, and means carried by the clamping bar for exerting pressure against the shank of a tool seated in said groove to adjustably clamp the same therein.

4. The substance of claim 3 wherein said tool holding block has a vertical slot therein adjacent the rear end of said groove in communication therewith, a back-up plate slidable vertically endwise into and out of said slot, said plate and slot having complementary interengaging side and wall portions, respectively, retaining the plate against removal from said slot except in an endwise direction, and means carried by the back-up plate for applying pressure against the end of the tool shank clamped in said groove.

5. The substance of claim 3 wherein said tool holding block is provided with a rearwardly projecting back portion having a vertical slot therein adjacent the rear end of said groove communi-

cating therewith, a back-up plate slidable vertically endwise into and out of said slot, said plate and slot having complementary interengaging side and wall portions, respectively, retaining the plate against removal from said slot except in an endwise direction, and means carried by the back-up plate for exerting pressure against the end of the tool shank clamped in said groove.

6. In a lathe tool holding block having a rearwardly projecting back portion and a tool seating groove extending through the block adapted to receive the shank of a cutting tool, means for adjustably clamping the tool shank in said groove, said block being formed with a vertical slot in its rearwardly projecting portion adjacent the rear end of said groove and communicating therewith, a back-up plate slidable vertically endwise into and out of said slot, said plate and slot having complementary interengaging side and wall portions, respectively, retaining the plate against displacement from said slot except in an endwise direction, means carried by the back-up plate for exerting pressure against the end of the tool shank clamped in said groove, and a stop extending from said block below said vertical slot in said rearwardly projecting portion for limiting vertical downward movement of the back-up plate in said slot.

7. In a lathe tool holding block having a tool seating groove extending therethrough for receiving the shank of a cutting tool, said block being formed with a slot in a face thereof extending parallel to and communicating with said tool receiving groove, a tool clamping bar slidable endwise into and out of said slot, said clamping bar and slot having complementary interengaging side and wall portions, respectively, retaining said bar against removal from the slot except in an endwise direction, means carried by the clamping bar adjustably clamping the shank of a tool in said groove, a tool buttressing plate extending forwardly from said block beneath and in reinforcing relation to the cutting face of the tool clamped in said groove, said tool holding block being provided with a rearwardly projecting back portion having a vertical slot therein adjacent the rear end of and communicating with said groove, a back-up plate slidable vertically endwise into and out of said slot, said plate and slot being of such cross sectional shape as to cooperate in retaining the plate against displacement from said slot except in an endwise direction, and means carried by the back-up plate for exerting pressure against the end of the tool shank clamped in said groove.

8. In a lathe tool holding block having a raised top portion and a rearwardly projecting back portion, said block being formed with spaced tool seating grooves extending through its main portion in the top face thereof for receiving the shanks of cutting tools, said raised top portion of the block having spaced slots of inverted T-shaped in cross section in the face thereof overlying and communicating with said grooves, tool clamping bars of corresponding cross-section slidable endwise into and out of said slots, hold-down screws extending through said clamping bars engageable against the shanks of the tools to adjustably clamp them in said grooves, said rearwardly projecting back portion of the block having spaced vertical slots of inverted T-shape in cross section in the face thereof overlying the rear end of and communicating with said grooves, back-up plates of corresponding cross-section slidable endwise into and out of said vertical slots, and jacking screws extending through said back-up plates engageable against the end of the tool shanks clamped in said grooves.

9. The substance of claim 8 wherein stop means are provided extending from said tool holding block beneath the vertical slots in said projecting back portion thereof to limit vertical downward sliding movement of the back-up plates in said slots.

10. The substance of claim 8 wherein tool buttressing plates extend forwardly from said tool holding block beneath and in reinforcing relation with the cutting faces of the tools clamped in said grooves.

11. The substance of claim 8 wherein said tool holding block is provided with interior passages extending therethrough for conducting a cooling fluid to the cutting faces of said tools.

EDMUND A. WATSON.
GEORGE L. PRESTON.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
160,161	Clay	Feb. 23, 1875
1,227,457	Langan	May 22, 1917
1,372,726	Sloan	Mar. 29, 1921
1,626,953	Muller	May 3, 1927
2,129,815	Bullard	Sept. 13, 1938
2,475,049	Premo	July 5, 1949

FOREIGN PATENTS

Number	Country	Date
390,545	France	July 3, 1908