Jan. 30, 1934. J. M. PALMER 1,945,291

TOOL HOLDER

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Fig. 1

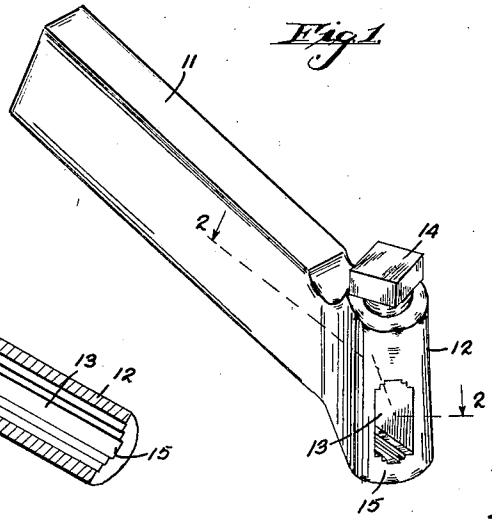


Fig. 2.

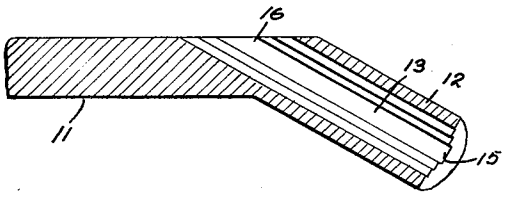


Fig. 14.

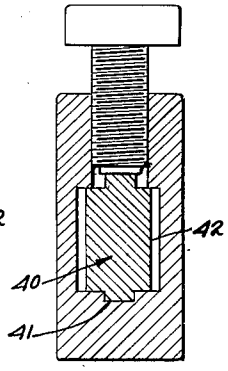


Fig. 13.

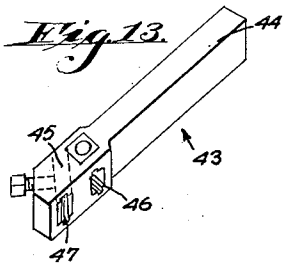


Fig. 3.

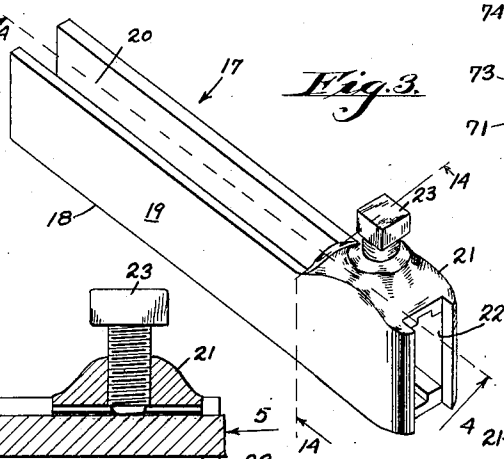
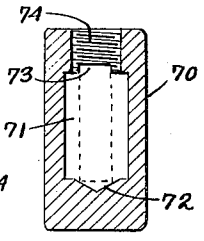


Fig. 16.



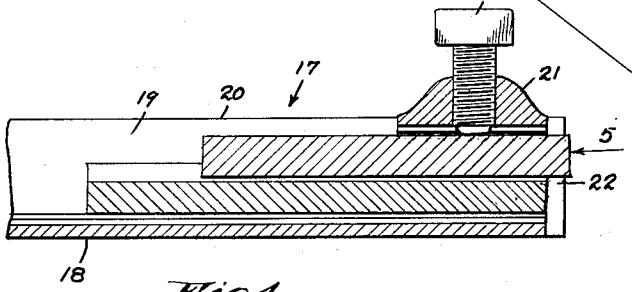


Fig. 4.

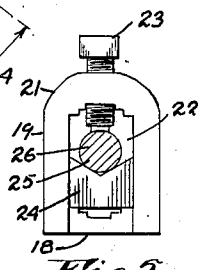


Fig. 5.

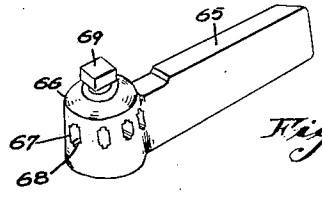


Fig. 15.

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Fig. 6.

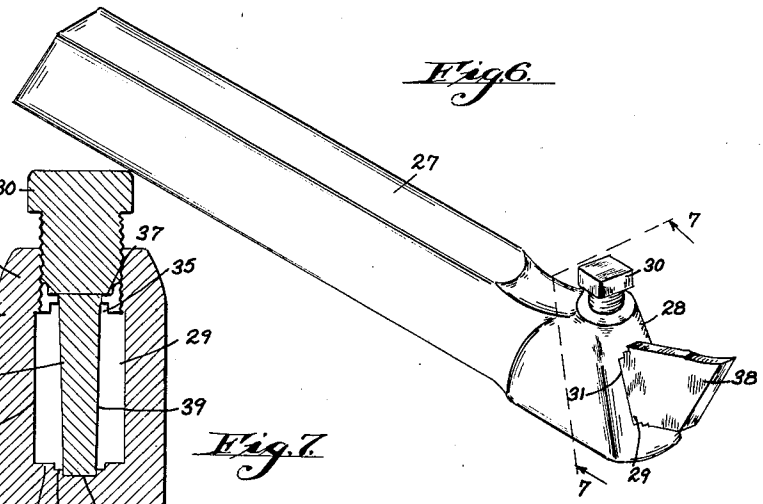
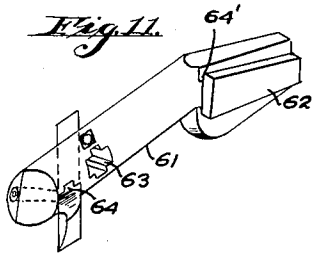


Fig. 7.

Fig. 11.



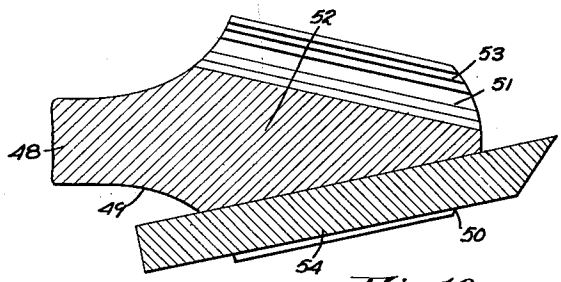
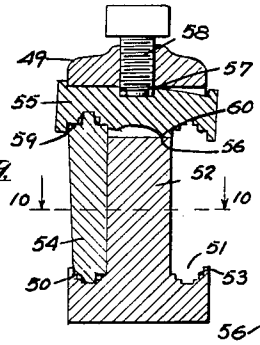


Fig. 10.

Fig. 9.



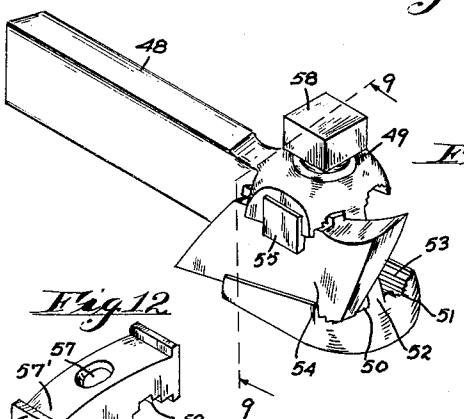


Fig. 8.

Fig. 12.

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UNITED STATES PATENT OFFICE

1,945,291

TOOL HOLDER

John M. Palmer, Los Angeles, Calif.

Application March 12, 1930. Serial No. 435,217

1 Claim. (Cl. 29—96)

The type of tool holder to which my invention pertains is particularly adapted for use in boring mills, lathes, shaping and other similar machines in which a fixed tool is held in a holder.

An object of my invention is to make the holder so that it is adapted for the mounting and holding of large heavy tools or tools successively graduated in size to comparatively thin narrow tools of a cutting off type; the tools being locked in place by means of a set screw or other similar device. To effect this arrangement I form the opening in the holder for the tool with preferably a rectangular opening of full size to accommodate the tool of largest cross section for heavy work. Through this longitudinal opening I form a succession of upper and lower grooves, these grooves being of varying width and the narrowest groove being formed in the next largest groove and extending deeper so that several or more sizes of tools may be mounted in the same holder and the smallest grooves being designed to carry comparatively thin cutting off tools or those for similar types of work. My holder may be built in a type for single tools and to have such tools in alignment with the holder or to have them offset or inclined to the right or to the left, or if desired to have a double mounting which may accommodate right and left hand tools.

Another object and feature of my invention is the use of filler blocks or adaptors which may be utilized in the holders to fill up the space so that comparatively small tools such as boring bars may be clamped in place. With the double jaw holders I provide a single slidable block which is engaged by the set screw and this block caused to engage the cutting tools.

My invention is illustrated in the accompanying drawings, in which,

Figure 1 is a perspective view of a single type of holder offset in one direction;

Fig. 2 is a horizontal setion of Fig. 1 on the line 2—2 in the direction of the arrows;

Fig. 3 is a perspective view of another type of holder suitable for a boring mill, in which the holding jaw is in alignment with the holding bar;

Fig. 4 is a longitudinal section of Fig. 3 on the line 4—4 in the direction of the arrows;

Fig. 5 is an end elevation in the direction of the arrow 5 of Fig. 4;

Fig. 6 is a perspective view of another type of holder with the tool in alignment with the bar of the holder;

Fig. 7 is a section on the line 7—7 of Fig. 6 in the direction of the arrows;

Fig. 8 is a perspective view of a tool holder having double jaws for holding left or right hand tools;

Fig. 9 is a vertical section on the line 9—9 of Fig. 8 in the direction of the arrows;

Fig. 10 is a horizontal section on the line 10—10 of Fig. 9 in the direction of the arrows;

Fig. 11 is a perspective view of a boring tool suitable for use in the jaws of the construction of Figs. 8, 9 and 10.

Fig. 12 is a perspective view of the clamping block used in the construction of Figs. 8 and 9;

Fig. 13 is a perspective view of another type of boring tool;

Fig. 14 is a transverse section of one of the tool heads such as on the line 14—14 of Fig. 3.

Fig. 15 is a modification of a holder having openings crossing each other.

Fig. 16 is a section through a modified form of holder.

Referring to the drawings, in Figs. 1 and 2 I illustrate a tool holder bar 11 having a tool head 12 with an opening 13 therethrough to accommodate various cutting tools and a set screw 14 extending downwardly in the head to bear on the tool. In this construction the opening 13 has an outer end 15 at the head for the working end of the tool and an opening 16 at the bar section for the rear end of the tool.

In Fig. 3 the tool bar 17 is made in the form of a channel with a base 18 and two side walls 19 and open at the top 20, having a head 21 with an opening 22 therethrough, the opening entering into the channel and having a set screw 23 extending through the head into the opening. In Figs. 4 and 5 I illustrate this holder as having an adaptor block 24 with a V-shaped upper surface 25 and with a boring bar 26 fitted therein and engaged by the set screw.

In Fig. 6 I illustrate a holder bar 27 with a head 28 and a hole or socket 29 formed in the head to accommodate the tool end with a set screw 30. In all of the constructions above mentioned the opening in the head may be considered as having a large opening bounded by the inside surfaces 31 on the sides and the bottom surface 32 with the small top surface 33. On the bottom and the top there is an intermediate groove 34 at the bottom and 35 at the top, these grooves extending outwardly at the top and bottom beyond the surfaces 32 and 33. In these grooves 34 and 35 there is illustrated a central or smaller groove 36 at the bottom and 37 at the top. The groove at the top is wider than the groove at

the bottom and these extend beyond the surfaces of the grooves 34 and 35.

The object of the smallest grooves 36 and 37 is to accommodate a thin tool 38 which is illustrated as having a downward taper 39 and is held in place by the set screw, this tool being thin, is suitable for a cut-off tool. A larger tool may be inserted so as to fit in the groove 34 and if desired the grooves 35 may be slightly wider than the grooves 34 so that the tool will have a slight downward taper and in which case there is preferably a space underneath the tool at the groove 36 and also a space at the top. The largest tool fits on the main surface 32 and may if desired be of sufficient size to have a sliding fit against the sides 31. The tops of all the tools are engaged by the set screw.

In some cases a tool is required to be used which may be considered an odd size and does not either fit in the large openings or in a pair of the grooves. Such an off sized tool is indicated by the numeral 40 (note Fig. 14) and in this case the tool has ribs 41 on the top and bottom which fit in the groove in the top and bottom of the head of the tool holder. In this case it will be noted that the sides 42 of the tool are not sufficiently wide apart to fill the whole opening and that the upper and lower surfaces of the tool bear on the upper and lower main surfaces of the opening in the tool head.

In the construction of Fig. 13 a boring tool is illustrated designated generally by the numeral 43. This has a bar section 44 with a head 45. The head has an opening 46 extending diametrically thereacross and an opening 47 at an angle. Each of these openings is provided with upper and lower grooves and various tools may be clamped in these openings, being secured in place by the set screws. Thus tools having either ribs or splines in the upper and lower surface or narrow tools may be utilized in the boring bar in place of full size tools.

In the construction illustrated in Figs. 8 through 10 the tool is illustrated as having a holder bar 48 with a head 49 having double openings 50 and 51 separated by a central or web section 52. The web section is tapered so that the openings converge. These openings have no closure on one side so that the sides of the tools held therein are exposed but are illustrated as provided with a plurality of upper and lower grooves 53, these being similar and adapted to accommodate narrow tools or tools having ribs on their upper and lower surface or both, it being this last construction which is specifically illustrated at Figs. 8 and 9, with the body of a tool 54 received in the largest groove 53 and having a rib such as previously described received in one of the smaller grooves.

A tool 54 is illustrated as secured to one side of the holder. The tool is gripped by a clamping block 55 which has flanged ends 56 maintaining the block centered in the head 49. There is a socket 57 to receive the set screw 58. The block has a plurality of grooves 59 to accommodate a tool of the full width of the largest groove or to accommodate tools of lesser width or those with a rib on the upper edge, it being the last construction which is specifically illustrated at Figs. 8 and 9, with the body of tool 54 received in the largest groove 59, and having a rib such as previously described received in one of the smaller grooves. When the set screw is forced downwardly, an inside edge 60 of the block engages one of the upper corners of the web 52. The clamping block then acts on this corner as a fulcrum and bears down on the tool, thus holding the tool in position in the opening on one side of the head. It will be understood that right and left-hand tools may be selectively clamped at the respective sides of the head and these tools and these may be of varying sizes.

In Fig. 11 I illustrate a boring bar 61 which is for the most part cylindrical and has a block 62 attached to one side; this block being adapted to fit in one of the openings in the head of Fig. 8. This construction is illustrated with a transverse opening 63 with a diagonal opening 64; these openings each having grooves to accommodate tools of different sizes.

In Fig. 11 I illustrate the boring bar 61 as having a longitudinal groove 64', such groove being for the purpose of accommodating the flange end of the clamping block 55.

Referring to Fig. 12, a feature of the clamping block is that the upper surface 57' slopes downwardly from the center towards each side. This allows a freer rocking action with the clamping bar than if it were straight and on the top.

In Fig. 15 I illustrate a type of holder having a holding bar 65 with a head 66. This head has a plurality of openings 67 which cross each other at the center and each of these openings is provided with upper and lower grooves 68. There is a set screw 69 in the top of the head. A head of this type is suitable for inserting cutters which are substantially the full size of the openings, or narrow cutters which fit in the upper and lower grooves or cutters which are of intermediate width and have a rib or tongue on the top and bottom which fit in the grooves; the cutters being held in place by the set screw. With this type of head on a holding bar a cutter may be positioned substantially in alignment with the bar or at right angles thereto, or at an intermediate angle or when the cutter is inserted in one of the openings adjacent the holding bar, the cutting edge of the tool may extend somewhat towards the holding bar and thus may be used to undercut work. It is obvious that the openings 67 may be made with a plurality of grooves, the grooves being of successively greater depth.

In Fig. 16 I show a cross section of a holder head 70 having a large opening 71 therein. The bottom of this opening is provided with a V-shaped groove 72 and the top with a rectangular shaped groove 73. There is a threaded opening 74 for a set screw to clamp the tool held in this holder. With this type of construction it is more or less immaterial as to the exact width of the tool as the lower edge of the tool accommodates itself in the V-shaped groove 72. The upper edge of the tool may fit in the groove 73 but this fit does not need to be a close fit as the set screw clamps the tool sufficiently tight against the V-shaped groove in the bottom of the large opening.

The important characteristics of my invention are the openings in the tool holder are for thick or thin flat bits or cutter blades. These openings in the tool holder are all female openings and such openings at the bottom may be provided with an angle shaped guide or groove such as illustrated at 72 in Fig. 16 and in defining this as a V-shaped groove it is to be understood that the angle may be an obtuse angle if desired. The upper inside surface of the openings may be a groove with square angles whereby the opening with the grooves may accommodate wide tools or tools having a thin blade and the tools

fitting in the angular guide grooves such as 72 do not need to have a tongue or rib, shaped to fit in the grooves, but may have a flat base as illustrated dotted in Fig. 16 and the upper edge of the tool fits in the squared groove. The tools may be held in the head at any suitable manner.

The tools or blades are all male blades and these may be of such width as to fill substantially the whole opening or fit in the different grooves or guide faces at the top and bottom of the tool head. These guide faces or grooves, preferably arranged on the inside bottom and top surface of the opening, may also if desired be formed as right angles and there may be a plurality of these, that is one groove being inside of another, as illustrated in connection with Figs. 7 and 9. These grooves may be shaped with corresponding grooves, narrower at the bottom than at the top to accommodate tools which taper in shape from the top to the bottom or, if desired, they may be the same width. These grooves also will accommodate bits or blades or cutters having a tongue or rib on their upper or lower edge or both, the said rib fitting into the grooves with the main portion of the tool extending beyond the shoulders of the grooves somewhat as shown in connection with Fig. 14. It is to be understood that the bits or tools may be held in the tool head in any suitable manner, but the usual procedure is to have a set-screw.

It will be noted, by my construction, that the tool holder has openings with lower and top surfaces adapted to engage the bottom and top of the tool and to guide such tool in being pushed in and withdrawn from said openings. In addition, these upper and lower surfaces are provided with one or more grooves and each groove may be considered as having a horizontal ledge and a vertical side surface, the deepest grooves being centered in the lesser grooves. The side surfaces of these grooves form a guide for the side surfaces of narrow tools and the bottom surface of the bottom groove and the upper surface of the upper groove receive the bottom edge and the top edge of the tools, whereby the tools are definitely guided. In conjunction with these grooves and these top and bottom surfaces and the opening, there is provided a means for clamping the tools. Also, in my construction, the top and bottom surfaces of the opening are continuous from one end to the other; the horizontal and vertical surfaces and grooves are also continuous from one end to the other.

Various changes may be made in the principles of my invention without departing from the spirit thereof as set forth in the description, drawings and claim.

I claim:

In combination, a tool holder comprising an integral rigid head having an opening therein, a longitudinally extending groove in each of a pair of opposite sides of the opening, said grooves being of uniform width in the direction of their depth, said pair of opposite sides of the opening each comprising surfaces extending laterally from the respective sides of the grooves, a tool shank adapted for reception in the opening, a projection on each of a pair of opposite sides of the tool shank, said projections being of uniform width in the direction of their projection from the tool shank and being adapted for sliding fit in the grooves, the tool shank having surfaces extending laterally from the respective sides of the base of each projection for engagement with the laterally extending surfaces of the opening, and a set screw carried by the head and extending into one of the grooves, the shank projection which is received in said groove having a surface adapted for abutment by the set screw for clamping the tool shank against the opposite grooved side of the opening.

JOHN M. PALMER.