June 12, 1951 H. HOFFART 2,556,723

TOOLHOLDER

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Fig. 1

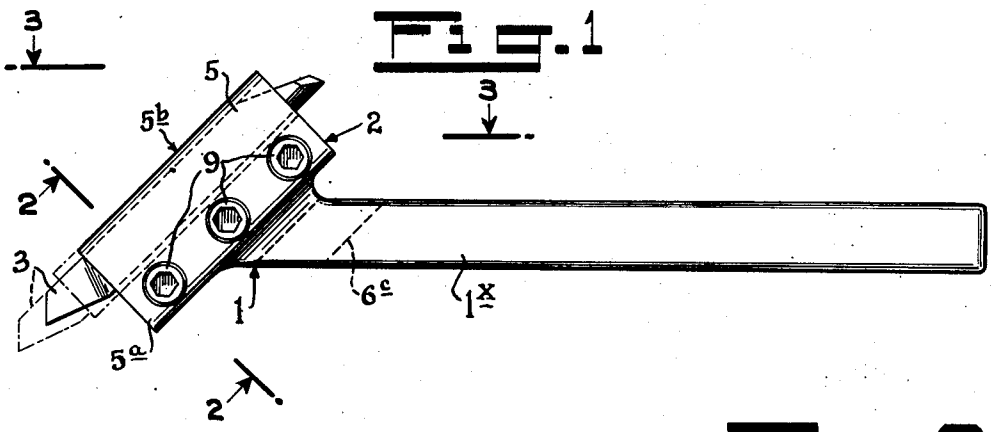


Fig. 2

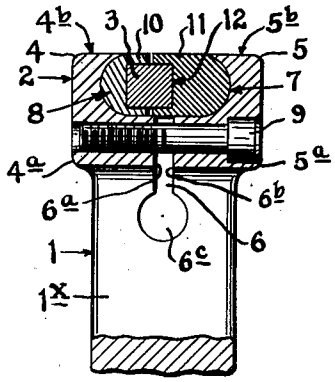


Fig. 4

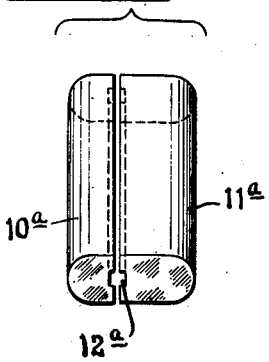


Fig. 3

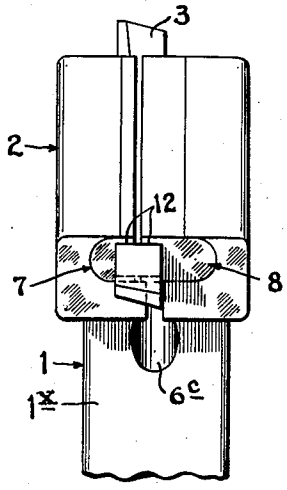


Fig. 5

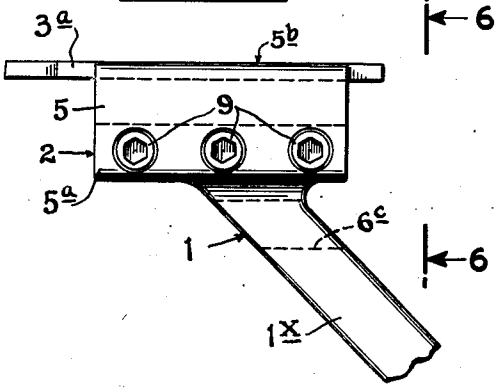
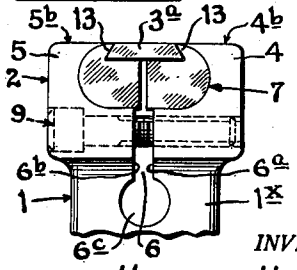


Fig. 6



INVENTOR.
HIPOLIT HOFFART
BY
Joseph F. O'Brien
ATTORNEY

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Fig. 7

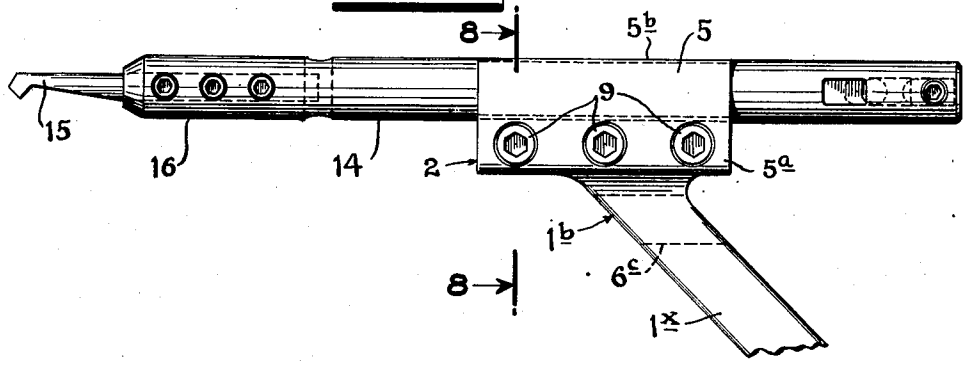


Fig. 8

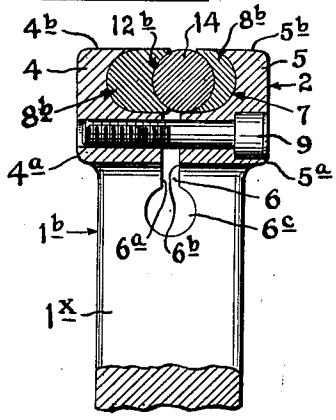


Fig. 9

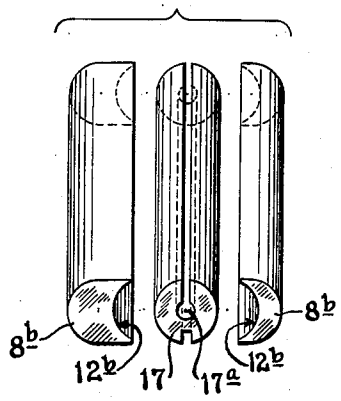
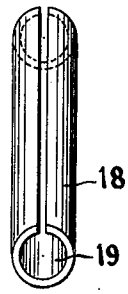


Fig. 10



INVENTOR.
HIPOLIT HOFFART
BY
Joseph L. O'Brien
ATTORNEY

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TOOLHOLDER

Hipolit Hoffart, New York, N. Y.

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4 Claims. (Cl. 29—96)

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This invention relates to improvements in cutting-tool holders of the split-head clamping type and particularly to such tool holders for holding cutting tools, such as bits and bit-holding rods for use on lathes and other metal-working machines.

Heretofore certain types of cutting-tool holders have employed fixed bit-seating sockets having substantially the configuration of the bit or other tool with a bit-adjusting screw extending transversely of the socket to engage and lock the bit therein, and other tool holders have employed a split-head which is provided with paired clamping jaws having between them a tool-seating socket and these clamping jaws, when brought together by a clamping screw, directly engaged and clamped a bit or tool therein. Also in some cases these split-head clamping holders were used in combination with an adjusting screw or other means at the end of the tool for adjusting, regulating or preventing the longitudinal movement of the tool in relation to the clamping jaws. In all these types of cutting-tool holders a head and a handle were required for each size and type of bit or cutting-tool.

One of the objects of this invention is to avoid the requirements of a head and handle for each cutting-tool; to economize material used in cutting-tool holders and to reduce the cost of such cutting-tool holders and tools by providing a split-head cutting-tool holder which is adapted to effectively and securely hold any one of a multiple number of bits of varying shapes and sizes.

Another object of my invention is to produce a split-head cutting-tool holder having a primary split clamping member or split-head provided with a socket of a conformation adapted to seat and upon adjustment of a clamping screw to effectively clamp therein any one of a series of auxiliary clamping members separable from the split head and each comprising a pair of bit-engaging clamping jaws adapted, upon manipulation of said clamping screw, to clamp within a single head any one of a multiple number of such pairs of clamping jaws provided with bit-engaging seats of a conformation that may be varied with the shape and size of the bit or cutting-tool to be engaged therein.

Another object of my invention is to provide a primary split clamping head with a split socket having a seat with a flat bottom extending to opposite sides of the split and at right angles thereto, and preferably provided with rounded end walls, combined with a plurality or series of auxiliary clamping jaws seated within and closely

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fitting said head socket so that any movement of the head parts will be transmitted to said auxiliary clamping jaws and preferably having rounded end surfaces conforming in contour with the rounded walls of said seat, said pair of auxiliary clamping jaws having tool-engaging faces preferably disposed perpendicularly to said flat bottom and said faces are provided with tool-engaging sockets of varying shapes and sizes to fit varying sizes and shapes of cutting tools.

Another object of my invention is in a device of the character specified to utilize a plurality of clamping screws to procure an increased and secure clamping of the tool within the primary and auxiliary clamping members and to avoid the necessity of special adjusting screws which directly engage the cutter or bit.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to co-act and cooperate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawings, in which:

Fig. 1 is a view in side elevation of a tool-holder embodying my invention;

Fig. 2 is a section on the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a rear-end elevation of the tool holder shown in Figs. 1 and 2;

Fig. 4 is a view in perspective of the separable bit-engaging internal jaws removed from the tool-holder shown in Figs. 1 to 3;

Fig. 5 is a view in side elevation of a holder embodying a modified form of bit-engaging separable jaws;

Fig. 6 is a fragmentary end elevation viewed on the line 6—6 of Fig. 5;

Fig. 7 is a view in side elevation showing my tool-holder employed with round bar bit-retaining members;

Fig. 8 is a section on the line 8—8 of Fig. 7 looking in the direction of the arrows;

Fig. 9 is a view in perspective of a modified form of my invention in which a bushing is employed for a round tool of small diameter; and

Fig. 10 is a view of a bushing employed in combination with my separable gripping jaws for a rod of larger diameter.

Referring now to these drawings which illustrate a preferred embodiment of my invention, 1 indicates a cutting-tool holder embodying a shank or handle 1^x and a primary clamping mem-

ber comprising a split head or clamp-body 2 which in the form of my invention shown in Fig. 1 is integral with the shank or handle 1 and the angular arrangement between the handle and head is such as to hold a tool 3 at a conventional working angle. The said head or holder body 2 is split into parts 4 and 5 by a relatively wide slit 6 and is provided with a socket 7 formed partially in each of the split-head parts 4 and 5 and adapted to snugly receive an auxiliary split clamping member 8, which comprises a pair of clamping jaws 10 and 11 having a relatively narrow slit or opening between tool-engaging faces thereof, which are conjointly provided with a seating and engaging socket 12 for the cutting tool 3.

The said slit 6 is provided at its lower terminal end with a substantially circular bore 6^c to permit movement of the surfaces 6^a and 6^b in parallel relationship with each other and thus to enable movement of the parts 4 and 5 in true parallel relationship to each other upon manipulation and movement of a clamping screw or series of screws 9.

In accordance with the preferred embodiment of my invention, the socket 7 is preferably disposed centrally in the split-head and has a flat bottom surface or wall preferably disposed at a right angle to the slit 6 and open at its upper end to permit ready insertion and engagement therein of a multiple number of said auxiliary clamping members or split tool-engaging jaws such as 10 and 11. The slit or opening between these jaws may be positioned at any suitable location along the cross-sectional width of the jaws and the tool-seating sockets 12 therein may be of any desired shape in order to effectively engage a tool upon manipulation of the screws 9, and this socket may furthermore be positioned at any suitable location within the split tool-engaging jaws 10 and 11. As shown in Figs. 2 and 3, the jaws have a socket and tool positioned to the left of the center, but it will be obvious that other jaws may provide a socket at the center or to the right of the center as may be desired for any particular piece of work.

In the preferred embodiment of my invention, the clamping screws 9 are arranged in a series of three and disposed in alignment in shoulder portions 4^a, 5^a beneath the primary socket, and the screws may be manipulated successively or conjointly. By the arrangement of a series of screws, I am enabled to transmit an increased and evenly-distributed clamping stress to the auxiliary member and to the cutting tool mounted therein.

In Fig. 4 I have shown a pair of my auxiliary clamping jaws 10^a, 11^a removed from the socket of primary clamping head or body. These jaws have a smaller tool-seating socket 12^a than is shown in Figs. 1 to 3 inclusive and it will be obvious that the socket 12^a may have any desired shape and may be placed in any desired position within the clamping jaws, and also that the opening between these jaws may be positioned at the middle or opposite side of the clamping jaws. In other respects, the auxiliary clamping jaws of Fig. 4 are similar to those shown in Figs. 1 to 3.

It is desirable to form the socket 7 of substantially elliptical conformation and to provide auxiliary clamping jaws of substantially similar elliptical conformation, and in such a construction the socket 7 will have a substantially flat bottom, the parts of which will be flush with each other across the slit 6 and said flat bottom is preferably disposed at a right angle to said slit 6. Such a flat bottom enables a true sliding movement thereon of similarly-shaped flat bottom surfaces of the auxiliary clamping member or jaws.

It is also desirable to provide an auxiliary clamping member or jaw assembly which will closely fit the said socket and will have a height to cause its upper surface to be flush with the upper surfaces 4^b, 5^b of the parts 4 and 5 of the primary clamping element. This positioning of the auxiliary clamping members or jaw assembly will enable said top surface to have a tool-engaging surface seat therein within which a cutting tool may be mounted, and in Figs. 5 and 6 I have shown a form of tool holder in which a tool 3^a is mounted in dovetailed grooves 13 extending to the outer surface of the jaws of the head so as to position the cutting tool along said upper surface. In other respects, the tool holder shown in Figs. 5 and 6 is similar to that hereinabove described in relation to Figs. 1 to 4.

My tool is also adapted for the holding of tools having cylindrical shanks or holders which permit extension of the cutting tool within a confined space, and in Figs. 7 to 10 I have illustrated a form of my cutting-tool holder having a jaw-assembly provided with a tool-engaging socket formed of rounded jaw sections adapted for the engagement therein of a round or cylindrical rod. Thus, in Figs. 7 and 8 I have shown a holder 1^b which is in all respects similar to the holder of Figs. 1 to 3 except that the auxiliary clamping member or jaw assembly has the tool-holding socket 12^b provided with rounded walls instead of walls of straight, angular, polygonal or dovetail conformation, and this socket 12^b has mounted therein a tool-holding rod 14 in which is mounted in a suitable conventional manner a cutting tool 15 by the use of a chuck 16. When, however, a tool with a cylindrical shank or holder is mounted in my cutting-tool holder a socket such as 12^b is formed with round walls in the auxiliary clamping member or jaw assembly and a single auxiliary clamping member or jaw assembly 8^b may be utilized for round rods of varying diameters from the smallest up to the diameter of the jaw socket employed by inserting bushings within said socket, and in Fig. 9 I have shown an auxiliary clamping member or jaw assembly 8^b removed from the head and arranged in juxtaposition to a bushing 17 having a bore or tool-holding socket 17^a of very small diameter, while in Fig. 10 I have shown another bushing 18 having a bore or socket 19 of an in-between diameter.

In the preferred form of my invention illustrated, the socket and the jaw assembly are elliptical in conformation and the top and bottom sides of the ellipse are equal, so that with certain types of cutters a right-hand cutter or one having the cutting tool positioned to the right of the center may, by turning the auxiliary clamping member or jaw assembly upside down, be converted into a left-hand cutter with the tool positioned at the right of the center.

Having described my invention, I claim:

1. A tool holder comprising, in combination, a clamping head composed of a metal block having a tool-holding end-face from which a cutting tool is adapted to project and provided with a longitudinally-disposed primary socket communicating at one end with said tool-holding end-face and extending longitudinally through said block at a right angle to said tool-holding face, said block being provided at one side of

said primary socket with a longitudinal slit communicating therewith and extending to side and end faces of the block to form clamping-jaw parts extending longitudinally and movable in contracting and expanding movements which partially close and open said slit, a handle member projecting horizontally from said slitted side face of the block in parallelism with said slit and having a connecting end-portion provided with a communicating slit, an auxiliary split clamping member seated within said primary socket and having an auxiliary tool-seating socket, said auxiliary split clamping member being movable by contraction of the walls of said primary socket to engage tools within said auxiliary seating socket upon contraction thereof and being releasable from said primary clamping jaw parts upon expansion of said primary socket, and clamping-screw means passing across said slit through the two parts of said primary clamping member for contracting and expanding said primary socket to engage and release a tool in said tool-seating socket.

2. A tool holder comprising, in combination, a clamping head composed of a metal block having a tool-holding face from which a cutting tool is adapted to project and provided with a longitudinally-disposed primary socket communicating at one end with said tool-holding end-face and extending longitudinally through said block at a right angle to said tool-holding face, said block having a longitudinally-disposed socket-entrance opening communicating with said primary socket and extending to the side and end-faces of the block, said block also being provided with a contractible and expansible slit communicating with the said primary socket and extending to the side face of said block opposite to said entrance opening, said entrance opening and slit forming open and resilient clamping-jaw parts extending longitudinally and movable vertically in contracting and expanding movements which partially close and open said slit, a handle member projecting horizontally from said slitted block in parallelism with said slit and having a connecting portion provided with a slit extending longitudinally therein and communicating with the slit in said block, an auxiliary split clamping member seatable within said primary socket and having an auxiliary tool-seating socket, said auxiliary split clamping member being movable by contraction of the said clamping-jaw parts to engage tools within said auxiliary seating socket and being releasable from said primary socket upon expansion of said clamping-jaw parts, and clamping-screw means passing across said slit through the two parts of said primary clamping member for contracting and expanding said clamping-jaw parts to engage and release a tool in said tool-seating socket.

3. A tool holder comprising, in combination, a clamping head composed of a metal block having a tool-holding end-face from which a cutting tool is adapted to project and provided with a longitudinally-disposed primary socket having an entrance section disposed at the outer side face of the block, said block being provided with a contractible and expansible slit extending transversely from said primary socket to the inner side face of the block opposite to said entrance section and passing longitudinally through said

block from one end-face to the other, said slit and said primary socket dividing said block into a pair of longitudinally-disposed clamping-jaw parts movable resiliently in contracting and expanding movements toward and away from each other, a handle member connecting said clamping jaw parts, extending in parallelism with said slit and projecting horizontally from said inner face of said block intermediate the ends thereof, said handle member having a portion provided with a slit communicating with the slit in said block, an auxiliary split clamping member having a conformation fitting said primary socket and provided with an auxiliary tool-seating socket, said auxiliary clamping member being movable by contraction of the inner surfaces of said clamping-jaw parts to engage tools within said auxiliary seating socket upon contraction thereof and being releasable from said primary clamping member upon expansion thereof, and clamping-screw means passing across said slit through the two parts of said primary clamping member for contracting and expanding said primary socket to engage and release oppositely-projecting tools in said tool-seating socket.

4. A tool holder comprising a block having a longitudinally-disposed primary socket provided with an entrance section at one side face of the block, said block having a slit positioned opposite to said entrance section and extending from said socket to the opposite side face of the block, said entrance section and slit dividing said block into clamping-jaw parts, a handle member connecting said clamping jaw parts and retaining the same in expansible and contractible relationship with each other, said clamping-jaw parts having end-wall sections of curvilinear shape and provided with intermediate guiding wall sections of flat rectilinear contour extending between and merging with said curvilinear end-wall sections, an auxiliary tool-clamping member seated within said primary socket and formed of two parts having between them an auxiliary tool-seating socket, said auxiliary tool-clamping member having curvilinear and flat rectilinear guiding surfaces contacting, respectively, with the curvilinear and flat wall sections of the clamping jaws, said auxiliary clamping member being releasable from said clamping jaw parts upon expansion thereof and upon contraction being movable by said walls to engage a tool within said auxiliary tool-seating socket, and clamping-screw means passing across said slit through said clamping jaw parts for contracting and expanding the same to engage and release a cutting tool in said auxiliary tool.

HIPOLIT HOFFART.

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