June 9, 1942. W. A. PURTELL 2,285,461

SOCKETED SCREW

Filed May 26, 1939

Fig. 1.

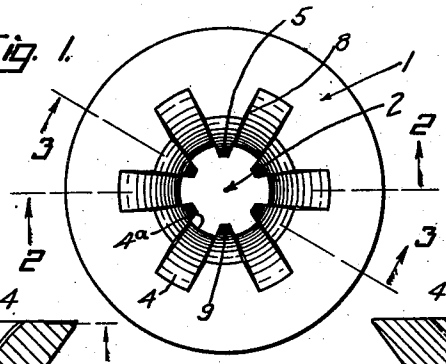


Fig. 2.

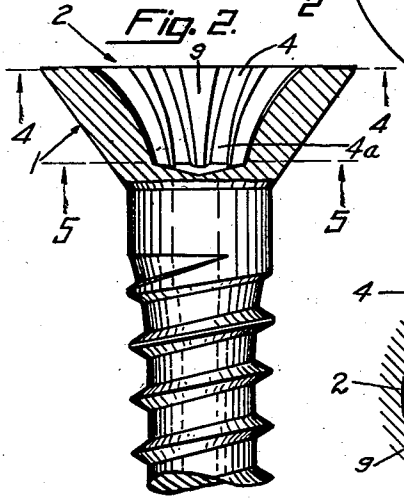


Fig. 3.

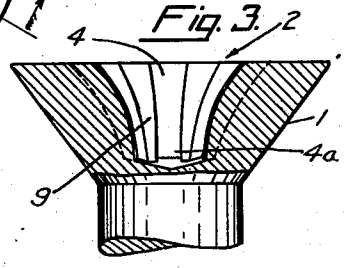


Fig. 4.

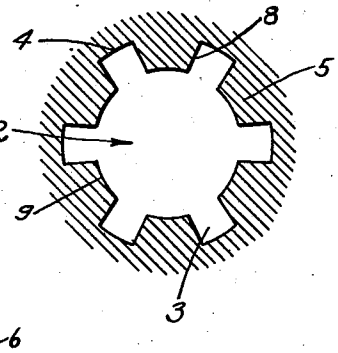
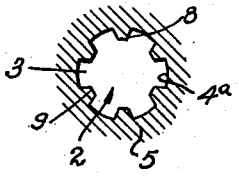


Fig. 5.



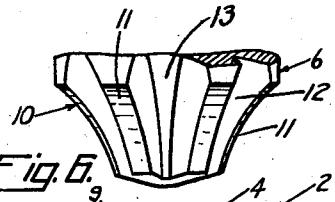


Fig. 6.

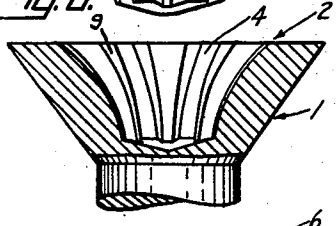


Fig. 10.

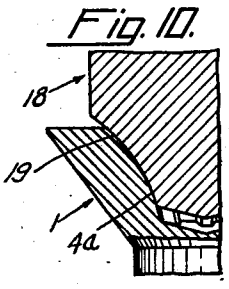
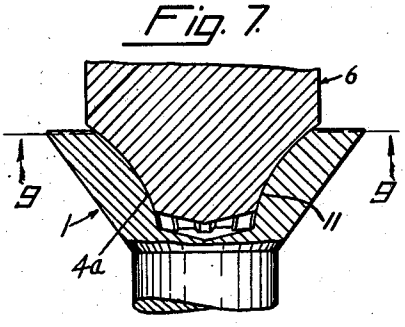


Fig. 7.



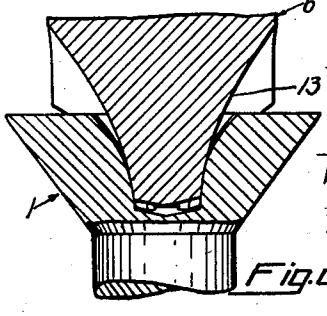


Fig. 8.

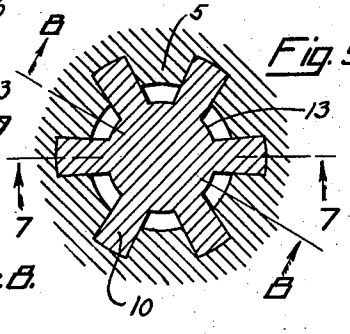


Fig. 9.

INVENTOR
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By [signature]
ATTORNEY

Patented June 9, 1942

2,285,461

UNITED STATES PATENT OFFICE

2,285,461

SOCKETED SCREW

William A. Purtell, West Hartford, Conn., assignor to The Holo-Krome Screw Corporation, a corporation of Connecticut

Application May 26, 1939, Serial No. 275,903

9 Claims. (Cl. 85—45)

My invention relates to socketed screws.

More particularly, it relates to screws of the type adapted to be produced by the preferred form of method and apparatus described and claimed in my copending application Serial No. 275,904, filed May 26, 1939; a further type of such screw also being described and claimed in my copending application Serial No. 275,902, filed May 26, 1939.

It has among its objects to provide an improved socketed screw, and, more particularly, an improved screw of the type utilizing cooperating convex and concave binding and guiding surfaces in the screw socket and on the screw driver. A further object of my invention is to provide such a screw having a socket of improved conformation, whereby, while obtaining the advantages of this type of screw, it is also made possible to provide an even larger target. A still further object of my invention is to provide such an improved socket having improved fluted portions and improved abutment means between the fluted portions whereby, while obtaining a target of larger diameter and reducing the metal in the socket wall, it is also made possible to produce a strong socket wall and a construction wherein there is a minimum tendency for the driver to break the head or mutilate the socket. These and other objects and advantages of my improved construction will, however, hereinafter more fully appear.

In the accompanying drawing, I have shown for purposes of illustration certain embodiments which my invention may assume in practice.

In the drawing:

Figure 1 is a top plan view of a socketed screw constructed in accordance with my improvements;

Fig. 2 is a side elevational view of the screw, partially in section, on line 2—2 of Figure 1, a portion of the shank being broken away to facilitate illustration;

Fig. 3 is a sectional view on line 3—3 of Figure 1;

Fig. 4 is a sectional view on line 4—4 of Figure 2;

Fig. 5 is a sectional view on line 5—5 of Figure 2;

Fig. 6 is a section of the screw similar to Figure 2 showing the driver in process of insertion therein;

Fig. 7 is a like sectional view but showing the driver in section and fully inserted in the screw;

Fig. 8 is a view similar to Figure 3, but with the driver fully inserted;

Fig. 9 is a section on line 9—9 of Figure 7, the section lines for Figures 7 and 8 also being indicated thereon, and

Fig. 10 is a detail sectional view showing a modified form of driver inserted in the screw.

In this illustrative construction, the screw head 1 is provided with a socket, generally indicated at 2, and this socket 2 is provided with radially located fluted portions, generally indicated at 3, having convex end or outer walls 4; the socket 2 and fluted portions 3 herein, however, being of improved construction and having improved abutment members 5 between the adjacent fluted portions, and my improved socket also being adapted to cooperate with a suitable screw driver, generally indicated at 6, all as hereinafter more fully described.

Referring to the socket 2, it will be observed that both the fluted portions 3 and the abutment portions 5 are of an improved construction enabling this socket 2 to present a substantially larger mouth or target for the screw driver. More particularly, referring to the fluted portions 3, the side walls 8 thereof are such that, instead of the width of the fluted portions increasing from the convex end wall 4 toward the axis of the socket, the cross section of the fluted portions decreases from this end wall 4 toward the axis. Herein, this is accomplished by providing flat side walls 8 extending inward from the opposite side edges of the convex surfaces 4, which converge as they approach the axis. Further, these side walls 8 are short, as compared with my prior construction of this type, and the adjacent side walls of adjacent fluted portions do not intersect. Instead, it will be observed that the abutments 5 are of substantial width at their inner ends and herein have curved surfaces 9 forming their inner ends and also forming the marginal walls of the target portion of the socket. It will also be observed that these surfaces 9 are convex vertically, as shown in Figure 3, in such manner as thereby to increase the size of the target at the open end of the socket. Here also, it will be noted that, as heretofore, the convex end walls 4 of the fluted portions 3 are more abruptly angled at their inner ends, as indicated at 4a, adjacent the bottom of the socket 2, in such manner as to provide the desired binding or wedging effect on the screw driver, while the surfaces 9, flaring away at their upper ends, also produce the wider mouth at the upper end of the socket.

Cooperating with my improved socket is also a screw driver having longitudinally disposed and

tapered rib portions 10 corresponding in cross section to and receivable in the fluted portions 3. These portions 10 not only have concave end walls 11 cooperating with the convex walls 4, but they are also provided with side walls 12 conforming to and engageable with the side walls 8 of the fluted portions 3. Herein also, convex walls 13 are provided between the ribs 10. Thus obviously, when the working end of the screw driver is inserted in the socket 2, the concave portions 11 on the ribs thereon will engage with the end walls 4 of the fluted portions 3 and produce binding or wedging at the portions 4a, as indicated in Figure 7. The ribs 10 also will have the inner edges of their side walls 12 engaging the side walls 8 of the fluted portions 3, but it will be observed that herein the entire surfaces of the walls 12 on ribs 10 will not engage corresponding surfaces on the socket and further that the surfaces 13 between the ribs 10 on the driver will not engage the surfaces 9 except at the bottom (Figure 8). In connection with the side walls 12 and 8 on the driver and fluted portions, it will be observed that the angle of these is such that any camming tendency is eliminated, while the construction of the head is such as to produce a very strong head despite the larger target.

In Figure 10, it will be noted that a modified form of screw driver 18 is illustrated having the end wall of its ribs concave, as heretofore, to cooperate with the portions 4a on the inner end of the convex end walls 9 in the socket 1. However, in this construction the concave end walls 19 on the ribs, corresponding to the end walls 11 heretofore described, slope away from the end wall 4 above the binding portion 4a, rather than engaging the wall 4 throughout the length thereof.

In the use of my improved construction, the driving tool is inserted in the socket 2 with increased facility, due to the increased size of the target provided, and herein defined by the upper ends of the walls 9. Further, at the same time that the target is thus increased in size, it will be observed that the abutments 5 are substantially increased in thickness and strength, while the fluted portions 4 and their cooperating rib portions 10 are so disposed that the latter portions cannot mutilate the abutment portions or tend to explode the head of the screw. In fact, due to the slight undercutting of the walls 8 and 12, a shearing action is required before the rib portions 10 can rotate relative to the fluted portions 4. Obviously, as regards guiding the tool into the socket and the gripping or binding action between the convex surfaces 4 and concave surfaces 11, this construction will function generally similarly to previous constructions of the convex-concave type.

As a result of my improved construction, it will be noted that, while the target is larger and a large number of flute portions is provided to facilitate entry of a driver, the head is very strong. This is due to the improved conformation of the socket walls and rib walls, and to the improved application of the turning forces made possible by my improved construction. These and other advantages of my improvements will, however, be clearly apparent to those skilled in the art.

No claim is made herein to the subject matter of the turning tool or driver or the combination thereof with the socketed screw, the same being claimed in a divisional application Serial No. 433,032, filed March 2, 1942.

While I have in this application specifically described certain embodiments which my invention may assume in practice, it will be understood that these forms have been shown for purposes of illustration, and that the invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A socketed connector having a turning socket therein including an axial aperture having spaced wall portions around the same and radially located fluted portions between said wall portions, and turning tool binding means in said socket, said binding means having increasingly sharp binding angles leading toward the bottom of said socket.

2. A socketed connector having a turning socket therein including an axial aperture and radially located fluted portions between portions of the walls thereof and arcuate inner faces on said wall portions, and turning tool binding means disposed around the bottom portion of said socket, said binding means having increasingly sharp binding angles toward the inner end of the latter.

3. A socketed connector having a turning socket therein including a conical axial aperture and shallow radially located fluted portions in the walls thereof of less depth than the radius of said aperture, and turning tool binding means in the bottom portion of said socket, said binding means having increasingly sharp binding angles toward the inner end of said socket.

4. A socketed screw having a turning socket therein including a conical axial aperture and radially located fluted portions in the annular walls thereof, and turning tool binding means in the bottom portion of said socket, said binding means having increasingly sharp binding angles toward the inner end of said socket, and said portions having abutments therebetween having arcuate inner extremities forming the annular walls of said conical aperture.

5. A socketed screw having a turning socket therein including an axial aperture and radially located fluted portions in the walls thereof, and turning tool binding means in the bottom portion of said socket, said binding means having increasingly sharp binding angles toward the inner end of said socket, and said portions having abutments therebetween and having side walls on said abutments intersecting the walls of said aperture.

6. A socketed screw having an axial turning socket therein including an axial aperture and radially located fluted portions, and having side walls on said portions spaced apart at their ends toward the socket axis and forming abutments between said portions having faces forming walls of said axial aperture, the faces of said abutments having vertically convex tool binding surfaces thereon adjacent the bottom of said socket.

7. A socketed screw having an axial turning socket therein including radially located fluted portions having side walls leading into said socket, intermediate abutment portions having their side walls formed by the side walls of said fluted portions and spaced apart at their ends toward the socket axis, and turning tool binding means on walls of said abutment portions, said binding means having increasingly sharp binding angles leading toward the bottom of said socket.

8. A socketed screw having an axial turning

socket therein including radially located fluted portions having end walls, intermediate abutment portions having their side walls formed by the side walls of said fluted portions and spaced apart at their ends toward the socket axis, and turning tool binding means in said fluted portions, said binding means having increasingly sharp binding angles leading toward the bottom of said socket.

9. A socketed screw having a conical axial turning socket therein including radially located fluted portions having side walls leading into said socket, intermediate abutment portions having side walls formed by the side walls of said fluted portions and spaced apart at their ends toward the socket axis, and turning tool binding means on the end walls of said fluted portions and on said abutment portions, disposed adjacent the bottom of said socket and said binding means having increasingly sharp binding angles toward the bottom of said socket.

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