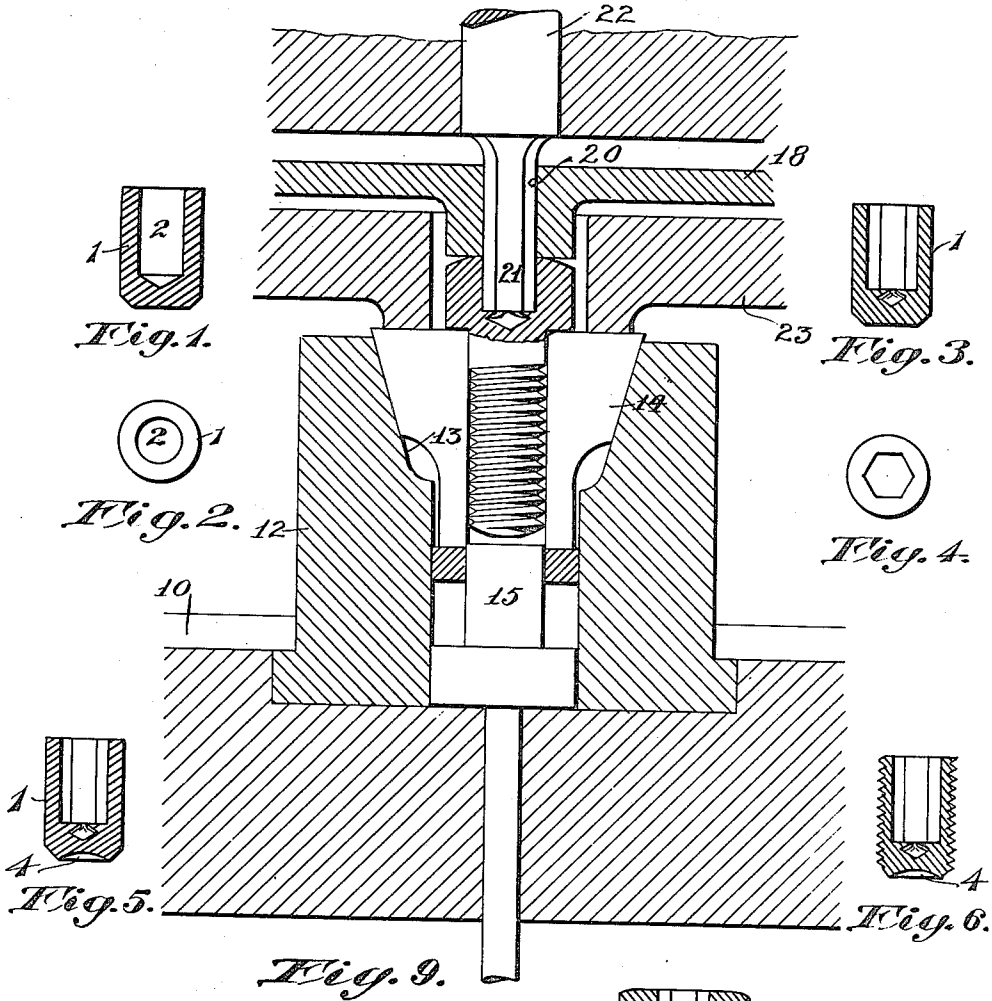
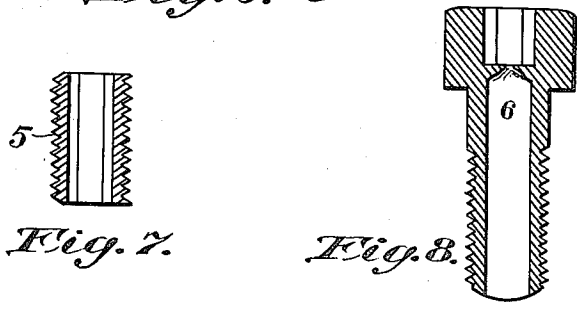
H. T. HALLOWELL.

HOLLOW OR SOCKET SCREW.

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1,153,488. Patented Sept. 14, 1915.





Witnesses:
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UNITED STATES PATENT OFFICE.

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HOLLOW OR SOCKET SCREW.

1,153,488. Specification of Letters Patent. Patented Sept. 14, 1915.

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To all whom it may concern:

Be it known that I, HOWARD T. HALLOWELL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in the Manufacture of Hollow or Socket Screws, of which the following is a specification.

My invention relates to screws of the type provided with sockets whereby they may be set in place by means of a suitable key wrench or tool having an end of polygonal or other shape corresponding to the contour of the socket that will enable the screw to be turned in or out, as desired, and the object of my invention is to facilitate the manufacture of such screws.

My invention comprises certain improvements in screws of this type, and in the process of and apparatus for making the same; all of which is more fully described hereinafter, reference being had to the accompanying drawings, in which:

Figures 1 to 8, inclusive, represent various forms of hollow or socketed screws made in accordance with my invention, and Fig. 9, is a sectional view illustrating one form of apparatus capable of employment in the completion of the improved screws forming the subject of my invention.

In the manufacture of hollow or hollow-headed screws in accordance with my invention, I preferably feed to an ordinary screw machine, bar metal, from which the screw blanks may be automatically threaded and cut off, being substantially socketed, in the same, or in a separate machine, by any of the ordinary or usual processes. In those instances where the screws have cupped engaging ends, such cupping together with the necessary socketing or recessing may be done in a magazine automatic machine. In some instances, this socket may extend entirely through the screw. In most instances, the socket is only in the head of the screw, or if the screw is of the headless type, the socket will extend nearly the entire length of the same. The sockets so formed are round or circular in contour, and hence provide no means of effecting a turning movement of the screw by a tool, and one part of my invention consists in transforming this circular aperture into another shape, preferably a polygonal shape, which may be square or hexagonal, as hereinafter described.

Figs. 1, 2, 3, 4, 5 and 6, represents various steps in the formation of one form of socketed set screws made in accordance with my invention. Fig. 1, represents a plain blank 1, having a socket 2, which is circular as shown in Fig. 2. Fig. 3 shows the same blank; the walls of the circular socket having been broached by a tool to change the same from circular to polygonal contour; in this instance hexagonal as clearly shown in Fig. 4. In the structure shown in Fig. 5, the end of the same has been cupped, as indicated at 4, to provide a proper engaging surface. Fig. 6, shows the finished, threaded, screw. In Fig. 7, I have shown a similar socket screw 5, tubular in form, however; the original socket or bore having been circular and shown as broached to a polygonal form, hexagonal for instance, as indicated in said figure.

Fig. 8, shows a hollow screw, which may be a fillister screw or a bolt, with the metal of its socket 6 broached to provide a polygonal recess.

To effect the desired broaching of the screws to change the sockets or bores of the same from a circular contour to one permitting the use of a key wrench to effect turning of the said screws, they are placed in a suitable structure substantially as illustrated in Fig. 9, in which 10 represents a suitable anvil plate carrying a socket member 12, with tapered inner walls 13 receiving an expanding collet 14 adapted to embrace the screw; such collet forming a support for the head and insuring the centering of the recess in said head with respect to the broaching tool. When the article operated upon is a headed structure, such head may rest upon the collet or the thread end may rest upon a separate plug element 15 fitting the lower portion of the collet, and supporting the screw. Such plug structure is, of course, necessary when the element operated upon is headless.

The head of the screw is anchored in place preferably by a suitable plate 18, which may have a boss 19 engaging said head, and apertured at 20 for the passage of a broaching tool 21 suitably mounted in a carrier 22, and controlled and operated by any suitable means. The plate 18 forms a stripper which is lowered initially, jamming the screw element whether headed or otherwise into the supporting collet, and truing the same before the broaching operation commences, and such action is immediately followed by

the broaching tool, which passes through the aperture of the stripper plate, and coming into engagement with portions of the wall of the recess or bore of the screw, carries down portions of the metal thereof, which portions are forced to the bottom of the socket under pressure sufficient to keep them in place without the necessity of turning them out. If desired they may be subsequently removed. The broaching tool is then withdrawn, the stripper holding the screw element in place, after which the stripper is displaced and said screw element removed in the form thus prepared, having a suitable polygonal recess for the reception of a similarly shaped tool whereby, in use, it may be operated as desired. The screw may be displaced and the collet loosened by a bar or "knock-out" operating from below.

The mechanism illustrated in Fig. 9, may be duplicated in a dial plate so that screws to be operated upon may be successively brought into position for engagement by the broaching element and constantly removed and blanks inserted by the operator.

The headed screws made in accordance with my invention are familiarly known as fillister screws, and are preferably provided with heads which are of the same diameter from top to bottom. The screws just mentioned are those usually employed in connecting parts together where it is desirable or necessary to sink the head or top portion of the screw below the surface of one of the parts connected. My invention, however, may be applied to flat headed fillister screws, or button-headed screws, and it is particularly adapted to ordinary headless screws threaded throughout their length.

In instances where screws or bolts are provided with heads of polygonal shape, such as hexagonal or square, they may also be provided with recesses of similar shape to receive key wrenches.

When making headless set screws, they are provided with the key seats or recesses first and then they may be mounted on a suitable key tool and fed to a screw machine, passing through the threading die without retraction.

When broaching screws which rest with their points on piece 15, there is provided a hold down plate 23 which leads the broaching punch and pushes the collet in place, thereby insuring the screw to be brought in line with broaching punch before it comes in contact with the screw.

I claim:

1. The process of making socketed screws, which consists in forming screw blanks with circular recesses or openings, broaching the walls of such recess to a contour other than round, and then threading said blanks.

2. The process of making socketed screws, which consists in forming screw blanks with circular recesses or openings, broaching the walls of such recess to a contour other than round and forcing the metal removed by the broaching operation into the opening or recess of the blank, and then threading said blank.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HOWARD T. HALLOWELL.

Witnesses:

MURRAY C. BOYER,

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