

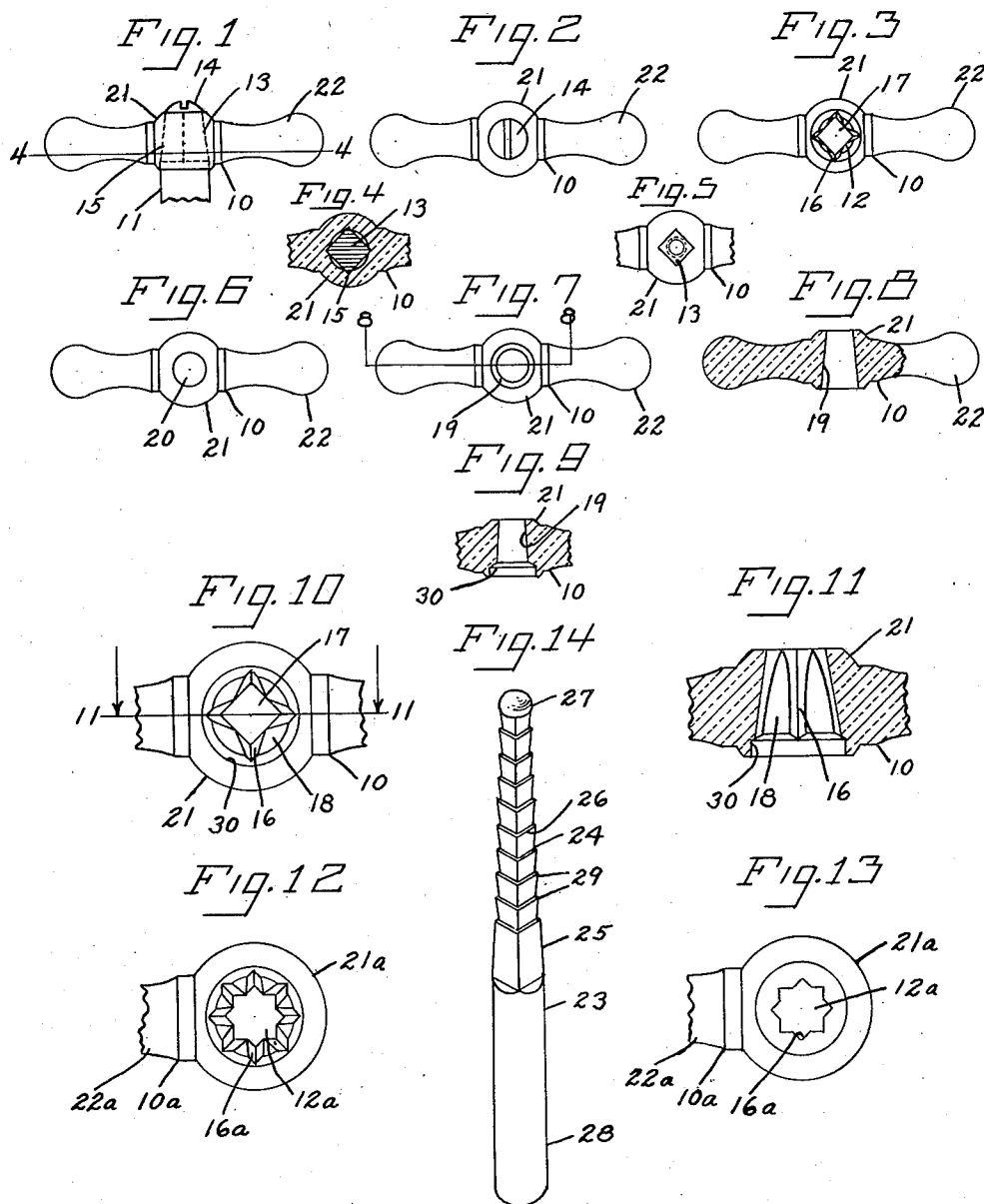
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FAUCET HANDLE CONSTRUCTION

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UNITED STATES PATENT OFFICE.

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FAUCET-HANDLE CONSTRUCTION.

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To all whom it may concern:

Be it known that I, JAMES McCARTY, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Faucet-Handle Constructions, of which the following is a specification.

My invention relates to improvements in faucet handle construction, having particular reference to the form of the opening in such handles for receiving the end of the faucet spindle or valve stem and the manner of operating on the blank for forming the said hole, and the object of my improvement is simplicity and economy in construction and convenience and efficiency in use.

In the accompanying drawing:—

Figure 1 is a side elevation of the upper end portion of the valve stem of a faucet and a handle mounted thereon and held in place by a screw, the said handle being made in accordance with my invention.

Figure 2 is a plan view of the same.

Figure 3 is a bottom view of the handle removed from the stem.

Figure 4 is a sectional view on the line 4—4 of Fig. 1.

Figure 5 is a plan view corresponding to Fig. 2 with the holding screw omitted.

Figure 6 is a bottom view relatively to the position of use of the blank with the drilled hole in condition for being operated upon for forming the non-circular hole for receiving the tapered and square-cross-sectioned engaging end of the valve stem.

Figure 7 is a bottom view of the same after operating on the walls of the hole by means of a reamer (not shown) that has a slightly though appreciably greater taper than the taper of engaging end of the valve stem.

Figure 8 is a sectional view on the line 8—8 of Fig. 7.

Figure 9 is a sectional view corresponding to Fig. 8 after the large end of the stem receiving opening has been counter-bored.

Figure 10 is a bottom view on an enlarged scale of the same after being operated upon by a broach and swage to produce the finished hole.

Figure 11 is a sectional view on the line 11—11 of Fig. 10.

Figure 12 is a bottom view of a handle

of different form and having a modified form of opening for the valve stem.

Figure 13 is a plan view of the same.

Figure 14 is an isometric view of the broach and swage.

My improved faucet handle 10 in the finished form corresponds to such handles that are common as to the manner of use and the method of applying the same to the valve stem 11, and also as to the exterior appearance when in the position for use on the said stem 11, and differs from such common or ordinary handles as to the details of the side walls of the non-circular and tapered hole or socket 12 that fits and is mounted on the correspondingly tapered and shaped tip or receiving end 13 of the said stem 11.

The said tip or receiving end 13, as shown, is of standard form, having a square form of cross-section and having the side walls tapered relatively to the axis, which taper is for each side approximately five degrees, making a total of ten degrees for the two sides. A holding screw 14 is entered axially from the top end face.

Corresponding to the square form for the cross-section of the tip 13 the socket 12 comprises, as part of the open space that is enclosed by the border walls, what may be designated as the socket proper that is operative to receive the tip 13. The said socket proper may be described as being of skeleton form in that the actual contact with and engagement with the said tip 13 is confined to the corner portions 15 thereof. The four right-angled corner portions 16 of the border wall of the socket 12, shown particularly in Fig. 10, are the parts of the said side wall that cooperate with the said corners 15, wherefore, the said corner portions 16 serve to define the socket proper.

The said corner portions 16 are formed as a final operation in producing the handle 10 in manufacture by means of a broach of square form that is combined with a swaging tool having a taper to correspond to that of the tip 13.

The portions of the border wall of the socket 12 between the corner portions 16 comprise longitudinal recesses or grooves 18 of tapered form. Said grooves 18 have the greatest depth at the large end of the socket 12 and diminish towards the small

end thereof and terminate at or adjacent said small end.

Actually, said grooves 18 are the remnants or undisturbed parts of the border wall of the tapered hole 19 that has a full-circular cross-section when formed, as shown in Figs. 7 and 8, and which is produced by means of a tapered reamer.

The blank for the handle 10 shown in Fig. 6 has a drilled hole 20 of suitable size to receive the tapered reamer mentioned and to be operated upon thereby to produce the tapered hole 19, the walls of the latter having approximately a taper of ten degrees relatively to the axis, making a total taper of about twenty degrees. At the large end of the tapered hole 19 there is provided, as is usually the case, a counterbore 30 for receiving the adjacent opposed part of the body portion of the stem 11.

The character 17 designates the square form for the small end of the socket 12, as shown in Figs. 3 and 10, and this is produced by means of a broach of corresponding form that operates in the tapered, reamed hole 19, such square form being, however, confined to the small end of said hole 19, by reason of the greater diameter at the large end or mouth.

The operation of the broach represents simply the use of a broach for providing a square form for the small end of the reamed hole 19 and cutting the corners inward from said small end up to the point where the diameter of the wall of the tapered hole 19 equals the overall width of the broach. Beyond this point, towards the mouth, the broach passes freely, without touching or cutting the side wall.

The structure described is next operated upon by a swage that has a form to correspond precisely to that of the tapered receiving end or tip 13 of the stem 11, and the work of said swage is confined generally to the corners, resulting in the formation of the engaging corners or seats 16 in the socket 12.

I prefer to effect the broaching and swaging described by means of a single tool 23 which is composed of a broach portion 24 at the engaging end and a swage portion 25 that is positioned in alignment with said broach portion 24 and adjacent the large end thereof.

The broach portion 24 is of suitable form and size to form the square hole 17, having a series of cutting edges or teeth 26 that increase in size gradually from the tip end 27 toward the head 28 up to the terminal or end teeth 29 at the inner end. Said end teeth 29 are of full size, corresponding in size to the size of the finished hole desired, and operate as finishing teeth.

Inwardly from the broach portion 24 is the swage 25, as mentioned, which is of

square form of cross-section and of tapered form to correspond to the structure defined by the corner seats 16, being the counterpart of the tip or receiving end 13 of the stem 11.

As described, the taper of the reamer is double that of the swage 25.

The handle 10 has the socket 12 provided in a ball or hub 21 that is positioned at the middle of the structure, being intermediate a pair of gripping portions or handle ends 22.

In use in the case of such handles as the handle 10 shown and described it is generally immaterial as to what the angular setting of the handle may be relatively to the handle stem or valve stem 11.

There are, however, situations in which the handle serves as an indicator in cooperation with the structure of the faucet to show that the water is turned off or on, as the case may be, so that it is desirable to provide something in the way of means for changing the angular position of the parts and permitting of a choice in setting the handle on the stem.

A handle for such special use may be of the form of the handle 10^a shown in Figs. 12 and 13 in which the handle end or grasping portion 22^a is directed to one side only of the hub or ball 21^a.

In this handle 10^a a choice of positions is provided by forming the socket opening 12^a first as described in the case of the handle 10, providing a set of corner seats 16^a made up of four thereof, and in addition providing a second set of such corner seats 16^a that is turned angularly midway between the first set.

That is to say, there are in all eight corner seat structures 16^a, separated by equal angles one from the other. Only one of such sets of four will be used at a time, the particular set that will be used being determined by the setting of the handle desired in each case.

I claim as my invention:—

1. The method of making sockets in faucet handles comprising providing a blank of bar-like form having a drilled hole, operating on the walls of the said hole by means of a tapered reamer, and operating upon parts of the walls of the reamed hole by means of a tool having a broach portion having a square form of cross-section and a swage portion of square cross-section and tapered longitudinally to provide a set of corner seats for the handle receiving tip of a valve stem.

2. The method of forming sockets in faucet handles as described in claim 1, the said tapered reamer having a taper in excess of the taper of the swage portion.

3. A faucet handle of bar-like form having a socket for receiving the tip end of

a valve stem that is of tapered form and has a square form of cross-section, the wall of the said socket having a set of corner seats for cooperating with the corners of the handle receiving tip of the valve stem, and the parts of the said wall between the said corner seats being in the form of recesses or grooves, whereby the engagement of the handle with the tip will be confined to the corner portions thereof.

4. In a faucet handle or similar structure having a socket that is longitudinally tapered and of polygonal form of cross-section for receiving the tapered and polygonal tip end of a valve stem, the walls of said socket having corners and a set of seats for cooperating with said tip end, and said seats being substantially confined to the corners, with the parts of said walls interme-

diating the corners spaced from the opposed faces of said tip end when the handle is placed thereon.

5. A faucet handle or similar structure for receiving the tip end of a stem that is longitudinally tapered and has a cross section in the form of a regular polygon, said handle having a tapered socket whose wall has a plurality of angularly spaced sets of seats, each set adapted to cooperate with the corners of said tip end, one set at a time, the seats of any set when another set is in engagement with said corners being spaced away from the sides of the tip end so that engagement of the handle with the tip will be confined substantially to the corner portions thereof.

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