May 28, 1929. R. K. WINNING 1,714,708

METHOD OF ATTACHING KNOBS

Filed March 14, 1927

FIG. 1.

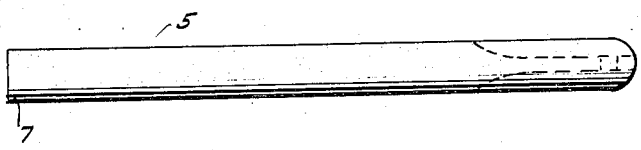


FIG. 2.

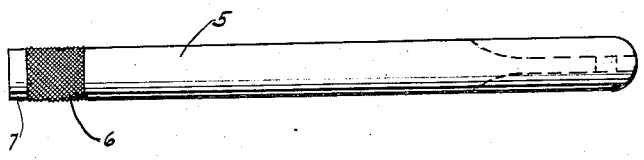


FIG. 3.

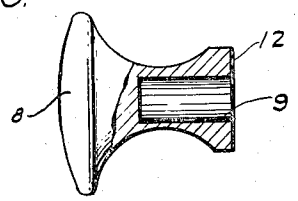
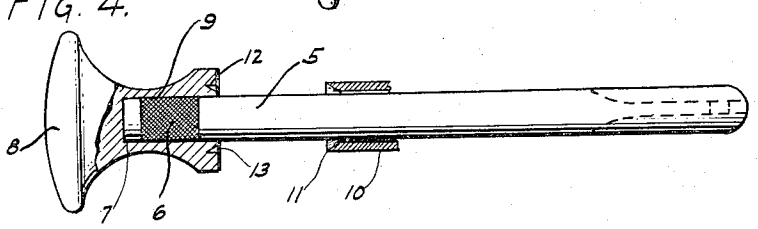


FIG. 4.



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UNITED STATES PATENT OFFICE.

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METHOD OF ATTACHING KNOBS.

Application filed March 14, 1927. Serial No. 175,193.

This invention relates to improvements in methods of fastening handle knobs to rods.

In the automotive industry it frequently becomes desirable to mount a handle on a control rod of some character either for the purpose of enabling the rod to be rotated manually or else for facilitating its reciprocation in an axial direction. In either case it is desirable to provide a means of attaching the handle rigidly to the rod at a minimum of expense. Broadly stated, that is the object of the present invention.

In accordance with this invention the handle rod is knurled and the metal of the handle is subsequently pressed into permanent engagement with the knurled portion of the rod. I am aware of the fact that knurling has heretofore been resorted to for similar purposes, and hence it is desirable to state more specifically the objects of the present invention.

One of the particular objects of the present invention is to facilitate the entry of the knurled shaft into the handle knob socket, both by the point of application of the knurling and proper selection of the relative sizes of the parts. It is then my further purpose to so compress the metal of the handle that it will be permanently engaged with the shaft without requiring any specific treatment of the shaft other than the knurling and without any great displacement of metal in the handle. All of these objects are satisfied by the method hereafter to be disclosed and, as above pointed out, the particular method is chosen primarily in order to secure most satisfactory results at a minimum of cost.

In the drawings:

Figure 1 represents a handle rod prior to its treatment for the purpose of fastening a handle knob thereto.

Figure 2 shows the handle rod after it has been knurled.

Figure 3 shows the knob partially cut away to an axial section to expose the socket therein.

Figure 4 shows the knob assembled on the rod after the final operations thereon have been performed.

Like parts are identified by the same reference characters throughout the several views.

The rod 5, prior to its treatment in accordance with this invention, has a cylindrical surface at the portion to which the knob is to be applied. The first operation thereon consists in knurling this cylindrical surface at 6. It will be noticed that the knurling is spaced somewhat from the end 7 of the rod. The knurling operation has the effect of increasing slightly the overall diameter of the rod due to the fact that in the knurling operation small teeth are cut and raised up by displacement from the formerly cylindrical surface.

The knob 8 is provided with a socket at 9 which is preferably of the same diameter as that of the cylindrical portion of rod 5. The knob will ordinarily be made of some relatively soft metal as brass or the like, although this is not essential.

The knob and rod are now assembled, the end 7 of the rod being introduced into socket 9, in which it fits exactly. With the end 7 thus introduced into the socket to guide the further assembling operation, it is an easy matter to press the knurled portion 6 of the rod into the socket. The knurled portion is only slightly larger than the socket diameter because of the fact that it is formed from a rod portion which was originally of the same diameter as the socket. It is found that under these circumstances the peripheral teeth or serrations formed by the knurled portion, will not be sheared off during entrance of the knurling 6 into the socket. On the contrary the metal wall of the socket will expand sufficiently to allow the entrance of the knurling and its elasticity is such that when the knurling comes to rest in its ultimate position the elastic contraction of the wall of the socket 9 will firmly engage the knurling and will strongly tend to retain rod 5 in the handle.

In order to complete an effective engagement between the parts, however, it is preferred to use a setting die which is shown fragmentally at 10. This die may be mounted conveniently in the same press which forces the rod and handle together and by a secondary operation the tubular die 10 is forced axially of shaft 5 until its downwardly bevelled annular blade portion 11 engages the end 12 of the knob.

It will be noted that the outer surface of the die 10 is cylindrical and the wedging action of the downwardly bevelled blade can only act to compress the metal of the knob centrally toward the axis of the rod. This die leaves a slight groove at 13 in the end 12

of the knob, but its influence is not limited to the portions of the knob immediately adjacent said grooves. In fact it is found that a very material portion of the metal adjacent the knurled portion of the rod is forced into intimate engagement with such knurled portion, this effect being additional to the natural result of contracting the end of the knob upon the unknurled portion of the rod. The engagement of the knob with the knurling 6 may be due slightly to axial pressure tending to flatten the knob. But it is preferred nevertheless to use a bevelled setting die as shown in order to ensure the additional contractile action above described.

In this manner the knob and rod are set in permanent engagement in the same operation by which they are assembled together and no channels, holes or pins are used in assembling or setting operations. As a result, economies are effected which become greatly important in the production of such devices in large quantities, and the degree of rigidity of attachment between the parts is substantially as great as if they had been formed in one piece.

I claim:

1. The method of assembling a socketed knob upon a knurled rod which includes the insertion of the knurled portion of the rod into the socket of the knob and the subsequent compression of the material of the knob on to the knurled portion of the rod.

2. The method of attaching a socketed knob to a rod of the same diameter as the socket which consists in knurling a portion of the rod spaced from the end thereof, and of such length as to be spaced from both ends of said socket when received therein, inserting the knurled portion of the rod into said socket, and pressing all portions of said knob about the end of said socket substantially uniformly about the axis of said rod.

3. The method of mounting a socketed handle upon a rod of a diameter substantially equal to that of the socket, said method including the knurling of said rod adjacent an end thereof and to a length such that the knurling is wholly receivable within said socket to a depth spaced below the opening thereof, the introduction of the knurled portion of the rod within the socket to such a depth, and the subsequent compression of an annular wedge upon the end of the knob in an axial direction whereby to compress the material of said socket from all sides upon knurled and unknurled portions of said rod.

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