A. S. VAUGHAN.

TOOL HANDLE HOLDING MEANS.

APPLICATION FILED OCT. 8, 1920.

1,399,172. Patented Dec. 6, 1921.

Fig. 1.

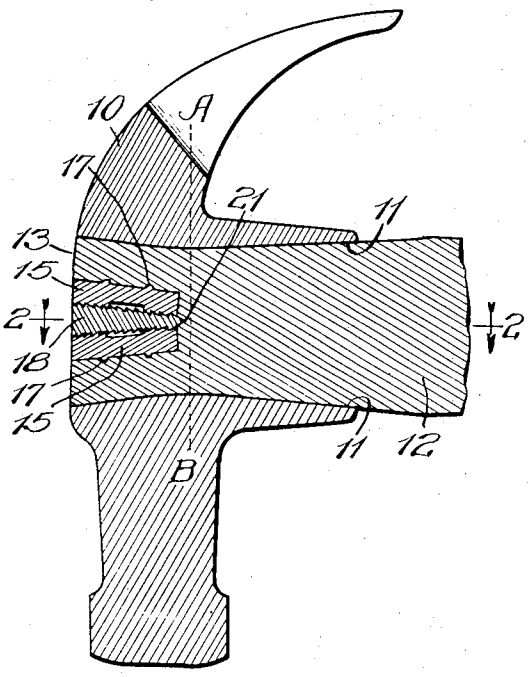


Fig. 2.

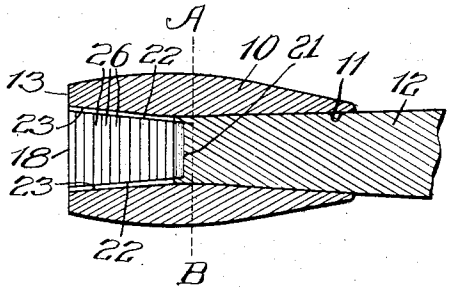


Fig. 3.

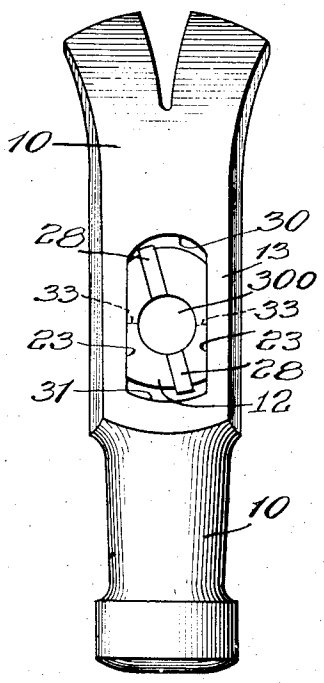


Fig. 4.

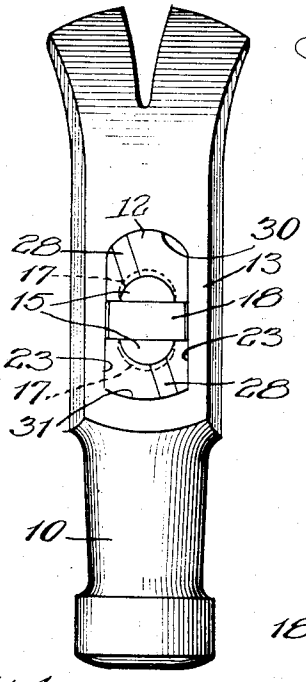
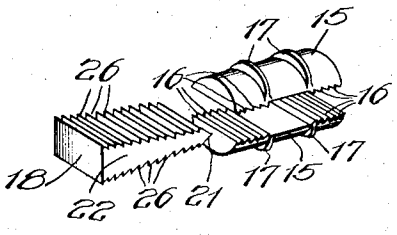


Fig. 5.



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UNITED STATES PATENT OFFICE.

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TOOL-HANDLE-HOLDING MEANS.

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To all whom it may concern:

Be it known that I, ALEXANDER S. VAUGHAN, a citizen of the United States, and a resident of Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tool-Handle-Holding Means, of which the following is a specification.

My invention relates to means for holding handles upon the heads respectively of a large variety of hand tools such as hammers, hatchets, axes, etc., each having an eye into which the handle projects.

The usual practice in securing the handle in the eye of the tool head is to drive several filler pieces, usually of sharpened flat metal, into the end of the handle where it lies flush with the head at the eye thereof, thus spreading the wood of the handle and binding it in the eye. That method, while cheap, is not satisfactory, for when the wood dries out the further driving in of the filler pieces has little if any effect in further spreading the wood, these filler pieces having substantially no wedging action except at the entering end. If made typically wedge-like they readily work out of place, and the addition of teeth or ribs upon them does not overcome this fault. In such case the usual practice of the user is to drive in more metal, most frequently nails, in an effort to tighten the handle in the eye, the handle thus becoming much weakened, and the desired result is not attained for want of a goodly quantity of firm and strong wood in the eye. I am aware that various other devices than the simple fillers or wedges have been suggested to overcome the objections pointed out, but none of these thus far appear to have been found satisfactory.

The chief object of the present invention is to provide means for securing the handle in the eye of the tool head whereby the handle will be held with unusual firmness and rigidity, whereby the handle-securing means are themselves held firmly and strongly against retraction, and whereby the desired tightness of the fit between the handle and the tool head may be restored in a simple and convenient way from time to time as the drying out and shrinking of the wood takes place. Other objects and advantages will appear hereinafter.

In the accompanying drawings, which form a part of this specification, Figure 1 is a medial vertical section through a hammer head and fragment of the handle securely locked together by my improved locking device; Fig. 2 is a horizontal section on the line 2—2 of Fig. 1, the wedge being shown in full face view; Fig. 3 is an end view showing the handle prepared to receive the locking device; Fig. 4 is an end view showing the several elements in their final position locking the handle and head together; and Fig. 5 is a perspective showing the wedge and pressure-transmitting members.

My improved construction is herewith illustrated in connection with a hammer of well-known form. The head 10 has the usual form of eye, commonly known as an adz-eye, consisting of two principal parts. The first part extends from the handle-entrance opening at 11 to about the line A—B. It is denfined by flat side and end walls on slanting lines and the opposite walls come closer together toward the line A—B forming wedging surfaces against which the handle 12 is driven tightly. The second part of the eye extends from about the line A—B to the outer surface 13 of the head, the eye gradually engaging outwardly. The eye is thus provided with a constricted or throat portion, and that part of the handle 12 which passes beyond the throat at A—B is necessarily considerably smaller in cross measurements than is the eye there, leaving considerable space all around this end portion of the handle. The desideratum is to fill up this space, and in such a way that the handle end is substantially provided with a head or enlarged portion which will not pass back through the throat at A—B when the tool is normally being used. The driving in of the filler pieces hereinbefore mentioned accomplishes the result to a certain extent, but with numerous disadvantages including those pointed out.

My improved locking elements illustrated consist of a pair of relatively long semi-cylindrical metallic blocks, anchors or pressure-transmitting members 15—15, their length being such as to reach to a place near the eye throat A—B, each thereof having on its flat side near the ends respectively a plurality of alternate crosswise teeth or ridges 16 providing a plurality of grooves between them, each member 15 having also a pair of crosswise ridges 17 on its curved or cylindrical side near the end portions thereof. These members 15 have a width

on their substantially flat surfaces respectively which is less than the width of the eye near the throat at A—B and are therefore of considerably less width than is the eye opening at the outer surface 13 of the head.

The locking elements include also a wedge 18 which is materially wide at one end and has substantially straight sides which gradually come closer together till near the smaller end and are then tapered more abruptly to form the sharp edge 21. The wedge 18 is rectangular in cross section throughout and its flat edges 22 are also on converging lines, the slant of which conforms substantially to that of the inwardly tapering sides 23 of the eye, the larger end of the wedge being a little less in width than is the eye where it opens into the end surface 13 of the head, as well seen in Fig. 4.

The sides of the wedge are provided with integral transverse teeth 26 adapted to interfit with or engage the teeth 16 of the pressure-transmitting members 15 respectively when the parts are in operative position. The teeth 26 on the wedge are preferably directed somewhat toward the larger end thereof while those of the members 15 extend in the opposite direction when the parts are in use, thus increasing the interlocking effect between the wedge and the anchors 15.

In my practice the wedge 18 and the side members 15 are made of malleable iron, but they may be of other materials, preferably a hard metal.

In the usual practice heretofore, after the handle has been driven tightly into the eye a wooden wedge is driven, in a somewhat diagonal direction, into the handle end in order to force the wood of the handle laterally and make it lie against the slanting walls 23. Such a wedge is used in my present construction also, and is shown at 28, Figs. 3 and 4. After this wedge 28 has been applied, a hole 300, (Fig. 3) preferably cylindrical, is bored longitudinally in the end of the handle substantially midway between its opposite sides and substantially midway between its opposite edges, the hole 300 having a depth equal to that of the anchors 15 and a diameter equal to that of these members 15 at one of the ridges 17 when the blocks 15 are face to face. These members 15 are then placed face to face and put into the hole 300 so as to rest upon the bottom thereof with their outer ends substantially flush with the surface 13 of the head.

The wedge 18 is next applied between the two expansion members 15, and by means of hammer blows is driven down substantially flush with the surface 13 of the hammer, thus expanding the wood so as to compress it tightly against the end walls 30 and 31 of the eye, and thus locking the handle in the eye. The exposed ends of the wedge and of the members 15 respectively are then surfaced off smoothly.

According to this construction the single wedge 18 expands the wood sufficiently to lock the handle in the head with a peculiarly strong and tight fit. The pressure-transmitting members 15, being strong and rigid from end to end, convey the expansive forces of the wedge to and against the wood parts from end to end of the members 15, and the angle of inclination of the sides of the wedge 18 is such that the wood is bound tightly against the end walls 30 and 31 of the eye from the throat at A—B to the outer surface 13. Furthermore, since these end walls 30 and 31 are made on curved lines, the effect of the semicylindrical sides of the members 15 directed toward them respectively is to transmit the wedging forces to the wood in such a way as to bind the wood tightly against these walls 30 and 31. The ribs or ridges 17 on the members 15 lock these members securely against retraction in the handle, and the inter-engaging teeth and recesses on the wedge and on the blocks 15 respectively hold the wedge positively against retraction.

When the wedge is inserted between the members 15 it divides the fibers of the wood handle at 33 (Fig. 3) and as it proceeds downward between the members 15 the wood fibers are forced apart. Since the wedge 18 is almost as wide as the eye the wedge acts against the wood directly at the edges of the wedge, forcing it in the direction of the end walls 30 and 31 of the eye, and thus all of the parts of the handle are placed under compression between the wedge and the end walls 30 and 31.

The ribs 17 on the members 15 also hold the wooden wedge 28 against its coming out when the tool is in use.

An important feature of the present construction is in the fact that when the handle dries out and shrinks and the head becomes loose upon it the original good and tight fit may be restored by simply driving the wedge 18 farther in between the members 15. Ordinarily driving it farther in the short distance between two adjacent teeth 26 on the wedge will restore the fit when the handle is appreciably loose. When the wedge 18 is driven farther and farther into the handle its sharp cutting edge 21 easily makes way for the wedge through the wood. The drying out of the wood naturally causes some looseness to occur between the handle and the head in the first part of the eye also and this may be overcome in the usual way, namely, by striking the free end of the handle a sharp blow with a hammer, driving it farther into the eye, and thereupon the wedge 18 is simply driven in a short distance and the original tight fit is found to be restored. From Fig. 2 it will be

noted that the difference in width between the wedge and the eye of the tool head allows for the driving in of the wedge a considerable distance. The amount of latitude in this direction may be varied so as to permit the wedge to be driven in still farther if desired. It will be observed that although the end of the wedge 18 is driven a considerable distance below the end surface 13 of the tool the binding pressure is still transmitted by the blocks 15 throughout their length, making for the tight fit desired.

Since the members 15 rest upon the wood at the bottom of the hole 300 they are held against further substantial movement into the handle and remain in their original positions respectively, the wedge passing on beyond them in the subsequent tightening operations.

It will also be appreciated that according to this construction the wood fibers at the end of the handle in the eye are not split up and weakened by the numerous filler pieces heretofore chiefly employed, nor is there any necessity for the addition of other filler pieces from time to time, further weakening the wood, but in this construction the wood in the eye is maintained in relatively large integral and sound masses on either side of the holding device, the strength of the handle being thereby greatly increased over that in the older practice.

I claim:

1. The combination of a tool head having a handle-eye therein, a handle extending into said eye, a pair of rigid substantially non-tapering pressure-transmitting members extending into a hole in the handle from the end thereof at the eye with their outer ends substantially flush with the end of the handle, said hole originally substantially corresponding to the shape of the pressure-transmitting members when inserted in the hole and providing a seat at the bottom of the hole for holding said members against further substantial movement into the handle, a wedge between said members adapted to move inwardly relative to them for forcing said members apart to bind the handle in the eye, and means within the handle for holding the wedge between said members in its binding position.

2. The combination of a tool head having a handle-eye therein, a handle extending into said eye, a pair of relatively long rigid substantially semi-cylindrical pressure-transmitting members extending into a substantially correspondingly rounded hole in the handle from the end thereof at the eye and having their outer ends substantially flush with the end of the handle, said members respectively having means within the handle for locking them in the handle against retraction, the bottom of said hole providing a transverse seat for holding said members substantially against further inward movement, a wedge positioned operatively between said members, and interengaging means on the wedge and members respectively for holding the wedge against retraction.

3. The combination of a tool head having an adz-eye handle-eye therein of the character described, the eye having opposite walls tapering outwardly from a middle portion toward each end of the eye, a tapering handle extending into and substantially through said eye with a substantially tight fit in the entrance part of the eye, the part of the handle within the other part of the eye having a hole extending longitudinally from the handle end, a pair of substantially semi-cylindrical pressure-transmitting members positioned in said hole and substantially fitting the hole on the rounded surfaces of said members with the outer ends of said members substantially flush with the end of the handle, said members respectively having means within the handle for locking them in the handle against retraction, means including a transverse seat in the handle at the inner end of said hole for holding said members substantially against further movement into the handle, and a wedge positioned operatively between said members, said members and the wedge having interengaging teeth for holding the wedge against retraction.

ALEXANDER S. VAUGHAN.