

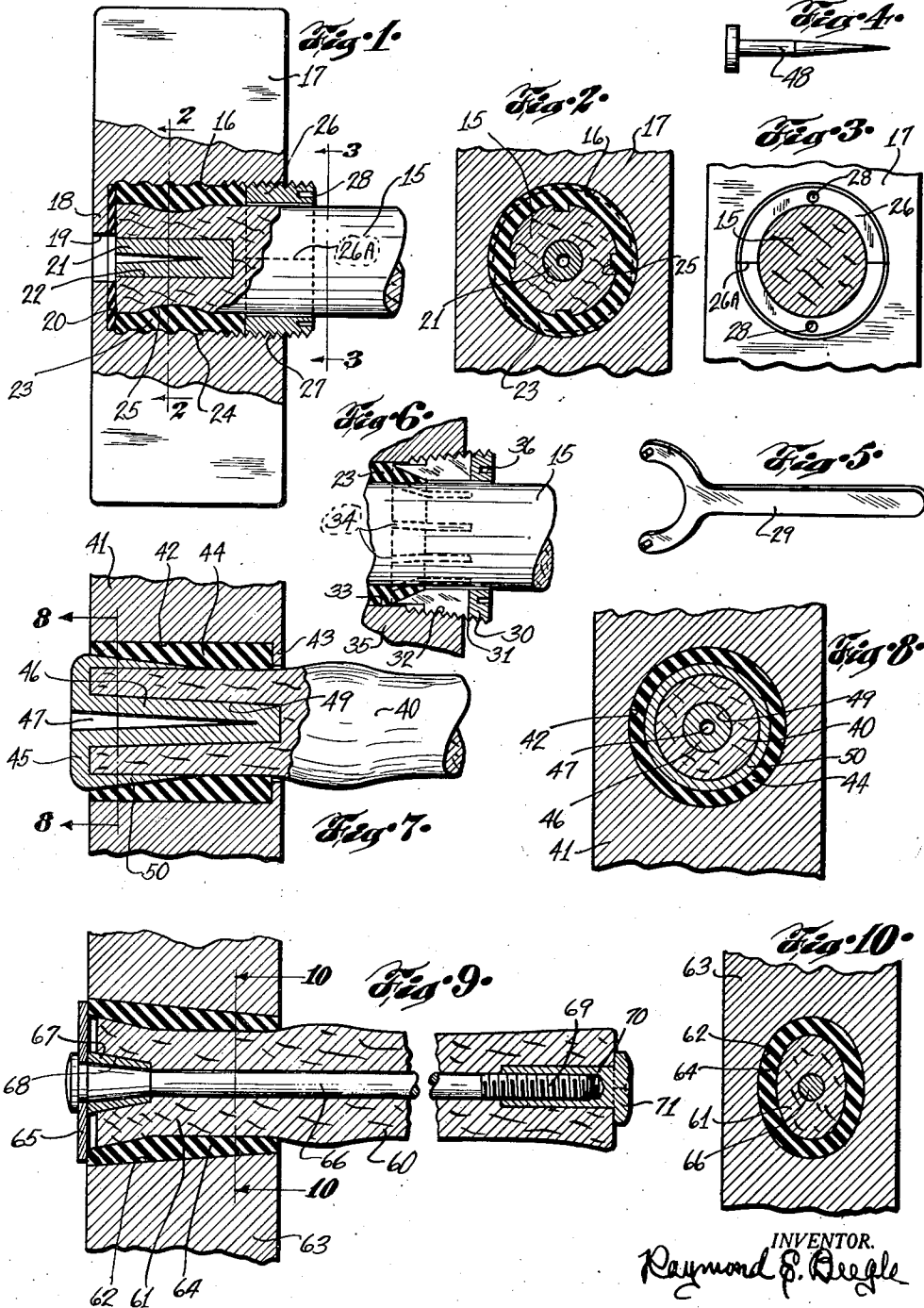
Jan. 12, 1937.

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2,067,751

SECURING MEANS FOR TOOL HANDLES

Filed March 2, 1935



UNITED STATES PATENT OFFICE

2,067,751

SECURING MEANS FOR TOOL HANDLES

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Application March 2, 1935, Serial No. 8,986

8 Claims. (Cl. 306—20)

The present improvements are particularly adapted for use with hammers of the type disclosed and claimed in my copending application of Serial No. 7,377, filed February 20, 1935.

5 This invention relates to improvements in securing means for tool handles, and more particularly to an improved means for securing the handle of a hammer or the like, to a head of a type provided with an eye for the reception of the handle.

10 The prevailing practice in this art has heretofore consisted, principally for the sake of economy, in the insertion of the end of a wood handle into the eye of a hammer head, the handle end being expanded by means of a metal wedge. The inflexibility of the wood, and the limited extent of its possible compression, render unfit these time-honored expedients. It is accordingly a general object of the invention to provide an improved, resilient cushioning insert between the handle end and the wall of the eye, together with provisions for a variation of the frictional relation between the assembled parts.

15 A further object of the invention is attained in the provision for internally expanding, as well as externally gripping, the end of a handle received by the eye of the tool head.

20 Yet another object of the invention is attained in an improved resilient or cushioning connection between a tool handle and its head, the compression or resilience of the connection being freely adjustable from time to time, and such as to minimize the transmission of driving shock and vibration from the tool head to the handle.

25 A further important object of the invention is realized in the provision of adjustable head- and handle-balancing means, such that the elements thereof may be used solely for balancing purposes, or as parts of the arrangement for assembling the tool handle and head.

30 Yet another object of the invention is attained in an arrangement whereby a relatively malleable or deformable insert is employed for expansion of the head-holding part of the handle, and such that the latter is externally cushioned within the head by an elastic element under variable compression.

35 Further objects and advantages of the invention will appear as the description proceeds, and from the accompanying drawing, in which:

40 Fig. 1 is a section through the head and a portion of the handle of a hammer as taken in a plane including the axes of the head and handle; Fig. 2 is a fragmentary section at a right angle to Fig. 1, as viewed along line 2—2 of Fig. 1;

Fig. 3 is a section transversely of a handle of a tool equipped in accordance with the present invention, and as viewed along line 3—3 of Fig. 1; Fig. 4 is a side elevation of a metal expander element such as may be used in spreading or deforming the metal insert internally of the handle end; Fig. 5 is a spanner wrench of a type adapted for threading the nut element of Fig. 1; Fig. 6 is a fragmentary sectional elevation in a plane corresponding to that of Fig. 1, but illustrating a modified arrangement for assembling the parts; Fig. 7 is a view in a plane corresponding to that of Fig. 1, but illustrating a modified arrangement for internally expanding the head end of the handle and for externally embracing the handle end within the eye; Fig. 8 is a sectional elevation as viewed along line 8—8 of Fig. 7; Fig. 9 is a fragmentary sectional elevation as viewed in a plane corresponding to those of Figs. 1 and 7, but illustrating a still further modification of the handle- and head-securing assembly, and Fig. 10 is a fragmentary section in a plane transverse to the handle but within the head portion, and as viewed along line 10—10 of Fig. 9.

Referring now by characters of reference to the drawing, the handle 15, usually formed of wood and of circular or oval section, is provided with an outer head-receiving end which extends into an eye 16 of socket form, located centrally of the hammer head 17, or other weighted portion of the driving tool, such as a sledge, maul or the like. It will be noted from Fig. 1, that in this structure the eye 16 does not extend clear through the head but terminates in an outer abutment 18 centrally apertured as at 19, in register with the central opening of an annular element or washer 20, preferably of rubber, the opening 19 being provided for access to an expandible plug member 21, formed of lead or other highly malleable and deformable material. The plug 21 occupies a preformed socket 22 therefor. Surrounding the head-receiving end of the tool, is a resilient element 23 formed of rubber or a composition characterized by the substantial resilience usually found in rubber stocks. Exteriorly of the member 23 and within the eye are formed a plurality of ribbed projections 24, on the element 23, and which serve to enhance the gripping engagement of the rubber sleeve or bushing with the internal metal wall of the socket or eye 16.

My preference is to provide the outer end of the handle 15 with slots 25, each of which extends a short distance lengthwise of this portion of the handle, and which, considered depthwise, are of arcuate section. This enables a certain

penetration of the handle end by the resilient stock of the sleeve 23, and provides an interlocking engagement between the sleeve and handle end.

Inwardly of the cushion or filler 23, which may be either originally tubular in form, or be formed of sheet material so as to assume a tubular aspect in assembly, is an externally threaded nut or bushing 26, which is preferably formed of metal, and the innermost margin of which abuts the adjacent annular margin of the filler sleeve 23. The nut 26 is characterized by external threads, and is of a length to project appreciably beyond the eye and along the handle which it slidably engages. The bushing or nut may be formed of one piece, but it is preferred to utilize a two-part member, divided longitudinally as indicated by dotted lines, at 26A. The two-part arrangement permits a latitude of accommodation for a variation in diameter of handle. To receive and co-act with the bushing 26, the eye 16 is internally threaded over a portion of its length as at 27. A convenient expedient for rotating the bushing 26 consists in the provision of a pair or more of opposed wrench-receiving pockets 28 for the reception of the prongs of a spanner 29 (Fig. 5), by which the bushing may be threaded up, or readily unthreaded for the purpose of enabling a variable compression of the resilient or elastic filler such as 23. The purpose of the arrangement also importantly includes a variation in balance of the assembly according to the extent the bushing is threaded into the eye, and also permits the nut to be backed out of the eye for the purpose of readily replacing the filler 23. In the arrangement of Fig. 1, it is my preference to provide in the outer end, or bottom of the socket constituted in part by the eye 16, the washer 20, heretofore noted. It will appear that the cushion or filler element 23, when compressed endwise under the influence of the nut or bushing 26, bottoms against the washer and thus expands in radial directions, both outwardly and inwardly, against the wall of the eye and about the end of the handle 15, within the eye.

Fig. 6 illustrates a modification of the arrangement of Fig. 1, the metal bushing 30 being shown, in the latter figure, as of tapered construction, the thickest portions of its wall being outermost of the eye and tapered inwardly thereof, with its inner end portion in engagement with the resilient sleeve 23. In this form of connection the outer threads 31 engage threads 32 in a tapered portion of the eye 33. The inner end of the bushing 30 is characterized by a plurality of slots 34 producing a castellated aspect in a manner to permit the end of the bushing to contract in diameter as it is threaded farther into the tapered eye portion. It is to be noted that the tapered end of the bushing may be extended so that the arrangement may be employed in case the resilient sleeve 23 is omitted. In this case a three-part structure results, in which the bushing slidably surrounds the end of the handle 15 and may be employed solely for the securement thereof into the eye of the head 35. Similarly, the bushing 30 may be employed for adjusting the balance of the head, by properly adjusting the mass of the bushing carried exteriorly of the head, and thus bring the center of gravity of the assembly relatively rearwardly along the handle. The spanner shown in Fig. 5 may be employed to engage apertures 36, in the arrangement of Fig. 6, in a manner similar to the bushing 26; however, in either case a hexagon or other polygonal wrench-receiving

head (not shown) may be employed, or the bushing may be formed for manual actuation without the use of tools.

The modification of Fig. 7 is characterized by a handle 40 and a head 41 which is provided with an eye 42 in the nature of a socket; however, the socket of Fig. 7 is inverted relative to that of Fig. 1, in that the portion of reduced diameter constituted by an annular flange 43, is on the innermost end of the eye and serves to provide an abutment for the resilient sleeve 44, which may be generally similar to those heretofore described.

As an element serving the dual purpose of regulating the balance of the head and handle assembly, and of selectively tightening the handle end in the eye, there is employed a member, preferably of one-piece, formed of a highly malleable material such as lead. This consists, as shown, of a rather heavy base portion 45 of disc form, centrally of which and inwardly of the handle projects a stem 46, provided with a tapered axial aperture 47 so that the stem may be selectively expanded by the tool 48 (Fig. 4) within a socket 49 in the end of the handle. It may here be noted that the tool 48 is also adapted for expansion of the lead plug element of Fig. 1, within the handle. In exterior engagement with the handle end is an annular flange, rim or skirt 50 which is of wedge form in longitudinal section, and which preferably, although not necessarily, is of annular transverse section as shown by Fig. 8. The internal and external gripping engagement of the element 45 prevents splitting of the handle end, since its skirt portion 50 embraces this part of the wood. At the same time the taper of the skirt 50 serves selectively to wedge and compress the bushing 44 within the eye, and thus selectively to tighten the handle and control the resilience of the connection. It is also important to be noted that the disc portion exteriorly of the eye will provide, according to the depth of the insertion of the member, a variable balancing expedient for the handle and head assembly. In applying the member 45, it may be started manually and then struck inwardly with a hammer to the extent desired for balancing purposes. Thereafter, if necessary, the tool 48 may be employed in the opening 47 selectively to expand the stem 46 within the socket 49.

In the arrangement of Fig. 9, there is illustrated a handle 60, the head-receiving end 61 of which is preferably flared at its outer end. In this case the eye 62 within the head 63 is tapered, being of larger diameter near the outer end, and of smaller diameter near its inner end. A sleeve 64 of rubber or other resilient composition is related to the handle end similarly to the previous showings. Bearing against the outer end face of the resilient sleeve 64 is a collar 65 in the nature of a washer, centrally apertured and preferably formed of a relatively rigid lead alloy. Projecting through the opening in the washer 65 is the head end of a bolt 66, while inwardly of the washer 65 and bolt head is a tapered sleeve 67, also preferably formed of lead and extending into a tapered socket 68 in the outer end of the handle. The bolt 66 projects from this point axially through the handle, terminating in a threaded end 69 which is in threaded engagement with a socketed screw 70, the head 71 of which projects outwardly of the free end of the handle and the socket of which is internally threaded to engage the threads of the bolt. As the head 71 of the screw element is threaded up, the bolt will be drawn farther inwardly of the handle, serving

variably to compress the rubber or like sleeve 64, and serving to vary the extent of penetration of the tapered lead sleeve 67. Facilities are thus provided for varying the extent of compression of the sleeve 64, and at the same time variably internally expanding the end of the wood handle. It may be noted that the lead washer or collar 65 may be of any desired thickness for counterbalancing purposes, and that its position with respect to the head and handle are varied as the nut 70 is threaded up.

It may also be noted that parts of the assembly shown by Fig. 9 may be employed for the purposes either of adjusting the balance of the head, or of expanding the end of the handle into snug engagement within the eye, without requiring the use of the resilient sleeve 64. The latter is however preferred, to obtain the maximum of adjustment facilities and in fulfillment of its shock-absorbing function.

While the invention has been described with reference to hammers, it is to be understood that this term is generically utilized, and that the features hereof are applicable to sledges, mauls and impact driving elements generally, and in many instances applicable for the securing of any actuating handle member to the implement, tool or device to be manipulated or controlled by the handle.

While the invention has been described with reference to a limited number of possible physical embodiments, it is to be understood that many changes may be made in the parts, their combinations and their arrangements, without departing from the full intended spirit and scope of the invention as defined by the claims hereunto appended.

I claim as my invention:

1. In combination in a hand implement of impact type, a head provided with an eye, a handle having an end extended into, and smaller than said eye, an elastic cushion member about the handle and within the eye, a metal element in variable compression engagement with the cushion member, and an element of deformable metal constituting a loading within the handle end, and adapted for compressive deformation, internally to expand the end of the handle against said cushion member.

2. In a hand tool of impact type, a head provided with an eye, a handle having an end extended into and smaller than said eye, a rubber filler about the handle end and within the eye, means for variably compressing the rubber filler about the handle end, and a lead insert located axially of the head end of the handle and adapted to be deformably compressed in a radial direction for the internal expansion of the handle end against the filler.

3. A hammer head and handle assembly including, in combination, a head having an eye therein and a handle having a head-receiving end smaller than said eye, an elastic bushing within the eye about the handle end, a nut about the handle end and threadedly engaging the head, said nut being in variable compression engagement with the bushing, and an insert of malleable metal within the handle end, adapted to be deformed for the expansion of the handle end against the elastic bushing.

4. In a hammer head and handle assembly, a

head having an eye, and an abutment near one end of the eye, a handle having an end smaller than and extended into said eye, an elastic bushing about the handle end within the eye, one end of said bushing bearing against said abutment, a metal bushing in variable compression engagement with the elastic bushing, the metal bushing surrounding the handle and being externally threaded, and the eye being provided with internal threads coacting with those of the bushing, and a metallic element within the handle end, adapted to be deformed for the expansion of the handle end against said elastic bushing.

5. In a hand tool of impact type, such as a hammer, a head provided with an eye, a handle having an end within the eye, a rubber bushing about the handle end within the eye, said handle end being recessed to permit interengagement thereof with the rubber bushing upon compression of the bushing, a metal bushing surrounding the handle near one end of the eye, the bushing being externally threaded and the eye being internally threaded to coact with the bushing, the eye being formed to provide an abutment for one end of the rubber bushing to permit variable compression of said bushing between the metal bushing and the abutment.

6. In a handle and head assembly in an impact tool, a tool head having an eye internally threaded near one of its ends, and a portion of reduced or stepped diameter near the opposite end, a handle having an end within the eye, a tubular rubber insert about the handle end within the eye, one end of the insert bearing against said portion of stepped diameter, an externally threaded metal bushing bearing against the opposite end of the rubber insert and threadedly engaging the threaded end of the eye, and an element of malleable metal constituting a loading within the handle end, and adapted to be deformed for the expansion of the handle end against the rubber insert.

7. In a hammer head and handle assembly including a head having an eye therein, a handle having an end extended into the eye, a rubber sleeve about the handle end within the eye, an element of malleable metal disposed within said handle end and adapted to be deformed for expanding the handle end against said rubber sleeve, and a nut slidably surrounding the handle adjacent said eye, the eye being internally threaded to receive the nut, and the nut projecting beyond the eye, whereby to enable variation in the balance of the assembly according to the extent of threaded engagement of the nut with the head.

8. In a hand tool of impact type such as a hammer, a head having an eye and an abutment near one end of the eye, a resilient element adjacent said abutment, a handle having one end extended into the eye and bearing against said element, a rubber cushion about the handle and within the eye, one end of said cushion abutting said resilient element, said handle end being recessed to permit interengagement thereof with the cushion upon compression of the cushion, and a nut projecting into the eye and threadedly engaging the head for variably compressing the rubber cushion between the nut and said resilient element.

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