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MARKING HAMMERS

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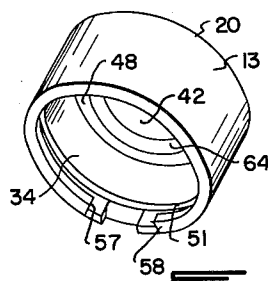
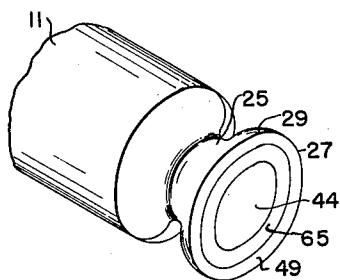
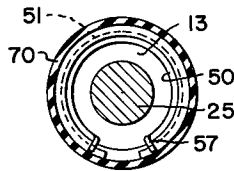
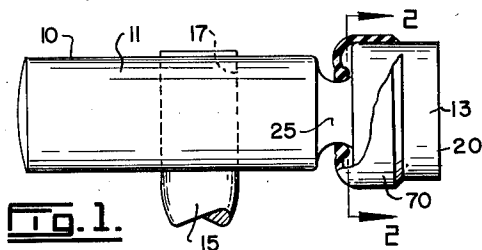


Fig. 3.

Fig. 4.

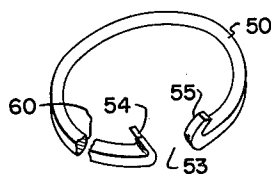


Fig. 5.

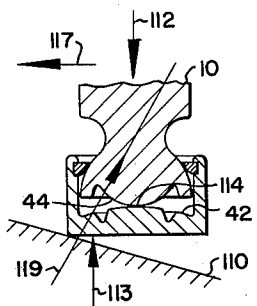


Fig. 9.

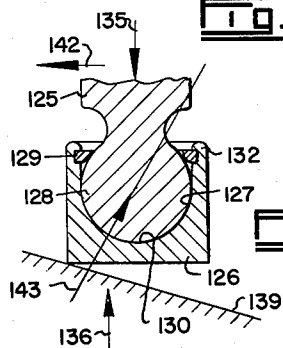


Fig. 10.

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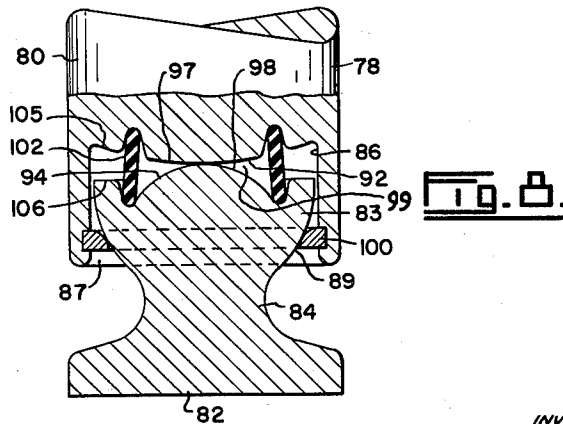
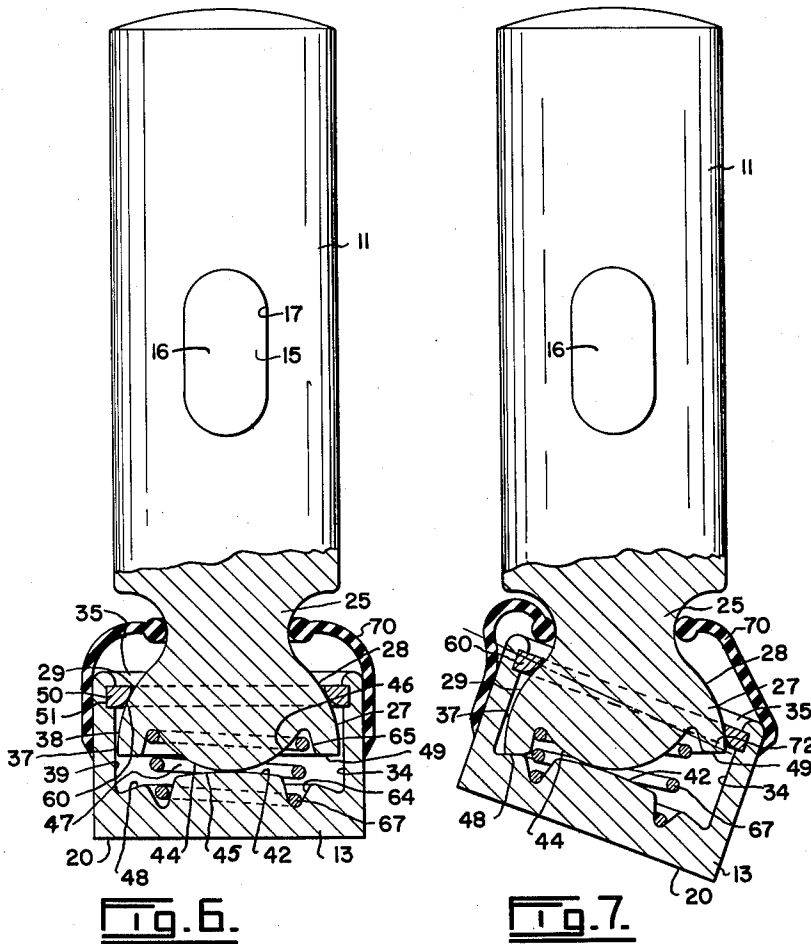
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MARKING HAMMERS

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This invention relates to improvements in hammers having self-aligning striking heads.

Although this hammer is particularly designed to be used for marking purposes, that is, a hammer having indicia on the striking face thereof, for cutting into material such as wood, or for printing on a surface, it may be used as an ordinary hammer with a self-aligning head.

Hammers with self-aligning heads are not new, but the hammers of the prior art include ball and socket arrangements wherein the surfaces of balls slide over concave surfaces of sockets. This results in a great deal of wear, in a tendency to bind under the force of a blow struck by the hammer, and if dirt, and particularly sand, gets in between the rubbing surfaces as it frequently does, these surfaces are soon scratched and are roughened so that they practically put the self-aligning feature out of commission.

An object of the present invention is the provision of a hammer with a self-aligning head of such construction that the above problems are substantially eliminated.

Another object is the provision of a marking hammer having a self-aligning head which may be quickly and easily mounted and demounted so that heads with different markings may be conveniently used.

Another object is the provision of a marking hammer having a quickly demountable striking head and yet which will not come apart during use.

The present hammer, instead of including relatively sliding surfaces between the self-aligning head and the support therefor, employs relatively rolling surfaces whereby one surface tends to roll over another. This eliminates excessive wear caused by scraping, resulting in the hammer lasting a great deal longer than the prior art hammers, and allows the striking head to roll quickly to an angle relative to the remainder of the hammer when an object is struck at an angle other than an angle normal to the object surface. If dirt, including sand, does get between the rolling surfaces, it is crushed by said surfaces rather than scraped between them. The crushing of sand grains prevents scratching and gouging of the relatively moving surfaces.

A hammer according to the present invention comprises a body element and a co-operating striking head element, with a cavity in one of said elements having an entrance facing the other element, and a knob on a neck extending from said other element and freely fitting within the cavity. In the preferred form of the invention, this knob is tapered inwardly towards the neck. Retaining means is provided in the element with the cavity at the entrance thereof and over the tapered portion of the knob for preventing withdrawal of the latter from the cavity while allowing a relative swivel action between the cavity element and said knob. A bottom surface is formed in the cavity opposite the entrance thereof, and a surface is formed on the knob near and facing said bottom surface, at least one of said surfaces having a projection extending outwardly therefrom centrally thereof and the other surface being shaped to permit the surface of the projection to rock on said other surface. The edges of the bottom and knob surfaces are normally spaced apart to permit the rocking action. The projection and said other surface are in rolling or rocking engagement when the head element strikes an object during use of the hammer and as a result of any relative swivel action be-

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tween the cavity element and the knob. The projection is preferably formed by substantially doming the surface outwardly, and it is preferred although not absolutely necessary, oppositely to dome the opposing surface. The main thing is that at least one of the two opposing surfaces has a projection centrally thereof extending towards the opposite surface.

Examples of this invention are illustrated in the accompanying drawings, in which,

FIGURE 1 is a side elevation of a preferred form of hammer,

FIGURE 2 is a section taken on the line 2—2 of FIGURE 1,

FIGURE 3 is a perspective view of the knob of the hammer of FIGURE 1,

FIGURE 4 is a perspective view of the striking head element of this hammer,

FIGURE 5 is a perspective view of one form of retainer spring used in this hammer,

FIGURE 6 is an enlarged section through the striking head and knob of this hammer, with the head in its normal position,

FIGURE 7 is a view similar to FIGURE 6, but showing the striking head swivelled to an extreme angular position relative to the remainder of the hammer,

FIGURE 8 is a view similar to FIGURE 6, illustrating an alternative form of hammer,

FIGURE 9 diagrammatically illustrates the forces involved when the present hammer strikes a surface that is inclined to the direction of the blow, and

FIGURE 10 diagrammatically illustrates the forces involved when a ball and socket type of hammer strikes a surface inclined relative to the direction of the blow.

Referring to FIGURES 1 to 7, 10 is a preferred form of hammer including a body element 11 and a co-operating striking head element 13. If this is a hand hammer, a handle 15 is connected to the body or element 11 in any desired manner. In this example, the end 16 of the handle extends through a hole 17 formed in the body. The body may be formed of any desired material, but it usually is formed of steel, and is of such proportions as to give the hammer a desired weight.

The striking head or element 13 has a striking surface 20 which normally extends substantially at right angles to and across the longitudinal axis of body 11. Surface 20 may be plain, so that the hammer is self-aligning head type of striking hammer, or it may have indicia, not shown, formed in or on said surface. This hammer is primarily designed for marking logs, in which case, suitable indicia projects from surface 20 or from a plate secured to said surface. However, rubber or the like indicia may be attached to surface 20, in which case, the hammer would be used in association with ink as a stamping device.

A neck 25 is formed on and projects outwardly from an end of body 11, and a knob 27 is formed on or attached to the outer end of said neck. The body may be thicker than the neck, as shown, or it may be the same size as or smaller than said neck. The knob is larger than neck 25, and is preferably formed with a portion 28 which tapers inwardly to said neck. It has been found desirable to produce tapered portion 28 by rounding the back of the knob at 29, as clearly shown in FIGURE 6.

Striking head 13 is formed with a cavity 34 having an entrance 35 facing body 11 and at the end of said head 13 remote from the striking surface 20 thereof. Knob 27 freely fits into cavity 34, while the tapered portion 28 thereof extends outwardly through entrance 35. It will be noted in FIGURE 6 that there is a slight space 37 between the side 38 of the knob and cavity wall 39, and this is preferred, although the side and wall may touch.

Cavity 34 of striking head 13 is provided with a bottom surface 42, and knob 27 is provided with a surface 44 near and opposed to bottom surface 42. Either or both of the surfaces 42 and 44 includes or include a projection centrally thereof extending towards the opposite surface. The best results are obtained by making each projection in the form of a dome. In the preferred form of the invention, the surfaces 42 and 44 include opposed domes 45 and 46, respectively. Each dome may be rounded, as shown, or it may be substantially conical in shape. However, each projection may be any desired shape provided it can roll or rock against the opposing surface. If there is a dome or projection at only one of the surfaces 42 and 44, the opposite surface must be such that it will permit the surface of the dome or projection to roll or rock on said opposite surface. In addition to this, the part of the surface with the projection extending therefrom and around said projection is normally spaced from the opposing surface and is movable towards and away from the latter. This space is indicated by numeral 47. Surface 42 has an annular shoulder 48 therearound near the cavity wall 39, while surface 44 has a similar shoulder 49 opposed to and normally spaced from shoulder 48.

Suitable retaining means is provided at entrance 35 of the cavity 34, and over the tapered portion 28 of knob 27 in order to keep said knob in the cavity. This is preferably done with a spring clip 50, see FIGURES 2, 5 and 6, which fits into a groove 51 formed in cavity wall 39 at the cavity entrance 35. The spring clip extends outwardly from groove 51 into the cavity and over the tapered portion 28 of the knob. This spring clip is basically of well known design. It is usually made of spring steel and it is circular in form with a gap 53 therein, see FIGURE 5. This particular clip is formed with lugs 54 and 55 on opposite sides of gap 53 which project through a notch 57 formed in the edge 58 of head 13, said notch being deep enough to communicate with groove 51 in said head. When it is desired to remove clip 50 from its groove 51, the lugs 54 and 55 are gripped by a suitable tool, such as pliers, and moved towards each other to reduce the size of gap 53. This reduces the diameter of the clip so that it may readily be drawn from groove 51 and lifted out through cavity entrance 35.

Although spring clip 50 is generally rectangular in cross section, it is preferable to form it with an inner bevel surface 60 facing the tapered portion 28 of knob 27. In the illustrated clip, bevel surface 60 is actually rounded in cross section away from the rounded surface 29 of the knob.

The hammer described so far is ready for use and will function satisfactorily. However, it has been found preferable to provide means for retaining head 13 in a normal striking position, that is, with surface 20 extending substantially at right angles to the axis of the hammer body 11. In this example, the cavity bottom surface 42 is formed with an annular groove 64 inside shoulder 58 and opposing an annular groove 65 formed in knob surface 44 inside shoulder 49. These grooves are concentric with the centres of their respective surfaces. Suitable resilient means is provided between surfaces 42 and 44. A coil spring 67 is shown with its ends fitting in grooves 64 and 65 for this purpose but a sleeve formed of suitable resilient material, such as rubber, might be used in the same way for the same purpose. Spring 67 acts as a self-centering device for maintaining head 13 in its normal striking position while allowing said head to swivel around knob 27. The projections or domes 45 and 46 may be in constant engagement, or they may be spaced slightly apart. In any case, when a blow is struck by the hammer, surfaces 45 and 46 are in rolling or rocking engagement.

It is preferable to provide a dust guard for hammer 10. This may be in the form of a resilient sleeve 70 which fits at one end snugly around neck 25 and extends outwardly over the outer surface of striking head 13.

The retainer or spring clip 50 keeps striking head 13 in position on knob 27. As this clip extends inwardly over the tapered portion 28 of the knob, it allows said head to swivel relative to the knob. FIGURE 7 shows the head in its maximum angular position relative to the knob. It will be noted that the thickness of the knob indicated by line 72 is such that the knob cannot slip out from under clip 50. By rounding the knob at 29, as shown, said knob substantially fills clip 50 at all times so that there is practically no room for dirt to get inside the striking head. Any pressure applied to the clip is against bevel or rounded surface 60 so that the force tends to press the clip into its groove, thereby eliminating any possibility of the clip being knocked out of its groove when the hammer is used to deliver very heavy blows or during constant use. It will be noted from FIGURE 7 that when the striking head has swivelled as far as it will go, annular shoulders 48 and 49 are in engagement. When the head is in this position, a large percentage of the force of the blow is applied towards the lower edge (as seen in FIGURE 7) of the head. When shoulders 48 and 49 come together at the upper edge of the head, some of the force is applied through said shoulders towards the upper ends.

If, when the hammer is used, the striking surface thereof hits the surface of an object at an angle to the latter surface, head 13 will instantly swivel to bring its striking surface into parallelism with the object surface. During this time, dome 45 rolls over dome 46 so that substantially no rubbing action takes place as the striking head swivels on the knob. Not only does this greatly reduce friction and wear, but a particle of dirt, such as a grain of sand, caught between domes 45 and 46 is crushed thereby and not move therebetween. However, the rolling action takes place unimpeded, even if one or both of the surfaces 45 or 46 is pitted or roughened. Spring clip 50 is so located that it permits the head to swivel as far as necessary for hammers of this type. Spring 67 returns head 13 to its normal striking position when the hammer is swung away from the object being struck, and it keeps the knob centered in cavity 34, but said spring may be omitted. Sleeve 70 helps to keep the dirt out of the strike head socket.

As stated above, one of the projections or domes 45 or 46 may be omitted, and, although a dome is preferred, the projection may have other shapes. In either case, the surface opposing the projection or dome must not follow the shape of or enclose the projection or dome so that the surface of the latter is not free to roll or rock over said opposing surface. Although it is preferable to have a central projection on the opposing surface, the latter may be flat or even depressed as long as there is a space between the edge of the surface with the projection and said opposing surface. The surface of the projection or dome must be free to roll or rock on the opposing surface. With this construction, no lubricant is required in this hammer.

FIGURE 8 illustrates an alternative form of hammer 78. This is similar to hammer 10, excepting that the socket is formed in the hammer body, and the knob is connected to the striking head.

Hammer 78 includes a body element 80 and a striking head element 82 co-operating therewith. A knob 83 is connected to or formed on the outer end of a neck 84 extending away from the head 82. This knob fits within a cavity 86 formed in an end of body 80 and having an entrance 87 opening out from the cavity and facing the head. Knob 83 is preferably formed with a portion 89 which tapers inwardly toward neck 84. Cavity 86 has a bottom surface 92, while knob 83 is formed with a surface 94 near and opposed to surface 92. Either or both of the surfaces 92 and 94 includes or include central projections. In this example, surfaces 92 and 94 include central domes 97 and 98 respectively. If one projection only is used, the opposing surface must have a shape that will permit the surface of the projection to roll or

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rock on said opposing surface. Furthermore, the edge of the surface with the projections normally must be spaced from said opposing surface in order to permit the rocking or rolling to take place. A space 99 is left between surfaces 92 and 94 at the edges thereof. Knob 83 is retained in cavity 86 by means of a spring clip 100 which is similar to clip 50 described above. Resilient means, such as a rubber sleeve 102, is provided around domes 97 and 98 to keep knob 83 centered in cavity 86 to retain head 82 in a normal striking position. Opposed annular shoulders 105 and 106 are formed on surfaces 92 and 94 respectively.

Hammer 78 functions in substantially the same manner as hammer 10. Domes 92 and 94 are in rolling or rocking engagement when the striking surface of head 82 strikes an object. Head 82 swivels relative to hammer body 80 when the striking surface of the head engages the surface of an object at an angle other than normal to the longitudinal axis of body 80. There is substantially no rubbing or sliding action between the various surfaces of the cavity and the knob, and any particles of dirt that do get into the cavity and between domes 97 and 98 will be crushed as said surfaces rock relative to each other.

FIGURE 9 diagrammatically illustrates the forces that come into play when hammer 10 strikes an inclined surface 110 under the most unfavourable conditions. The direction of the blow is indicated by arrow 112 and the reaction force by arrow 113. The reaction force 113 causes the striking head to swivel around fulcrum point 114. However, should the hammer also be moving sideways at the moment of impact, indicated by arrow 117, the resultant reaction force would be substantially along arrow 119. This would not cause any sliding action between surfaces 42 and 44 but merely causes the head to swivel around fulcrum 114. Therefore, the reaction force always aids the swivel motion of the striking head.

FIGURE 10 diagrammatically illustrates a ball and socket type of hammer 125 having a striking head 126 with a socket 127 therein into which a ball 128 fits. A spring clip 129 similar to those of the present invention is included to keep the striking head or ball 128, but it is to be understood that this clip does not form part of the prior art. The socket has a curved concave bottom 130 concentric with and slidably engaging a curved surface 132 on the ball. Arrows 135 and 136 indicate the direction of the blow and reaction force respectively as the hammer strikes a sloping surface 139. It is obvious that only a small portion of the reaction force is available to cause surface 130 to slide along surface 132 in order to enable head 126 to swivel on ball 128. If the movement of the hammer has a lateral component at this time, indicated by arrow 142, the resultant reaction force is in the direction of arrow 143. This reaction force opposes the swivelling motion of head 126, and the harder the blow, the greater the opposition to the swivelling of the head. Thus, FIGURES 9 and 10 illustrate an advantage of the present hammer over the ball and socket type of the prior art, since with the former hammer the reaction force always assists the swivelling of the striking head, but with the prior art hammer the reaction force often opposes said swivelling action.

What I claim as my invention is:

1. A hammer comprising a body element and a cooperating striking head element mounted to swivel relative to said body element, a cavity in one of said elements and having an entrance facing the other element, a knob on a neck extending from said other element and freely fitting within the cavity to turn within the latter, said knob being larger than the neck, retaining means in the element with the cavity at the entrance thereof and over the knob for preventing withdrawal of the latter from the cavity while allowing a relative swivel action between the cavity element and said knob, a bottom surface in the

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cavity opposite the entrance thereof, and a surface on the knob near and facing said bottom surface, at least one of said surfaces including a projection extending outwardly therefrom centrally thereof towards the other surface and said other surface being shaped to permit the surface of the projection to rock on said other surface, and said bottom and knob surfaces normally being spaced apart at the edges thereof, whereby said surfaces are in rocking engagement when the head element strikes an object during use of the hammer and as a result of any relative swivel action between the cavity element and the knob.

2. A hammer as claimed in claim 1 including opposed annular shoulders formed on the cavity bottom surface and the opposing knob surface, said shoulders normally being spaced apart and coming together when the relative rocking of said surfaces reaches a predetermined extent.

3. A hammer comprising a body element and a cooperating striking head element mounted to swivel relative to said body element, a cavity in one of said elements and having an entrance facing the other element, a knob on a neck extending from said other element and freely fitting within the cavity to turn within the latter, said knob being larger than the neck, retaining means in the element with the cavity at the entrance thereof and over the knob for preventing withdrawal of the latter from the cavity while allowing a relative swivel action between the cavity element and said knob, a bottom surface in the cavity opposite the entrance thereof, and a surface on the knob near and facing said bottom surface, at least one of said surfaces including a dome extending outwardly therefrom centrally thereof towards the other surface and said other surface being shaped to permit the surface of the projection to rock on said other surface, and said bottom and knob surfaces normally being spaced apart at the edges thereof, whereby said surfaces are in rocking engagement when the head element strikes an object during use of the hammer and as a result of any relative swivel action between the cavity element and the knob.

4. A hammer as claimed in claim 3 in which the knob is tapered inwardly towards the neck, and the retaining means comprises a spring clip fitting in a groove formed in the cavity element at the entrance of the cavity and opening into the latter, said clip projecting a little into the cavity over the tapered portion of the knob and having a bevel surface facing and substantially parallel with said tapered portion.

5. A hammer as claimed in claim 3 including resilient means between the knob surface and the bottom surface normally maintaining the head element in a normal striking position.

6. A hammer comprising a body element and a cooperating striking head element mounted to swivel relative to said body element, a cavity in one of said elements and having an entrance facing the other element, a knob on a neck extending from said other element and freely fitting within the cavity to turn within the latter, said knob being larger than the neck, retaining means in the element with the cavity at the entrance thereof and over the knob for preventing withdrawal of the latter from the cavity while allowing a relative swivel action between the cavity element and said knob, a bottom surface in the cavity opposite the entrance thereof, a surface on the knob near and facing said bottom surface, and a central dome forming part of each of said surfaces extending towards the opposite surface, whereby said surfaces are in rocking engagement when the head element strikes an object during use of the hammer and as a result of any relative swivel action between the cavity element and the knob.

7. A hammer comprising a body, a neck projecting from the body, a knob on the outer end of the neck and being larger than said neck, a striking head having a cavity therein with an entrance opening out from the

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head, said knob freely fitting within the cavity to turn within the latter, retaining means in the head at the cavity entrance and over the knob for preventing withdrawal of the latter from the cavity while allowing a relative swivel action between the head and said knob, a bottom surface in the cavity opposite the entrance thereof, a surface in the knob near and facing said bottom surface, at least one of said surfaces including a dome extending outwardly therefrom centrally thereof towards the other surface and said other surface being shaped to permit the surface of the dome to rock over said other surface, and said bottom and knob surfaces normally being spaced apart at the edges thereof, whereby said surfaces are in rocking engagement when the head strikes an object during use of the hammer and as a result of any relative swivel action between the head and the knob.

8. A hammer comprising a body, a neck projecting from the body, a knob on the outer end of the neck and being larger than said neck, a striking head having a cavity therein with an entrance opening out from the head, said knob freely fitting within the cavity to turn within the latter, retaining means in the head at the cavity entrance and over the knob for preventing withdrawal of the latter from the cavity while allowing a relative swivel action between the head and said knob, a bottom surface in the cavity opposite the entrance thereof, a surface in the knob near and facing said bottom surface, and a central dome on each of said surfaces extending towards the opposite surface, whereby said surfaces are in rocking engagement when the head strikes an object during use of the hammer and as a result of any relative swivel action between the head and the knob.

9. A hammer comprising a body, a cavity in the body with an entrance opening out therefrom, a striking head having a neck extending towards the body, a knob on the outer end of the neck and being larger than said neck, said knob freely fitting within the cavity to turn within the latter, retaining means in the body at the

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cavity entrance and over the knob for preventing withdrawal of the latter from the cavity while allowing a relative swivel action between the body and said knob, a bottom surface in the cavity opposite the entrance thereof, a surface in the knob near and facing said bottom surface, at least one of said surfaces including a dome extending outwardly therefrom centrally thereof towards the other surface and said outer surface being shaped to permit the surface of the projection to rock on said other surface, and said bottom and knob surfaces normally being spaced apart at the edges thereof, whereby said surfaces are in rocking engagement when the head strikes an object during use of the hammer and as a result of any relative swivel action between the body and the knob.

10. A hammer comprising a body, a cavity in the body with an entrance opening out therefrom, a striking head having a neck extending towards the body, a knob on the outer end of the neck and being larger than said neck, said knob freely fitting within the cavity to turn within the latter, retaining means in the body at the cavity entrance and over the knob for preventing withdrawal of the latter from the cavity while allowing a relative swivel action between the body and said knob, a bottom surface in the cavity opposite the entrance thereof, a surface in the knob near and facing said bottom surface, and a central dome on each of said surfaces extending towards the opposite surface, whereby said surfaces are in rocking engagement when the head strikes an object during use of the hammer and as a result of any relative swivel action between the body and the knob.

References Cited in the file of this patent

UNITED STATES PATENTS

124,655	Bailey	Mar. 19, 1872
583,287	Gardner	May 25, 1897
1,727,915	Thomson	Sept. 10, 1929
2,198,764	Edwards	Apr. 30, 1940