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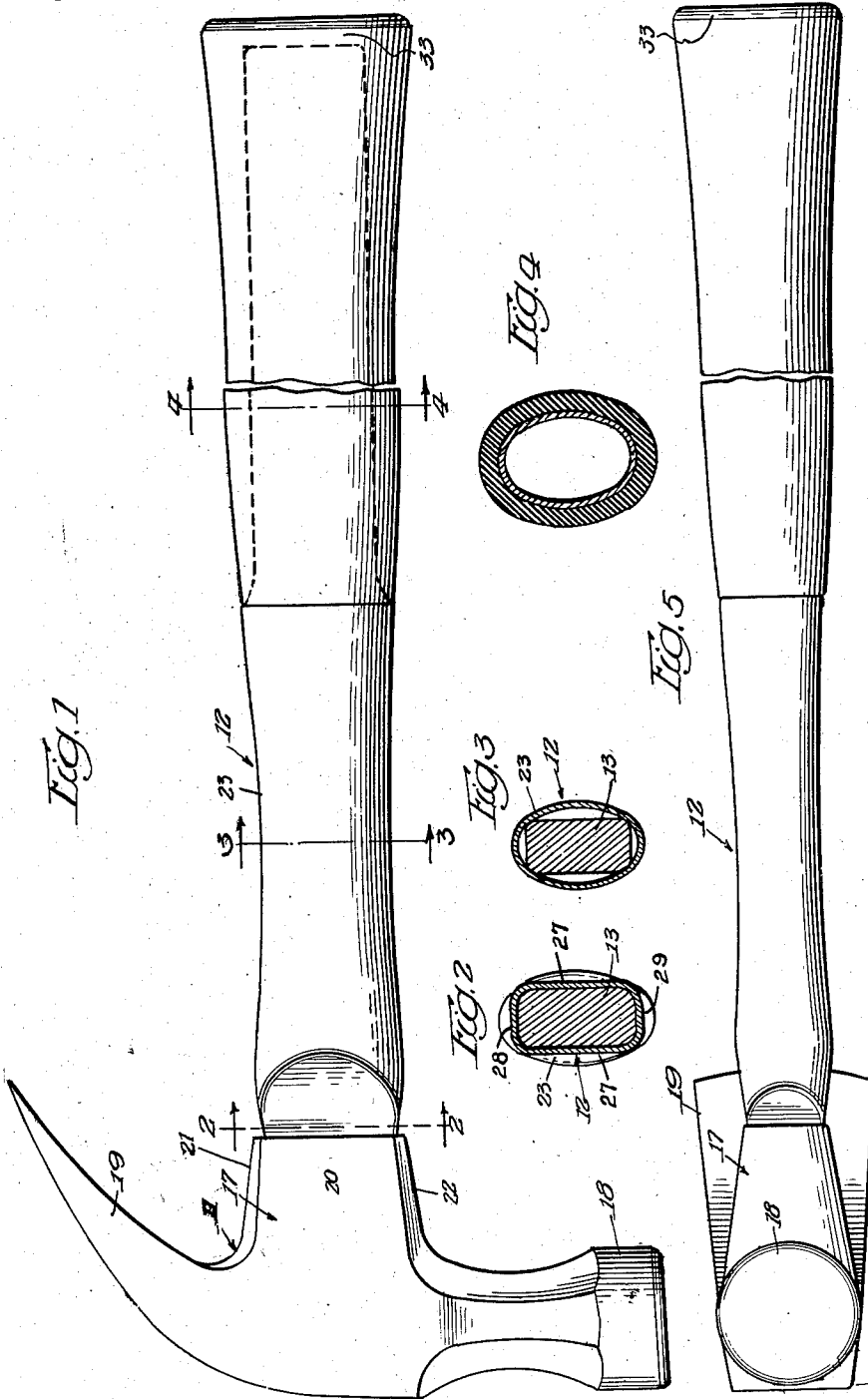
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CLAW HAMMER WITH TUBULAR HANDLE

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2 Sheets-Sheet 1



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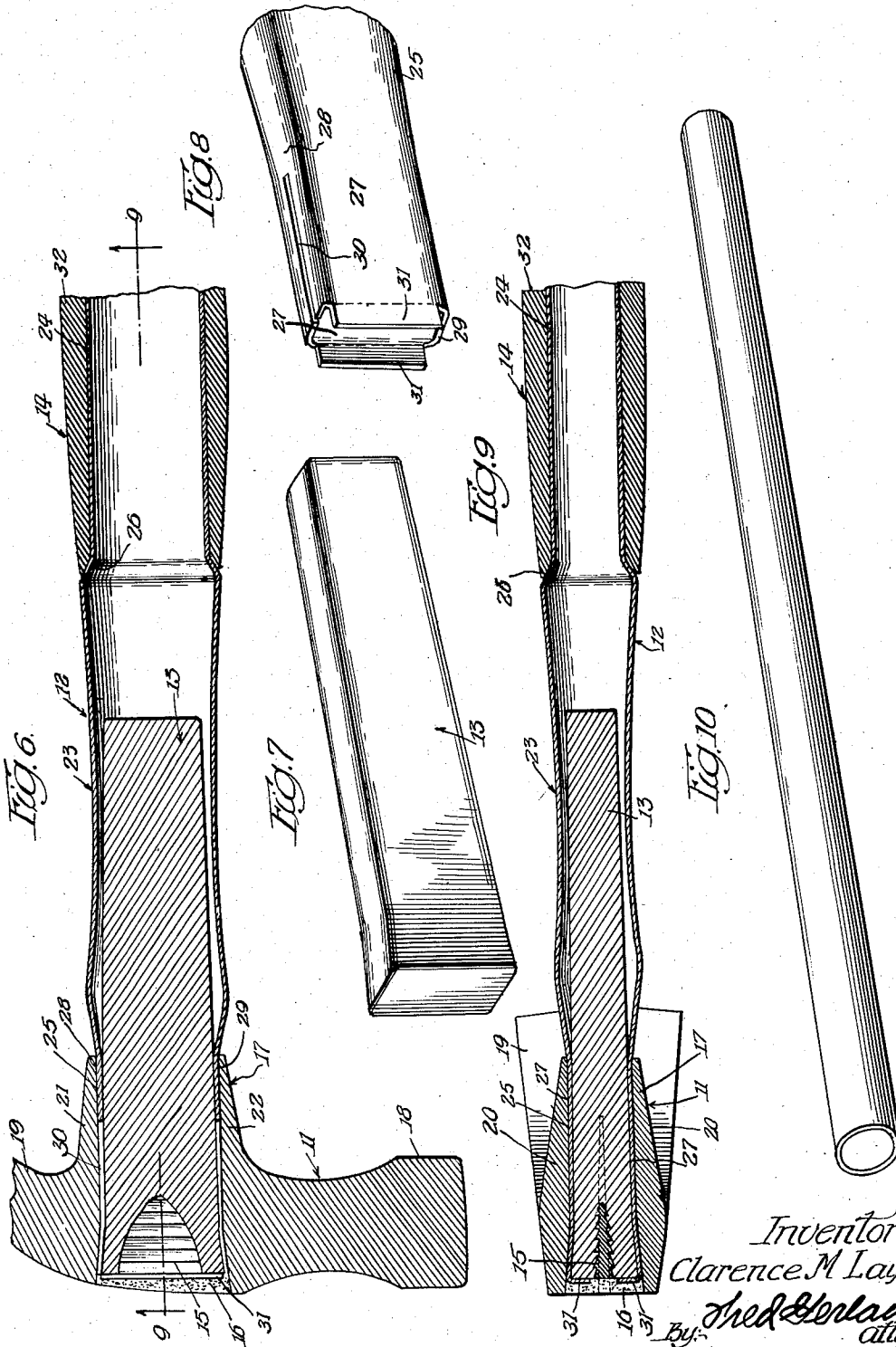
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CLAW HAMMER WITH TUBULAR HANDLE

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2 Sheets-Sheet 2



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CLAW HAMMER WITH TUBULAR HANDLE

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Continuation of application Serial No. 565,976, February 16, 1956. This application April 1, 1958, Serial No. 727,021

6 Claims. (Cl. 145-29)

The present invention relates generally to hammers for use by carpenters and others in hammering nails and other items or objects. More particularly, the invention relates to that type of hammer which is known in the hardware industry as a claw hammer and as its components or parts comprises: (1) a one-piece head which is in the form of a drop forging and consists of an elongated open-ended eye which has its interior of generally uniform cross sectional shape from end to end, a cylindrical hammer part which is connected to, and extends downwards from, the outer end portion of the bottom part of the eye, and a bifurcated arcuate claw which is connected to, and extends upwards from, the outer end portion of the eye top part; (2) an elongated one-piece tubular handle which is formed of steel or similar strong metal and embodies an intermediate neck-like part, a comparatively long rear end part which is connected to the rear end of, and is in longitudinal alignment with, the intermediate neck-like part, and a front end part which is connected to the front end of the intermediate neck-like part and has its central and outer end portions shaped conformably to, and fitting snugly within, the eye of the head; (3) a driven-into-place wooden plug which extends through, and fits snugly within, the front end part of the tubular handle, and serves after being driven into place to hold the central and outer end portions of the front end part of the handle in firm gripping relation with the inner surfaces of the eye and in addition to reinforce the handle at the location where the intermediate neck-like part and the front end part are connected together; and (4) a tubular grip which is formed of molded rubber or like material, extends around, and serves as a covering for, the rear end part of the handle, and is adapted to be grasped by the hand in connection with use of the hammer.

One object of the invention is to provide a claw hammer which is an improvement upon, and has certain inherent advantages over, previously designed hammers of the aforementioned type and is characterized by the fact that the tubular handle is of such shape and so formed that the intermediate neck-like part and the inner end portion of the front end part possess the necessary or desired springiness or so-called "give" for impact absorbing purposes while at the same time they are not likely to fracture even though the handle is subjected to great lateral force or strain in connection with use of the hammer.

Another object of the invention is to provide a claw hammer of the type and character under consideration and in which the tubular handle has for all intents and purposes the same wall thickness throughout its entire area and is formed by first placing a steel tube of uniform diameter and wall thickness from end to end in a mold the cavity of which has the same shape as the exterior of the finished or completed handle, and then sealing the ends of the tube and subjecting the tube interior to such hydraulic pressure as to cause the tube to expand laterally until it has the same shape of the mold cavity.

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Another object of the invention is to provide a claw hammer of the last mentioned character and in which the wooden plug tapers gradually towards its rear or inner end, and has its rear end extending no less than half way through the intermediate neck-like part of the handle and arranged so that it is out of contact with the said intermediate neck-like part of the handle except at said neck-like parts.

A further object of the invention is to provide a claw hammer of the aforementioned type and character and in which the rear end part of the tubular handle is of elliptical and uniform cross section from end to end, is of less width and height than the rear extremity of the intermediate neck-like part, and has its front extremity connected to said rear extremity of the intermediate neck-like part by a rearwardly and sharply tapered shoulder-forming connecting part, and the front end of the tubular grip is positioned in abutting and seated relation with said shoulder-forming connecting part and has its exterior shaped so as to form a smooth continuation of the exterior of the rear end portion of the intermediate neck-like part of the handle.

A still further object of the invention is to provide a claw hammer which is generally of new and improved construction, possesses extremely high resistance to breakage of the handle thereof, is comparatively light in weight, and is capable of being assembled with facility and produced or fabricated at a comparatively low cost.

Other objects of the invention and the various advantages and characteristics of the present claw hammer will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by the claims at the conclusion hereof.

In the drawings which accompany and form a part of the specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Fig. 1 is a fragmentary side view of a claw hammer embodying the invention;

Figs. 2, 3 and 4 are transverse sections taken respectively on the lines 2-2, 3-3 and 4-4 of Fig. 1;

Fig. 5 is a bottom or inverted plan view of the hammer; Fig. 6 is a fragmentary vertical longitudinal section of the hammer, illustrating in detail the shape and design of the tubular handle and the arrangement and character of the drive-in variety wooden plug;

Fig. 7 is a perspective of the wooden plug;

Fig. 8 is a perspective of the front end part of the tubular handle prior to its assembly with the hammer head;

Fig. 9 is a horizontal section taken on the line 9-9 of Fig. 6; and

Fig. 10 is a perspective of a piece or length of conventional steel tubing before treatment and shaping thereof to form the tubular handle of the hammer.

The claw hammer which is shown in the drawings constitutes the preferred form or embodiment of the invention. It is primarily adapted for use in carpentry and consists of a head 11, a handle 12, a plug 13, a tubular grip 14, a wedge 15, and a sealing member 16.

The head 11 is in the form of a one-piece drop forging and consists of an elongated open-ended eye 17, a cylindrical hammer part 18 and a bifurcated arcuate claw 19. The eye 17 is disposed between, and serves to connect, the hammer part 18 and the claw 19. It is approximately twice as long as it is high and embodies a pair of spaced apart side walls 20, a top wall 21 and a bottom wall 22. The top and bottom walls 21 and 22 extend between, and serve to space apart, the side walls 20 and have the side margins thereof formed integrally with the side margins

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of the side walls. The interior of the eye 17 is preferably but not necessarily rectangular in cross section from end to end. The central and inner end portions of the interior of the eye are uniformly rectangular in cross section throughout and the outer end portion of the eye interior is flared outwards to a small extent (see Figs. 6 and 9). Preferably, the outer end portion of the interior of the eye 17 is flared outwards at an angle of approximately 7° with respect to the longitudinal axis of the eye. The inner surfaces of the side, top and bottom walls of the eye are smooth. The cylindrical hammer part 18 of the head 11 is connected to, and extends downwards from, the outer end portion of the bottom wall 22 of the eye, and the bifurcated arcuate claw 19 is connected to, and extends upwards from, the outer end portion of the top wall 21 of the eye. As well understood in the art, the claw 19 is curved rearwards with respect to the eye of the head and serves as a medium for removing nails or similar articles.

The handle 12 is tubular. It is formed of steel and consists of an intermediate neck-like part 23, a rear end part 24 and a front end part 25. As best shown in Figs. 6 and 9, the handle is of one-piece design or construction and has the wall thickness thereof substantially uniform or the same throughout its entire area. The intermediate neck-like part 23 is preferably round or elliptical in cross section and is gradually flared from its midpoint to its ends. It is longer than the front end part 25 and is about half as long as the rear end part 24. If desired the intermediate neck-like part 23 may be made so that it is octagonal or tear-shaped in cross section instead of round or elliptical. The rear end part 24 of the handle is in longitudinal alignment with the intermediate neck-like part 23 and is of elliptical and uniform cross section from end to end. It is of materially less width and height than the rear extremity of the intermediate neck-like part 23 and has its front extremity connected to said rear extremity of the intermediate neck-like part by a rearwardly and sharply tapered shoulder-forming connecting part 26. The front end part 25 is rectangular in cross section throughout its length as shown in Fig. 2 and consists of a pair of spaced apart side walls 27, a top wall 28 and a bottom wall 29. The central and outer end portions of the front end part 25 fit snugly within, and are shaped conformably to, the interior of the eye 17, and the inner or rear end portion of the front end part is rearwardly flared and is disposed outside of the inner end of the eye. The top and bottom walls 28 and 29 of the front end part 25 extend between, and serve to space apart, the side walls 27 and have the side margins thereof formed integrally with the side margins of said side walls. The central and outer end portions of the outer surfaces of the side, top and bottom walls 27, 28 and 29 are in firm gripping relation with the inner surfaces of the side, top and bottom walls 20, 21 and 22 of the eye 17 of the head. The top and bottom walls 28 and 29 of the front end part 25 are provided with centrally disposed longitudinally extending slots 30 (see Figs. 8) in order that the outer end portion of said outer end part 25 is free to expand laterally when the wedge 15 is driven into the plug 13 as hereinafter described. The inner ends of the slots 30 terminate adjacent to the central portions of the top and bottom walls 28 and 29, and the outer ends of the slots extend through the outer edges of the top and bottom walls as best shown in Fig. 8. The outer end margins of the side walls 27 of the front end part 25 are provided with inwardly extending right angle flanges 31 (see Fig. 9). The latter assist in holding the wooden plug 13 against outward displacement after it has been driven into place. Before the plug is driven into place, the flanges 31 are arranged in coplanar relation with the side walls 27 as shown in Fig. 8. The outer or front extremity of the front end part 25 terminates a small distance inwards of the outer ends of

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the side, top and bottom walls of the eye 17 as shown in Figs. 6 and 9.

The handle 12 is formed by shaping properly a steel tube of uniform diameter and wall thickness from end to end, like the tube or length of steel tubing that is shown in Fig. 10. In forming the handle, the tube or length of tubing is inserted into a mold (not shown) the cavity of which has the same shape as the exterior of the finished or completed handle. Thereafter, the ends of the tube are sealed and then the interior of the tube is subjected to such hydraulic pressure so as to cause the tube to expand laterally until it has the same shape as the mold cavity. It is, of course, contemplated that the mold will be sectional and that the sections will be separated after a handle-forming operation in order to permit the formed handle to be removed. Because of the particular shape of the handle and the manner in which the handle is formed, the intermediate neck-like part 23 and the inner end portion of the front end part 25 possess an appreciable amount of springiness or so-called "give" for impact absorbing purposes while at the same time they are extremely strong and hence are not likely to fracture even through the handle is subject to great lateral force or strain in connection with use of the hammer.

The plug 15 of the hammer is formed of hickory or like hard wood. It is preferably rectangular in cross section from end to end and tapers gradually towards its inner or rear end. The front or outer end portion of the plug extends through and fits snugly within the front end part 25 of the handle and the rear or inner end portion of the plug extends approximately three-fourths of the way through the intermediate neck-line part 23. It is to be understood, however, that the rear end portion of the plug may, instead of extend three-fourths of the way through the neck-like part 23 as shown in the drawings, extend only to the portion of said part that is of narrowest cross section (medial region). The inner end portion of the plug is of such height and width that it engages only the central or medial portion of the intermediate neck-like part 23 as shown in Figs. 3, 6 and 9. By reason of the fact that such part is round or elliptical in cross section, only the four corner portions of the rear or inner end portion of the plug abut against the central portion of the intermediate neck-like part 23 and the rearwardly flared rear end portion of the front end part 25 are not engaged by the plug (see Figs. 6 and 9) and hence they are free with the result that they are capable of flexing laterally to a limited extent when the handle, as a whole is subject to a lateral force or strain during use of the hammer. By reason of the fact that the central or medial region of the intermediate neck-like part 23 is engaged only by the four corner portions of the inner end portion of the plug, such central portion of the intermediate part possesses limited flexibility for shock absorbing purposes while at the same time it is effectively reinforced by the inner end portion of the plug. By having the rear end portion of the plug tapered rearwardly and out of contact with the neck-like part 23 of the handle, except at the latter's central or medial region, the point or portion of greatest weakness of said neck-like part is effectively and efficiently reinforced against fracture or bending and the outwardly flared end portions of the neck-like part of the handle are free or unsupported so far as the plug is concerned, and hence, are resilient to such an extent that the handle as a whole has the aforesaid desired springiness or shock absorbing characteristics. By having the neck-like part 23 round or elliptical in cross section and the rear end portion of the plug rectangular in cross section, said rear end portion of the plug makes tangential point contact with the central or medial region of the neck-like part of the handle along each of its four longitudinal corner edges. The plug is inserted into place by first positioning the small inner or rear end thereof in registering relation with the front end of the eye 17. Thereafter, the plug is driven

rearwards. Originally, the outer end portion of the plug is of slightly greater cross sectional area than the central and outer end portions of the outer end part 25 of the handle. When the plug is driven into place, the outer end portion thereof tends to expand the central and outer end portions of the side, top and bottom walls of the front end part 25 to the end that they grip snugly and are shaped conformably to the inner surfaces of the side, top and bottom walls of the eye 17. As previously pointed out, it is contemplated that when the plug is driven into place, the flanges 31 on the outer end margins of the side walls 27 of the front end part 25 will be arranged as shown in Fig. 8, i. e., in coplanar relation with the side walls. After the plug has been completely driven into place, the flanges 31 are bent inwards so that they lap the outer end surface of the plug and thus hold the plug against outward movement with respect to the handle. When the plug is in its proper operative position, its outer end surface is disposed a small distance inwards of the outer end of the eye 17 as heretofore mentioned.

The tubular grip 14 of the hammer is preferably formed of molded rubber and consists of a continuous side wall 32 and a rear end wall 33. The side wall 32 is round or oval in cross section as shown in Fig. 4 and extends snugly around the rear end part 24 of the handle. It is approximately the same in length as the rear end part of the handle and is fixedly secured in place by any suitable adhesive or cement. The front end of the grip side wall 32 is positioned in direct abutment or seated relation with the shoulder-forming connecting part 26 (see Figs. 6 and 9) and has its exterior shaped so as to form a smooth continuation of the exterior of the rearwardly flared rear end portion of the intermediate neck-like part 23 of the handle. The rear end wall 33 of the grip extends across, and is formed integrally with, the rear end of the continuous side wall 32 and serves as a closure for the rear extremity of the rear end part 24 of the handle. The side wall 32 of the grip is adapted to be grasped by the hand in connection with use of the hammer. By reason of the fact that the front end of the continuous side wall 32 of the grip 14 is in abutment with the shoulder-forming connecting part 26, the handle is positively held against forward displacement or sliding movement with respect to the rear end part 24 of the tubular handle.

The wedge 15 of the hammer is of standard or conventional design and is driven into the front or outer end of the plug 13. It serves when in its operative position laterally to expand the outer end portion of the plug 13 and consequently the outer end portion of the front end part 23 so that said latter portion is expanded against and grips firmly the outwardly flared outer end portion of the interior of the eye 17 of the head 11.

The sealing member 16 of the hammer fits within, and serves to seal, the space within the outer end of the eye 17, i. e., the space between the outer ends of the side, top and bottom walls of the eye and the outer extremity of the front end part 25 of the handle. It is formed of any suitable fluid impervious plastic material and prevents moisture in the plug from evaporating through the outer end of the eye interior. If desired, the sealing member may be preformed and then driven into the outer end of the eye interior until its outer surface is flush with the outer ends of the side, top and bottom walls 20, 21 and 22 of the eye 17. Instead of preforming the plug and then driving it into place, the plug may be formed by filling the space in the outer end of the eye with uncured plastic material and then curing such material. After the plastic material is cured, the edge portions of the sealing member tend adhesively to grip the outer ends of the side, top and bottom walls 17.

The herein described hammer is comparatively light in weight, possesses extremely high resistance to breakage of the handle thereof, and is capable of being assembled

with facility and produced or fabricated at a comparatively low cost for the reason that the steel handle is tubular and of the particular shape or design heretofore described above. By reason of the fact that the head is of standard size and design, it may, if desired, be fitted with a conventional wooden handle in the event of breakage of the hollow steel handle 12 at a place or location where any hollow steel handle is not immediately available.

Whereas the invention has been described in connection with a claw hammer, it is to be understood that it may be embodied in any other type of hammer or hammering tool the head of which embodies an eye for the handle. It is also to be understood that the invention is not to be restricted to the details set forth since they may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

This application is a continuation of my application Serial No. 565,976, filed on February 16, 1956 and now abandoned.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. As a new article of manufacture, a hammering tool comprising: a head embodying an elongated open-ended eye with the interior thereof of generally uniform cross sectional shape from end to end; an elongated one-piece tubular handle formed of a laterally expanded length of metallic tubing and having substantially the same wall thickness throughout, said handle having an intermediate inwardly bowed neck-like part which is continuous and symmetrical in cross section and of substantially the same cross sectional shape from end to end, said neck-like part being flared gradually outwardly in opposite directions completely around its periphery from its mid point to its ends, said handle also having a comparatively long rear end part which is connected to the rear end of the intermediate neck-like part and is of uniform cross sectional shape from end to end, and a front end part which is connected to the front end of the intermediate neck-like part, has the central and front end portions thereof shaped conformably to, and fitting snugly within, the eye, and has its rear end portion disposed directly behind the rear end of the eye and flared rearwardly beyond the confines of the eye in all directions; an elongated driven-into-place plug formed of slightly compressible material, having the front end portion thereof extending through, and fitting snugly within, the front end and central portions of the front end part of the handle, and having its rear end portion extending no less than half-way through the inwardly bowed neck-like part and making firm contact with the medial region of said inwardly bowed neck-like part, said rear end portion of the plug being tapered rearwardly and out of contact with said inwardly bowed neck-like part except at the latter's medial region; and a tubular grip extending completely around, and serving as a covering for, the rear end part of the handle.

2. A hammering tool according to claim 1 and in which the rear end part of the handle is elliptical in cross section, is of less width and height than the rear extremity of the neck-like part, and has its front extremity connected to said rear extremity of the intermediate neck-like part by a rearwardly and sharply tapered shoulder-forming connecting part, and the front end of the tubular grip is positioned in abutting and seated relation with said shoulder-forming connecting part and has its exterior shaped so as to form a smooth continuation of the exterior of the rear end portion of said intermediate neck-like part of the handle.

3. A hammering tool according to claim 1 and in which the intermediate inwardly bowed neck-like part of the handle is round in cross section and the rear end portion of the elongated plug is of rectangular cross section and has its rear extremity in direct tangential point contact

with the medial region of said inwardly bowed neck-like part of the handle along each of its four corner edges.

4. As a new article of manufacture, a hammering tool comprising: a head embodying an elongated open ended eye with the interior thereof of rectangular cross section from end to end; an elongated one-piece tubular handle formed of a laterally expanded length of metallic tubing and having substantially the same wall thickness throughout, said handle having an intermediate inwardly bowed neck-like part which is round in cross section and of the same cross sectional shape from end to end, said neck-like part being flared gradually outwardly in opposite directions completely around its circumference, said handle also having a comparatively long rear end part which is connected to the rear end of the intermediate neck-like part and is of uniform cross sectional shape from end to end, and a front end part which is connected to the front end of the intermediate neck-like part, is substantially rectangular in cross section from end to end, has the central and front end portions thereof shaped conformably to, and fitting snugly within, the eye, and has its rear end portion disposed directly behind the inner or rear end of the eye and flared rearwardly and outwardly beyond the rectangular confines of the eye on all four sides thereof; an elongated driven-into-place plug of rectangular cross section from end to end, formed of slightly compressible material, having the front end portion thereof extending through, and fitting snugly within, the front end and central portions of the front end part of the handle, and having its rear end portion extending no less than half-way through the inwardly bowed neck-like part and making tangential point contact with the medial regions of said inwardly bowed neck-like part along each of the four longitudinal corner edges thereof; and a tubular grip extending completely around, and serving as a covering for, the rear end part of the handle.

5. A hammering tool according to claim 4 and in which the intermediate inwardly bowed neck-like part of the handle is elliptical in cross section, the rear end part of the handle is elliptical in cross section, is of less width and height than the rear extremity of the neck-like part, and has its front extremity connected to said rear extremity of the neck-like part by a rearwardly and sharply tapered shoulder-forming connecting part, and

the front end of the tubular grip is positioned in abutting and seated relation with said shoulder-forming connecting part and has its exterior shaped so as to form a smooth continuation of the exterior of the rear end portion of said intermediate neck-like part of the handle.

6. As a new article of manufacture, a hammering tool comprising: a head embodying an elongated open-ended eye with the interior thereof of generally uniform cross sectional shape from end to end; an elongated one-piece tubular handle formed of a laterally expanded length of metallic tubing and having substantially the same wall thickness throughout, said handle having an intermediate inwardly bowed neck-like part which is continuous and symmetrical in cross section and of the same cross sectional shape from end to end, said neck-like part being flared gradually outwardly in opposite directions completely around its periphery from its mid point to its ends, said handle also having a comparatively long rear end part which is elliptical in cross section, is of less width and height than the rear extremity of the neck-like part, and has its front extremity connected to said rear extremity of the neck-like part by a rearwardly and sharply tapered shoulder-forming connecting part, and a front end part which is connected to the front extremity of the intermediate neck-like part, has the central and front end portions thereof shaped conformably to, and fitting snugly within, the eye, and has its rear end portion disposed directly behind the inner or rear end of the eye and flared rearwardly beyond the confines of the eye in all directions; and a tubular grip extending completely around, and serving as a covering for, the rear end part of the handle and having the front end thereof in abutting and seated relation with said shoulder-forming part and shaped exteriorly so as to form a smooth continuation of the exterior of the rear end portion of said intermediate neck-like part of the handle.

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