July 23, 1946. Z. C. VAN SCHWARTZ 2,404,580

TOOL

Filed July 29, 1943

Fig. 1.

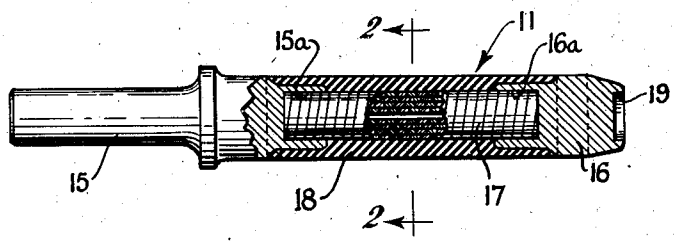


Fig. 2.

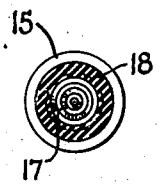


Fig. 3.

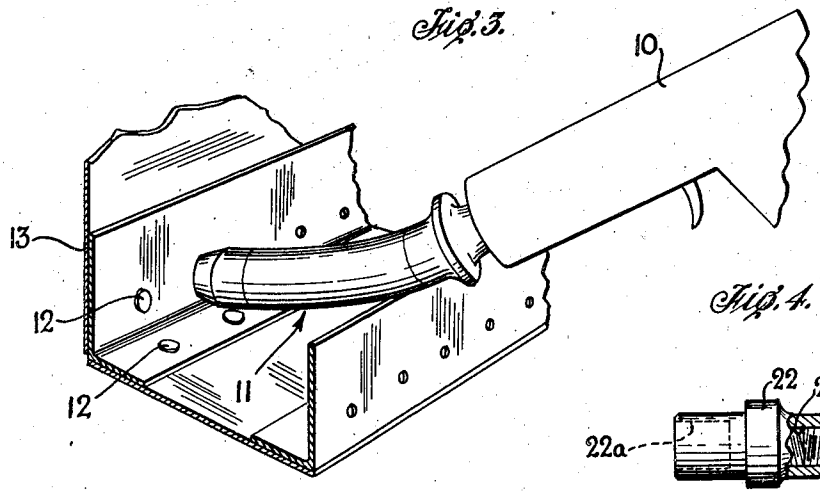


Fig. 4.

Inventor

ZOLLY C. VAN SCHWARTZ

By Ely & Frye

Attorneys

Patented July 23, 1946 2,404,580

UNITED STATES PATENT OFFICE

2,404,580

TOOL

Zolly C. Van Schwartz, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio, a corporation of Ohio

Application July 29, 1943, Serial No. 496,673

1 Claim. (Cl. 74—501)

1

This invention relates to tools, and more especially it relates to tools having inherent flexibility to enable use thereof in places that are difficult of access.

The tool is of primary utility in operative association with percussive apparatus such as the pneumatic hammer, in which association it is adapted for a number of uses. For the purpose of illustration, but not limitation, the invention is shown and described herein as it is embodied in a rivet set.

The chief objects of the invention are to provide a tool of the character mentioned capable of functioning in locations that are too difficult of access to enable use of conventional tools ordinarily used. More specifically the invention aims to provide a percussive tool capable of transmitting percussion force or impact in an arcuate course; and to provide a tool of the character mentioned that will deliver the full striking power of the percussive apparatus. Another object is to provide a tool of the character mentioned capable of safe and easy manipulation by an operator. Other objects will be manifest as the description proceeds.

Of the accompanying drawing:

Fig. 1 is a side elevation of a tool embodying the invention, a part thereof being broken away and in section;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary perspective view of a pneumatic hammer with the improved tool operatively associated therewith, and work on which the tool is operating; and

Fig. 4 is an elevation, partly in section, of a tool head of modified construction.

Referring first to Fig. 3 of the drawing, there is shown a portion of a pneumatic hammer 10, and the improved tool of the invention, designated as a whole by the numeral 11, mounted in said hammer so as to be reciprocated thereby. The arrangement is such that the tool is adapted to transmit percussive force from the hammer 10 to the work, herein shown as rivets 12, 12 in a fabricated metal structure 13. As shown in said figure, the rivets 12 are so positioned as to be practically inaccessible to conventional riveting devices, but readily are engaged by the tool 11 by reason of the flexible nature of the latter which enables it to be flexed to arcuate or offset form wherein its striking head is out of alignment with the axis of the hammer 10. It will be understood that the flexing of the tool is manually effected by the operator of the apparatus, who grasps the tool in one of his hands (not

2

shown) and guides it into engagement with the work.

The improved tool 11, shown in detail in Figs. 1 and 2, comprises a shank portion 15 at one end thereof, and a head portion 16 at the other end thereof, which shank and head are connected by a flexible metal element 17, the latter being encased in a sleeve or sheath 18 of flexible material such as rubber composition. The shank portion 15 is arranged to be mounted in an end of a pneumatic hammer 10 and to be reciprocated thereby. The head 16 is specially designed for performing a particular type of work, and in the rivet set shown its outer end or striking face is recessed at 19 for engagement with a rivet, the recess being of such shape as to form a flat head on the latter. The flexible metal element 17 is shown as a quadruple "Keller" type spring cable, which cable comprises laterally abutting convolutions of spring-metal wires of rectangular cross-section, with the result that the cable 17 is axially incompressible, but readily may be flexed to arcuate form. The cable 17 is united with the shank 15 and head 16 by having its end portions brazed or sweated into respective sockets or recesses 15*a*, 16*a* formed in the confronting end portions of said shank and head. The rubber sheath 18 may be vulcanized in situ upon the cable 17, with its end portions overlying contiguous portions of the shank and head as shown, or the sheath may be vulcanized as a separate element and subsequently mounted on the tool. Preferably the confronting end portions of the shank 15 and the head 16 are of reduced outside diameter as shown, so that the rubber sheath 18 fits thereover and has its outer face flush with the adjacent peripheral surfaces of shank and head.

The arrangement is such that the tool readily may be flexed to enable the head 16 to be applied to work in otherwise inaccessible locations. Such flexing of the tool is effected manually by the operator, at which time the sheath 18 on the tool protects the operator's hand from being pinched by the cable 17, the convolutions of which separate somewhat on the tension side when the tool is flexed. Being flexible and elastic, the rubber sheath 18 does not impair the flexing ability of the cable 17. The tool delivers the full percussive force of the hammer 10 to the head 16, and achieves the other advantages set out in the foregoing statement of objects.

Obviously the recess 19 in the head 16 may be of different shape for setting rivet heads of different shape. Furthermore, the head itself may

be of different shape for performing operations other than riveting. For example, it may be shaped as a chisel for removing metallic projections or to cut clearances; it may be shaped as a tamp for use in calking operations; or it may constitute a hammer head for driving nails in difficult situations, such as "toe-nailing" operations.

In Fig. 4 is shown a tool head **22** of modified construction which may be employed in lieu of the head **16** previously described. The head **22** is formed at one end with an axial recess **22***a* in which a cable, such as the cable **17** of the previously described embodiment, is receivable. At its opposite end the head is formed with an internally threaded recess **23** in which a complementally threaded work-engaging element **24** is receivable. The element **24** is shown as a chisel, and it will be obvious that it readily may be removed from the head **22** and an element of different shape for a different purpose mounted in the head in lieu thereof.

Other modifications may be resorted to without departing from the spirit of the invention, or

the scope thereof as defined by the appended claim.

What is claimed is:

A tool of the character described comprising a shank element at one end thereof, a head element at the other end thereof, the confronting end portions of said shank and head being of reduced outside diameter and formed with respective axial sockets, a flexible axially incompressible element composed of a plurality of concentric metallic abutting coils of wires of rectangular cross-section having its end portions received in respective sockets in said shank and head and permanently secured therein, said coil element capable of transmitting a percussive force in an arcuate course longitudinally of its structure, and a sheath of flexible elastic material covering said coil element and adjacent reduced portions of shank and head and permanently bonded thereto, the outer surface of said sheath being flush with adjacent peripheral surfaces of said shank and head.

ZOLLY C. VAN SCHWARTZ.