United States Patent [19]

Broscoff et al.

[11] **3,862,516**

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[54] **PIN VISE**

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[21] Appl. No.: **477,067**

[52] **U.S. Cl.** ..... **51/217 P**, 145/46, 269/49, 81/53.2

[51] **Int. Cl.** **B25b 3/00**

[58] **Field of Search** ..... 145/46, 50 D, 51, 50, 52, 145/62; 81/3, 53.2; 269/49; 51/217 P

[56] **References Cited**

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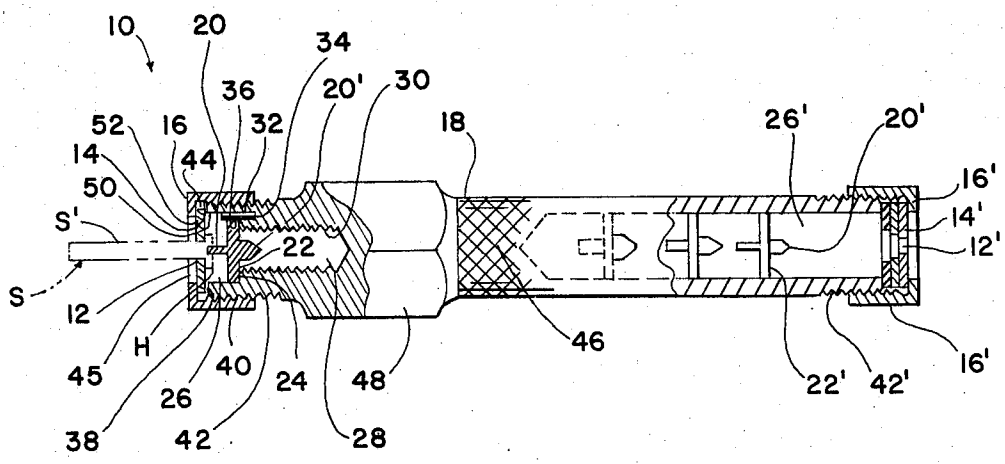
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[57] **ABSTRACT**

A vise for holding cap screws and the like, which grips the screw head by applying pressure between the underside of the head and the driving slot; the double-bit tool disks provided fit within the handle for storage, and the cover disks, which adjustably engage the screw head with the bit under pressure of a screw-cap, store at the rear of the handle under retention by a spare screw-cap; the handle has adaptation for mounting a drill chuck in place of the screw gripping mechanism.

7 Claims, 7 Drawing Figures



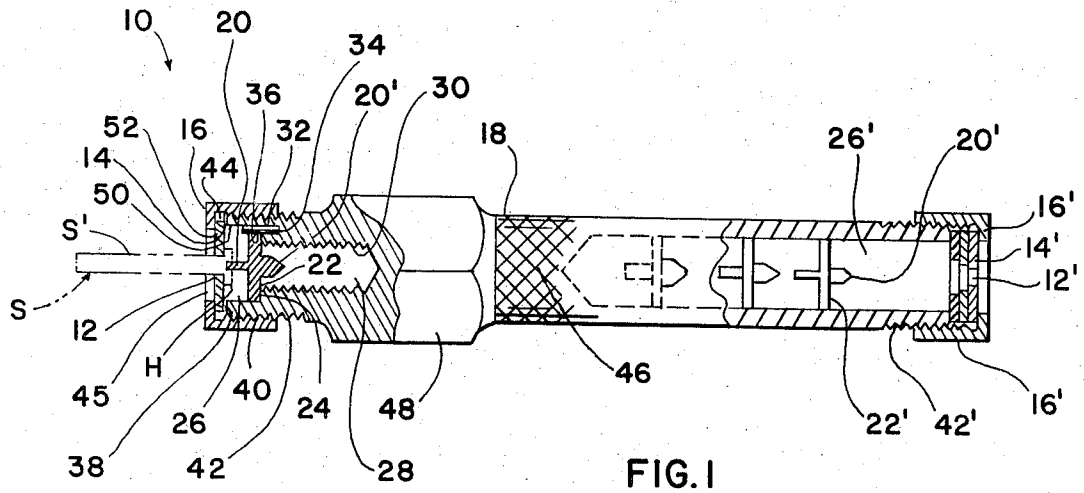


FIG. 1

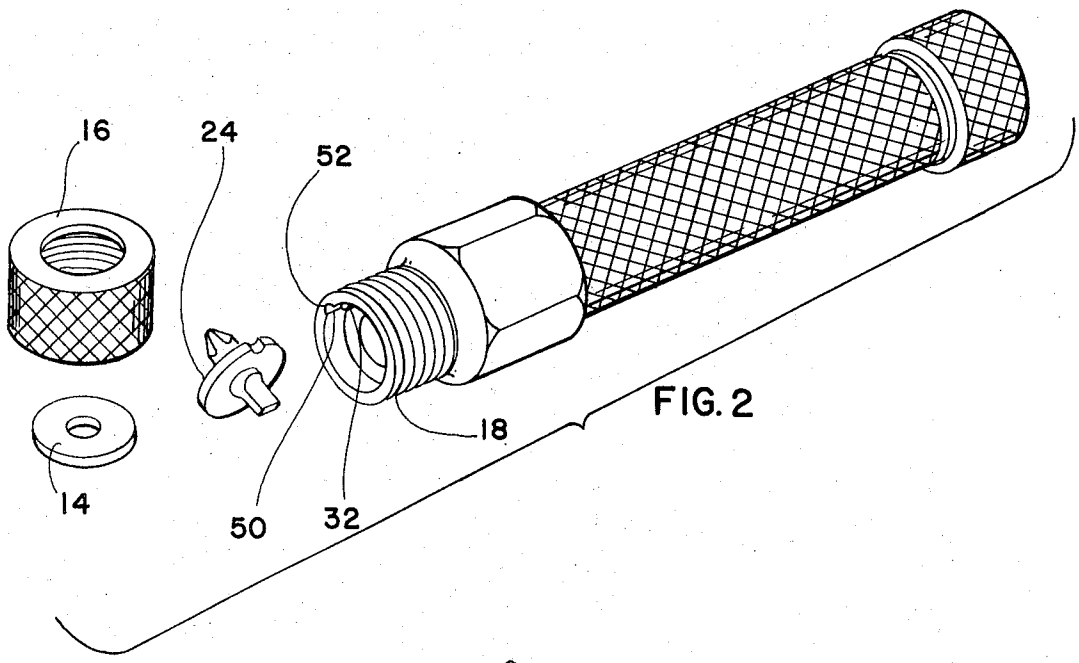


FIG. 2

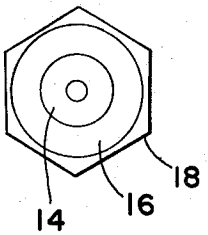


FIG. 3

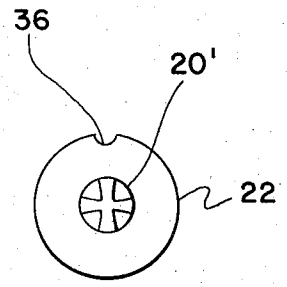


FIG. 4

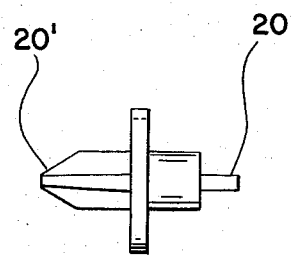


FIG. 5

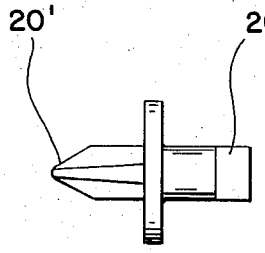


FIG. 6

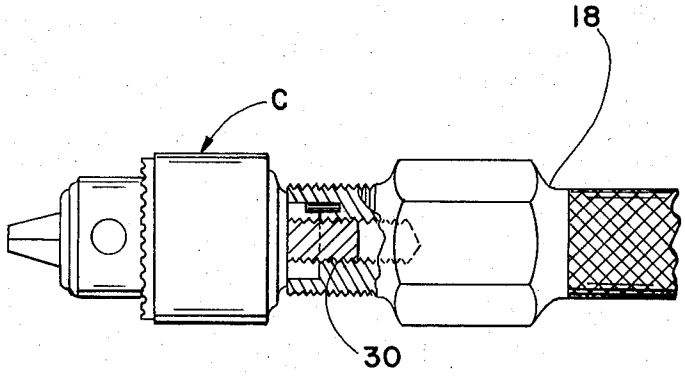


FIG. 7

PIN VISE

This invention relates generally to holders and specifically to elongate-work-holding vises adapted for manual manipulation.

A principal object of the invention is to provide a positive-grip vise for holding headed elongate objects such as cap screws. Cap screw threads are frequently cut, burnished, or otherwise worked while the head is held in a vise.

Pin vises as a type are widely known and used, but have limitations inherent in the design, being noticeably awkward at gripping headed objects, which tend

The screw shank S' passes through a clearance hole **12** in the center of cover disk **14**, and the screw is actually gripped by the head H, not by the shank.

Gripping pressure is applied axially on the screw head by cap **16** which engages the end of elongate housing **18** and forces the cover disk against the underside of the screw head, in turn forcing the slotted head of the screw against the operative end of double tool bit **20, 20'**, and pressing the periphery of the rear face of tool disk **22**, which is integral with the tool bit, against shoulder **24**. The shoulder forms the junction of coaxial larger diameter bore **26** and smaller diameter bore **28** in the housing. The smaller diameter bore pref-

prevent damage when the vise is itself gripped in another vise.

It has been shown above how the vise assembly is adapted to impose heavy torques on screws, as in threading, grinding, and the like, without damage to the screw shanks or to the screw heads operatively captured in it.

A further feature of the invention both reinforces the cylindrical pin previously described and provides a visual and tactile indicator at the forward end of the housing for orienting tool bit disks on insertion in the housing, as when changing sizes etc.

FIGS. **1** and **2** both illustrate this aspect. A forwardly extending hemi-cylindrical portion **50** of the contour of the hole in which cylindrical pin is fixed engages and supports the length of the body of the cylindrical pin, so that loads transmitted through the pin from housing to tool disk and vice versa are shear-loads, not bending loads which would tend to unseat the pin from the hole.

Breakthrough of the hemi-cylindrical contour at the front end of the housing as at **52**, provides the orientation indicator easily seen under or felt under all levels of illumination, assuring proper insertion of tool bit disks.

FIG. **3** is an end view with cap and cover disk. This is typical of both ends of the vise, and emphasizes the ease of manufacture and the on-hand availability of spare parts, should one of the smaller parts be misplaced.

FIGS. **4**, **5** and **6** illustrate the rugged, simple, durable, easily fabricated nature of a typical tool disk with tool bits. The tool bits may be of any of the well known types from simple screwdriver **20** to Phillips screwdriver **20'**, to Allen wrench, to Bristol wrench, or the like.

These may be fabricated in one piece, but it has been found quite easy to weld or silver solder the axially extending portions in notched disks. Typically, for a size B Phillips blade a one-sixteenth inch thick disk is used, the housing bore being one-half inch and the pin being three thirty-seconds of an inch in diameter. The double-bit feature both strengthens the assembly, and provides a positive, axially extending grip for handling the tool disks both during insertion and removal from storage and in use, as well as on the tabletop. Maximum use is made of each disk, the design of which provides substantially backlash-free operation regardless of which way inserted.

FIG. **7** illustrates a further feature of the invention. The threads **30** of the smaller diameter bore in the forward part of the housing can be used to receive and retain an ordinary commercially obtainable drill chuck C, during which time the forward cap, cover plate, and any tool disk in use can be removed and safely stored at the rear of the housing.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed and desired to be secured by United States Letters Patent is:

1. A vise for holding elongate-shank headed objects, comprising: an elongate housing having forward and rearward ends, the forward end having an axial opening with coaxial larger and smaller diameters, a shoulder between said larger and smaller diameters, a member protrusive inwardly into the larger diameter proximate the shoulder, a tool disk having a periphery proportioned for sliding fit with said larger diameter, with a notch therein for receiving the inwardly protrusive member; a tool bit axially protrusive from the tool disk; a cover disk having a central aperture proportioned for freely receiving a shank of a said headed elongate-shank object with the head thereof against a face of said cover disk, said forward end of the housing having a thread thereon, and a cylindrical cap having an end with a central aperture therein smaller than said cover disk and an internal thread positioned for engaging the thread on the housing forward end, said cover disk being located within said cap.

2. A vise for holding elongate-shank headed objects as recited in claim **1**, wherein the tool bit extends from said tool disk substantially to said forward end of the housing with the tool disk in operating position against said shoulder, wherein the cover disk is larger than said larger diameter, and wherein said cap and all said threads are proportioned for drawing the cover disk substantially against the front end of the housing.

3. A vise for holding elongate-shank headed objects as recited in claim **2**, wherein the interior of the cap has a bore providing a clearance around the periphery of the cover disk when the cover disk is retained by the cap.

4. A vise for holding elongate-shank headed objects as recited in claim **3**, wherein the tool bit comprises an elongate member passing through the tool disk and having first and second tool bits ends thereon, with the second tool bit end within said smaller diameter.

5. A vise for holding elongate-shank headed objects as recited in claim **4**, wherein the inwardly protrusive member comprises a cylindrical pin, wherein the rearward end of the cylindrical pin is retained in a hole in said flange, and wherein a forwardly extending portion of the contour of said hole stabilizes the length of said pin and provides a visual and tactile indicator at the forward end of said housing for orienting said tool disk notch.

6. A vise for holding elongate-shank headed objects as recited in claim **5**, wherein the rearward end of the housing has an axial opening therein having a diameter equal to said larger diameter, said axial opening accommodating a plurality of tool disks with differing tool bits, fitted within said axial opening; wherein the rearward end of the housing has a thread thereon like said thread on the forward end of the housing, a second cylindrical cap like the first said cylindrical cap, and a plurality of said cover disks retained at the rearward end of the housing by the second said cap, said plurality of cover disks having respective apertures of differing sizes therein.

7. A vise for holding elongate-shank headed objects as recited in claim **6**, wherein the smaller diameter has threads therein for receiving a drill chuck, and wherein the housing has a handle portion with a plurality of wrenching flats thereon.

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