United States Patent

Fischer

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[45] **June 27, 1972**

[54] HAND TOOLS

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[22] Filed: **Oct. 6, 1970**

[21] Appl. No.: **78,463**

[52] **U.S. Cl.** .....**145/65,** 81/177 D

[51] **Int. Cl.**.....**B25g 3/06**

[58] **Field of Search**.....145/61 R, 61 L, 50 C, 65, 76, 145/77; 81/177 ST, 177 PP, 177 G, 177 D; 279/76, 79, 24

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Assistant Examiner—Michael Koczo, Jr.
Attorney—Michael Williams

[57] **ABSTRACT**

A hand tool, and particularly a screw driver, comprising a handle and a detachable shank. The handle has intersecting longitudinal and transverse openings, and either opening receives either end of the shank. A single holding means, in the form of a spring-pressed ball detent, is contained within the handle and is cooperable with the shank end to hold the shank assembled with the handle.

6 Claims, 6 Drawing Figures

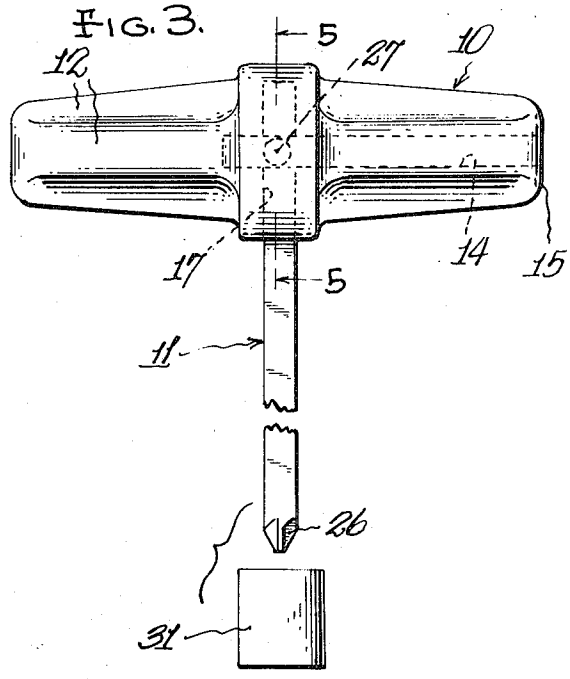


FIG. 1.

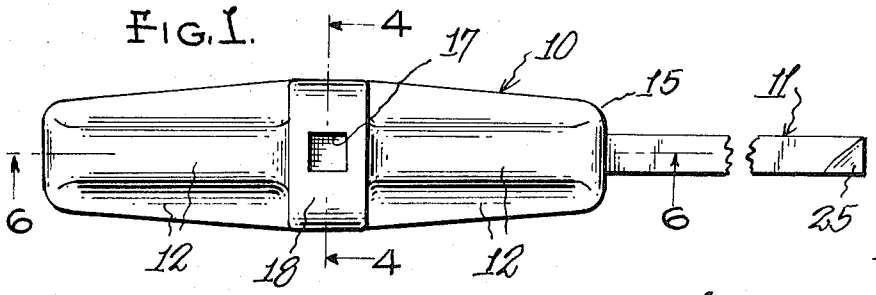


FIG. 2.

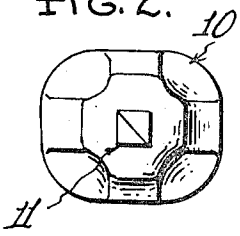


FIG. 3.

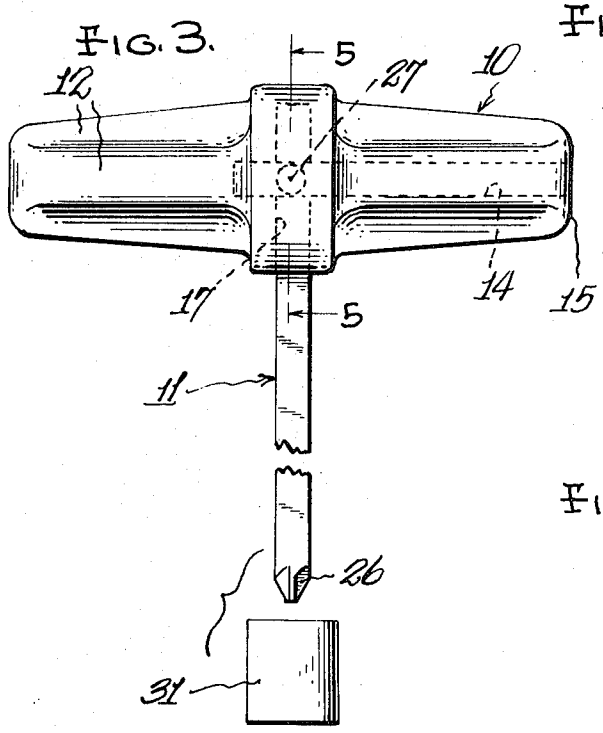


FIG. 4.

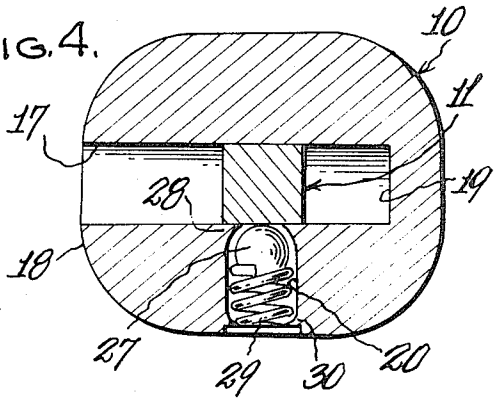


FIG. 5.

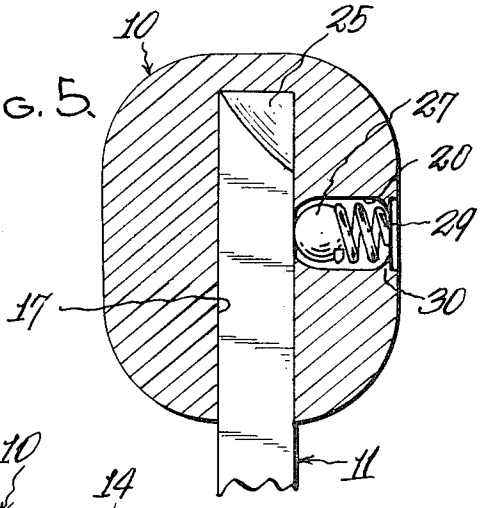
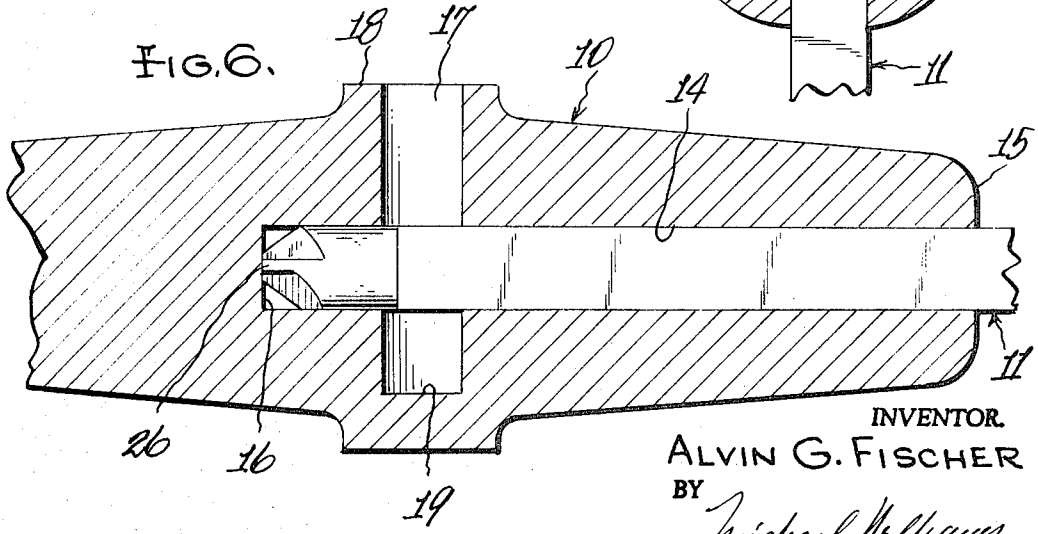


FIG. 6.



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HAND TOOLS

BACKGROUND AND SUMMARY

Hand tools, such as screw drivers, having a shank which is detachable from a handle are well known in the prior art. Also known are constructions wherein either end of a shank may be disposed within an opening in a handle. Such prior art tools, although finding some commercial acceptance, do not provide simply yet sturdy structure which my invention makes possible, nor do they provide the utility of my improved structure.

According to my invention, the handle may be made as a metal or plastic casting or molding to eliminate expensive machining operations, and the shank may be made in accordance with standard methods. Either of the pair of openings in the handle receive a sufficient length of the shank end so that considerable force may be applied to the handle; yet the shank may be easily removed from the handle so that either of its ends may be disposed in either of the handle openings. The single spring-pressed ball detent securely holds the shank assembled with the handle in any of their variously related positions. Accordingly, it is a principal object of my invention to provide new and improved hand tools of the character described.

DESCRIPTION OF THE DRAWING

In the drawing accompanying this description and forming a part of this application there is shown, for purposes of illustration, an embodiment which my invention may assume, and in this drawing:

FIG. 1 is an elevational view of a screw driver, showing the handle and shank assembled in one relation, the shank being fragmentarily shown to conserve space,

FIG. 2 is an end view of the construction shown in FIG. 1,

FIG. 3 is an elevational view of a screw driver, showing the handle and shank assembled in another relation, the shank again being fragmentarily shown, and a socket being included in the combination,

FIG. 4 is an enlarged sectional view corresponding to the line 5—5 of FIG. 3, the shank being fragmentarily shown, and

FIG. 6 is an enlarged sectional view corresponding to the line 6—6 of FIG. 1, the shank being fragmentarily shown.

DESCRIPTION OF PREFERRED EMBODIMENT

My improved hand tool is herein disclosed in the form of a screw driver comprising a handle **10** and a shank or blade **11**. The handle may be formed of any suitable material, such as metal or plastic. Metal is preferred in order to provide strength for withstanding the great pressure that may be applied by the tool.

The handle **10** is oblong and is preferably provided with longitudinal ribs **12** to improve gripping qualities. The handle may be made of cast metal to provide the contour shown in the drawing and to provide a pair of intersecting openings, thereby eliminating expensive machining operations.

As shown in FIG. 6, the handle **10** is provided with a longitudinal opening **14** which extends from an end **15** inwardly to a point **16** beyond the longitudinal midpoint of the handle. As shown in FIG. 4, the handle is also provided with a transverse opening **17** which extends from a side **18** inwardly to a point **19** beyond the transverse midpoint of the handle. The longitudinal and transverse openings intersect at the midpoint of the handle, to provide a balanced effect. A transverse bore **20** is formed in the handle at its midpoint and the line with the intersection of the longitudinal and transverse openings.

Either end of the blade **22** may be disposed in either of the

longitudinal or transverse openings, and the cross-section of the blade is complementary to that of the openings for a close, non-rotatable fit. In the present embodiment, the blade **11** is square in cross-section, and so are the openings. One end of the blade is herein shown as provided with a wedge-like tip **25** to fit the kerf in the head of a conventional screw, while the other end of the blade is provided with a cross-like tip **26** to fit the head of a Phillips screw.

A hardened steel ball **27** is disposed within the bore **20** and is prevented from fully entering the intersection of the longitudinal and transverse openings **14** and **17** by an annular lip **28**. The ball is pressed inwardly by a spring **29** which is disposed between the ball and a seat **30** formed by an inward deformation of the metal surrounding the outer end of the bore.

To assemble the blade, it is merely necessary to insert either end thereof into either opening and push on the blade to cam the ball **27** rearwardly. The inner ends of the longitudinal and transverse openings form stops against which inner end of the blade abut. The pressure of the ball **27** against the inner end of the blade will adequately hold the letter assembled with the handle. Because of the ribbed contour of the handle, the latter may be firmly gripped by the hand of a user. With the blade and handle assembled in the relation shown in FIG. 3, a tremendous pressure may be applied to turn the most stubbornly locked screw. The invention may also be used to turn nuts and bolts by merely assembling a socket **31** over the free end of the blade.

I claim:

1. A hand tool, comprising an oblong handle, and a shank detachably securable to said handle, said handle having longitudinal and transverse non-circular openings of equal transverse size which extend inwardly from respective transverse and longitudinal walls of said handle and intersect at a midpoint of the longitudinal axis of said handle, each opening extending beyond the point of intersection but short of penetration through an opposed wall of said handle to form a bottom for each opening, said shank comprising end portions of cross-section complementary to the non-circular transverse size of said openings to fit closely within either opening and extend beyond the point of intersection so that an extremity abuts the bottom of the opening and a part between the latter and the point of intersection is supported by the adjoining wall surface of the opening, and means within the handle at said point of intersection to engage a shank end portion in either opening and releasably hold said shank assembled with said handle.

2. The construction according to claim **1** wherein said last named means is a detent permanently carried by said handle and resiliently urged into the intersection of said openings and adapted to frictionally engage the shank portion within one of said openings.

3. The construction according to claim **2** wherein said detent is a ball which is spring-pressed to frictionally engage said shank portion.

4. The construction according to claim **1** wherein said openings are rectangular in transverse size and said handle portions are correspondingly rectangular in cross-section.

5. The construction according to claim **1** wherein said shank is a screw driver blade of uniform cross-section throughout its length and has its opposite ends of different formation for engagement with screw heads having different types of screw driver slots.

6. The construction according to claim **4** and further including a socket having one end formed with an opening rectangular in transverse size to closely receive an end of said shank, said socket at its other end having an opening to receive and rotate conventional nuts and bolt heads.

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(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3 672 419 Dated June 27, 1972

Inventor(s) Alvin G. Fischer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 9, "simply" should be---------simple-------.

* Line 40, cancel the entire line and insert-----line 4-4 of Figure 1, Figure 5 is an enlarged sectional view corresponding to the line 5-5 of Figure 3, the shank being fragmentarily shown, and

Line 67, "22"should be---------11---------.

Column 2, line 20, "letter" should be----------latter--------.

Signed and sealed this 5th day of December 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents