

Oct. 27, 1953

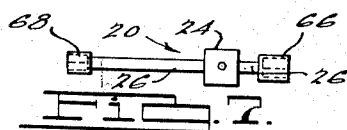
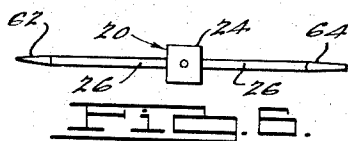
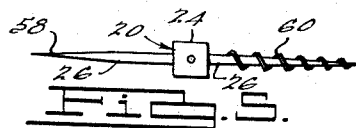
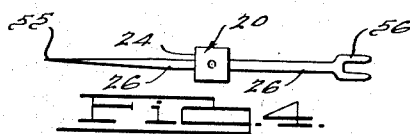
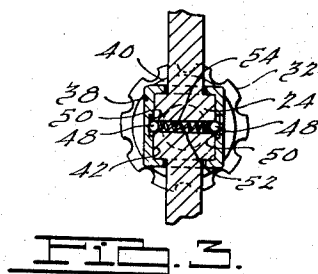
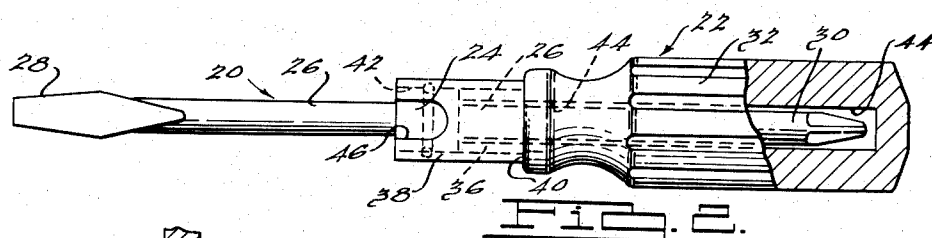
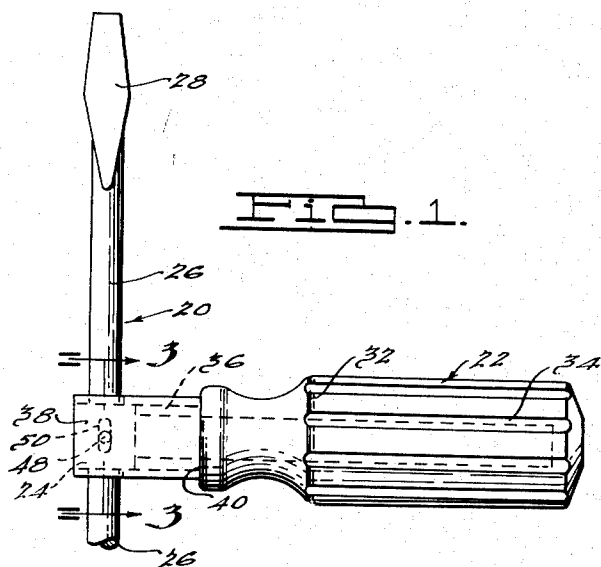
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2,656,865

RATCHET TOOL WITH ANGULARLY ADJUSTABLE HANDLE

Original Filed Oct. 16, 1946

2 Sheets-Sheet 1



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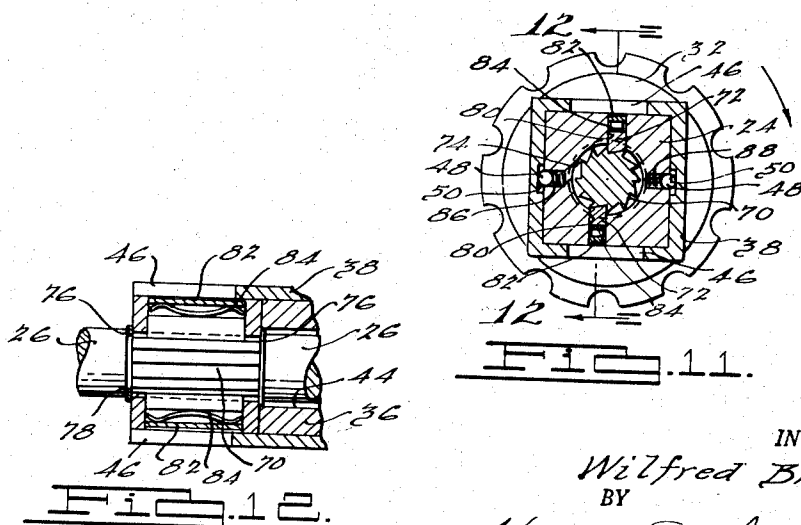
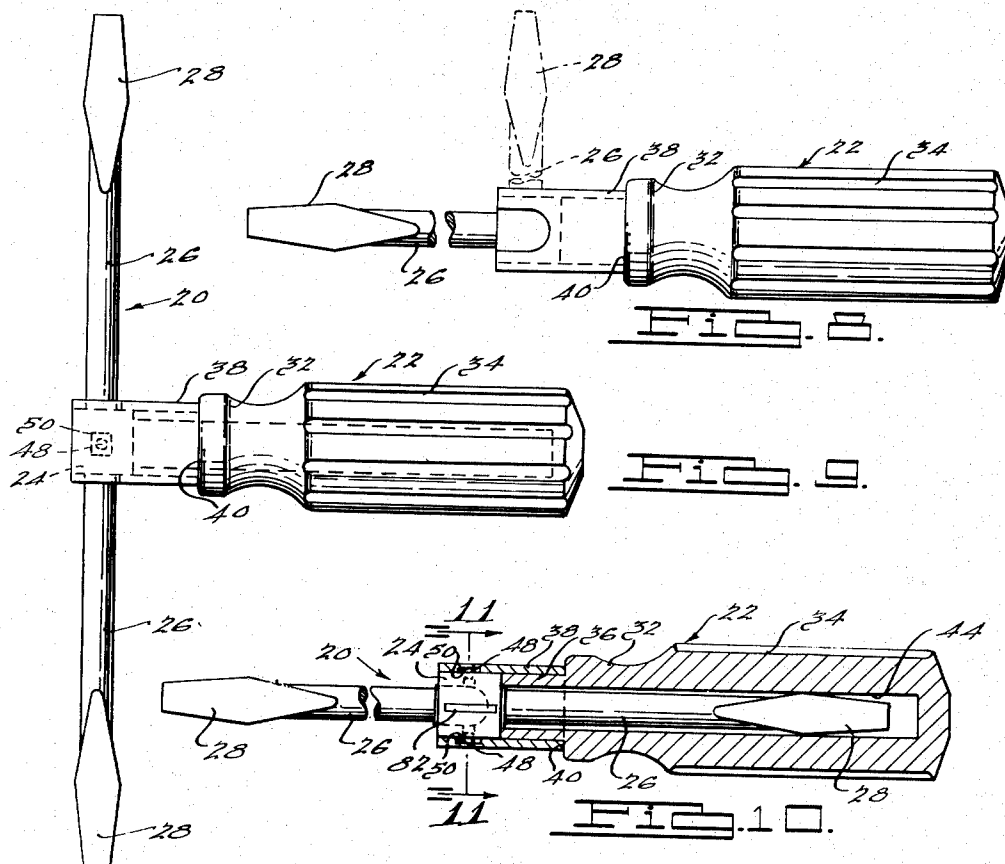
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RATCHET TOOL WITH ANGULARLY ADJUSTABLE HANDLE

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2 Sheets-Sheet 2



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RATCHET TOOL WITH ANGULARLY
ADJUSTABLE HANDLE

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Substituted for application Serial No. 703,677,
October 16, 1946. This application March 24,
1949, Serial No. 83,115

7 Claims. (Cl. 145-75)

1

This is a substitute for my prior application, Serial No. 703,677, which was filed October 16, 1946, now abandoned.

This invention relates broadly to hand tools such as screw drivers, wrenches, awls, punches, nail sets, ice picks, ice shavers, and the like. More particularly, the invention relates to a holder for tools of this character which permits the same to be used in several different positions and wherein the tools are readily adapted for any particular mode of use.

An important object of the present invention is to provide a hand tool which includes a tool element and a holder therefor and wherein the tool element can be arranged either in alignment with the handle or substantially at right angles thereto.

Another object of the invention is to provide a hand tool of the above-mentioned character wherein the two parts of the tool can be easily and quickly fastened together or disengaged from each other.

Still another object of the invention is to provide a hand tool of the above-mentioned character which includes a novel union between the tool element and the holder.

Yet another object of the invention is to provide a hand tool of the above-mentioned character in which an exceedingly strong connection is provided between the holder and tool element in both positions of the latter.

A further object of the invention is to provide a hand tool of the above-mentioned character which is simple yet sturdy in construction, efficient in operation, and relatively inexpensive to manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the drawings forming a part of this specification, wherein like numerals are employed to designate like parts throughout the same:

Fig. 1 is a fragmentary, side elevational view of a hand tool embodying the invention and illustrating two tool- or work-engaging elements positioned at right angles to the holder;

Fig. 2 is a view similar to Fig. 1 but illustrating the tool elements positioned in alignment with the holder and showing the latter broken away and in section for clearness of illustration;

Fig. 3 is a fragmentary, transverse sectional view taken on the line 3-3 of Fig. 1;

Figs. 4-7 illustrate different types and combinations of tool elements;

Fig. 8 is a side elevational view of a modified

2

form of the invention which is equipped with but one tool- or work-engaging element;

Fig. 9 is a side elevational view showing another modification of the invention which is generally similar to the form shown in Fig. 1 but includes a pawl and ratchet mechanism between the tool elements and the holder;

Fig. 10 is another view of the latter form of the invention but showing parts in section and parts in elevation and illustrating the tool elements disposed in alignment with the holder;

Fig. 11 is an enlarged, fragmentary, transverse, sectional view taken on the line 11-11 of Fig. 10; and

Fig. 12 is a fragmentary, longitudinal, sectional view taken on the line 12-12 of Fig. 11.

In the drawings, attention is first directed to Figs. 1-3 which show a preferred embodiment of the invention. The hand tool there shown broadly comprises a double-ended tool 20 and a holder 22 for the tool.

More specifically, the tool 20 comprises a generally cubical connecting member 24 and shanks 26 which are carried by and extend in opposite directions from the member. The tool here shown by way of illustration is a screw driver, and it will be observed that the terminal of one shank 26 has the form of a blade-type driver 28, while the terminal of the other shank 26 is shaped to provide a Phillips-type driver 30. Preferably, the connecting member 24 is integral with the shanks 26; however, if desired, the connecting member and shanks can be formed separately and then fastened together by welding, brazing, or the like.

The holder 22 here shown by way of illustration is generally similar in size and shape to the handle of a conventional screw driver. It conveniently can be made of wood, plastic or the like, and preferably has a plurality of longitudinal, parallel, external flutes 34 which enable the user to obtain a proper purchase when turning or otherwise manipulating the tool. At its inner end the handle 32 is formed with a centrally located and integral, longitudinal extension 36 which preferably is square in transverse section and carries a square ferrule 38. As shown in Figs. 1 and 2, the ferrule 38 abuts at its inner end against a shoulder 40 which extends radially from the base of extension 36, and the outer portion thereof extends axially beyond the extension to form a socket 42 for the connecting member 24. The extension 36 and the portion of ferrule 38 which fits over it need not be square; however, this construction is preferred, as the

portion of the ferrule which projects beyond the extension must be square to properly fit the cubical connecting member 24. Also, the socket 42 formed by extension 36 and ferrule 38 should fit the connecting member 24 substantially exactly and relatively snugly. A relatively deep bore 44 is provided in the handle 32, which bore opens at one end into the socket 42 and is sufficiently deep to accommodate either of the shanks 26.

In opposite walls of the socket 42 are aligned recesses 46. These recesses open through the edge of ferrule 38 and receive shanks 26 when the connecting member 24 is inserted into socket 42 with the shanks substantially at right angles to the holder 22, as shown in Fig. 1. Also, it will be observed that connecting member 24 is equipped with detents 48 which enter indentations 50 in opposite walls of the socket 42 to hold the tool 20 securely but removably associated with the holder 22. A relatively simple detent arrangement is shown in Fig. 3 which comprises a through bore 52 located substantially centrally in the connecting member 24. Within the bore 52 and confined between ball detents 48 is a spring 54 which urges the detents outwardly against and into frictional engagement with the walls of socket 42.

As a result of the above construction and arrangement of parts, the tool 20 can be associated with the holder 22 either as shown in Fig. 1 or as shown in Fig. 2. By reason of its cubical shape, the connecting member 24 fits the socket 42 snugly in both positions of the tool 20 and functions not only to hold the two parts firmly together but also to establish a union therebetween for efficiently transmitting rotary movement from the holder 22 to the tool 20. Also, the cubical shape of connecting member 24 positions or locates the ball detents 48 so that they are received in the indentations 50 in both positions of the tool 20.

When the tool 20 is positioned as shown in Fig. 2, it has the appearance of a conventional screw driver, and it can be associated with the holder with either the blade-type driver 28 or the Phillips-type driver 30 in operative position. Manifestly one or the other of the shank portions 26 is received or housed in the bore 44 when the tool 20 is mounted in this manner. On the other hand, when the tool 20 is positioned as shown in Fig. 1, with shanks 26 substantially at right angles to the holder 22, both of the shanks are exposed and both driving heads 28 and 30 are in operative position.

From the foregoing, it will be readily apparent that the instant tool has a much greater utility than a conventional tool of this type and that it has an entirely different and improved mode of use. The device can be adapted to situations where a conventional screw driver is useless and can be used with greater facility in many situations where a conventional screw driver can be used only with greatest difficulty.

Although the device has greater utility in most situations if equipped with two shanks 26, it also is contemplated that the tool 20 be formed with only one shank as shown in Fig. 8. This latter construction is adaptable to form an L-shaped tool which is or may be handier than the T-shaped tool shown in Fig. 1. In this form of the invention the bore 44 can be omitted from handle 32. Except for the distinctions noted, however, the construction and mode of operation are similar to the form first described.

Also, the tool 20 is susceptible of wide modification without departing from the spirit of the invention. In this connection, attention is directed to Figs. 4-7 which show various modified forms of the tool 20. For example, in Fig. 4, the tool 20 is provided at one end with an ice pick 55 and at the other end thereof with an ice shaver 56. In Fig. 5, the tool 20 is provided at one end with an awl 58 and at the other end thereof with a gimlet 60. In Fig. 6, nail sets 62 and 64 are provided at opposite ends of the tool 20. In Fig. 7, sockets 66 and 68 are provided at the ends of the tool 20 and these sockets conveniently have a different shape or size to enhance the utility of the tool. The modifications illustrated in Figs. 4-7 are given merely by way of example. Obviously, the invention has a much wider application, and it can be adapted to an infinite variety and combination of tools.

In the form of the invention shown in Fig. 7, the connecting member 24 is disposed closer to socket 66 than to socket 68. This arrangement has particular utility where the tool is to be used primarily in a specialized capacity and where an inordinately long or short shank is desired between the handle and one of the sockets. A radio repair kit, for example, requires tools of this character. In this connection, however, it will be readily appreciated that the offset connecting member 24 can be used in connection with other types of tools than the one illustrated in Fig. 7.

Reference is now had to Figs. 9-12 which show still another modification of the invention which is pre-eminently suited for rotatable tools such as screw drivers. In this form of the invention the connecting member 24 is formed separately from shanks 26 and is connected thereto for mutual rotation in at least one direction by a ratchet 70 and pawls 72 (Fig. 11). The shanks 24 preferably are integrally connected, and although the ratchet 70 may comprise a separate element thereon, it preferably also is integral with the shanks. The ratchet 70 is here shown milled directly into the shanks 26, and the cubical connecting member 24 has a through bore 74 which fits over and loosely receives the ratchet. Snap rings 76 which fit in annular grooves 78 at opposite sides of the ratchet 70 retain the connecting member 24 and prevent it from sliding axially along the shanks 26.

As best shown in Fig. 11, the two pawls 72 are slidably mounted in correspondingly shaped openings 80 at opposite sides of the connecting member 24. The outer ends of openings 80 are closed by retainer plates 82, and leaf springs 84 interposed between pawls 72 and the retainer plates urge the pawls inwardly against the ratchet 70. When holder 22 is turned in the direction of the arrow in Fig. 11, the springs 84 yield so that pawls 72 pass easily over the teeth of ratchet 70 without rotating the same; however, when the holder is rotated in a reverse direction, pawls 72 engage the ratchet to establish a direct drive between the holder and tool.

Manifestly, in the latter form of the invention the direction in which the pawl and ratchet mechanism drives the tool is reversed by turning the same end for end in the holder 22. Thus, the tool 20 preferably is formed with identical work-engaging elements at both ends thereof as shown in Figs. 9 and 10, since, with the pawl and ratchet arrangement shown, one element must be used for rotating the work in one direction and the other used for rotating it in

the opposite direction. In the form of the invention shown in Figs. 9-12, one driver is used for tightening the screw and the other driver is used for loosening the same.

Also, in this form of the invention, the bore 74 makes it necessary to provide separate sockets or recesses 86 for ball detents 48, and a separate spring 88 is provided behind each of the ball detents. However, it will be readily apparent that the ball detents 48 function in the same manner and serve the same purpose as in the invention first described.

It is to be understood that the forms of the invention herewith shown and described are to be taken as preferred examples of the same and that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the appended claims.

Having thus described the invention, I claim:

1. A tool comprising a holder provided with a substantially square socket, opposite walls of the socket having opposed notches and said walls being wider than the notches to provide abutments at the sides of the notches; and a tool element having a shank and a square portion on said shank, said square portion adapted to fit snugly in the socket with said shank projecting from the socket either between the notches or through one of said notches, and said abutments engaging the square portion of the tool element in both positions of the latter to hold said square portion securely in the socket.

2. A tool comprising a holder having a socket provided with a side opening; a tool element having a shank, and a connecting member on said shank, said socket and said connecting member being correspondingly shaped, said connecting member being insertible bodily in or removable bodily from said socket with the shank disposed either in line with and extending axially from said holder or in right-angular relation with respect to said holder and in said side opening; and detent means carried by said connecting member engageable with the walls of said socket in both positions of said connecting member to fasten the holder and tool detachably together.

3. A tool comprising a holder having a socket provided with a side opening; a tool element having a shank; a connecting member surrounding and rotatably mounted on said shank; pawl and ratchet means fastening the shank and connecting member for mutual rotation in one direction, said connecting member and said socket so constructed and arranged that the connecting member is adapted to fit snugly and non-rotatably in the socket with said shank in either of two right-angularly related positions, said connecting member being insertible bodily in or removable bodily from said socket with the shank disposed either in line with and extending axially from said holder or in right-angular relation with respect to said holder and in said side opening, and means interengaging between the connecting member and the walls of said socket in both positions of said connecting member to fasten the holder and tool detachably together.

4. A tool comprising a holder having a generally cubical socket provided in opposite walls thereof with notches of less width than said walls; and a tool element having a generally cubical connecting member and shank portions extending in opposite directions from said con-

necting member, said connecting member being wider than said notches and of a size to fit snugly in the socket and adapted to be removably inserted therein with said shank portions extending through said notches.

5. A tool comprising a holder having a hollow handle portion and a generally cubical socket at one end thereof, said socket opening into said handle and provided with notches at opposite sides thereof and shoulders adjacent said notches; a tool element having a generally cubical connecting member, and a spindle extending through and rotatable in said connecting member, said spindle having terminal work-engaging portions; and pawl and ratchet means fastening the spindle and connecting member for mutual rotation in one direction, said connecting member of a size to fit snugly in said socket and adapted to be disposed therein either with said spindle extending axially into the hollow handle portion of the holder or with said spindle arranged substantially at right angles to said holder and in said notches with said connecting member engaging said shoulder.

6. A tool comprising a holder having a hollow handle portion and a generally cubical socket at one end thereof, which socket opens into said handle and is provided with notches at opposite sides thereof; and a tool element having a generally cubical connecting member, and shank portions extending in opposite directions from said connecting member, the terminals of said shank portions in the form of socket wrenches, said connecting member of a size to fit snugly in said socket and adapted to be disposed therein either with one shank extending into the handle and the other shank extending axially away from the handle or with both of said shank portions arranged substantially at right angles to said holder and in said notches.

7. A tool comprising a holder having a socket provided with a side opening; a tool element having a shank, and a connecting member on said shank, said socket and said connecting member being correspondingly shaped, said connecting member being insertible bodily in or removable bodily from said socket with the shank disposed either in line with and extending axially from said holder or in right-angular relation with respect to said holder and in said side opening, and means interengaging between said connecting member and the walls of said socket in both positions of said connecting member to fasten the holder and tool detachably together.

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