

Oct. 18, 1927.

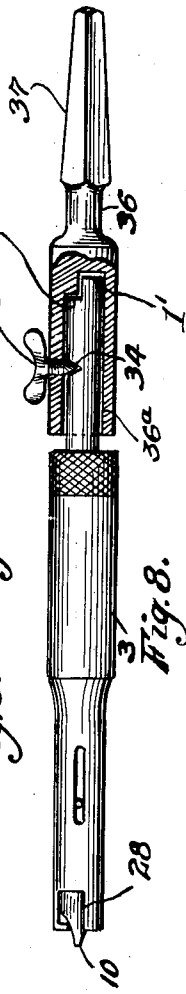
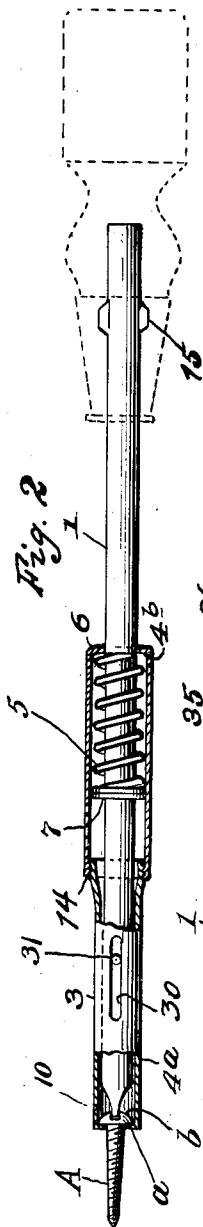
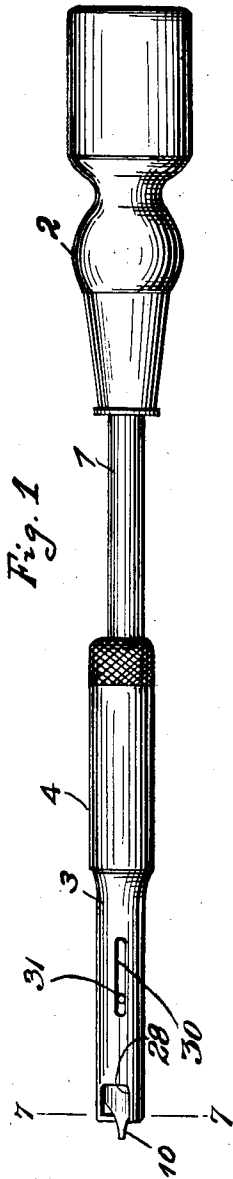
E. HANSON

1,645,753

TOOL

Filed Oct. 15, 1925

2 Sheets-Sheet 1



INVENTOR.
Edward Hanson

Oct. 18, 1927.

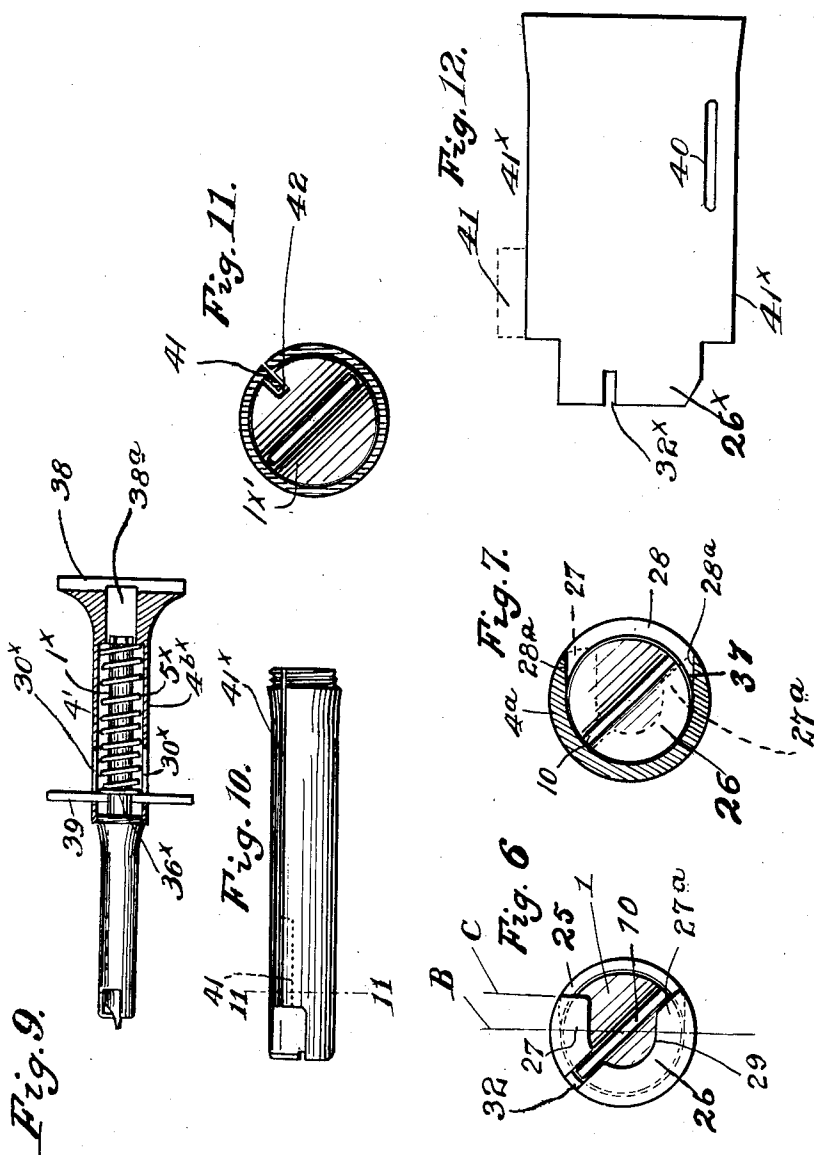
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2 Sheets-Sheet 2



INVENTOR.

Edward Hanson

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UNITED STATES PATENT OFFICE.

EDWARD HANSON, OF CLEVELAND, OHIO.

TOOL.

Application filed October 15, 1925. Serial No. 62,520.

This invention relates to tools for operating screws, bolts, nails, tacks and like devices, more particularly a tool of the holding type in which the device to be driven or screwed into a body or a hole therein is removably engaged and held in operative relation to the tool element.

One object of the invention is to construct a holding mechanism of relatively simple construction capable of (1) firmly and positively holding the device in operative relation to the tool element and (2) readily engaging and disengaging the device.

Another object of the invention is to construct a tool with an improved holder capable of rectilinear movement longitudinally of the tool to permit engagement and disengagement of the device to be operated, whereby the construction of the tool and its operation is materially simplified.

Another object of the invention is to provide a tool with an improved device holder the walls of which co-act with the tool element to hold the device and prevent displacement thereof or its accidental removal from the holder.

Another object is to provide a tool with a holder that will prevent the device from slipping out through the side opening in the holder unless the tool shank is withdrawn.

Another object of the invention is to provide a holder so constructed and associated with the tool element that the latter is exposed for effecting the normal or ordinary operations when the holder is not operated.

Another object of the invention is to so construct the holder that maximum engagement with the device is attained while permitting the ready engagement of the device in operative relation to the tool element or its disengagement therefrom.

A further object is the provision of an adapter whereby the screw driver can be attached or connected to a brace or drill.

Other objects of my invention will be apparent to those skilled in the art to which it relates from the following description taken in connection with the accompanying drawings, wherein—

In the accompanying drawings illustrating the preferred embodiment of my invention, Fig. 1 is a side view of the tool.

Fig. 2 is a similar view with parts broken away.

Fig. 3 is a fragmentary view of the tool shank.

Figs. 4 and 5 are detail views of the parts forming one of the spring abutments.

Fig. 6 is an end view of the tool.

Fig. 7 is a section on the line 7—7 of Fig. 1.

Fig. 8 is a side view, partly in section showing the manner of associating the tool with an adapter whereby it may be mounted in the socket of a brace or drill.

Fig. 9 is a side elevation, partly in section, of a slightly modified form of construction.

Fig. 10 is a side elevation of the holder shell when made from a blank sheet of metal.

Fig. 11 is a section on the line 11—11 of Fig. 10 and showing the tool element in its withdrawn position.

Fig. 12 is a plan view of a sheet blank cut into shape to form the shell when rolled into the shape shown in Fig. 10.

The tool element may be adapted to engage various kinds of securing devices, that shown for illustrative purposes comprises a screw driver. Since screws have to be held in operative relation to the threaded openings formed to receive them and it is also desirable to grasp them when being removed therefrom, my invention finds its most useful application in connection with this form of tool, thereby permitting the screws to be conveniently held while being inserted and started in their openings; also gripped and held when being removed so that they will not get lost or accidentally drop into some inaccessible place; but in such illustration and the following description thereof, applicant does not wish to be so limited.

In the drawings, 1 indicates a shank one end of which is secured to or mounted in a suitable handle 2 in any desired manner. While such mounting is not a part of my invention, the shank end preferably fits an opening in the handle and the metal of the shank is up-set to form lugs 15 which prevent its getting loose therein. The outer end of the shank 1 is tapered down, cut or ground away, preferably on concaved lines to form a transverse rib 10 adapted to fit the slot *a* in the screw A in a well known manner as shown in Fig. 2.

3 indicates as an entirety the holder for the screws. Of the holder 3, 4 indicates a sleeve slidably fitting the shank 1 near its outer end. To facilitate manufacture and assembly, the sleeve 4 may be formed from two tubular sections, 4^a, 4^b, connected together substantially end to end in any desired man-

ner, the form of construction providing for the enclosure of a coiled spring 5 normally tending to slide the sleeve 4 endwise or along the shank 1 inwardly, whereby the screw A will be engaged and held in the manner to be later set forth. The spring 5 abuts at one end against an inturned flange 6 on the inner end of the section 4^a and at its opposite end against an annular abutment 7 removably fixed to the shank 1. The abutment 7 preferably comprises a ring 36 and a key 35 having bifurcations which fit aligned slots 34 formed in the opposite sides of the shank 1. To secure the sections together their adjoining ends have a telescoping relation and the section 4^a is expanded or flared into engagement with section 4^b, so that they may have a screw threaded or other suitable connection. At its outer end the section 4^a is provided with an inturned wall 26, the purpose of which is to engage the under side of the head b of the screw A and thus co-act with the rib 10 to grip or hold it between them (see Fig. 2).

As shown in Fig. 6, the wall 26 is of semi-circular shape at one side of an imaginary line B, its inner edge forming an end wall to receive and engage the shank of the largest screw A capable of being held by the holder 3; at the opposite side of the line B the wall 26 extends laterally, as indicated at 27, 27^a, to a plane indicated by the line C, preferably co-incident with a chord of an arcuate opening 28 formed in the side of the tubular section 4^a and extending inwardly from its outer end, the inner edges of these extensions being disposed parallel and forming an elongated slot 29 through which the screw is moved to position it between the wall 26 and rib 10. The sleeve 4 is preferably guided in a rectilinear direction when moving outwardly to separate the wall 26 and rib 10 or inwardly to effect their co-action to hold a screw. For this purpose the sleeve 4 is formed with an elongated opening 30 which receives a pin 31, the end walls of the slot serving to limit the movement of the sleeve in either direction. As will be understood from Figs. 6 and 7, the shank 1 has a predetermined angular relation to the sleeve 4 so that its rib 10 will be disposed at an angle to the major axis of the slot 29 or the line B, preferably at an angle of 45 degrees to each thereof. This arrangement (1) permits the wall 26 and its extensions to extend around a greater portion of the circumference of the screw head and be rigidly connected to the side wall of the sleeve section 4^a and (2) causes the thrust or reaction of the screw head due to any force tending to rock it out of the slot 39 to bear at an angle on the rib 10; that is, the side wall of the slot a in the screw head will bear against the side of the rib 10, hence the latter will prevent displacement of the screw.

Likewise if a force is applied to the screw in a direction outwardly of the slot 29 in the plane of the wall 26, the screw will be held in the holder due to the abutting relation between the side of the rib 10 and side wall of the slot a. To permit the tool element or rib 10 to extend beyond the holder 3 to enable it to be used in the ordinary manner as well as to engage the screw A when its head is close to or in engagement with the body in which it is mounted, I form the wall 26 with a slot 32 and cut away the remote extension 27^a thereby permitting the sleeve to slide inwardly on the shank 1 so that the outer end thereof and the rib 10 extend beyond the wall 26, as shown in Fig. 1. As shown in Fig. 7, the metal of the sleeve section 4^a along the sides of the opening 28 is cut away on lines 28^a that are tangential to the inner wall of the section at diametrical points so that this opening will receive a screw head of a size equal to the diameter of the section.

Where the tool is to be removably mounted in a supporting member, such as the socket of a ratchet screw driver, a carpenter's brace or a hand drill, or to be mounted in an adapter, which in turn is to be mounted in one of these supporting members, the inner end of the shank is cut off as shown at 1' in Fig. 8 and preferably stepped as shown at 33, and at a point remote from the end 1' the shank is formed with a notch 34 to receive the inner end of a set screw 35. In Fig. 8 I have shown the tool shank mounted in an adapter 36 having a socket 36^a the bottom of which is shaped to fit the stepped end 33, and a set screw. The adapter is provided with a tapered angular stem 37 to fit within the holding socket or chuck of a brace.

Where it is desired to reduce the size of the tool particularly for use in connection with the smaller sizes of screws, I construct the tool as shown in Fig. 9. In this form of construction I substantially reverse the parts, that is, the sleeve 4' serves as the handle and the tool shank 1^x is moved relative to the sleeve to permit the insertion and removal of the screw. To provide for this arrangement the outer end of the sleeve section 4^b is provided with a head 38 which is hollowed out on its inner end to form a chamber 38^a for the inner end of the shank 1^x when it is moved against the tension of the spring 5^x. 39 indicates a rod fixed to the shank 1^x and preferably extending laterally from its opposite sides through slots 30^x formed in the opposite sides of the sleeve section 4^b. As will be understood, the rod 39 and the slots 30^x serve to guide the shank 1^x in a rectilinear direction to maintain it and the sleeve 4' in the predetermined relation already set forth. The spring 5^x abuts the inner end of the head 38 and a washer 36^x bearing against the rod 39. Where the

tool is relatively small it may be grasped in the hand with the head 38 against the palm and the index and second finger disposed over or around the opposite ends of the rod 39 so that inward movement of the shank 1* can be readily effected.

If desired, the sections 4^a, 4^b, may be made from a blank of sheet metal, such a blank for the section 4^a being shown in Fig. 12, having a member 26* to form the wall 26 and a cut away 32* to form the slot 32 for the rib 10 and an elongated slot 40 to receive the pin 31. Or, if desired, instead of providing a guide comprising a pin and a slot, such guide may comprise a fin 41 (see dotted lines in Figs. 10 and 12) extending inwardly from one edge 41* of the blank and fitting a longitudinal groove 42 formed in the shank 1*, as shown in Fig. 11. The opposite edges 41* of the blank may be welded together if desired.

To operate the tool shown in Figs. 1, 2 and 8, it is held in one hand and outward pressure is effected on the sleeve against the tension of the spring 5 to move the sleeve 4 outwardly beyond the rib 10, thus separating the rib 10 and wall 26 and permitting the other hand to insert the screw through the opening 28 and slot 29 with the screw head *b* inwardly of the wall 26. Then the pressure on the sleeve 4 is released, permitting the spring 5 to move it inwardly and clamp the screw between the wall 26 and rib 10 and thus securely hold it while being started in its opening. When the screw head is close to being seated, a pull back on the handle 2 withdraws the rib 10 from the kerf or slot *a* of the screw head, and by giving the tool a slight twist, the screw holder slips off the screw head, the spring retracts the screw holder 3 on the shank and thus causes the rib to project beyond the end of the screw holder, whereby it may be operated as an ordinary screw driver for tightening the screw into its final position. Of course it is merely a matter of reversing the sequence of these motions when removing a screw particularly when it is necessary to prevent the loss of the same or its falling into an inaccessible place.

It is obvious that the tool can be made of any size and the size in the opening in the screw holder varied so that it can be

used for various sizes and kinds of screws. Other changes may be made without departing from the spirit of this invention.

What I claim is:

1. In mechanism of the class described, the combination with a shank having a tool element at its outer end, of a holder for a device to be operated upon by said element comprising a sleeve slidable endwise on said shank and having an opening formed in its side wall adjacent its outer end, said opening having a width substantially equal to the internal diameter of said sleeve, an inwardly extending flange extending around the end of said sleeve between the opposite sides of said opening and forming a slot as an elongation of said opening, means between said sleeve and shank for maintaining said tool element at an angle to the major axis of said slot while guiding said sleeve and shank longitudinally one relative to the other, and a spring interposed between said shank and said sleeve normally tending to effect relative movement between them in a direction to clamp a device between said tool element and the inner face of said flange.

2. A mechanism as claimed in claim 1 in which the flange is formed with a radial slot through which the tool element normally projects and the ends of said flange extend beyond a line cutting the axis of the tool shank at right angles to the axis of the elongated slot.

3. In a tool of the class described, the combination of a shank having a tool element on its free end, a sleeve slidable longitudinally on said shank, a flange on and extending inwardly from the outer end of said sleeve around a portion of its side and forming a slot as an elongation of an opening, said sleeve having said opening in its side wall registering with the open end of said slot, and means for guiding the sleeve on said shank with said tool element extending from one end of said flange at an inclined angle to said slot, and said flange at the portion diametrically opposite said end being formed with a narrow slot through which said tool element projects.

In testimony whereof, I have hereunto affixed my signature.

EDWARD HANSON.