July 29, 1924.

1,503,047

E. HENDRICKSON

TOOL CONSTRUCTION

Filed Dec. 19, 1923

Fig. 1.

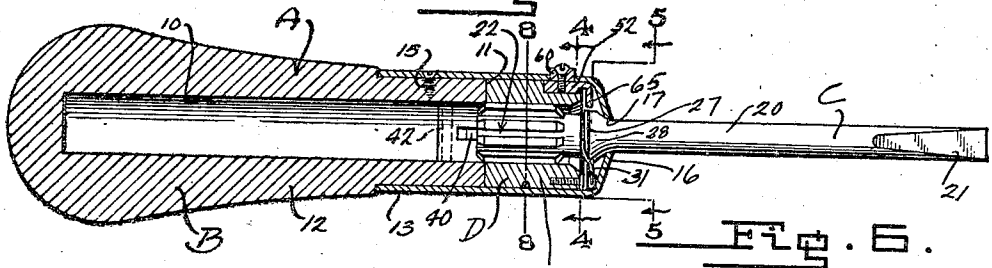


Fig. 6.

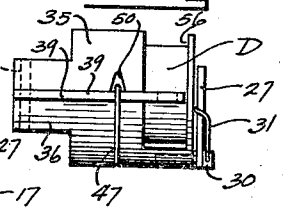


Fig. 2.

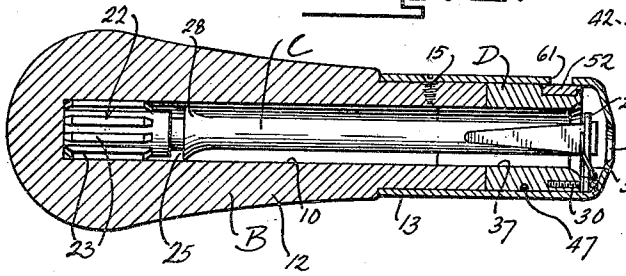


Fig. 7.

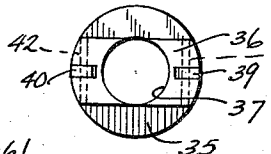


Fig. 3.

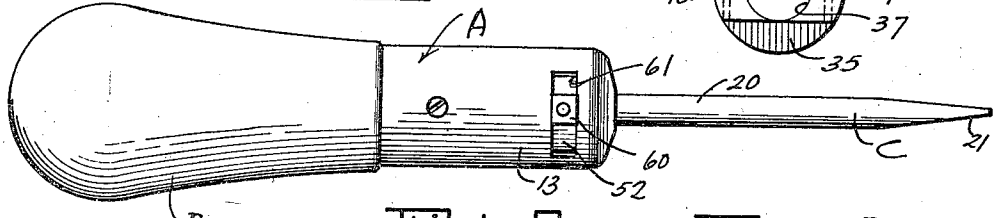


Fig. 8.

Fig. 4.

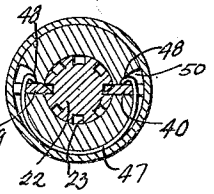
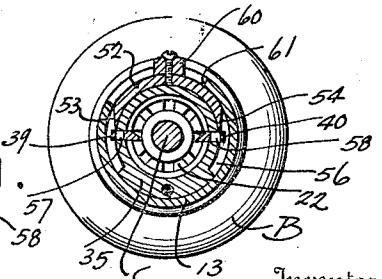


Fig. 5.



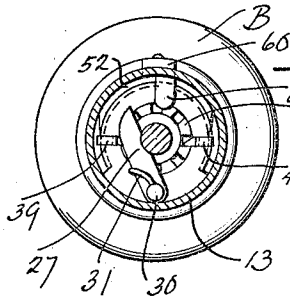
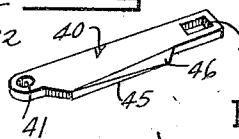


Fig. 9.



Inventor

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UNITED STATES PATENT OFFICE.

ELI HENDRICKSON, OF SEATTLE, WASHINGTON.

TOOL CONSTRUCTION.

Application filed December 19, 1923. Serial No. 681,626.

To all whom it may concern:

Be it known that I, ELI HENDRICKSON, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Tool Constructions, of which the following is a specification.

This invention relates to improvements in tools such as screw-drivers.

The primary object of this invention is the provision of a collapsible ratchet tool.

An important object of this invention is the provision of a screw-driver or like tool, embodying handle and bit portions, the latter of which may be given an intermittent movement in a selected direction by means of a novel ratchet device used in connection with the tool.

A further object of this invention is the provision of a ratchet tool of the above mentioned character embodying a bit or blade which may be collapsed into the handle portion of the tool into a compact arrangement.

A further object of this invention is the provision of a relatively simple collapsible ratchet tool of the above mentioned character which has very few working parts, which may be easily operated, and which is very durable in construction.

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

In the accompanying drawing forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a longitudinal sectional view taken through the improved tool, showing the same in a working position.

Figure 2 is a cross sectional view taken through the improved tool, showing the bit portion thereof in collapsed relation with the handle.

Figure 3 is an exterior view of the improved tool, showing the parts thereof in extended working relation.

Figures 4 and 5 are cross sectional views taken substantially on their respective lines in Figure 1 of the drawing.

Figure 6 is a side elevation of a novel ratchet device used in connection with this tool.

Figure 7 is a rear elevation of the ratchet device illustrated in Figure 6.

Figure 8 is a cross sectional view taken substantially on the line 8—8 of Figure 1.

Figure 9 is a perspective view of a novel pawl or ratchet member used in connection with this tool.

In the drawing, wherein for the purpose of illustration is shown but the preferred embodiment of this invention the letter A may generally designate the improved tool, which may include a handle B; a bit or blade C; and novel ratchet means D for controlling the operation of the blade C with respect to the handle B.

The handle B is preferably of any material, and of any formation, including a longitudinal bore or compartment 10, which opens at the forward edge 11 of the body portion 12 of the handle B. The handle B may also include a metal ferrule 13, which is attached over the forward edge of the body portion 12, as by screws 15, and which houses therein the ratchet device D, providing a front wall 16 of outwardly bulging formation having an opening 17 therein of less diameter than the diameter of the pocket or compartment 10; the edges defining the opening 17 being beveled in converging relation from the inside toward the outside of the wall 16, and which construction is provided in order that the bit C may have a snug seating in the aperture 17, as is illustrated in Figure 1 of the drawing, and as will be subsequently described.

The blade C may be of any formation, and as the device A is a screw-driver the blade C of course provides the shank portion 20 with the chisel point 21 at the forward end thereof. At its rear end the blade C is provided with a ratchet wheel or head 22, having the longitudinally extending teeth 23 thereon, which are formed on the wheel 22 so that the head may fit for close sliding engagement in the pocket or compartment 10 to permit the longitudinal sliding of the blade C therein. Just forwardly of the rachet wheel or head 22 an annular groove 25 is provided, which receives therein a retaining arm or lug member 27, when the blade C is outwardly extended, in order to retain the blade C in its extended rela-

tion with the handle B. On this blade or bit C adjacent the groove 25 a tapered portion 28 is provided, which converges from the groove 25 into the shank 20 thereof; this tapered portion 28 when the arm 27 is located in the groove 25 resting in the beveled opening 17 of the wall 16 of the handle B, to stabilize the positioning of the bit C. The retaining arm or lug 27 is pivotally mounted, as at 30, upon the front face of the ratchet device D, and a spring 31 is connected to the bolt 30 at the pivot point of the arm 27, and acts against the arm 27 to normally urge the same into engagement with the bit C. When the bit C is collapsed within the compartment 10 the latch arm 27 rests against a flat chisel surface of the blade C, substantially as is illustrated in Figure 2 of the drawing, which will maintain the blade or bit in entire secreted relation within the compartment 10, and prevents accidental extension, due to frictional engagement with the latch arm 27, as shown. When in such collapsed position the blade C is always in position to be forwardly extended by a jerk of the handle B, as the blade shank 20 will readily slide along the latch 27 and the tapered portion 28 will push the latch 27 against the normal tendency of the spring 31 so that it will snap into the groove 25 to retain the blade C in extended relation with respect to the handle B, as is illustrated in Figures 1 and 3 of the drawing.

The ratchet device D is preferably of metal construction, and includes a frame or body portion 35, which at its rear end provides a polygonal portion or shank 36 which may extend into a suitable recess in the smaller part of the body portion 12 of the handle B in order to connect the frame 35 to the body portion 12 to prevent relative rotation thereof. The body portion 35 is in the main cylindrical shaped in formation, and is provided with a bore 37 therethrough, which forms a part of the pocket or compartment 10. Ratchets or pawls 39 and 40 are pivotally carried by the frame 35, having suitable openings 41 at their rear ends to receive pins 42 whereby said pawls may be pivotally connected in suitable side recesses or grooves provided at diametrically opposed points on the frame 35 and extending longitudinally thereof; the pins 42 being transversely connected to the polygonal portion 36 of the frame 35, so that the pawls 39 and 40 are pivotally connected at their rear ends to the rear end of the frame 35. Each of the pawls or racthets 40 and 41 has a locking flange or tongue 45 as a part thereof, which provides an upper inclined face 46 and a lower face flush with the lower side of the pawl or ratchet 40. A semi-circular spring 47 is preferably carried by the frame 35, having the upper ends 48 thereof hooked and engaging over the oppositely located pawls or ratchets 39 and 40 and in suitable grooves 50 provided in the sides of the frame 35; the normal tendency of the spring 47 being to force the pawls or ratchets 39 and 40 inwardly of the frame 35 so that the locking tongues 45 thereof normally extend into the bore 37 of the frame 35, so that they may engage in the grooves between the teeth 23 of the ratchet wheel or head 22.

In connection with the ratchet device D a control member 52 is provided, which is of arcuate formation, having the opposite ends 53 and 54 thereof pointed or tapered. This member 52 is adapted for sliding in a segment or groove 56 provided in the frame 35, and the pointed ends 53 and 54 thereof are adapted for cooperation in openings 57 and 58 respectively provided in the ratchets 39 and 40. A finger engaging lug 60 is preferably rigidly affixed to the control member 52, extending outwardly through a slot 61 provided in the ferrule 13. This control member 52 also has a forwardly depending finger 65 rigid therewith, which extends radially inwardly toward the bore 10, forwardly of the frame 35, as a means for releasing the latch member 27 from its engagement in the groove 25 of the bit C when it is desired to collapse or position the bit in the compartment 10 of the handle B.

Referring to the operation of the improved device, assuming that the bit C is collapsed within the handle B, to extend the blade C it is merely necessary to suddenly jerk the device with the opening 17 of the tool lowermost, and bit C will be extended, sliding along the retaining latch 27 until the latch 27 is snapped into the groove 25 to prevent any further longitudinal extension or retraction of the blade C. In this position the ratchets 39 and 40 may ride into the grooves between the teeth of the ratchet wheel 22. If the control member 52 is positioned so that the tapered ends 53 and 54 thereof are out of engagement in the apertures 57 and 58 of the ratchets 39 and 40, both of said ratchets or pawls 39 and 40 will be in engagement between the teeth of the ratchet wheel 22, and any relative movement of the blade C with respect to the handle B will be prevented. However, if it is intended to permit only a left hand turning of the tool A, so that during such left hand turning the bit C is locked to the handle B, as is the case when a screw is being driven into some material, it is necessary to shift the control member 52 by the lug 60, toward the pawl member 40; the tapered end 54 of the member 52 then entering the opening 58 of the pawl or ratchet 40 and drawing the same outwardly so that the locking flange 45 is removed from engagement with the ratchet wheel

teeth 23. The tool having been set in this manner it is to be noted that the pawl 39 is the only one which is in engagement with the teeth of the ratchet wheel. Incident to the inclined face 46 thereof the handle will move relative to the bit C in one direction, by sliding over the teeth 23, but is prevented from moving in the opposite direction over the teeth 23, because the surface of the locking flange 45 opposite the inclined surface 46 will engage the teeth 23 and will lock the blade C to the handle B for rotation therewith. Thus, an intermittent motion may be given to the blade 20 upon oscillation of the handle B, in accordance with the known motion fo the ratchet screw driver. The action of the screw driver when the pawl 40 is engaged with the teeth and the pawl 39 is not, is just opposite to that above described; this relation of the pawls or ratchets being effected by moving the control member 52 so that the pointed end 53 thereof may enter the opening 57 of the ratchet 39 to withdraw the locking flange 45 thereof from engagement with the ratchet wheel teeth 23.

As above noted the retaining member 27 is controlled by the radial extension 65 of the control member 52. This is effected by means of moving the control member 52 until the lug 60 thereof is at the extreme end of the slot 61, and in which relation the lug 65 will move to engage the lock arm or retaining member 27 to move the same out of engagement from the groove 25, so that the blade C may be collapsed into the compartment 10 of the handle B. It is thus to be noted that the entire control of the blade C with respect to the handle B is effected by means of moving the lug member 60 in the slot 61.

From the foregoing description of this invention it is apparent that a very simple type of ratchet tool has been provided, which will permit of selective intermittent motion of the blade thereof in either direction with a sliding movement of the handle with respect to the blade in the opposite direction, or the blade may be locked with the handle to prevent movement in either direction. In addition to these features the blade or bit member may be collapsed in a compact relation within the handle.

Various changes in the shape, size, and arrangement of parts may be made to the form of invention herein shown and described, without departing from the spirit of this invention or the scope of the claims.

I claim:

1. A tool of the class described comprising a handle defining a compartment therein, a bit adapted to be inoperably disposed in the compartment, latch means for holding the bit extended from the handle, ratchet means cooperatively supported by the handle and bit to permit intermittent movement of the bit in a selected direction upon oscillative movement of said handle, and common means for moving the latch means to an inoperative position and for controlling operation of said ratchet means.

2. A tool of the class described comprising a handle providing a longitudinal pocket therein, a bit slidable in the longitudinal pocket, at its inner end providing a ratchet wheel rigid with the bit, said bit adapted to be entirely collapsed within the pocket of said handle, a ratchet device carried by the handle forwardly thereof embodying a pair of pawls, means controlling said pawls so that they may be selectively placed in engagement with the teeth of the ratchet wheel whereby the bit may be given an intermittent movement with respect to the handle upon oscillation of the handle, and means for locking the bit in extended or collapsed relation within the pocket of the handle.

3. In a device of the class described the combination of a handle providing a longitudinal pocket therein, a ferrule forwardly carried by the handle having an opening therein of less dimension than the dimension of said pocket, a bit slidably carried by the handle providing a reduced shank which may extend through the opening of said ferrule, the inner end portion of the bit having longitudinally extending teeth, pawls pivotally carried by said handle and yieldably held in engagement with the teeth, said shank at its inner end providing an outwardly tapered portion and an annular groove therein rearwardly of the tapered portion, a retaining latch member pivotally carried by the handle adapted to engage the groove of the bit whereby the tapered portion of the bit may be forced into the openings of said ferrule to lock the bit in stable relation with the handle and extended therefrom, operating means rotatably carried by said handle for selectively moving the pawls out of engagement with the teeth when the operating means is rotated in a proper direction, and means carried by said operating means for withdrawing said retaining member from said groove to permit collapsing of the bit within the pocket of said handle when the operating means is rotated in one direction beyond the position for a tooth engaging pawl.

4. In a device of the class described, a handle provided with a longitudinally extending pocket, a bit slidably carried by the handle and having a shank portion slidable into and out of the pocket, the inner end portion of said bit having longitudinally extending teeth and a circumferentially extending groove forwardly of said teeth, pawls pivotally carried by said handle and yieldably held in position for engaging said teeth when the bit is extended a retaining latch

pivotally carried by said handle and yieldably held in position for entering said groove and retaining the bit extended, an arcuate strip oscillatably carried by the handle and having its end portions adapted to engage said pawls and selectively move the same to an inoperative position when said strip is moved in the proper direction, and a finger extending from said strip intermediate its length for engaging said latch and moving the latch out of said groove to permit retraction of the bit when said strip is moved in one direction beyond the position for engaging a tooth engaging pawl.

ELI HENDRICKSON.