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2,778,396

RATCHET HANDLE WITH STRAIGHT CRANK ARM

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Application September 9, 1955, Serial No. 533,287

1 Claim. (Cl. 145—71)

This invention relates to screw drivers or related tools, and more particularly has reference to a screw driver having a double ratchet construction and a foldable power lever.

One important object of the present invention is to provide a screw driver of the type referred to, which can be used with substantially greater speed than is true of conventional screw drivers of approximately similar types in present day use.

Another object is to provide a screw driver which will be so designed as to drive a screw in even very hard woods, with maximum ease, due to the particular formation and relative arrangement of a power lever embodied in the device.

A further object of importance is to provide a screw driver as described which can be made of relatively light, inexpensive materials, despite the particular advantages thereof hereinbefore noted.

A further object of importance is to provide a screw driver as stated which will be designed in such manner as to include a bit-supporting head and shank having a ratchet-type connection to an associated handle aligned axially with the bit, the ratchet in connection being of the double ratchet type, with the construction being such that whenever a power lever is in use for rotating the pawl assembly of the ratchet means, the handle will be rotatable relative to the shank of the bit supporting portion of the device, and can be used to steady the device during operation of the power lever, the construction further being designed to cause the power lever, when folded to inoperative position, to serve as a means connecting the handle and pawl assembly for joint rotation so that the handle may now be used for rotating the pawl assembly.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing in which like reference characters designate like parts throughout the several views and wherein:

Figure 1 is a perspective view of a tool formed according to the present invention, as it appears when in use with the radial handle member or power lever operatively extended;

Figure 2 is an elevational view of the tool with the auxiliary handle folded;

Figure 3 is an enlarged longitudinal sectional view on line 3—3 of Figure 2;

Figure 4 is a transverse sectional view, still further enlarged, on line 4—4 of Figure 3;

Figure 5 is a transverse sectional view, on an enlarged scale, on line 5—5 of Figure 3; and

Figure 6 is a transverse section on line 6—6 of Figure 3.

An elongated, cylindrical main handle 10 has a rounded upper end and has an axial bore 12 opening upon the lower end of the handle and terminating at its upper end adjacent the rounded upper extremity of the handle. Communicating with the upper end of the bore is a transverse slot 14 formed in one side of the handle and, as

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shown in Figure 4, extending through half the thickness of the handle.

Formed in the slot-provided side of the handle is an elongated longitudinal groove 16 extending fully from the lower end of the handle to the slot, in closely spaced, parallel relation to axial bore 12, and cut into the upper end portions of the side walls of the slot are notches 18, for a purpose to be made presently apparent.

An elongated stem or shank 20 fits snugly but rotatably within the axial bore 12, and has at its upper end a reduced, headed, axial extension 22. A filler piece 24 of semi-circular outer configuration (Figure 4) is fixedly engaged in the slot 14, and has, medially between opposite ends of its inside edge, a semi-circular recess 26 constituting means forming a shoulder engageable under the head 22.

Stem 20 is thus, while freely rotatable within the handle, prevented from movement relative to the handle in an axial direction.

In the handle, at opposite sides of the bore, there are formed threaded recesses, receiving screws 28 extending through smooth-walled openings that register with the recesses as shown in Figure 4, to provide the means for fixedly connecting the filler piece 24 to the handle body.

At its lower end, the handle is formed with a flat end wall lying perpendicularly to the axis of the stem, and abutting against said end wall is a short, cylindrical block 30 having an axial bore 32 receiving the lower end portion of stem 20 as shown in Figure 3.

The axial bore 32 of the block 30, at its lower end, is counterbored to receive an enlarged portion integrally formed upon the lower end of the stem 20, said portion being designated at 34 and being shown in cross section in Figure 6. Portion 34 is formed with longitudinally extending ratchet teeth 36, engageable by the pawls of a double ratchet assembly shown as including a plug 38 having a spring loaded pawl 40, said plug being threaded into a radial opening formed in the block 30. Aligned diametrically of the block 30 with the radial opening is a second, threaded radial opening in which is threadedly engaged a plug 42, cupped to receive a pawl 44 diametrically opposing the pawl 40 and having a stem 46, a spring 48 being held under compression between the pawl 44 and the inner end of the recess of the plug to resiliently, yieldably bias the pawl 44 against the toothed enlargement of the stem 20.

The arrangement provides a double pawl assembly for the ratchet, insuring that there will be a full, balanced driving relationship between the block 30 and the enlargement 34 when the block is rotated in one direction, the pawls 40, 44 being adapted to ratchet over the teeth when the block 30 is rotated in an opposite direction, that is, counterclockwise in Figure 6.

The pawl assemblies, it will be understood, are identically constituted with the plug 38 being cupped similarly to the cup-like plug 42 and housing a spring normally biasing the pawl 40 in the direction of the ratchet teeth 36.

Integral with the enlargement 34, at the lower end thereof, is a bit-carrying head 50, said head 50 tapering at its outer end and having an axial socket 52 opening upon the tapered end thereof and adapted to receive the inner end of a removable screw driver bit 54. Bit 54 is notched adjacent its inner end, in registration with a threaded opening formed radially in the head 50 in communication with the socket 52, and a set screw 56 is threaded into the opening of the head into the notch to fixedly engage the bit shank with the head for rotation therewith.

Formed in the block 30 is an outwardly opening recess 58 aligning with the groove 16, and extending trans-

versely between the walls of recess 53 is a hinge or pivot pin 60 passing through an opening formed in the inner end of a power lever or auxiliary handle 62. Handle 62 is exteriorly roughened for the greatest part of its length, and is swingable between the dotted and full line positions shown in Figure 3. The auxiliary handle 62, adjacent its free end, is formed with transversely spaced notches defining a short longitudinal rib 64 which can be grasped between the thumb and index finger of the hand for the purpose of swinging the auxiliary handle outwardly from its normally housed position in groove 16 to a position such as that shown in Figure 1 in which it extends radially, outwardly from the block 30, the notches 18 being in registration with the side recesses of the auxiliary handle 62 to facilitate the grasping of the auxiliary handle.

At its free end, the auxiliary handle has an axial recess, in which is engaged a spring loaded ball element 66, said element being adapted to extend partially into a complementary, part-spherical bottom recess formed in the filler piece 24 when the auxiliary handle is in its folded position within groove 16.

In use, and assuming that it is not necessary to use the auxiliary handle 62, the parts will appear as shown in full lines in Figure 3. With the auxiliary handle in its folded or housed position, it extends as a tie rod between the block 30 and the handle 10, connecting the handle 10 and block 30 for joint rotation. The user need only, now, rotate the handle 10, thus causing the block 30 to rotate, by setting up a driving connection between the pawls 40, 44 and ratchet teeth 36 when the handle is rotated in one direction. Rotation in the opposite direction permits the block 30 and handle 10 to rotate without the accompanying rotation of the head 50, stem 20, and bit 54, thus providing a ratchet action screw driver.

Assuming that it is desired to provide additional power during the driving action, the user swings the auxiliary handle outwardly to the Figure 1 position thereof. As a result, the handle 10 is now disengaged from the block 30, and is freely rotatable relative to the block 30 and relative, also, to the floating stem 20 and the associated head 50 and bit 54. The auxiliary handle 62, however, by reason of its being pinned to the block 30, will rotate the block 30 when swung about the axis of the stem 20. As a result, the user can exert a downward, axial pressure upon the handle 10 to force the bit tightly against the screw that is being driven, and while exerting this downward pressure, can swing the auxiliary handle back and forth in a horizontal plane, so that there is again the ratchet action driving of the head 50, this time, however, without accompanying rotation of the handle 10 which is held stationary during the exertion of the aforementioned downward, axial pressure. As a result, when a screw is being driven into a very hard wood, the driving of the screw is still accomplished with maximum ease and facility, since the radial handle provides a powerful lever type action, and since, further, a full downward pressure can

be exerted by the user against the handle 10 to insure the interengagement between the blade of the bit and the head of the screw being driven.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claim.

What is claimed is:

15 A holder for a bit or like tool element comprising an elongated, axially bored handle having a longitudinal groove paralleling the bore thereof, said handle having a transverse slot extending through substantially half its thickness and communicating between one end of the groove and the corresponding end of the bore; a block 20 abutting at one end against the handle and having an axial bore registering with that of the handle; an elongated stem rotatably engaged in the bores of the handle and block and terminating at one end, beyond the block, in a bit-receiving head, said stem having at its other end 25 a reduced, headed, axial extension; a filler piece of substantially semi-circular outer configuration fixedly engaged in the slot and formed with a shoulder fitting under the headed extension to hold the stem and handle assembled with each other for relative rotation while maintained against relative axial movement, said filler piece 30 having a bottom recess opening into the groove; means interengaging between the stem and block for driving the stem and head; and an auxiliary handle pivotally connected to the block to swing about an axis normal to the axis of rotation of the stem, between a first position in which said auxiliary handle projects radially, outwardly from the block normally to said axis of rotation of the stem, and a second position in which the auxiliary handle 40 extends longitudinally of the first named handle within the groove, the auxiliary handle and first named handle being thus adapted for interengagement with one another in the second named position of the auxiliary handle, thus to connect the first named handle and block for joint rotation when the auxiliary handle is in the second named position thereof, said auxiliary handle including a spring loaded detent engaging in the bottom recess of the filler piece in the second named position of the auxiliary handle. 45

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