SCREW DRIVER WITH SCREW HOLDING JAWS

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The present invention relates to a screw-driver provided with a plier system for the secure positioning of the screws during their screwing and unscrewing, respectively.

It is an object of the present invention to provide a screw-driver which allows holding a screw fast by means of a spring provided in a sleeve carried by its spindle being urged against the head of the screw and the rear surface being pressed against the jaws of the latter. This object is achieved by the screw holding jaws of the sleeve 1 that is diametrically opposed to the slot 7.

The outer sleeve 4 is also provided in its front wall with an opening which is formed by an upper longitudinal slot 8 the shape and size of which corresponds with that of the slot 6 of the inner sleeve 1 and by a lower rectangular opening 9 the width of which is the same as that of the slot 7 of the sleeve 1.

The flange 5 on the outer sleeve defines a square or rectangular opening 10 serving as a guide for a cross-member of the stirrup-shaped tongs 11. The two arms of the stirrup-shaped tongs are arranged vertically and extend in downward direction from a supporting cross member 11', but are then flared outwardly and their lower ends are bent inwardly and terminate into an edge provided with a triangular recess, so that the oppositely disposed edges form a square opening 10. Immediately under the cross-member of the stirrup-shaped tongs 11 is provided a sliding strip 13 engaging the slots 7 and 7' of the sleeve 1 and the front edge of which strip 13 registers with the outer periphery of the outer sleeve 4.

In order to allow the introduction of the strip 13 into the slots 7 and 7', it is necessary to urge slightly upwards the tongs 11 and cylindrical member 3 through a slight compression of the coil springs 14, respectively. The lower end of the strip 13 holds the two sleeves together inasmuch as the two sleeves are allowed to assume an axial movement relative to each other but no relative rotary movement and at the same time it secures the downwardly sliding strip 13.

The inner cross-member 11' of the tongs is provided with a central bore the diameter of which is slightly greater than that provided in the upper bent flange of the sleeve 1. These bores allow the insertion of the spindle 14 to be adapted to receive a double edge blade of alloy steel. The latter is secured in the slot 15 through a screw 16 and the two edges have preferably different sizes so as to permit of operation of two different sizes of screws.

The cylindrical slider 3 also includes a number, for instance, four, of tapped openings 17 (two of which are shown in Figs. 1 and 2), perpendicular to its axis disposed equally apart at its periphery, each of said openings being located at a different level and furthermore, the cylindrical slider 3 has a transversal bore 18 which receives a ball 19, subjected to the action of an annular spring 21, lying in a annular groove 22. The urging of the ball 19 inwardly into engagement with the said bore 18. A recess 22 is provided for this ball 19 in the spindle 14. As soon as the ball 19 enters said recess 22, the shaft 14 and slide 3 are engaged.

The operation of the screw-driver is performed in the following manner: The suitably carried screw-head is urged against the tool spindle 14 after the tool edge has engaged the slot in the screw-head, while this pressure is maintained, the two sleeves 1 and 4 are urged forwardly towards the screw by thumb pressure. As soon as the two jaws of the tongs 11 have moved somewhat beyond the head of the screw, it is possible, while retaining the pressure exerted on the spindle and the counter-pressure on the sleeve 1, to urge Fig. 3 a front elevational view of the screw-driver in operative position; Fig. 5 is a front elevational view of the screw-driver shown in a differently set position compared with that of Fig. 4; Fig. 6 is a bottom plan view of the screw-driver shown in Fig. 1; Fig. 7 is a section along the lines 7—7 of Fig. 1; and Fig. 8 is an axial section of another embodiment of the screw-driver in operative position.

The present invention may be made in substantially one step and require an exceedingly short time.
It is necessary to limit the upward movement of the spindle axially with reference to the sleeve 1. In this connection it is well to note that the tapping 17 in the cylindrical slider 3 is eccentrically located so as to provide a lever and with a stem disposed eccentrically relative to the axis of the screw 23. This is brought about in the position where the slots 6 and 8 of the sleeve 1 and 4, respectively, are adjacent. It is then sufficient, as soon as a screw is turned hold of, to turn said lever-operated screw until its eccentric stem engages the upper edge of the slot 6 in the sleeve, so as to obtain thus the desired limiting of the downward movement of the sleeve 1.

The screw-driver is now ready for operation and, in case it is intended for executing mass operation for which the same type of screw is being used constantly, no further adjustment is required.

It is possible to take hold in succession of the different screws to bring them into the desired location and to screw them in, for which operation it is of advantage to use a key, a winch or any similar suitable arrangement fitted over the upper end of the spindle 14 of the cylindrical slider 3, generally in cross-section. As soon as the edge of the sleeve 4 projecting beyond the flange 5 of the sleeve 4 is held up by the support in which the screw is to be screwed, the sleeve 4 moves automatically backward and releases the screw from the head. This takes place without the spindle 14 leaving the latter, so that the screw is further screwed into the support without any interruption until the head of the screw engages securely the support.

Referring now to Fig. 8, which discloses a second embodiment, the cylindrical slider 3 is not connected to the spindle by means of an elastic coupling but by means of a screw connection. The cylindrical slider is provided in this case with an inner thread 24 and the spindle 14 with a threaded portion 25 while the eccentric screw 23 is replaced simply by an ordinary headed screw 26 that ensures the locking of the tool. Otherwise, the operation and the control are the same as in the first embodiment. The slight difference, however, that each time after the screwing of the screw is completed, the spindle must be screwed back in order to provide again for the contact between its enlarged end and the cylindrical slider.

In order to dismantle the tool, it is sufficient to remove the holding screw 23, to remove the spindle 14 and then the cylindrical slider 3, to separate the inner sleeve 1 from the outer sleeve 4, and finally to remove the slider strip 13 and the coil spring 2 from the inner sleeve 1.

It will be readily understood that the described arrangements are given only by way of example and that the shape, size and details may be modified in accordance with requirements without modifying the principle underlying the invention, as defined in accompanying claims. In particular, there is also the possibility of using the screw-driver not only for taking hold of and clamping screws, but for operating with the same result on a large number of other removable connecting parts such as rivets, pins and heads, and the like. Obviously, in such cases, the lower end of the actual screw-driver should be given a shape matching the part that is to be clamped.

Finally, it should be also remarked that the fact of removability quickly and easily at any moment the tongues from the spindle, allows the tool to be used without such tongues, i.e., an ordinary tool.

Claims:

1. A screw-driver comprising a tool spindle with an enlarged end, a first sleeve with an inwardly projecting flange at one end thereof slidingly fitted over the said spindle, a slider carried on the said spindle adjacent the said enlarged end thereof inside the sleeve, a spring between the cooperating surfaces of the flange of the said sleeve and the said slider, tongs projecting beyond the lower end of said slider and including side walls sliding inwardly and jaws directed inwardly at the end of said walls, means for engaging said tongs with said slider, a second sleeve mounted in axially sliding relationship over the first sleeve and including an inner projection adapted to engage the tong jaws inwardly when the second sleeve is moved outwardly relative to the said first sleeve for engaging the rear surface of the screw head, the lower edge of the said second sleeve extending beyond the location of said projection to meet the support in which the screw is to be screwed during the screwing operation to provide for the relative rearward movement of said second sleeve and consequent release of the tong jaws.

2. A screw-driver comprising a tool spindle with an enlarged end, a first sleeve with an inwardly projecting flange at one end thereof slidingly fitted over the said spindle, a slider carried on the said spindle adjacent the said enlarged end thereof inside the sleeve, a spring between the cooperating surfaces of the flange of the said sleeve and the said slider, tongs projecting beyond the lower end of said slider and including side walls sliding outwardly and jaws directed inwardly at the end of said walls, a second sleeve mounted in axially sliding relationship over the said first sleeve and including an inner projection adapted to engage the said tong jaws inwardly when the said second sleeve is moved outwardly with reference to the said first sleeve or engaging the rear surface of the screw head, the lower edge of the said second sleeve extending beyond the location of said projection to meet the support in which the screw is to be screwed during the screwing operation to provide for the rearward movement of said second sleeve and consequent release of the said tong jaws, a tangential strip engaging the said two sleeves for holding them together for relative axial but not radial movement, means for engaging the said tongs for holding the tongues within said sleeves.

3. A screw-driver comprising a tool spindle with an enlarged end, a first sleeve with an inwardly projecting flange at one end thereof slidingly fitted over the said spindle, a slider carried on the said spindle adjacent the said enlarged end thereof inside the sleeve, a spring between the cooperating surfaces of the flange of the said sleeve and the said slider, readily removable means adapted to engage the said spindle with the said first sleeve, tongs projecting beyond the lower end of said sleeve and including side walls sliding outwardly and jaws directed inwardly at the said end of said walls, means for engaging said tongs with said slider, a second sleeve mounted in axially sliding relationship over the said first sleeve and including an inner projection adapted to engage the tong jaws inwardly when the said second sleeve is moved outwardly with reference to the said first sleeve for engaging the rear surface of the screw head, the lower edge of the said second sleeve extending beyond the location of said projection to meet the support in which the screw is to be screwed during the screwing operation to provide for the relative rearward movement of said second sleeve and consequent release of the said tong jaws.

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