

A STUD ROTATING TOOL

The present invention relates to a stud rotating tool.

BACKGROUND OF THE INVENTION

Studs of a kind which have a threaded engagement into a structure to fasten it and perhaps also other components to the structure are in common use. A stud, like bolts may secure a flange to crankcase of a ship's engine, close a cover to manhole in a bulkhead or may be a component of an engine. Such studs provide a threaded portion of a male kind which may be engaged by threading it into a female thread of the structure.

Studs as well as including a threaded region to engage into the aperture of the structure, also provide a threaded portion protruding from the structure. The protruding threaded portion is utilised for its engagement by tools to insert or remove the stud from the structure. The way in which the stud is rotated to remove or insert it with the structure is currently achieved in a cumbersome manner. The existing manner involves the threading of two nuts onto the protruding portion of the stud. These nuts are then rotated on the thread to move towards each other and to become engaged and tightly pressed against each other. This creates a wedging effect between the thread of the nuts and the

thread of the stud and increases the friction between the threads with the result that a locking of the nuts with the stud occurs. A transmission of torque provided to the nuts to rotate the stud can then be achieved. Normally two spanners are required, one for rotating or holding each nut relative to the other. Such spanners are engaged independently from each other on the nuts and can be quite cumbersome to use. This is particularly so if the handles of the spanners are not extending from the nuts in a conveniently to use direction where sufficient moment can be maintained on the spanners to keep the nuts from slipping on the stud whilst simultaneously rotating them to insert or remove the from the structure. There is hence a need for a more conveniently to use means of rotating a threaded stud.

Accordingly it is an object of the present invention to provide a threaded stud rotating tool which improves on the abovementioned existing technique or which will at least provide the public with a useful choice.

SUMMARY OF THE INVENTION

The present invention consists a threaded stud rotating tool to rotate a stud of the type which in an operative condition has an extremity projecting from a mounting to which it is threadingly engaged, said extremity being provided with male thread, said tool comprising:

a sleeve member having a first open end and a second open end and a cavity extending axially therebetween, at least a part of the male thread of said stud to be axially received into said cavity through said first open end,

a female thread region of or provided by a socket to said sleeve member located in said cavity, said female thread region in use threadingly engagable with the male thread of said stud, said female thread region terminating short of said second open end

a means for digitally rotating said sleeve defining member

a tightening member located in part in said cavity and rotatable about and translatable along said axis relative to said sleeve member when in a non stud rotating mode, said tightening member extending through said second opening to a means for digitally rotating said tightening member relative to said sleeve member

said tightening member including or engagable to a socket having a bore with a female thread region which in use is located in said cavity and threadingly engaged with the male thread of said stud

said sleeve member and said tightening member each including a seating surface engagable upon each other in the axial direction

wherein in use in a stud rotating mode said seating surfaces are mutually seated upon each other through rotational advancement of said tightening member and said sleeve member along said male thread towards each other and

thereby prevent the relative rotation and translation of said sleeve member said tightening member and said stud.

Preferably said female thread region of said sleeve member is provided in said cavity proximal to said first open end.

Preferably said cavity consists of said a female thread region and a non threaded region wherein the non threaded region extends in said cavity from said second open end.

Preferably said non threaded region is a circular bore into which part of said tightening member extends in a rotational and translation relationship to said sleeve member save for when in use in said stud rotating mode.

Preferably said tightening member is generally elongate in and provides the means for digitally rotating, as a handle at the end thereof distal from the cavity.

Preferably said bore of said tightening member is a blind bore.

Preferably said bore of said tightening member is a through bore.

Preferably said tightening member is of an circular cross section with an external diameter (a) smaller than the diameter of the cavity of said sleeve defining member at said non threaded region and (b) larger than said female threaded region of said cavity.

Preferably said female thread region of said sleeve member and said female thread region of said tightening member are provided by sockets which

are axially engageable to said sleeve member and said tightening member in a manner to be drivable in rotation thereby.

Preferably said sockets are threadingly engagable to said sleeve member and said tightening member.

Preferably said means for digitally rotating said sleeve member is at least one arm extending radially from said sleeve member.

Preferably said means for digitally rotating said sleeve member are two arms extending substantially diametrically to each other from said sleeve defining member.

Preferably said means for digitally rotating said tightening member is at least one arm extending radially from said sleeve member.

Preferably said means for digitally rotating said tightening member are two arms extending substantially diametrically to each other from said tightening member.

Preferably the seating surface of the sleeve member is provided by a step in the wall of the cavity between a first internal diameter thereof and a second internal diameter

Preferably the step in the wall of the cavity to define the seating surface of the sleeve member is at the inner most end of the female thread of said sleeve member in said cavity .

Preferably the seating surface of the tightening member is at the distal end thereof located in use in said cavity of the sleeve member.

Preferably the means for digitally rotating said sleeve and said tightening members are in use sufficiently proximate in the axial such that a digit of the user can engage both means for digitally rotating with one hand.

To those skilled in the art to which the invention relates, many changes in construction in widely different embodiments and applications of the invention both suggest themselves without departing from the scope of the invention as defined in the appending claims. Disclosure and the description herein are purely illustrative and are not intended to be in any sense limiting.

The invention consists in the foregoing and also in visages constructions of which the following give examples.

Preferred forms of the present invention will now be described with reference to the accompanying drawings in which:-

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an exploded front view of the tool of the present invention,

Figure 2 is a front view of the tool of the present invention in an assembled configuration ready to be advanced onto the male thread of the stud shown as mounted in the structure,

Figure 3 is a sectional view of part of the first end of the sleeve member and the first end of the axial force providing member,

Figure 4 is a sectional view through an alternative configuration of the tool of the present invention illustrating an alternative configuration in relation to the seating surfaces, and

Figure 5 is a sectional view of part of the tool of the present invention wherein the female threaded regions are provided by inserts which are interchangeable to allow for the tool of the present invention to be useful in rotating different sized studs.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to Figure 1 there is shown a stud rotating tool in a form which is the most preferred form of the present invention. This stud rotating tool (1) consists of a sleeve (2) with which the tightening member (3) is engaged in an axially slidable and in a rotating manner. The axial movement of the tightening

member with the sleeve is in a direction parallel to the axis (12). The axis (12) is an axis about which the two members are rotatable to each other and which is also shared by the axes of threaded regions (6) and (7) of the sleeve (2) and tightening member (3). The threaded regions (6) and (7) are female threads disposed in or provided to the sleeve and tightening members. The female threads are complimentary shaped to the male thread (8) of the stud with which the stud rotating tool is to engage. The thread (6) of the sleeve (2) is provided within the cavity (9) extending through the sleeve. The cavity (9) is provided to be substantially co-axial with the axis (12) and is most preferably circular in cross-section. The thread (6) extends from the first end (10) of the sleeve into the cavity. The thread stops short of the other end (11) of the cavity and with reference to Figure 1, it can be seen that the thread (6) extends only a very small distance inside the cavity.

The remainder of the cavity (9) extending from the second end (11) of the sleeve to the thread (6) is substantially non threaded or at least of a diameter such that the shank (13) of the tightening member (3) can freely move therein in an axial (non threaded) and rotational direction relative to the sleeve. Provided to the sleeve is a handle (4) which a user of the tool can grasp with his or her hand and thereby rotate the sleeve. Similarly the tightening member (3) is provided with a handle (5) which is graspable by the hand of a user to allow the tightening member (3) to rotate about the axis (12). The shank extends into the cavity (9)

sufficiently to present the female thread (7) to be threadingly advanced onto the male thread (8) of the stud protruding beyond the threaded region (6) of the sleeve (2).

In use when both female threads are engaged on the stud the tightening member (3) tightens itself against the sleeve member (2) in a manner to prevent the two female thread portions moving closer to each other. As a result the threads of the sleeve and tightening member start to operate not as freely rotating, but instead to wedge their threads with the thread of the stud. When axial displacement of the sleeve relative to the tightening member along the thread of the stud is prevented, the frictional force between the threads (6) and (7) and the male thread (8) increases because of their wedging effect. Further rotation of the thread (6) and (7) then allows for the tool to rotate the stud (8) in the appropriate direction.

The axial advancement of the thread (7) and thread (6) towards each other is limited as a result of a seat providing arrangement between the sleeve (2) and the tightening member (3). The seat providing arrangement is preferably in the form of two seating surfaces, one on each of the sleeve (2) and the tightening member (3). In use these become engaged onto each other and then prevent any further advancement of the female threads towards each other. In the most preferred form the seating surfaces are provided as for example shown in Figure

3, by the distal end (14) of the shank (13) and the step provided in the cavity wall between the threaded region (6) and the remainder of the cavity (9). This step presents a surface in the direction from which the other seating surface is to be advanced towards it. Further rotation and axial displacement of the member (3) relative to the sleeve (2) on the thread (8) of the stud causes the seating surfaces to engage each other and the result is an increase in the frictional engagement between the female threads (6) and (7) and the thread of the stud (8) due to the wedging effect, then allowing the tool to drive the stud. The wedging effect of each female thread created a tension in the stud therebetween.

An alternative configuration of seating surfaces is as for example shown in Figure 4 wherein the end (11) of the sleeve and a step in diameter (15) of the tightening member (3) defines the seating surfaces for limiting the axial displacement of the sleeve (2) to the tightening member (3). This arrangement is however less preferred since a gap is created between the threads in the axial direction and would hence require a longer stud to provide sufficient thread to allow for both the threads (6) and (7) to engage thereon.

This present invention may also come in the form to allow for studs of different sized thread or different type of thread to be rotated by the tool. With reference to for example Figure 1, interchangeable ends of different size female thread may be secured to the sleeve (6). Similarly interchangeable ends to the shank

(13) may be provided to allow for different sized female thread to be driven by the tightening member (3). Figure 5 shows but one example of how interchangeable female thread providing members (16) and (17) may engage to the sleeve member and to the tightening member (3).

As well as providing a tool which may be in the form of allowing interchangeable sockets to be used, the tool is also convenient to use in that the tightening member is partly located in the cavity of the sleeve member and presents the female thread coaxially with the female thread of the cavity and hence is in this configuration maintained ready for use.



CLAIMS

1. A threaded stud rotating tool to rotate a stud of the type which in an operative condition has an extremity projecting from a mounting to which it is threadingly engaged, said extremity being provided with male thread, said tool comprising:

a sleeve member having a first open end and a second open end and a cavity extending axially therebetween, at least a part of the male thread of said stud to be axially received into said cavity through said first open end;

a female thread region or provided by a socket to said sleeve member located in said cavity, said female thread region in use threadingly engagable with the male thread of said stud, said female thread region terminating short of said second open end

a means for digitally rotating said sleeve defining member

a tightening member located in part in said cavity and rotatable about and translatable along said axis relative to said sleeve member when in a non stud rotating mode, said tightening member extending through said second opening to a means for digitally rotating said tightening member relative to said sleeve member

said tightening member including or engagable to a socket having a bore with a female thread region which in use is located in said cavity and threadingly engaged with the male thread of said stud



said sleeve member and said tightening member each including a seating surface engagable upon each other in the axial direction

wherein in use in a stud rotating mode said seating surfaces are mutually seated upon each other through rotational advancement of said tightening member and said sleeve member along said male thread towards each other and thereby prevent the relative rotation and translation of said sleeve member said tightening member and said stud.

2. A threaded stud rotating tool as claimed in claim 1 wherein said female thread region of said sleeve member is provided in said cavity proximal to said first open end.

3. A threaded stud rotating tool as claimed in claims 1 or 2 wherein said cavity consists of said a female thread region and a non threaded region wherein the non threaded region extends in said cavity from said second open end.

4. A threaded stud rotating tool as claimed in claim 3 wherein said non threaded region is a circular bore into which part of said tightening member extends in a rotational and translation relationship to said sleeve member save for when in use in said stud rotating mode.

5. A threaded stud rotating tool as claimed in any one of claims 1 to 4 wherein said tightening member is generally elongate in and provides the means for digitally rotating, as a handle at the end thereof distal from the cavity.



6. A threaded stud rotating tool as claimed in any one of claims 1 to 5 wherein said bore of said tightening member is a blind bore.
7. A threaded stud rotating tool as claimed in any one of claims 1 to 5 wherein said bore of said tightening member is a through bore.
8. A threaded stud rotating tool as claimed in any one of claims 3 to 8 wherein said tightening member is of an circular cross section with an external diameter (a) smaller than the diameter of the cavity of said sleeve defining member at said non threaded region and (b) larger than said female threaded region of said cavity.
9. A threaded stud rotating tool as claimed in any one of claims 1 to 5 wherein said female thread region of said sleeve member and said female thread region of said tightening member are provided by sockets which are axially engageable to said sleeve member and said tightening member in a manner to be drivable in rotation thereby.
10. A threaded stud rotating tool as claimed in claim 9 wherein said sockets are threadingly engagable to said sleeve member and said tightening member.
11. A threaded stud rotating tool as claimed in any one of claims 1 to 10 wherein said means for digitally rotating said sleeve member is at least one arm extending radially from said sleeve member.
12. A threaded stud rotating tool as claimed in any one of claims 1 to 11 wherein said means for digitally rotating said sleeve member are two arms



extending substantially diametrically to each other from said sleeve defining member.

13. A threaded stud rotating tool as claimed in any one of claims 1 to 12 wherein said means for digitally rotating said tightening member is at least one arm extending radially from said sleeve member.

14. A threaded stud rotating tool as claimed in any one of claims 1 to 13 wherein said means for digitally rotating said tightening member are two arms extending substantially diametrically to each other from said tightening member.

15. A threaded stud rotating tool as claimed in any one of claims 1 to 14 wherein the seating surface of the sleeve member is provided by a step in the wall of the cavity between a first internal diameter thereof and a second internal diameter

16. A threaded stud rotating tool as claimed in a claim 15 wherein the step in the wall of the cavity to define the seating surface of the sleeve member is at the inner most end of the female thread of said sleeve member in said cavity .

17. A threaded stud rotating tool as claimed in any one of claims 1 to 16 wherein the seating surface of the tightening member is at the distal end thereof located in use in said cavity of the sleeve member.

18. A threaded stud rotating tool as claimed in any one of claims 1 to 17 wherein the means for digitally rotating said sleeve and said tightening members are in use sufficiently proximate in the axial such that a digit of the user can engage both means for digitally rotating with one hand.