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(54) Title: BUSHING FOR SUPPORTING SCREW TAPS

(57) Abstract: The invention relates to a bushing for supporting screw taps (2), which features a first front seat (10) to be coupled to a shank (3, 3a) of a screw tap, a second rear seat (12) to be coupled to a tool (16, 17; 20, 21, 22) for operating the bushing (1). The bushing allows operating the tap (2) by means of ratchets, wrenches and other tools, so that holes can be tapped even in tight spaces and conditions.

Fig. 1
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Title:

"BUSHING FOR SUPPORTING SCREW TAPS"

The present invention relates to a bushing for supporting screw taps.

As is known, the latter are mechanical tools which are used for creating female threads in holes of mechanical parts in general, such as dies and nuts, or in stud holes, i.e. blind holes as typically used in internal combustion engines for fastening cylinder heads.

A screw tap consists of a cylindrical bar made of special steel, on which a helical cutting edge is provided for cutting into the metal of the inner wall of the hole, so as to create a female thread. The chip produced by the cutting operation is removed through longitudinal grooves dividing the helical edge, which are typically in a number of three or four or even more for very large taps. The grooves are shaped like straight or helical slots: straight grooves are suitable for generic applications, whereas helical ones promote rear evacuation and provide a better finishing on hard-to-work materials producing long chips.

The front part of the tap is also called point (or head) and is tapered to promote the insertion and grip of the
cutting edges into the hole to be tapped. The beginning point is a very important part of the tap, since it is the part that performs the main cutting work, while the rear threads mostly acts as guides; the opening angle of the tap determines the chip thickness.

Depending on the beginning point length, taps are classified as short-point taps or long-point taps; the former are suitable for blind holes because they can tap down to a few millimeters from the bottom, whereas the latter are used for through holes because they facilitate penetration and threading (i.e. grip) and produce thinner chips which are easier to evacuate.

The various types of taps are also referred to as roughening, intermediate and finishing taps, depending on which hole tapping stage they are intended for, and differ in the helix ridge and diameter of their beginning. Roughening taps have an annular cut near the square; intermediate taps have two or more annular cuts; finishing taps have none.

Taps also have a stem, i.e. a portion of their extensions with no cutting edge, which is useful for grasping and handling the taps during the various tapping steps. In particular, the end of the stem has a polygonal,
typically square, cross-section, which is useful for coupling to a spindle when the tap is mounted on machine tools, or to a manual tap wrench when it is used by operators without the aid of any machines: for example, for on-site repairs of machines or parts thereof that cannot be removed and worked in a mechanic's workshop.

Tap wrenches are tools essentially comprising a clamp-type fitting (similar to those commonly used for drill bits), the shape of which is conjugated to that of the tap tang, and having a T-shaped handle that allows turning it while exerting the torque required for tapping the hole.

When the fitting is central relative to the handle, the tap wrench is also referred to as a double-end tap wrench.

The tap fitting can be adjusted for use with taps of different sizes; for this reason, tap wrenches include stems, sliders, threaded ring nuts or the like, which allow the fitting to be adjusted by closing or opening the clamp that holds the tap tang.

One drawback of the tap wrenches known in the art is that, when an operator is working in narrow spaces, as is often the case aboard ships, he cannot turn the tap wrench properly because its handle will hit or anyway interfere with adjacent objects or machine parts (e.g. pipes,
containers, gears or the like). It follows that the final result may be an improper or
defective tapping, leading to adverse consequences that in some cases may be particularly severe (e.g. damaged or
irreparable machine parts, etc.).

The technical problem underlying the present invention is therefore to overcome this state of the art; in other
words, the invention aims at providing a tool for manual
operation of screw taps, which has such structural and
operating features that make it suitable for use also in
tight spaces.

The idea for solving this problem is to provide a bushing
that comprises a seat or means for coupling to the tap
tang, and a seat or means for coupling to the pin of a
wrench, a ratchet or the like: in this way, the tap can be
operated by using a tool that can be handled more easily
than any of the above mentioned known tap wrenches.

Furthermore, when using a ratchet, the tap can be rotated
without the tool needing to make a whole turn, so that it
can also be operated in very narrow spaces.

The features of the invention are specifically set out in
the claims appended to this description. The invention
relates also to a kit of tools for screwing threaded holes
and to a container for such a tool hit.

Such features, the effects deriving therefrom and the results attained by the invention will become more apparent from the following description of an example of embodiment and a few variants thereof as shown in the annexed drawings, wherein:

- Fig. 1 is an exploded view of a bushing and a tap according to the invention;
- Fig. 2 is an exploded view of the bushing and tap of Fig. 1, seen from a different angle;
- Fig. 3 shows the bushing and tap of the preceding figures in the assembled condition, with a part removed for clarity;
- Fig. 4 is a longitudinal sectional view of the bushing of the preceding figures;
- Figs. 5 and 6 are exploded views from respective angles of a bushing and a ratchet according to the invention;
- Fig. 7 is an exploded view of a bushing and a T-wrench according to the invention;
- Figs. 8, 9 and 10 show respective variants of the bushing for screw taps in accordance with the invention.

With reference to the above-listed drawings, reference numeral 1 designates as a whole a bushing for supporting
screw taps 2; the latter may be of different types and sizes, as already explained; as will be detailed below, the tap 2 to be used together with the bushing of the invention may differ from those known in the art as concerns the shape of its tang.

The example of Figures 1-3 shows a tap 2 with the tang 3a of the stem 3 having the usual square cross-section, intended for engaging with a corresponding front seat 10 of the bushing 1; the shape of the seat 10 is conjugated, i.e. it has a square cross-section, to that of the tang 3a, so that it can be firmly coupled thereto in order to apply the torque required for its rotation.

The bushing 1 has a substantially cylindrical body 11 and further comprises a second rear seat 12 on the side opposite to the first seat 10.

The second seat 12 is for use with a pin, a drive or the like, associated with a tool for operating the tap; to this end, also the rear seat has a shape conjugated to that of the pin to be coupled thereto.

For example, with reference to Figs. 5 and 6, the rear seat 12 of the bushing 1 is coupled to a square pin 16a of a ratchet 16, and therefore it has a square cross-section; the pin 16a is preferably equipped with a ball 17
elastically mounted therein as known in the art to allow elastic coupling of the bushing 1.

The bushing 1 may also be operated with tools other than the ratchet 16, such as, for instance, a T-wrench, as shown by way of example in Fig. 7.

As can be seen, in this case the wrench, designated as a whole 20, comprises a handle 21 and a tube extension 22; both the handle 21 and the tube extension 22 have respective coupling pins 21a, 22a, similar to that of the ratchet 16.

Thus, the handle 21 and the extension 22 can be coupled to each other or else directly to the rear seat 12 of the bushing 1, thereby providing more ways of adapting the bushing control to the circumstances.

It is worth pointing out that, in the former case, the extension 22 has a rear seat 23 (similar to the rear seat 12 of the bushing) to be engaged with the pin 21a.

The operation of the bushing 1 according to the invention is apparent in the light of the above description.

Indeed, it can receive a screw tap 2 in the front seat 10 on one side.

It can be easily understood from the above description how the invention operates and how it can solve the technical
problem addressed by it.
The bushing 1 allows, in fact, using the tap 2 with any tool, not only with double-end or T-handle tap wrenches known in the art.

For example, in addition to the tools shown in the drawings, the bushing 1 can also be operated by using wrenches that are commonly employed for turning nuts, bolts and similar (the so-called socket wrench sets), which include ratchets, wrenches, sockets and the like.

It follows that an operator will be easily able to find, among the many combinations available, the tool which will be most suited to the tapping conditions.
The operator is thus put in the best conditions for the work that needs to be carried out, with clear benefits in terms of quality, productivity and costs.

In this regard, it must be underlined that the present invention can be easily implemented without requiring any particular modification or adaptation to existing taps and wrenches, since the bushing 1 will be directly applicable thereto; of course, the front seat 10 and the rear seat 12 will have to be suitably configured for coupling to existing wrenches and taps.

Nevertheless, other applications are also possible, with
tools different from those which have been taken into account so far.

Bushing variants may thus be provided, such as, for example, those shown in Figures 8, 9 and 10, which show different views (designated a, b, c) of respective variants of the bushing 1, which differ from the one shown in the preceding drawings, in their configuration of the rear seat 12 to be engaged with an operating tool not shown in the drawings.

For simplicity, Figures 8, 9 and 10 retain the same numbering as the previous example.

As can be seen, the rear seat 12 may have a hexagonal cross-section (Fig. 8), thus being suitable for socket wrenches, or a star (Fig. 9) or complex (Fig. 10) cross-section for use with other tools.

All of these variants can be separated from each other or grouped together with a plurality of screw taps having various shapes and/or sizes, e.g. into tool kit carrying cases or tap sets for workshops.

All of these situations will still fall within the scope of the following claims.
CLAIMS

1. Bushing for supporting screw taps (2), characterized in that it comprises a body (11) featuring a first front seat (10) to be coupled to a tang (3, 3a) of a screw tap, a second rear seat (12) to be coupled to a tool (16, 17; 20, 21, 22) for operating the bushing (1).

2. Bushing according to claim 1, wherein the front seat (10) has a square cross-section.

3. Bushing according to claims 1 or 2, wherein the rear seat (12) has a square cross-section.

4. Bushing according to claims 1 or 2, wherein the rear seat (12) is configured with an hexagonal, star or complex cross-section.

5. Tool kit container such as a carrying case, a cabinet or the like, comprising a plurality of screw taps (2) of different sizes and at least one bushing (1) according to any one of claims 1 to 4, wherein a front seat (10) is suitable for coupling to one or more of the screw taps (2).

6. Tool kit container according to claim 5, comprising at least one or more of the following tools: a ratchet (16), a handle (21), a tube extension (22), equipped with a respective pin (16a, 21a, 22a), wherein said pins (16a, 21a, 22a) are configured for coupling to the rear seat (12).
of the bushing (1).
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. B23G1/26
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

29 May 2015

Date of mailing of the international search report

09/06/2015

Name and mailing address of the ISA/

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