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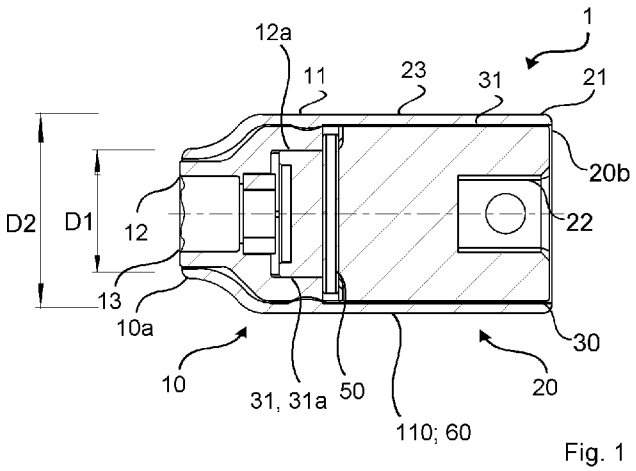


Fig. 1

(57) **Abstract:** The present specification relates to a torque transferring device (1) for power tools, comprising a first portion(10) comprising a first portion (11) of a tubular body (110) and a first inner element (12) comprising an engaging structure (13) adapted to engage a corresponding mating structure to transfer torque thereto, and a second portion (20) comprising a second portion (21) of the tubular body (110) and a second engaging structure (22) for connection to the output shaft of a power tool, wherein an inner insulating element (30) is provided inside said tubular body rotatably coupled to said first and said second engaging structure such that a torque may be transferred there between and wherein said inner insulating element is made of an electrically insulating material, such that for operator protecting purposes an electrical insulation is formed between said first engaging structure and said second engaging structure.

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TORQUE TRANSFERRING DEVICE FOR USE WITH A POWER TOOL

Technical field

The present invention generally relates to a torque transferring device for connection to the output shaft of a power tool such as a socket or a quick change adapter, more particularly to such a device comprising means for increasing work place safety.

Technical Background

Torque transferring devices for connection to the output shaft of a power tool, such as a socket for tightening of nuts or screws or an adapter, such as a quick-change adapter, are well known. For example, a well-known standard type of socket has a square cross sectional recess at its rear end intended for receiving the square shaped end portion of a power tool output shaft and an internal cross sectional shape adapted to fit the type of screw joint to be tightened, for instance a hexagonal shape, at its front end. Similarly, an adapter such as a quick change adapter may comprise the same type of structure for receiving the square shaped end portion of a power tool output shaft but, at its front end, a structure for engaging the rear end of a socket or similar.

In order to sustain the high torques to be delivered, commonly some or all parts of such a device have to be made of high strength, durable materials, and commonly metals such as steel are utilized. Apart from being strong and durable, such materials however tend to be good conductors and thus problems with such devices related to operator safety may arise when screw tightening is performed in the vicinity of power sources such as batteries or other energized components. Due to the conductive properties of the device, there is a high risk of electrical shock should a metallic socket come into contact with energized parts. Such a shock could harm not only the operator should the operator touch the socket or parts of the tool in electrical contact with the socket but could also cause short

circuits damaging components in vicinity of the joint to be tightened.

In order to alleviate some of these problems, attempts have been made to provide an insulting outer layer, for example covers or sleeves provided on the outside of the socket or adapter to thereby provide insulation for operator protection purposes should the operator touch the outer surface.

However, there are still problems remaining for example in that hazardous conductive paths may still be formed bypassing such a sleeve which may allow a current to potentially injure an operator or damage components. Further, such sleeves tend to add bulk to the design as the radius is increased making screws in tight position hard or impossible to reach. Hence there exists a need for improvement in the field of insulation and electric shock protection for torque transferring devices for power tools such as sockets and quick change adapters.

Summary of the invention

Accordingly, it would be desirable to provide a torque transferring device for a power tool adapted to provide an improved protection against electric shock and short circuits. In particular, it would be desirable to provide such a device having a compact design. To better address one or more of these concerns a torque transferring device as defined in the independent claim is provided. Preferred embodiments are defined in the dependent claims.

According to a first aspect of the present invention a torque transferring device for power tools is provided, the device comprising a first portion comprising a first portion of a tubular body and a first inner element comprising a first engaging structure arranged at a front end of the first portion and adapted to engage a corresponding mating structure to transfer torque thereto, and a second portion comprising a second portion of the tubular body and a second engaging structure for connection to the output shaft of a power tool arranged at a rear end portion of the second body or portion, wherein an inner insulating element is provided inside the

tubular body, wherein the inner insulating element is rotatably coupled to the first engaging structure arranged at the front end of the first portion and to the second engaging structure arranged at the rear end of the second body element i.e. the second portion such that a torque may be transferred there between, and wherein the inner insulating element is made of an electrically insulating material, such that for operator protecting purposes an electrical insulation is formed between the first engaging structure and the second engaging structure.

According to the first aspect, the torque transferring device provides an inventive solution to the concerns described above by means of a design providing an integrated protection against electrical shock. This by means of the inner insulating element arranged to provide an electrical insulation between the first engaging structure adapted to engage a mating structure such as a screw, i.e. which hence may be positioned at a potentially energized position, and the second engaging structure adapted to engage the tool and hence be in contact with the operator holding the tool. Further, since the insulating component is an insulating component providing axial insulation and arranged at least partly on the insider of the tubular body element, the protection against electrical shock is not only more efficient but provided in a particularly compact manner and hence no undue restrictions are put on the device with regards to tightening of screws arranged at harder to reach positions. Hence, the torque transferring device according to independent claim 1 cleverly solves the problem of achieving a more efficient insulation, i.e. protection against electrical shock in a compact manner not increasing the size of the device. By provided inside should be understood provided in, or within the tubular element, i.e. arranged in a space delimited by an inner side of the tubular element. Further, by tubular should be understood a tube-shaped i.e. cylindrical shape having a varying or constant diameter.

The device, which in some embodiments may be for example a socket, a quick change adapter or an extension adapted to be arranged between such a socket and a tool or a bit holder, is hence adapted to both

provide a secure engagement between a socket and a nut or screw and a power tool (or in the case of an adapter between such a socket and the tool) such that torque may be transferred and the screw or nut tightened, but also to protect the operator from an electrical shock. To ensure the secure engagement, the first and second engaging structure may have any suitable design, such as hex, square or similar. For example, the device may have a square cross sectional recess at its rear end intended for receiving the square shaped end portion of a power tool output shaft and an internal cross sectional shape adapted to fit the type of screw joint to be tightened, for instance a hexagonal shape, at its front end. Examples include any combination of square female or male input and output and male or female hex input and output.

The insulating material from which the inner insulating component and/or the insulating outer sleeve is made may be a polymer, for example a thermoplastic polymer where examples include POM, or in some cases a thermosetting polymer such as epoxy, possibly reinforced (e.g. glass reinforced). In order to ensure a proper insulation, the distance between conductive elements of the device is to be kept sufficiently large such that no short circuits may arise.

The power tool with which the inventive device may be used may be a tightening tool such as a screwdriver, such as a pneumatic an electrically powered screwdriver. The device may be particularly advantageous for use with a hand held tool, possibly a battery powered tool, or a handheld manual tool such as a torque wrench.

According to one embodiment , the device is adapted to be arranged at least partly within the head of the power tool, i.e. the second engaging structure is a structure adapted to engage the output shaft of the tool in an inner space of the power tool head. The device may in such an embodiment be described as a so called flush socket or flush mounted socket.

According to one embodiment, the inner insulating element is provided inside said second portion of said tubular body. According to one embodiment, the inner insulating element comprises a substantially cylindrical portion having a diameter corresponding to

an inner diameter of an adjacent portion the tubular body, for example the second portion of the tubular body. Hereby, an efficient insulation may be achieved in that as much space as possible inside the tubular body is utilized for the insulating element.

According to one embodiment, the second engaging structure for connection to the output shaft of a power tool is arranged in the inner insulating element. Hereby, as the output shaft will engage the non-conductive, inner insulating element a proper operator protection is reliably ensured.

According to one embodiment, the second body element i.e. second portion comprises a further inner element arranged at the rear end, wherein the further inner element is rotatably coupled to the inner insulating element such that a torque may be transferred there between and wherein the second engaging structure for connection to the output shaft of a power tool is arranged in the further inner element. For example, the further inner element may comprise a socket arranged to improve the engagement between the tool output and the device. According to one embodiment, the further portion, i.e. the further inner element, is made of metal, for example steel. Hereby, the engagement between the tool output and the device may be made more durable.

According to one embodiment, the first engaging structure arranged at the front end of the first portion is made of metal. Similarly as described above, a stronger and more durable engagement may thereby be provided by the first engaging structure. In some embodiments, the first engaging structure arranged at the front end of the first portion further comprises a magnet arranged to facilitate the handling of magnetic fastening elements such as magnetic screws or nuts.

According to one embodiment, the insulating inner element is rotatably coupled to the first inner element by means of a coupling between a first male hex shaped structure comprised by the inner insulting element and a corresponding female hex-shape structure comprised by the first inner element. This structure extends in an axial direction, and further extends into a correspondingly hex shaped recess or socket in the first inner element, Hereby a firm

engagement is achieved. The skilled person realizes that any shape other than hex may off course be utilized as well.

According to one embodiment, the inner insulating element is rotatably coupled to the further inner element by means of a coupling between a second male hex shaped structure comprised by the inner insulting element and a corresponding female hex-shape structure comprised by the further inner element. I.e., the inner insulating element in such an embodiment comprises two hex shaped structures, extending in an axial direction at a respective first and second end of the insulating element, and for example a cylindrical portion arranged there between.

According to one embodiment, the first inner element and the inner insulating component are rotatably coupled by means of a pin arranged between the first portion and the inner component, such that a torque may be transferred there between. One example includes a so called spring pin, i.e. a self-retaining fastener that secures the position of the two components in question relative to each other also known as a tension pin or roll pin. In one embodiment, where the device comprises at least one male hex shaped structure, a first through hole may be provided through this hex shaped structure and an additional through hole may be provided in the first and/or further inner element, such that the pin may extend through these holes in order to provide the engagement.

In other embodiments, the first inner element and the inner insulating component are coupled by means of an adhesive, alone or combined with the spring pin mentioned above.

According to one embodiment, the first portion and the second portion may be integrally formed. For example, in one embodiment, the first portion of the tubular body and the second portion of the tubular body are integrally formed. Such an embodiment may be described as having a tubular outer body formed by the first and second portion of the tubular body, inside which the first inner element, the inner insulating element and possibly the further inner element are arranged, such that the first engaging structure and the second engaging structure are arranged at a respective first and

second end of the integrally formed tubular outer body element, i.e. at the openings of the tubular element.

According to one embodiment, the torque transferring device is a component chosen from the group socket, bit holder, or quick change adapter, for example a quick change adapter having a male square or female hex output. Further, the device may also be a so called extension.

According to one embodiment, the device is a socket or a bit holder, wherein the engaging portion arranged at a front end thereof adapted to engage a corresponding mating structure to transfer torque thereto, is a portion adapted to engage a nut or a bit. As mentioned above, the second engaging portion arranged for connection to an output shaft of a power tool may in such an embodiment may equally well engage a corresponding output of a quick change adapter, extension or similar device arranged between the power tool and the socket. According to another embodiment, the device is an adapter, for example a quick change adapter or extension, wherein the first engaging portion arranged at a front end thereof adapted to engage a corresponding mating structure to transfer torque thereto, is an adapter output adapted to engage a nut socket or bit holder. Examples include an insulated quick change adapter with square female input and square male output or an adapter with square input and female hex output.

In some embodiments, the device further comprises an insulating outer sleeve provided on the outside of the device for operator protecting purposes since additional protection is provided in the form of radial insulation in addition to the axial insulation, the sleeve being made of an electrically insulating material. For example, an insulating sleeve may be provided on the outside of at least one of the first portion and the second portion. In other embodiment, the insulating sleeve may be formed by the tubular body, i.e. the tubular body may be made of an electrically insulation material such as a polymer for example of the type mentioned above or may in other embodiment be a separate insulating sleeve provide on the outside of the tubular body.

According to one embodiment, the insulating sleeve is a freely rotatable sleeve. Hereby, not only is increased protection provided in that a radial electrical insulation is provided, the operator is also protected from injuries at screw joint tightening operations due for instance tangled gloves. According to one embodiment, the freely rotatable sleeve further comprises a radially protruding collar arranged at an end of the sleeve adjacent to the second engaging structure for additional operator protecting purpose, wherein the collar is made of an electrically insulating material. Hereby, further operator protection is achieved in that the collar prevents the hand of the operator from slipping towards the joint.

According to one embodiment, the freely rotatable sleeve is formed by the tubular body. Further, in one embodiment, the freely rotatable sleeve is formed by at least the first portion of the tubular body. For example, in some embodiments a shorter freely rotatable sleeve formed by the first portion of the tubular body is provided at the first end of the device whereas in other embodiments a longer sleeve covering the entirety of the length of the device is provided, for example a sleeve formed by the tubular body as mentioned above. In some embodiment however, only the insulation in axial direction is provided by the inventive device, for example in the form of an adapter, whereas the radial insulation may be provided by a separate socket or bit holder comprising a sleeve of the type described above.

According to one embodiment, the device further comprises an electronic identification tag such as an RFID-tag. Hereby, the device may for example be recognized as an insulated device, such as an insulated socket, by a tool or other device comprising suitable circuitry for reading the RFID-tag.

According to a second aspect of the present invention, an assembly comprising a first and second device according to any of the preceding claims is provided. For example, in one embodiment, the first separate component may be a socket or a bit holder and the second separate component may be a quick change adapter.

Further objectives of, features of and advantages of the present invention will become apparent when studying the following detailed

disclosure, the drawings and the appended claims. Those skilled in the art realize that different features of the present invention can be combined to create embodiments other than those described in the following.

Brief description of the drawings

The invention will be described in the following illustrative and non-limiting detailed description of exemplary embodiments, with reference to the appended drawing, on which

Figure 1 is a cross sectional view of an exemplary torque transferring device according to a first embodiment.

Figure 2 is a cross sectional view of an exemplary torque transferring device according to a second embodiment.

Figures 3a and b are both side views of an exemplary torque transferring device according to the first or second embodiment.

Figure 4 is a cross sectional view of an exemplary torque transferring device according to a third embodiment.

Figure 5 is a cross sectional view of an exemplary torque transferring device according to a fourth embodiment.

All figures are schematic, not necessarily to scale and generally only show parts which are necessary in order to elucidate the invention, wherein other parts may be omitted or merely suggested.

Detailed description

An exemplary torque transferring device 1 for use with a power tool according to a first embodiment is shown in a cross sectional view in Figure 1. The illustrated exemplary device 1 is a socket 1 comprising a first portion 10 and a second portion 20. The first portion 10 comprises a first portion 11 of a tubular body 110 having a first diameter D1 and a first inner element 12 made of metal, where a first engaging structure 13 is arranged at a front end 10a of the first portion and adapted to engage a nut to transfer torque thereto, i.e. to tighten a joint. The second portion 20 similarly comprises a second portion 21 of the tubular body having a diameter

D2 and a second engaging structure 22, in the illustrated embodiment a square female input 22, for connection to the output shaft of a power tool arranged at a rear end portion 20b of the second body part. Examples of a respective first and second engaging structure 13, 22 are also shown in figures 3a and b. It should be noted that the illustrated embodiment may just as well be a quick change adapter, where the difference would be that the first engaging structure 13 would instead be for example a female Hex output adapted to engage a bit or nut setter instead of a socket.

An inner insulating element 30 is provided inside said second portion of the tubular body 21. This inner insulating element 30 is rotatably coupled to the first engaging structure and hence the first inner element 12 by means of a first male hex shaped structure 31a, extending in an axial direction at a first end 31 of the insulating element 30 engaging a corresponding female hex structure 12a arranged in the first inner element 12, and further by means of a fastening element, here a spring pin 50 arranged between the first inner element 12 and the insulating inner component 30 such that a torque may be transferred there between and consequently from the tool to the joint. The second engaging structure 22 is in the illustrated embodiment arranged in, i.e. forms part of, the inner insulating element 30. Further, the inner insulating element 30 is made of an electrically insulating material, such as a polymer. Hereby, for operator protecting purposes, an electrical insulation is formed between the first engaging structure 13 and the second engaging structure 22, i.e. between the joint and the tool and hence the hand of the operator holding the tool.

The inner insulating element 30 has a substantially cylindrical shape, i.e. it has a cylindrical portion 31 which has approximately the same diameter as the inner diameter of the adjacent portion of the second portion 21 of the tubular body. And further, as explained above, comprises a square female input 22 for connection to the output shaft of a power tool.

In order to further enhance the operator protection, the tubular body 110 in the illustrated embodiment forms a freely rotatable

sleeve 60 made of an electrically insulating material and provided on the outside of the first and second portion 10,20.

In the illustrated embodiment of fig 1, the total length of the socket is approximately 50 mm, whereas the first diameter D1 is approximately 20 mm and the second diameter D2 is approximately 25 mm.

Turning to figure 2, another exemplary torque transferring device 1 according to a second embodiment is shown in a cross sectional view. The socket 1 comprises a first portion 10 and a second portion 20, where the first portion 10 comprises a first portion of the tubular body 11 having a first diameter D1 and a first inner element 12 made of metal, a first engaging structure 13 is arranged at a front end 10a of the first portion and adapted to engage a nut to transfer torque thereto, i.e. to tighten a joint. The second portion 20 similarly comprises a second portion of the tubular body 21 having a diameter D2 and a second engaging structure 22, in the illustrated embodiment a square female input 22, for connection to the output shaft of a power tool arranged at a rear end portion 20b of the second body part. Examples of a respective first and second engaging structure 13, 22 are also shown in figures 3a and b.

In the second embodiment, an inner insulating element 30 is provided inside said second portion of the tubular body 21, the inner insulating element 30 comprising a cylindrical portion having a diameter D3 which is approximately the same as the inner diameter of the second tubular element 21. This inner insulating element 30 is rotatably coupled to the first engaging structure 13 by means of a male hex structure 31a and a spring pin 50 arranged between the first inner element 12 and the insulating inner component 30. Further, the inner insulating element 30 is made of an electrically insulating material, such as a polymer.

In contrast to the first embodiment however, the device shown in fig. 2 comprises a further inner element 40 arranged at the rear end 20b. The further inner element 40 is rotatably coupled to the inner insulating element such that a torque may be transferred, this similarly as described above by a second male hex shaped structure

32b, extending in an axial direction at a second end 32 of the insulating element 30 engaging a corresponding female hex structure 41 arranged in the further inner element 40, and further by means of a second spring pin arranged between the further inner element 40 and the insulating inner component 30 such that a torque may be transferred. Further the second engaging structure 22 for connection to the output shaft of a power tool is arranged in the further inner element 40. In the illustrated embodiment, the further inner element 40 is made of metal. This provides increased strength to the socket (i.e. the device), but poses no problem with regards to electrical shock protection since the inner insulating element 30 arranged between the first engaging structure and the second as above ensures that the required insulation is formed between the first engaging structure 13 and the second engaging structure 22, i.e. between the joint and the tool. As in figure 1, the tubular body 110 forms a freely rotatable sleeve 60 made of an electrically insulating material provided on the outside of the first and second portion 10, 20. Further, the total length of the socket shown in fig. 2 is approximately 60 mm.

Figure 4 shows a third embodiment of the device, a so called quick change adapter. This embodiments is similar to the embodiment described above with reference to figure 2 in that the illustrated quick change adapter comprises a first portion 10 and a second portion 20. The first portion 10 comprises a first portion of the tubular body 110 having and a first inner element 12 made of metal, a first engaging structure 13 is arranged at a front end 10a of the first portion. In the quick change adapter, this structure 13 is a female hex-structure 13 adapted to engage for example a bit holder having a rear male hex structure and transfer torque thereto. The second portion 20 similarly comprises a second portion of the tubular body and a second engaging structure 22 arranged in a further inner element 40 at a rear end portion 20b of the second body part, in the illustrated embodiment a square female input 22, for connection to the output shaft of a power tool.

An inner insulating element 30 is provided inside the tubular body 110 and is rotatably coupled to the first engaging structure 13 by

means of a male hex structure 31a and to the further inner element 40 by means of a second male hex shaped structure 32b.

As in figures 1 and 2, the tubular body 110 forms a freely rotatable sleeve 60 made of an electrically insulating material provided on the outside of the first and second portion 10, 20.

Turning to fig 5, yet another alternative embodiment of the device 1 is shown which is adapted to be arranged at least partly within the head of the power tool, i.e. a so called flush socket where the second engaging structure 22 is a structure adapted to be arranged in and engage the output shaft of the tool in an inner space of the power tool head (not shown).

The flush socket 1 comprises a first portion 10 and a second portion 20, the first portion 10 and the second portion 20 being. The first portion 10 comprising a first portion 11 of a tubular body 110 having a first smaller diameter and a first inner element 12 made of metal, a first engaging structure 13 is arranged at a front end 10a of the first portion and adapted to engage a fastening element to transfer torque thereto, i.e. to tighten a joint. The first engaging inner element in this embodiment comprises an integrated bit, i.e. the structure 13 is a bit. The second portion 20 is as mentioned above in this embodiment adapted to be arranged in a space in the tool head to achieve a compact, flush arrangement and comprises a second portion 21 of the tubular body having a larger diameter and a second engaging structure 22 adapted to engage the tool output.

The insulating element 30 in this embodiment is provided inside the tubular body 110 which also forms a freely rotatable sleeve 60 made of an electrically insulating material, and is as described above rotatably coupled to the first engaging structure and hence the first inner element 12 by means of a first male hex shaped structure 31a engaging a corresponding female hex structure arranged in the first inner element 12 and to the second portion 22 by means of a second male hex shaped structure 32b, engaging a corresponding female hex structure 221 arranged in the second portion 22. The inner insulating element 30 in this embodiment further has a middle portion cylindrical portion which has a larger diameter forming a collar.

While the invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive; the invention is not limited to the disclosed embodiments. The skilled person understands that many modifications, variations and alterations are conceivable within the scope as defined in the appended claims. For example, the invention may apart from the sockets and quick change adapter of the illustrated embodiments just as well be realized as an adapter or extension, or as a bit holder. Further, in some embodiments, insulation in the axial and radial direction is provided by the inventive device, for example in the form of a quick change adapter, combined with as a separate socket or bit holder radially insulted by means a sleeve of the type described above or possibly a bit comprising an insulated sleeve.

Additionally, variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure and the appended claims. In the claims, the word “comprising” does not exclude other elements or steps and the indefinite article “a” or “an” does not exclude a plurality. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage. Any reference signs in the claims should not be construed as limiting the scope of the claims.

CLAIMS

1. A torque transferring device (1) for a power tool, comprising a first portion (10) comprising a first portion (11) of a tubular body (110) and a first inner element (12) comprising a first engaging structure (13) arranged at a front end (10a) of said first portion and adapted to engage a corresponding mating structure to transfer torque thereto, and a second portion (20) comprising a second portion (12) of said tubular body (110) and a second engaging structure (22) for connection to the output shaft of a power tool arranged at a rear end portion (20b) of said second portion,

wherein an inner insulating element (30) is provided inside said tubular body,

wherein said inner insulating element is rotatably coupled to said first engaging structure arranged at said front end of said first portion and to said second engaging structure arranged at said rear end of said second portion such that a torque may be transferred there between, and

wherein said inner insulating element is made of an electrically insulating material, such that for operator protecting purposes an electrical insulation is formed between said first engaging structure and said second engaging structure.

2. Torque transferring device according to claim 1, wherein said inner insulating element comprises a substantially cylindrical portion (31) having a diameter corresponding to an inner diameter of an adjacent portion (23) of said tubular body.

3. Torque transferring device according to claim 1 or 2, wherein said second engaging structure for connection to the output shaft of a power tool is arranged in said inner insulating element.

4. Torque transferring device according to any of claims 1 or 2, wherein said second portion (20) comprises a further inner element (40) arranged at said rear end (20b), wherein said further inner element (40) is rotatably coupled to said inner insulating element such that a torque may be transferred there between and wherein said second engaging structure for connection to the output shaft of a power tool is arranged in said further inner element (40).

5. Torque transferring device according to claim 4, wherein said further inner element is made of metal.

6. Torque transferring device according to any of the preceding claims, wherein said first engaging structure arranged at said front end of said first portion is made of metal.

7. Torque transferring device according to any of the preceding claims, wherein said insulating inner element is rotatably coupled to said first inner element by means of a coupling between a first male hex shaped structure (31a) comprised by said inner insulting element and a corresponding female hex-shape structure (12a) comprised by said first inner element.

8. Torque transferring device according to any of the preceding claims 4-7, wherein said inner insulating element is rotatably coupled to said further inner element by means of a coupling between a second male hex shaped structure (32a) comprised by said inner insulting element and a corresponding female hex-shape structure (41) comprised by said further inner element.

9. Torque transferring device according to any of the preceding claims, wherein said first inner element and said inner insulating element are rotatably coupled by

means of a pin (50) arranged between said first inner element and said inner insulating element, such that a torque may be transferred there between.

10. Torque transferring device according to any of the preceding claims, wherein said torque transferring device is a component chosen from the group socket, quick change adapter or bit holder.

11. Torque transferring device according to claim 10, wherein said device is a socket or a bit holder, and wherein said engaging portion arranged at a front end thereof adapted to engage a corresponding mating structure to transfer torque thereto, is a portion adapted to engage a nut or a bit.

12. Torque transferring device according to claim 10, wherein said device is a quick change adapter, and wherein said engaging portion arranged at a front end thereof adapted to engage a corresponding mating structure to transfer torque thereto, is an adapter output adapted to engage a bit, socket or bit holder.

13. Torque transferring device according to any of the preceding claims, wherein the device further comprises a freely rotatable outer sleeve (60) for operator protecting purpose, and wherein said sleeve is made of an electrically insulating material.

14. Torque transferring device according to claim 13, wherein said freely rotatable sleeve (60) is formed by said tubular body (110).

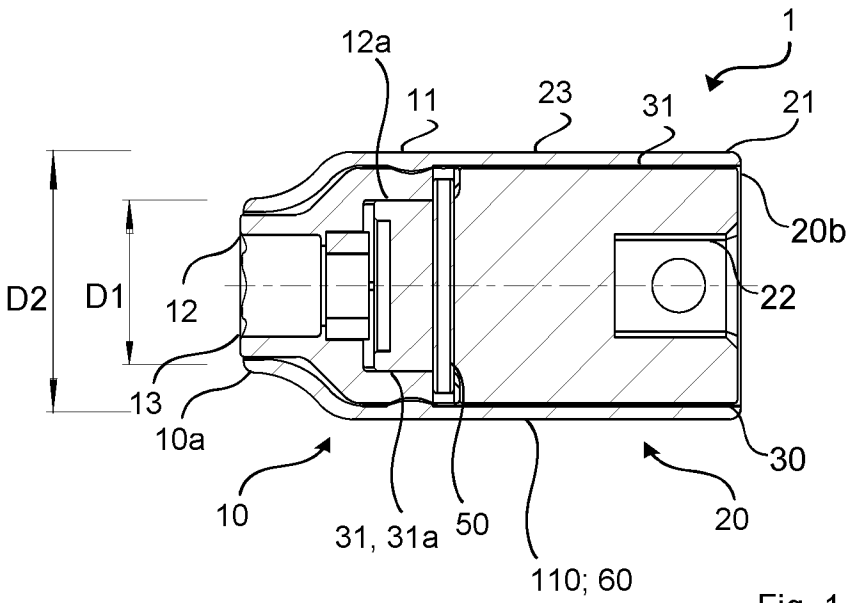


Fig. 1

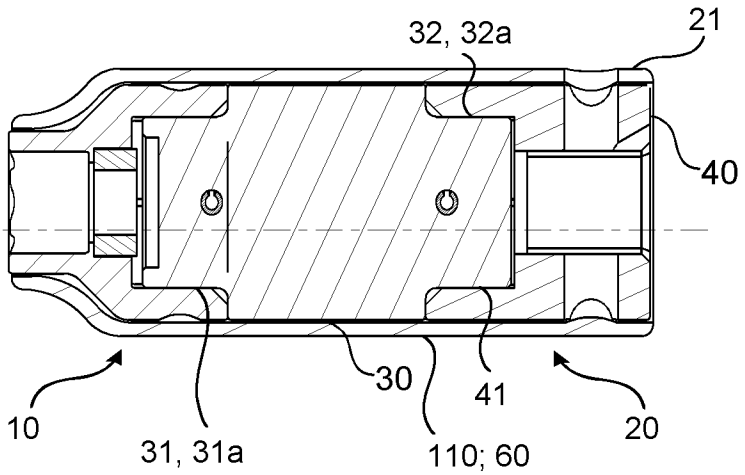


Fig. 2

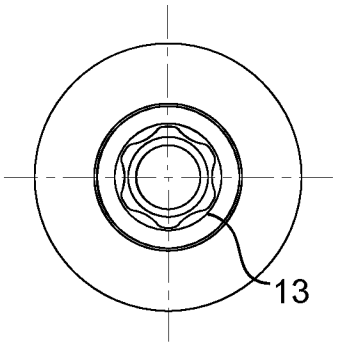


Fig. 3a

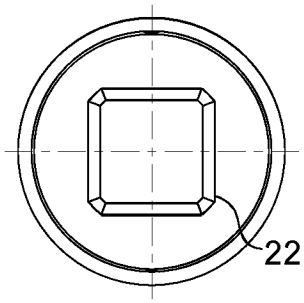


Fig. 3b

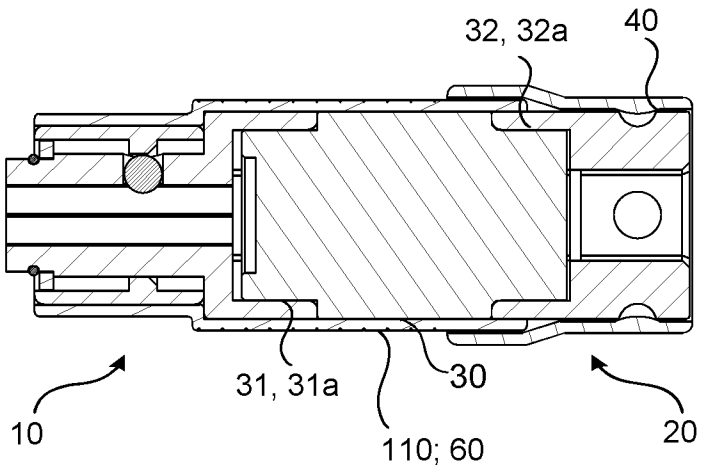

32, 32a
40
31, 31a
30
10
110; 60
20

Fig. 4

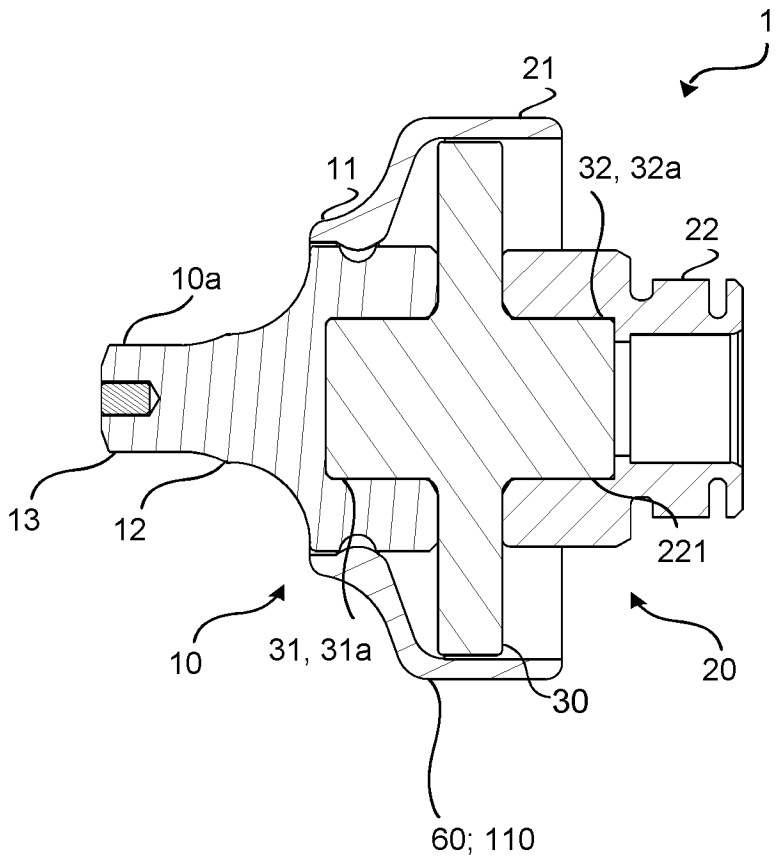

1
21
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32, 32a
22
10a
13
12
221
10
31, 31a
20
30
60; 110

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/066011

A. CLASSIFICATION OF SUBJECT MATTER
INV. B25B13/06 B25B23/00 B25G1/12
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B25B B25H B25G

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO 2018/204468 A1 (APEX BRANDS INC [US]) 8 November 2018 (2018-11-08) page 4, line 27 - page 8, line 34; figures 1-2b,4a,4b,7	1-6,8, 10-14 7,9
Y	EP 0 747 179 A1 (SNAP ON TECH INC [US]) 11 December 1996 (1996-12-11) column 2, line 53 - column 4, line 46; figures 3,6	7
Y	FR 2 652 027 A1 (PEUGEOT [FR]; CITROEN SA [FR]) 22 March 1991 (1991-03-22) page 2, line 10 - page 3, line 13; figure 1	9
A	JP 3 219263 U ((XUBB-I) XU B) 13 December 2018 (2018-12-13) paragraphs [0052] - [0088]; figures 1-9	1-14

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 August 2020	19/08/2020

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Pastramas, Nikolaos

1

Form PCT/ISA/210 (second sheet) (April 2005)

International application No
PCT/EP2020/066011

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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