



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
22.11.2023 Bulletin 2023/47

(51) International Patent Classification (IPC):
B25B 23/147 ^(2006.01) **B25B 27/10** ^(2006.01)
B25F 1/00 ^(2006.01)

(21) Application number: **22174467.5**

(52) Cooperative Patent Classification (CPC):
B25B 27/10; B25B 23/147; B25F 5/00

(22) Date of filing: **20.05.2022**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(54) **ADAPTER FOR A PIPE PRESSING DEVICE**

(57) An adapter for a pipe pressing device for joining two work pieces, in particular a pipe and a press fitting, by pressing, the pipe pressing device comprising a pressing tool with a plurality of pressing jaws, a battery pack detachably mounted onto the pressing tool to supply power thereto, the adapter comprising a main body that includes a first coupling portion and a second coupling

portion, the first coupling portion having a configuration identical to a coupling portion of the battery pack that is to be attached to the pressing tool; the second coupling portion having a configuration identical to a coupling portion of the pipe pressing tool that is attached to the battery pack.

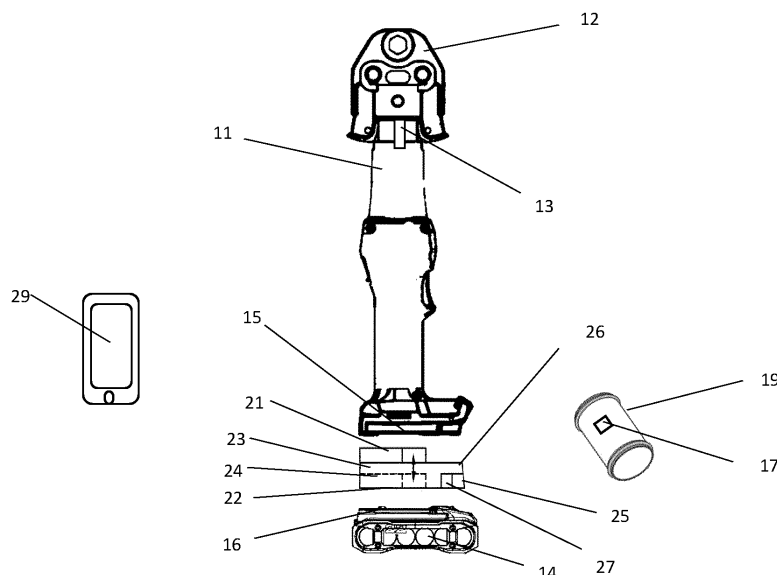


Fig. 2

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a handheld pipe pressing device, in particular to an adapter for a pipe pressing device.

BACKGROUND OF THE INVENTION

[0002] Handheld pressing devices are commonly used for the purpose of joining pipes. In preparation of the pressing, a press fitting is slipped on the pipe ends and is then compressed by means of the pressing device, wherein both the press fittings and the pipe end are compressed. Typically, the pressing devices include a pressing tool with two or more pressing jaws that approach each other during the pressing operation, whereby the press fitting is pressed together with the pipe end.

[0003] Such pressing devices are used for great numbers of pressing operations in buildings, in particular when erecting a building. However, different pipe pressing applications demand differently equipped pressing tools, jaws and fitting or connectors, which means that almost every component has to be specially adapted to an individual specification. This means that each press tool has to be specially designed with a specific setup of accessories, such as jaws providing desired operational features, with the result that the manufacturing costs for the pressing tools tend to be rather high.

[0004] In the pipe pressing trade, there are many combinations of tools and inserts, i.e. jaws and fittings and/or pipes. Currently, the user needs to document information about each pressing operation manually, e.g., the materials or components, that has been pressed and/or the success or failure of the press process. However, this manual documentation can lead to an increased workload and time required to properly document the relevant information. Furthermore, manual errors can occur and distort the documentation.

[0005] It is an object of the present invention to provide an adapter for a pipe pressing device, by which the adaptability of a pipe pressing device to different desired specifications is increased in combination with a cost saving flexibility for the tool manufacturer who will be able to offer pressing tools with a wide range of specifications based on just a few basic tool models. On the same time, the adapter is helpful for documenting everything in the pressing operation.

SUMMARY OF THE INVENTION

[0006] The invention relates to an adapter for a pipe pressing device for joining two work pieces, in particular a pipe and a press fitting, by pressing, the pipe pressing device comprising a pressing tool with a plurality of pressing jaws and a battery pack, which is mounted on the pressing tool to supply power thereto. The adapter com-

prises a main body that includes a first coupling portion and a second coupling portion, the first coupling portion having a configuration identical to a coupling portion of the battery pack that is to be attached to the pipe pressing tool; the second coupling portion having a configuration identical to a coupling portion of the pipe pressing tool that is attached to the battery pack. In the context of the present invention, the adapter according to the present invention will preferably also be referred to as "external adapter". By providing such an external adapter for a pipe pressing device, an adapter can be provided, which is easily to be attached to the pipe pressing tool, no change in the designs of either the battery pack or the pressing tool is necessary is needed, and thus no additional costs are incurred. Additionally, the external adapter is adapted to work with various pressing tools on a same platform, which means the interfaces between these pressing tools and battery pack are the same.

[0007] According to one embodiment of the present invention, the adapter comprises at least one data collecting element provided on the main body and a memory unit for storing the collected data. Thus, it is possible to optically collect data specific to pressing tool, jaws and/or work pieces. This collection is preferably carried out by using the data collecting element. The collected data can be documented and readout at any later time.

[0008] According to a preferred embodiment of the present invention, the at least one data collecting element is a scanner. This allows for a simplified identification of the pressing jaw and work pieces used in the pressing application.

[0009] According to another preferred embodiment of the present invention, the scanner is configured to scan coding means, such as NFC tags, RFID tags, bar codes, data matrix codes or any combination thereof on the pressing jaws and/or on the work pieces, in particular the press fitting and the pipe, in order to identify the pressing jaws and/or the work pieces. In particular, the data collecting element is capable of reading out so-called "distinguishing marks", which may be part of the pipe pressing device or its components, in particular the pressing jaw. These distinguishing marks can also be present at work pieces to be joint by the pipe pressing device. Suitable distinguishing marks are colour marks and/or special characters. Furthermore, barcodes or QR codes can be used, which allow for a simple identification of the pressing jaw and work pieces used.

[0010] According to another embodiment of the present invention, the adapter comprises an input unit, being configured to receive the data of the pressing tool, wherein the data can be manually entered by a user. The input unit may include an internal display device and/or an internal memory device to display the data of pressing tool pre-stored in the adapter in advanced. Storing data of pressing tool in advances allows the user select manually via the display device.

[0011] According to another embodiment of the present invention, the adapter comprises a transmitter

unit adapted to be connected to an external device to transmit the collected data to the external device. For each single pressing operation, the data can be well documented and/or readout at any time. It is thus possible at a later time to prove the pressing operation and the proper execution thereof.

[0012] In a second aspect, the present invention further provides a method for documenting pressing operations performed on two work pieces, in particular a pipe and a press fitting, performed with a handheld pressing device with a pressing tool having a plurality of pressing jaws; the method comprises:

- 1) attaching the adapter according to the present invention to the pressing tool;
- 2) collecting data of the pressing devices before pressing operation;
- 3) collecting data of the tool pressure, force, motor loads, current consumption values, strain values or any of the combination thereof during pressing operation.
- 4) the data collected in the steps 2) and 3) being stored in the memory unit of the adapter.

[0013] For the documentation of pressing operations, using such an external adapter, that can be attached between the tool and/or the battery can advantageously increase the adaptability of a pipe pressing device to different desired specifications.

[0014] According to a preferred embodiment of the present invention, data of the pressing devices collected in the step 2) includes the data of the pressing jaw used and/or the work pieces used by scanning coding means, such as NFC tags, RFID tags, bar codes, data matrix codes or any combination thereof on the pressing jaws and/or on the work pieces, in particular the press fitting and the pipe. For the documentation of pressing operations, identifying the pressing tool, which has been used in the relevant pressing operation, the jaw used, and the work pieces is a precondition. During each pressing operation, the data collecting element collects data specific to the device. The data collected are stored in a memory unit and are associated to a defined pressing operation. It is thus possible later to prove that the pressing operation has been carried out and the proper execution thereof.

[0015] According to a preferred embodiment of the present invention, the data collected in the step 2) further includes of the data of press tool used by a user manually selecting from the data of pressing tools pre-stored in the memory unit in advance.

[0016] Preferably the data is selected from a group comprising type, name, serial number, last service, or any combination of aforementioned information of the pressing tool and/or pressing jaw, type, name and/or batch of the work pieces.

[0017] According to another embodiment of the present invention, the data collected in step 3) is selected

from a group comprising the pressing tool pressure, force, motor loads, current consumption values, strain values or any combination thereof. The data is collected by a sensor system inbuilt in the pressing tool. Hence, it can be proven subsequently that the required pressing force has been reached and the pressing operation has been executed basically completely by reading out the data at a later time.

[0018] Preferably the data collected in step 3) further includes the success or fail information from the pressing tool, an operation number and - if the pressing operation was not successful - the reason for failure. In order to achieve a reliable pressing, it is necessary to ensure the proper functionality of the pressing device. By collecting the success or fail information from the pressing tool, the user of the pressing device may - as a consequence - be able to read out the information whether the pressing device functions properly.

[0019] According to a preferred embodiment of the present invention, the collected data is transmitted in a wireless manner, in particular via WLAN, Bluetooth, IR transmission and/or radio transmission - without being limited to these transmission methods - to an external device. This external device may in particular be a laptop computer, a tablet PC or a smart phone. As provided by the invention, this offers the advantage of a simple operation, while at the same time enabling a high degree of portability. This allows the manufacturer of the pressing tool to perform a remote diagnosis. Further, the collected data can be stored for safe access, so that they may be used as evidence if needed at a later time.

BRIEF DESCRIPTION OF THE FIGURES

[0020] The embodiments mentioned can be better understood through the following detailed description while perusing the accompanying drawings. It is emphasized that the various components are not necessarily drawn to scale. In fact, dimensions can be enlarged or reduced at will for the purposes of clear discussion. In the drawings, identical reference labels denote identical elements.

- Fig. 1 is a simplified schematic drawing of the adapter attached to the pressing tool provided in an embodiment of the present invention.
- Fig. 2 is simplified schematic drawing of the adapter which has not been attached to the pressing tool provided in the present invention.
- Fig. 3 is simplified chart to show how the adapter works.

DETAILED DESCRIPTION OF THE INVENTION

[0021] Refer to Fig.1 and Fig. 2, the present handheld pressing device 10 is used for joining two work pieces, in particular a pipe 18 and a press fitting 19, by pressing. The pipe pressing device 10 comprises a pressing tool

11 with a plurality of pressing jaws 12. The pressing tool 11 includes a converting unit and an electric motor (not shown), the electric motor and the converting means being enclosed by a housing. A battery pack 14 is detachably mounted on the pressing tool to supply power to the electric motor. The pressing tool 11 has a coupling portion 15 that is attached to the battery pack 14 on the rear end of its housing while the battery pack 14 has a coupling portion 16 of the battery pack 14 that is to be attached to the pipe pressing tool 11 on the top side of the battery pack 14. Therefore, the battery pack 14 is mounted onto the pressing tool 11 when the coupling portion 16 of the battery pack 14 is couple to the coupling portion 15 of the pressing tool 11. Vice versa, the battery pack 14 is detached from the pressing tool 11 when the coupling portion 16 of the battery pack 14 is decoupled with the coupling portion 15 of the pressing tool 11. Persons skilled in the art will recognize that power tool battery packs 14 may have a latching mechanism for latching and/or fixing the power tool battery pack 14 to the pressing tool 11.

[0022] In a pressing operation, the pressing jaws 12 of the pressing tool 11 are pressed apart at the rear part, i.e. on the side facing the converting unit. Thereby, the pressing jaws 12 are pivoted about pivot pins so that the pressing jaws 12 approach each other at the front part, i.e. on the side averted from the converting unit. Thereby, a compression is achieved. Due to the pressing movement of the pressing tool 11, a press fitting 19 is joined with a pipe end 18 by pressing and is thus joined with the same in a reliable and tight manner. A sensor system 13 is arranged on the head of the pressing tool 11 close to the pivot pin of the pressing jaw 12 coupled to the pressing tool 11

[0023] According to the invention, an adapter 20 for a pipe pressing device 10 for joining two work pieces is provided. The adapter 20 comprises a main body 23 that includes a first coupling portion 21 and a second coupling portion 22. The first coupling portion 21 has a configuration basically identical to a coupling portion 16 of the battery pack 14 that is to be attached to the pressing tool 11. The second coupling portion 22 has a configuration basically identical to a coupling portion 15 of the pipe pressing tool 11 that is attached to the battery pack 14. The adapter 20 can be mechanically and/or electrically connected to the housing of the pressing tool 11 by attaching the first coupling portion 21 to the coupling portion 15 of the pressing tool 11. Also, the adapter 20 can be mechanically and/or electrically connected to the battery pack 14 by attaching the second coupling portion 22 to the coupling portion 16 of the battery pack 14.

[0024] By providing such an external adapter 20 for a pipe pressing device 10, the adapter can be attached to the pipe pressing tool 11, no change in the designs of either the battery pack 14 or the pressing tool 11 is necessary, and thus no additional costs are incurred. Also, the external adapter 20 is adapted to work with various pressing tools on a same platform, which means the in-

terfaces between these pressing tools and battery pack 14 are same.

[0025] According to one embodiment of the present invention, referring to figs. 2 and 3, the adapter 20 comprises at least one data collecting element provided on the main body 23 and a memory unit 24 for storing data. According to a preferred embodiment of the present invention, the at least one data collecting element is a scanner 25 for reading information. In particular, the scanner 25 is for reading coding means 17 provided on the pressing jaw 12, the end of the pipe 18 and the press fitting 19. The coding means 17 can be optical and/or electronic coding means and may in particular comprise NFC tags, RFID tags, barcodes, data matrix codes or any combination thereof. This allows for a simplified identification of the pressing jaw 12 and work pieces used in the pressing application.

[0026] For example, the pressing jaws 12 is equipped with a barcode element and the press fitting 19 is equipped with an NFC element and the pipe 18 is equipped with a RFID tag element. The scanner 25 captures three elements and can thereby identify the pressing jaw 12, the pipe 18 and the press fitting 19.

[0027] Preferably, the adapter 20 may comprise an input unit 26. For example, the input unit 26 may in particular be an internal display device being configured to receive the data of the pressing tool 11 manually input by a user. The internal display device display the data of pressing tool pre-stored in the memory unit 24 of the adapter 20. Pre-storing data of the pressing tool 11 in advance allows the user to select manually via the display device at a later time.

[0028] During pressing operation, a sensor system 13 inbuilt in the pressing tool 11 is used to measure the data of the pressing operation. The data of the pressing operation may in particular be the tool pressure, force, motor loads, current consumption values, strain values, the operation number or any combination thereof over the full press cycle.

[0029] A controller 28 of the adapter 20 will assess if the measured data from the sensor system 13 match the pre-stored data in the memory unit 24. In particular, the controller 28 compares the measured data collected by the sensor system 13 to the pre-stored data. If the measured data match with the pre-stored data, the pressing operation will be regarded as successful. However, if the measured data have a deviation from with the pre-stored data, the pressing operation will be regarded as having failed.

[0030] Furthermore, the adapter 20 comprises transmitter unit 27 adapted to be connected to an external device 29 to transmit the collected data to the external device 29. Here, the information result from the collected data transmitted from the adapter 20 by the transmitter unit 27 via Bluetooth. An overview of the collected data of the pressing operations stored in the memory unit 24 is reached via the external device 29. Hence, for each single pressing operation, the data can be well docu-

mented and/or read out at any time.

[0031] In addition, the present invention further provides a method for documenting pressing operations performed on two work pieces. The method for the documentation of pressing operations for later use as evidence.

[0032] For the documentation of pressing operations, firstly, the adapter 20 is connected to both the pressing tool 11 and battery pack 14 mechanically and electrically. Specifically, it is possible that the data collecting is started automatically with each single pressing operation or, as an alternative, upon activation of the pressing device so as to collect the respective pressing operations.

[0033] According to a preferred embodiment of the present invention, the data of the pressing tool 11 is selected manually by the user from the input unit 26. Preferably the data are type, name, serial number, last service, or any combination of aforementioned information of the pressing tool 11.

[0034] Then, the scanner 25 collects data specific to the pressing devices before pressing operation. The scanner 25 will scan the coding means 17, like NFC tags, RFID tags, bar codes, data matrix codes or any combination thereof, which can be attached to the pressing jaws 12 and/or on the work pieces, in particular the press fitting 19 and the pipe 18. Data of the pressing devices collected by the adapter 20 here includes the information of the pressing jaw 12 used, such as type, name, serial number, last service, and the information of the fittings 18 and pipe 19, such as type, name, batch, or any of combination.

[0035] During the pressing operation, the sensor systems 13 measures and collects the data over the full operation. The data that will be collected is the tool pressure, force, motor loads, current consumption values, strain values, the operation number or any combination thereof, as well as success or fail information from the tool 11 and, if any failure occurs, the reason for failure. Preferably, the data collected in this step further includes the success or fail information from the pressing tool 11, and wherein if any failure occurs then the reason for failure, as well as the operation number. All the data collected are stored in the memory unit 24 and are associated to a defined pressing operation. At the end, for each pressing operation cycle, the above-mentioned information can be tabulated in a sequence so that the data can be well documented and/or read out at any time.

[0036] According to a preferred embodiment of the present invention, the collected data is transmitted in particular in a wireless manner, for example via WLAN, Bluetooth, IR transmission or radio transmission to an external device 29. This external device 29 may in particular be a laptop computer, a tablet PC or a smart phone. As provided by the invention, this offers the advantage of a simple operation, while at the same time enabling a high degree of portability. This allows the manufacturer of the pressing device 10 to perform a remote diagnosis. Further, the collected data can be stored for safe access, so

that they may be used as evidence if needed later.

[0037] As stated above, although demonstrative embodiments of the present invention have already been explained herein with reference to the accompanying drawings, the present invention is not limited to the particular embodiments described above; many other embodiments are possible, and the scope of the present invention should be defined by the claims and their equivalent meaning.

Claims

1. An adapter (20) for a pipe pressing device (10) for joining two work pieces, in particular a pipe (18) and a press fitting (19), by pressing, the pipe pressing device (10) comprising a pressing tool (11) with a plurality of pressing jaws (12), a battery pack (14) detachably mounted onto the pressing tool (11) to supply power thereto,
characterized in that
the adapter (20) comprising a main body (23) that includes a first coupling portion (21) and a second coupling portion (22), the first coupling portion (21) having a configuration basically identical to a coupling portion (16) of the battery pack (14) that is to be attached to the pipe pressing tool (110); the second coupling portion (22) having a configuration basically identical to a coupling portion (15) of the pipe pressing tool (11) that is attached to the battery pack (14).
2. The adapter (20) as claimed in claim 1,
characterized in that
the adapter (20) comprises at least one data collecting element provided on the main body (23) and a memory unit (24) for storing the collected data.
3. The adapter as claimed in claim 2,
characterized in that
the at least one data collecting element is a scanner (25).
4. The adapter as claimed in claim 3,
characterized in that
the scanner (25) is configured to scan NFC tags, RFID tags, bar codes, data matrix codes or any combination thereof on the pressing jaws (12) and/or on the work pieces, in particular the press fitting (19) and the pipe (18), in order to identify the pressing jaws (12) and/or the work pieces.
5. The adapter as claimed in one of claims 1 - 4,
characterized in that
the adapter comprises an input unit (26), being configured to receive the data of the pressing tool (11) manually by a user.

6. The adapter as claimed in one of claims 1 - 5,
characterized in that
the adapter (20) comprises transmitter unit (27)
adapted to be connected to an external device (29)
to transmit the collected data to the external device.
7. A method for documenting pressing operations per-
formed on two work pieces, in particular a pipe (18)
and a press fitting (19), performed with a handheld
pressing device (10) with a pressing tool (11) having
a plurality of pressing jaws (12), a battery pack (14)
detachably mounted to the pressing tool (11),
characterized in that
the method comprises:
- 1) attaching the adapter (20) according to any
one of claims 1-6 to the pressing tool (11) and
battery pack (14);
 - 2) collecting data of the pressing tool (11), press-
ing jaws (12), pipe (18) and/or press fitting (19)
before pressing operation;
 - 3) collecting data of the tool pressure, force, mo-
tor loads, current consumption values, strain
values or any of the combination thereof during
pressing operation;
 - 4) the data collected in the steps 2) and 3) being
stored in the memory unit (24) of the adapter.
8. The method as claimed in claim 7,
characterized in that
data collected in the step 2) includes the data of the
pressing jaw (12) used and/or the work pieces used
by scanning the NFC tags, RFID tags, bar codes,
data matrix codes or any combination thereof on the
pressing jaws (12) and/or on the work pieces, in par-
ticular the press fitting (19) and the pipe (18).
9. The method as claimed in claim 7,
characterized in that
the data collected in the step 2) further includes of
the data of press tool (11) used by a user manually
selecting from the data of pressing tools pre-stored
in the memory unit (24) of the adapter (20).
10. The method as claimed in claim 8 or 9,
characterized in that
the data are type, name, serial number, last service,
or any combination of aforementioned information
of the pressing tool and/or pressing jaw, or the type,
name or batch of the work pieces.
11. The method as claims in any of claims 7-10,
characterized in that
the data collected in step 3) are the pressing tool
pressure or force or motor loads or current consump-
tion values or strain values or any of the combination
- characterized in that**
the data collected in step 3) is collected by a sensor
system (13) inbuilt in the pressing tool (11).
13. The method as claims in any of claims 7-12,
characterized in that
the collected data are transmitted in a wireless man-
ner, in particular via WLAN, Bluetooth, IR transmis-
sion or radio transmission to an external device (29).
14. The method as claims in claim 13,
characterized in that
the collected data for each pressing operation cycle
are tabulated and/or sequenced.

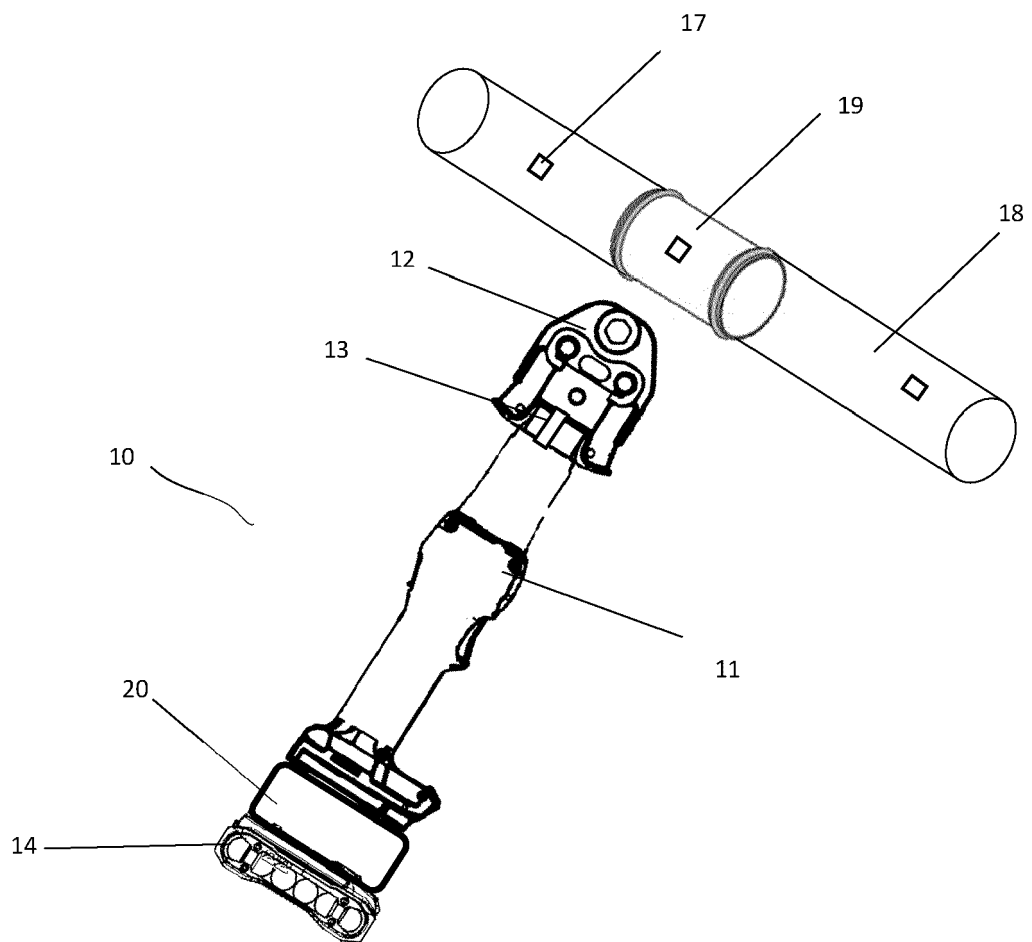


Fig. 1

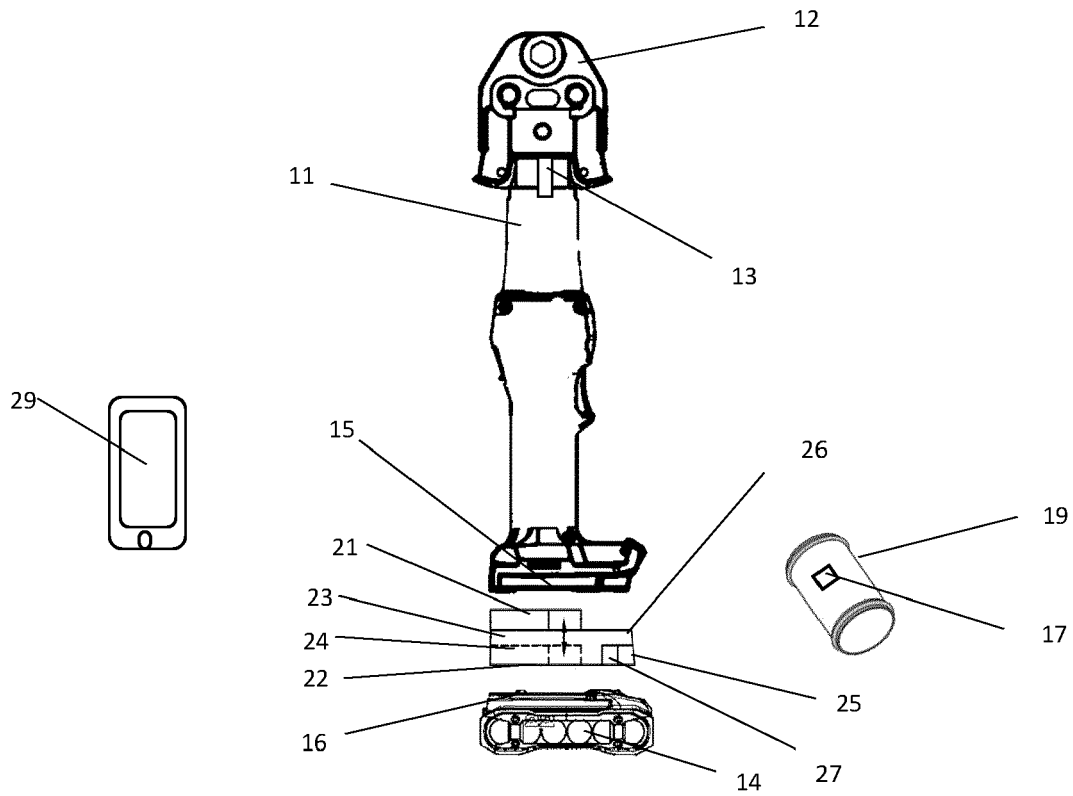


Fig. 2

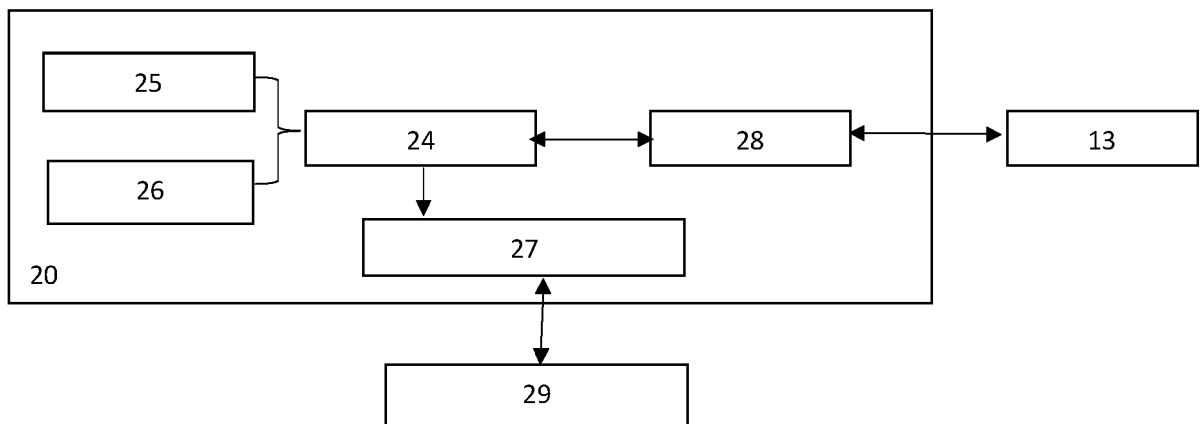


Fig. 3



EUROPEAN SEARCH REPORT

Application Number

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 November 2022	Examiner Pastramas, Nikolaos
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EPO FORM 1503 03.82 (P04C01)



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Place of search The Hague			Examiner Pastramas, Nikolaos
Date of completion of the search 7 November 2022			
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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document

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