



## Description

### Field of the invention

**[0001]** The present invention relates to spray guns of the type comprising a body having a handle and a head, an air inlet for supplying air under pressure and a substance inlet for supplying a fluid substance to be sprayed. A spray nozzle is applied to the head and a trigger-operated air valve is associated with the air inlet. The air valve is passed through by a needle for controlling the flow through the spray nozzle, which is also operated by the trigger.

### State of the art

**[0002]** In spray guns of this type, for example, as generally described in the document US-3,482,781, the spray nozzle and the needle must be periodically replaced, as they are subject to wear. Consequently, the needle is secured in a removable manner, at its end opposite to the nozzle, to a bushing axially movable in the body of the gun together with the air valve. Traditionally, the disassembly operation of the needle is relatively long and complex, as it requires disassembling the various components, which also usually includes the trigger.

**[0003]** To try to resolve this problem, solutions have been proposed, such as the one described in the document WO-2010/080365, which entail, however, additional structural complications.

### Summary of the invention

**[0004]** The object of the invention is that of resolving the problem related to a quick and easy replacement of the needle of the gun in a constructively simple and functional manner.

**[0005]** According to the invention, this object is achieved thanks to the fact that a restraining collet is screwed within the bushing, with which the end of the needle engages axially, said restraining collet being operable in rotation to advance the needle outwards with respect to the bushing from the head of the body, and to release said end from the restraining collet to enable withdrawal of the needle from the gun.

**[0006]** Thanks to this solution idea, the removal of the needle for its periodic replacement can be performed extremely simply and quickly, without requiring disassembly of other components of the gun, except for the nozzle which, moreover, also constitutes an element subject to wear and thus requires replacing together with the needle.

**[0007]** According to the invention, the restraining collet and the bushing conveniently have respective surfaces of mutual force-fit engagement to provide blocking of said end of the needle within said restraining collet.

### Brief description of the drawings

**[0008]** Additional features of the invention will become apparent from the detailed description which follows, with reference to the attached drawings provided purely by way of non-limiting example, in which:

- Figure 1 is a perspective view of an embodiment of a spray gun according to the invention,
- Figures 2, 3 and 4 are analogous views to Figure 1, which exemplify the modes of disassembly of the needle of the gun in respective successive steps,
- Figure 5 is a perspective dorsal view of the gun showing an additional step during disassembly of the needle,
- Figure 6 is a front perspective view on an enlarged scale of the gun in the step corresponding to Figure 5,
- Figure 7 is a perspective view analogous to Figures 1 to 4 which shows the gun following removal of the needle,
- Figure 8 is a view analogous to Figure 6, on an enlarged scale and partially cross-sectioned, and
- Figure 9 shows a part of Figure 8, further cross-sectioned.

### Detailed description of the invention

**[0009]** Referring initially to Figure 1, a spray gun according to the invention essentially comprises a body 1 having a handle 2 and a head 3 to which a hand guard 4 is applied. The handle 2 is provided at its base with an inlet connector 5 connectable to a source of air under pressure, and the head 3 is connected to a substance inlet 6 for supplying a fluid substance to be sprayed.

**[0010]** Referring now in greater detail to Figure 8, numeral 7 indicates a manually-operable trigger for controlling an air valve 8 which controls the opening and closing of a passage 9 connected to the air inlet 5. The air valve 8 contrasts axially against a bushing 10 axially movable within the body 1, on the opposite side to the head 3, against the action of an elastic system 11.

**[0011]** Numeral 12 indicates a needle which extends between the bushing 10 and a spray nozzle 13, applied in a removable manner to the head 3. The function of the needle 12 is that of controlling the flow of fluid substance sprayed through the nozzle 13.

**[0012]** As is illustrated in detail in Figure 9, the needle 12 passes through the air valve 8, which is hollow, and is axially displaceable together therewith, due to the effect of operating the trigger 7.

**[0013]** According to the unique characteristic of the invention, the end of the needle 12 opposite to the nozzle 13, indicated by 14 in Figure 9, engages within a restraining collet 15 inserted coaxially and rotatably with threaded coupling 16 within the bushing 10. The threaded coupling 16 is such so that the restraining collet 15 operates in a screw-like manner and the bushing 10 operates in a nut-like manner.

[0014] Still with reference to Figure 9, the end 14 of the needle 12 is inserted axially into a blind hole 17 of the restraining collet 15, at which said collet 15 has a tapered outer portion 18 configured to cooperate with a corresponding internal tapered portion 19 of the bushing 10.

[0015] The end of the restraining collet 15 opposite to the air valve 8 has a seat 20 accessible from the outside, following the removal of a cap 21, for the insertion of an Allen key B through which the screwing or unscrewing of the restraining collet 15 is controlled relative to the bushing 10.

[0016] The sequence of disassembly of the needle 12 for its periodic replacement is exemplified in Figures 1 to 7.

[0017] Following the removal of the hand guard 4 (Figure 2), the nozzle 13 is unscrewed and removed from the head 3 of the body 1 (Figure 3) and the removal of the cap 21 can then be carried out (Figure 4). The Allen key B is introduced within the seat 20 of the restraining collet 15 (Figure 5), which then operates the screwing rotation of the restraining collet 15 relative to the bushing 10. Due to the effect of this maneuver, the restraining collet 15 advances in the direction of the head 3 of the body 1 and in so doing moves the needle 12 in the same way, which in this way is made to protrude beyond the head 3. This maneuver also causes the disengagement between the tapered surfaces 18 and 19, so as to loosen the force-fit engagement of the end 14 of the needle 12 within the hole 17. The needle 12 can then be pulled and extracted outside of the head 3, as represented in Figure 7, to be replaced.

[0018] For replacement, the new needle 12 is inserted through the head 3 of the body 1, and then through the air valve 8 to engage the hole 17 of the restraining collet 15 with its end 14. Through the Allen key B, the restraining collet 15 is then rotated in the unscrewing direction relative to the bushing 10, in order to engage the tapered surfaces 18, 19 with each other again, thus producing the forced blocking of the end 14 of the needle 12 relative to the restraining collet 15.

[0019] It is apparent from above that the operations of disassembly and reassembly of the needle 12 can be carried out very quickly and easily without requiring the removal of other parts of the gun, apart from the spray nozzle 13 which is, however, also an element subject to wear, and therefore requires periodic replacement like the needle 12.

[0020] Of course, the details of construction and the embodiments may be widely varied with respect to those described and illustrated, without departing from the scope of the present invention as defined by the following claims.

(2) and a head (3), an air inlet (5) for the supply of air under pressure, a substance inlet (6) for the supply of a fluid substance to be sprayed, a spray nozzle (13) releasably secured to the head (2), an air valve (8) associated with the air inlet (5), a needle (12) for controlling the flow through the spray nozzle (13), and a trigger (7) for operating the air valve (8) and the needle (12), wherein the needle (12) passes through the air valve (8) and is releasably fixed at its end (14) opposite to the spray nozzle (13) to a bushing (10), which is axially movable within the gun body (1) **characterized in that** a restraining collet (15) is screwed within said bushing (10) with which said end (14) of the needle (12) is axially engaged, said restraining collet (15) being operable in rotation to advance the needle (12) outwards with respect to the bushing (10) from the head (2) of the body (1) and release said end (14) from the restraining collet (15) so as to enable withdrawal of said needle (12) from the gun.

2. Spray gun according to claim 1, **characterized in that** the restraining collet (15) and the bushing (10) have respective surfaces of mutual force-fit engagement (18, 19) to provide blocking of said end (14) of the needle (12) within said restraining collet (15).

## Claims

1. A spray gun comprising a body (1) having a handle

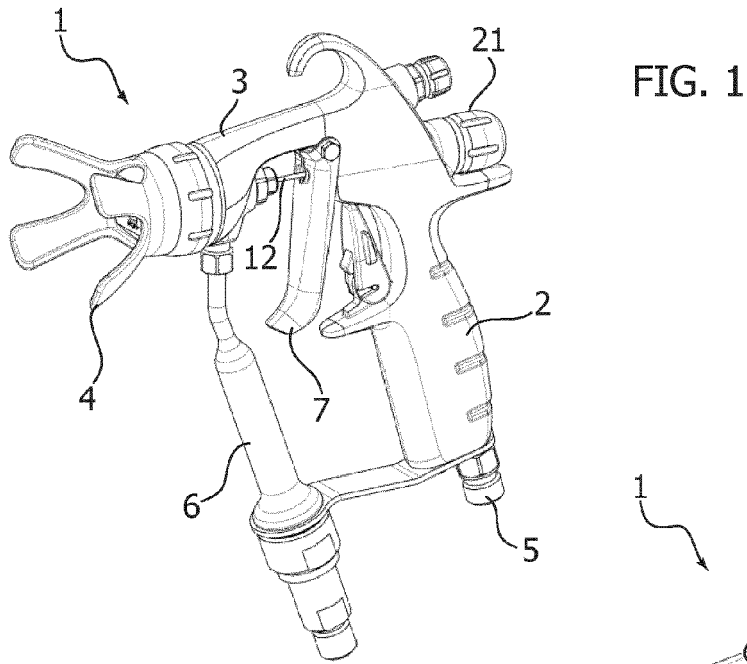


FIG. 1

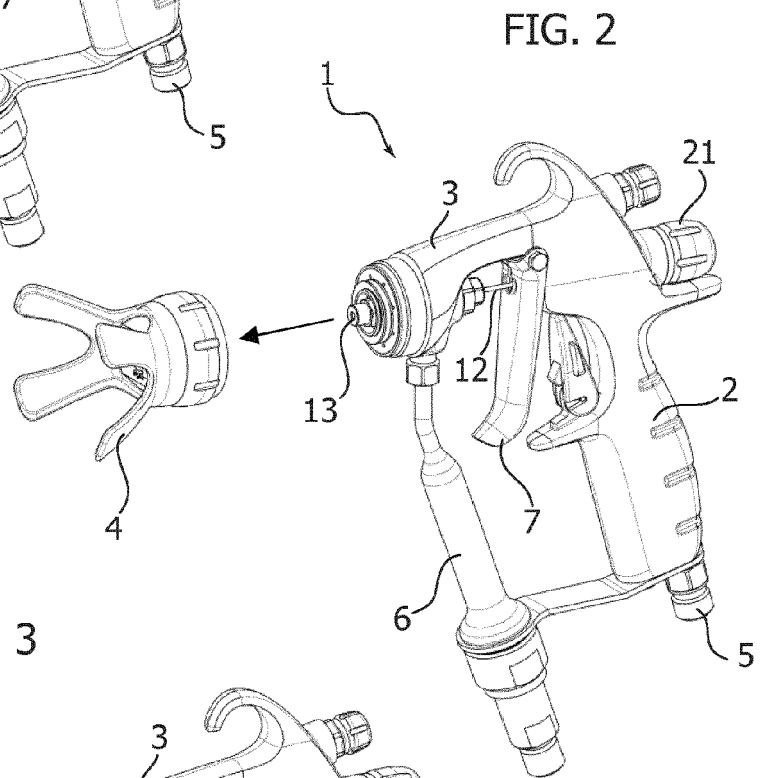


FIG. 2

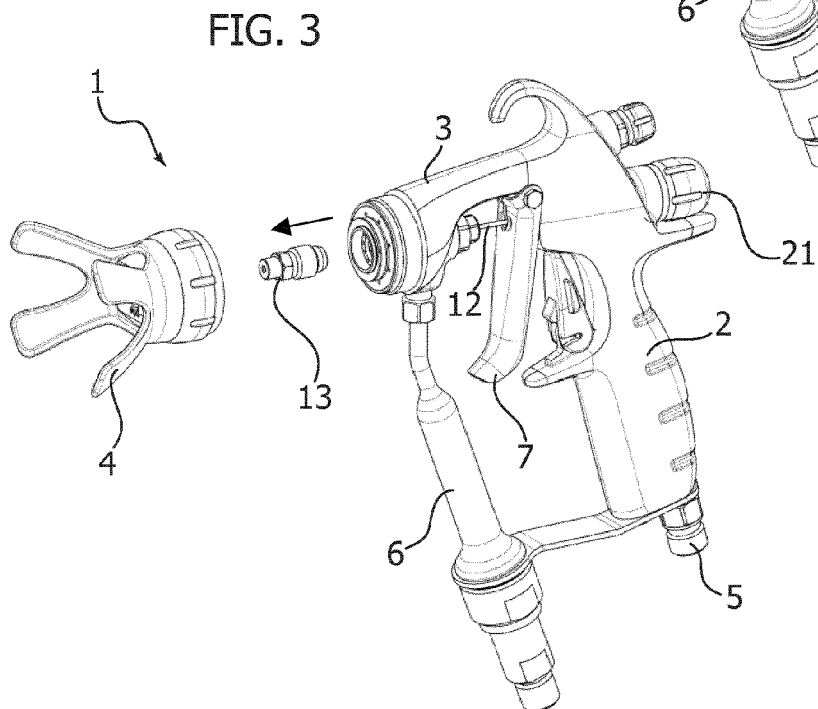


FIG. 3

FIG. 4

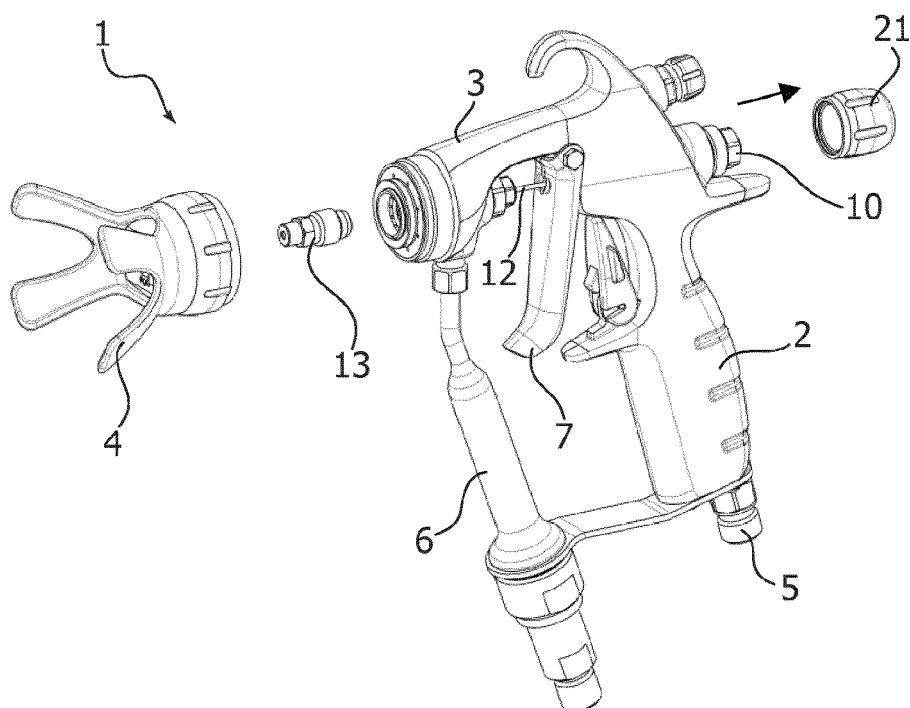


FIG. 5

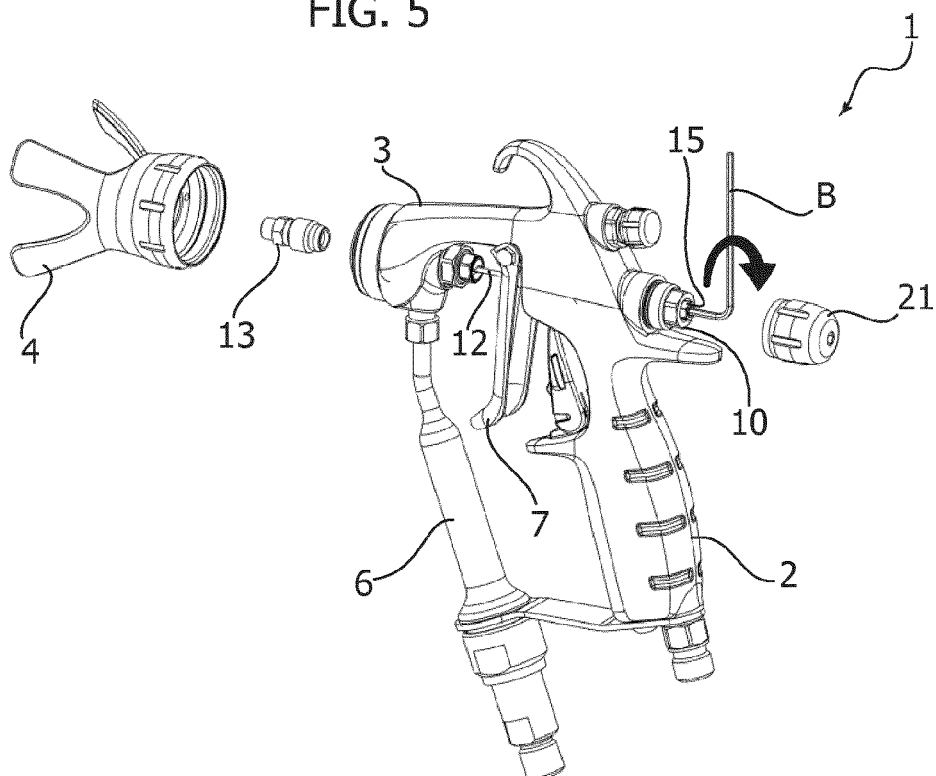


FIG. 6

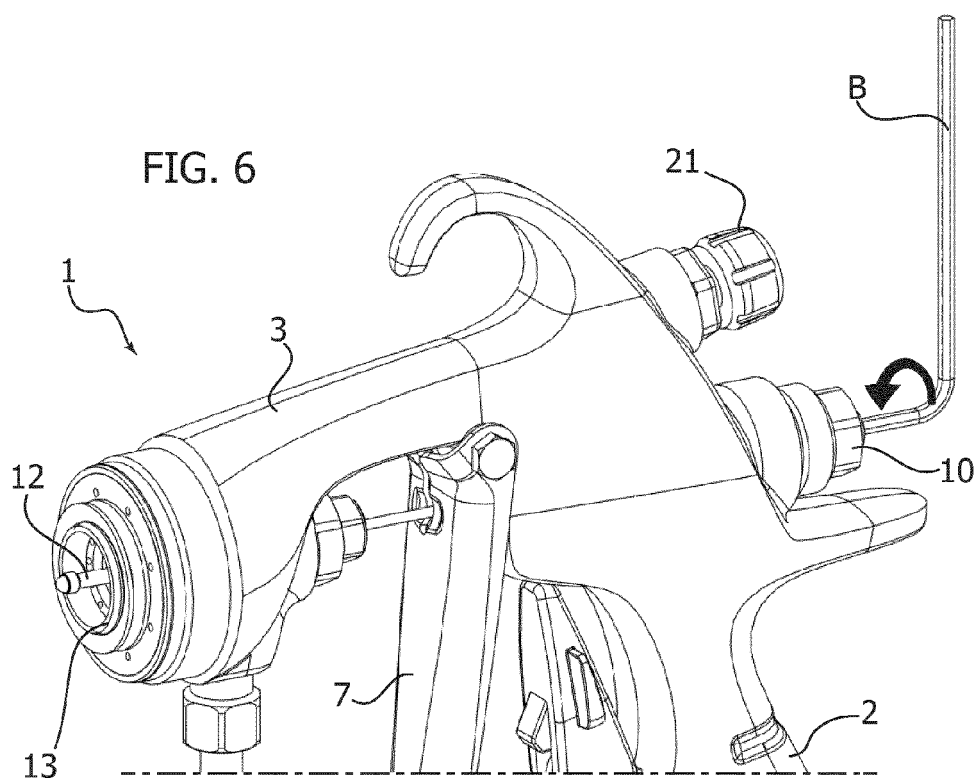


FIG. 7

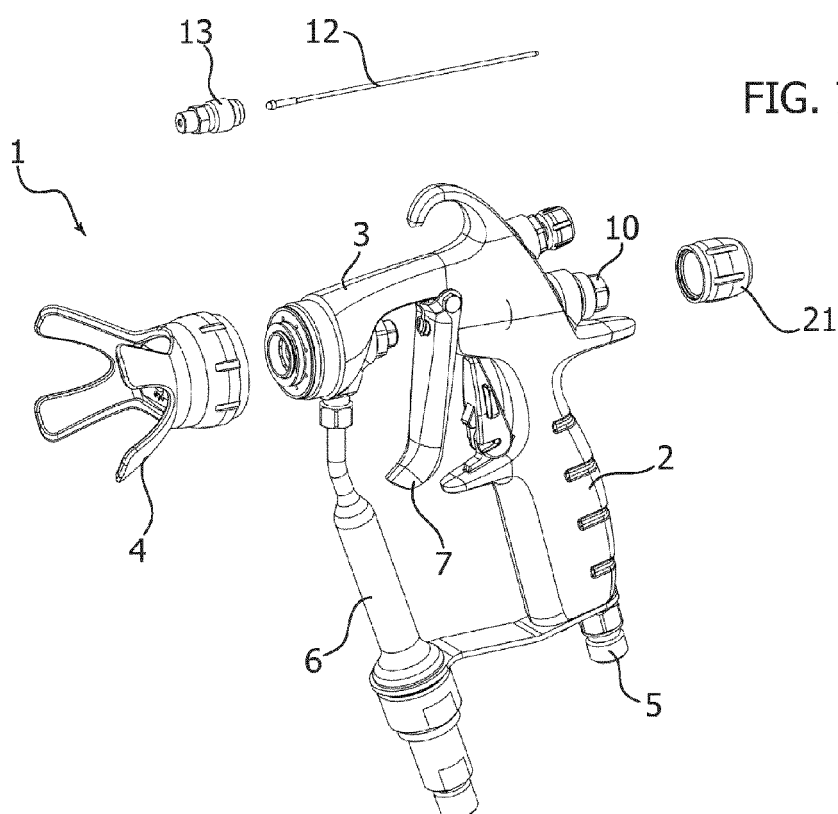


FIG. 8

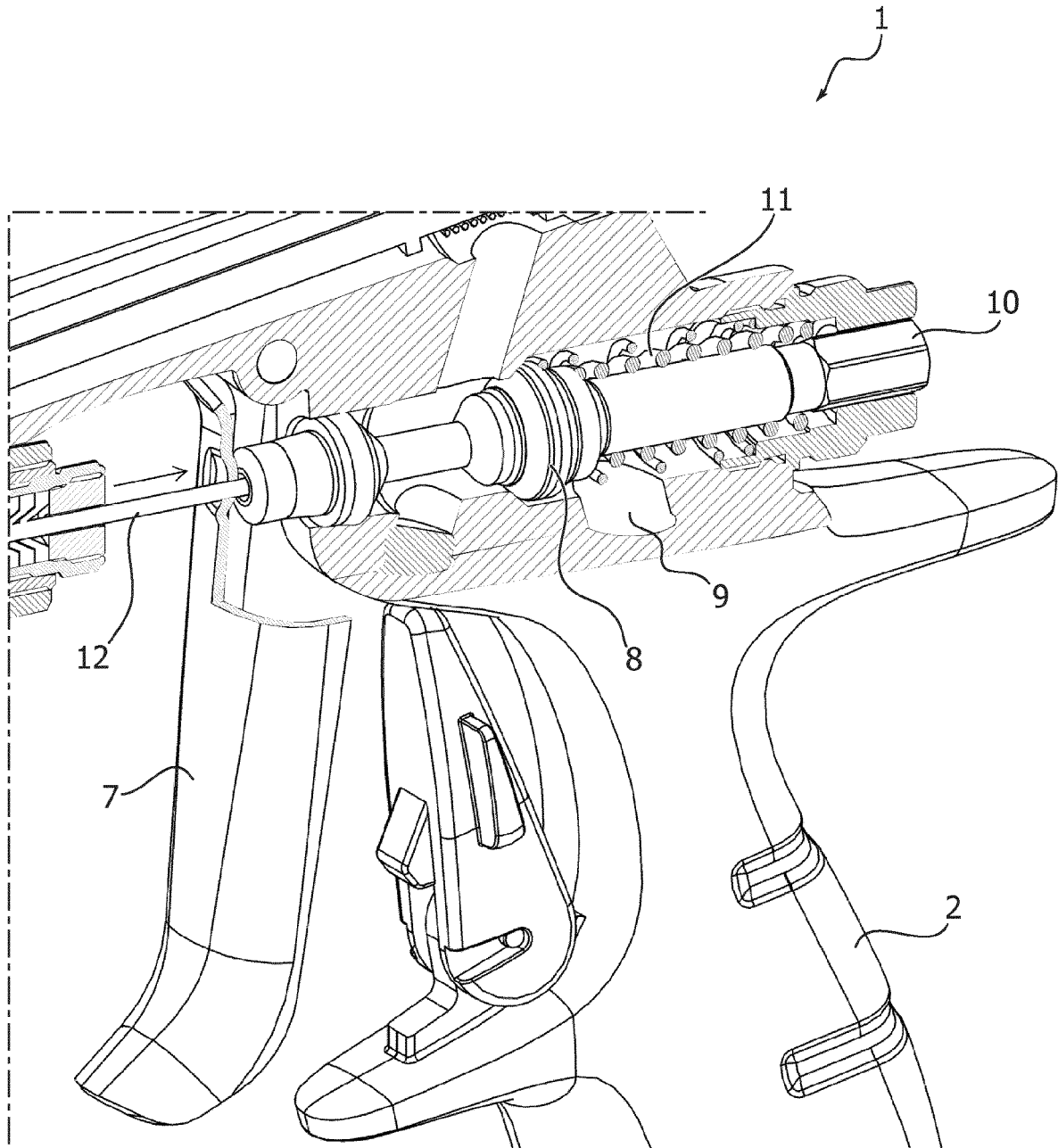
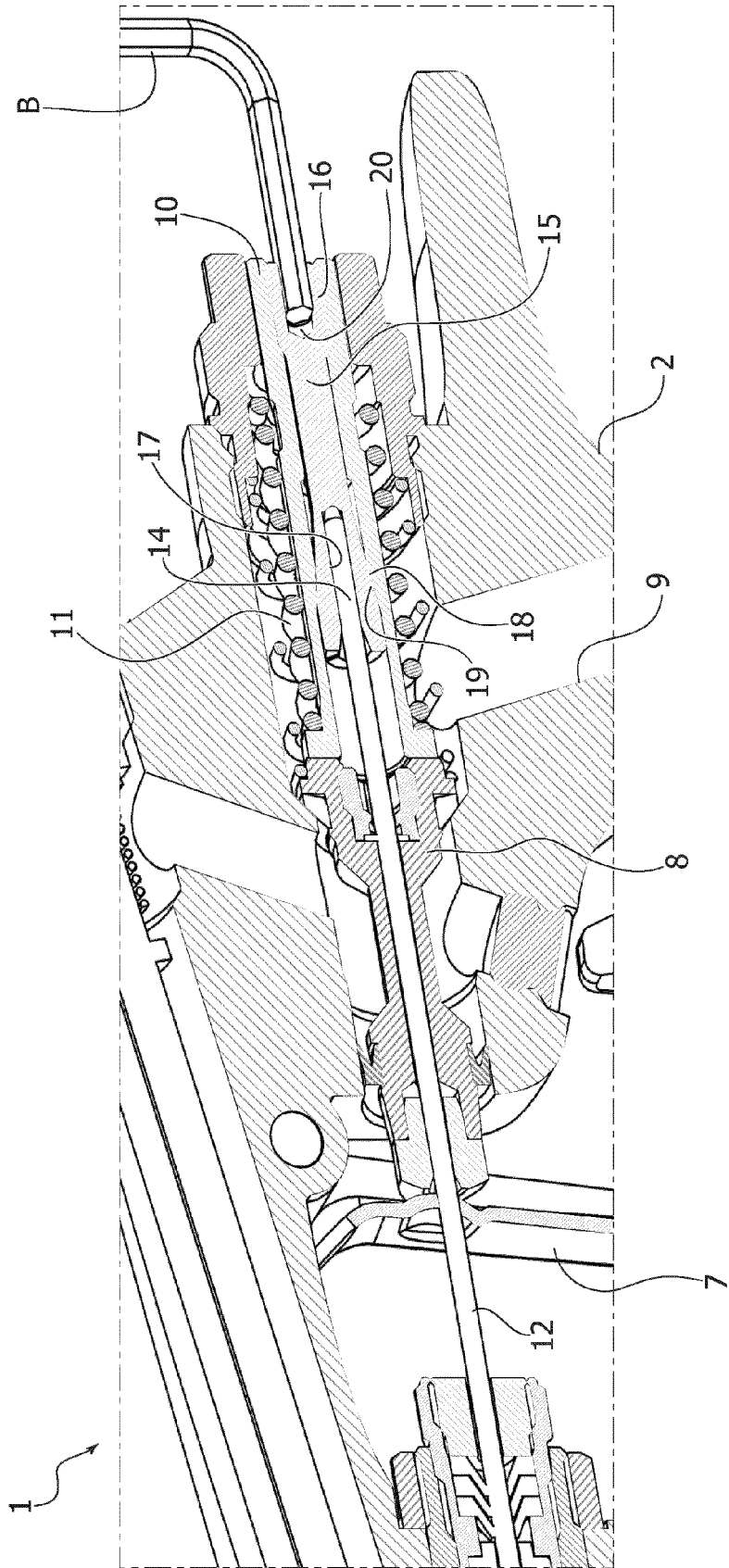


FIG. 9







## EUROPEAN SEARCH REPORT

Application Number  
EP 15 19 7146

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>26 April 2016</b>	Examiner <b>Moroncini, Alessio</b>
CATEGORY OF CITED DOCUMENTS 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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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**REFERENCES CITED IN THE DESCRIPTION**

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