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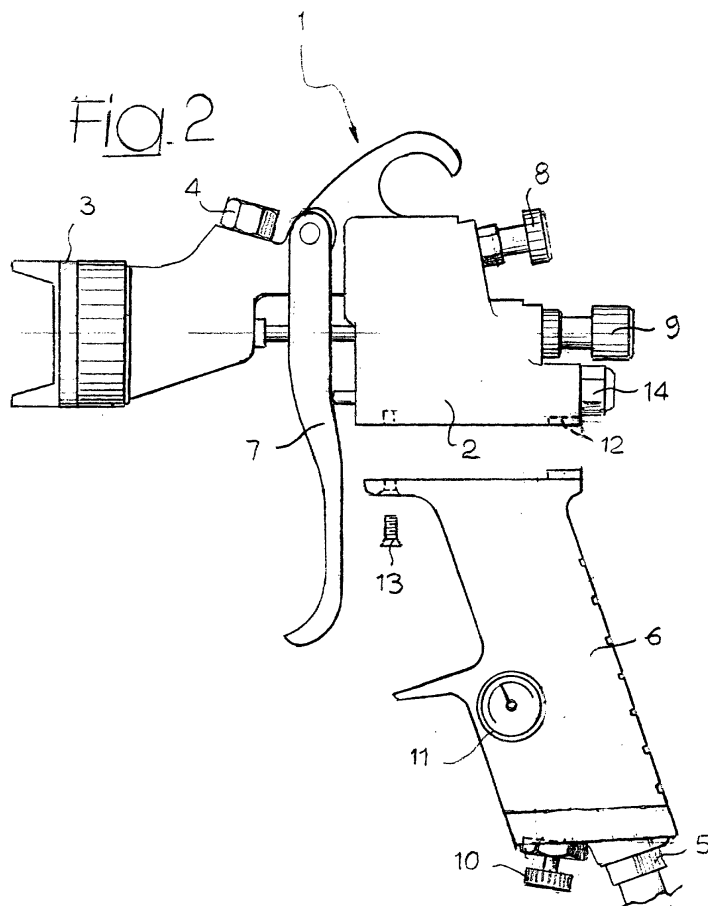
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(54) **Manual spray gun**

(57) Manual spraying gun (1) comprising a body (2) with a spraying nozzle (3) and a grip (6) with a compressed air supply fitting (5) and associated regulator

(10) and related pressure indicator. The grip (6) consists of an element which is distinct from the body (2), is connected thereto in a quickly releasable fashion, and incorporates a pressure gauge (4').



Description

[0001] This invention relates to guns for the application of covering substances, such paint, chemical substances, powder and similar by spraying.

[0002] More specifically, this invention relates to a manual spraying gun of the type comprising a body with a spraying nozzle connected to a supply fitting of a substance to be sprayed with associated regulator, and a compressed air supply fitting leading to a grip with associated regulator and related pressure indicator.

[0003] In the use of guns of this type, specifically when used for spraying paint, they must be frequently cleaned to prevent obstruction and subsequent faults. These operations are carried out by washing with suitable liquids, such as solvents, conveniently by means of automatic devices.

[0004] The pressure indicator traditionally consists of a pressure gauge with analogue dial, which obviously must be removed from the gun before each washing operation: for this reason, the pressure gauge is normally arranged between the compressed air supply fitting and the base of the grip, so to be easily removed. This arrangement causes a considerable longitudinal size of the grip, that is under the gun, with consequent problems related to handling.

[0005] In order to solve this problem, it has been suggested to replace the analogue dial with an electronic pressure transducer and associated digital display fitted in the body.

[0006] This embodiment is described, for example, in European patent EP-B-526525 in the name of ITW Limited.

[0007] This arrangement makes it practically impossible, or otherwise extremely difficult, to wash the gun with solvents or similar liquid substances. This is because the electronic transducer and respective digital display require the use of a source of electrical power in the gun, typically consisting of one or more batteries, which presence does not reconcile with the action of washing fluids.

[0008] From DE-8814651U a spraying device is known having a handle grip secured to the body through a threaded member enabling its removal. Assembling and disassembling this known spraying device however require uncomfortable and relative long operations.

[0009] The object of this invention is to solve the aforesaid problems by making a manual spraying gun, of the type described above, which permits the use of an analogue pressure gauge without increasing the size of the handle, which can be easily washed after use, and which also permits the use of an electronic pressure transducer, even in this case without any problems related to washing the gun.

[0010] According to this invention, this purpose is reached by virtue of the features recited in claim 1. Additional secondary features are set forth in the sub-claims.

[0011] Thanks to this idea of solution, the body of the gun, i.e. the part containing the functional components which require washing after use, can be easily separated from the grip which, in turn, does not require additional outer devices for installing the pressure gauge. This gauge, which may be either analogue or digital, can be thus conveniently incorporated in the grip.

[0012] Furthermore, the body and the grip can be made of different materials: particularly, the grip could be made of plastic material and the body could be made, as usual, of metal.

[0013] The pressure indicator may be consisting of an analogue pressure gauge with an elastic device sensitive to the pressure in said supply conduit and connected to a mobile hand on a graduated scale. According to another feature of the invention, the analogue pressure indicator is housed inside the grip with said graduated scale visible externally and with said elastic device exposed to a tubular member directed radially with respect to the graduated scale and communicating with said supply conduit via a derived passage arranged in the grip.

[0014] Thanks to this solution, the extension in length of the grip can be appreciably reduced, to the advantage of handling ease of the gun and without no problems related to periodical gun washing operations, also thanks to the fact that the grip is made of a separate part from the body and is connected to the body in a way which can be rapidly removed.

[0015] This invention will be better explained by the following detailed description with reference to the accompanying drawings purely provided as a non-limiting example, wherein:

- figure 1 is a schematic lateral elevated view of a manual spraying gun according to a first form of embodiment of the invention herein illustrated in the condition of normal use,
- figure 2 is a view similar to that of figure 1 on a larger scale illustrating the gun removed from the grip,
- figure 3 is a dorsal elevated view, fragmented and on a larger scale, according to the arrow III in figure 1,
- figure 4 is a schematic, partial view similar to that of figure 2, showing a second form of embodiment of the manual spraying gun according to this invention,
- figure 5 illustrates the gun of figure 4 in assembled conditions,
- figure 6 is a section view according to the line VI-VI in figure 7,
- figure 7 is a cross-section view on a larger scale according to the line VII-VII in figure 4,
- figure 8 is a cross-section view, according to the line VIII-VIII in figure 4,
- figure 9 schematically illustrates the assembly/disassembly method of the gun according to figures 4-8,

- figure 10 is a schematic partial cross-section view showing a part of the manual spraying gun grip according to this invention,
- figure 11 is a longitudinally section view of figure 10, and
- figure 12 is a view from the back of the figure 10.

[0016] With initial reference to figures 1-3, numeral 1 generally indicates a manual spraying gun according to this invention for applying coating substances, for example paint. The gun 1 comprises a body 2 with a nozzle, generally indicated with numeral 3, and comprising, in a known way, a spraying nozzle by means of which the paint or similar, supplied from a reservoir coupled to a fitting 4 of the body 2, is sprayed by ejection of compressed air. The compressed air is supplied to the gun 1 via a fitting 5 arranged on the lower extremity of a hollow grip 6. The sprayed output of paint, or similar, is controlled by means of a trigger lever 7 jointed to the body 2, which also carries manual adjustment devices 8, 9 and 14 for supplying paint, or similar, for the passage of flow through the nozzle of the sprayer 3 and of the trigger 7, respectively.

[0017] In turn, the grip 6 has a manual pressure regulator 10, which is associated to a gauge consisting, in the illustrated example, of a traditional pressure gauge with analogue dial 4' by the side of the compressed air input fitting 5.

[0018] In conventional spraying guns, the grip 6 usually forms a single part with the body 2. Conversely, in the case of this invention, the body 2 and the grip 6 consist of two distinct elements, which are connected in such a way to be easily and rapidly disassembled. In the case of the example illustrated in figures from 1 to 3, the coupling is achieved by a joint, consisting of a dovetail projection 11, jutting from the top of the grip 6, which engages a complementary housing 12 in the body 2 and is fastened with the assistance of one or more anchoring screws 13.

[0019] Despite not being shown in the example illustrated in figures 1-3, a holding device will be provided between the coupling surfaces of the grip 6 and the body 2 in the compressed air passage area of the fitting 5 towards the sprayer 3.

[0020] The pressure gauge 4' is incorporated and embedded inside the grip 6 with the respective display visible on a side of the grip, in the way further described and illustrated in detail in the following, with reference to figures 10-13.

[0021] It is stressed that, according to an alternative form of embodiment not illustrated in the drawings, the analogue pressure gauge 4' may be replaced by an electronic pressure transducer with digital display, identically incorporated in the grip 6.

[0022] Additional electrical equipments can be further embodied within the grip 6, such as for instance a heater for raising the temperature of the compressed air supplied to the gun, one or more temperature transducers,

and the like. These electrical equipments shall be electrically connected to the outside of the grip 6 via a connecting device (not shown in the drawings since within the skill of the practitioner) which may be associated to the fitting 5.

[0023] Thanks to the arrangement described above, the washing operations of the gun 1 following use can be carried out easily and conveniently by separating the body 2 from the grip 6, thus avoiding that the latter, with the respective pressure gauge and any additional electrical equipments incorporated therewithin, is contaminated by solvents or similar substances used for washing. Furthermore, the fact that the analogue, or digital, pressure gauge is incorporated in the grip 6 limits its size, making the gun 1 in total more compact and, consequently, easier to handle.

[0024] Furthermore, the body and the grip can be made of different materials: specifically, the grip could be made of plastic material, instead of metal, as the body, to the advantage of lightness and cost-effectiveness of construction.

[0025] Naturally, the solution described above with reference to figures 1-3 is non-limiting, since any equivalent configuration of removable use between the body 2 and the grip, for example by means of a clip-on joint or a bayonet joint, is included in the scope of this invention.

[0026] A possible alternative form of embodiment, consisting of a bayonet coupling, which is currently considered the preferred solution, is illustrated in figures 4-9, in which parts which are identical or similar to those described with reference to figures 1-3, are shown with the same numerals.

[0027] The grip 6, in this case, is formed with two opposite projections 15, 16 for engaging by turning two corresponding side housings 17, 18 projecting from the base of the body 2, as schematically shown in figure 9, where relevant under the action of an axial thrust elastic device, not illustrated. The compressed air input duct, conventionally formed through the grip 6, can in this case present a projecting centring portion 19 with associated washer 20, suitable to engage the base of the body 2 in the assembled condition of the gun illustrated in figure 4.

[0028] Following the reciprocal engagement rotation of the projections 15, 16 and the housings 17, 18, the grip 6 is automatically locked with respect to the body 2 by means of a fastening device 21 associated, for example, with the projection 15, which can be engaged, under the effect of a spring 24, in a recess 25 of the housing 17. A voluntary action is required to release the fastening device 21, to allow disassembly of the body 2 and the grip 6, for example the manual pressure of a spring button 22 associated, for example, to the housing 17.

[0029] Furthermore, one or more automatic clip positioning devices 23 between one or both of the housings 17, 18 and the respective projections 15, 16 which can

be engaged by turning in engagement direction and released by turning in release direction between the grip 6 and the body 2.

[0030] Referring now to figures 10-13, numeral 2' indicates the compressed air supply duct formed in the grip 6. The air flow through the supply conduit 2' can be adjusted by means of an on-off valve, schematically indicated by numeral 3', which moves in a conventional fashion by means of a conventional adjustment device (not illustrated in the drawings since well known to the man skilled in the art) which is external to the grip 6.

[0031] The pressure of the air conveyed through the supply duct 2' to the spraying nozzle of the gun is displayed and controlled by means of the analogue pressure indicator 4' which is housed inside the grip 6. This analogue pressure indicator in the case of the illustrated example consists of a so-called "bourdon" pressure gauge including, in a usual fashion, an elastically deformable metallic elliptical cross-section tube 5', which mobile extremity, indicated with numeral 6', operates a mobile hand 7' in front of a graduated scale 8' by means of the mechanism 13'. The graduated scale 8' can be seen externally through a transparent window 9' applied in an opening 10' in the grip 6.

[0032] As clearly appears in figure 11, the pressure gauge 4' is entirely contained in the thickness of the grip 6 thanks to the fact that the respective tubular fitting 11' for letting air inside the tube 5' is directed radially with respect to the graduated scale 8' instead of axially, as in the case of conventional "bourdon" pressure gauges.

[0033] The tubular fitting 11' communicates with the supply conduit 2' immediately downstream to the adjustment valve 3' with respect to the air supply flow, via a derived passage 12' formed inside the grip 6 laterally with respect to the supply conduit 2'.

[0034] In figures 10 and 11 reference numeral 26 designates a heating resistor embedded within the grip 6 (which in this case is obviously made of a thermally and electrically insulating material) around the supply conduit 2', by which the compressed air supplied to the gun nozzle can be selectively heated. As already pointed out in the above, additional electrical or electronic devices such as temperature transducer(s) can be further embedded within the releasable grip 6.

[0035] Naturally, numerous changes can be implemented to the construction and forms of embodiment of the invention herein envisaged, all comprised within the context of the concept characterising this invention. For example, the analogue pressure gauge 4' incorporated in the grip 6 could be different than the one described with reference to the drawings: for example, it could be of the metallic membrane or capsule type, or similar.

Claims

1. Manual spraying gun (1) comprising a body (2) with a spraying nozzle (3) connected to a supply mem-

ber (4) of a substance to be sprayed with associated regulator (8), and a supply fitting (5) of compressed air leading to a grip (6) with associated regulator (10) and related pressure indicator, **characterised in that** the grip (6) consists of an element which is distinct from the body (2) and connected thereto in a quickly releasable fashion, said grip (6) incorporating a pressure gauge (4') therewithin.

2. Gun according to claim 1, **characterised in that** said pressure gauge consists of an analogue pressure gauge (4').

3. Gun according to claim 1, **characterised in that** said pressure gauge consists of an electronic transducer.

4. Gun according to any of the previous claims, **characterised in that** the grip (6) and the body (2) are provided with reciprocal jointing formations (11, 12).

5. Gun according to any of the previous claims from 1 to 3, **characterised in that** the grip (6) and the body (2) are provided with reciprocal bayonet coupling formations (15, 16; 17, 18).

6. Gun according to claim 5, **characterised in that** it includes automatic locking devices (21) and manually operated release devices (22) working on said bayonet coupling formations (15, 16; 17, 18).

7. Gun according to any of the previous claims, **characterised in that** the grip (6) and the body (2) are made of different materials.

8. Gun according to any of the previous claims, **characterised in that** the grip (6) is made of plastic material.

9. Gun according to claim 2, wherein said analogue pressure gauge (4') has an elastic device (5') sensitive to the pressure within a supply conduit (2') formed in said grip (6) and connected to a mobile hand (7') on a graduated scale (8'), **characterised in that** said analogue pressure gauge (4') is housed inside the grip (6) with said graduated scale (8') visible externally and said elastic device (5') exposed to a tubular member (11') directed radially with respect to the graduated scale (8') and in communication with said supply conduit (2') via a derived passage (12') provided in the grip (6).

10. Gun according to claim 9, **characterised in that** said analogue pressure gauge (4') is a tubular spring (5') pressure gauge.

11. Gun according to any of the previous claims, **characterised in that** it further comprises electrical

heating means (26) incorporated within said grip (6).

12. Gun according to any of the previous claims, **characterised in that** it further comprises electrical devices incorporated within said grip (6). 5

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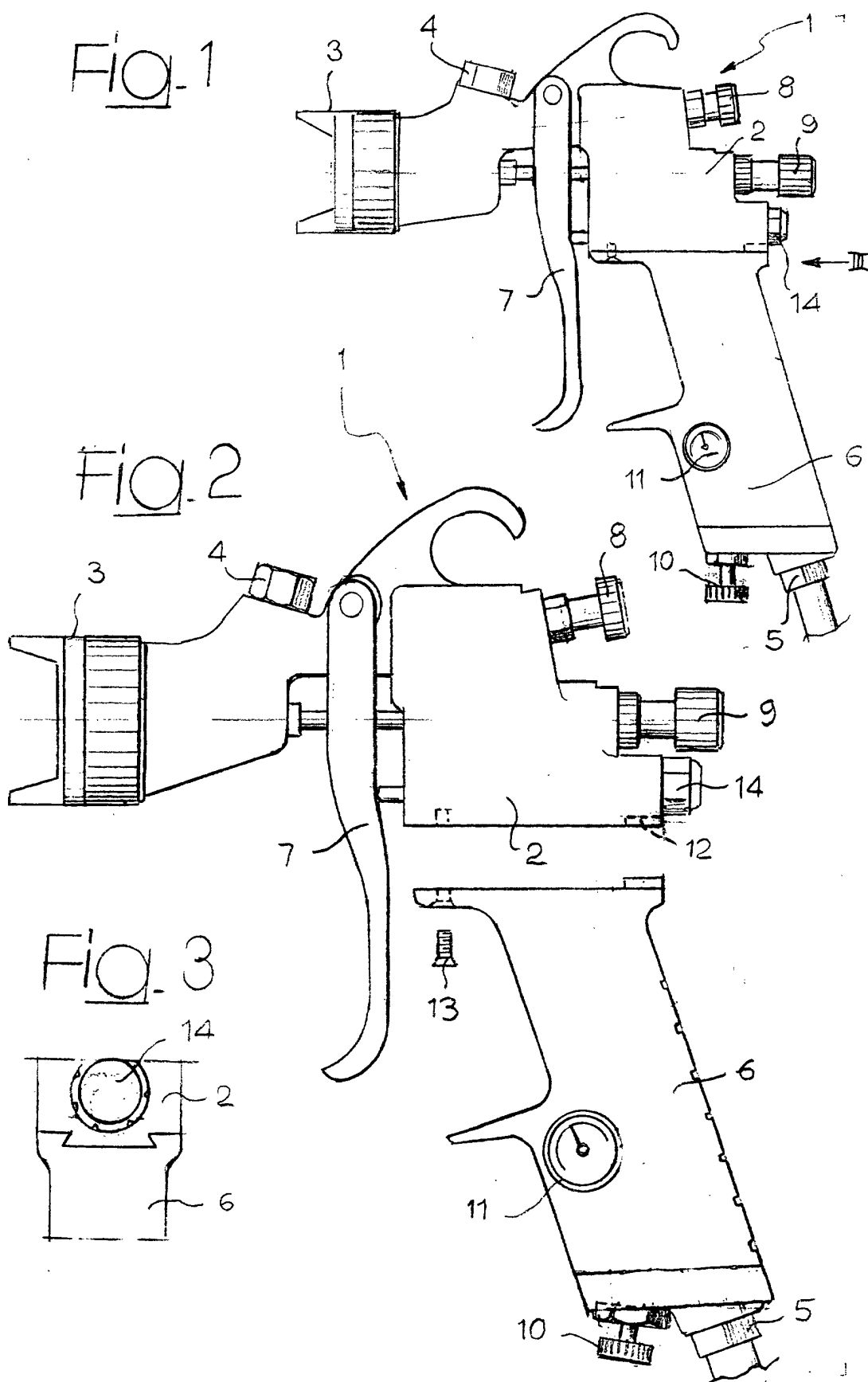
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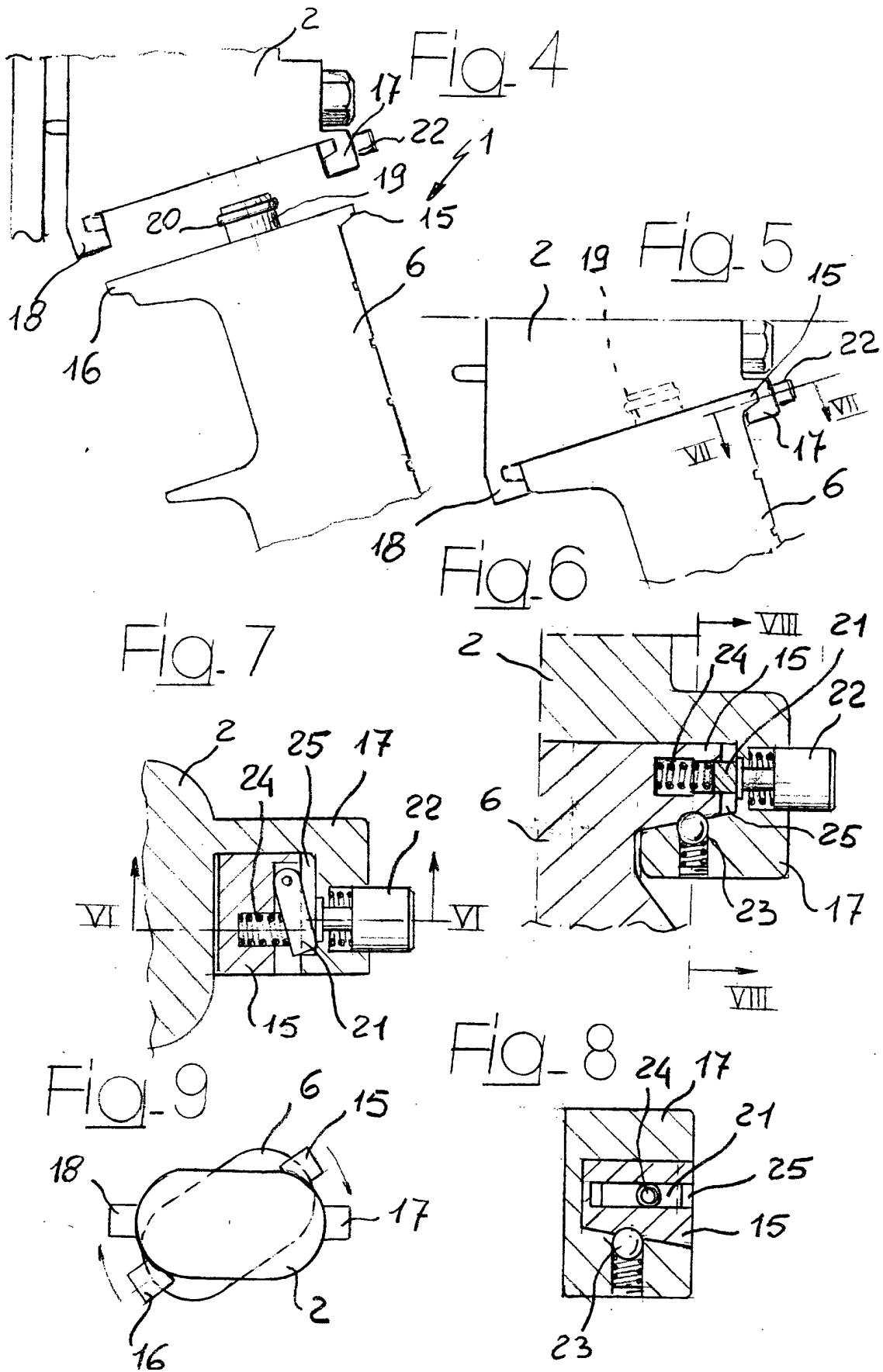


Fig. 10

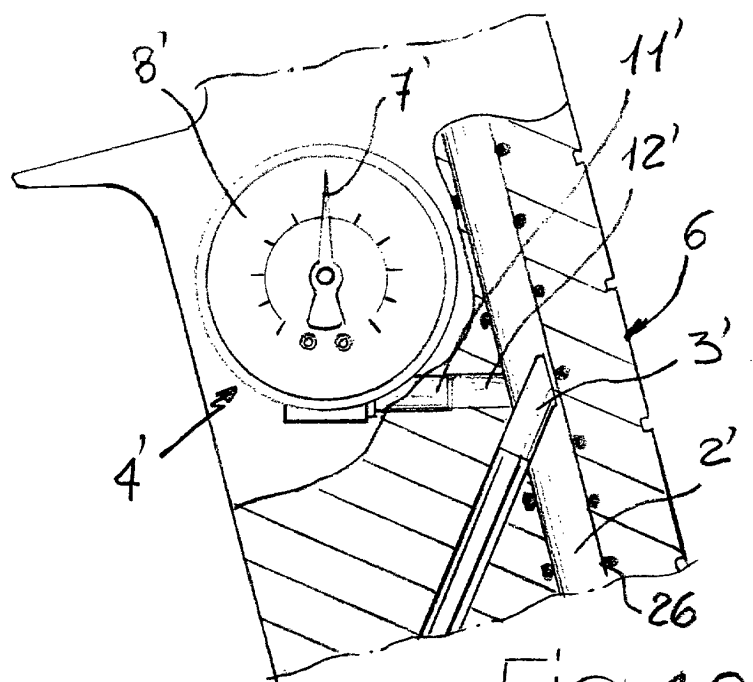


Fig. 11

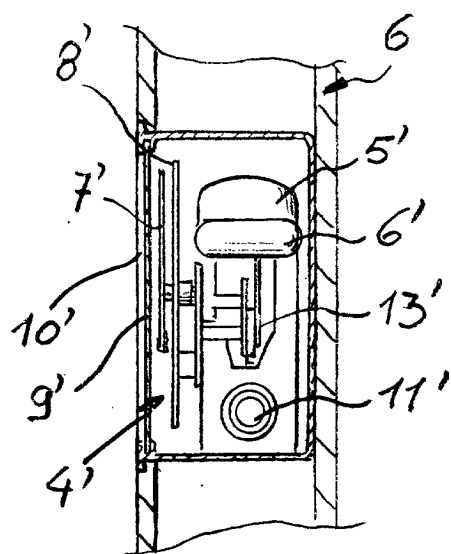
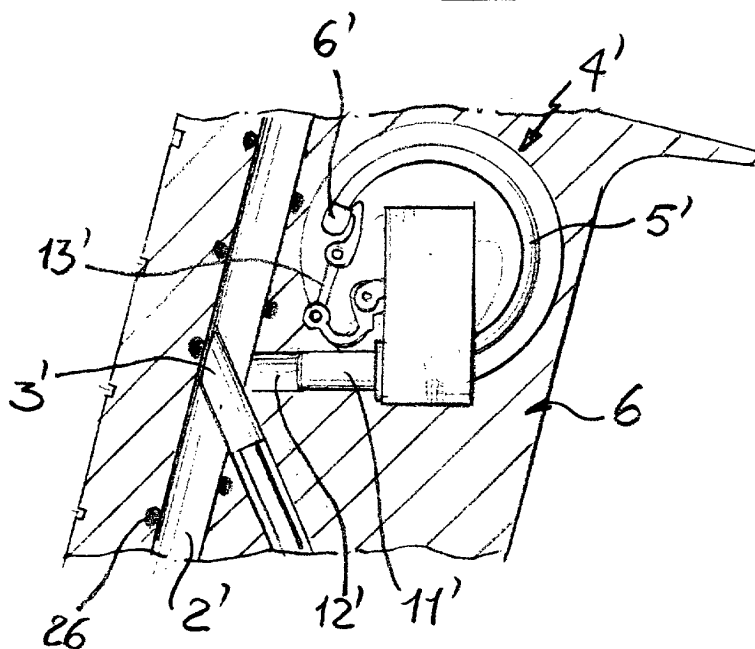


Fig. 12





European Patent
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Application Number
EP 01 83 0716

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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