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(54) **Fluid dispensing gun**

(57) The invention concerns a fluid dispensing gun comprising a dispensing tube with a dosing nozzle, a spring-loaded needle which is co-axially moveable in the dispensing tube for opening and closing the dosing nozzle, a trigger for actuating said needle in order to open the dosing nozzle and to dispense the fluid, regulating means for regulating the degree of opening of the outlet of the dosing nozzle and coupling means for coupling a pressurized can to the gun.

In order to provide a better regulation and control of the output rate of the fluid dispensing gun, it is proposed that the inside of the dosing nozzle has a first cylindrical area, followed by a first conical area, followed by a second cylindrical area, followed by a second conical area and ends in the dosing nozzle with a third cylindrical area.

With this new design of the inner area of the dosing nozzle, it is easier to regulate the output rate of the dispensing gun.

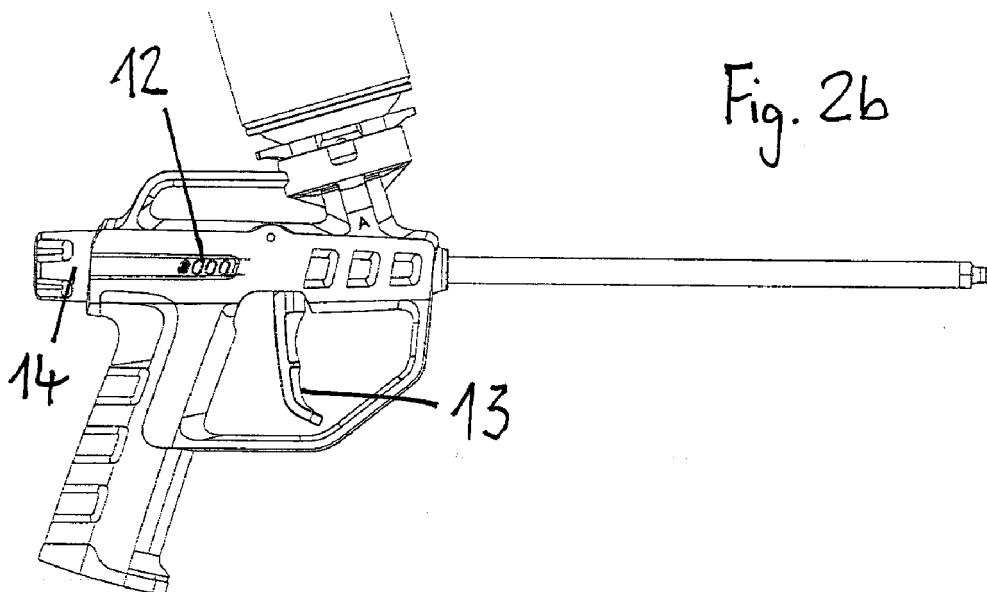


Fig. 2b

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## Description

**[0001]** The invention concerns a fluid dispensing gun comprising a dispensing tube with a dosing nozzle, a spring-loaded needle which is co-axially moveable in the dispensing tube for opening and closing the dosing nozzle, a trigger for actuating said needle in order to open the dosing nozzle and to dispense the fluid, regulating means for regulating the degree of opening of the outlet of the dosing nozzle and coupling means for coupling a pressurized can to the gun.

**[0002]** Fluid dispensing guns are used for dispensing one or two component polyurethane (PU) foam systems, adhesives, sealants, etc.

**[0003]** A fluid dispensing gun for foams, adhesives and sealants comprising a dispensing tube and a trigger for actuating a gun needle able to open the end of said dispensing tube for dispensing the fluid which may be coupled to a pressurized can is known from EP 1 650 140 A1.

**[0004]** A major drawback of presently available fluid dispensing guns lies in the fact that the output rate cannot be very precisely regulated and controlled.

**[0005]** The object of the present invention is therefore to provide a better regulation and control of the output rate of the fluid dispensing gun.

**[0006]** This object is achieved according to the present invention in that the inside of the dosing nozzle has a first cylindrical area, followed by a first conical area, followed by a second cylindrical area, followed by a second conical area and ends in the outlet of the dosing nozzle with a third cylindrical area.

**[0007]** The invention is based on the fact that in current dispensing guns in which the dosing nozzle has a first cylindrical area, followed by a conical area and ends in the dosing nozzle with a second cylindrical area the ratio between the needle travel and the foam output is insufficient since with a small needle travel the output is highly increased. The new design of the dosing nozzle overcomes this drawback. With this new design of the inner area of the dosing nozzle, it is easier to regulate the output rate of the dispensing gun.

**[0008]** A further embodiment of the invention consists in the fact that means for visual feedback of the current degree of opening of the outlet of the dosing nozzle are provided.

**[0009]** This embodiment concerns the control of the output rate and can be applied independently from the new design of the dosing nozzle, but also be combined with it. In currently available fluid dispensing guns, the user can only consider the degree he has activated the regulating means for regulating the degree of opening of the dosing nozzle in order to have a vague idea of the current output rate. Combined with the fact that in current fluid dispensing guns a small needle travel leads to a high increase of the output rate, the output rate can hardly be adapted to the current needs. With a visual feedback, the user is able to see at any moment how the output rate is regulated.

**[0010]** It is within the scope of the present invention that the means for visual feedback are designed as position indicators which show the current co-axial position of the needle within the dispensing tube.

**[0011]** Since the needle opens and closes the dosing nozzle and defines the output rate, optical means can be coupled to the needle or parts linked to it in order to show the current co-axial position of the needle within the dispensing tube.

**[0012]** In this context, it is possible that the position indicators are in form of a window or a plurality of windows provided in the housing of the gun and the needle or a part linked to it is provided with markers which appear in the windows in function of the co-axial position of the needle within the dispensing tube.

**[0013]** The part linked to the needle can be e.g. the regulating means which is generally in form of a back screw. This back screw can be provided with a slope which appears in the window or the windows provided in the wall of the gun showing the degree of opening of the dosing nozzle. As alternative or complementary embodiment of the present invention, means for acoustic and/or haptic feedback of the current output rate are provided.

**[0014]** In this context, it is possible to have a snap fixed on the needle which provokes a snapping noise at each progression of the needle. This may help users in a dark environment to estimate the current dosing nozzle rate. It is also possible to fix on the needle a protrusion which can be felt at the outside of the gun by the user. In function of the position of the protrusion within a window, the user can estimate the current output rate.

**[0015]** In the following, execution examples of the invention are explained in detail with reference to the figures.

Fig. 1a a comparative representation of a dosing nozzle according to the invention and of a dosing nozzle according to the prior art with 0 mm needle travel,

Fig. 1b the visual feedback for the user corresponding to the position of Fig. 1a,

Fig. 2a a comparative representation of a dosing nozzle according to the invention and of a dosing nozzle according to the prior art with 1 mm needle travel,

Fig. 2b the visual feedback for the user corresponding to the position of Fig. 2a,

Fig. 3a a comparative representation of a dosing nozzle according to the invention and of a dosing nozzle according to the prior art with 2 mm needle travel,

Fig. 3b the visual feedback for the user corresponding to the position of Fig. 3a,

- Fig. 4a a comparative representation of a dosing nozzle according to the invention and of a dosing nozzle according to the prior art with 3 mm needle travel,
- Fig. 4b the visual feedback for the user corresponding to the position of Fig. 4a,
- Fig. 5a a comparative representation of a dosing nozzle according to the invention and of a dosing nozzle according to the prior art with 4 mm needle travel,
- Fig. 5b the visual feedback for the user corresponding to the position of Fig. 5a,
- Fig. 6a an overview of the assembly,
- Fig. 6b a detail view of the rear part of the needle and of the back screw,
- Fig. 7a a perspective view of the back screw and
- Fig. 7b a side view of the back screw.

**[0016]** As shown in Fig. 1a, 2a, 3a, 4a and 5a, the inside of the dosing nozzle (1) according to the present invention (upper view of the figures) has a first cylindrical area (2), followed by a first conical area (3), followed by a second cylindrical area (4), followed by a second conical area (5) and ends in the outlet (6) of the dosing nozzle (1) with a third cylindrical area (7). The dosing nozzle (1) of a current dispensing gun (lower view of the figures) has a first cylindrical area (8), followed by a conical area (9) and ends in the dosing nozzle (6) with a second cylindrical area (10). The design of the needle (11) is unchanged.

**[0017]** Tests have shown that the ratio between the needle travel and the foam output rate is much better with the design of the dosing nozzle (1) according to the present invention because the ratio between the needle travel and the output is less important and more linear. Therefore, it is easier to regulate the output rate of the fluid dispensing gun.

**[0018]** As shown in Fig. 1b, 2b, 3b, 4b and 5b, the current position of the needle defining the output rate is shown by position indicators are in form of a plurality of windows (12) provided in the housing (17) of the gun and the needle or a part linked to it is provided with markers which appear in the windows in function of the co-axial position of the needle within the dispensing tube. The four white windows of Fig. 1b correspond to the closed position, the one black window of Fig. 2b corresponds to low output, the two black windows of Fig. 3b correspond to middle output, the three black windows of Fig. 4b correspond to high output and the four black windows of Fig. 5b correspond to maximum output.

**[0019]** Of course, it is possible to provide more or less windows or to visualize the output rate of the fluid dis-

pensing gun in any other way.

**[0020]** Fig. 6a shows an overview of the assembly and Fig. 6b shows a detail view of the rear part of the needle (11) and of the back screw (14). The needle (11) can be activated by pushing the trigger (13). The needle (11) has a front part (11a) and a rear part (11b) which are coupled together. The needle (11) is loaded by a spring (12) pushing on the rear part (11b) of the needle (11). A back screw (14) is linked to the rear part (11b) of the needle (11) and is provided with a thread (15) cooperating with a corresponding thread (16) of the housing (17) of the gun. Turning the end of the back screw (14) which is outside the housing of the fluid dispensing gun makes the needle travel co-axially within the housing (17) and regulates the degree of opening of the dosing nozzle (1). The lead or pitch on the back screw (14) is 3 mm which means that if the back screw (14) is turned slightly less than 360° (which is the maximum), a needle travel of 3 mm is achieved. Since a needle travel of about 4 mm is required for a satisfying regulation of the fluid output, a slope (19) is provided on the rear part (11b) of the needle (11) as shown in Fig. 6b.

**[0021]** A second slope (18) provided on the back screw (14) gives visual feedback of the current output rate since it appears in the windows (12) of the housing (17) as explained above concerning Figures 1b, 2b, 3b, 4b and 5b. The back screw (14) with the slope (18) at its end is shown in detail in Figures 7a and 7b.

## Claims

1. Fluid dispensing gun comprising a dispensing tube with a dosing nozzle (1), a spring-loaded needle (11) which is co-axially moveable in the dispensing tube for opening and closing the dosing nozzle (1), a trigger (13) for actuating said needle (11) in order to open the dosing nozzle (1) and to dispense the fluid, regulating means (14) for regulating the degree of opening of the outlet (6) of the dosing nozzle (1) and coupling means for coupling a pressurized can to the gun, **characterized in that** the inside of the dosing nozzle (1) has a first cylindrical area (2), followed by a first conical area (3), followed by a second cylindrical area (4), followed by a second conical area (5) and ends in the outlet (6) of the dosing nozzle (1) with a third cylindrical area (7).
2. Fluid dispensing gun according to claim 1, **characterized in that** means for visual feedback of the current degree of opening of the outlet (6) of the dosing nozzle (1) are provided.
3. Fluid dispensing gun according to claim 1 or to claim 2, **characterized in that** the means for visual feedback are designed as position indicators which show the current co-axial position of the needle (11) within the dispensing tube.

4. Fluid dispensing gun according to one of the preceding claims, **characterized in that** the position indicators are in form of a window (12) or a plurality of windows (12) provided in the housing (17) of the gun and the needle (11) or a part linked to it is provided with markers which appear in the windows (12) in function of the co-axial position of the needle (11) within the dispensing tube. 5
5. Fluid dispensing gun according to one of the preceding claims, **characterized in that** means for acoustic and/or haptic feedback of the current dosing nozzle rate are provided. 10

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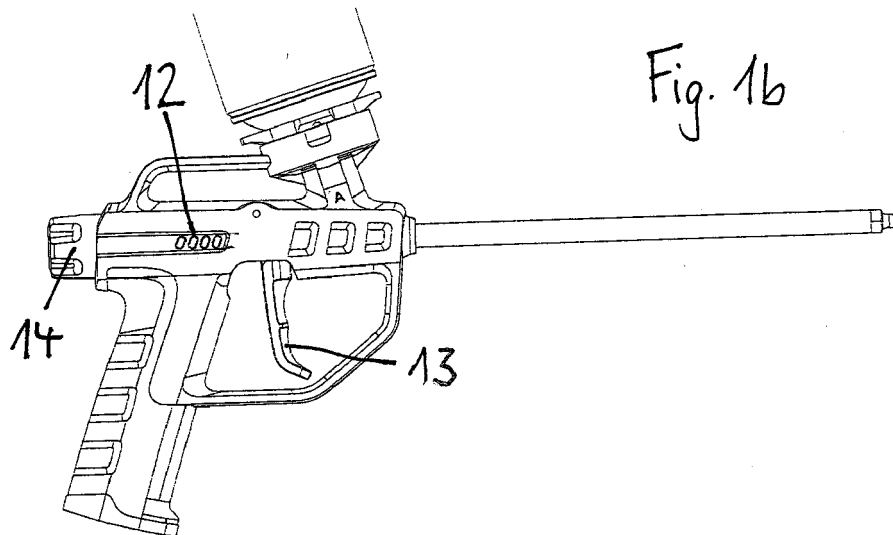
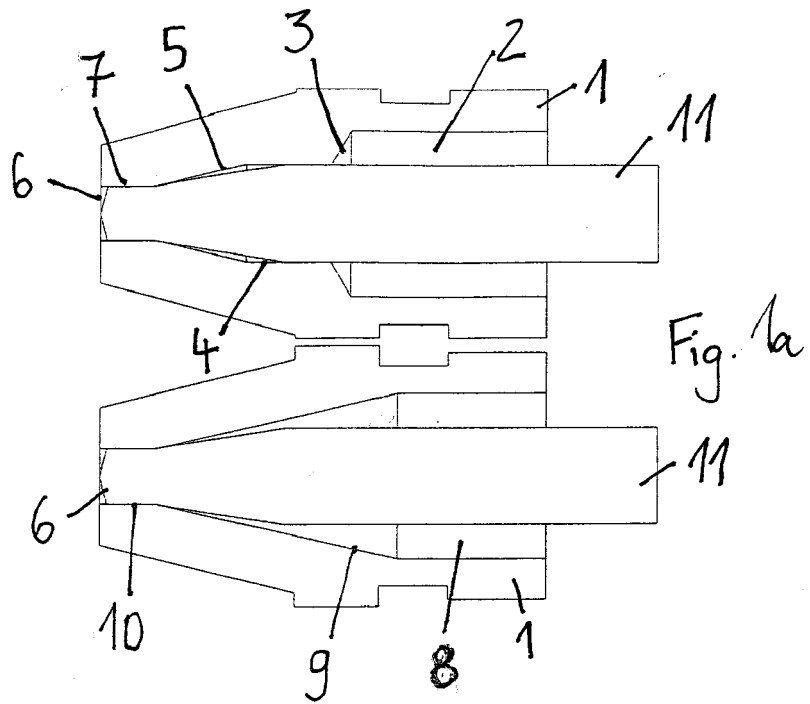
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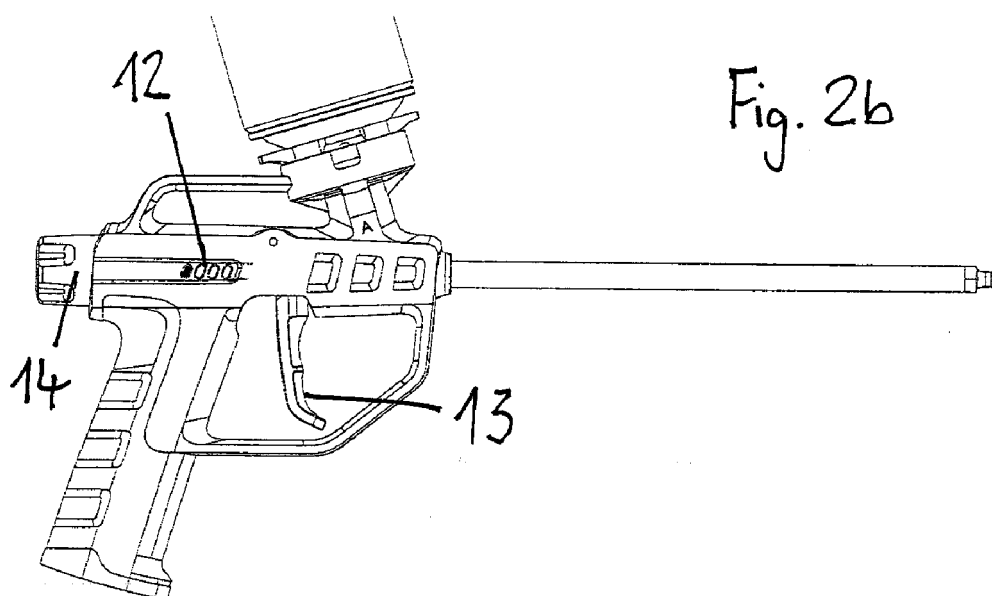
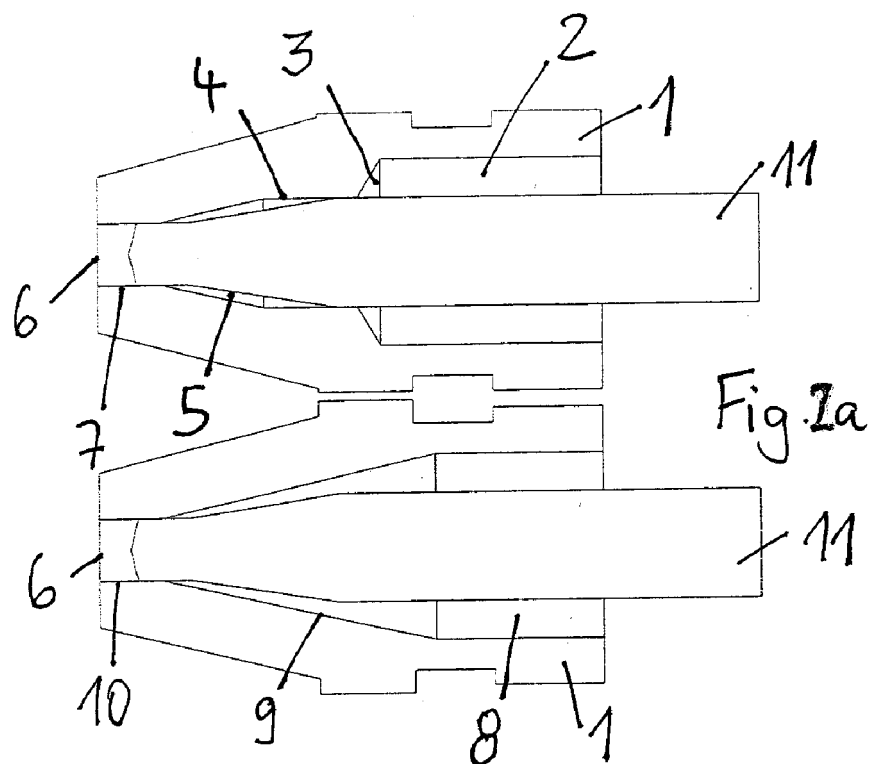
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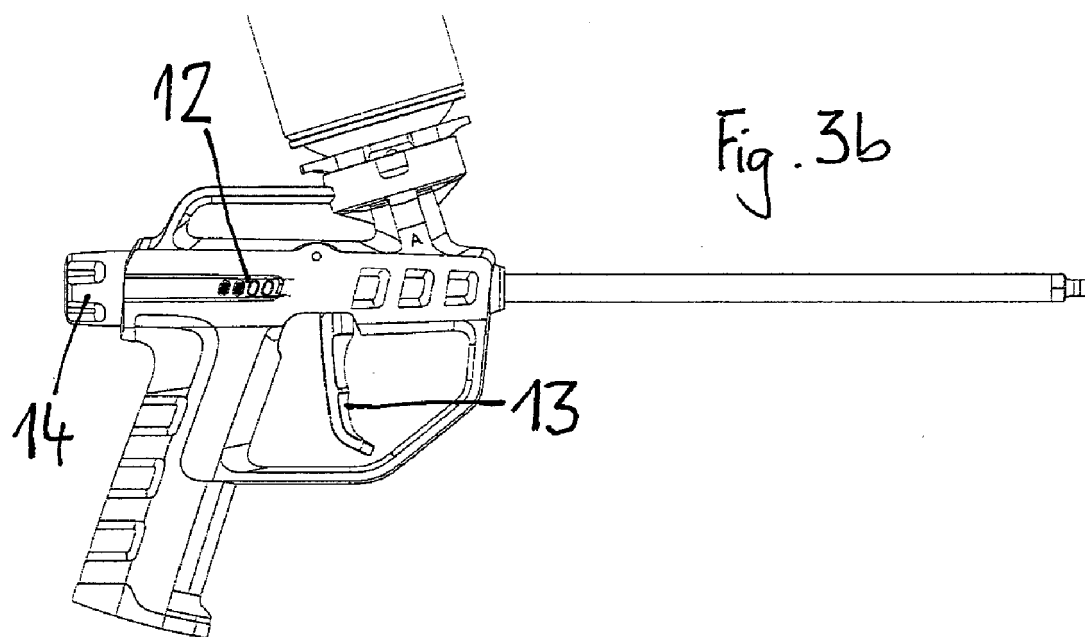
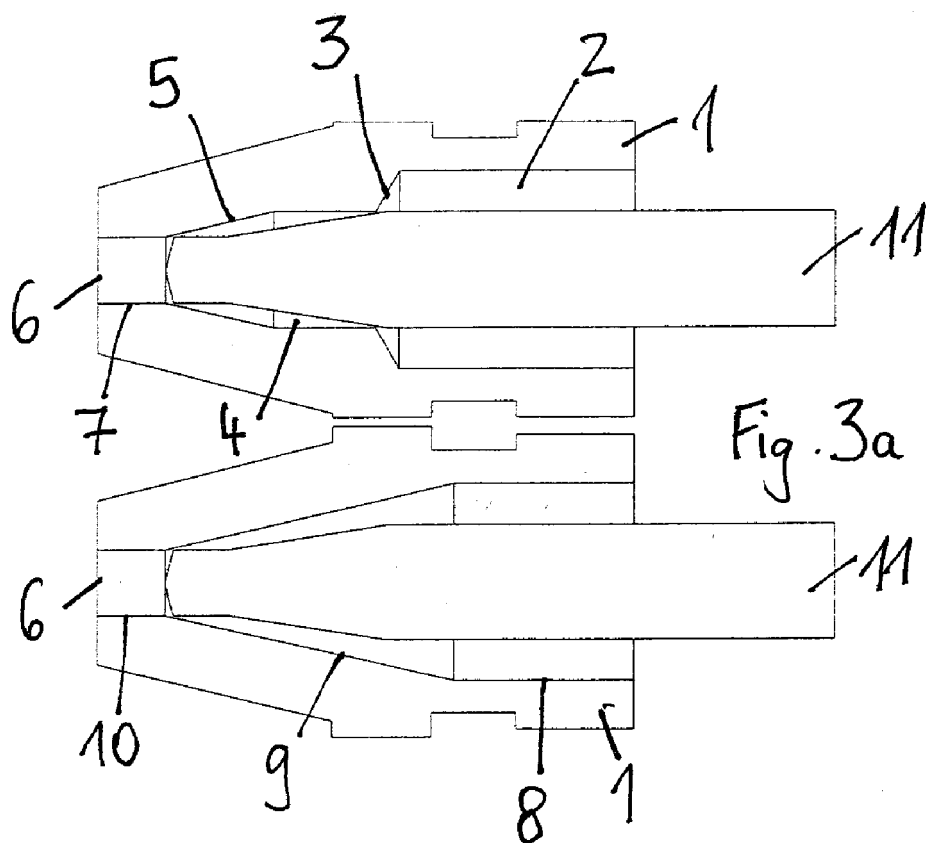
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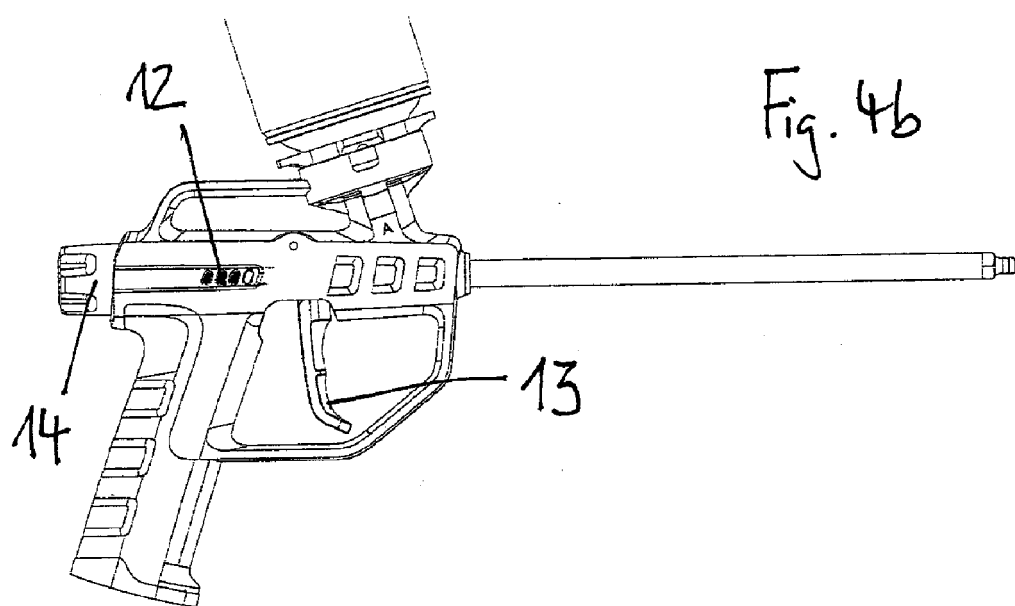
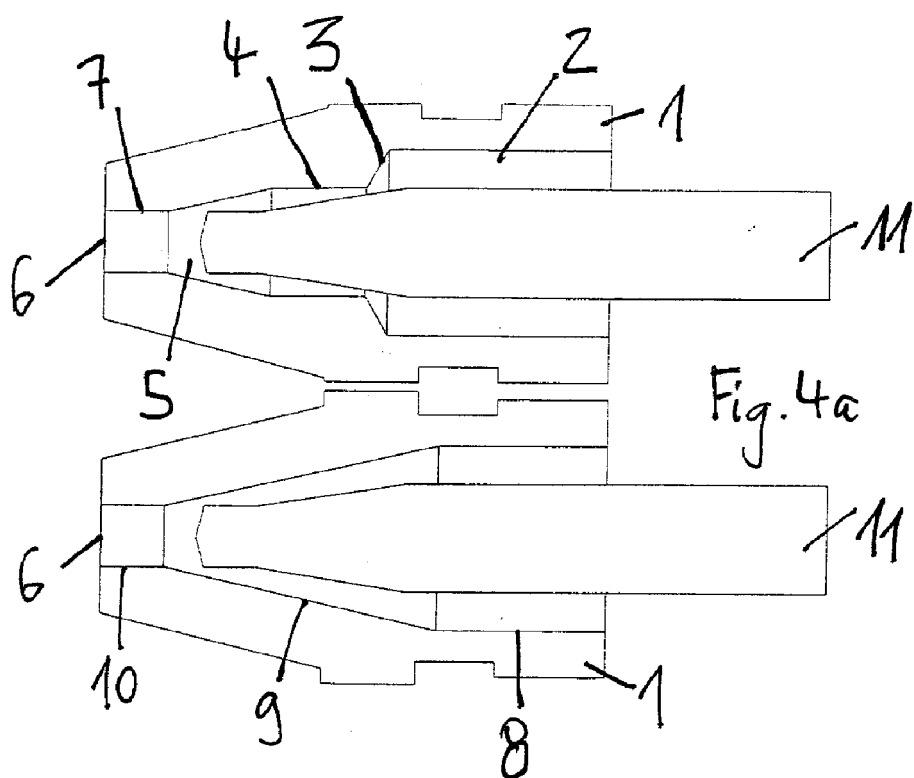
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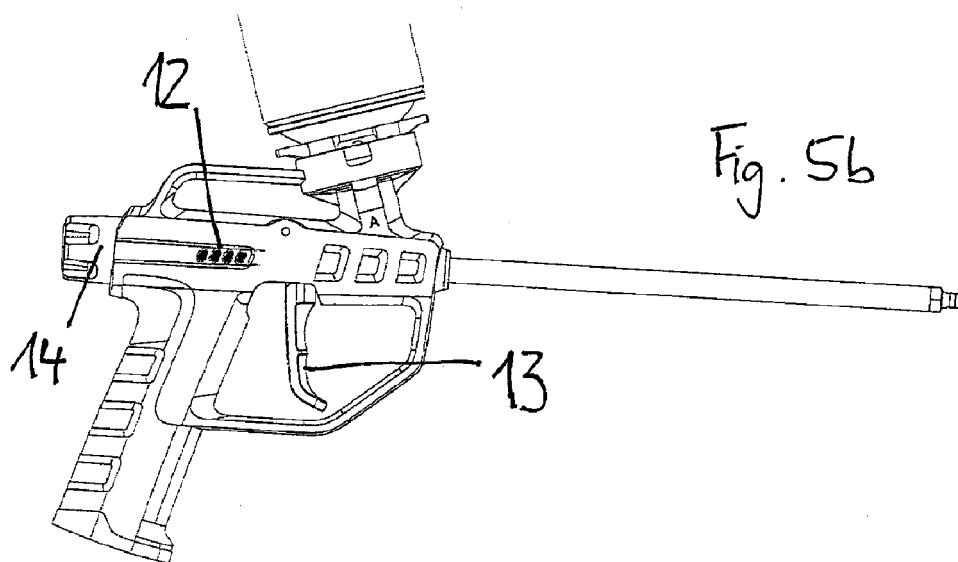
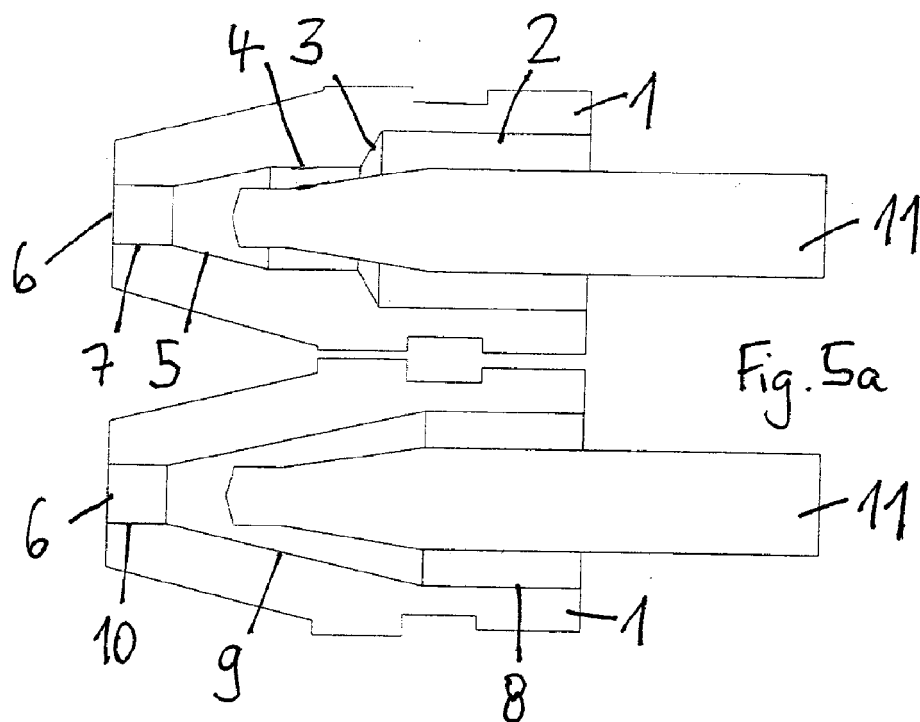


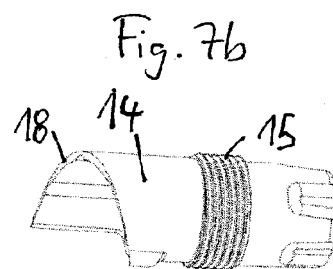
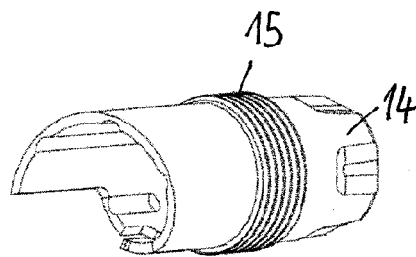
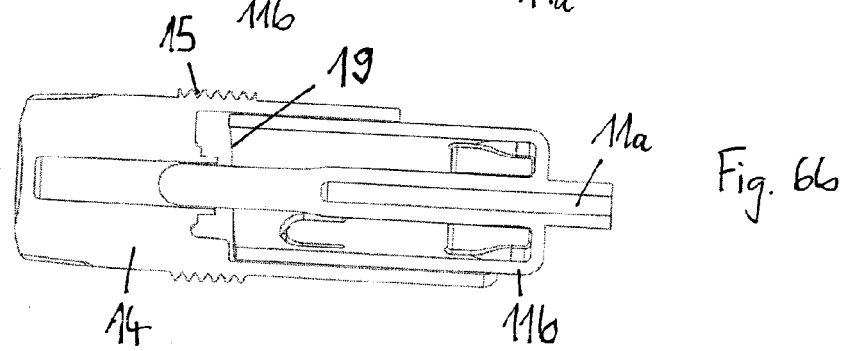
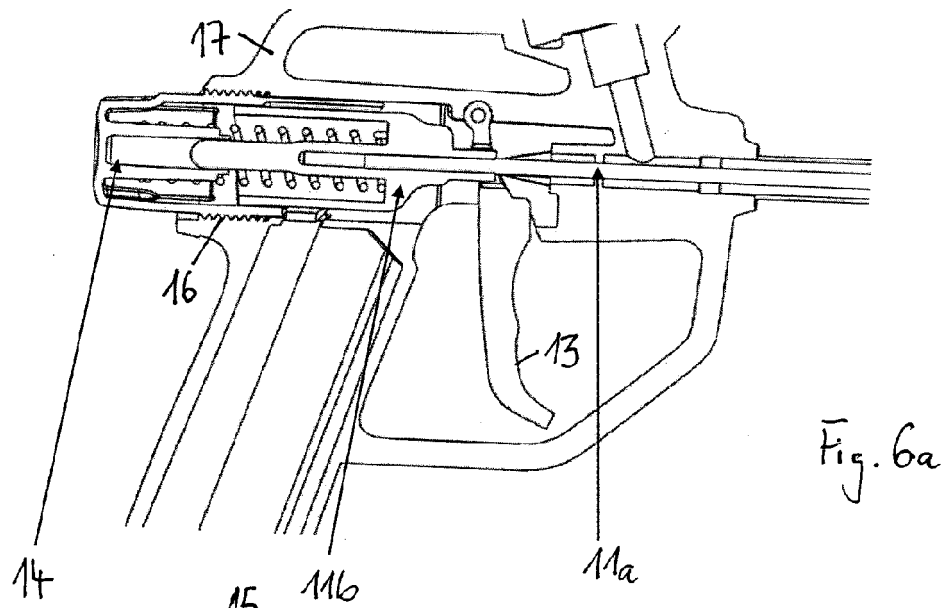














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