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## (54) A surface coating repair gun and assembly kit

(57) A repair gun assembly comprising a body (1) and characterised by, a nozzle (18) attached to the gun body (1), a needle (9) mounted for axial movement in the body (1) and co-operating with the nozzle (18) for opening and closing the nozzle opening, biasing means (12) for biasing the needle (9) in a direction to close the opening of the nozzle (18), a collar (11) on the needle (9) in a position spaced from the tip thereof and a trigger assembly (3) mounted on the body (1) and including a resilient catch member (15) for co-operating with a radially projecting rim (17) of the collar for moving the collar (11) in a direction to open the nozzle opening against the action of the biasing means (12) and being slidable past the rim (17) after a predetermined resistance has been reached to allow the needle (9) to move back in a direction to close the nozzle (18), the nozzle, needle, collar and trigger assembly being configured to cause the gun to fire small jets of paint.

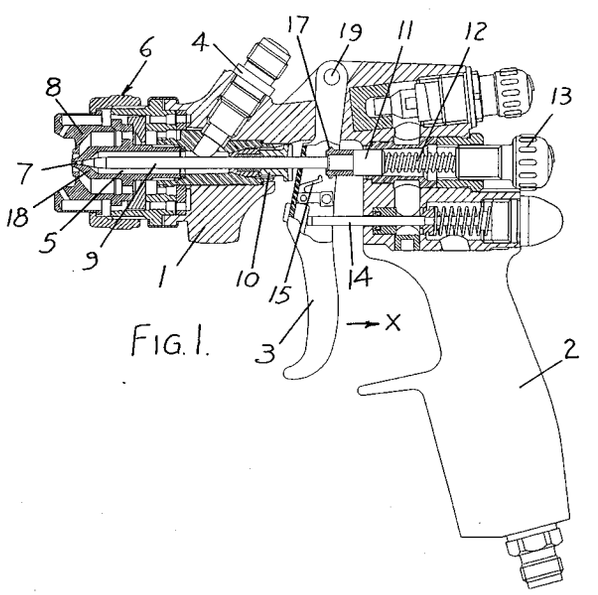


FIG. 1.

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## Description

**[0001]** This invention relates to a surface coating repair gun and to an assembly kit to adapt an existing paint/fluid spray gun.

**[0002]** The current practice to repair coated surfaces, e.g. car body panels damaged by stone chippings, is to use a fine pointed brush to retouch the holes formed, usually on the front of used cars. Although this is effective for a single car owner with a paint matching the car colour, it has the disadvantage that it is time consuming when used in car body repair shops and the paint of the car has to be matched for a wide range of colours.

**[0003]** An aim of the present invention is to provide a repair gun or an assembly kit to adapt an existing paint spray gun to reduce or overcome the above mentioned disadvantage.

**[0004]** According to one aspect of the present invention there is provided a gun kit assembly for converting a standard gun into a repair gun comprising a nozzle for attachment to the gun body in place of the existing nozzle, a needle for replacement of the existing needle and movable axially in cooperation with the nozzle to open and close the nozzle opening, a collar on the needle in a position spaced from the tip thereof and a trigger assembly for replacement of the existing trigger assembly and including a resilient catch member for cooperating with a radially projecting rim of the collar for moving the collar in a direction to open the nozzle opening and being slidable past the rim after opening the nozzle opening to allow the needle to move back in a direction to close the nozzle.

**[0005]** Conveniently, the trigger assembly has an aperture at its upper end to pivot the trigger to a spray gun body.

**[0006]** In a preferred construction the needle collar is adapted for cooperation with an adjustable spring-loaded pin provided in the existing gun body for biasing the needle in a direction to close the opening of the nozzle.

**[0007]** According to a second aspect of the invention there is provided a repair gun assembly comprising a body, a nozzle attached to the gun body; a needle mounted for axial movement in the body and cooperating with the nozzle for opening and closing the nozzle opening, biasing means for biasing the needle in a direction to close the opening of the nozzle, a collar on the needle in a position spaced from the tip thereof and a trigger assembly mounted on the body and including a resilient catch member for cooperating with a radially projecting rim of the collar for moving the collar in a direction to open the nozzle opening against the action of the biasing means and being slidable past the rim after a predetermined resistance has been reached to allow the needle to move back in a direction to close the nozzle.

**[0008]** An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is an axial cross-section of a repair gun fitted with an assembly kit, according to the present invention;

Figure 2 is a similar view to Figure 1, showing the trigger assembly and firing needle in a first cocking position;

Figure 3 is a similar view to Figure 2, showing the trigger assembly and firing needle in a second cocking position; and

Figure 4 is a similar view to Figure 3, showing the trigger assembly and firing needle in the fully cocked position.

**[0009]** The repair gun illustrated in Figure 1 is a standard paint spray gun adapted with an assembly kit to convert it to a repair gun to fire (apply) small jets of paint to holes in a surface coating.

**[0010]** The gun comprises a body 1, a handle 2, a trigger 3 and an inlet 4 for receiving a gravity fed paint cup (not shown) which feeds paint to a chamber 5. The nozzle end 6 of the gun has a central jet aperture 7 surrounded by a cap 8, which jet is metered by a needle 9. The needle passes through a conventional packing seal 10 to seal the chamber 5 from the outside while allowing axial movement of the needle 9.

**[0011]** The rear end of the needle has a collar 11 which engages a spring-loaded plunger 12, the tension of which is adjustable by a knob 13. The axial movement of the needle 9 is made by the trigger 3 which is tensioned by an adjustable spring-loaded rod 14. The trigger has riveted thereto a resilient catch 15 the free end of which engages a radially projecting rim 17 of the collar 11.

**[0012]** With reference now to Figures 2 to 4, where like parts have the same reference numerals as in Figure 1, Figure 2 shows the repair gun with the trigger 3 and firing needle 9 in a first position with the catch 15 engaging the front of collar 11. The pressure on the trigger is against an adjustable spring-loaded rod 14. When further pressure is applied to the trigger, the catch 15 is located behind a rim 17 of the collar 11 retracting the tip of the needle 9 from a seating in the nozzle 18 as shown in Figure 3, allowing paint from the gravity cup to fill the chamber 5 and pass the needle tip into nozzle 18. Further pressure on the trigger releases the collar and fires the needle forward, ejecting a measured amount of paint in front of the needle tip to be deposited in the chipped hole in the surface coating.

**[0013]** The axial speed of movement of the needle can be adjusted to retract the needle tip from its seating, metering the amount of paint which seeps past the needle on operation of the trigger to be ejected from the gun nozzle.

**[0014]** In operation a gravity feed paint cup is filled with the required quantity of paint to match the coated surface to be repaired. The nozzle end of the gun is pointed with the nozzle spaced e.g. 0.118 inches (3mm) to 2 inches (50mm) from the chipped surface and the

paint fills the chamber behind the nozzle. By pulling on the trigger in the direction of arrow X, the trigger pivots about pin 19 bringing the catch 15 into contact with the collar 11 retracting the needle tip from its seating in the nozzle.

**[0015]** When the tension on the needle spring reaches a level greater than the threshold of the catch, the catch deflects over the rim 16 of collar 11 allowing the needle to return on its spring. This causes paint which has passed from the chamber into the nozzle in front of the retracted needle tip to be ejected from the nozzle forming a metered spot of paint to repair the chipped surface.

**[0016]** The amount of ejected paint can be controlled by means of the needle adjustment knob 13 which is standard on all spray guns. This adjustment has the effect of increasing or decreasing the tension in the needle spring, changing the point in the firing cycle at which the threshold of the catch will release the amount of paint flowing into the chamber. The lower the spring tension, the later in the firing cycle the catch is released allowing more paint to enter the chamber.

**[0017]** On release of the trigger it returns to its starting position by the spring-loaded plunger 12 which replaces the standard air valve used in existing spray guns. The repair gun uses a mechanical action and paint is "fired" into the chipped blemish on the surface, requiring only limited finishing once dry. As the gun does not need any air supply, application can be carried out anywhere in the body workshop prior to the final finishing of the surface. The repair gun is suitable for use with both waterborne and solvent based materials. To adapt a standard FLG (Finishline Gun) spray gun to a repair gun of the present invention, the invention extends to an assembly kit comprising:

(i) a stainless steel nozzle
(ii) a needle
(iii) a trigger assembly
(iv) a catch
(v) a trigger return stem
(vi) a needle collar.
(vii) a strong needle spring

**[0018]** The trigger assembly and catch replace the conventional trigger assembly and are permanently assembled as part of the gun, while the needle collar is fitted to the needle during assembly of the gun.

**[0019]** The stainless steel nozzle is fitted to suit the needle while the trigger return stem and spring are part of the conventional gun.

**[0020]** The repair gun is prepared for use as follows:

**[0021]** The paint is mixed to the required shade using a combination of base colours, clear coats, thinners and/or activators.

**[0022]** The trigger is adjusted by pulling on the trigger and adjusting the needle screw knob until the catch is released every time the trigger is pulled, so that a "click" is heard. As soon as the "click" is heard the trigger is released automatically returning to its stationary position.

**[0023]** The actuation of the trigger needs to be performed quickly to deposit the metered quantity of paint on the chipped blemish to be repaired. This trigger action does not require the trigger to be pulled fully back and held in the retracted position.

**[0024]** The mixed paint is poured into the paint cup and the lid is fitted. The trigger is pulled to prime the gun releasing paint into the chamber behind the needle point. The gun is held approximately 0.118 inches (3mm) to 2 inches (50mm) from a test piece and the trigger is actuated observing the amount of paint fired from the nozzle. If the metered amount of paint is too large, the needle adjustment knob is screwed clockwise and the test repeated. To increase the amount of paint deposited, the needle adjustment knob is rotated counterclockwise.

## Claims

1. A repair gun assembly comprising a body (1) and **characterised by**, a nozzle (18) attached to the gun body (1), a needle (9) mounted for axial movement in the body (1) and co-operating with the nozzle (18) for opening and closing the nozzle opening, biasing means (12) for biasing the needle (9) in a direction to close the opening of the nozzle (18), a collar (11) on the needle (9) in a position spaced from the tip thereof and a trigger assembly (3) mounted on the body (1) and including a resilient catch member (15) for co-operating with a radially projecting rim (17) of the collar for moving the collar (11) in a direction to open the nozzle opening against the action of the biasing means (12) and being slidable past the rim (17) after a predetermined resistance has been reached to allow the needle (9) to move back in a direction to close the nozzle (18), the nozzle, needle, collar and trigger assembly being configured to cause the gun to fire small jets of paint.

2. An assembly as claimed in claim 1, **characterised in that** the resilient catch (15) is attached to the trigger assembly (3) on the opposite side of the trigger assembly (3) to the nozzle (18).

3. An assembly as claimed in any preceding claim, **characterised in that** the catch (15) is resilient in a direction generally radial to the longitudinal axis of the needle (9).

4. An assembly as claimed in any preceding claim, **characterised in that** nozzle (18) has a chamber (5) located around the needle (9) for receiving material to be sprayed.

**5.** An assembly as claimed in claim 4, **characterised in that** the nozzle (18) has a passageway in front of the needle (9) for receiving the material to be sprayed from the chamber (5) when the needle (9) moves in a direction to open the nozzle opening.

**6.** An assembly as claimed in claim 5, **characterised in that** needle (9) is adapted to co-operate with the passageway to expel the material in the passageway during movement of the needle (9) to close the nozzle opening.

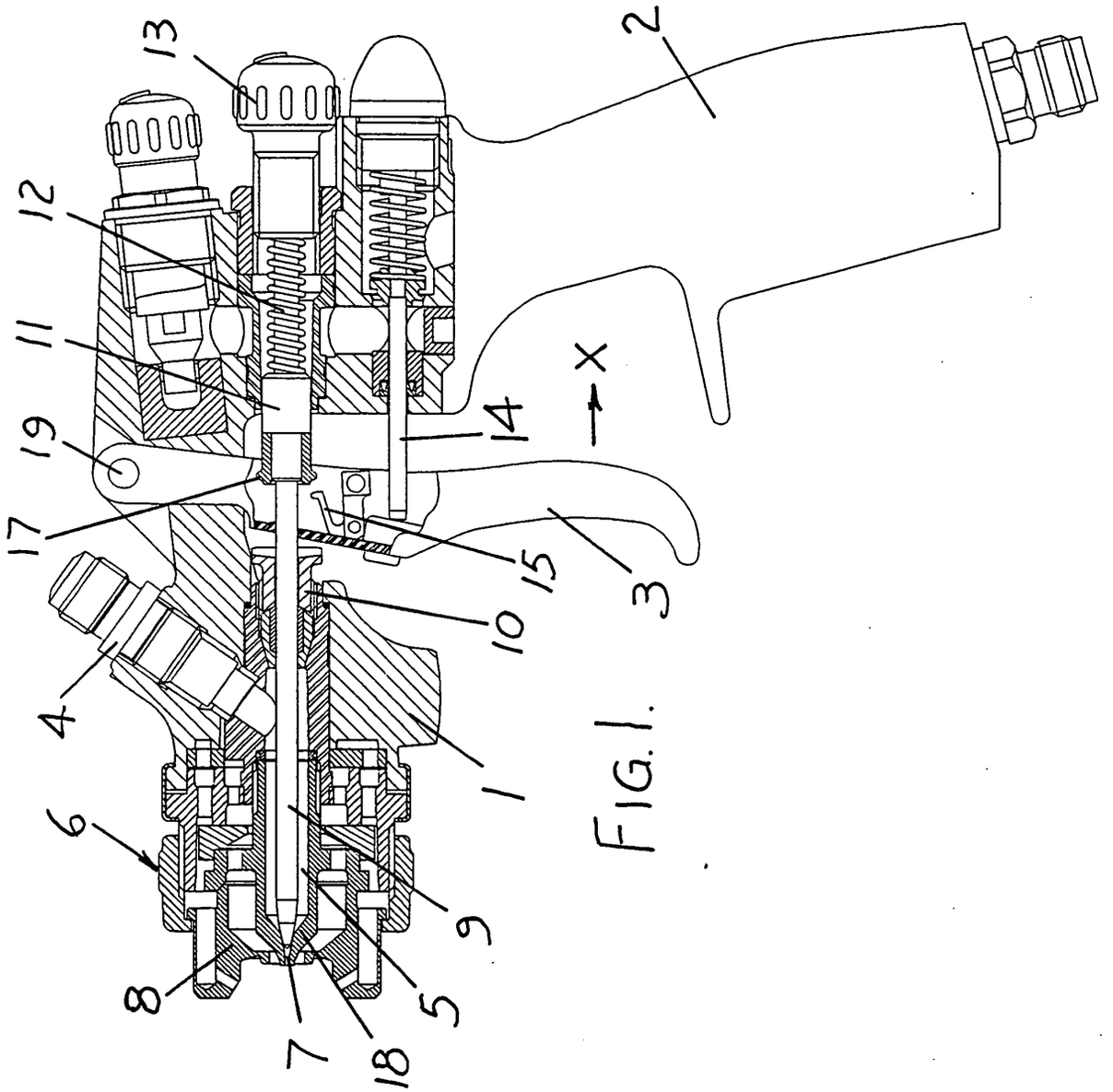


FIG. 1.

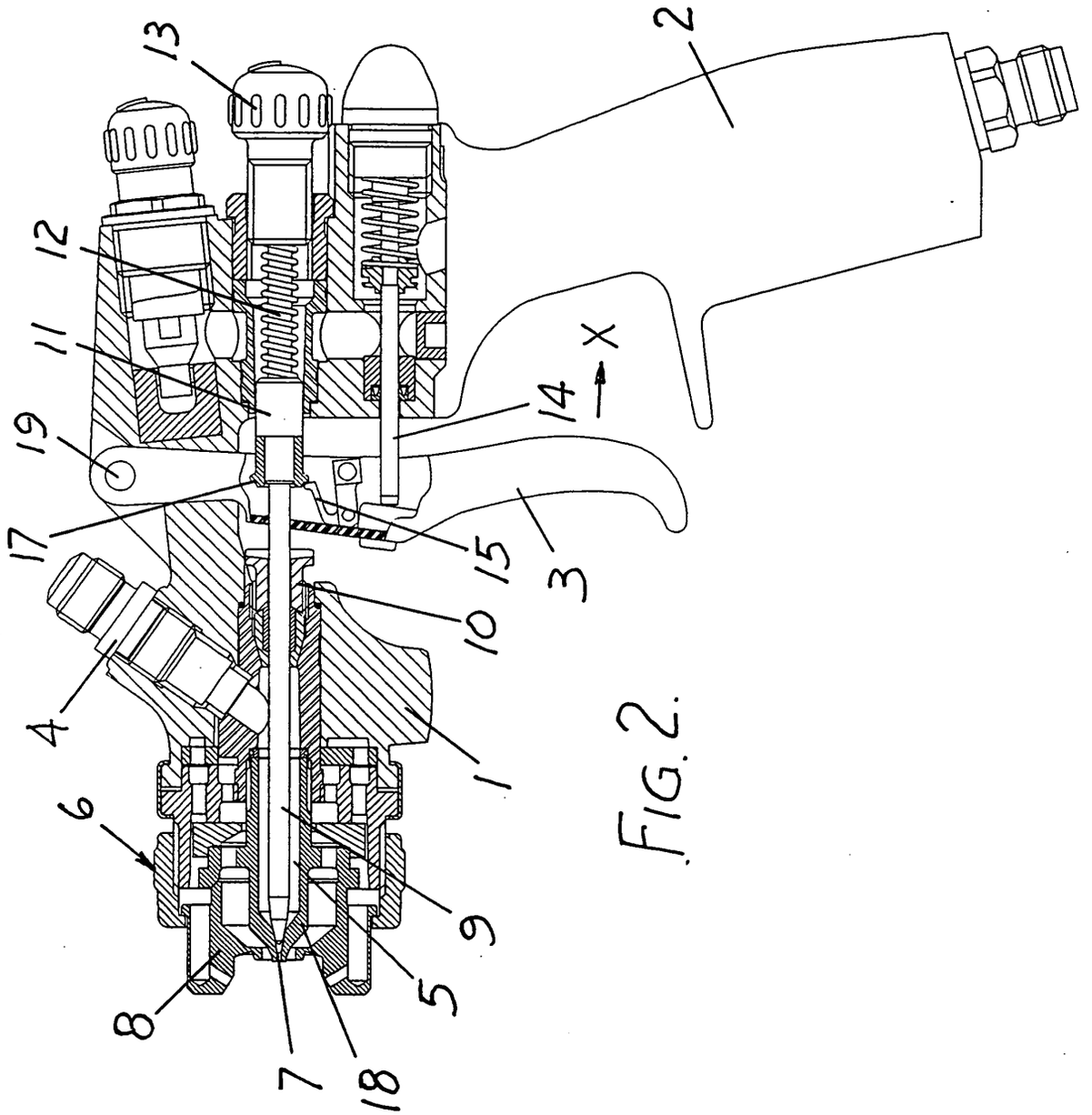


FIG. 2.

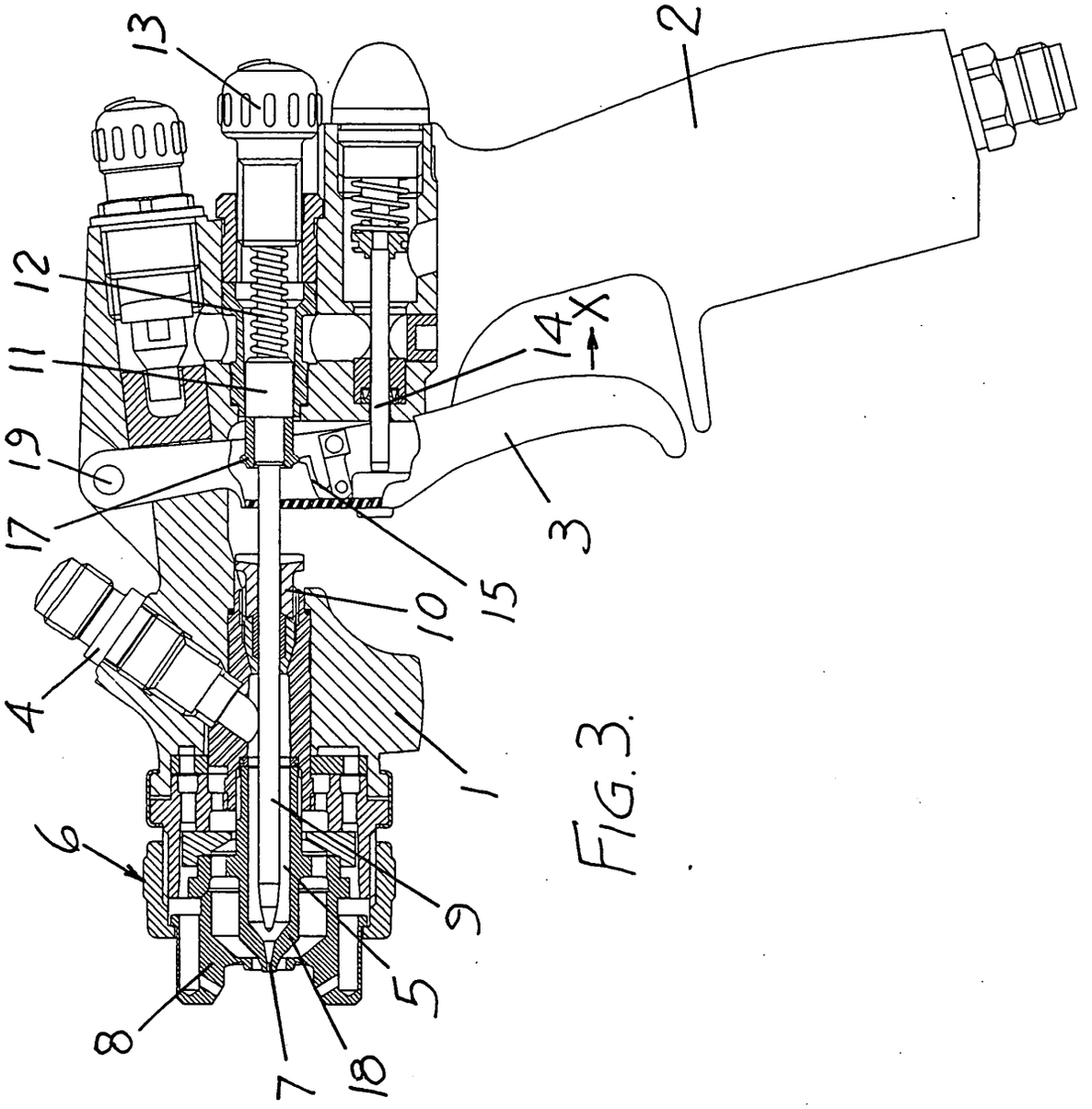


FIG. 3.

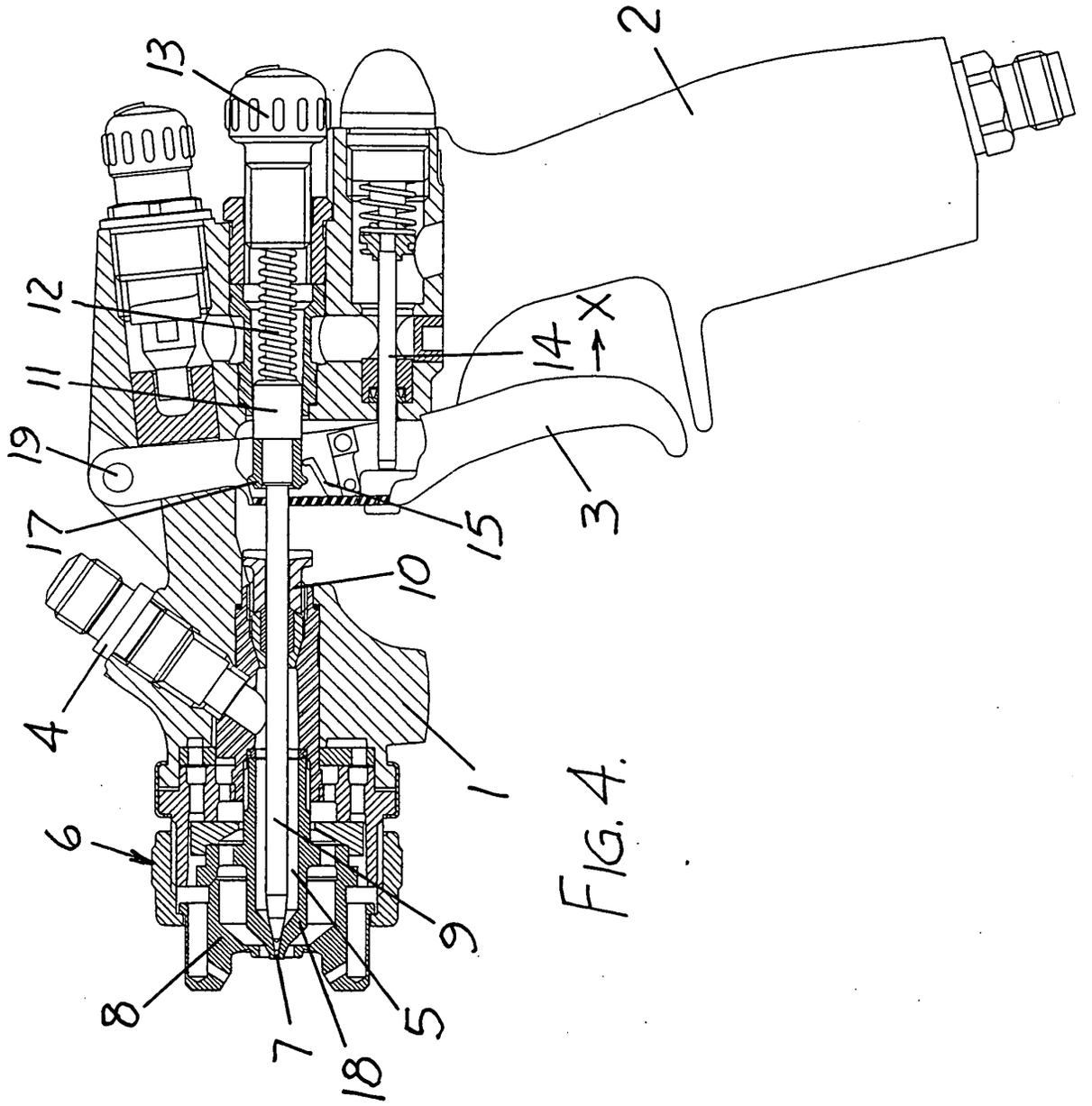


FIG. 4.