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(54) **Nozzle for spray guns**

(57) The invention relates to a nozzle for spray guns, defining a central chamber (7) and a peripheral chamber (8), the central chamber of which has a central opening (9) and a series of central air exit holes (10) and the peripheral chamber of which has a series of peripheral air exit holes (11). The nozzle further comprises means (16-18) for controlling the pressure of the air reaching the central exit holes (10) and peripheral exit holes (11), determining contractions (15-22) of the air passage section in the peripheral and central chambers.

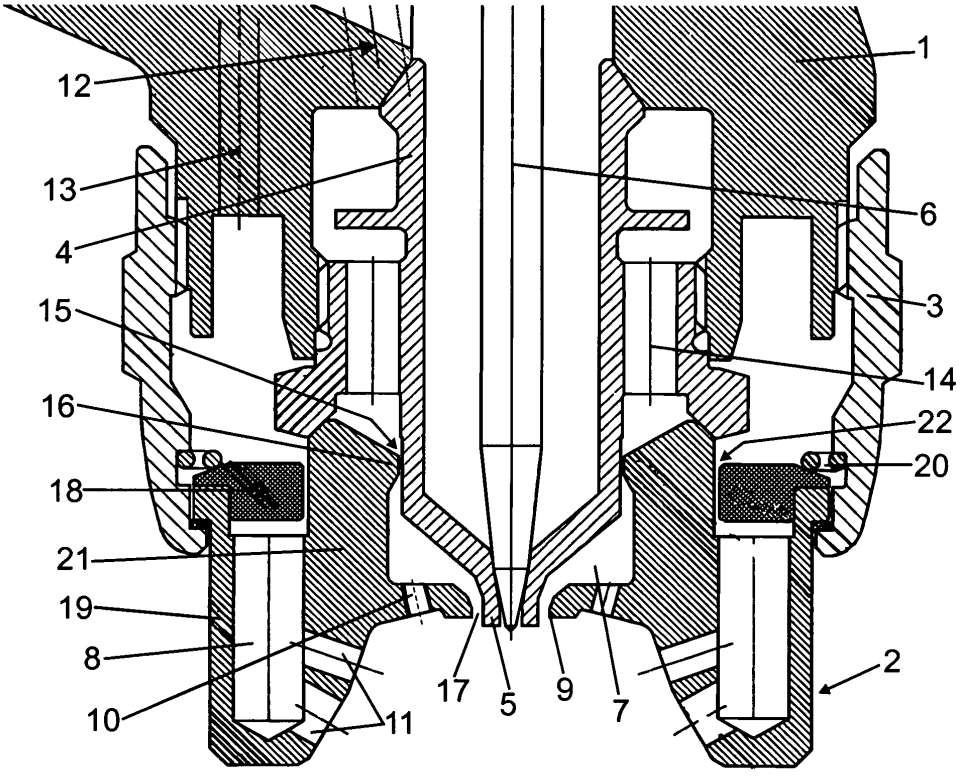

FIG. 1

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Description

Field of the Invention

[0001] The present invention relates to a nozzle for spray guns, especially designed for applying fluids, such as paints and the like.

[0002] More specifically, the nozzle of the invention is of the type defining two chambers: a central chamber and a peripheral chamber. The central chamber has a central opening, through which there emerges the outlet of the chamber for supplying the fluid to be sprayed, and a series of central holes for the exit of pressurized air supplied by the gun. The peripheral chamber has a series of peripheral holes, also for the exit of pressurized air supplied by the gun. The pressurized air coming out through the central and peripheral holes causes the spraying and projection of the paint or liquid to be sprayed.

Background of the Invention

[0003] The pressurized air coming out through the central and peripheral holes of the nozzle must be useful for achieving a suitable spraying and projection of the fluid to be sprayed. Depending on the characteristics of this fluid and the specific application thereof, it will be necessary to change the conditions of the pressurized air, both the exit pressure and the direction thereof. This circumstance makes it necessary to have different guns, each one suitable to provide air at the suitable pressure and with the suitable direction to achieve the desired spraying and projection. This solution is expensive because it forces having as many different spray guns as the different applications that can exist.

Description of the Invention

[0004] The object of the present invention is to eliminate the problem set forth by means of a nozzle formed such that it defines the exit conditions of the air, regardless of the features of the gun to which the nozzle is applied.

[0005] Different exit conditions of the pressurized air can thus be achieved by having nozzles with different features, therefore, different conditions of pressurized air supplied by the nozzle can be achieved with a single gun by simply changing the type of nozzle assembled in the gun.

[0006] To that end, according to the present invention, the nozzle comprises means for controlling the pressure of the air reaching the central and peripheral exit holes, as well as for controlling the air exit direction. The means for controlling the pressure of the air consist of contractions of the air passage section located in the peripheral and central chambers. The means for directing the exit of the air consist of changing the inclination of the central and peripheral air exit holes.

[0007] The contraction in the passage section of the peripheral chamber is caused in the nozzle of the invention by a washer which is arranged between the walls of the peripheral chamber of the nozzle, being supported on the edge of the outer wall and defining with the inner wall a narrow ring-shaped passageway making the air flow laminar so that it reaches in a completely guided manner the area from which the peripheral exit holes start, which holes will be suitably positioned both in dimensions and in heights and angles. The mentioned washer is retained by a ring-shaped spring which is assembled between said washer and the nut for assembling the nozzle in the gun.

[0008] The contraction in the passage section of the central chamber is achieved by means of a ring-shaped rib of the inner surface of the wall of the central chamber, the rib of which is opposite to the wall of chamber for supplying the pressurized fluid, running in a centered position through the gun to the nozzle, in order to the emerge through the central hole thereof. The rib determines with the chamber for conducting the fluid to be sprayed a ring-shaped passageway with a section much smaller than that of said chamber. The mentioned ring-shaped passageway makes the air flow laminar and allows the passage of a certain amount of such air, finally reaching the area from which the central holes start for its exit therethrough as well as also through the ring-shaped passageway defined by the central opening with the outlet of the chamber for supplying the fluid to be sprayed.

[0009] In short, by means of the contractions caused in the two chambers, it is achieved that the air reaching the areas from which the central and peripheral holes start does so at the suitable pressure, coming out through both holes in a correctly conducted manner as a result of the inclination of such holes, which will depend in each nozzle on the fluid to be sprayed for which it is intended.

[0010] A suitable air exit or spraying is achieved with the nozzle of the invention as a correct distribution of compressed air is ensured in the areas from which the central and peripheral holes start, all of this as a result of the mentioned contractions, by means of which each of the mentioned areas receives an exact amount of air and at a certain pressure which, in addition to a correctly selected inclination of the central and peripheral air exit holes, allows very accurately distributing the amount of air that each spray nozzle needs and in the correct ratio.

[0011] In short, correct control of the air flow rate and pressure, an improvement in the finishing of the sprayed fluids is achieved with the nozzle of the invention, and all of this as a result of the fact that each air nozzle incorporates the necessary elements for its correct operation.

[0012] The nozzle of the invention can furthermore be easily assembled and disassembled and also allows easily cleaning the assembly.

[0013] The air fluids can be better distributed and made laminar as a result of the mentioned contractions.

Brief Description of the Drawings

[0014] The attached drawings show a nozzle for spray guns formed according to the invention, and aid in better understating the makeup, features and advantages of the nozzle.

[0015] In the drawings:

Figure 1 is a diametrical section of a nozzle formed according to the invention, assembled in a spray gun.

Figure 2 is a diametrical section of the nozzle, showing the air exit direction through the central and peripheral holes.

Figure 3 is a lower plan view of the nozzle.

Figures 4, 5 and 6 are views similar to Figure 2, showing implementation variants in relation to the section and inclination of the central and peripheral air exit holes.

Detailed Description of a Preferred Embodiment

[0016] Figure 1 partially shows the body of a spray gun, in which the nozzle 2 of the invention is coupled by means of nut 3. The chamber 4 for supplying the fluid to be sprayed runs through the inside of the body of the gun 1, which chamber has an outlet 5 which can be blocked by means of the needle 6 which can be actuated by the gun.

[0017] Once the nozzle 2 has been assembled in the gun 1, it defines a central chamber 7 and a peripheral chamber 8.

[0018] The central chamber 7 has a central opening 9 through which there emerges the outlet 5 of the chamber 4 for supplying the fluid to be sprayed. The central chamber 7 also has a series of central holes 10 for the exit of pressurized air.

[0019] The peripheral chamber 8 in turn has a series of peripheral holes 11, also for the exit of pressurized air.

[0020] The pressurized air is supplied by the gun 1 through two groups of ducts 12 and 13. The pressurized air reaches the central chamber 7 through ducts 12 and passageways 14, passing through a ring-shaped contraction 15 defined between the wall of the chamber 4 and a rib 16 projecting from the inner wall of the nozzle 2. The passageway 15 makes the air flow laminar and allows the passage of a certain amount of such air. The air reaches the central chamber 7 in these conditions, where it is distributed and will come out through the holes 10 and through the ring-shaped section 17 confined between the central opening 9 of the nozzle and the outlet 5 of the chamber 4 for conducting the fluid to be sprayed.

[0021] Before the peripheral chamber 8, the nozzle 2 includes a washer 18 which is supported against the edge of the outer wall 19 of the nozzle 2 and is retained by means of a ring-shaped spring 20 assembled between said washer and the lock nut 3 of the nozzle. The washer 18 determines with the inner wall 21 of the nozzle 2 a ring-shaped passageway 22 forming a contraction for the passage of the air, making its flow laminar so that it reaches in a completely guided manner the peripheral chamber 8 and then the peripheral exit holes 11.

[0022] A correct distribution of the compressed air is achieved by means of ring-shaped contractions 15 and 22, so that the necessary amount of air reaches each central chamber 7 and peripheral chamber 8 at the suitable pressure. By combining these conditions with a correct inclination of the central holes 10 and peripheral holes 11, the amount of air that each spray nozzle needs is very accurately distributed and is in the correct ratio and direction to achieve a perfect spraying of the fluid contained in chamber 4, supplied through outlet 5, when the needle 6 is retracted by the actuation controls of the gun 1.

[0023] The contractions 15 and 22 allow a suitable control of the correct air flow rate and pressure for each nozzle.

[0024] Figure 3 shows in a lower plan view of the nozzle the position of the central holes 10 and peripheral holes 11, as well as the ring-shaped passageway 17 confined between the central opening 9 and the outlet 5 of the chamber for supplying the fluid to be distributed.

[0025] Figure 2 shows the exit direction of air jets 24 through central holes 10, and of air jets 25 through exit holes 11. Another distribution, such as that shown in Figures 4, 5 and 6, can be achieved by changing the section, position and inclination of these holes. In Figure 4 air jets 25 define a closer angle than in the case of Figure 2, whereas jets 24 have considerably parallel exit directions. In the case of Figure 5, jets 25 meet at one and the same vertex 26, whereas jets 24 have considerably parallel directions.

[0026] In the case of Figure 6 there is a larger number of central holes 10, the jets 24 of which converge slightly with one another, whereas air jets 25 cross one another near the corresponding vertices.

[0027] With the described constitution, by means of a single gun having different nozzles, different spraying conditions suitable for the substance to be sprayed can be obtained, which involves considerable savings given that the cost of the nozzles is extremely reduced compared to that of the gun assembly.

Claims

1. A nozzle for spray guns, defining a central chamber and a peripheral chamber, the central chamber of which has a central opening, through which there emerges the outlet of the chamber for supplying the fluid to be sprayed, and a series of central air exit holes, and the peripheral chamber of which has a series of peripheral air exit holes, **characterized in that** it comprises means for controlling the pressure of the air reaching the central and peripheral exit holes; which means consist of contractions of the air passage section located in the peripheral and central

chambers.

2. A nozzle according to claim 1, **characterized in that** the contraction in the passage section of the peripheral chamber is caused by a washer which is arranged between inner and outer walls delimiting the peripheral chamber of the nozzle, being supported on the edge of the outer wall and defining with the inner wall a narrow ring-shaped passageway, which washer is retained by a ring-shaped spring assembled between said washer and the nut for assembling the gun.

3. A nozzle according to claim 1, **characterized in that** the contraction in the passage section of the central chamber is caused by a ring-shaped rib of the inner surface of the inner wall of the nozzle delimiting the central chamber, which rib is opposite to the wall of the chamber for supplying the product to be sprayed, determining therewith a ring-shaped passageway with a section much smaller than that of said chamber.

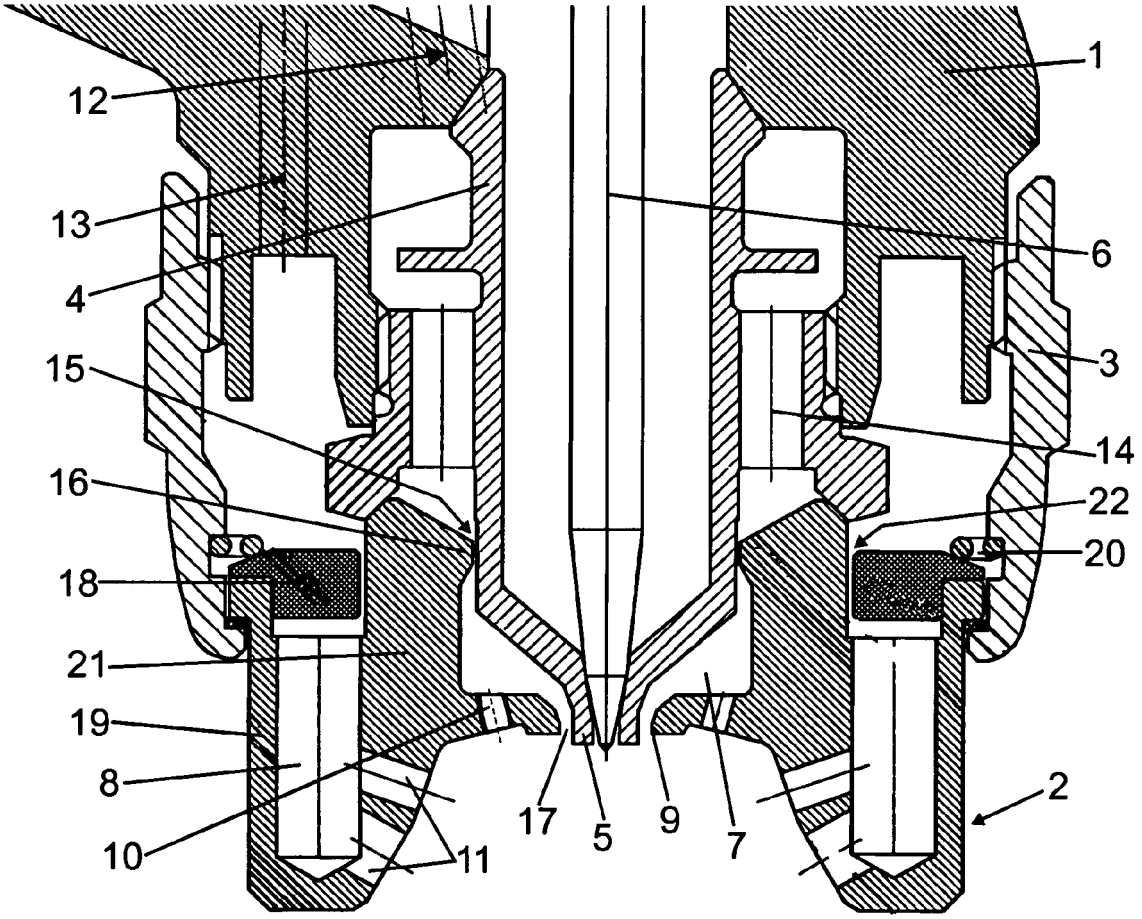


FIG. 1

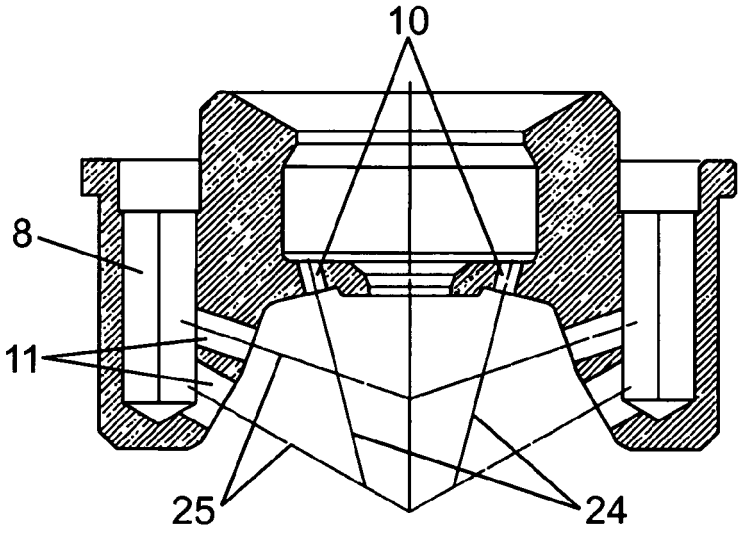


FIG. 2

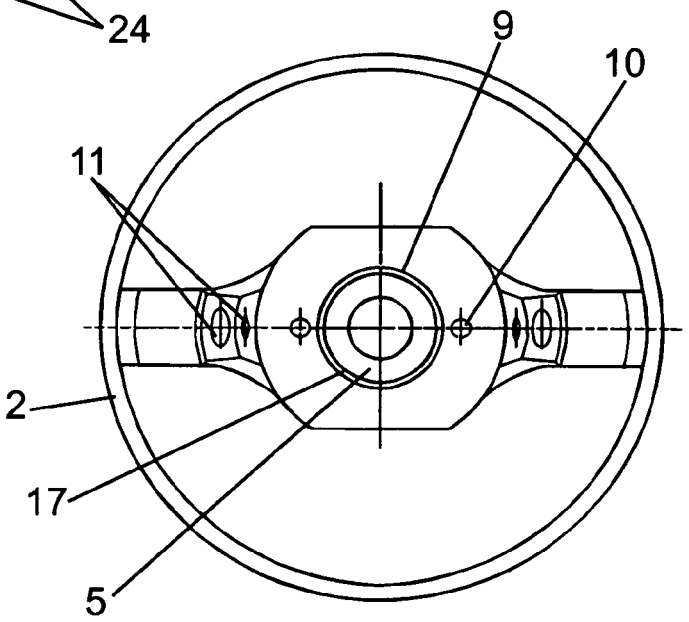


FIG. 3

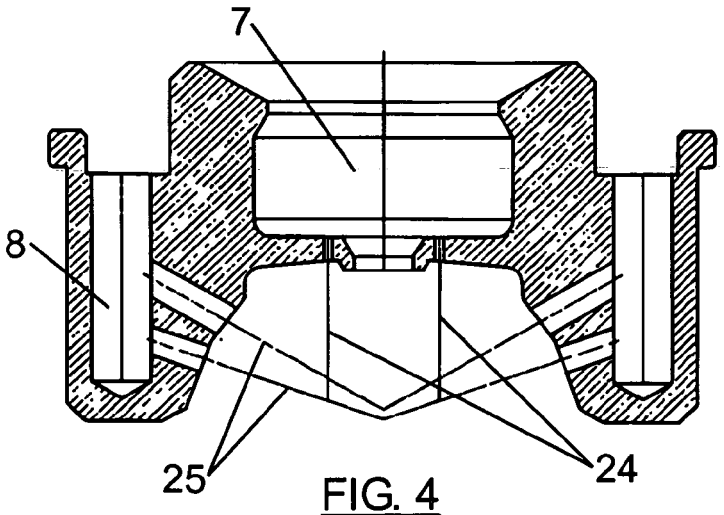
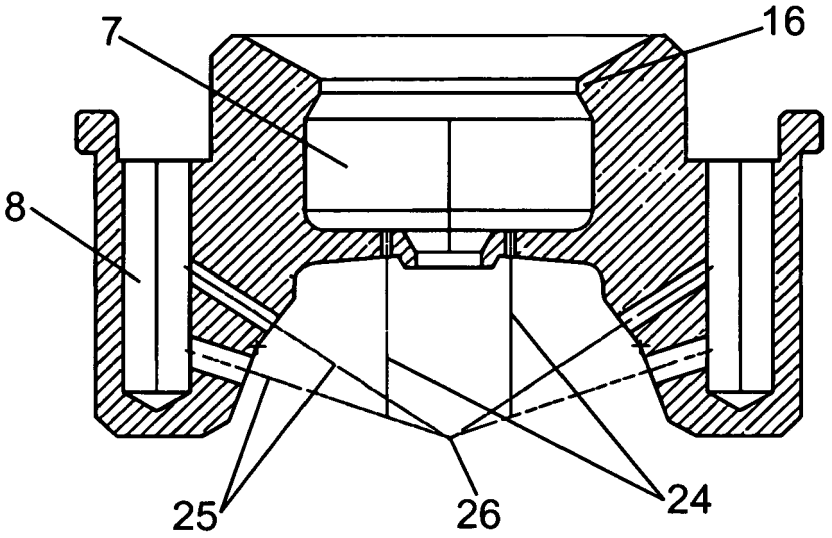


FIG. 4

FIG. 5



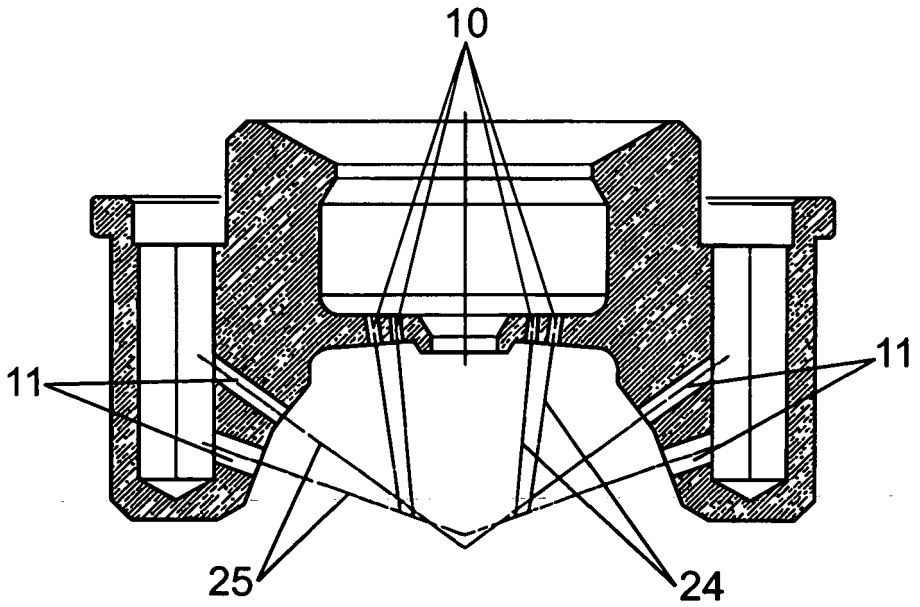


FIG. 6