Feb. 9, 1960 F. R. VON RÜLING 2,924,392

HOT SPRAY GUN

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Fig.1

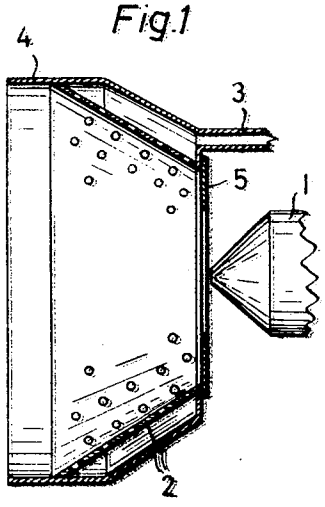
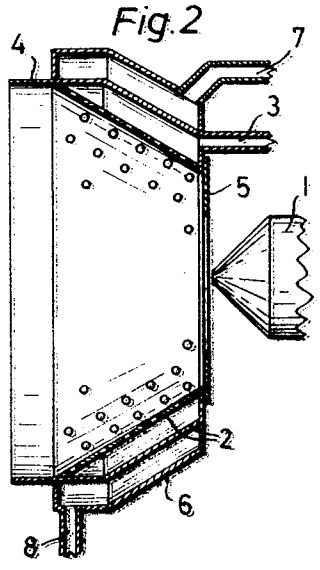


Fig.2



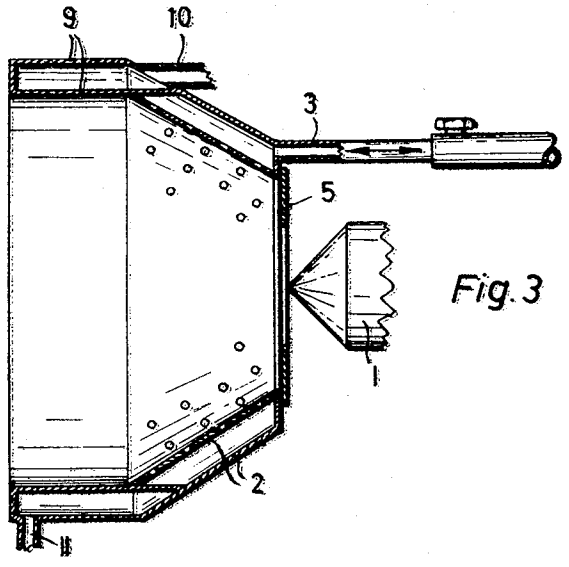


Fig.3

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HOT SPRAY GUN

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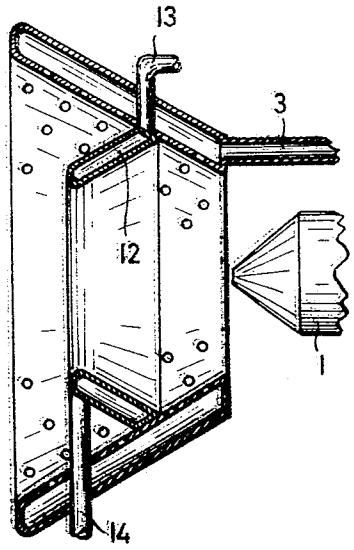
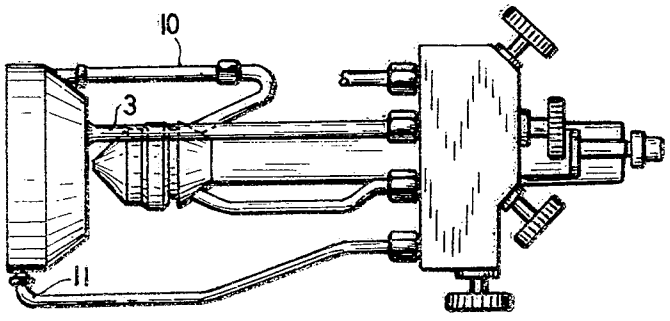


Fig.4

Fig.5



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HOT SPRAY GUN

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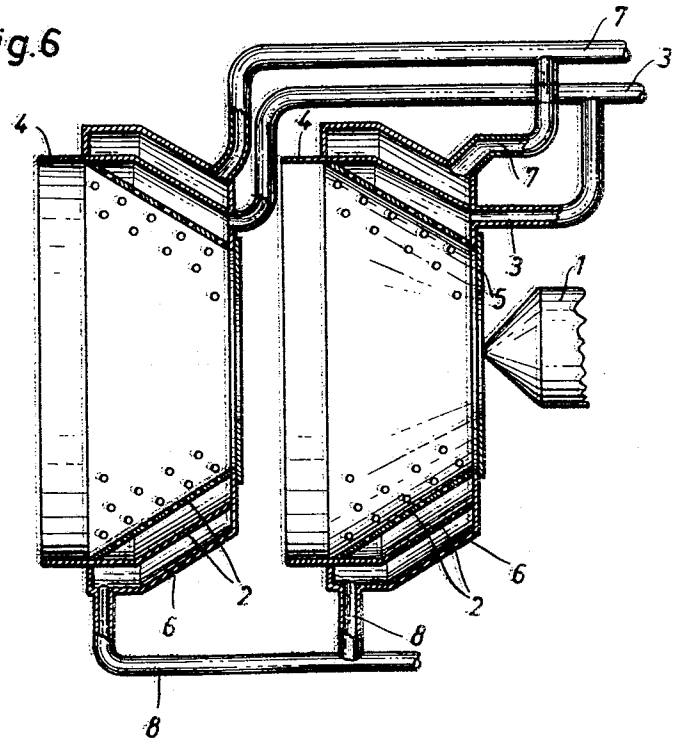
Fig.6



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United States Patent Office 2,924,392 Patented Feb. 9, 1960

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HOT SPRAY GUN

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Application January 2, 1957, Serial No. 632,137

Claims priority, application Germany January 3, 1956

7 Claims. (Cl. 239—133)

The invention relates to a hot spray gun with the aid of which materials, preferably in the form of dispersions or emulsions, are applied to surfaces of any kind with the object of forming a coating thereon. The known hot spray guns used for this purpose are only suitable for limited outputs, particularly as regards the quantity of the material to be sprayed. The spraying of large quantities of a dispersion presents no difficulties, but when spraying, for example, aqueous dispersions, large quantities of heat must be used to vaporize the water, on account of the high latent heat of evaporization of water. The burners hitherto used for hot spray guns are not capable of evaporating large quantities of water; moreover there is a danger of these being interrupted or extinguished by the air sucked in by the spray jet; and this danger increases as the air suction becomes greater, which in turn is determined by the strength of the spray jet. For these reasons the efficiency of the known hot spray guns is kept within relatively narrow limits. The hot spray gun, constituting the subject matter of the present invention, does not possess these disadvantages.

In the hot spray gun according to the invention a frustoconical burner surface is arranged coaxial with and in front of the gun; the burner surface is preferably formed by an inner wall provided with gas passages of a frustoconical double-walled casing connected to a gas feed pipe.

In the case of the gun according to the invention the burner surface is not, as in the known guns, directed perpendicularly to the axis to the spray jet, but forms an angle therewith, widening in the direction of the spray. The angle of inclination of the burner surface to the axis of the spray jet which is most advantageous for obtaining the best output of any gun, can be determined without difficulty by experiment, so that even in the case of the strongest suction produced on the burner surface by the spray jet, an interruption of the gas flame by the sucked-in air does not occur.

To prevent the loss of combustion heat by the heating of the outer air, it is advisable to fit a cylindrical screen on the outer edge of the frustoconical double-walled casing, which screen may, if desired, be also constructed as a double wall and provided with an inlet and outlet for air, so that the compressed air necessary for operating the spray gun is pre-heated in this double wall. However, the compressed air can likewise be preheated by providing around the frustoconical combustion chamber arranged in front of the spray nozzle a double-walled casing with inlet and outlet for air which is also preheated in this casing. Finally it is also possible for preheating the air to fit on the combustion surface a frustoconical casing projecting into the combustion chamber and provided with inlet and outlet for the air.

To control the quantity of air sucked into the combustion chamber by the spray jet, a diaphragm is, according to the invention, arranged on the rear wall of the frustoconical double-walled casing, through which diaphragm,

according to the size of its aperture, more or less hot air passes into the combustion chamber.

In order to attain very high outputs, it is advisable to arrange two or more frustoconical burners in series, so as to heat the spray jet along a longer path of travel. In this manner it is possible to avoid the necessity of making the combustion chamber too large in diameter.

Several embodiments of the invention are illustrated in longitudinal section by way of example in Figs. 1 to 4 of the accompanying drawings.

Fig. 5 shows a hot spray gun in side elevation.

Figure 6 shows a modification of the hot spray gun in a longitudinal sectional view.

To avoid repetitions similar parts are designated by the same reference numerals in the different figures of the drawings.

According to Fig. 1 a frustoconical burner is arranged in front of a spray nozzle **1** in the axis thereof and consists substantially of a double-walled casing **2**, the inner surface or wall of which is pierced by holes for the passage of combustion gas. A gas conduit **3** communicates with the space enclosed in the double-walled casing. On the front edge of the burner a cylindrical screen **4** is arranged which prevents the formation of eddy currents which might easily be produced if the hot burner air were to come directly into contact with the surrounding atmospheric air.

At the rear end of the burner chamber a diaphragm **5** is provided, by which the quantity of air sucked into the burner chamber by the spray jet from the spray nozzle is regulated, with the result that it is also possible to prevent the interruption or extinguishing of the gas flame.

For the purpose of pre-heating the compressed air necessary for operating the spray gun the burner is, according to Fig. 2 provided with a double-walled casing **6** which is provided with an air inlet **7** and an air outlet **8**. The air entering the space enclosed by the double-walled casing **6** through the inlet **7** is heated by the heat prevailing in the combustion chamber and imparted to the walls of the double-walled casing **2**.

According to Fig. 3 the cylindrical screen provided on the front edge of the combustion chamber is constructed as a double-walled casing **9**. The air to be preheated passes through the conduit **10** into the air space enclosed by the double-walled casing. The heated air again passes out through the conduit **11**.

Fig. 4 shows a further possibility of heating the compressed air by arranging the frustoconical double-walled casing **12** within the combustion chamber. The conduits for feeding and leading off the air are designated by **13** and **14** respectively.

The connection of the combustion chamber, according to the invention, with the gun itself, and in particular the feed and exhaust conduits of the pre-heated air, are illustrated in Fig. **5**.

What I claim is:

1. A flame spray gun comprising a nozzle having an axial discharge port for fluid to be sprayed, a hollow casing defining a chamber and having a perforated frustoconical internal wall coaxial with said port providing a burner surface, means supporting said casing with respect to said nozzle, said wall having a smaller end adjacent said nozzle and open to atmosphere and a larger end remote from said nozzle, and a gas supply conduit connected to said chamber.

2. A flame spray gun as set forth in claim 1 wherein said smaller end is axially spaced from said nozzle.

3. A flame spray gun as set forth in claim 1 wherein a cylindrical screen extends forwardly from said larger end.

4. A flame spray gun as set forth in claim 1 wherein

said casing supports a second double walled casing having air inlet and outlet ports.

5. A flame spray gun as set forth in claim 4 wherein said second casing surrounds the first.

6. A flame spray gun as set forth in claim 1 wherein said smaller end is provided with a diaphragm for the regulation of air passing therethrough.

7. A flame spray gun as set forth in claim 1 wherein a plurality of similar hollow casings are disposed in series.

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