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(54) Reversible tip for high pressure air assisted spraying

(57) A reversible tip is incorporated into a high pressure air assisted airless sprayer to allow cleaning of the plugged tip without removal of the tip and yet provide enhanced atomisation in a compact package.

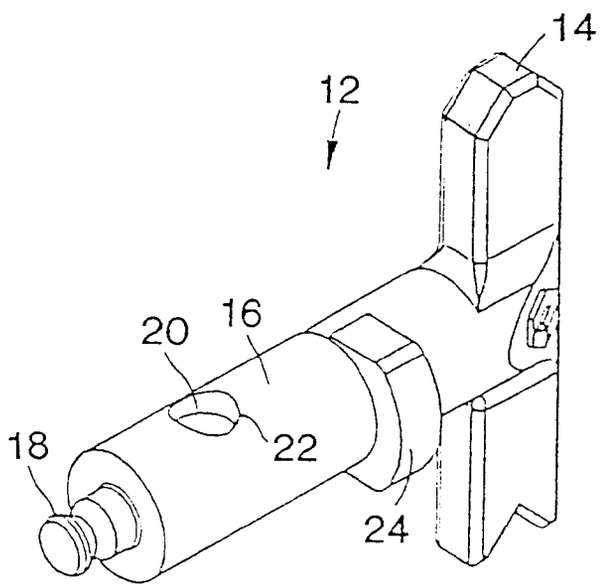

FIG. 5

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Description

Air assisted airless spraying (see Cowan US Patent No. 3,843,052) has become increasingly popular over the years. As coating materials have been manufactured with higher and higher solids content, the pressures required to atomise such materials (even using air assisted airless atomisation) have become higher and higher. Concurrent with this increase in required working pressures is increased susceptibility to clogging of the nozzle.

While reversible nozzles of the type typified in the Eull patent (US Patent No. 4,165,836, the contents of which are hereby incorporated by reference) have been used for airless spraying towards that end, it has been desired to incorporate a reversible tip assembly into an air assisted airless spray gun. This has been particularly difficult because of the need to route air to the front of the gun to assist in atomisation.

This invention provides a tip assembly for attachment to an air-assisted spray gun, said tip assembly being characterised by comprising:

a body;
means for retaining said body on said spray gun;
a tip cylinder having an axis of rotation and being located and rotatable in said body, said tip cylinder comprising an airless tip and a handle;
an air cap removably retained on said body and having a front face, said front face comprising a slot having an axis of elongation normal to said cylinder axis of rotation; and
first and second sets of atomising passages in said air cap for connection to a source of compressed air, each said set comprising at least first and second atomising passages located parallel to said slot axis and wherein air from said first and second sets exits said air cap and intersects above said front face and over said slot.

In the reversible tip of the present invention, a cylindrical housing has a crossbore which holds the tip cylinder located inside the air cap. This housing also includes axially extending passages leading from the front end of the gun body to near the front end of the air cap which then intersect with angled passages to provide air assisting atomisation air. An elongated slot is provided in the front and of the air cap parallel to the fan pattern to provide clearance and allow space for the atomisation jets to function.

These and other objects and advantages of the invention will appear more fully from the following exemplary description made in conjunction with the accompanying diagrammatic drawings wherein like reference characters refer to the same or similar parts throughout the several views.

FIG. 1 is a perspective view of the instant invention in the spraying position.

FIG. 2 is a side plan view of the instant invention in the spraying position.

FIG. 3 is a front perspective view of the instant invention in the cleaning position.

FIG. 4 is a side plan view of the instant invention in the cleaning position.

FIG. 5 is a perspective view of the tip cylinder.

FIG. 6 is a different front perspective view showing the housing and tip guard of the instant invention.

FIG. 7 is a partially cutaway side view of the housing of the instant invention.

FIG. 8 is a front plan view of the housing of the instant invention.

FIG. 9 is a perspective view of the air cap member alone of the instant invention.

FIG. 10 is a cross sectional view of the air cap of FIG. 9.

FIG. 11 is a wireframe perspective view of the housing of the instant invention.

FIG. 12 is a side plan view of the housing of the instant invention.

FIG. 13 is a cross section of the housing of the instant invention.

The instant invention provides a reversible tip construction for routing air to the front of the gun to assist in atomisation having a sealing mechanism similar to the aforementioned Eull patent. The instant invention provides a cylindrical housing 48 having a crossbore 50 for holding a tip cylinder 12 which is located inside an air cap which includes axial passages leading from the bottom or front end of the gun body itself to near the front end of the air cap whereupon angled passages connected to the axial passages provide air assisting atomisation air jets. An elongated slot is provided in the front end off the air cap parallel to the fan pattern to provide clearance and allow room for the atomisation jets to work.

The device of the instant invention is generally shown in Figures 1 to 4 with Figures 1 and 2 showing the device in the spraying position while Figures 3 and 4 show it in the cleaning position.

Figure 5 shows the tip cylinder 12 having a handle 14 and a main cylinder 16 with a detent end 18. A tip 20 is located in cavity 22 as is generally known in the art. A stop 24 is provided on cylinder 16 to confine rotation of tip cylinder 12 to approximately 180° between the two aforementioned positions.

Turning to Figures 6 through 8, the tip assembly 10 is provided with an air cap 30 to which a further air cap 28 is attached. Cylindrical passage 32 is provided in air cap 30 for receiving cylinder 16. A detent spring and ball 34 is located in one side of air cap 30 and the end thereof interacts with detent portion 18 on cylinder 16 to retain cylinder 16 in cylindrical passage 32 and housing 48. A retaining ring 36 is used to threadedly attach the assembly 10 to the front end of the spray gun.

Turning to Figures 9 and 10, these show in more detail air cap 30 and it can be seen that in addition to

cylindrical passageway 32, an elongated slot 38 is provided in the front end 40 of cap 30. While it is not shown in Figure 9, the fan pattern of tip 20 runs parallel to the axis of the elongation of slot 38 which thereby provides the fan pattern room to expand without impinging upon the front of air cap 30.

Four passages 42 are provided which run from the back end 44 of cap 30 to near the front end 40 whereupon they terminate in atomisation passages 46 which are angled at about 20° relative to the front face 40 of air cap 30 and intersect the fan pattern about 4.572mm (.180 inches) in front of tip 20.

It is contemplated that various changes and modifications may be made to the tip assembly without departing from the spirit and scope of the invention as defined by the following claims.

The aforegoing description has been given by way of example only and it will be appreciated by a person skilled in the art that modifications can be made without departing from the scope of the present invention.

Claims

1. A tip assembly (10) for attachment to an air-assisted spray gun, said tip assembly being characterised by comprising:

   a body (48);
   means for retaining said body on said spray gun;
   a tip cylinder (12) having an axis of rotation and being located and rotatable in said body, said tip cylinder comprising an airless tip (20) and a handle (28);
   an air cap (30) removably retained on said body and having a front face (40), said front face comprising a slot (38) having an axis of elongation normal to said cylinder axis of rotation; and
   first and second sets of atomising passages (46) in said air cap for connection to a source of compressed air, each said set comprising at least first and second atomising passages located parallel to said slot axis and wherein air from said first and second sets exits said air cap and intersects above said front face and over said slot.

2. The tip assembly of claim 1, wherein said airless tip has an axis of elongation and said tip axis of elongation is parallel to said slot axis.

3. The tip assembly of claim 1, wherein said atomising passages exit said front face at an angle of about 20° relative to said front face.

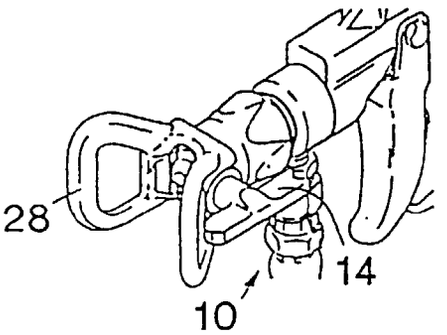

FIG. 1

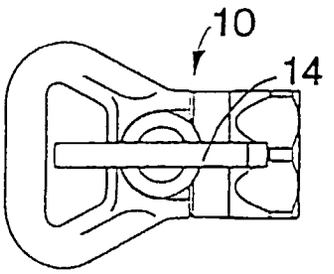

FIG. 2

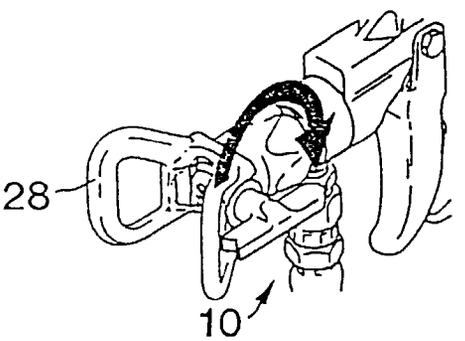

FIG. 3

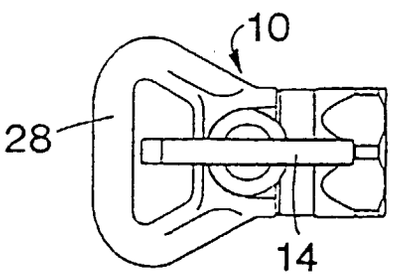

FIG. 4

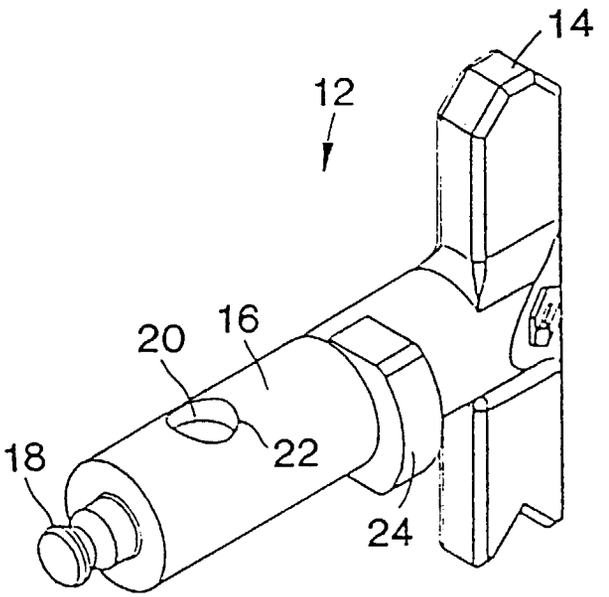

FIG. 5

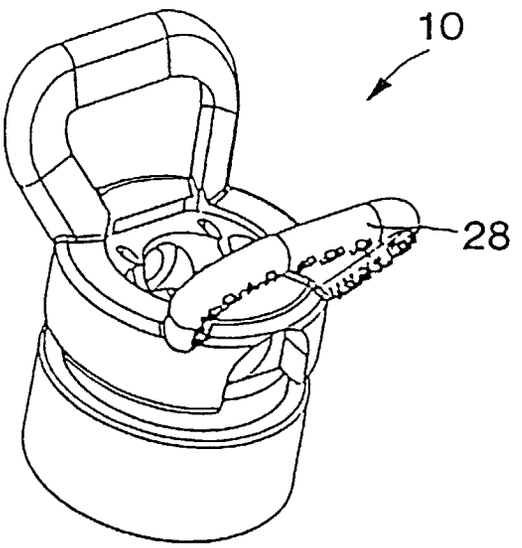

FIG. 6

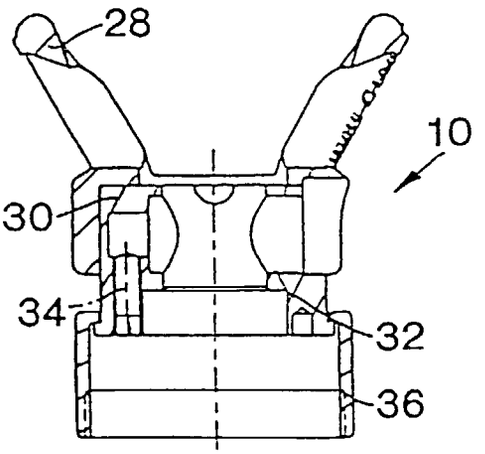

FIG. 7

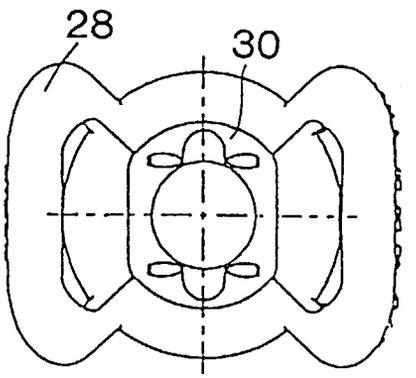

FIG. 8

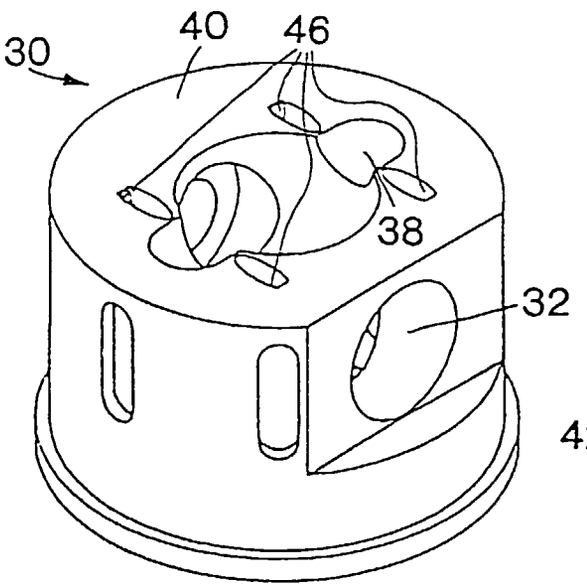

FIG. 9

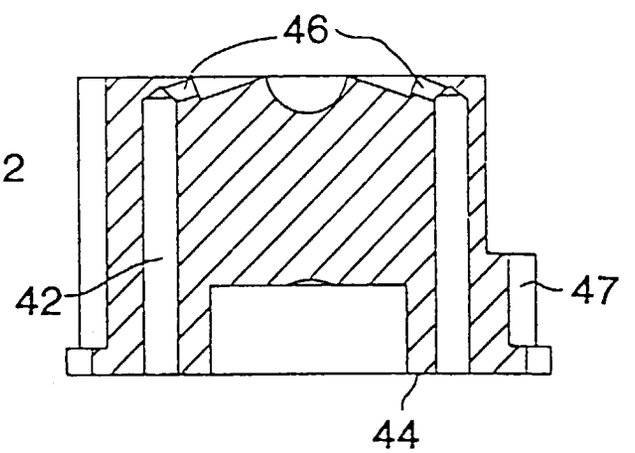

FIG. 10

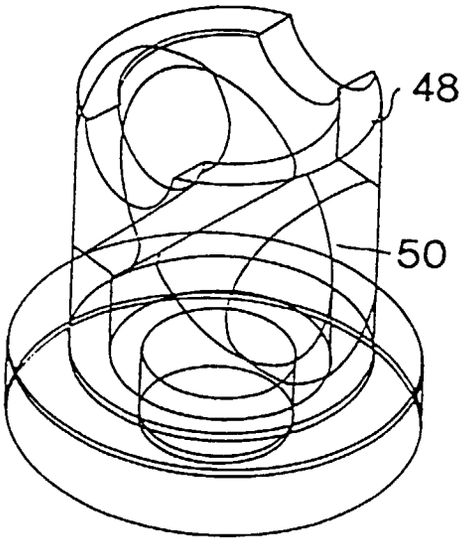

FIG. 11

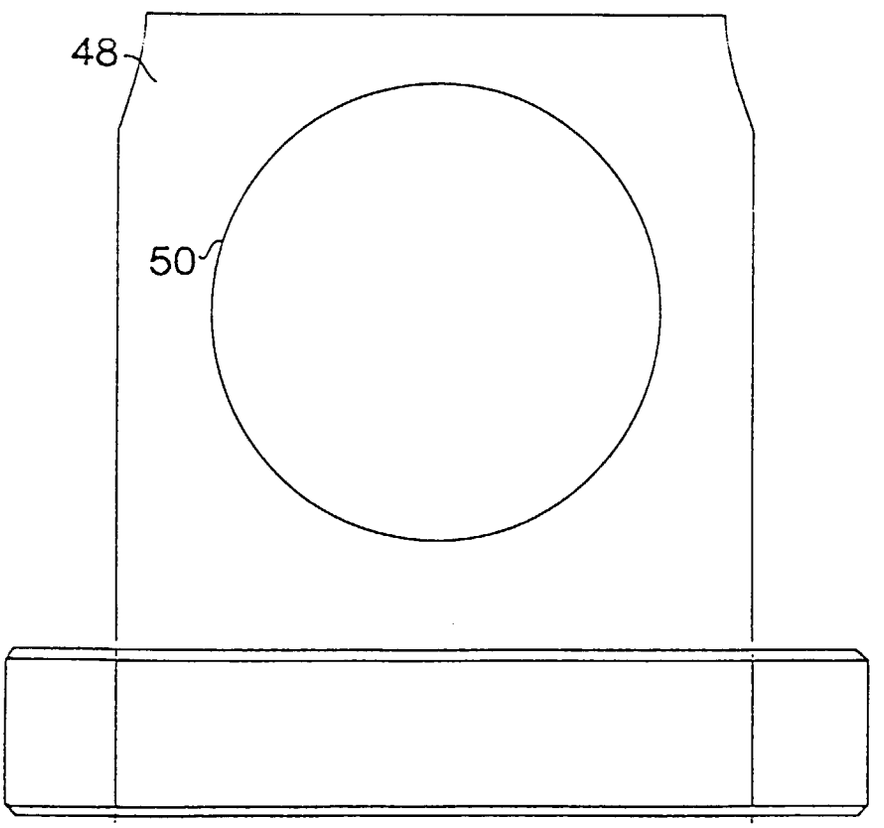

FIG. 12

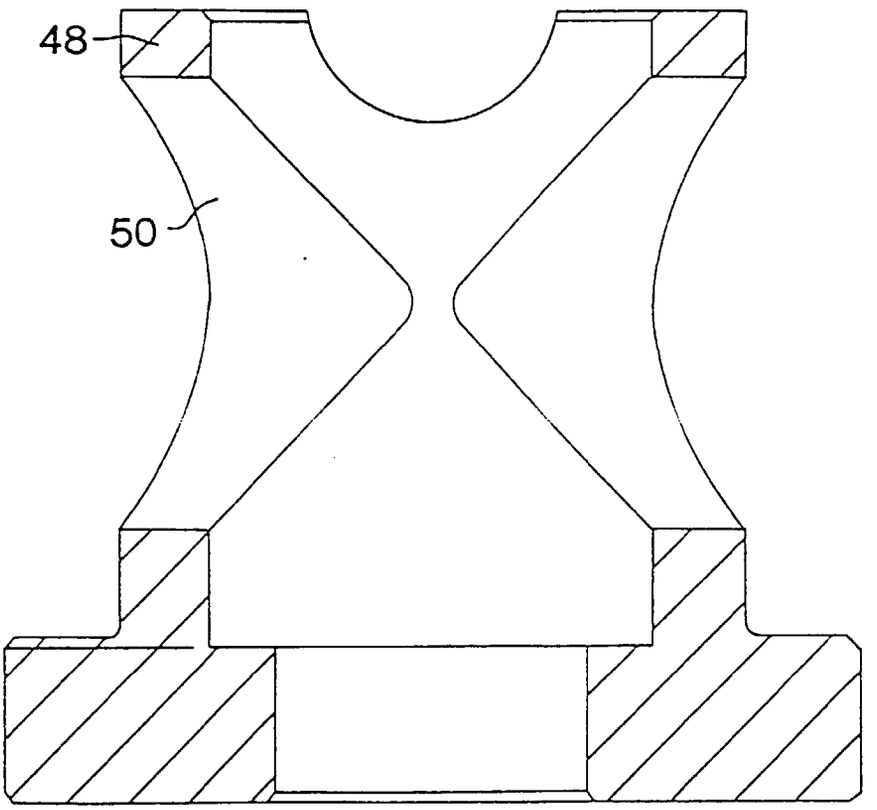

FIG. 13