

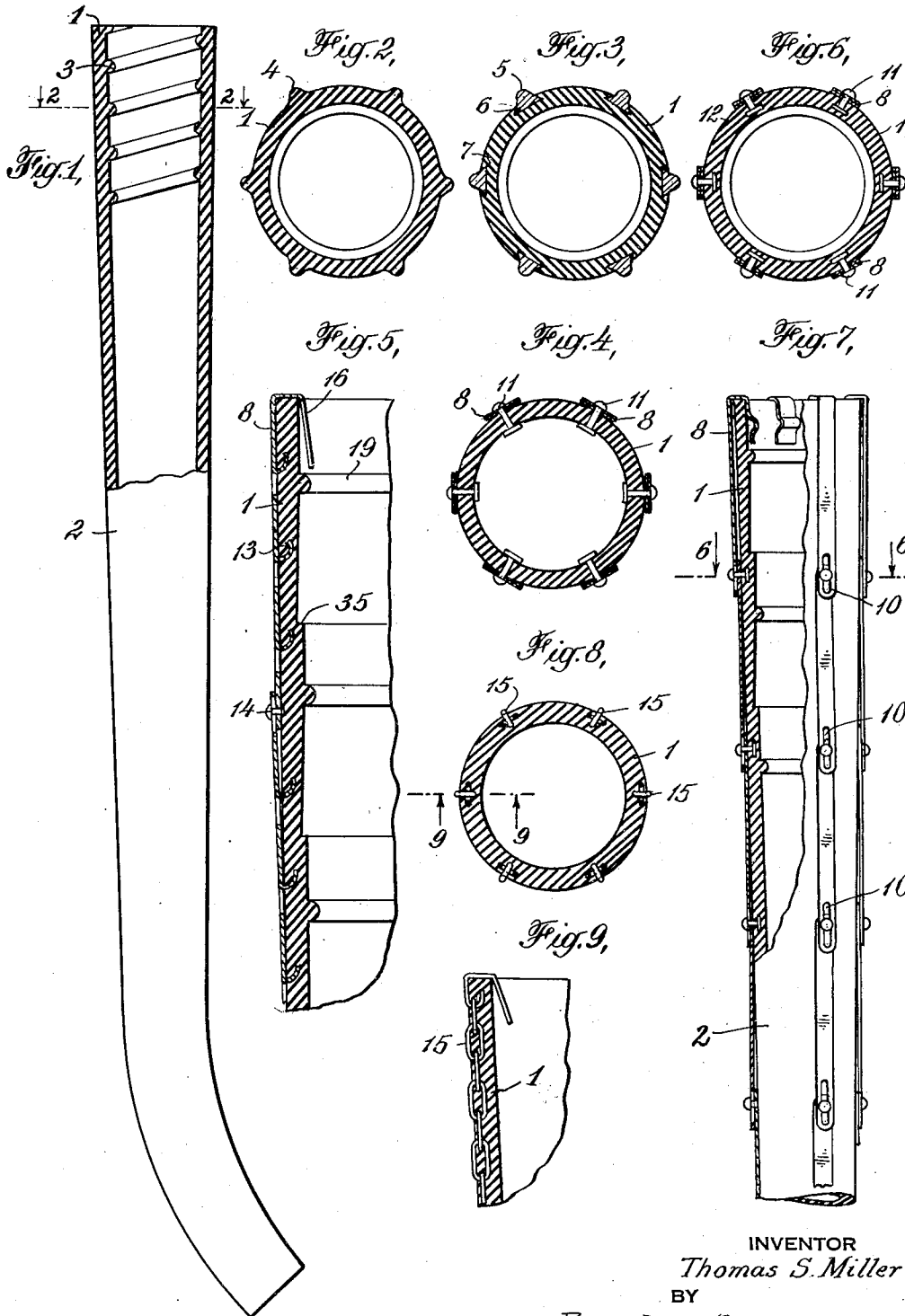
April 4, 1939.

T. S. MILLER
TANK FILLING DEVICE

2,153,199

Filed Aug. 1, 1935

2 Sheets-Sheet 1



INVENTOR

Thomas S. Miller

BY

Pernil, Davis, Marvin, and Edwards
ATTORNEYS

April 4, 1939.

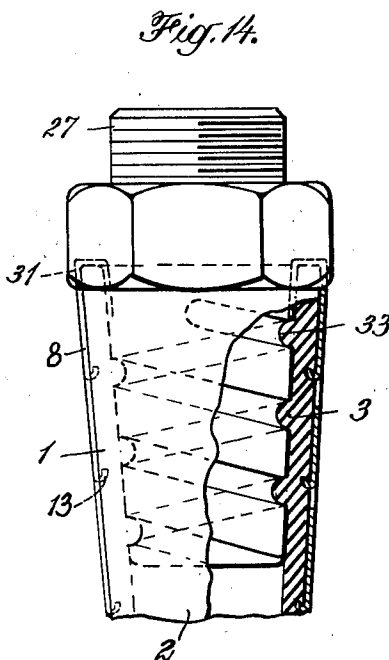
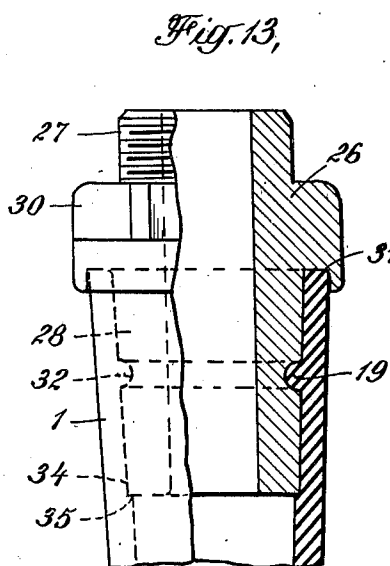
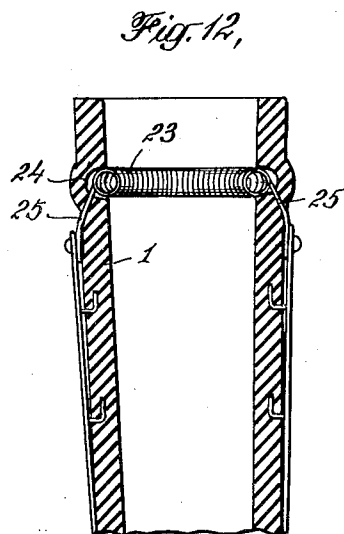
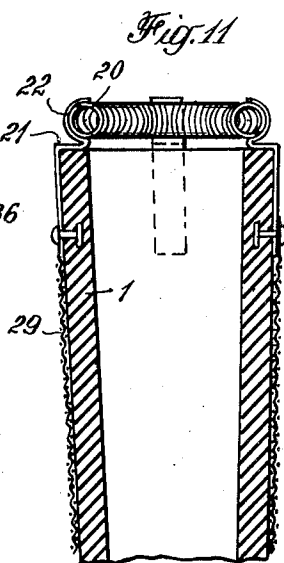
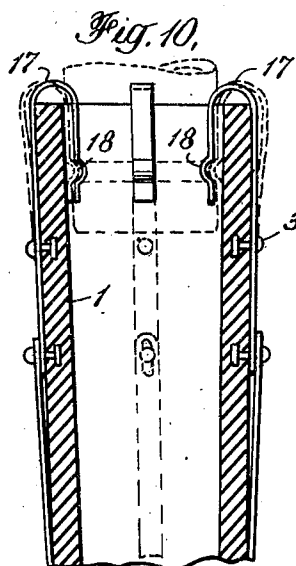
T. S. MILLER

2,153,199

TANK FILLING DEVICE

Filed Aug. 1, 1935

2 Sheets-Sheet 2



INVENTOR
Thomas S. Miller

BY

Penning, Davis, Marvin & Edmunds
ATTORNEYS

UNITED STATES PATENT OFFICE

2,153,199

TANK FILLING DEVICE

Thomas S. Miller, Rome, N. Y.

Application August 1, 1935, Serial No. 34,208

16 Claims. (Cl. 221—84)

This invention relates to tank filling devices and particularly to attachments for fluid delivery nozzles. More particularly, the invention contemplates the provision of an improved attachment for fluid delivery nozzles to facilitate the filling of gasoline tanks in automobiles.

As a result of recent efforts to "stream line" bodies of automobiles, gasoline tank openings in modern cars are frequently placed behind or beneath some of the rear appurtenances of the automobile. The location of tire racks and luggage carriers at the rear of modern automobiles is frequently such as to interfere with the accessibility of the opening in the gasoline tank. The modern type of construction, while desirable from many viewpoints, has resulted in difficulties, both for the gasoline filling station and for the consumer. The insertion of a gasoline delivery nozzle into the fuel tank is often difficult and time-consuming, while the final position of the nozzle in the neck of the tank is often so precarious that the gasoline must be pumped slowly to avoid spilling. Thus, useless delay is occasioned not only for the consumer but also for the filling station attendant. From the standpoint of the vendor of gasoline there is an even more serious objection. The volume indicators on modern gasoline pumps are usually graduated for definite rates of flow of the fluid. If the pumping rate is reduced either by diminishing the speed of the pumping means or by constricting the flow by means of an outlet valve, the pump will deliver more fluid than is indicated. In some instances a pump may deliver at least 10% more than the amount which is indicated. Inasmuch as the profit of filling stations upon gasoline is usually less than 10%, this discrepancy in measurement may be extremely serious for in some instances it may eliminate all profit upon a sale and cause an actual loss to the vendor.

The heretofore customary means of filling gasoline tanks having inconveniently placed openings has been to hold the metal delivery nozzle over the opening and close the valve on the delivery line to a point that will permit delivery of the gasoline without spilling. This method, of course, occasions waste of time and induces the aforementioned measuring difficulties. In contradistinction to the heretofore customary method of filling gasoline tanks, the present invention contemplates, in its complete aspect, an apparatus whereby any such tank may be filled at the normal rate of speed, even though the opening in the tank be relatively inaccessible.

The apparatus in its preferred construction comprises a delivery tube provided with an adaptor designed to fit various sizes of gasoline delivery nozzles. The delivery tube is designed to reach otherwise inaccessible gasoline tank openings. When an automobile with an inconveniently located tank opening is to be filled, the ordinary gasoline delivery nozzle on a pump is inserted into the adaptor, and the delivery tube (which may be either flexible or rigid and bent to an appropriate curvature) is inserted into the gasoline opening in the tank. The adaptor (which may be either flexible or rigid) is so constructed as to fit tightly over the delivery nozzle and may be provided with means for maintaining an electrical contact between the metal delivery nozzle and a grounding device attached to the delivery tube. The delivery tube which is connected to the adaptor and communicates therewith may be firmly and securely placed within the tank opening. A modified form of delivery tube is provided with longitudinal projections or ribs which insure air spaces between the tube and the tank opening when the delivery tube is inserted therein.

In another improved form, a grounding device is attached to the delivery tube as mentioned above. In its broadest aspect this device comprises an electric conductor in electrical contact with the attachment and the metal fluid delivery nozzle. The purpose of such a device is to maintain all portions of apparatus through which gasoline flows, and especially those portions which are in contact with air, at substantially ground potential. The grounding may comprise a flexible element attached to the delivery tube or may comprise a metal rib of the type above-mentioned.

A further improvement comprises a connecting adaptor designed to connect a certain type of gasoline delivery nozzle to an extension attachment for the nozzle. It frequently happens that the flexible metal delivery tubes on standard fuel pump nozzles break adjacent the main body portion of the nozzle. When such a failure occurs it is usually impossible to insert the main body portion of the nozzle into the adaptor of the fluid delivery nozzle attachment and the proposed adaptor makes possible the connection between such a broken nozzle and said attachment.

My invention will be better understood in the light of the following detailed description taken in conjunction with the drawings, in which:

Fig. 1 is an improved form of the attachment

in which the adaptor portion is provided with a helical gasket;

Figures 2 and 3 are cross-sectional views along line 2—2 in Figure 1 of a modified form of attachment showing the radially disposed projections or ribs;

Figure 4 is a cross-sectional view along line 2—2 in Figure 1 showing the rivets projecting through the walls of the attachment;

Fig. 5 is a longitudinal sectional view of a proposed form of grounding device showing another form of attachment adaptor fully described in my copending application, Serial No. 757,851 and also shown in Fig. 7.

Fig. 6 is a cross-sectional view of another proposed grounding device shown in Fig. 7 and taken along line 6—6 showing the conducting elements attached to the delivery tube by rivets embedded in the walls of the tube;

Fig. 7 is a longitudinal view partly in section showing a preferred grounding device of my invention;

Fig. 8 is a cross-sectional view along line 2—2 of the grounding device shown in the cut-away view in Fig. 9;

Fig. 9 is a partial sectional view of the grounding device shown in cross section in Fig. 8,

Fig. 10 is a sectional view of an adaptor showing a form of contact clip;

Figs. 11 and 12 are further sectional views of adaptors showing proposed forms of grounding contacts;

Fig. 13 is a longitudinal view partly in section showing an adaptor designed to connect a standard form of gasoline delivery nozzle with one form of my attachment for such nozzle and shows the adaptor engaging the type of attachment adaptor shown in Figs. 5 and 7; and

Fig. 14 is a full view partly in section showing a modified form of adaptor engaging the attachment shown in Fig. 1.

Referring to Fig. 1 of the drawings, it will be seen that the apparatus of my invention comprises an adaptor having walls 1 connected either rigidly or integrally to a delivery tube 2. The adaptor comprises a chamber of substantially frusto-conical shape having a flexible helical gasket 3 located within the chamber, and the adaptor is connected to the delivery tube at the smaller end of the frusto-conical chamber. The gasket is located within the chamber in axial alignment therewith and has an effective internal diameter at any point less than the internal diameter of the chamber at that point.

The diameter of the delivery tube is preferably no smaller than that of the smaller end of the frusto-conically shaped adaptor in order that no undue constriction of the flow of gasoline may result.

As shown in Fig. 2, the adaptor and the delivery tube may be provided with longitudinal projections or ribs 4 radially disposed about the outer surface of the adaptor and tube. The ribs 4 may be formed integrally with the adaptor and tube and may comprise the same flexible material as that of which the attachment is made. The ribs may, however, be constructed of an inflexible material, such as metal as shown in Fig. 3 in which case the ribs may serve also as grounding elements for the attachment. Ribs 5 comprise a rounded outer portion and a T-shaped base 6 adapted to fit into slots 7 in the outer wall of the attachment in the now preferred form, the projections or ribs extending substantially the entire length of the attachment.

The grounding device may comprise segments of flexible corset steel 8, or any similar electric conducting material. The segments are provided at their ends with longitudinal slots 9 through which adjacent strips may be riveted. This type of slotted joint construction permits pivotal movement around the rivets as well as longitudinal motion as the delivery tube is bent and one side of the tube is compressed while the other is stretched. The head of the rivet 11 may be embedded in the walls 12 of the attachment, as shown in Fig. 6 and the shank projecting through the slot of the grounding element and riveted down thereover thus holding the element adjacent the attachment.

In a modified form the rivets project through the entire wall as shown in Fig. 4, similarly holding the grounding element against the outer surface of the attachment.

In a still further modified form hooks 13 are stamped out of the grounding elements 8 and the hooks embedded in the walls of the attachment by casting the attachment with the grounding elements in position or in some equivalent manner. In such a case, the grounding elements are held firmly against the outer surface of the attachment and are connected through the longitudinal slots in their ends by rivets 14 which may or may not extend into the walls of the attachment.

Instead of metal strips, the grounding elements may comprise an electric conducting chain 15 either wholly embedded in the walls of the attachment or partially embedded therein. In the latter case, portions of the links whose planes are perpendicular to the walls may extend either from the outer (as in Figs. 8 and 9) or inner surfaces of the walls of the attachment. Another form of grounding element is shown in Fig. 11 and comprises a flexible metal mesh 29 surrounding the attachment and attached thereto in an appropriate manner or embedded in the walls of the attachment. It should be noted, at this time, that the type of grounding element used is independent of the form of the attachment adaptor.

The grounding elements extend substantially the entire length of the attachment and are connected, at the end thereof adjacent the open end of the adaptor, with means for maintaining an electrical contact between the grounding element and the metal fluid delivery nozzle which is inserted in the adaptor. The contact may comprise a metal clip 16 which is bent over the end of the adaptor and which projects into the open end of the adaptor toward the center thereof. A modified form of clip is shown in Fig. 10 and comprises a metal clip 17 formed from the end of the grounding elements. The end is bent around the wall of the adaptor adjacent the open end thereof and projects into the chamber parallel to the inner surface. The portion of the clip on the outer surface of the adaptor is held firmly thereto by a rivet 36 or some similar means whereby spring tension may be applied against the metal delivery nozzle by the elasticity of the clip. The end of the clip may be bent to form a curved end portion 18 which extends towards the center of the chamber thus reducing the effective diameter of the opening of the adaptor so as to make contact between the clip and the metal fluid delivery nozzle which is inserted into the adaptor.

Another modified form of grounding connection comprises a coil spring 20 bent into the form

of an annular ring, the inner diameter of which ring is less than the internal diameter of the open end of the adaptor. The spring is held in position and in electrical contact with the grounding element by arcuate clips formed by bending the ends 21 of the grounding element over the open end of the adaptor and further providing the end with an arcuate curvature 22 which will hold the spring adjacent but outside of the open end of the adaptor.

An additionally proposed form comprises a similar coil spring 23 held in an annular recess 24 within the inner surface of the adaptor. The inner diameter of the spring is less than the internal diameter of the adaptor at the point at which the spring is located, and the outer diameter of the spring is smaller than the diameter of the circular recess in the wall of the adaptor, thus permitting the expansion of the spring as the metal fluid delivery nozzle is inserted there-through. Suitable electric conducting connections 25 are provided through the walls of the adaptor for maintaining electrical contact between the coil spring and the grounding element on the outer surface of the attachment.

The connecting adaptors shown in Figs. 13 and 14 comprise a hollow body member 26 of rigid material, such as metal or composition, threaded at one end 27 and having the other end 28 tapered. A flange 30 is disposed between the threaded end portions of the hollow body member and has an undercut annular recess 31 formed therein adjacent the tapered end portion of the member. The annular recess has a diameter equal to that of the attachment adaptor walls 1 at the open end thereof. The outer surface of the tapered end portion may be provided with an annular recess 32 adapted to engage an annular gasket 19 within the frusto-conical chamber of one form of my attachment shown in Figs. 5 and 7, or may be provided with a helical recess 33 adapted to engage (as shown in Fig. 14) the helical gasket 3 within that form of adaptor which is shown in Fig. 1. The central body portion of the connecting adaptor is shaped so as to have a substantially hexagonal cross section to permit the use of a wrench in screwing the threaded end portion of the adaptor into the fluid delivery nozzle. When the tapered end portion is provided with an annular recess, the length of the tapered end portion is made such that the end 34 of the portion fits snugly against the shoulder 35 nearest the inlet end of the attachment shown in Figs. 5 and 7. The relative positions of connecting adaptor and such an attachment adaptor are shown in Fig. 13.

In operation, a gasoline delivery nozzle is inserted into the adaptor of the attachment until it fits tightly within the helical gasket. The outer end of the delivery tube is inserted into the opening in the gasoline tank and gasoline passed through the attachment into the tank at a normal rate. The radially disposed longitudinal ribs maintain an air space between the tube and the tank opening to permit escape of air through the space as the tank is filled thus precluding the possibility of gasoline bubbling out of the tank opening during the filling operation.

The static electricity generated by the passage of gasoline through the attachment is conducted along the grounding elements adjacent the walls of the attachment to the metal delivery nozzle. It is thus assured that the attachment is at ground potential as is the delivery nozzle so that

the danger of an electric spark igniting the gasoline is eliminated.

If it is desired to connect my attachment to a standard type delivery nozzle having a flexible metal extension tube, the flexible extension tube unit may be unscrewed from the nozzle and my adaptor (shown in Figs. 13 and 14) screwed into the nozzle. The hexagonal shape of the central body portion of the adaptor makes it possible to tighten the screw connection with a wrench so as to prevent leakage at that point. The tapered end portion may be inserted forcibly into an attachment having an adaptor whose inner chamber is provided with an annular gasket until the gasket engages the annular recess on the outer surface of the tapered end portion and the end of the tapered portion rests against the shoulder of the attachment adaptor. The annular undercut recess in the flange of the central body portion is adapted to engage the ends of the walls of the adaptor of the attachment thus insuring a tight connection between the attachment adaptor and the tapered end portion of the connecting adaptor. The adaptor shown in Fig. 14 has a helical recess cut in the outer surface of the tapered end portion so that the latter may be screwed into the adaptor of an attachment such as is shown in Fig. 1 until the helical gasket within the attachment adaptor is firmly engaged in the helical recess in the tapered end portion of the connecting adaptor (Fig. 14).

It will be apparent that my invention provides simple, cheap and ready means, free of fire hazards, for eliminating delay, spills and inaccurate measurements in the vending of gasoline. The apparatus is of simple construction and may be built cheaply.

Modifications of the apparatus of my invention may occur to the man skilled in the art, without, however, departing from the principle of my invention.

I claim:

1. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion communicating with the adaptor portion, and electric conducting elements comprising segments of flexible metal strips pivotally connected through holes in the ends of the strips and radially disposed about the attachment and extending substantially the entire length thereof.

2. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion communicating with the adaptor portion, and electric conducting elements comprising segments of flexible metal strips pivotally connected through longitudinal slots in the ends of the strips and radially disposed about the attachment and extending substantially the entire length thereof.

3. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion communicating with the adaptor portion, and electric conducting means adapted to conduct static electricity away from the tubular portion, said means being embedded in the walls of the attachment and extending substantially the entire length thereof.

4. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion communicating with the adaptor portion, and an electric conducting chain partially embedded in the walls of the attachment and extending substantially the entire length thereof.

5. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion

communicating with the adaptor portion, and a flexible electric conducting mesh attached to and extending substantially the entire length of the attachment.

- 5 6. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion communicating with the adaptor portion, means for conducting electricity along the attachment, and flexible electric conducting elements attached
10 to said means and extending within the adaptor portion and adapted to maintain electrical contact between said means and a fluid delivery nozzle.

7. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion communicating with the adaptor portion, means for conducting electricity along the attachment, and an annular coil spring attached to the electric conducting means and held within an annular recess in the inner wall of the adaptor portion to maintain electrical contact between said means and a fluid delivery nozzle.

8. An attachment for fluid delivery nozzles comprising an adaptor portion, a flexible tubular
25 portion communicating with the adaptor portion, and flexible electric conducting metal strips attached to and extending substantially the entire length of the attachment.

9. An attachment for fluid delivery nozzles comprising an adaptor portion, a flexible tubular portion communicating with the adaptor portion and formed integrally therewith, and means for electrically conducting static electricity away from the tubular portion.

- 35 10. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion communicating with the adaptor portion, and means associated with the attachment for electrically conducting static electricity away from the tubular portion and for providing a space between the tubular portion and a tank opening.
40

11. An attachment for fluid delivery nozzles comprising an adaptor portion provided with a chamber of substantially frusto-conical shape and having a helical gasket disposed coaxially within the chamber adapted to maintain sealed engagement between the adaptor portion and a fluid delivery nozzle, a tubular portion communicating with the adaptor portion at the smaller
45 end of the frusto-conical chamber, and means for electrically conducting static electricity away from the tubular portion.
50

12. An attachment for fluid delivery nozzles

comprising an adaptor portion provided with a chamber of substantially frusto-conical shape and having a flexible gasket disposed coaxially within the chamber adapted to maintain sealed engagement between the adaptor portion and a fluid delivery nozzle, a tubular portion communicating with the adaptor portion at the smaller end of the frusto-conical chamber, means for conducting static electricity away from the tubular portion, and means adjacent one end of the electric conducting means for maintaining electric contact between said means and a fluid delivery nozzle.

13. An attachment for fluid delivery nozzles comprising an adaptor portion, a tubular portion communicating with the adaptor portion, means for conducting electricity along the attachment, and an annular coil spring attached to the electric conducting means and held adjacent the open end of the adaptor portion for providing electrical contact between said means and a fluid delivery nozzle which is inserted into the adaptor portion.

14. An attachment for fluid delivery nozzles comprising an adapter portion provided with a chamber of substantially frusto-conical shape and having a helical gasket disposed coaxially within the chamber adapted to maintain sealed engagement between the adapter portion and a fluid delivery nozzle, and a tubular portion communicating with the adapter portion at the smaller end of the frusto-conical chamber.

15. An attachment for fluid delivery nozzles comprising an adapter portion having a chamber with a flexible concentric helical gasket disposed within the chamber, the inner surface of the helical gasket forming a frusto-conical space within the chamber, and a tubular portion communicating with the adapter portion at the end of the chamber adjacent the smaller frusto-conical space formed by the helical gasket.
40

16. An attachment for fluid delivery nozzles comprising an adapter portion having a chamber with a flexible concentric helical gasket disposed within the chamber, the inner surface of the helical gasket forming a frusto-conical space within the chamber, a tubular portion communicating with the adapter portion at the end of the chamber adjacent the smaller frusto-conical space formed by the helical gasket, and means for electrically conducting static electricity away from the tubular portion.
50

THOMAS S. MILLER.