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FILLING DEVICES

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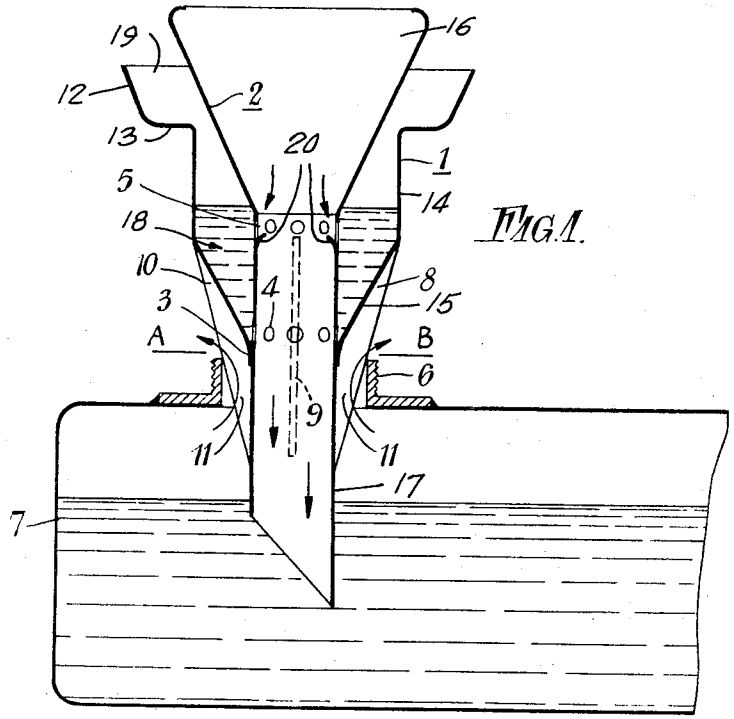


FIG. 1.

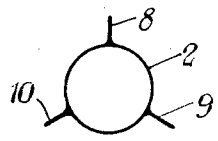


FIG. 2.

Inventor
Otto Anton v. Smekal
by Stevens, Davis, Miller & Mosher
his attorneys

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FILLING DEVICES

Otto Anton von Smekal, Potton, England

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5 Claims. (Cl. 141—105)

This invention relates to filling devices and more particularly to filling devices of the character used to fill a vessel with two miscible liquids. It is of particular value in connection with the filling of the fuel tank of a vehicle with a mixture of oil and petrol.

Most two-stroke internal combustion engines are powered by a petrol/oil mixture and since these are not usually sold in a pre-mixed condition it is necessary at the filling station to effect the mixing as the liquids are being fed into the tank. One device for effecting such simultaneous filling and mixing consists of a funnel having a concentric inner tube which passes down into the tank to be filled, there being a plurality of apertures in the tube near to the base of the funnel. The annulus surrounding the tube is charged with oil and petrol is then supplied to the funnel. It may flow over the surface of the oil in the annulus but for the most part it runs through the tube into the vessel being filled. At the same time oil passes through the apertures into the tube and is mixed with the petrol as it passes into the vessel.

Such apparatus is quite effective where the oil/petrol ratio does not exceed about 1:16. However, modern two-stroke engines frequently require oil/petrol ratios of 1:25 or 1:30 and for this purpose the aforesaid apparatus is not wholly efficient.

According to the present invention a filling apparatus for the simultaneous mixing of two miscible liquids such as oil and petrol and their charging into a vessel such as the fuel tank of a two-stroke internal combustion engine comprises an outer funnel, an inner funnel to the outer surface of which the outer funnel is sealed, one or more apertures in said inner funnel near to and above the point where the outer funnel is sealed to it and one or more apertures in said inner funnel at a substantially greater distance above said point. These latter apertures are preferably inclined so that liquid passing down the main funnel tends to be thrown out into the outer funnel.

In use the annulus between the funnel is charged with oil and petrol is supplied to the inner funnel. Mixing of the oil and petrol takes place both at the upper apertures and at the lower apertures so that the mixture passing out of the lower end of the inner funnel is a very satisfactory mixture of the oil and petrol.

Preferably, in order to allow air to pass freely out of a vessel which is being filled via a small opening, usually circular in shape, the device is provided with wing plates, e.g. three such plates at 120° intervals round the device, whereby the device rests in the filling aperture on the edges of said wing plates and air can pass out freely between such plates.

An embodiment of apparatus according to this invention is illustrated in the accompanying drawings wherein:

Figure 1 shows the device in diagrammatic cross-section, and

Figure 2 shows a detail of the device in plan.

It consists of an outer funnel **1** and an inner funnel **2**, the funnels being sealed together at **3**. The inner funnel **2** is provided with lower apertures **4** and upper apertures

5. The device is shown in position with the lower extremity of the funnel **2** passing through a filling aperture **6** of a tank **7**. The device is provided with three fins **8**, **9** and **10** which serve to provide passages **11** for air to escape from the tank **7**. The apertures **5** are inclined as shown.

The outer funnel **1** has an open-top head **12** of shallow coned formation with an annular base **13** carried on a cylindrical or tubular neck **14** shaped with tapered end **15** sealed at **3** to the inner funnel.

The inner funnel **2** is concentrically arranged within the outer funnel; and it incorporates an elongated open-top head **16** of coned formation carried by a tubular stem or spout **17**.

In use, petrol is introduced into the funnel **2** from a petrol pump and oil is introduced into the chamber **18** between the two funnels through the annular opening **19** between the rims of the two funnel heads **12**, **16**. A first mixing takes place at apertures **5** by movement of petrol in the direction shown by the arrows and a second mixing takes place at apertures **4**, so that a thorough mixture reaches the lower part of the funnel **2** and enters the tank **7**. Air thus displaced leaves the tank **7** through the passages **11** as shown by the arrows.

Figure 2 is a plan section on the line AB of Figure 1 and shows the disposition of the fins **8**, **9** and **10**.

What I claim is:

1. A filling device for the simultaneous mixing of two miscible liquids such as oil and petrol and their charging into a vessel such as the fuel tank of a two-stroke internal combustion engine which comprises a unit incorporating an outer funnel having an open-top head on a tubular neck with a tapered lower end, a concentric inner funnel having an open-top head on a tubular spout which extends through and is sealed to the tapered lower end of the outer funnel, the two funnels being spaced apart to afford an intervening chamber for liquid with an annular filler opening between the spaced rims of the funnel heads, there being provided at least one hole in the nozzle wall of the inner funnel communicating direct with the bottom of the chamber between the funnels for discharge of liquid therefrom into liquid passing down the inner funnel.

2. A filling device for the simultaneous mixing of two miscible liquids such as oil and petrol and their charging into a vessel such as the fuel tank of a two-stroke internal combustion engine which comprises a unit incorporating an outer funnel having an open-top head on a tubular neck with a tapered lower end, a concentric inner funnel having an open-top head on a tubular spout which extends through and is sealed to the tapered lower end of the outer funnel, the two funnels being spaced apart to afford an intervening chamber for liquid with an annular filler opening between the spaced rims of the funnel heads, there being provided at least one hole in the nozzle wall of the inner funnel communicating direct with the bottom of the chamber between the funnels for discharge of liquid therefrom into liquid passing down the inner funnel, and in addition at least one hole at a higher level in the nozzle wall also communicating direct with the liquid chamber.

3. A filling device for the simultaneous mixing of two miscible liquids such as oil and petrol and their charging into a vessel such as the fuel tank of a two-stroke internal combustion engine which comprises a unit incorporating an outer funnel having an open-top head of shallow coned form with an annular base carried on a cylindrical neck with a tapered lower end, a concentric inner funnel having an elongated open-top head of coned formation carried at its lower end on a tubular spout which extends through and is sealed to the tapered lower end of the outer funnel, the two funnels being spaced apart to afford an inter-

vening chamber for liquid with an annular filler opening between the spaced rims of the funnel heads, there being provided a ring of holes in the nozzle wall of the inner funnel communicating direct with the bottom of the liquid chamber between the funnels for discharge of liquid therefrom into the inner funnel, and in addition a ring of holes at a higher level in the nozzle wall also communicating direct with the liquid chamber.

4. A filling device as claimed in claim 3, wherein inturned lips are provided at the bottoms of the upper ring of holes for directing liquid passing down the inner funnel into the chamber.

5. A filling device as claimed in claim 3, wherein external radial fins are carried by the nozzle to act as air vents.

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