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F. S. AJERO

3,720,231

ADD-ON OIL-FUEL METERING DEVICE

Filed Dec. 20, 1971

Fig. 3

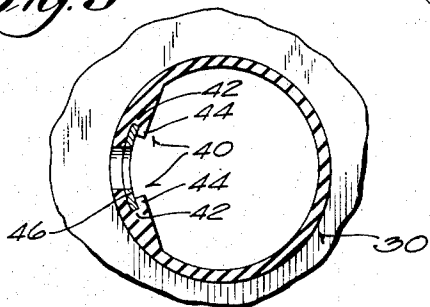


Fig. 4

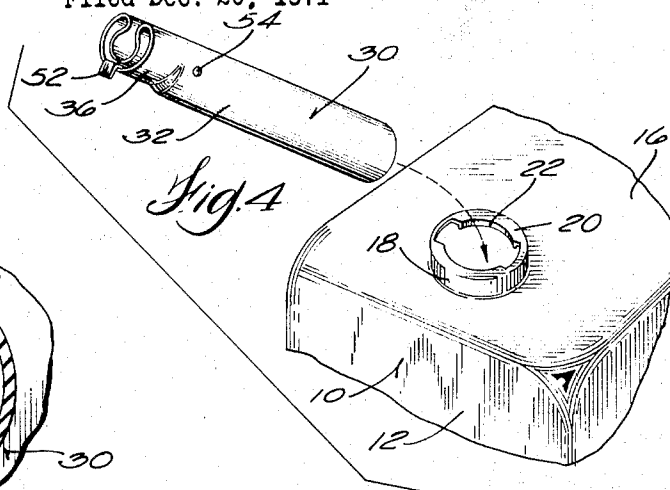


Fig. 1

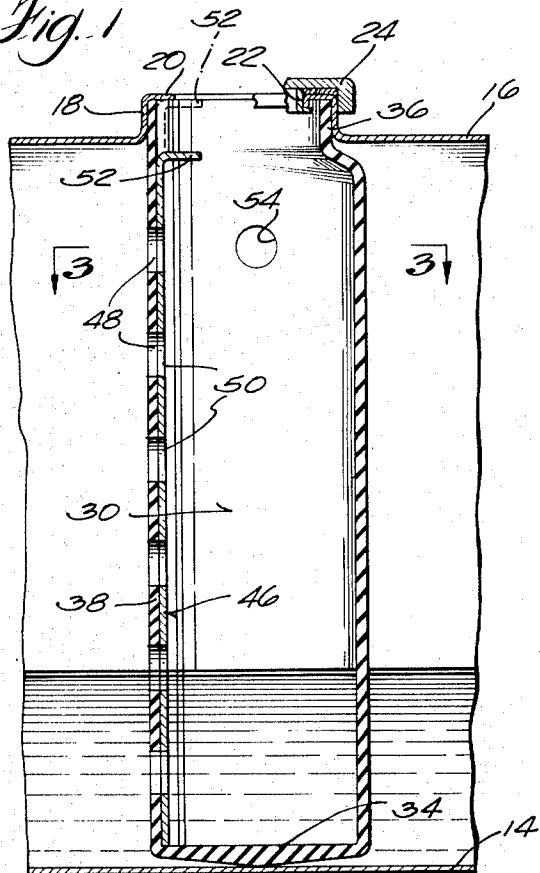
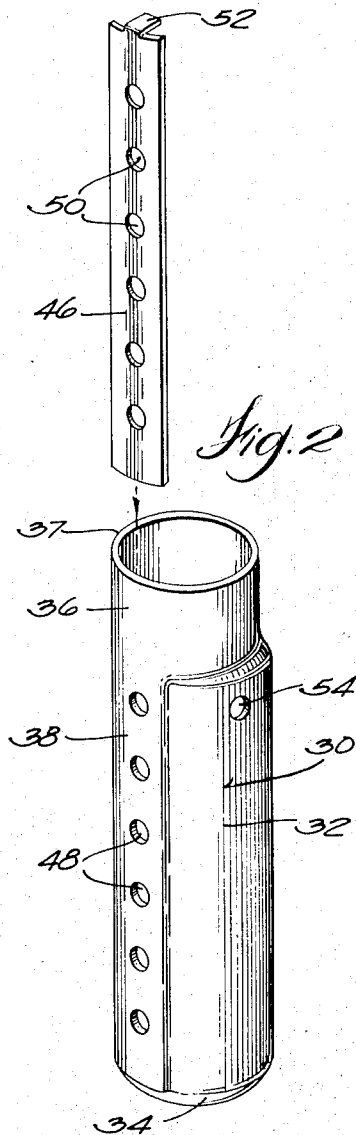


Fig. 2



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ADD-ON OIL-FUEL METERING DEVICE

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9 Claims

ABSTRACT OF THE DISCLOSURE

This application relates to an accessory for a gasoline tank, for a two stroke cycle engine of a type which uses a mixture of gasoline and oil. The accessory is a flexible chamber inserted through the filler neck of the tank. The ratio of the areas of the chamber and the tank in a horizontal plane is equal to (or a whole number quotient of) the proportion of oil to gasoline required by the engine. The chamber is flexible enough to permit it to be folded and inserted into the filler neck of the can despite the fact that the conventional filler neck has a much smaller area than the required area of the chamber for proper metering. The chamber also has a simplified structure and a vertically operating valve insertable through the neck which utilizes the flange of the filler neck as a stop and which assists in supporting the chamber. The chamber is desirably made of neoprene or a similar flexible substance impervious to gasoline and oil.

THE PRIOR ART

This invention is a further development of the device shown in Pat. 3,316,933.

THE INVENTION

The invention consists in providing a metering chamber having only two parts, only one of which is a moving part, in simplifying the valve structure by giving it a vertical action rather than a rotary action, and most importantly in the fact that the chamber is flexible so that it may readily be inserted in a new or existing gasoline tank without any other modification whatsoever. The vertically movable valve contributes to this result, both because its limited circumferential extent permits insertion through the fuel filler neck and because it assists in stiffening the chamber vertically. The neck flange serves as its stop. Upon insertion, the user is enabled to add the precise amount of oil required for the mixture which is to fill the tank, regardless of the level existing in the tank before the filling operation, without calculations. He does not even have to read a gauge. Applicant regards neoprene having a durometer hardness between 50 and 70 as particularly suitable for use in this invention, with material of 70 hardness being preferred. The hardnesses given are illustrative rather than limitations, but it is essential to the invention that although flexible, the chamber is stiff enough to maintain its shape, and therefore the required area relationships.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical cross-sectional view through a gasoline tank showing the device of my invention installed therein, the ends of the gas tank being broken away.

FIG. 2 is an exploded perspective view of the chamber of my invention.

FIG. 3 is a horizontal cross-sectional view through the chamber of my invention taken on line 3—3 of FIG. 1.

FIG. 4 is an exploded perspective view showing the chamber of my invention with the flexible walls collapsed to a cross-sectional area sufficiently small so that said chamber may be inserted in the filler neck of a gasoline tank.

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DETAILED DESCRIPTION OF THE INVENTION

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention, which may be embodied in other specific structure. While the best presently known embodiment has been described, the details may be changed without departing from the invention, which is defined by the claims.

As shown in the drawings, a conventional gasoline tank 10 for a conventional two stroke cycle engine is provided with sidewalls 12, a bottom 14 and a top 16. Extending from the top is a filler neck having a generally cylindrical sidewall 18 and generally horizontal flange 20 provided with downwardly extending cam portions 22 to secure the cap 24.

My chamber 30 is made entirely of flexible gasoline-impervious material, such as neoprene. It has a generally cylindrical sidewall 32, a bottom wall 34 and a generally cylindrical filler neck 36 which is eccentric with regard to cylindrical sidewall 32. Cylinder 36 terminates in plain edge 37, which, when installed, lies within filler 18 and abuts flange 20. The two eccentric cylinders 32 and 36 coincide in a vertical strip portion 38. Portion 38 of sidewall 32 is bounded by a pair of vertical valve slide flanges 40 each having a portion 42 extending radially inwardly from sidewall 32 and a portion 44 extending circumferentially. The two circumferential portions 44 extend toward each other, and over a small portion of section 38 of sidewall 32. Thus flanges 40 form channels which enclose the edges of a valve slide 46. The external curvature of valve 46 matches the internal curvature of wall 32 for face contact therewith. The upper end of the valve slide 46 is provided with a tab 52 at right angles to valve slide 46 to serve as a handle. The handle may take other forms, but the form shown and described is particularly convenient and economical.

Sidewall portion 38 is provided with a vertical series of holes or orifices 48 which are aligned with like holes or orifices 50 in valve slide 46 when the slide is in its lowermost position. Holes 48 and 50 are so sized and located that they may be brought completely out of register by moving slide 46 a little more than the diameter of a hole 48—50. Valve slide 46 extends from the bottom of flexible chamber 30 to a point near the top of margin 37 of cylindrical portion 36 when it is open. It is sufficiently shorter than the height of the entire flexible chamber 30 so that it may slide upwardly between flanges 40 slightly more than the full diameter of holes 48 and 50, so that holes 50 lie against the unbroken wall portions 38 between holes 48, to seal the openings. When valve 46 is in its uppermost position, sealing the openings, its handle 52 is against flange 20 of neck 18. It will be seen that the eccentric cylinders 32 and 36 with aligned portion 38 permits the lower portion 32 to have the required area to meter oil and the upper portion 36 to fit the neck while slide 46 is aligned with both.

Chamber 30 is provided with an upper "full" mark which advantageously takes the form of a hole 54. Marker 54 is not in portion 38 covered by valve slide 46, and so is never closed. Thus it not only marks the full point, but serves as an overflow.

When fuel tank 10 is in use, the valve slide 46 is placed in its lower position, opening the holes 48 and 50 for flow of fuel. The level of fuel within chamber 30 is then the same as that within gas tank 10. When it is desired to refill the tank, valve slide 46 is grasped by handle 52 and moved to its upper position, closing the holes 48 and 50 and trapping the fuel mixture within the chamber 30. Chamber 30 is then filled with oil to the level of indicator hole 54. (Hole 54 serves as an overflow means and is not one of the holes 48 covered

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by the valve slide 46.) After filling chamber 30 with oil, valve slide 46 is moved to its lower position, releasing the oil to the interior of the tank 10, after which the tank is filled with gasoline to the same indicator 54 with valve 46 open. Because the common two stroke engine requires one part oil to 50 parts fuel, and because the area of a horizontal section of chamber 30 is one-fiftieth the area of the same section of tank 10, the proportion of oil added is correct, regardless of how much fuel remains in the tank before filling. This is known, but is here achieved with a chamber which can be added to existing tanks and having only one simple movable part, the valve slide.

While the ratio illustrated is 50:1, because that is a frequently used ratio, the same chamber may be filled with oil, the valve 46 worked to release it to tank 10, the valve 46 closed, chamber 30 refilled with oil, valve 46 opened and gasoline added to achieve roughly the 24:1 mix long required for older two stroke engines. Of course other chamber sizes could be made as required for other ratios. It will be seen that the ratio of chamber area to tank area in a given plane is desirably equal to the required oil-fuel ratio, but it may be a whole number quotient of the required ratio so that filling it completely a number of times gives the correct ratio. It will be apparent that other indicators can be added, especially on the slide 46, to enable other ratios to be used if necessary.

I claim:

1. For use in a fuel tank having a filler neck, for an engine which requires oil mixed with fuel in a specified ratio; a proportional mixing chamber adapted to extend the full height of the tank within and beneath the fuel filling opening of the tank, said chamber having a full level marking means, the ratio of the volume included in the mixing chamber below the full level marking means to the volume included within the tank being substantially a whole number quotient of the ratio of oil to fuel predetermined as suitable for the engine served by the tank, when said chamber is free-standing within the tank between the bottom and the filler neck of the tank, said chamber having flexible side and bottom walls adapted to permit said chamber to be folded for insertion into a tank through a filler neck smaller than the diameter of the chamber, said chamber having a portion at its upper end engageable with the filler neck to position said upper end within said filler neck without interfering with the placement of a cap on the filler neck, said chamber being further provided with a fuel flow opening in its sidewall, a valve guide secured to the wall of said chamber adjacent said fuel flow opening, a vertically movable valve member reciprocable on said guide to first and second positions, said valve member having a valve opening aligned with said fuel flow opening in said chamber wall in said first position of vertical reciprocation, said valve opening being out of alignment with said fuel flow opening in said chamber wall in said second position of vertical reciprocation.

2. The device of claim 1 in which said valve member is sufficiently rigid to assist in maintaining the shape of

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said chamber between the bottom of said gas tank and the filler neck.

3. The device of claim 1 in which said chamber is constructed of a substance impervious to fuel and oil, said chamber being provided near the top with a fixed indicator marking the level to which the chamber is to be filled with successive fillings of oil or fuel, and said valve having means for moving said valve member between said first and second position.

4. The device of claim 3 in which the chamber is constructed of 70 durometer artificial rubber, said indicator comprising a pressure equalizing opening in the chamber wall, said opening being in a portion of said chamber wall spaced from said valve and adjacent to said portion of said chamber adapted to engage the filler neck of said tank.

5. The device of claim 1 in which said chamber comprises a measuring portion within the body of said tank having a cross-sectional area greater than the area of the filler neck, and an upper portion which is a close fit in the filler neck, said measuring portion and said filler neck portion having a common vertical wall portion extending in a continuous vertical line, said valve means being disposed on said common vertical wall portion.

6. The device of claim 5 in which the measuring portion comprises a first larger cylindrical portion and the filler neck portion comprises a second smaller cylindrical portion eccentric to said first cylindrical portion and having a wall portion vertically aligned with the wall portion of said first cylinder, said valve operating on said vertically aligned portions, the remainder of the walls of the two cylinders being joined by a shoulder of varying width.

7. The device of claim 6 in which a pair of said valve guides are provided, said guides comprising parallel vertical oppositely directed channels formed in the wall of the chamber and disposed against the sides of the valve member.

8. The device of claim 6 in which said filler neck portion has an outer diameter substantially equal to the inner diameter of the filler neck and terminates in a free edge adapted to fit snugly under a horizontal flange at the top of the filler neck.

9. The device of claim 8 in which said valve member has a handle at its upper end comprising a flange integral with the rest of the valve member and adapted to abut the top of a tank filler neck when said chamber is in place in a tank and said valve member is in its said second position.

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U.S. Cl. X.R.

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