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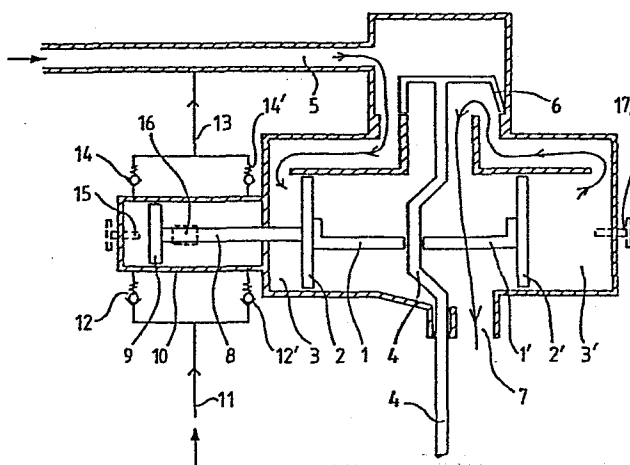
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(54) Fluid amount meter comprising a mixing system.

57) A mixing system for fluids mainly comprising a fluid pump, a fluid amount meter based on the displacer principle and a dosing pump coupled with the main pipe system in which

- a) the dosing pump is designed in the form of a displacer pump,
- b) the dosing pump is mechanically coupled with one of the moving parts of the volume gauge.



Fluid amount meter comprising a mixing system.

The invention relates to a fluid mixing system mainly comprising a fluid pump, a fluid gauge based on the displacer principle and a dosing pump coupled with the main duct system.

More particularly the invention relates to a petrol pump having a volume meter, in which precautions are taken to add a fluid such as mixed lubricant, anti-knock agents and the like in very accurately dosed amounts. Other applications are, however, not excluded.

The most conventional petrol pumps comprise a volume gauge based on the displacer principle and they have two or more single- or double-acting pistons, the reciprocatory movement of which is converted into a rotary movement of a crank shaft. The rotation drives a counter either directly or through a pulse producer and an electronic processing system. This system measures accurately at highly varying rates. Hereinafter pistons, piston rods and crank shafts of the volume gauge will be termed "moving parts".

The varying rate during operation renders it difficult to inject a fluid of highly constant ratio into the main stress. At any rate this requires a direct or indirect coupling of the dosing pump with the volume gauge, whilst it has to be ensured that the dosing pump immediately responds to the instantaneously desired amount. Therefore, mixtures (for example of petrol and two-stroke oil) have so far been held as a whole on stock.

According to the invention the problem of accurate dosing is solved when:

a) the dosing pump is designed in the form of a displacer pump

and

- b) the dosing pump is mechanically coupled with one of the moving parts of the volume gauge.

The dosing pump may be a plunger pump in which the
5 reciprocatory movement of the plunger (piston) is derived from the rotary movement of the crank shaft of the volume gauge. The rotary movement of the crank shaft may, as an alternative, be transferred to the shaft of a rotary displacer pump, for example, of the gear wheel type.

10 A very simple and satisfactorily controllable dosing system is obtained when:

- a) the dosing pump is designed in the form of a plunger pump and
- b) the plunger of the pump is mechanically coupled through a
15 tie rod with one of the pistons of the gauge.

In the latter embodiment of the invention the volume gauge and the pump perform the same strokes. However, as an alternative the stroke (volume) of the dosing pump may be controlled by means of an adjustable stop. It is then required that the
20 connection between the plunger of the pump and the piston of the gauge should be compressible.

The outlet of the dosing pump is connected with the main pipe system of the gauge. Preferably the gauge is connected with this system. The main fluid stream and the injected stream
25 are then commonly measured on a quantitative basis, which, if of course, usually desired. Moreover, there is a reasonable chance of a satisfactory mixing in the gauge.

The invention will be explained with reference to a drawing which illustrates the preferred embodiment in which the
30 piston of the gauge and the plunger (piston) of the displacer pump are coupled. The Figure is a sectional view of a volume meter known per se operating on the displacer principle and basically comprising two pistons 2 and 2' coupled with piston rods 1 and 1' and adapted to move in cylinders 3 and 3' (forming
35 a unit). The piston system 1, 1', 2, 2' is capable of rotating a shaft 4 upon the supply of fluid (petrol) through a duct 5 by means of a pump (not shown). A rotating valve 6 is rigidly secured to the shaft 4. This valve 6 allows fluid to enter alternatively the cylinders 3 and 3', whilst upon introduction into

one cylinder the fluid is expelled from the other towards the outlet 7 (in the direction indicated by the arrow).

The shaft has coupled with it a pulse producer. The generated pulses are processed by an electronic system (not shown), 5 which finally displays the number of litres dispensed as well as the amount due. The shaft 4 may, as an alternative, be coupled with a gear wheel pump (not shown), which injects fluid into the main stream simultaneously with the rotary speed of the crank shaft of the volume gauge.

10 Through a tie rod 8 the movement of the piston 2 is transferred to a plunger (piston) 9 adapted to move in a cylinder 10. The tie rod is, of course, sealed with respect to the cylinder space 3. The dosing pump comprising the plunger 9 and the cylinder 10 is, in this case, double-acting, for which purpose the 15 inlet duct 11 includes valves 12 and 12' and the outlet duct 13 includes the valves 14 and 14'.

The Figure shows the preferred embodiment in which the outlet duct 13 is connected with the main feeding duct 5. The main stream and the additive are thus commonly measured quantitatively. 20

By means of a stop 15 the stroke of the plunger of the dosing pump can be set. Of course, the tie rod 8 has to be compressible in this case, which is schematically shown by a spring 16. Adjustment of the pump is furthermore possible by 25 means:

- a) fixed stops in the meter covers (cylinder covers),
- b) adjustable stops 17 in the meter covers,
- c) said stop 15 in the pump, as the case may be, in conjunction with the a) and/or b).

30 As a matter of course, it is possible to connect each of the pistons 2, 2' etc. with a separate dosing pump 8, 9, 10, etc. so that more than one fluid can be injected into the main stream, each in the desired, set dose with respect to the main stream 5.

35 Although it is not limited thereto, the mixing system particularly relates to a petrol pump with additive dosing capacities. This will be particularly important when lead-free petrol is prescribed and anti-knock additives have to be added to the

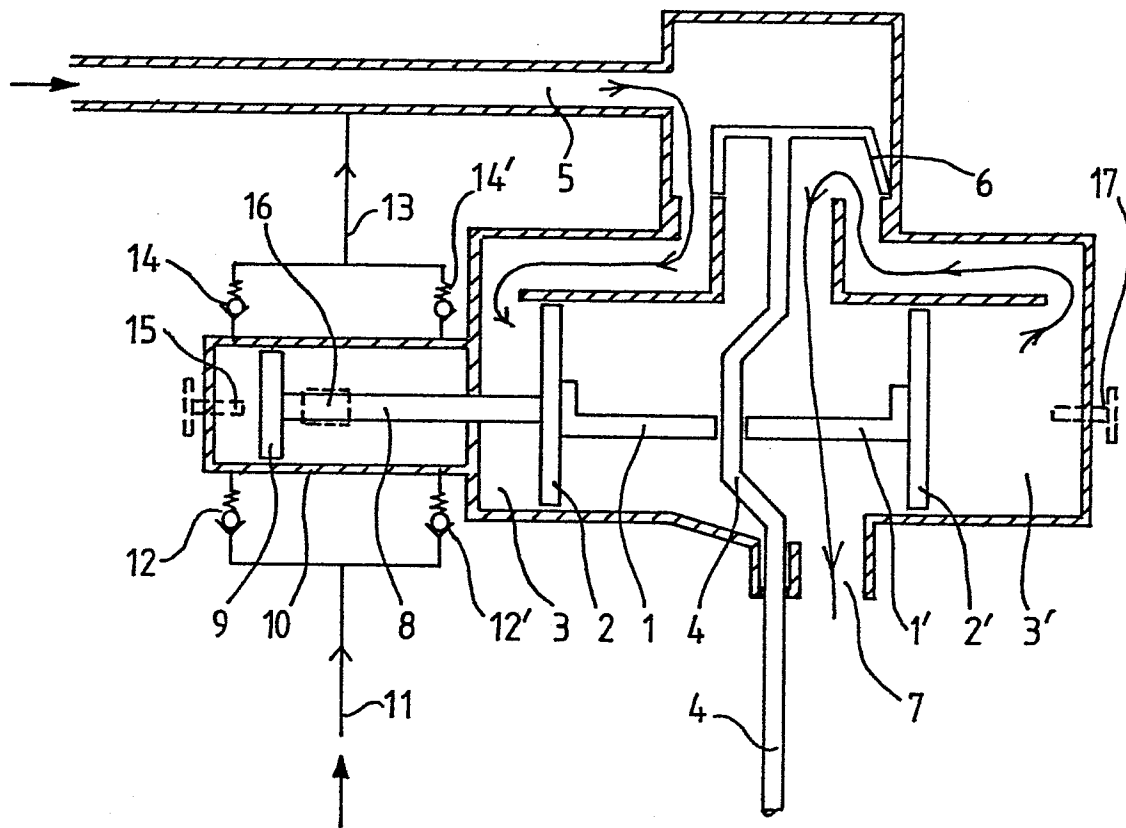
petrol. Moreover, special two-stroke oil need no longer be kept on stock when a pump embodying the invention is employed.

CLAIMS.

1. A mixing system for fluids mainly comprising a fluid pump, a fluid amount meter based on the displacer principle and a dosing pump coupled with the main pipe system characterized
5 in that
 - a) the dosing pump is designed in the form of a displacer pump,
 - b) the dosing pump is mechanically coupled with one of the moving parts of the volume gauge.
2. A mixing system as claimed in Claim 1 characterized
10 in that the dosing pump is a plunger pump, the reciprocatory movement of which is derived from the rotary movement of the crank shaft of the volume gauge.
3. A mixing system as claimed in Claim 1 characterized in that the crank shaft of the volume gauge is coupled with the
15 shaft of a rotary displacer pump, for example, a gear wheel pump.
4. A mixing system as claimed in Claim 1 characterized in that
 - a) the dosing pump is designed in the form of a plunger pump and
 - 20 b) the plunger (piston) (9) of the pump is mechanically coupled by a tie rod (8) with one of the pistons (2) of the gauge.
5. A mixing system as claimed in Claim 1 or 4 characterized in that the stroke of the dosing pump (8, 9, 10) is controllable by means of an adjustable stop (15) in conjunction with a compressible
25 tie rod (8, 16).
6. A mixing system as claimed in Claim 1, 2, 4 or 5 characterized in that the dosing pump (8, 9, 10) is a double-acting pump.
7. A mixing system as claimed in Claims 1 to 6 characterized in that the outlet (13) of the dosing pump (8, 9, 10) communicates with the inlet duct (5) of the gauge (1, 2, 3, 1', 2', 3').
8. A mixing system as claimed in Claim 1, 2, 4 to 7 characterized in that the system is adjusted by means of one or
35 more of the following stops:
 - a) fixed stops in the meter covers,
 - b) adjustable stops (17) in the meter covers,
 - c) an adjustable stop (15) in the dosing pump (8, 9, 10).

9. A mixing system as claimed in Claim 1, 2, 4 to 8 characterized in that each of the pistons (2, 2', etc.) is connected with a dosing pump (8, 9, 10, etc.).

10. A mixing system as claimed in anyone of the preceding
5 Claims characterized in that the system comprises a petrol gauge.





European Patent
Office

EUROPEAN SEARCH REPORT

0147903

Application number

EP 84 20 1923

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	BE-A- 530 438 (BECK) ---		B 67 D 5/56 B 01 F 15/04 B 01 F 3/08
A	US-A-3 316 844 (VALK) ---		
A	US-A-3 092 129 (STEEN) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 67 D B 01 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 05-04-1985	Examiner VROMMAN L.E.S.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	