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(54) **Fluid amount meter comprising a mixing system.**

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| (38) Priority: 29.12.83 NL 8304472 | (73) Proprietor: Koppens Automatic Fabrieken B.V.
Industrieweg 5
NL-5531 AD Bladel (NL) |
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10.07.85 Bulletin 85/28 | (72) Inventor: Willemsen, Henricus Johannes
Boogschutter 14
Hapert (NL) |
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12.08.87 Bulletin 87/33 | (74) Representative: Timmermans, Anthonius C.Th.,
Ir. et al
European Patent Attorneys Octrooibureau Zuid
P.O. Box 2287
NL-5600 CG Eindhoven (NL) |
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Description

The invention relates to a fluid mixing system comprising a fluid pump, a fluid amount meter based on the displacer principle and a dosing pump coupled with the main pipe system.

The invention aims at providing a petrol pump having a fluid amount meter, in which there are provisions for adding a fluid such as mixed lubricant, anti-knock agents and the like in very accurately dosed amounts. Other applications are, however, not excluded.

Most conventional petrol pumps comprise a fluid amount meter 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 fluid amount meter will be termed "moving parts".

The varying rate during operation renders it difficult to inject a fluid of highly constant ratio into the main flow. At any rate this requires a direct or indirect coupling of the dosing pump with the fluid amount meter, 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 in stock.

According to the invention the problem of accurate dosing is solved when: the dosing pump is of the displacer type and is mechanically coupled with one of the moving parts of the fluid amount meter.

The dosing pump may be a plunger pump of which the reciprocatory movement of the plunger (piston) is derived from the rotary movement of a crank shaft of the fluid amount meter by means of a connecting rod. The rotary movement of the crank shaft may, as an alternative, be transferred to the shaft of a dosing pump of the rotary type such as a gear wheel pump.

A very simple and satisfactorily controllable dosing system is obtained when the connecting rod extends between the plunger of the dosing pump and a piston of the fluid amount meter.

In the latter embodiment of the invention the plungers of the fluid amount meter and the dosing pump perform the same stroke. However, as an alternative the stroke of the dosing pump plunger may be adjustable by means of a stop in conjunction with a compressible part of the connecting rod.

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

The invention will be explained with reference to a drawing which illustrates the preferred embodiment in which the piston of the fluid amount meter and the plunger (piston) of the dosing pump are coupled. The Figure is a sectional view of a fluid amount meter known per se operating on the displacer principle and basically comprising two pistons 2 and 2' coupled with piston rods 1 and 1' adapted to move in cylinders 3 and 3' (forming a unit). The piston system 1, 1', 2, 2' is capable of rotating a shaft 4 upon the supply of a fluid such as 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), 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 4 of the fluid amount meter.

Through a connecting rod 8 the movement of the piston 2 is transferred to a plunger 9 adapted to move in a cylinder 10. The connecting 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 inlet duct 11 includes valves 12 and 12' and the outlet duct 13 includes the valves 14 and 14'.

In the preferred embodiment shown the outlet duct 13 is connected with the main pipe system 5. The main flow and the additive are thus commonly measured quantitatively.

By means of a stop 15 the stroke of the plunger 9 of the dosing pump can be set. Of course, the connecting 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 means of fixed or adjustable stops in the meter cylinder covers, and/or stop 15 in the dosing pump cover, as the case may be.

It is possible to connect each of the pistons 2, 2' with a separate dosing pump 8, 9, 10 so that more than one fluid can be injected into the main flow, each in the desired, set dose with respect to the main flow through pipe 5.

Although it is not limited thereto, the mixing system particularly relates to a petrol pump with additive dosing capabilities. 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 fluid mixing system comprising a fluid

pump, a fluid amount meter based on the displacer principle and a dosing pump coupled with a main pipe system, characterized in that the dosing pump (9, 10) is of the displacer type and is mechanically coupled with one of the moving parts of the fluid amount meter (1, 1', 2, 2', 3, 3').

2. A fluid mixing system as claimed in claim 1, characterized in that the dosing pump (9, 10) is a plunger pump, of which the reciprocatory movement of the plunger (9) is derived from the rotary movement of a crank shaft (4) of the fluid amount meter (1—3') by means of a connecting rod (8).

3. A fluid mixing system as claimed in claim 1, characterized in that a crank shaft (4) of the fluid amount meter (1—3') is coupled with a drive shaft of a dosing pump of the rotary type such as a gear wheel pump.

4. A fluid mixing system as claimed in claim 2, characterized in that the connecting rod (8) extends between the plunger (9) of the dosing pump and a piston (2) of the fluid amount meter (1—3').

5. A fluid mixing system as claimed in claim 2 or 4, characterized in that the stroke of the dosing pump plunger (9) is adjustable by means of a stop (15) in conjunction with a compressible part (16) of the connecting rod (8).

6. A fluid mixing system as claimed in claim 1, 2, 4 or 5 characterized in that the dosing pump (9, 10) is double acting.

7. A fluid mixing system as claimed in anyone of the preceding claims, characterized in that the outlet (13) of the dosing pump (9, 10) communicates with the inlet duct (5) of the main pipe system leading to the fluid amount meter (1—3').

8. A fluid mixing system as claimed in anyone of the preceding claims characterized in that the fluid amount meter (1—3') is provided with two pistons (2, 2') which are interconnected by a connecting rod (1, 1').

9. A fluid mixing system as claimed in anyone of the preceding claims characterized in that the fluid amount meter (1—3') is a meter for measuring an amount of petrol and the dosing pump (9, 10) is a pump for adding dosed amounts of one or more additions to petrol in advance of the mixture of petrol and additions being measured by the fluid amount meter (1—3').

Patentansprüche

1. Mischsystem für Flüssigkeiten, das aus einer Flüssigkeitspumpe, einem auf dem Verdrängerprinzip basierenden Flüssigkeitsmengenmesser und einer Dosierpumpe besteht, die mit dem Hauptleitungssystem verbunden ist, dadurch gekennzeichnet, daß die Dosierpumpe (9, 10) als Verdrängerpumpe ausgeführt und mechanisch mit einem der beweglichen Teile des Flüssigkeitsmengenmessers (1, 1', 2, 2', 3, 3') verbunden ist.

2. Mischsystem für Flüssigkeiten nach Anspruch 1, dadurch gekennzeichnet, daß die Dosierpumpe (9, 10) eine Plungerpumpe ist, bei

der die Hin- und Herbewegung des Plungers (9) von der Drehbewegung einer Kurbelwelle (4) des Flüssigkeitsmengenmessers (1—3') mittels einer Verbindungsstange (8) abgeleitet wird.

3. Mischsystem für Flüssigkeiten nach Anspruch 1, dadurch gekennzeichnet, daß eine Kurbelwelle (4) des Flüssigkeitsmengenmessers (1—3') an eine Antriebswelle einer rotierenden Dosierpumpe, wie einer Zahnradpumpe, gekoppelt ist.

4. Mischsystem für Flüssigkeiten nach Anspruch 2, dadurch gekennzeichnet, daß sich die Verbindungsstange zwischen dem Plunger (9) der Dosierpumpe und einem Kolben (2) des Flüssigkeitsmengenmessers (1—3') befindet.

5. Mischsystem für Flüssigkeiten nach Anspruch 2 oder 4, dadurch gekennzeichnet, daß der Hub des Plungers der Dosierpumpe (9) mittels eines Anschlags (15) kombiniert mit einem zusammendrückbaren Teil der Verbindungsstange (8) regelbar ist.

6. Mischsystem für Flüssigkeiten nach Anspruch 1, 2, 4 oder 5, dadurch gekennzeichnet, daß die Dosierpumpe (9, 10) zweifachwirkend ist.

7. Mischsystem für Flüssigkeiten nach einem der vorigen Ansprüche, dadurch gekennzeichnet, daß der Ausgang (13) der Dosierpumpe (9, 10) mit der Zufuhrleitung (5) des Hauptleitungssystems zum Flüssigkeitsmengenmesser (1—3') in Verbindung steht.

8. Mischsystem für Flüssigkeiten nach einem oder mehreren der vorigen Ansprüche, dadurch gekennzeichnet, daß der Flüssigkeitsmengenmesser (1—3') mit 2 Kolben (2, 2') versehen ist, die mittels einer Verbindungsstange (1, 1') miteinander in Verbindung stehen.

9. Mischsystem für Flüssigkeiten nach einem oder mehreren der vorigen Ansprüche, dadurch gekennzeichnet, daß der Flüssigkeitsmengenmesser (1—3') ein Messer zur Messung einer Benzinmenge ist und daß die Dosierpumpe (9, 10) eine Pumpe ist, mit der dosierte Mengen eines oder mehrerer Zusätze zum Benzin hinzugefügt werden, bevor der Flüssigkeitsmengenmesser (1—3') das Gemisch aus Benzin und Zusätzen mißt.

Revendications

1. Système pour le mélange de liquides, consistant dans une pompe à liquide, un appareil servant à mesurer une quantité de liquide qui repose sur le principe du refoulement, et une pompe doseuse reliée au système de conduite principale, caractérisé par ce que la pompe de dosage (9, 10) est construite comme pompe refoulante et reliée mécaniquement à l'une des parties mobiles de l'appareil servant à mesurer une quantité de liquide (1, 1', 2, 2', 3, 3').

2. Système pour le mélange de liquides selon la revendication 1, caractérisé par ce que la pompe de dosage (9, 10) est une pompe à piston dans laquelle le mouvement de va-et-vient du piston (9) est dérivé, au moyen d'une tige de liaison (8) du mouvement de rotation d'un vilebrequin (4) de l'appareil servant à mesurer une

quantité de liquide (1—3').

3. Système pour le mélange de liquides selon la revendication 1, caractérisé par ce qu'un vilebrequin (4) de l'appareil servant à mesurer une quantité de liquide (1—3') est relié à un axe d'entraînement d'une pompe de dosage rotative, telle qu'une pompe à engrenage.

4. Système pour le mélange de liquides selon la revendication 2, caractérisé par ce que la tige de liaison (8) est située entre le piston (9) de la pompe de dosage et un piston (2) de l'appareil servant à mesurer une quantité de liquide (1—3').

5. Système pour le mélange de liquides selon les revendications 2 ou 4, caractérisé par ce que la course du piston de la pompe de dosage (9) est réglable au moyen d'une butée (15), combinée avec une partie compressible de la tige de liaison (8).

6. Système pour le mélange de liquides selon les revendications 1, 2, 4 ou 5, caractérisé par ce que la pompe de dosage (9, 10) est à double effet.

7. Système pour le mélange de liquides selon

une ou plusieurs des revendications qui précèdent, caractérisé par ce que la sortie (13) de la pompe de dosage (9, 10) communique avec la conduite d'alimentation (5) du système de conduite principale qui va vers l'appareil servant à mesurer une quantité de liquide (1—3').

8. Système pour le mélange de liquides selon une ou plusieurs des revendications qui précèdent, caractérisé par ce que l'appareil servant à mesurer une quantité de liquide (1—3') est équipée de 2 pistons (2, 2') qui sont reliés entre eux par l'intermédiaire d'une tige de liaison (1, 1').

9. Système pour le mélange de liquides selon une ou plusieurs des revendications qui précèdent, caractérisé par ce que l'appareil servant à mesurer une quantité de liquide (1—3') est un appareil pour mesurer une quantité d'essence, et que la pompe de dosage (9, 10) est une pompe pour introduire dans l'essence des quantités dosées d'une ou plusieurs additifs avant que l'appareil à mesurer une quantité de liquide (1—3') ne mesure le mélange d'essence et d'additifs.

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