

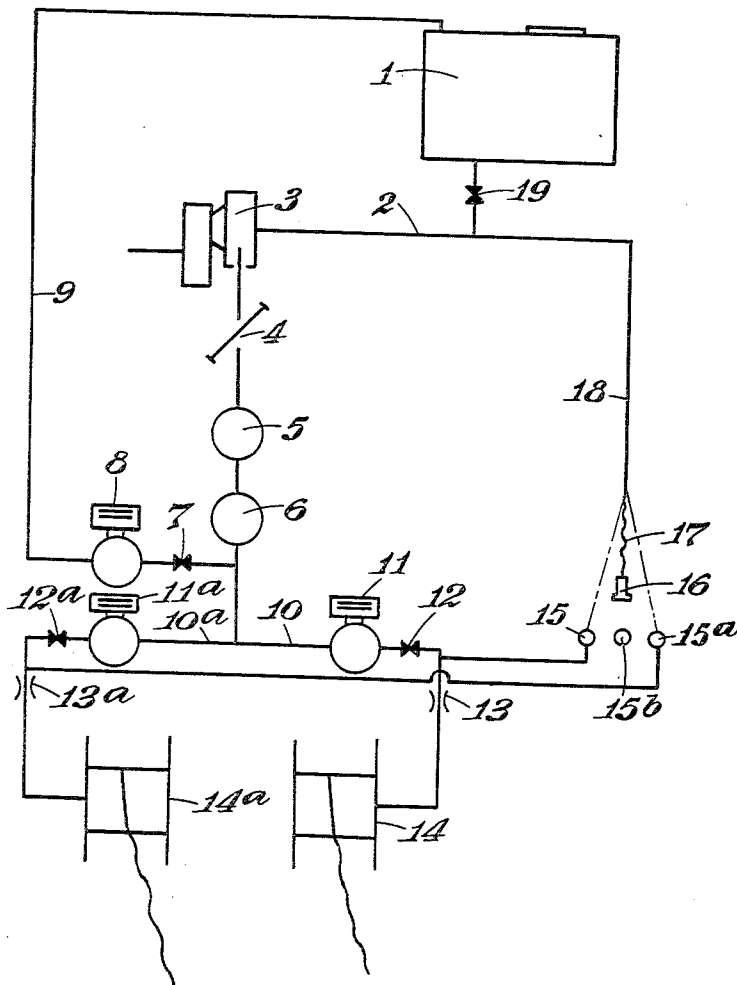
May 31, 1960

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2,938,535

LIQUID SUPPLY APPARATUS

Filed Sept. 24, 1956



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2,938,535

LIQUID SUPPLY APPARATUS

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Filed Sept. 24, 1956, Ser. No. 611,536

Claims priority, application Great Britain Sept. 28, 1955

2 Claims. (Cl. 137—351)

This invention relates to improved liquid supply apparatus. More particularly it relates to apparatus for the metered supply of liquid both to and from a storage tank.

Fuel tanker vehicles are known in which the fuel is supplied from a storage tank, via a four way valve, to the suction side of a fuel supply pump, the fuel thereafter being passed through a pressure control valve, micro-filter, air separator and fuel supply meter and again through said four way valve to a fuel supply hose. By manipulation of said four way valve, the overall direction of flow of the fuel can be reversed whereby fuel is drawn through said hose to the suction side of the fuel supply pump, the fuel thereafter being passed through said pressure control valve, micro-filter, air separator and fuel supply meter and again through said four way valve to said storage tank. This system while providing for the use, both in supply from and return of fuel to storage, of a single fuel supply pump, fuel meter and auxiliary equipment is open to the disadvantage that, simultaneously, two fuel streams are passed through the four way valve. Any defect in the valve which leads to internal leakage will have the effect of recycling fuel through the fuel pump and hence through the fuel supply meter, leading to inaccurate record of the amount of fuel transferred.

It is an object of the present invention to provide a liquid supply apparatus capable of metering both the flow of fluid from a zone A to a zone B and from zone B to zone A under the action of a pump whereby inaccuracy of metering due to internal leakage of fluid within the apparatus is avoided.

It is a further object of the present invention to provide apparatus for the metered supply of liquid, said apparatus being capable of use for the transference of liquid either to or from storage, which ensures that no inaccuracies of metering arise from recycle of supplied liquid through the metering stage when transferring the liquid from storage.

Further objects will appear from the following description, the accompanying drawing and the appended claims.

Of the drawing:

The figure is a schematic diagram of a fluid supply system, embodying this invention.

The apparatus may incorporate conventional auxiliary equipment such as pressure control valves, venturis, filters and air separators.

The apparatus of the present invention is further illustrated with reference to the accompanying drawing which is a schematic diagram of a fuel supply installation of a fuel supply tanker vehicle suitable for the fuelling of aircraft with gasoline or kerosene.

With reference to said drawing:

A bulk tank 1 of the fuel supply tanker vehicle is connected by valve 19 and line 2 to the suction side of a fuel discharge pump 3. From the delivery side of said

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pump, fuel is passed through a pressure control valve 4, micro-filter 5 and air separator 6. To the delivery side of said air separator is connected a valve 7, a "fuel returned" meter 8 and fuel return line 9 by which fuel may be returned to tank 1.

To the delivery side of said air separator is also connected in duplicate the following system:

A line 10 from said air separator delivery side is connected to delivery meter 11, fuel thence passing through manual valve 12, venturi 13 and hose 14. Between valve 12 and venturi 13 a line is provided to the socket 15 of a self-sealing detachable coupling, that is, a coupling such that the components thereof are constructed to ensure that, after separation one from the other, the components do not permit the flow of liquids from the ends so exposed.

The duplicate system is indicated on the drawing by the corresponding numerals with the suffix "a."

A coupling component 16 is connected as required to either of sockets 15 and 15a or to a "blind" socket 15b. Coupling component 16 is connected by hose 17 and line 18 to line 2.

The venturis 13 and 13a are employed in conventional manner to operate pressure control valve 4.

With further reference to the drawing, the fuel supply installation of the fuel supply tanker vehicle is operated in the following manner.

For the discharge of fuel from the vehicle bulk tank 1, coupling component 16 is attached to the blind socket 15b, thereby blanking off line 18. Valve 7 is closed. Valves 12 and 19 are opened whereby, on operation of pump 3, fuel is fed from tank 1 via valve 19, line 2, pump 3, valve 4, filter 5, separator 6, line 10, meter 11, valve 12, venturi 13 to hose 14. If desired valve 12a may be opened to provide similarly a supply of fuel to hose 14a.

Since no physical connection exists at 15 or 15a it is impossible for fuel, once metered to recycle to the pump 3.

For defuelling from hose 14, valve 7 is opened, valves 12, 12a and 19 are closed and coupling component 16 is connected to socket 15. On operation of pump 3, fuel is drawn from hose 14, via venturi 13, socket 15, coupling component 16, hose 17, line 18, line 2, pump 3, valve 4, filter 5, separator 6, valve 7, "fuel returned" meter 8, line 9 to tank 1.

For defuelling from hose 14a, similar procedure is followed except that coupling component 16 is attached to socket 15a.

I claim:

1. A fluid supply system capable of metering both the flow of fluid from a first zone to a second zone and from said second zone to said first zone and whereby inaccuracy of metering due to internal leakage of fluid within the apparatus is avoided at least during fluid flow in one direction, said system comprising a pump; a feed line including a shut-off valve for feeding fluid from said second zone to the suction side of said pump; a first meter for measuring fluid supplied to said first zone from said second zone, a first valve and a first line, said first line, in operation, connecting said first zone through said first meter and through said first valve to said delivery side of said pump, said first meter being between said first valve and the delivery side of said pump; a second meter for measuring fluid supplied to said second zone from said first zone, a second valve and a second line, said second line, in operation, connecting said second zone through said second meter and through said second valve to the delivery side of said pump, said second valve being between said second

meter and the delivery side of said pump; a third line which, in operation, is connected to the suction side of said pump and to said first line on the downstream side of said first valve and which is capable of connection and disconnection, to said first line on the downstream side of said first valve, self-sealing, detachable coupling means being provided in said third line for effecting said connection and disconnection, said coupling means serving when said third line is disconnected from said first line, to ensure that leakage cannot take place through said third line into said first line during use of the system for fluid flow from said second zone to said first zone.

2. A liquid supply installation comprising the apparatus according to claim 1 wherein said second zone is

a storage tank, said storage tank being connected to said second line downstream of said second meter, and to the suction side of said pump.

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