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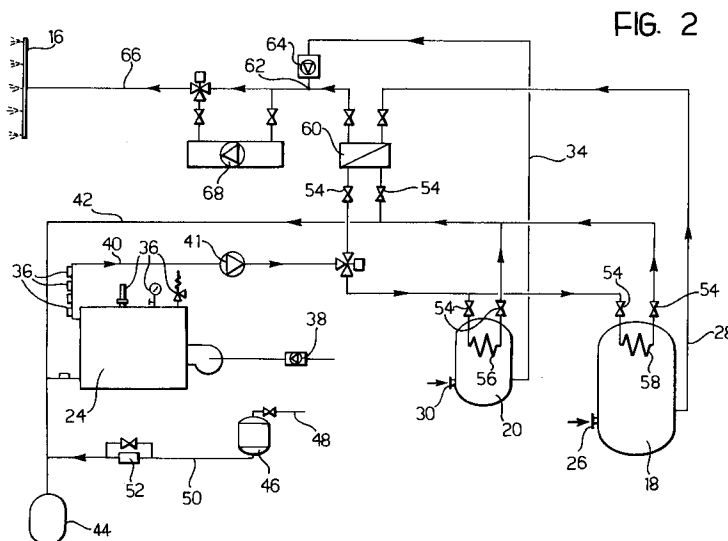
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I-10121 Torino (IT)(54) **A unitary assembly for use on a motor vehicle suitable for clearing roads of snow and ice.**

(57) The unitary assembly (14) is adapted for use on a motor vehicle (10) suitable for clearing roads of snow and ice by means of spraying jets of a heated saline solution. It includes: a larger tank (18) for containing water and having an outlet duct; a smaller tank (20) for containing a concentrated saline solution and having an outlet duct (34); and a compartment (22) containing a boiler (24) for heating a diathermic fluid intended to flow through heat ex-

changers (56, 60) within the smaller tank (20) and around the outlet duct (28) from the larger tank (18) respectively, and means (64) for mixing the flows from the outlet ducts (28, 34) from the larger tank (18) and the smaller tank (20) and subsequently for supplying the more dilute saline solution obtained by the mixing of the flows to a spray device (16) carried by the motor vehicle (10).

**EP 0 560 243 A1**

The present invention relates to a unitary assembly for use on a motor vehicle suitable for clearing roads of snow and ice by means of spraying jets of heated saline solution.

The object of the present invention is to provide a unitary assembly which can produce an adequate volume of heated saline solution for the requirements and which may be mounted simply and quickly on the flat-bed of a motor vehicle with suitable links being made to the hydraulic, electrical and compressed air circuits of the latter.

This object is achieved by virtue of a unitary assembly characterised in that it includes:

- a larger tank for containing water and having an outlet duct,
- a smaller tank for containing a concentrated saline solution and having an outlet duct, and
- a compartment containing a boiler for heating a diathermic fluid intended to flow through heat exchangers within the smaller tank and on the outlet duct from the larger tank respectively, and means for mixing the flows from the outlet ducts of the larger and smaller tanks, and subsequently for supplying the more dilute saline solution obtained from the mixing of the flows to a spray device carried by the motor vehicle.

The device of the invention has the advantage of requiring a fairly low-powered boiler since it does not have to keep all the water in the larger tank at temperature but needs only heat the water which flows through the outlet duct of the latter and which is intended for mixing with the more concentrated solution from the smaller tank, forming a more dilute solution suitable for spraying on the roads.

Unitary assemblies according to the invention may be produced in various versions so as to be adapted for use on motor vehicles used on longer stretches of motor roads, for use on smaller motor vehicles for roads outside towns and of average length and for even smaller motor vehicles for use in towns.

A further subject of the present invention is a motor vehicle characterised in that it carries a unitary assembly of the type described above on its flat-bed.

Further advantages and characteristics of the present invention will become apparent from the detailed description which follows given with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figure 1 is a schematic plan view of a motor vehicle according to the invention, and
Figure 2 is a diagram illustrating the operation of the hydraulic circuits of the assembly of the invention.

A motor vehicle 10 suitable for clearing roads of snow and ice carries a unitary assembly 14 on its flat-bed 12 for providing a heated saline solution to a spray device 16 of the bar type mounted on the front part of the motor vehicle 10.

The unitary assembly 14 includes a larger tank 18 for containing water, a smaller tank 20 for containing a concentrated saline solution, and a compartment 22 for covering a boiler 24 and pumps as will be described in more detail below.

The unitary assembly 14 is provided with supports and attachments not illustrated in the drawings for fixing it to the flat-bed 12 of the motor vehicle 10.

The larger tank 18 is covered with a layer of insulating material and provided with a filter, not illustrated, for purifying the water, and has an aperture 26 for the introduction of water and an outlet duct 28.

The smaller tank 20 is covered with a thick layer of insulating material, has an aperture 30 for the introduction of water, an access opening 32 for the introduction of a saline substance, such as, for example, sodium, magnesium or calcium chloride, and an outlet duct 34.

The compartment 22 is made of metal with an internal lining of flame-retardant material and has a system for automatically putting out fires of the carbon dioxide or powder type.

The boiler 24 includes known control and regulating instrumentation 36 and a pump 38 for supplying diesel oil from a suitable reservoir, not illustrated in the drawings. The combustion of the diesel oil heats a diathermic fluid which flows from the boiler 24 through a delivery duct 40 including a circulation pump 41 and from there flows back through a return duct 42.

The diathermic fluid circuit is completed by an expansion vessel 44 and an auxiliary, refill reservoir 46 kept under pressure by a duct 48 for supplying compressed air connected to the main circuit by a duct 50 provided with a supply pump 52.

Three heat exchangers 56, 58 and 60 are connected in parallel between the delivery duct 40 and the return duct 42 of the diathermic fluid circuit and can be isolated selectively by respective valves 54, the heat exchangers being positioned respectively within the smaller tank 20, within the larger tank 18 and around the outlet duct 28 of the latter.

The outlet duct 28 joins the outlet duct 34 from the smaller tank 18 at a junction 62. A diaphragm metering device 64 is located in the duct 34 before the junction 62.

The junction 62 is connected to the spray device 16 of the motor vehicle 10 by a duct 66 through which the saline solution is made to flow by a high-pressure, multistage pump 68 driven by its own diesel engine.

Alternatively the energy needed for its operation could be electrical energy produced by a generator.

Before being put in service, a motor vehicle 10 provided with a unitary assembly 14 according to the invention, is supplied with water and the saline substance, preferably at service stations having a water supply and a salt deposit, so as to fill the larger and smaller reservoirs 18, 20.

The water is preferably supplied at a minimum temperature of about 40 °C and the quantity of salt supplied to the smaller reservoir 20 is such as to give a concentration of the salt in the concentrated solution of about 70%.

As the motor vehicle 10 travels, the concentrated saline solution is further heated by the heat exchanger 56 while the exchanger 58 in the larger tank is used only if the ambient temperature is very low and there is a danger of the water freezing within it.

The more dilute saline solution is obtained by the mixing of the flows in the outlet ducts 28 and 34 from the tanks 18 and 20, the metering device 64 being regulated suitably to give a salt concentration of between 10% and 15%.

The temperature of the solution resulting from the mixture of the two flows is preferably about 80 °C at most and is regulated by suitable variation of the diathermic fluid flows in the exchangers 56 and 60 and the ratio of the flows in the outlet ducts 28 and 34.

The more dilute solution thus obtained is supplied to the spray device 16 by the pump 68 at a pressure of up to 50 bars and with a flow suitable to the speed of the motor vehicle which is at least 30 or 35 km/h but which naturally will vary according to the thickness of the snow cover. Naturally all the said regulations may be carried out by means of a control panel located in the driving cab of the motor vehicle 10.

Claims

1. A unitary assembly (14) for use on a motor vehicle (10) for clearing roads of snow and ice by means of spraying jets of heated saline solution, characterised in that it includes:
 - a larger tank (18) for containing water and having an outlet duct (28),
 - a smaller tank (20) for containing a concentrated saline solution and having an outlet duct (34), and
 - a compartment (22) containing a boiler (24) for heating a diathermic fluid intended to flow through heat exchangers (56, 60) within the smaller tank (20) and on the outflow duct (28) from the larger tank (18) respectively, and means (64)

for mixing the flows from the outlet ducts (28, 34) of the larger tank (18) and the smaller tank (20), and subsequently for supplying the more dilute saline solution obtained from the mixing of the flows to a spray device (16) carried by the motor vehicle (10).

2. A unitary assembly (14) according to Claim 1, characterised in that the mixing means include a diaphragm metering device (64) in the outlet duct (34) from the smaller tank (20) before its junction (62) with the outlet duct (28) from the larger tank (18).
3. A unitary assembly (14) according to any one of the preceding claims, characterised in that the means for supplying the more dilute saline solution include a high-pressure, multistage pump (68) located downstream of the junction (62) of the outlet ducts (28, 34) from the larger (18) and smaller (20) tanks.
4. A unitary assembly according to any one of the preceding claims, characterised in that a heat exchanger (58) is located within the larger tank (18) and is traversed by the diathermic fluid from the boiler (24) which heats the water in the larger tank (18).
5. A motor vehicle (10) for clearing roads of ice and snow, characterised in that it carries a unitary assembly (14) according to any one of the preceding claims on its flat-bed (12).

FIG. 1

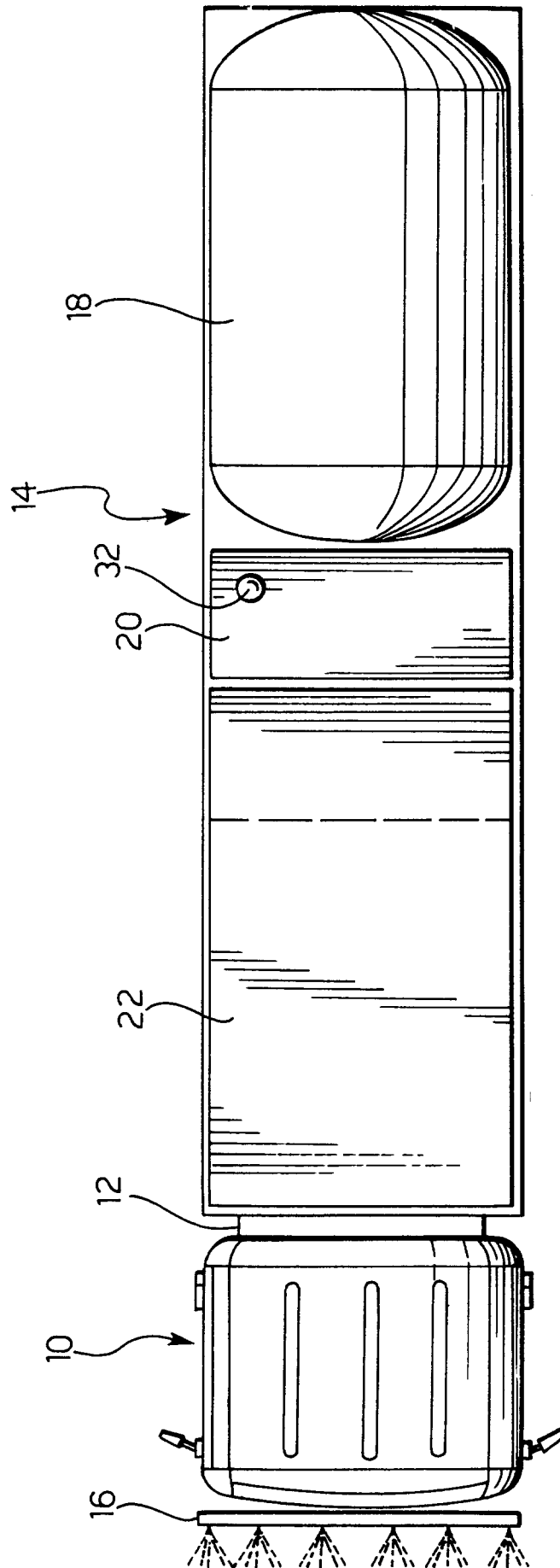
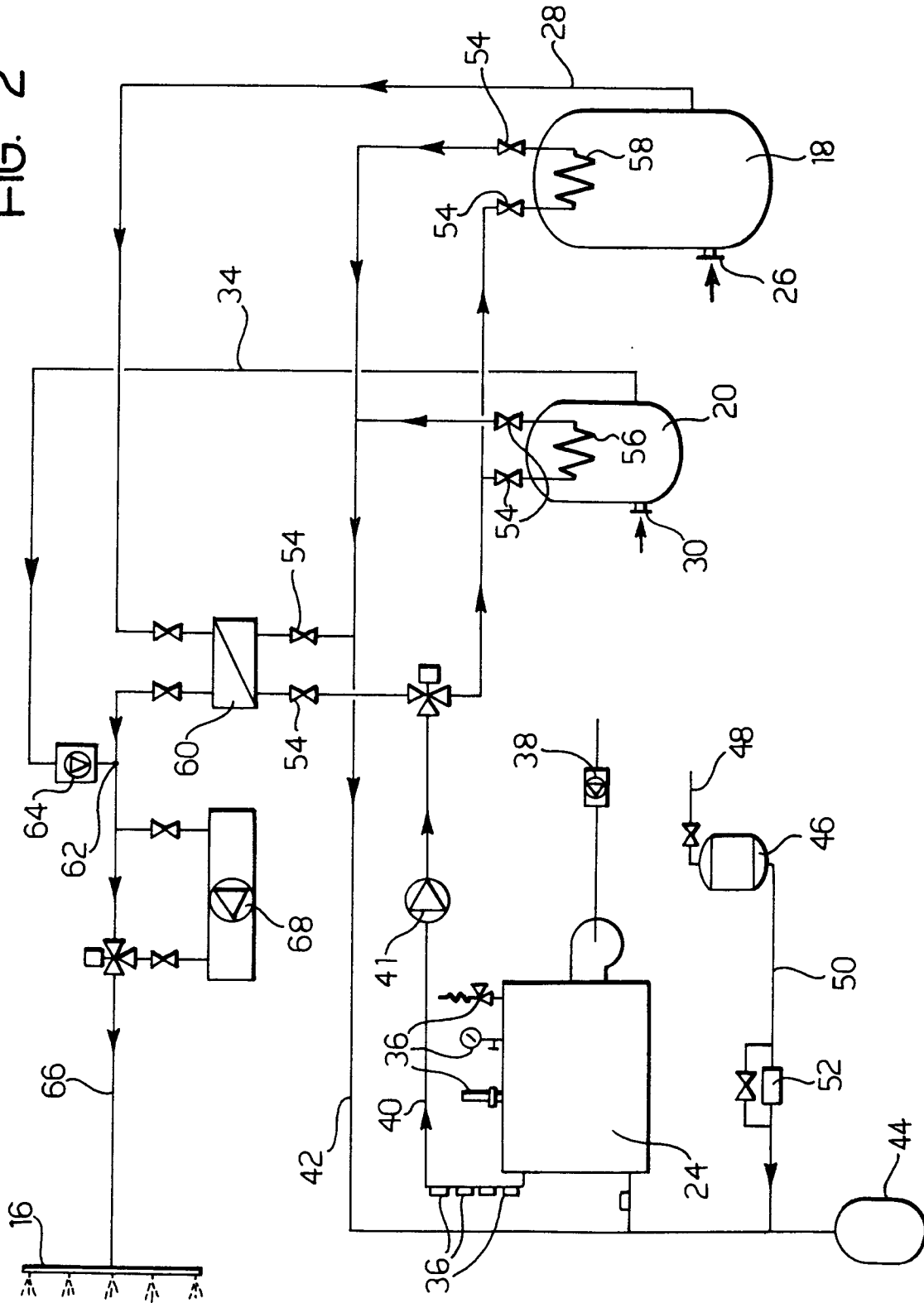


FIG. 2





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EUROPEAN SEARCH REPORT

Application Number

EP 93 10 3652

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.5)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 MAY 1993	Examiner DIJKSTRA G.
CATEGORY OF CITED DOCUMENTS			
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