This invention relates to a priming system for dual pump installations, and has for its principal object the provision, for one pump of such an installation, of an automatic priming system of improved reliability not dependent upon external or indirect sources of power for its operation.

The use of eductors for priming pumps has been generally accepted when manual operation of the priming systems is permissible. A common arrangement of this device for pump priming provides an external supply of water under pressure to operate the eductor, which is connected by suitable piping to evacuate air and vapor from the pump and a check valve installed adjacent to the pump discharge to prevent air from entering the pump during the priming operation. When automatic priming is required, the use of separate vacuum pumps or booster pumps is often resorted to. Vacuum pumps are usually installed with piping connections similar to those used for an eductor; the vacuum pump, however, requires no external supply of water under pressure, but requires a power supply for its operation. Booster pumps are usually installed in a location that insures a gravity supply of water to the booster pump, and connected to discharge water continuously to the pump requiring priming. An electric motor is commonly used to drive the booster pump.

It is therefore an object of the present invention to overcome, in the case of dual pump installations, the disadvantages inherent in systems such as those described above, and in particular to provide a system having the maximum obtainable reliability of operation, but of minimum complexity and requiring a minimum quantity of equipment. A further object is to provide a priming system for dual pump installations wherein the operation of the priming systems will not result in admixture of the fluid normally pumped by one pump with the fluid normally pumped by the other pump.

In order to make the invention more clearly understood, there is shown in the accompanying drawing one embodiment of means for carrying the invention into practical use, without limiting the improvements in their useful application to the particular construction, which, for the purpose of explanation, have been made the subject of illustration.

The single figure of the accompanying drawing is a view showing an end elevation of a marine internal combustion engine having two centrifugal pumps used in the operation of the engine cooling system, wherein a portion of the water discharged from the jacket water pump is used to automatically prime the sea water pump.

In this drawing is illustrated a Diesel engine having a jacket water pump 1 and a sea water or raw water pump 2. The jacket water pump is shown connected in a conventional manner to draw jacket water from a heat exchanger 23 by means of pipe 3 and to discharge the water to the engine cooling passages by means of jacket water discharge pipe 4. From the engine cooling passages the jacket water returns via pipe 24 through the heat exchanger to pipe 3 and to the jacket water pump. Surge tank 5 is connected to the jacket water system through pipe 6 and functions, in part, to maintain the jacket water system, including the jacket water pump, heat exchanger, engine cooling passages, and the piping, completely filled. The sea water pump 2 draws water through the sea water suction pipe 7 from a source of water, the surface level of which may be below the pump, and discharges water through check valve 9 and water discharge pipe 8 to the heat exchanger.

The priming system is comprised as follows: a pressure responsive valve 10 so constructed that application of pressure from pipe 21 on diaphragm 21' closes the valve, the valve maintaining an open position when pressure is not so applied; a water jet eductor 11 is so arranged that the lateral suction created by a jet of water supplied through eductor actuating pipe 16 acts to evacuate the priming pipe 20, the fluid so evacuated being discharged with the actuating water through eductor discharge pipe 17; a float operated valve 12 so constructed that the valve is closed by the action of liquid entering and filling the valve chamber, the valve maintaining an open position when liquid is not so present; a tank 13 so arranged that fluid passing through priming line passes also through this tank; tank 13 is provided with an indicator 14 which functions to indicate the height of the liquid level within the tank; check valves 8 and 15 connected and arranged to permit flow in the manner shown. These various items are connected by pipes 16, 17, 18, 19, 20 and 21.

The operation of the apparatus is as follows. Upon starting the engine the jacket water pump will immediately function to force jacket water around the closed jacket system. Sea water pump 2 may, however, fail to draw water unless the pump casing is filled. In this event the sea water pump will fail to create a pressure in the sea...
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3. The priming system of claim 1 comprising also a valve responsive to the position of the liquid level in said passage, adapted, in said passage, to prevent the flow of liquid from the first said pump to the eductor.

5. The priming system of claim 1 comprising also a valve, responsive to the pressure in first said pump, adapted to control the flow of water between the jacket water pump and the eductor, and a valve responsive to the position of the liquid level in said passage, positioned in said passage and adapted to prevent the flow of liquid from the first said pump to the eductor.

8. In a priming system for a first pump having a fluid cooled internal combustion engine as motive power, an eductor, a second pump driven by said engine for circulating engine cooling fluid from said second pump to said eductor, and a passage connecting said eductor to said first pump to evacuate air therefrom, a valve in said means responsive to the discharge pressure of said first pump to prevent the flow of cooling fluid to said eductor when said first pump is primed.

7. A priming system as claimed in claim 6, and a check valve connected in the discharge of said first pump to prevent leakage of air into the pump while priming.

9. A priming system as claimed in claim 6, and a check valve in said passage adapted to prevent passage of water therethrough when said first pump is primed.

What is claimed is:

1. A priming system for a pump driven by an internal combustion engine provided with a jacket water pump also driven by the engine, comprising an eductor through which water is forced by the jacket water pump, the eductor being adapted to evacuate air and vapor from the first said pump via a passage connecting the first said pump and the eductor, means to prevent flow of fluid into the first said pump through its outlet and means adapted to prevent flow of fluid from the eductor to said first pump.

2. The priming system of claim 1 comprising also a valve, responsive to the pressure in the first said pump, adapted to control the flow of water between the jacket water pump and the eductor.

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