June 8, 1937. A. LAMÈRE 2,083,167

TURBO-PUMP UNIT FOR EXTINGUISHING FIRES

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Fig. 1.

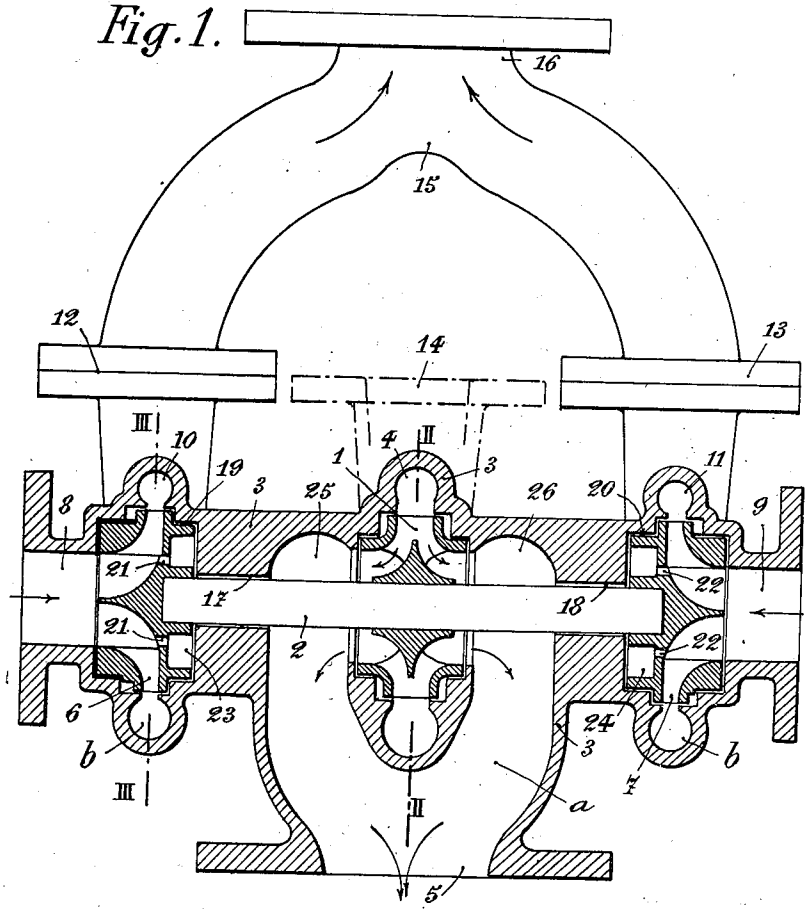


Fig. 2.

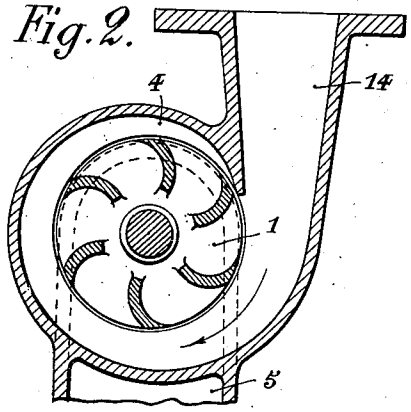
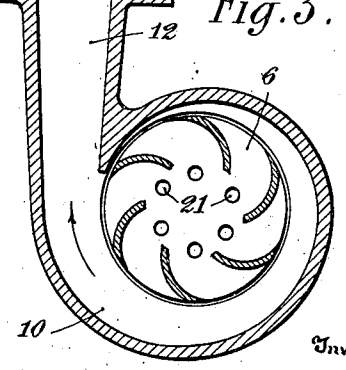


Fig. 3.



Inventor

André Lamère

By

Cameron, Kerkam & Sutton

Attorneys.

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TURBO-PUMP UNIT FOR EXTINGUISHING FIRES

André Lamère, Paris, France, assignor to Société de Moteurs à Gaz et d'Industrie Mecanique, Paris, France, a company of France

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2 Claims. (Cl. 103—87)

The present invention relates to improvements in motor-pump units intended for extinguishing fires by projecting upon the seat of the fire a chemical foam formed at the moment of use by the union in a common delivery conduit of two solutions which cause the formation of the said foam when mixed together, the said solutions being supplied by two separate conduits fed respectively by two pumps driven by a motor common to both.

In the motor-pump unit according to the invention, the two pumps each forcing one of the two solutions respectively are centrifugal pumps driven by the same hydraulic turbine mounted on the shaft common to the two pumps and between the latter, the two wheels of the pumps and the wheel of the turbine being moreover disposed in a common casing frame carrying the suction and delivery connecting pieces necessary for the pumps, as well as the admission and outlet connecting pieces for the turbine. The device furthermore comprises means for preventing, without the use of a stuffing box, any mixing of the solutions in the interior of the casing. There is thus provided a compact and perfectly balanced construction, which is easy to keep in repair and ensures an irreproachable operation of the turbo-pump unit.

In the accompanying drawing showing by way of example a form of construction of the invention, Figure 1 is a sectional elevation on the axis of the shaft common to the pumps and turbine, Figure 2 is a cross-section of the turbine on the line II—II of Figure 1 and Figure 3 is a cross-section of one of the pumps on the line III—III of the same Figure 1.

The turbine comprises a blade wheel or impeller 1 mounted on a shaft 2 and rotating in a central chamber *a* of a casing frame 3 common to the turbine and to the pumps. The water under pressure enters through the distributor or guide ring 4, passes through the blade wheel 1 in the directions shown by the arrows, and leaves by the connecting piece 5.

Two centrifugal pump discs 6 and 7 are mounted on the ends of the shaft 2 suitably extended for that purpose, and rotate in the same casing frame 3, in which are provided the two end chambers *b, b*. The disc 6 draws one of the solutions through the conduit 8 and the disc 7 draws the other solution through the conduit 9. The solutions are delivered into diffusers 10 and 11, provided in the end chambers of the said casing frame 3. The outlets 12 and 13 of these diffusers are connected by a header 15 having the form of an inverted Y in the leg of which the mixing of the two liquids takes place. The resulting emulsion leaves by 16 to be directed towards the nozzle of the fire hose.

In order to prevent the elementary solutions from passing through the bearings 17 and 18 provided in the frame for the shaft 2 and mixing in the turbine, a partial vacuum is created in the said bearings by utilizing for this purpose the known means for reducing leakage between the discs of the pump and the casing. The discs 6 and 7 comprise an external flange 19, 20 confining a lateral chamber 23, 24 and forming a baffle, and also orifices 21 and 22 putting the back of each disc into communication with the corresponding suction chamber. Due to the said holes and baffles, the suction pressure prevails in the chambers or compartments 23 and 24. It is then merely necessary to select the pressure so that at the outlet of the turbine at 25 and 26, in the vicinity of the bearings 17 and 18, it is greater than the suction pressure of the discs 6 and 7, for example by creating a sufficient loss of head at the outlet 5 of the turbine. Under these conditions, leakage occurs from 25 towards 23 and from 26 towards 24 but not in the opposite direction.

I claim:

1. A turbo-pump unit of the type adapted to separately deliver two different water-miscible liquids to a common mixing chamber and delivery conduit, comprising a common casing for housing all of the elements of said unit, a pair of pump chambers disposed within said casing at the opposite ends thereof, a turbine chamber disposed within said casing between said pump chambers, a hydraulically operated turbine in said turbine chamber, a shaft for said turbine, packless bearings for said shaft in the walls of said casing between said turbine chamber and said pump chambers, the ends of said shaft extending through said walls and into said pump chambers, centrifugal pump impellers mounted in said pump chambers on the ends of said shaft, separate inlets to said pump chambers coaxial with said shaft for supplying the water-miscible liquids thereto, separate outlets from said pump chambers joining in a common mixing chamber, a separate inlet and outlet for said turbine chamber, said turbine outlet being in direct communication with the inner ends of said packless bearings and so constructed and arranged that the pressure of the water discharged therefrom exceeds the suction pressure of each of said pumps, and means for establishing communication between

the outer ends of said bearings and the suction sides of said pump impellers, whereby a pressure differential is created that forces any leakage through said bearings to flow from said turbine chamber to said pump chambers and prevents any passage of the water-miscible liquids into the turbine chamber.

2. A fire fighting, turbo-pump unit of the type adapted to separately deliver two different water-miscible liquids to a common mixing chamber and delivery conduit wherein their mixture produces a fire extinguishing foam, comprising a common casing for housing all of the elements of said unit, a pair of pump chambers disposed within said casing at the opposite ends thereof, a turbine chamber disposed within said casing between said pump chambers, a hydraulically operated turbine in said turbine chamber, a shaft for said turbine, packless bearings for said shaft in the walls of said casing between said turbine chamber and said pump chambers, the ends of said shaft extending through said walls and into said pump chambers, centrifugal pump impellers mounted in said pump chambers on the ends of said shaft, separate inlets to said pump chambers coaxial with said shaft for supplying the water-miscible, foam-producing liquids thereto, separate outlets from said pump chambers joining in a common mixing chamber, a separate inlet and outlet for said turbine chamber, said turbine outlet being in direct communication with the inner ends of said packless bearings and so constructed and arranged that the pressure of the water discharged therefrom exceeds the suction pressure of each of said pumps, leakage receiving pockets formed between said pump impellers and the adjacent walls of said casing and in direct communication with the outer ends of said bearings, and openings in said impellers providing communication between said pockets and the suction sides of said impellers, whereby a pressure differential is created that forces any leakage through said bearings to flow from said turbine chamber to said pump chambers and prevents any passage of the foam-producing liquids into the turbine chamber.

ANDRÉ LAMÈRE.