

APPARATUS FOR DISTRIBUTING FUEL IN INTERNAL COMBUSTION ENGINES.

1,026,732.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR DISTRIBUTING FUEL IN INTERNAL-COMBUSTION ENGINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HANS TH. BRUNS, a subject of the King of Prussia, residing at Nuremberg, in the Kingdom of Bavaria and German Empire, have invented an Improved Apparatus for Distributing Fuel in Internal-Combustion Engines, of which the following is a specification.

This invention relates to "an improved apparatus for distributing fuel in internal combustion engines."

In internal combustion engines the fuel, such as benzin, petroleum, or heavy oils, is supplied to the spraying jets or nozzles at regular intervals of time, either by automatic flow under an unvarying head of pressure, by means of constant air pressure, or by means of a special pump. The present invention is only directed to engines of the latter class, in which the fuel is supplied to the cylinders by means of special oil pumps. In the known machines of this kind the fuel is drawn by the oil pumps from a reservoir communicating with the atmosphere and forced to the atomizer in suitable quantities. This method of distributing the oil is, however irregular and this defect cannot be wholly obviated by the provision of correcting means, such as floats or the like, and present day experience has demonstrated that this method is not applicable at all to marine engines.

According to my present invention, the engine is provided with a separate closed intermediate chamber into which the fuel is forced by a special pump of large capacity so that in the said chamber it will be under a given pressure. The fuel is sucked from the said chamber through a valve by means of a second pump and forced through a second valve and a supply conduit into the combustion chamber or cylinder of the motor. It is essential that the oil should always completely fill the work chambers of the distributing pumps as the oil in the intermediate chamber is subjected to excess pressure. This arrangement is also advantageous in that the main pump can be utilized for filling the supply conduits, etc., before the engine is started. In order to regulate the pressure conditions in the oil chambers and for the purpose of emptying them, if necessary, a discharge pipe with loaded or spring controlled valve is provided on the intermediate chamber; this discharge pipe can be connected to the tank

so that the oil flowing off returns into the storage tank or reservoir.

The invention is illustrated diagrammatically by way of example in the accompanying drawing.

a indicates the intermediate chamber. The pump *b* forces the oil out of the reservoir into the said chamber *a*, the upper part of which may contain air, which will act as a cushion. The chamber *a* is connected with the work chamber of the distributing pump *d* through a pipe *c*. A valve is arranged at *e* in the suction pipe. The piston of the pump *d* is marked *f*, and the delivery valve *g*. The pressure strokes of the pump *f* force the oil drawn into the work chamber *d'* of the pump through the valve *g* and the supply conduit *h* into the spraying nozzle of the combustion chamber not shown. The distributing gear necessary to produce this result is of any known construction. The regulating valve on the discharge pipe *i* of the intermediate chamber is illustrated by *j*.

My new apparatus operates as follows: The pump *b* forces the fuel into the intermediate chamber *a* to an amount in excess of what the pump *d* can deliver to the engine. Therefore, the fuel in the chamber *a* will be under a certain pressure, which is determined by the loaded valve *j*. If the pressure in the chamber *a* exceeds the load of the valve *j*, fuel will flow from the chamber *a* through the pipe *i* back to the supply tank, from which the pump *b* pumps the fuel into the chamber *a*. Since only an excess pressure in chamber *a* is taken care of by the valve *j*, there will be in chamber *a* always a constant pressure, which will aid the suction stroke of the piston *f* of the delivery pump *d* so as to completely fill the cylinder of said pump, even when a heavy oil is used as a fuel and when the engine runs at a higher speed. In ordinary fuel supply pumps, where a heavy oil is used, and the pump runs at a higher speed, the cylinder will not be completely filled at each suction stroke of the pump piston and there will be, therefore, a certain vacuum in the pump cylinder. This is entirely obviated by the fuel supply apparatus according to my invention.

Having described my invention what I claim is:—

1. In an apparatus for distributing fuel in internal combustion engines, the combination with a fuel supply tank of an inter-

mediate closed air-containing chamber, a pump for forcing fuel from said supply tank into said chamber to an amount sufficient to constantly maintain in said chamber a pressure, and a second pump connected with said chamber for delivering the fuel from said chamber to the engine.

2. In an apparatus for distributing fuel in internal combustion engines the combination with a fuel supply tank of an intermediate closed air-containing chamber, a pump for forcing the fuel from said supply tank into said chamber to an amount sufficient to constantly maintain a pressure in said chamber, a conduit entering said chamber, and a second pump connected to said conduit for delivering fuel from the chamber to the engine.

3. In an apparatus for distributing fuel in internal combustion engines the combination with a fuel supply tank of an intermediate closed air-containing chamber, a pump for forcing the fuel from said supply tank into said chamber to an amount sufficient to constantly maintain a pressure in said chamber, a conduit entering said chamber, and a second pump connected to said conduit for delivering fuel from the chamber to the engine, and a valve in said conduit intermediate the chamber and said second pump.

4. In an apparatus for distributing fuel in internal combustion engines, the combination with a fuel supply tank of an interme-

mediate closed air-containing chamber, a pump for forcing fuel from said supply tank into said chamber to an amount sufficient to constantly maintain a pressure in said chamber, a second pump connected to said chamber and adapted to deliver fuel therefrom to the engine, a discharge pipe connected to said chamber and a loaded valve in said discharge pipe, adapted to automatically control the pressure in said chamber.

5. In an apparatus for distributing fuel in internal combustion engines the combination with a fuel supply tank of an intermediate closed air-containing chamber, a pump for forcing the fuel from said supply tank into said chamber to an amount sufficient to constantly maintain a pressure in said chamber, a conduit entering said chamber, and a second pump connected to said conduit for delivering fuel from the chamber to the engine, and a valve in said conduit intermediate the chamber and said second pump, and a discharge pipe connected to said chamber, and a loaded valve in said discharge pipe adapted to automatically control the pressure in said chamber.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HANS TH. BRUNS.

Witnesses:

RALPH W. DOX,
ELISABETH HELLMUTH.