

E. SCHNEIDER.
CHARGE FORMING DEVICE FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JUNE 18, 1913.

1,106,115.

Patented Aug. 4, 1914.

2 SHEETS-SHEET 1.

Fig. 1.

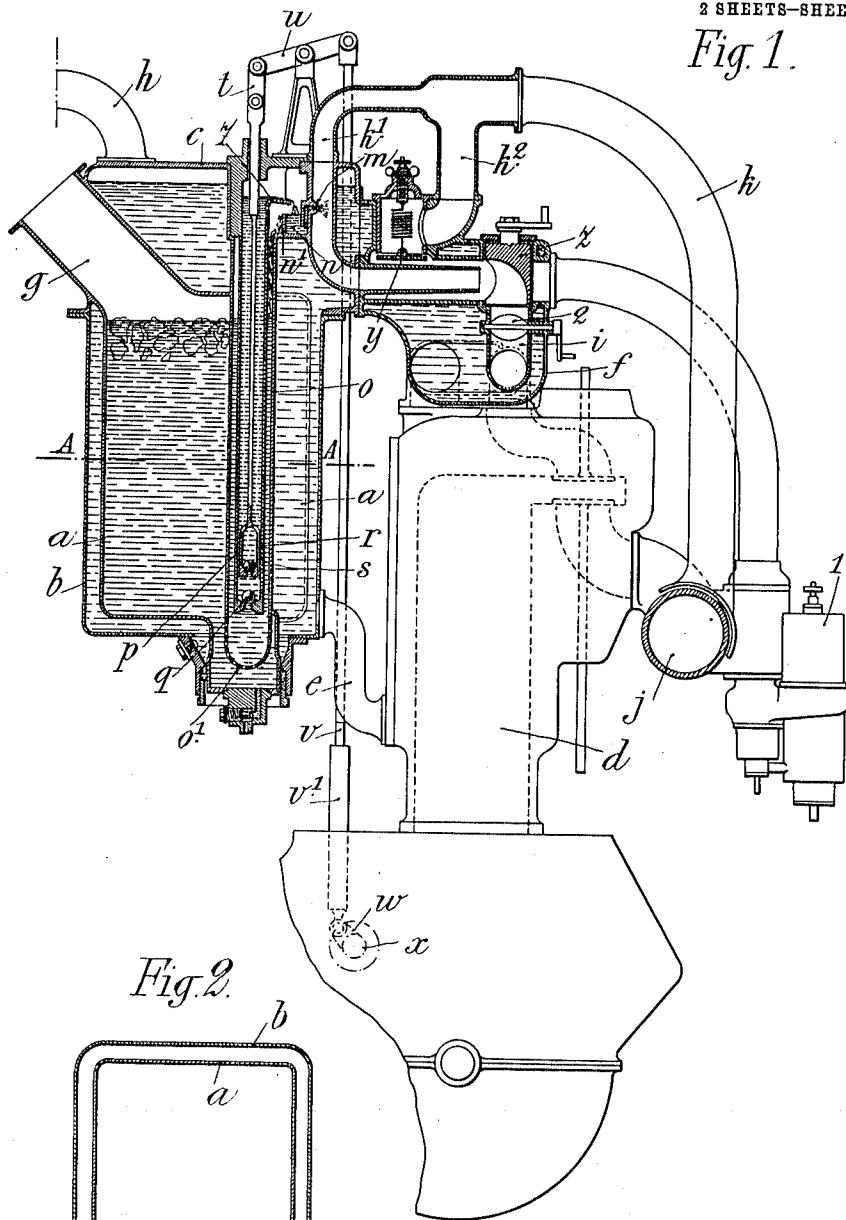
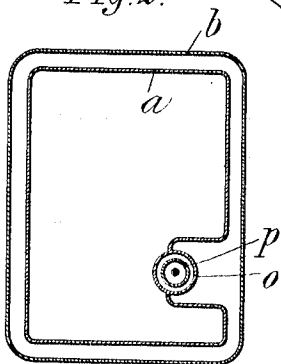


Fig. 2.



Witnesses:
James H. Anderson.
E. E. Warfield.

Inventor:
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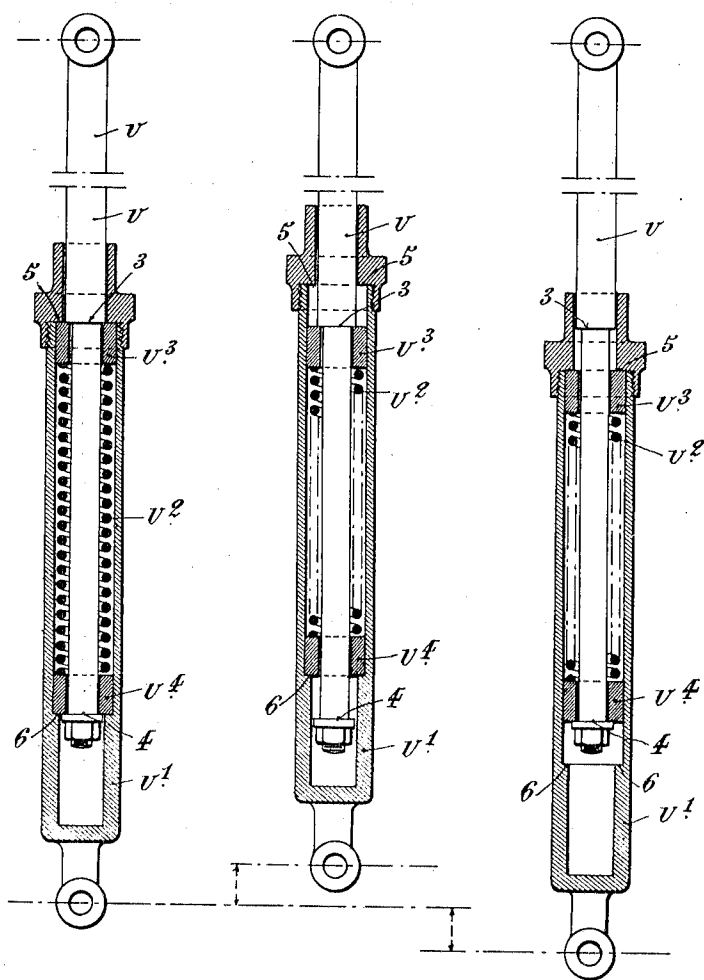
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2 SHEETS-SHEET 2.

Fig. 3.

Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

EUGÈNE SCHNEIDER, OF LE CREUZOT, FRANCE.

CHARGE-FORMING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,106,115.

Specification of Letters Patent.

Patented Aug. 4, 1914.

Application filed June 18, 1913. Serial No. 774,487.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, citizen of the Republic of France, residing at Le Creuzot, Saône-et-Loire, France, have invented new and useful Improvements in Charge-Forming Devices for Internal-Combustion Engines, of which the following is a specification.

Engines in which solid fusible fuels such as naphthalene are used comprise in principle a vessel in which the naphthalene is melted by the waste heat of the engine such as the exhaust gases, water circulation and so forth and a suitable heated carbureter utilizing as fuel the liquid arising from the fusion. Starting can be effected either by preliminary running by means of a volatile fuel such as petroleum spirit or benzol or by employing a furnace which enables the said vessel and the engine to be heated simultaneously. In the known arrangements the carbureter is arranged at the lower part of the reservoir and, like all known forms of carbureter, comprises a constant-level device regulated by a float. Experience has demonstrated that this arrangement presents the following defects: 1. The inspection of the float is troublesome because it operates with a hot liquid which sets immediately upon inspecting the apparatus. 2. The arrangement of the carbureter at the lower part of the fusion receptacle for the reception of the liquid coming from a higher level renders access to it difficult. 3. With this arrangement the passages for the carbureted air are up-passages, which presents an obstacle to carrying badly vaporized drops or particles to the cylinders.

In accordance with the present invention the feed, instead of taking place by gravity from the fuel reservoir to a vessel in which a constant level is maintained by a float valve, is effected by means of a lifting pump conducting the liquid from the reservoir into a vessel in which a constant level is insured by an overflow so that the jet can be arranged at the upper part of the fuel reservoir at a readily accessible point. The operation of the lifting pump by the engine itself is rendered possible as soon as starting takes place, (that is to say at a time when the fuel is not liquefied) owing to the interposition, in the transmission, of a resilient member which enables the piston of the pump to remain stationary until fusion has taken place.

Figures 1 and 2 of the accompanying drawing represent a constructional form of the device as applied to the case in which the fusion of the fuel is produced by the water of circulation raised to a boiling point. Fig. 1 represents a cross section between the two groups of cylinders through the fusion receptacle at the pump and the carbureter. Fig. 2 is a cross section of the fusion receptacle on the line A—A in Fig. 1. Figs. 3, 4 and 5 represent in different positions the resilient portion of the operating rod.

a designates the receptacle for naphthalene or other solid fuel arranged in a casing in two parts *b c* containing the circulation water and communicating with the jackets of the cylinders *d*, at the lower part through conduits *e*, and at the upper part by means of a sleeve *f* covering the carburation apparatus and accessories. The fuel is supplied to the apparatus through a socket *g*. The steam produced by the evaporation of the water is discharged through a conduit *h*. The sleeve *f* also surrounds the conduit *i* through which the explosive mixture is drawn in so that this mixture is appropriately heated. At *j* the exhaust collector of the motor is arranged; *k* is the hot air conduit which may bifurcate into two branches *k'* *k''* in order to furnish the supply to the primary and secondary air inlets of the carbureter respectively.

In accordance with the invention the jet *m*, the nozzle of which opens into the primary air conduit *k'* opens at its other end into a cup *n* arranged outside and above the fusion receptacle, at the upper part of the water jacket *b*. This cup is supplied by a lifting pump actuated by the engine. With this object the cup *n* is connected by an overflow wall *n'* with a well *o* opening at its lower extremity into a fuel tank through a perforated bottom *o'*. Preferably a portion of the longitudinal wall of the well should be jacketed by the circulation water in order to keep the temperature in the well as high as possible. In the wall *o* a cylindrical pump body *p* is arranged, its bottom carrying a suction valve *q*. A hollow piston *r* moves in the pump body and is closed at its lower part by a valve *s*. The piston is driven by the engine by means of an appropriate transmission comprising for example a rod *t'*, a beam *u*, a connecting rod *v*, a crank *w* and an eccentric or a cam keyed upon a shaft *x*.

y designates the valve for the supply of secondary air; z is a three-way cock for effecting starting by means of a spirit carbureter arranged at 1.

5 2 is a speed regulating valve.

The operation of the lifting pump which supplies the cup n is rendered possible as soon as starting takes place—that is to say even before the solid fuel has melted—owing to the interposition of a resilient member in the transmission $t-u-v-w-x$. In 10 the example illustrated the rod v is adapted to be lengthened and shortened. With this object it is divided into two telescopic elements v and v' with the interposition of a spring v^2 and of two bearing rings v^3 and v^4 . These rings are able to slide on the rod between the two stops 3 and 4 and in the sleeve v' between two stops 5 and 6. Normally, 20 when the fuel is melted and the piston opposes no obstacle to its displacement, the parts occupy the position shown in Fig. 3. On starting, and so long as the free displacement of the piston is opposed, the relative displacement of the sleeve v' and the rod v (shortening Fig. 4 or lengthening Fig. 5) always take place by compression of the spring v^2 which always tends to cause the parts to occupy the position shown in 30 Fig. 3. The liquid fuel raised by the operation of the piston is discharged through the discharge spout 7, into the cup n into which the suction pipe of the jet m penetrates. The excess of liquid supplied to the cup n is discharged over the wall n' into the well o .

It will readily be understood that the arrangement of the jet at the upper part eliminates any rising element in the conduits for 40 the distribution of the explosive mixture, thereby obviating any possibility of the return of drops or particles of fuel to the carbureter and insuring that any unvaporized portion of the charge shall be carried to the 45 cylinder. It will of course be understood that the feed device described is also applicable to cases in which the fusion of the fuel is produced by the waste heat of the exhaust. The resilient member interposed in 50 the transmission for operating the pump piston may vary at will; for example it might be replaced by a lever or beam adapted to be set at different angles or by a device for automatically disengaging the crank in 55 case of resistance opposed by the piston to its displacement.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In combination with an internal com-

bustion engine, a jacketed reservoir in which 60 fuel is to be melted by fluid passing through the jacket and heated by the engine, a reciprocating pump and an open receptacle within the said reservoir, the latter being located 65 above the normal level of the melted fuel in the reservoir and fed by said pump, means for discharging fuel from said receptacle to the engine, and connections between the engine and said reciprocating pump adapted to be rendered inoperative when the fuel is 70 solid in the reservoir and active when the fuel is liquid.

2. In combination with an internal combustion engine, a jacketed reservoir in which fuel is to be melted by fluid passing through 75 the jacket and heated by the engine, a reciprocating pump and an open receptacle within the said reservoir, the latter being located above the normal level of the melted fuel in the reservoir and fed by said pump, 80 means for discharging fuel from said receptacle to the engine, and a yielding connection between said pump and a moving part of the engine adapted to operate said pump when the fuel in the reservoir is liquid and 85 to yield when the fuel in the same is solid.

3. In combination with an internal combustion engine, a jacketed reservoir in which fuel is to be melted by fluid passing through 90 the jacket and heated by the engine, a reciprocating pump and an open receptacle within the said reservoir, the latter being located above the normal level of the melted fuel in the reservoir and fed by said pump, means 95 for discharging fuel from said receptacle to the engine, connections between the engine and said reciprocating pump adapted to be rendered inoperative when the fuel is solid in the reservoir and active when the fuel is liquid, and a source of liquid fuel in- 100 dependent of the said reservoir supply for starting the engine.

4. In combination, a constant level reservoir in which fuel is to be melted, a reciprocating pump for pumping liquefied oil in 105 said reservoir, and connections between a source of power and said pump adapted to be rendered inoperative to actuate the pump when the fuel in the reservoir is solid and active when the fuel is liquid. 110

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

EUGÈNE SCHNEIDER.

Witnesses:

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