Oct. 24, 1933. R. OPPENHEIM 1,931,875

PROCESS AND APPARATUS PERMITTING THE UTILIZATION OF HEAVY FUELS FOR FEEDING ENGINES

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Fig.1.

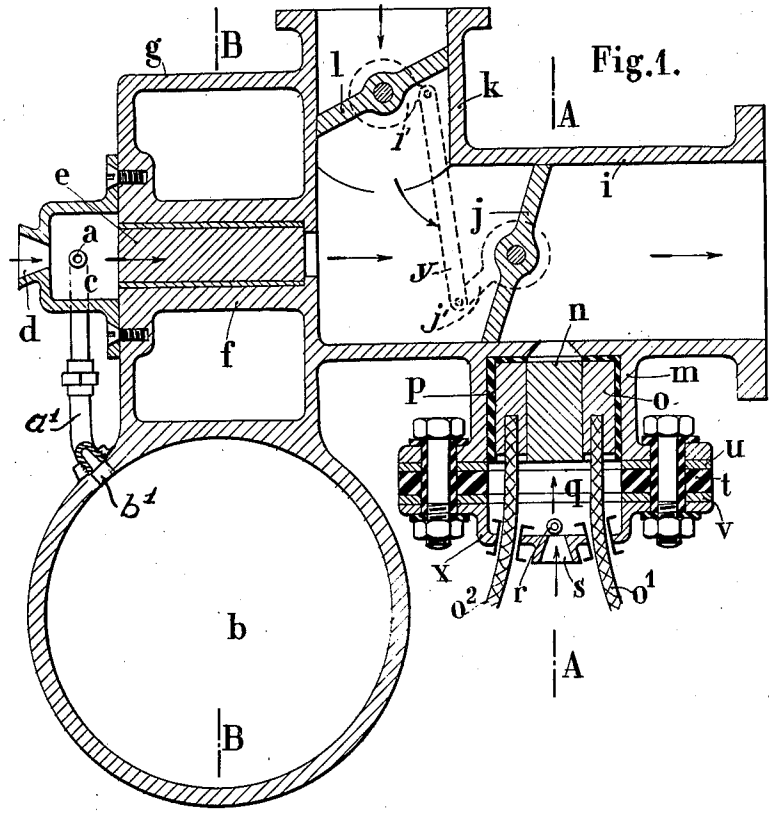
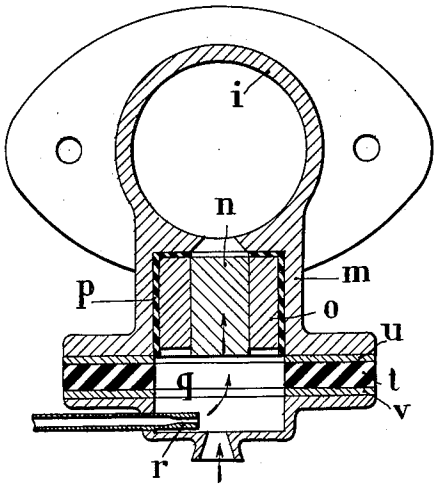



Fig.2.




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Fig.3.

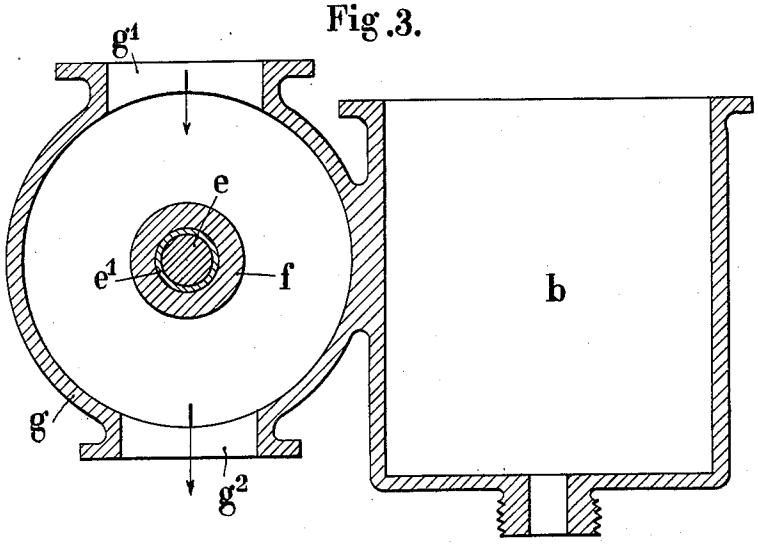
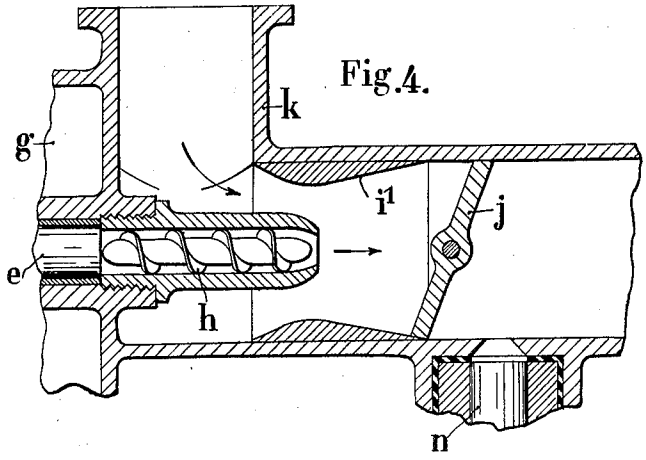



Fig.4.




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# UNITED STATES PATENT OFFICE

1,931,875

## PROCESS AND APPARATUS PERMITTING THE UTILIZATION OF HEAVY FUELS FOR FEEDING ENGINES

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2 Claims. (Cl. 123—127)

Endeavours have already been made to utilize heavy fuel, such as petroleum for burning in lamps, oils etc., for feeding prime movers and to that end endeavours have been made to render these products lighter and more inflammable by heating them, and by decomposing them before allowing them to enter the prime mover. The processes and means heretofore proposed, however, have not given complete satisfaction. Now the present invention has for its object a process for the treatment of such heavy fuels, before being admitted to the prime mover they are intended to feed, characterized by the fact that the fuel comes into contact with a catalyzing substance before being mixed with the air intended to form together with it the carburant or explosive mixture.

It comprises a special arrangement of the apparatus enabling this process to be realized, characterized by the combination by a fuel inlet bringing this latter into contact with the catalyzing substance, and of an air inlet opening into the same chamber as the decomposed fuel.

The invention is, furthermore, characterized by a starting device permitting of starting up without having recourse to spirit or to any other volatile fuel.

This device consists essentially of a special inlet for heavy liquid fuel, which comes into contact with a heated catalyzing substance, only at the moment of starting by an auxiliary source of heat, such for example as by a resistance through which the current of a battery is passed.

The accompanying drawings, given by way of example, represent a method of putting the invention into practice.

In these drawings:—

Figure 1 is a horizontal section of the apparatus.

Figure 2 is a section corresponding to the line A—A, and Figure 3 a section corresponding to the line B—B of Figure 1.

Figure 4 shows a modification.

As will be seen from these drawings the apparatus comprises a main nozzle *a* which receives the heavy fuel through a conduit *a'* from a port *b'* in a constant level container *b*. This nozzle opens into a chamber *c*, provided with a small air inlet *d*, and one side of which is formed by the end of a block of activated carbon *e*. This latter is mounted in a thin copper tube $e^1$, which enables it to be removed and easily replaced when required. This tube is located inside a metal socket *f* forming the axis of a box *g* of bronze or other metal that is not attacked by the exhaust gases. These gases enter at $g^1$, and escape at $g^2$, whilst raising the carbon *e* to the temperature desired. In order to facilitate the exchange of temperature, the box *g* may be provided with gills.

The box *g* is adjacent to a carburetor body *i*, provided with a regulating throttle *j*. In front of this throttle opens an air feed conduit *k*, also provided with a throttle *l*. The throttles *j* and *l* are interconnected by means of a mechanical device, indicated at *l'*, *j'* and *y*, providing at all speeds for the best possible mixture of air and combustible. After the throttle *j*, there opens a pipe *m* containing the starting system; this latter is composed of an activated carbon *n*, surrounded by another carbon *o*, forming a heating resistance and provided with current inlets $o^1$, $o^2$. The carbon *o* is surrounded by a socket *p* of insulating type from the electric point of view. Upon the pipe *m* there is fastened by means of a porcelain joint *t* and metalloplastic joints *u* and *v*, a cap *x* forming a chamber *q*, into which there opens a starting nozzle *r*; a small opening *s* permits of the admission into this chamber of a certain quantity of air.

The method of operation is as follows:—

In order to start the motor the throttles *j* and *l* are closed. The electric current is sent by the aid of a special switch to the sleeve *o*, which raises it almost at once to a fairly high temperature, which must be about 250 degrees. The activated carbon *n* is heated by conduction. The motor absorbs through the carbon *n*, the fuel arriving through the nozzle *r*.

This fuel is decomposed and transformed into light products, rich in carbon, which are easily inflammable and which give an explosive mixture, developing a power superior to that of spirit.

The exhaust products pass into the chamber *g* and heat the activated carbon *e*.

In order to accelerate, the throttle *j* is opened and this opens in a corresponding manner the throttle *l*, the throttle *j* having an arm *j'* associated with the same and moving therewith, while throttle *l* is similarly associated with an arm *l'*, and the two arms *j'* and *l'* connected by a link *y*. Of course other and more elaborate structure can be used instead, but said arms and link suffice to indicate the interconnection between the throttles. The main nozzle *a* comes into action. A small amount of primary air for atomization purposes is admitted through the small air inlet *d* and the fuel thus atomized passes through the carbon *e* which is already heated, is subjected to the catalyzing action, and reaches the chamber *i*,

where it becomes mixed with the secondary air entering through the piping *k*.

It will thus be seen that the mixture of air and fuel is effected after this latter has been subjected to the action of the carbon *e*. This process presents the advantage of avoiding the cooling of this carbon by the air and the passing of the whole combustible mixture through the activated carbon which would result in rapid contamination or poisoning of the same.

The starting device described permits of starting up without having recourse to any other light fuel, which is always a great complication.

The carbureter which has just been described is not of the type known as automatic. Figure 4 shows the application of the invention to an automatic carbureter.

In this apparatus an arrangement is located following after the activating carbon *e* so to conduct the fuel into the choked or contracted part of a diffuser $i^1$. This device may consist of a pulverizer or spray forming device *h*, intended to give the fuel a rotary movement. The starting system and the other characteristic arrangements which have just been described are not altered.

In this arrangement as in the preceding one the nozzles are composed, that is to say provided with, a receiving chamber containing a small reserve of fuel ensuring restarting. The arrangements, hereinbefore described, are, as will be readily understood, given merely by way of example; the forms, sizes and all arrangements of details may be varied without departing from the principles of the invention.

I claim:

1. A method of operating an automobile explosion motor with heavy fuels, which comprises heating a mass of catalyzing substance, causing an auxiliary charge of the heavy fuel to contact with the heated catalyzing substance so that it may be decomposed to form an easily combustible starting mixture, leading the exhaust gases from the burned starting mixture around a second mass of catalyzing substance to heat the same, decomposing the main charge of the heavy fuel by causing it to contact with the second heated catalyzing substance, and then mixing the decomposed main charge of the heavy fuel with air to form the operating explosive mixture for the motor.

2. An apparatus for the treatment of heavy fuels for use in automobile explosion motors comprising a mass of catalyzing substance, a sleeve surrounding said catalyzing substance, means for leading an electric current through the sleeve so that the sleeve may be heated due to its resistance to the passage of the current and consequently heat the catalyzing substance by conduction, means for causing an auxiliary charge of the heavy fuel to contact the catalyzing substance so that it may be decomposed and form an easily combustible starting mixture, a second mass of catalyzing substance, means for leading the exhaust gases of the motor around the second mass of catalyzing substance to heat the same, means for causing a main charge of the heavy fuel to contact with the second mass of catalyzing substance to be decomposed thereby, and a mixing chamber for mixing the decomposed heavy fuel with air to form the operating explosive mixture for the motor.

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