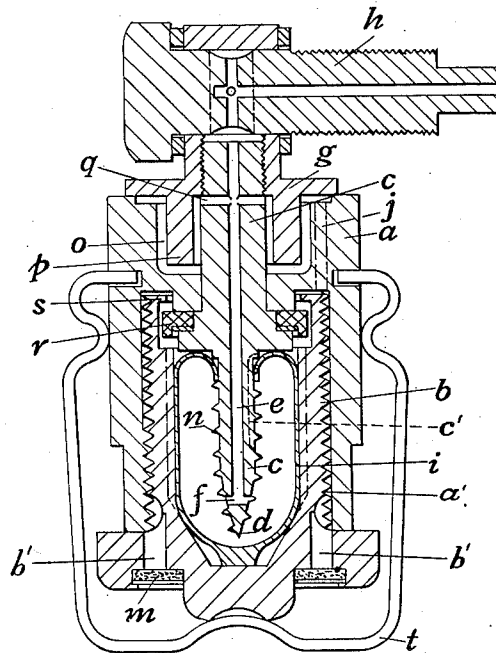


Nov. 10, 1953

W. A. BEVIS ET AL
MEANS FOR SUPPLYING AUXILIARY FUEL
TO INTERNAL-COMBUSTION ENGINES
Filed May 4, 1951

2,658,490



Inventors
W. A. Bevis
P. Cusack
By Joseph Downing Reble
ATTY

UNITED STATES PATENT OFFICE

2,658,490

MEANS FOR SUPPLYING AUXILIARY FUEL
TO INTERNAL-COMBUSTION ENGINESWilliam Albert Bevis, Pinner, and Patrick Cusack,
Chiswick, London, England, assignors to C. A. V.
Limited, London, England

Application May 4, 1951, Serial No. 224,586

Claims priority, application Great Britain
May 13, 1950

3 Claims. (Cl. 123—187.5)

1

This invention has for its object to provide simple and effective means for supplying an auxiliary liquid fuel, such as ether, to a diesel or other internal combustion engine, to facilitate starting of the engine.

The invention comprises the combination of a hollow two-part body adapted to receive a puncturable capsule containing ether or other liquid, and a suction piece attached to one of the body parts and adapted to puncture and enter the capsule when the two parts of the body are interconnected, one of the said parts being adapted for connection to the manifold of the engine.

The invention also comprises a device as specified in the preceding paragraph, having combined with it a well for liquid derived from the capsule, the well being arranged between the suction piece and the engine manifold connection.

The accompanying drawing illustrates one embodiment of the invention.

Referring to the drawing, there is provided a hollow body of cylindrical or other convenient form consisting of two parts, *a*, *b* which are interconnectible by a screw thread or other means. Coaxially with the part *a* is attached one end of a suction piece *c* which along a part of its length is preferably of tapered form and which at its free end *d* is sharply pointed. Along the greater part of its length, the said piece has formed in it an axial bore *e* which at the end adjacent to the point communicates with one or more radial ports *f*. At the fixed end the said piece is attached to a part *g* which is provided with a connection *h* for attachment to the manifold of the engine either directly or by means of a pipe. The length of the suction piece is such that it extends to near the closed end of the part *b* of the body.

The two parts *a*, *b* of the body are of sufficient diameter and length to accommodate a capsule *i* of such size as will contain the desired volume of ether or the like, and preferably the detachable part *b* of the body is of such size that it can enclose the whole or greater part of the capsule. Also a groove *a*¹ is formed along the interior of the part *a* to allow air from the atmosphere to enter the body part. If desired a filter *m* may be combined with the part *b* through which the air must pass before entering the groove *a*¹ by way of drilled holes *b*¹ in the part *b*.

The capsule may be made from any convenient thin and easily puncturable material, either metallic or non-metallic. Or it may be made for the greater part from relatively thick material,

2

and provided with a puncturable closure piece at one end. To facilitate puncturing the tapered suction piece may have formed on it a helical thread *n* in the manner of a wood screw.

The mode of use is as follows:

With the parts of the body separated, the charged capsule is placed in the detachable part *b*, and on connecting the parts, the pointed end of the suction piece pierces and enters one end of the capsule. When the engine is set in motion by a starting motor or other means, the depression of pressure in the manifold, sucks the liquid from the capsule through the suction piece, and the mixture of the ether or other liquid with the air passing through the manifold provides the combustible mixture for starting the engine. Meanwhile air enters the two-part body to ensure complete discharge of the capsule. Air passes through the filter *m* and drilled holes *b*¹ and thence through the groove *a*¹ which extends throughout the length of the threads.

Preferably and as shown in the drawing, there is combined with the construction above described a well adapted to receive liquid from the capsule. In the example shown there is formed in the upper end of the part *a* a chamber constituting the well *o*, and the part *g* which is secured (in any convenient manner) to the part *a*, has formed on it an annular extension *p* which is contained in the said chamber, and is so dimensioned as to form with the part *a* the required well *o*, the latter being in communication with the bore of the suction piece *c* through radial ports *q*. Also the air can be admitted to the well *o* along a narrow passage *j* which receives air entering the body part by way of the groove *a*¹ above mentioned.

Preferably there is mounted on the suction piece *c* a rubber or like sealing washer *r*, and on the upper end of the part *b* is formed a narrow inwardly directed lip *s*. During the initial part of the movement of the part *b* when it is being engaged with the part *a*, the stem of the suction piece *c* punctures the capsule, but no displacement of liquid occurs from the capsule to the well and air flows freely in from the outer atmosphere through the filter *m*, drilled holes *b*¹, groove *a*¹, and past the edge of the washer *r*. But when the lip *s* encounters the under side of the washer *r* it temporarily stops further inflow of air by closing the path from the upper end of the groove *a*¹, and the continued advance of the part *b* into the part *a* causes a reduction of volume of, and consequently an increase of pres-

3

sure in, the entrapped air, resulting in displacement of liquid from the capsule to the well *o*. Meanwhile the lip *s* slides over (whilst maintaining a sealing contact with) the washer until the part *b* approaches its inmost position. Finally the lip *s* passes over the washer to the position shown in which communication with the outer atmosphere is restored.

To ensure flow of air into the capsule, the stem of the suction piece which enters the capsule may have one or more longitudinal grooves *c*¹ formed therein. To prevent accidental unscrewing of the part *b* from the part *a* a stirrup *t* may be pivotally attached to the part *a* and adapted to bear against the lower end of the part *b*.

During the initial phase of the starting of the engine and after liquid has been displaced from the capsule into the well as previously described, liquid is drawn freely into the manifold from the well, the quantity of liquid thus supplied being sufficient to provide an over-rich combustible mixture. Later the liquid is drawn from the capsule through the well at a rate sufficient to supply a less rich mixture.

By this invention a device for supplying to a diesel or other engine, an auxiliary starting fuel of a readily combustible character, is provided in a very simple and convenient form, and in the form in which a well is combined with the device, an ample supply of liquid during the first phase of the starting operation is ensured.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

1. Apparatus for supplying auxiliary starting fuel to a diesel or other internal combustion engine comprising, in combination, a hollow body having two relatively movable parts and adapted to receive a puncturable capsule containing ether or other liquid, a suction piece attached to one of the body parts and formed and arranged to puncture and enter the capsule upon appropriate

4

relative movement of the said parts, one of said parts being adapted to be connected to the engine manifold, a well formed in the body and arranged to receive liquid from the capsule, means permitting air to enter the body from the outside atmosphere, and means actuated by relative movement of the body parts for temporarily interrupting the entry of air into the body so that during such interruption the entry of the suction piece into the capsule forces liquid therefrom into the well, whereby such liquid can be drawn freely from the well by the engine during the initial phase of starting of the engine.

2. Apparatus according to claim 1, comprising a resilient sealing washer carried by the suction piece and an inwardly directed lip on one of the body parts disposed to engage the said washer and thereby obstruct the means permitting air to enter the body, the said washer and lip being so dimensioned that upon continued relative movement of the body parts after engagement of the washer and lip the said lip passes over the resilient washer and thereby re-opens the means permitting air to enter the body.

3. Apparatus according to claim 1, comprising a screw threaded connection between the body parts permitting relative movement thereof and a stirrup attached to one of the body parts and adapted to be engaged with the other body part to prevent accidental separation of the parts.

WILLIAM ALBERT BEVIS.
PATRICK CUSACK.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,364,356	Greathouse	Dec. 5, 1944
2,485,423	Weaver	Oct. 18, 1949
2,516,787	Moody	July 25, 1950

FOREIGN PATENTS

Number	Country	Date
2,252	Great Britain	Jan. 28, 1913