A. J. N. HEMPEL AND O. A. E. JACOBSEN.

CARBURETOR.

APPLICATION FILED APR. 18, 1919.

1,407,155. Patented Feb. 21, 1922.

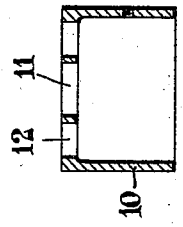

Fig.5.

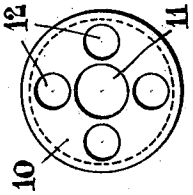

Fig.6.

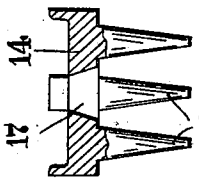

Fig.3.

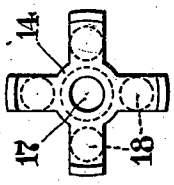

Fig.4.

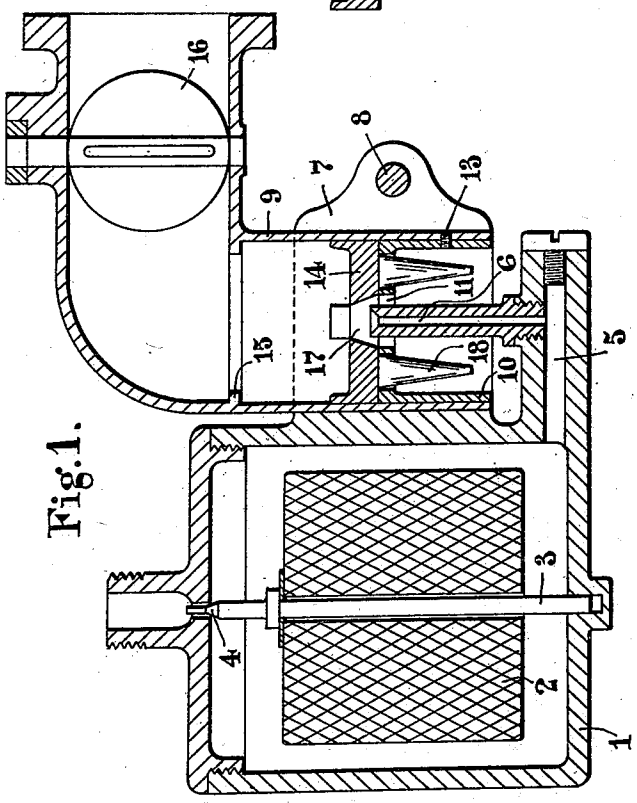

Fig.1.

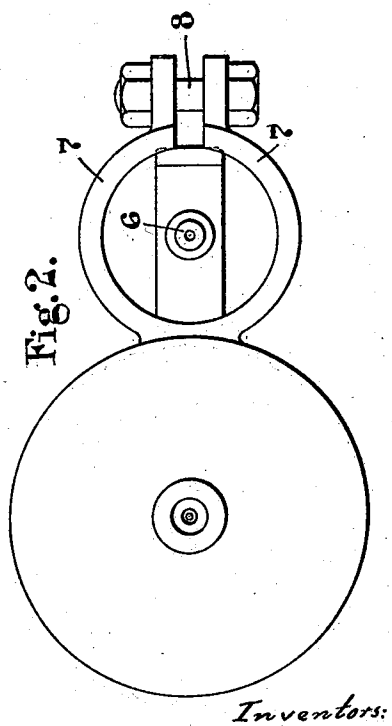

Fig.2.

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UNITED STATES PATENT OFFICE.

AAGE JORGEN NELLEMANN HEMPEL AND OLAF AAGE ERNST JACOBSEN, OF DURBAN NATAL, SOUTH AFRICA.

CARBURETOR.

1,407,155. Specification of Letters Patent. Patented Feb. 21, 1922.

Application filed April 18, 1919. Serial No. 291,095.

To all whom it may concern:

Be it known that we, AAGE JORGEN NELLEMANN HEMPEL and OLAF AAGE ERNST JACOBSEN, both subjects of the King of Great Britain, and residents of 59 St. George's Street, Durban, in the Province of Natal, Union of South Africa, have invented certain new and useful Improvements in Carburetors for Internal-Combustion Engines, of which the following is a specification.

This invention relates to carburetors for internal combustion engines, and it has for its object the provision of means for regulating the proportions of the combustible mixture automatically according to the speed of the engine. A further object of the invention is to effect the thorough mixing of the fuel with the air. These and other objects are attained in the carburetor forming the subject of this invention, by the use of a suction-operated piston valve as hereinafter more fully set forth.

The invention is illustrated by way of example in the accompanying drawings, wherein:—

Figure 1 shows the carburetor in sectional elevation.

Figure 2 shows the body of the carburetor in plan with the outlet pipe removed.

Figure 3 shows the piston valve in vertical section, and

Figure 4 shows the piston valve in plan view.

Figure 5 shows the valve seating in vertical section, and

Figure 6 shows the valve seating in plan view.

The body of the carburetor 1 includes a float chamber containing a float 2, the stem 3 of which is guided in a socket at the bottom of the float chamber, and regulates the admission of the fuel at 4. The float chamber has a passage 5 communicating with the fuel nozzle 6. At the side of the carburetor body is a clamp 7 adapted to be tightened by a bolt 8 and to hold a pipe 9 which surrounds the fuel nozzle 6 and forms the outlet for the combustible mixture. In this pipe is mounted a valve seating 10 formed with a large central hole at 11 which surrounds the fuel nozzle, and a number of outer holes 12, The valve seating is mounted in the pipe 9 and is held in position by a screw 13. Above the seating 10 is arranged a valve 14 having radial arms which slides in the pipe 9 between the seating 10 and a ring or flange 15 forming an upper limiting stop. By adjustment of the pipe 9 vertically in the clamp 7 the height of the seating 10 and the normal position of the star valve 14 can be adjusted relatively to the fuel nozzle 6 as required.

In pipe 9 is a throttle valve 16 of a usual type controlling the flow of mixture to the engine.

The valve is shown in detail in Figures 3 and 4. It has a central aperture at 17 which is preferably tapered as shown, and which forms a tapered extension of the central hole 11 of the seating around the fuel nozzle 6 when the valve is in its lowest position, as in Figure 1. The arms of the valve have tapered projections 18 which pass into the holes 12 in the seating 10, and which open these holes to a greater or less extent according to the height to which the valve 14 is lifted in the pipe 9, owing to the tapered form of said projections 18. Air for mixing with the fuel enters through the open bottom end of the pipe 9 and passes out through the hole 11 in the seating around the nozzle, and through the holes 12 in so far as these are exposed by the lifting of the valve.

At starting a rich mixture is required, and this is provided automatically as the suction or rush of air through the star valve from beneath is not then sufficient to raise it; the whole of the air therefore passes through the central hole 11 in the seating and the tapered hole 17 in the star valve, producing a strong suction at the fuel nozzle. As the engine speed increases, and a weaker mixture is desired, this is provided automatically because the increased rush of air through the star valve causes it to lift from its seating, partially exposing the holes 12, and lifting the tapered aperture 17 to some extent away from the top of the fuel nozzle. The suction at the nozzle therefore is less in proportion to the amount of air passing through the valve. The faster the engine runs the higher will the valve 14 be lifted until it is stopped by the ring 15. The projections 18 never pass completely out of the holes 12 in the seating, so that the valve will always fall correctly into position again as the speed of the engine and the consequent suction of air through the valve is reduced.

A further feature of the invention is that the valve 14 causes the air and fuel to be

mixed thoroughly, particularly at high engine speeds when the mixture is comparatively weak, owing to the breaking up of the stream of air in passing through the valve seating, around the projections 18 and past the valve 14. In this way a very flexible drive is obtained in the engine at all working speeds, while the fuel consumption is substantially reduced owing to the automatic control of the strength of the mixture by the operation of the valve. The carburetor can be used with all usual fuels for internal combustion engines, and generally the only adjustment required is to raise or lower the pipe 9 somewhat in the clamp 7 according to the calorific value of the fuel.

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

In a carburetor for internal combustion engines, the combination with a fuel nozzle of a pipe surrounding said nozzle, a valve seat having a central opening surrounding the fuel nozzle and an outer row of apertures, a valve member with radial arms normally seated on the valve seat and adapted to freely move vertically inside said pipe in accordance with the suction of the engine, said valve member having a central tapered aperture opposite the opening in the valve seat and partially surrounding the fuel nozzle in its normal position, and projections gradually tapered along their whole length, said projections being arranged one on each radial arm of the valve member and fitting into the outer row of apertures in the valve seat, said tapered projections co-operating with the outer row of apertures in such a manner that as the suction action increases and the valve member is raised the passage area through the outer row of apertures is gradually increased.

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