July 10, 1923. 1,461,662

F. N. KAWAMURA

INTERNAL COMBUSTION ENGINE

Filed Jan. 5, 1920

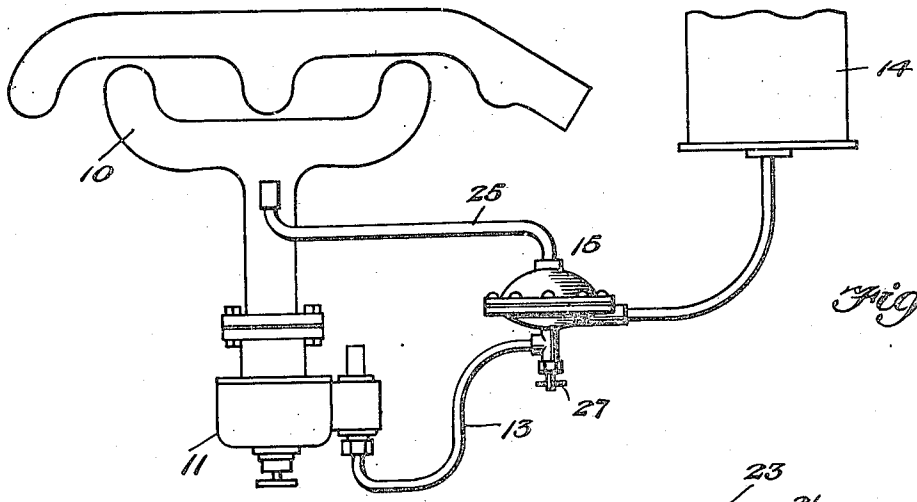


Fig. 1.

Fig. 2.

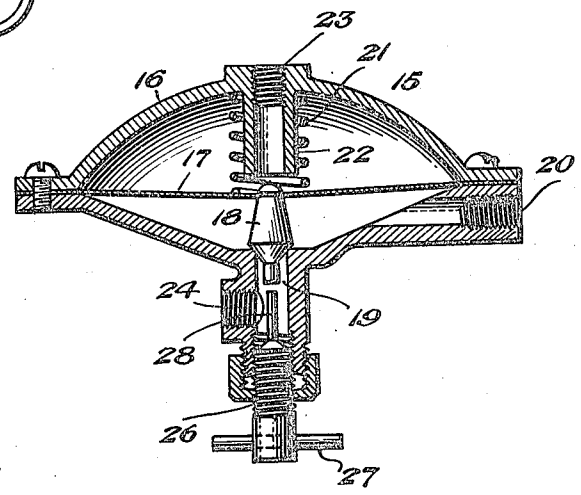
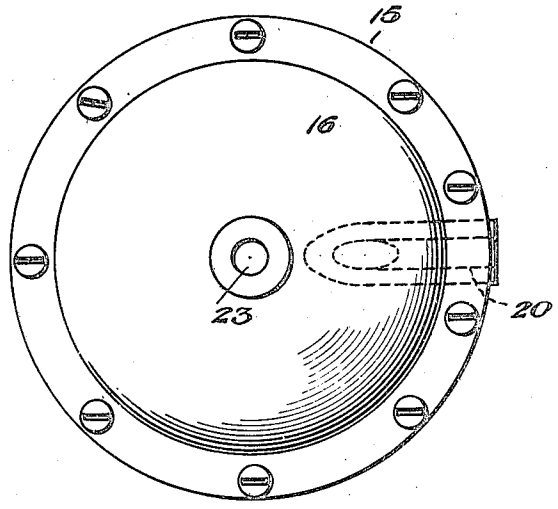


Fig. 3.



Inventor

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UNITED STATES PATENT OFFICE.

FRED N. KAWAMURA, OF DENVER, COLORADO.

INTERNAL-COMBUSTION ENGINE.

Application filed January 5, 1920. Serial No. 349,422.

To all whom it may concern:

Be it known that I, FRED N. KAWAMURA, a citizen of Japan, residing at Denver, in the county of Denver and State of Colorado, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in internal combustion engines, and has special relation to the fuel supply for use in connection with motor vehicles.

An object of the invention is the provision of an automatic cut-off valve for permitting the feed of the fuel to the engine only during its operation, for the purpose of eliminating waste of fuel due to the failure of the float valve of the carburetor to seat or from other causes.

Another object is the provision of a device of this character, wherein the suction of the engine is utilized to unseat a normally closed valve which is included in the fuel supply pipe, so that fuel will be fed to the engine only during its operation, provision being made for manually unseating the valve when necessary or desired.

Other objects and advantages of the invention will appear as the following description is read in connection with the accompanying drawing.

In the drawings:—

Figure 1 is a fragmentary view showing the application of the invention.

Figure 2 is an enlarged sectional view through the valve.

Figure 3 is a plan view of the valve.

Referring to the drawings in detail, wherein like characters of reference denote corresponding parts, the reference character 10 indicates the intake manifold of an internal combustion engine, (not shown) and 11 a carburetor connected thereto. The fuel supply pipe which is indicated at 13, leads to a suitable source of supply, herein shown as a vacuum feed tank 14, although this pipe may lead to the main fuel supply tank of a gravity feed system.

Located with the fuel supply pipe 13 is a normally closed valve 15, through which the fuel must pass from the tank 14 to the carburetor. This valve is opened and controlled by the operation of the engine and comprises a casing 16 formed of separate sections. Secured within this casing between the sections is a diaphragm 17, which may be either solid or perforated. The diaphragm carries a valve member 18, which is adapted to normally close a fuel passage 19, to which the fuel is admitted through an inlet 20 connected with a fuel supply pipe 13. This valve is normally held seated by means of a spring 21, which surrounds a sleeve 22, projecting inwardly from an opening 23 in the top of the casing 16. An outlet port 24 is also connected with the fuel supply pipe 13, so that the fuel passing through the valve enters through the port 20 and passes out through the port 21 when the valve 18 is lifted from the seat by the operation of the engine.

The lifting of the valve member 18 is effected through a pipe connection 25 between the top of the valve casing 16 and the intake manifold 10, this pipe being connected to the port 23 so that the suction of the engine will create a vacuum in the casing 16 and lift the diaphragm against action of the spring 21 and consequently lift the valve member 18 from its seat and permit of the passage of fuel through the valve. The valve is thus maintained in open position during the operation of the engine and as soon as the engine is stopped, the spring 21 will close the valve and prevent passage of fuel to the carburetor.

When it is desired to hold the valve in open position, it may be accomplished by operating a threaded plug 26, located in the bottom of the casing 16 and provided at one end with an operating handle 27. The opposite end of this plug is provided with a reduced extension 28, which engages the valve member 18 and lifts the latter from its seat. This permits of a supply of an extra amount of fuel to the engine, which is sometimes desirable.

It is believed that when the foregoing description is read in connection with the accompanying drawings, the construction, operation and advantages of the invention will be apparent. Various changes may be made in the form, proportions and minor details of construction, and the right is herein reserved to make such changes as properly fall within the scope of the appended claim.

Having described the invention what is claimed is:—

The combination with an internal combustion engine having a carbureter, of a fuel supply tank, a conduit for establishing communication between the carbureter and said tank, a valve casing disposed in said con-

duit and having an inwardly extending tubular projection, a diaphragm secured within the casing in spaced relation with respect to said tubular projection, a valve carried by said diaphragm and normally disposed in closed position to prevent the passage of fuel from the tank to the carbureter, spring means surrounding said tubular projection and co-acting with the valve casing of a diaphragm for positively holding said valve in closed position, and a pipe connected with the intake manifold of the engine and the tubular projection for establishing communication between the interior of the engine and the interior of the valve casing to open said valve while the engine is in operation.

In testimony whereof I affix my signature.

FRED N. KAWAMURA.