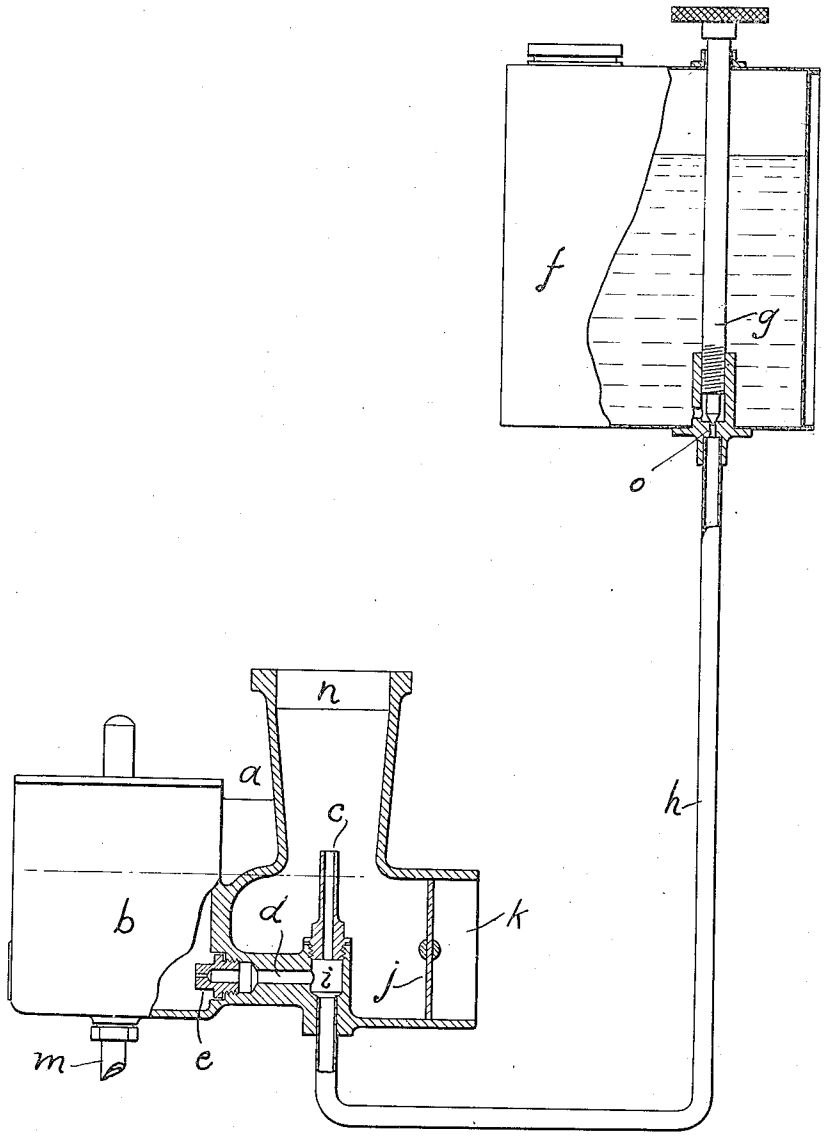
P. S. TICE.

PRIMING APPARATUS.

APPLICATION FILED OCT. 18, 1916.

1,287,796.

Patented Dec. 17, 1918.



INVENTOR

Percival S. Tice

BY Ralzemond A. Parker

ATTORNEY

UNITED STATES PATENT OFFICE.

PERCIVAL S. TICE, OF DETROIT, MICHIGAN.

PRIMING APPARATUS.

1,287,796. Specification of Letters Patent. Patented Dec. 17, 1918.

Application filed October 18, 1916. Serial No. 126,260.

To all whom it may concern:

Be it known that I, PERCIVAL S. TICE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Priming Apparatus, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to priming and starting apparatus for internal combustion engines and a special object of my improvements is to provide a convenient and simple apparatus for supplying an initial quantity of comparatively volatile fuel to the air passage of a carbureter when a heavier liquid fuel, such as kerosene, is used in the normal running of the engine.

I secure this object in the device illustrated in the accompanying drawing, in which an apparatus embodying my invention is shown in vertical elevation and partly in section.

a is a carbureter of any convenient construction in which the air is taken in through the passage *k* controlled by the throttle valve *j* and passes through the passage *n* to the intake of the engine. *c* is a spraying nozzle for delivering liquid fuel to the air passage of the carbureter *a*. *b* is the usual float chamber supplied in the conventional way through a passage *m* with liquid hydrocarbon which may be of the heavier quality. *d* is the passage connecting the float chamber *b* with the spraying nozzle *c* to supply the liquid fuel for the running of the engine. *e* is the meter plug having a small aperture therethrough and acting as a contraction in the passage *d* adjacent to the float chamber *b*.

f is an elevated tank for containing the lighter hydrocarbon priming and starting liquid. *h* is a pipe connecting the reservoir *f* with the passage *d* at the point *i* between the nozzle *c* and meter plug *e*. *g* is a needle valve for controlling the opening from the reservoir *f* to the pipe *h*. *o* is a metering hole or aperture in which needle valve *g* seats, said aperture *o* being of such a size that it will supply the lighter starting fuel at a suitable rate to operate the engine.

The operation of the above described device is as follows:

In the ordinary running of an engine the heavier hydrocarbon is supplied from the float chamber *b* to the spraying nozzle *c* through the passage *d* and meter plug *e* and delivered to the air passing through the air passage of the carbureter in the usual way.

If the engine has been stopped and stood idle for a sufficient time to cause cooling of the parts which are depended upon to heat and vaporize the heavier fuel and it is desired to start the engine again, the needle valve *g* is turned so as to open communication between the reservoir *f* and the passage *h*. The reservoir *f* having a sufficient gravity head or pressure supplies the lighter hydrocarbon through the meter aperture *o* and pipe *h* to the passage *d* at the point *i* thus displacing the heavier fuel with the lighter by causing overflow from the delivery end of the nozzle *c*. This overflow, within the carbureter, of the lighter hydrocarbon from reservoir *f* primes the carbureter and permits an easy starting of the engine.

The lighter hydrocarbon from the reservoir *f* being supplied at a sufficiently high rate to operate the engine prevents the heavier fuel contained in the float chamber *b* from passing the metering plug *e*, thus the engine is caused to run on the lighter fuel from the reservoir *f* until such time as the needle valve *g* is closed. Needle valve *g* is closed when the engine parts are sufficiently warmed up by running on the lighter fuel to permit of running on the heavier and less readily vaporized fuel supplied by way of connection *m* and float chamber *b*.

Thus the engine may be started and run as long as desired, or until it warms up, using the lighter hydrocarbon and as soon as the supply of this lighter hydrocarbon is shut off the engine will continue to run using the heavier fuel.

Used in conjunction with a carbureter having the engine throttle in the air intake port *k* of the carbureter, the reservoir *f* need not be at a higher level than the carbureter to cause the lighter fuel contained therein to be delivered at the outlet end of the nozzle *c*, since cranking of the engine with the throttle valve *j* in a partly opened position will cause a partial vacuum to be drawn in the

passage *h*. This depression of pressure operates on the outlet of the nozzle *c* and causes the lighter fuel to be drawn or lifted from the reservoir *f* to the point *i* in the passage *d*, thus bringing about priming and initial running as described, and under such circumstances some of the heavier hydrocarbon might also be drawn from the float chamber, but in a relatively small amount by reason of the restriction caused by the metering plug *e*. With the construction shown having the reservoir, *f*, elevated so as to afford a sufficient gravity head or pressure as stated, and with the flow from the float chamber restricted by the metering plug, *e*, as shown, the float controlling the level of the liquid so that it can never rise quite to the level of the point of the nozzle as indicated in the drawings, when the liquid is admitted freely from the reservoir, *f*, and driven to the nozzle under the gravity head or pressure corresponding to the elevation of said reservoir, *f*, the back pressure from the nozzle due to the restriction at its discharge, in comparison with the freedom of flow of the lighter hydrocarbon from the reservoir, *f*, practically blockades the flow of the heavier hydrocarbon from the float chamber, except possibly a very slight amount which may be entrained by the current of the lighter hydrocarbon passing the point of junction of the duct from the float chamber. Furthermore, it should be considered that the enlargement of the fuel passage shown at *i*, facilitates the displacement of the heavier fuel by the lighter in said passage from the point of junction of *d* and *h*, and said enlargement is a valuable feature for that purpose when the two fuels are supplied under the same head, because the lighter fuel passing up through the heavier fuel in said enlargement will occupy exclusively the restricted passage therebeyond in the nozzle, *c*, whereas if the passage from the point of junction is restricted to a slender bore as in *c*, the two liquids will be more likely to be intermixed in the discharge.

What I claim is:

1. A priming apparatus, in combination with a delivery nozzle; a main supply reservoir; a passage therefrom to the nozzle; means for maintaining the liquid level in the reservoir below the level of the delivery point of the nozzle; a source of supply for a priming liquid elevated relatively to the nozzle for delivering the liquid under pressure to the nozzle, and a passage from said elevated source, communicating with the passage which leads to the nozzle from the main supply reservoir.

2. In a priming apparatus, the combination with a delivery nozzle of a supply reservoir and a passage leading therefrom to the nozzle; means for maintaining the liquid level of the reservoir below the level of the delivery point of the nozzle; unvariable means restricting the passage leading from the reservoir to the nozzle for metering the maximum flow from said reservoir; an elevated reservoir for a priming liquid and a passage leading therefrom to the nozzle passage for delivering the priming liquid under gravity head or pressure to the nozzle, and a valve controlling the flow from said elevated reservoir.

In testimony whereof, I sign this specification.

PERCIVAL S. TICE.