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A. P. BRUSH.

CARBURETING MECHANISM FOR INTERNAL COMBUSTION ENGINES.

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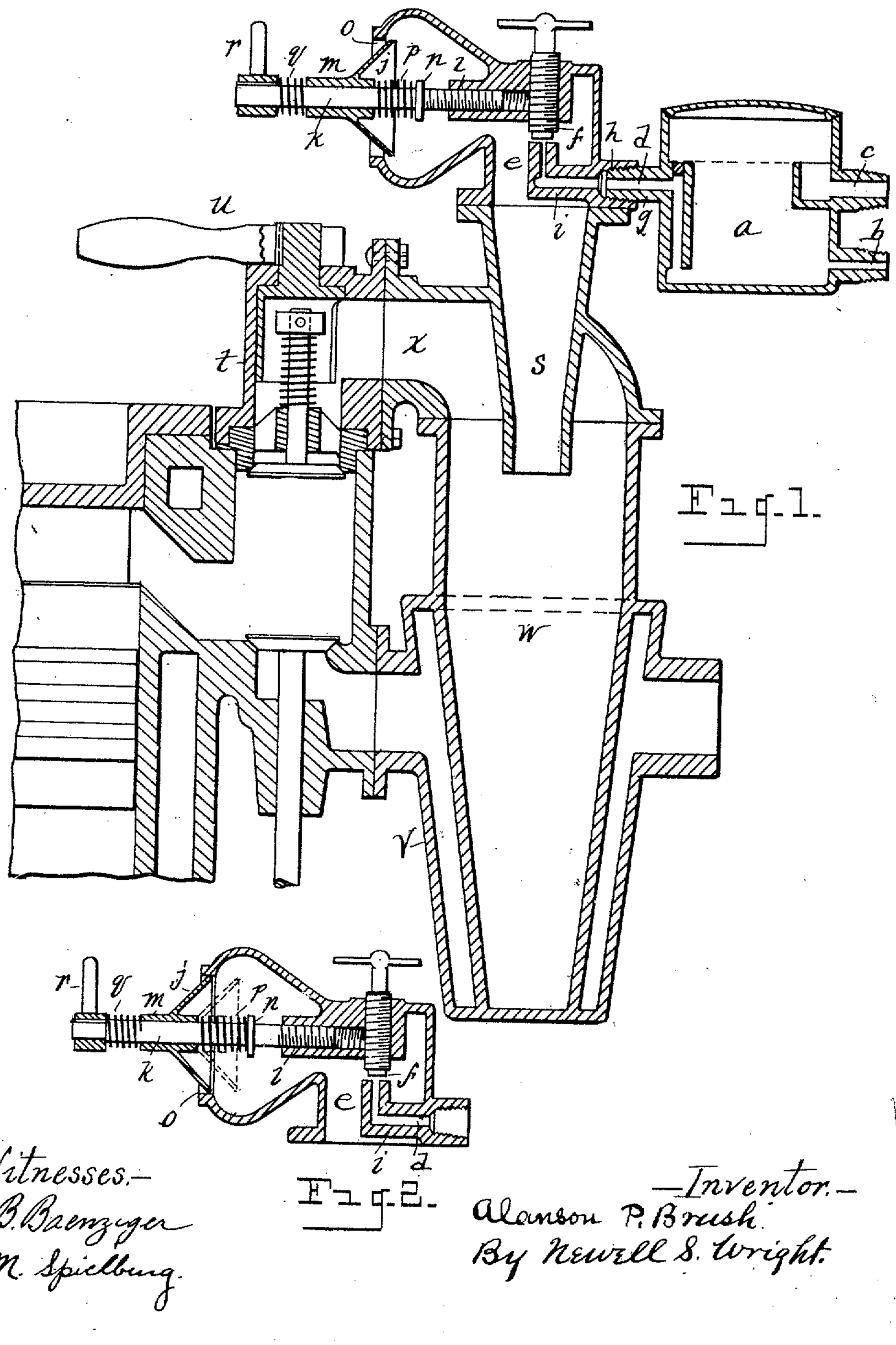

Fig. 1.

Fig. 2.

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CARBURETING MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

No. 886,760. Specification of Letters Patent. Patented May 5, 1908.

Application filed February 3, 1906. Serial No. 299,281.

To all whom it may concern:

Be it known that I, ALANSON P. BRUSH, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in a Carbureting or Fuel-Feeding Mechanism for Internal-Combustion Engines, of which the following is a specification, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object novel carbureting or fuel feeding mechanism for internal combustion engines and I have shown the same in connection with certain features of an engine of this class.

I carry out my invention as hereinafter described and claimed and illustrated in the accompanying drawings, in which,

Figure 1 is a view in vertical section illustrating my invention, the air valve being shown in a slightly open position. Fig. 2 is a detail view showing the air valve in full lines in closed position, and in dotted lines, in extreme open position.

The aim of my invention is to provide a carbureting or fuel feeding device of superior efficiency and utility, the same being shown and herewith described as adapted for use with various fuels.

Certain features of my invention are especially designed for vaporizing hydrocarbon fuels heavier than gasolene, as for example, ordinary kerosene, the construction being such that certain heavy hydrocarbon fuels may be conveniently and effectually vaporized and in a simple and economical manner.

As illustrated in the drawings, *a* represents a fuel reservoir provided with a fuel inlet *b* and a fuel outlet or overflow pipe *c*, the outlet opening into the reservoir at a height to sustain a proper level of the fuel within the reservoir. From the reservoir leads a fuel feed passage *d* into a mixing chamber *e*. A valve to control the admission of fuel through said feed passage is shown at *f*.

For convenience of construction the fuel reservoir and the mixing chamber are shown separately constructed, the reservoir having a channeled arm *g* threaded into the case of the mixing chamber as indicated at *h*, the mixing chamber being constructed with an inwardly projecting channeled arm *i*, the channels in the arms *g* and *i* forming the fuel feed passage *d*. The arm *i* projects upward at its inner end and forms a seat for the valve *f*. The end of the passage *d* within the reservoir opens thereinto preferably near the base thereof so as to permit the feeding of all the fuel within the reservoir into the mixing chamber, should the supply of fuel within the reservoir run low.

It will be obvious that the fuel within the inner end of the passage *d* will rise to the same level as in the reservoir. An air inlet opening into the mixing chamber is shown at *o*. A valve to control the admission of air into the mixing chamber is shown at *j*, said air controlling valve being loosely mounted upon a rod *k* having an adjustable engagement in the case of the mixing chamber, said rod being shown having a threaded engagement with said case as indicated at *l*. The body of the valve *j* is shown as of conical form and provided with a hub loosely mounted upon the rod *k*. Springs *p* and *q* upon the rod *k* engage both sides of the air valve, the air valve being balanced between said springs. The rod *k* is provided with a collar *n* against which one end of the spring *p* engages. Said rod is also shown provided with an operating arm or lever *r* for turning the rod to adjust the valve *j* in opening or closing the same as may be desired. The mixing chamber *e* is provided with an outlet *s* to carry the mixture to the engine, an engine of any desired construction being indicated at *t*. The throttle lever *u* of the engine is shown to control the amount of mixture passing to the engine. It will be evident that, the valve *j* being open, the air is drawn into the mixing chamber through the opening about the valve by suction, the fuel also being drawn by suction into the mixing chamber, the valve *f* being open.

It will be obvious that the normal position of the valve *j* must be so adjusted that the least possible speed of the engine will cause sufficient suction in the mixing chamber to draw the fuel through the channel *d*, the valve *f* being open. As the speed of the engine increases the valve *j* is drawn further open but the increase of suction also draws in more of the fuel.

It is understood that in starting the engine an excessive amount of fuel must be admitted into the mixing chamber. While the valve *j* would in normal running conditions be adjusted so as to have a small fixed opening for starting, it may be adjusted so as to normally close the air opening as illustrated

in Fig. 2, which would cause an excess of fuel to be drawn into the mixing chamber when the engine is started. But such adjustment would not appreciably affect the quality of the mixture at high speed. The air valve *j* sliding upon the rod *k* by suction to increase the opening for the air the valve can be so accurately balanced between the springs that the normally fixed opening thereof will be readily increased with the least increase of suction over the minimum. The carbureters in common use have a fixed air opening and an auxiliary air valve which closes with some little tension, which makes the quality of the mixture uneven through the lower speeds and does not permit as low a minimum. It is evident that, the valve *j* being balanced between the springs *p* and *q*, does not flutter or make a noise in operation.

The mechanism now described will efficiently serve in the use of light fuels, as gasolene, for example. In order, however, to provide for the proper vaporization of heavier fuel, my invention contemplates providing an exhaust jacketed chamber indicated at *v* within which projects a vaporizing chamber *w* into which the outlet channel *s* communicates, the channel *s* and chamber *w* communicating with the channel *x* leading into the engine. The exhaust jacketed chamber is arranged to lead exhaust steam about the chamber *w* as shown, and it will be evident that any portion of the fuel not vaporized within the mixing chamber *e* and outlet channel *s* will drop downward within the chamber *w*, in which chamber vaporization will be completed. The chamber *w* is closed at its lower end so that the only outlet for the vapor therein is through the channel *x*. The exhaust jacketed chamber *v* may be secured in place upon the engine, when its use is desired, in any suitable manner. It will be clearly understood that all unvaporized fuel passing into the chamber *w* will be quickly heated and vaporized, passing out therefrom through the channel *x* leading into the engine, and this without unnecessarily heating the vaporized fuel passing through the channel *s* and *x* to the engine, that is, the fuel precipitated into the chamber *w* will be heated to any necessary temperature to vaporize the same. It will be seen that the discharge passage *s* and the passage *x* leading into the engine necessitates an abrupt change of direction of the vapor passing to the engine at the lower end of the passage *s*, which will result in the precipitation of all unvaporized fuel into the heated portion of the chamber *w*. The chamber *w* being heated by the exhaust steam, however, would cause the vaporization of the fuel precipitated thereinto before any of the fuel would be likely to reach the base of the vaporizing chamber.

What I claim as my invention is:

1. In a fuel feeding device for internal combustion engines provided with a mixing chamber or air passage, a fuel reservoir discharging into the mixing chamber, a valve for controlling the discharge of the fuel into the mixing chamber, a balanced air valve for controlling the admission of air into the mixing chamber for atomizing the fuel, and means to adjust said air valve to vary the quality of the mixture at low speeds without materially varying the quality of the mixture at high speeds.

2. A carbureting mechanism for internal combustion engines comprising a fuel reservoir provided with an inlet and with an overflow passage, a mixing chamber with which said reservoir communicates provided with an air inlet opening leading thereinto, and with a discharge passage to carry the fuel mixture from the mixing chamber to the engine, a valve to control the communication of the reservoir with the mixing chamber, an adjustable valve rod, and a balanced valve loosely mounted upon said rod to control the air inlet opening before atomizing the fuel.

3. A carbureting mechanism for internal combustion engines comprising a fuel reservoir provided with an inlet and with an overflow passage, a mixing chamber provided with an air inlet opening leading thereinto and with a discharge passage to carry the fuel mixture from the mixing chamber to the engine, a channel whereby the reservoir communicates with the mixing chamber, a fuel controlling valve to govern said channel, an adjustable rod, a balanced suction actuated valve loosely mounted upon said rod to govern the air supplied into the mixing chamber to atomize the fuel, and springs upon the rod upon opposite sides of the valve to balance the valve.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

ALANSON P. BRUSH.

Witnesses:
N. S. WRIGHT,
E. M. SPIELBURG.