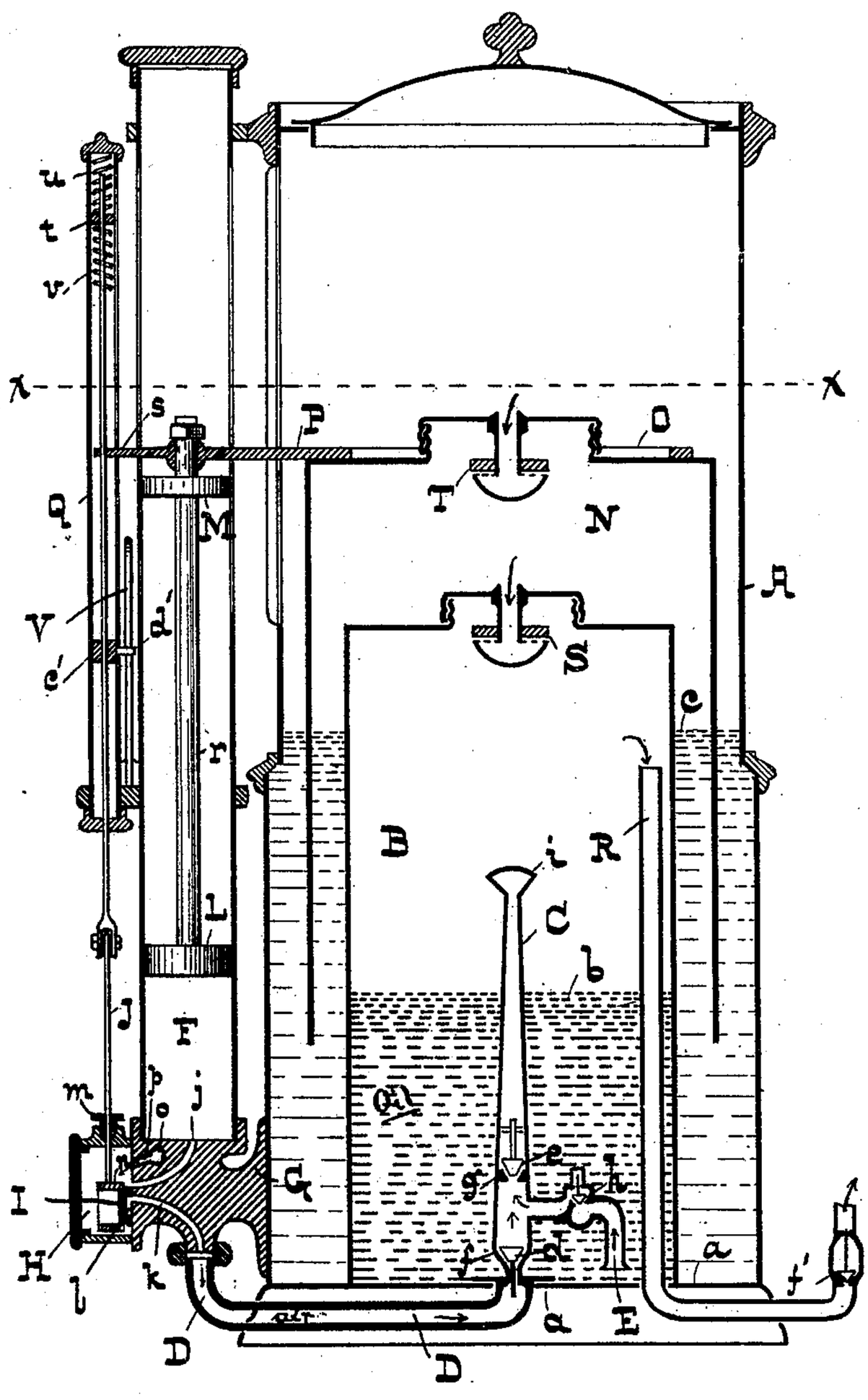
(No Model.) 3 Sheets—Sheet 1.

R. D. BRADLEY.

AIR CARBURETOR.

No. 423,898. Patented Mar. 25, 1890.

Fig 1.



-WITNESSES-

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(No Model.) 3 Sheets—Sheet 2.

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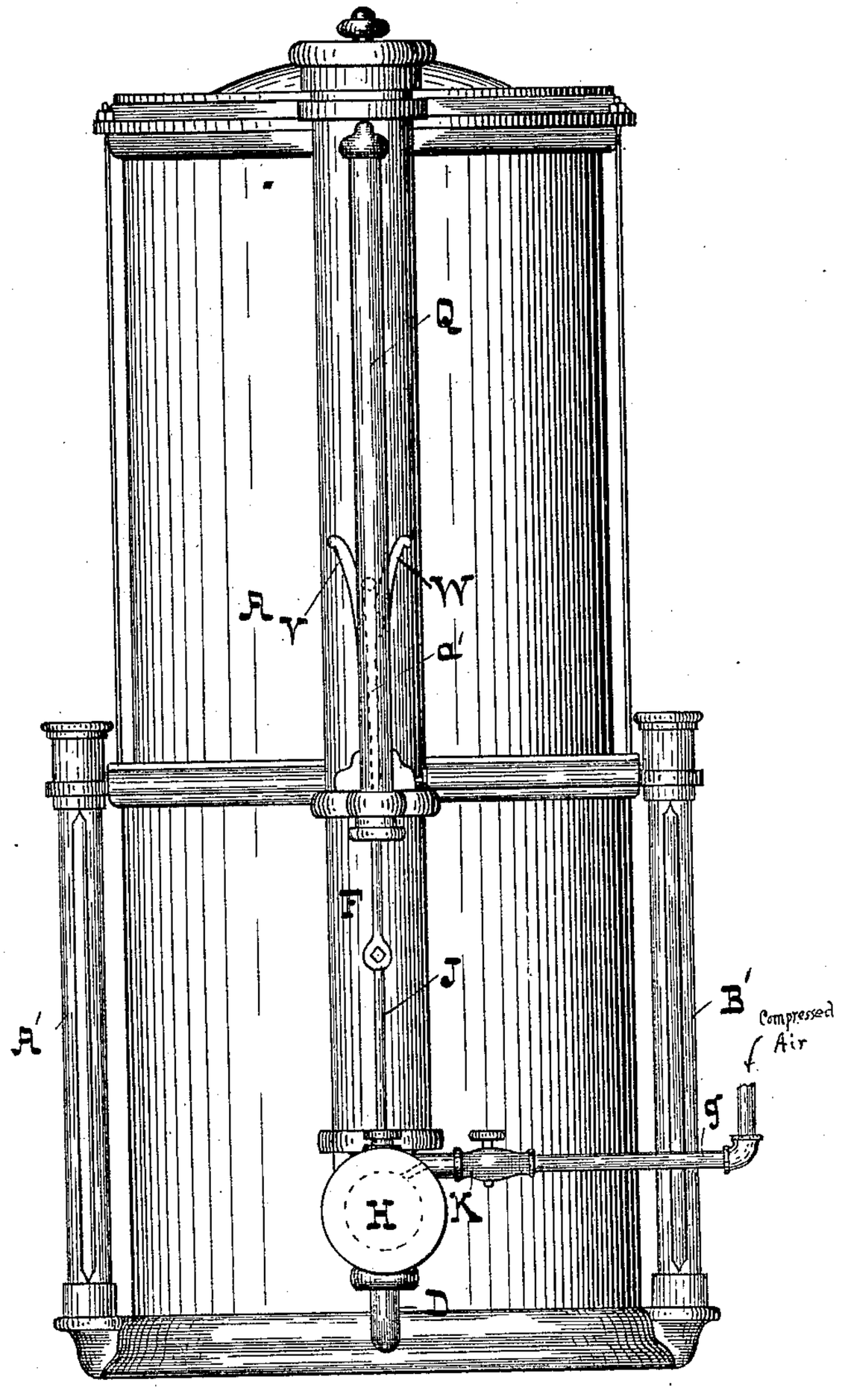
AIR CARBURETOR.

No. 423,898. Patented Mar. 25, 1890.

Fig 2.



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(No Model.) 3 Sheets—Sheet 3.

R. D. BRADLEY.

AIR CARBURETOR.

No. 423,898. Patented Mar. 25, 1890.

Fig 3.

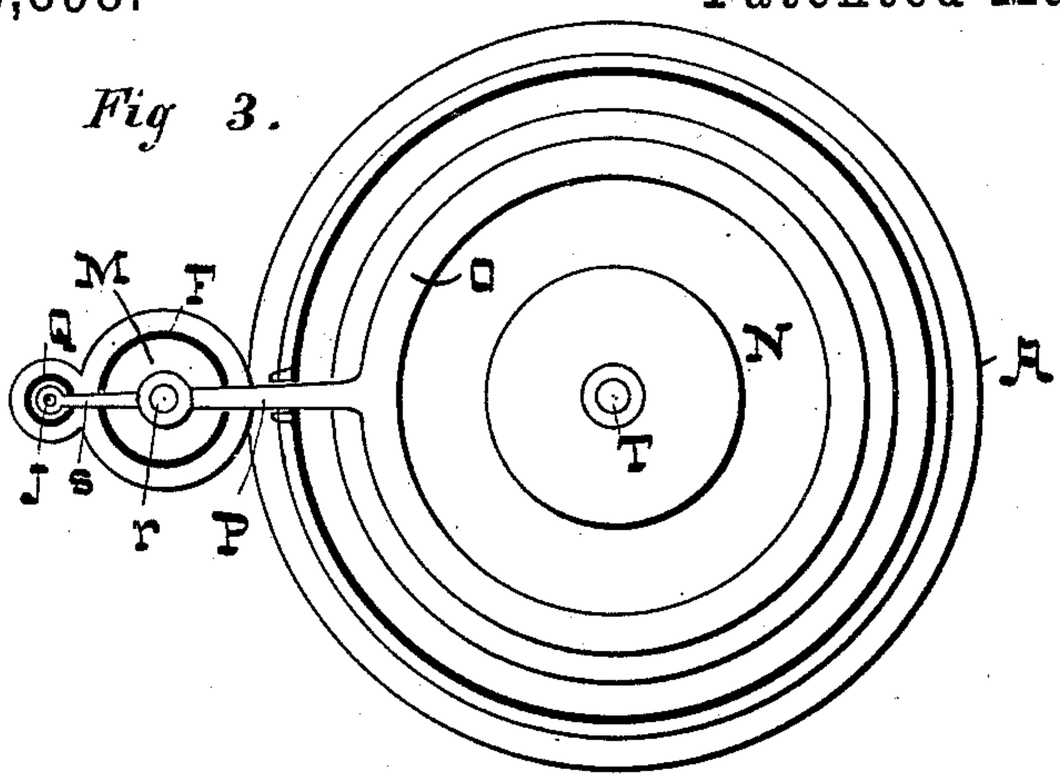
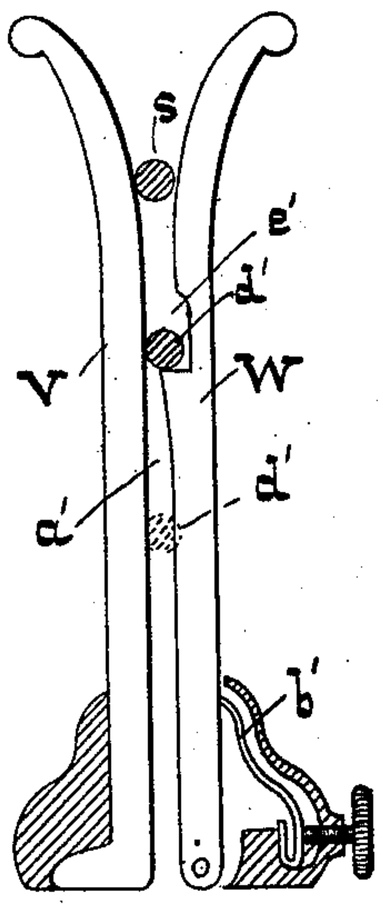


Fig 4.



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UNITED STATES PATENT OFFICE.

ROBERT D. BRADLEY, OF PRESTON, MARYLAND.

AIR-CARBURETOR.

SPECIFICATION forming part of Letters Patent No. 423,898, dated March 25, 1890.

Application filed December 8, 1888. Serial No. 293,035. (No model.)

To all whom it may concern:

Be it known that I, ROBERT D. BRADLEY, of Preston, in the county of Caroline and State of Maryland, have invented certain Improvements in Air-Carburetors, of which the following is a specification.

This invention consists, primarily, in a vessel partially filled with gasoline, containing a trapping apparatus whereby a small portion of the body of gasoline is isolated from the other, and the trapped portion subjected to the sudden action of a current of air under pressure, whereby it is vaporized and at the same time mixed with the compressed air and discharged to above the level of the gasoline in a condition for use.

It further consists in means whereby the air carbureted, as described, is augmented in pressure and diluted within the vessel in which the carbureting is accomplished, as will hereinafter fully appear.

In the further description of the said invention which follows, reference is made to the accompanying drawings forming a part hereof, and in which—

Figure 1 is a central sectional elevation of the apparatus, and Fig. 2 an exterior elevation of the same. Fig. 3 is a section of Fig. 1 taken on the dotted line *x x*. Fig. 4 is an enlarged detail of the invention.

Similar letters of reference indicate similar parts in all the figures.

A is a tank, preferably cylindrical in shape, and B a gasoline-holding vessel secured to the bottom *a* of the tank A.

The gasoline in the vessel B is denoted by dotted lines marked *b*, and a body of water in the tank and around the vessel B is similarly represented and marked *c*.

C is a stand-pipe erected in the gasoline-vessel, the lower end of which is in communication with a pipe D, situated under the bottom of the tank A. This stand-pipe is provided with the valves *d* and *e*, which have suitable seats *f* and *g*. The space between the valves *d* and *e* in the stand-pipe is intended as a gasoline-holder, and it is provided with a downward-turned nozzle E opening into the body of gasoline in the vessel B. This nozzle is fitted with an inwardly-opening check-valve *h*, which prevents the return of gasoline from the holder to the vessel B. It will be seen that from the construction of the trapping devices the body of gasoline which enters the holder has not head enough to lift the valve *e*, and therefore is retained in the holder until forcibly discharged therefrom, as hereinafter described. The upper end of the stand-pipe C is tapered and it terminates in a rose-nozzle *i*.

F is an air-cylinder, secured to the base G, which is bolted or otherwise fastened to the outside of the tank A and near to its bottom. In this base are the ports *j* and *k*, the former leading to the air-cylinder and the latter to the pipe D, the end of which is united to the said base. Both of these ports are in communication with a valve-chest H, on the side of the base G. Within this valve-chest is a valve I, having an exhaust-cavity *l*, as is common in valves of this class. The valve-stem J passes through a stuffing-box *m*, and at its inner end is provided with a strap *n*, which fits over the valve and serves as the means of communicating to it motion from the stem.

Compressed air from any source is introduced to the valve-chest through a hole *o* and a passage *p*, which connects the hole with the valve face or seat.

A cock *k* (shown in Fig. 2) in the compressed-air pipe *g* is used to start and stop the operation of the machine.

L is a piston in the air-cylinder F, having a rod *r* with a guiding-disk M near its upper end.

N is a hood, placed over the gasoline-vessel B, with its lower edge in the water in the tank.

O is a ring on the head of the hood N, having an arm P, extending from it through the wall of the tank, which is slotted for the purpose to the piston-rod *r*, to which it is attached.

An extension of the arm P beyond the piston-rod is provided with an aperture, through which the valve-stem J may loosely slide. (See Figs. 1 and 3.) The valve-stem is inclosed by a casing Q, fastened to the outside of the air-cylinder F, and the casing is slotted to allow of a vertical reciprocating movement of the extension *s* of the arm P. (See Fig. 1.)

The valve-stem J is provided about midway

of its length with a collar c', having a pin d' projecting through the same slot in the casing Q, in which the extension s reciprocates.

Between the air-cylinder F and the casing Q are placed two vertical arms V and W, (shown in Fig. 4 on an enlarged scale,) separated so as to form a space a' between them, and into which space the pin d' projects. The arm V is rigidly attached to its base-support and the arm W is pivoted at its lower end to the same support, and a spring b' pushes it normally toward the arm V. Both arms are curved outwardly at their upper ends to form a Y.

The arm W is provided with a notch e, for a purpose to be hereinafter described.

The upper part of the valve-stem has a collar t, which serves as a guide for the stem, and a spring u confined between this collar and the head of the casing influences the valve I to keep in its lowest position. (Shown in Fig. 1.) With the valve in this position the port j is uncovered and compressed air entering it from the valve-chest passes underneath the piston L in the air-cylinder and forces it up, together with the hood N, to which it is connected by means of the arm P. As the extension s of the arm P approaches the collar t, the spiral spring v, which is within the casing Q and underneath the collar t, is compressed, and as the compression increases the valve-stem is lifted and the position of the slide-valve changed so as to close the upper port j and bring the lower one k into communication with the pipe D through the medium of the cavity l in the valve. The exhaust-air, still under pressure, is thus conducted to the gasoline-holder, and the contained gasoline forced with great rapidity past the valve e, through the tapered stand-pipe, and finally through the rose-head into the space in the vessel B above the gasoline therein. In this operation a small body of gasoline has been suddenly projected from its holder and vaporized by the action of a current of air under great pressure, which vapor and air after combination are expanded to a low tension in the vessel B. This gas is, however, too rich in carbon for use, and its pressure not adequate for its discharge to the burners. But these difficulties are automatically overcome by the action of the hood N, which, in its downward movement forces air received from the open portion of the tank through the valve T past the valve S into the vessel B, which at one operation increases the pressure and dilutes the mixture with air.

R is a pipe opening into the upper part of the vessel B for the purpose of conveying the carbureted air to a storage-tank or to the point of combustion.

By referring to Fig. 2 it will be seen that the apparatus is provided with gasoline and water gages, which are respectively denoted by A′ and B′.

Supposing the various parts of the apparatus to be relatively arranged as shown in Fig. 1 of the drawings, air under pressure is passing under the piston in the air-cylinder and the piston is moving rapidly upward together with the hood N. At this time the holder in the stand-pipe C is being filled through the nozzle E from the body of gasoline in the vessel B, and the gasoline once taken in cannot escape except past the valve e into the stand-pipe. In the upward movement of the hood the valve S in the vessel B is closed and the valve T opened to allow the entrance of air to the space between the hood and the top of the vessel B. As the valve-stem reaches its highest position, the exhaust takes place and the compressed air which served to raise the hood is conducted, still under pressure, underneath the isolated body of gasoline in the holder forming a part of the stand-pipe, and a mixture of vapor and air produced in the vessel B, as before described. As the valve-stem is elevated by the arm P, the pin d' is also elevated, and in this movement enters the notch e' in the pivoted arm W. The slide-valve I is thus held in its elevated position during the vapor-making operation. As the hood descends the carbureted air will be gradually forced out of the vessel B through the pipe R, and when the hood nearly reaches its lowest point of descent the extension s of the arm P will enter the space a', and force the arm W out. This releases the pin d', and allows the valve-stem and valve to fall. In the reversal of position of the valve I, compressed air is again admitted under the piston, the hood elevated, as before described, and the air-carbureting operation repeated.

I claim as my invention—

1. In an air-carburetor, a vessel to be partially filled with gasoline, a gasoline-holder within the said vessel having near its lower end an opening provided with a check-valve to prevent the return of the contents of the lower portion of said vessel and having a discharge-opening near its upper end and having an air-adit pipe, substantially as and for the purpose specified.

2. In an air-carburetor, the combination of a water-holding tank, a gasoline-vessel within the said tank having an inwardly-opening valve at its upper end, a hood placed over the gasoline-vessel having its lower edge immersed in the water and provided in its top with an inwardly-opening valve, a gasoline-holder in the gasoline-vessel having openings near its upper and lower ends, and an air-engine connected to the said hood and having its exhaust-pipe connected to the lower end of the gasoline-holder, substantially as and for the purpose specified.

3. In an air-carburetor, a water-holding tank, a gasoline-vessel within said tank having an inwardly-opening valve at its upper end, a hood having its lower edge immersed in the water placed over the gasoline-vessel, said hood having an inwardly-opening valve at its upper end, an air-engine, the piston-rod of

which is attached to said hood and is arranged to elevate it when the piston is forced in one direction, and a discharge-pipe R, opening into the upper portion of the gasoline-holding vessel, all combined and operating substantially as and for the purpose specified.

4. In an air-carbureting apparatus, the combination, with the gasoline-vessel, of a stand-pipe provided with two upwardly-opening valves located one above the other to form a space for the reception of gasoline, a downwardly-bent pipe leading from said space into the gasoline-vessel, said bent pipe being provided with an inwardly-opening check-valve, and an air-supply pipe communicating with the bottom of the stand-pipe, substantially as and for the purpose specified.

ROBERT D. BRADLEY.

Witnesses:
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DANL. FISHER.