No. 635,298. Patented Oct. 24, 1899.

F. E. CANDA.

CARBURETER.

(Application filed Dec. 18, 1897. Renewed Mar. 16, 1899.)

(No Model.) 2 Sheets—Sheet 1.

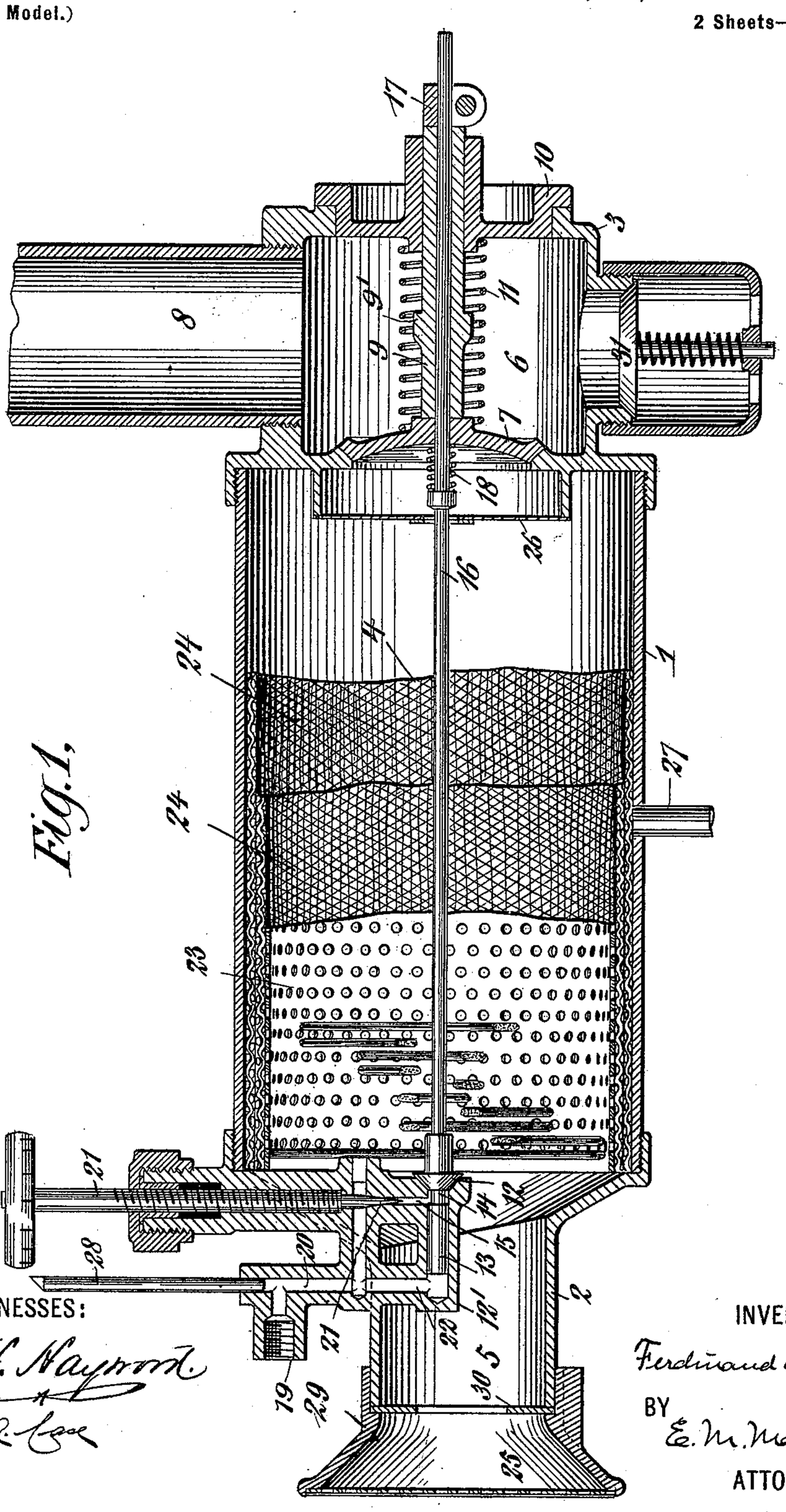


Fig. 1.

WITNESSES:

D. H. Hayward

H. A. Lee

INVENTOR

Ferdinand E. Canda

BY E. M. Marble & Son

ATTORNEYS

No. 635,298. Patented Oct. 24, 1899.

F. E. CANDA.

CARBURETER.

(Application filed Dec. 18, 1897. Renewed Mar. 16, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

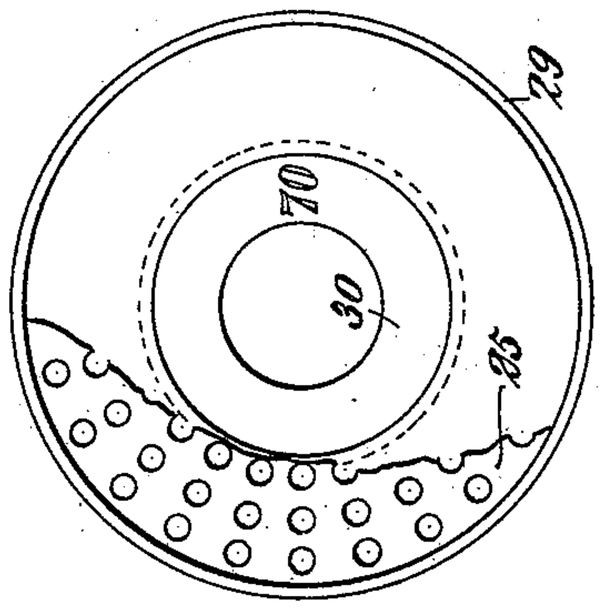


Fig. 4.

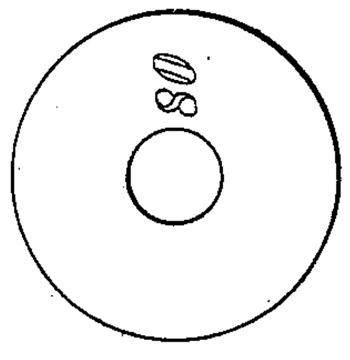
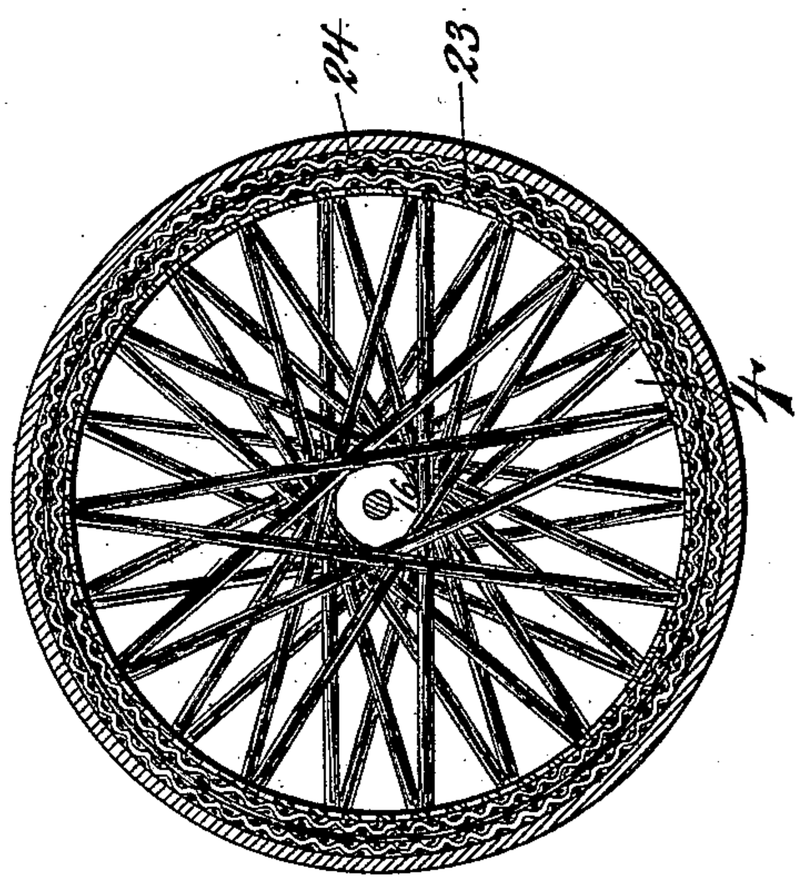


Fig. 2.



WITNESSES:

D. H. Hayward

H. A. Lee.

INVENTOR

Ferdinand E. Canda

BY E. M. Marblestone

ATTORNEYS

UNITED STATES PATENT OFFICE.

FERDINAND E. CANDA, OF NEW YORK, N. Y.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 635,298, dated October 24, 1899.

Application filed December 18, 1897. Renewed March 16, 1899. Serial No. 709,360. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND E. CANDA, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Carbureters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to carbureters or gasifiers, and particularly to carbureters which are used in connection with what are known as "oil" or "internal-combustion" engines, employing as a fuel a fluid which before ignition is or should be converted into a gas. This fluid is usually one of the hydrocarbon oils. Difficulty has been experienced in the past with such engines, due to the fact that most, if not all, of the carbureters heretofore used do not at all times produce a "dry" gas, but permit some unvaporized fluid to pass into the engine-cylinder, the result being fouling of the cylinder and passages, interference with the operation of the igniting device, and the production of a disagreeable smell, which unfits the engines for many uses—such, for instance, as the propulsion of vehicles.

My invention consists in the novel means employed for regulating the amount of oil admitted into the carbureter, in the novel means employed for operating the oil-admission valve, in the novel arrangement of the absorbent material employed for facilitating the evaporation of the oil and the carbureting of the entering air, and generally in the novel combination, construction, and arrangement of the parts.

The objects of my invention are, first, to produce a carbureter or gasifier capable of producing at all times absolutely-dry gas free from liquid; second, to provide improved means for regulating the supply of the oil to the carbureter and for admitting a definite quantity of air to the carbureter with each admission-stroke of the engine; third, to provide an improved arrangement of the parts employed for operating the oil-supply and gas-outlet valves and to so arrange these parts that no cams or other devices driven from some moving part of the engine shall be required to operate them; fourth, to provide an improved arrangement of the wicking or other absorbent material employed for facilitating the evaporation of the oil and its absorption by the air, such that the whole body of absorbent material may be removed from the carbureter when desired and a fresh supply of absorbent material inserted easily and quickly, and, fifth, to make the carbureter simple, compact, not liable to derangement, and comparatively inexpensive. These objects are attained in the carbureter herein described, and illustrated in the drawings which accompany and form a part of this specification, in which the same reference-numerals indicate the same or corresponding parts, and in which—

Figure 1 is a central longitudinal section of the carbureter. Fig. 2 is a transverse section of the wick-cylinder or cartridge separate from the carbureter, showing the construction thereof. Fig. 3 is a detail view showing the strainer across the mouth of the air-admission opening with an air-regulating disk in place, the strainer being partly broken away; and Fig. 4 is a detail view of one of the air-regulating disks.

The carbureter consists of four main sections—viz., a central cylinder 1, two end sections 2 and 3, screwing upon or otherwise secured upon the ends of the cylinder 1, and a wick-cylinder or cartridge 4 within the cylinder 1. The end section 2 contains the oil-admission valve and the passage 5, through which air is admitted to the carbureter. The end section 3 contains the outlet-chamber 6, the outlet-valve 7, and a spring for operating the same, a relief-valve 31, and has connected to it a pipe 8, leading to the cylinder or cylinders of the engine.

The outlet-valve 7 opens into the outlet-chamber 6 and is operated by the suction produced by the piston of the engine in drawing a charge of gas into the engine-cylinder. It is a valve-disk of ordinary construction fitting into a correspondingly-shaped valve-seat and mounted upon a stem 9, which passes through a closely-fitting opening in an end cap 10. This end cap, which is removable, is somewhat larger than the valve 7, and therefore permits the valve to be removed readily. Surrounding the valve-stem 9 is a spiral spring 11,

which tends to press the valve against its seat. When the piston of the engine begins to draw gas into the engine-cylinder, the suction thereby produced acting upon the valve 7 opens said valve against the pressure of the spring 11; but the instant the main valve of the engine stops the further admission of gas to the engine-cylinder the spring 11 closes the valve 7. A reciprocating motion is thus communicated to the valve 7, although no special cam or other equivalent device driven from some moving part of the engine is employed for that purpose. The stem 9 has a shoulder 9', which acts as a stop to prevent too-wide opening of the valve 7.

The oil-supply valve 12 is located in a lug 12', projecting into the air-admission passage 5 in such a manner that the valve is in the axial line of the spindle 9. The oil-valve 12 is a conical plug-valve provided with a rearwardly-extending guiding piston or plunger 13, in which is a groove or oil-carrier 14, which is directly opposite an oil-supply passage 15 when the valve is closed. The valve is connected to a spindle 16, which passes through an axial passage in the outlet-valve 7 and spindle 9 and has on its end an adjustable collar 17, engaging the end of spindle 9, by means of which the spindle 9 is caused to open the oil-supply valve when the outlet-valve 7 opens. A spring 18, bearing against the valve 7 and against a shoulder on the spindle 16, closes the oil-supply valve when the valve 7 closes and permits the independent seating of the valves 7 and 12.

The oil-supply pipe is connected to the carbureter at 19, and from this point a passage 20 leads to a regulating needle-valve 21 in the passage 15, above referred to. A branch passage 22 leads from the passage 20 to the rear of piston 13. The oil in this passage cushions the valve 12, and since there is free communication between the end of the chamber in which the piston moves and the oil-passages accumulation of oil behind the piston which would be sure to take place were the end of the piston-chamber closed cannot prevent the complete closing of the oil-supply valve.

In order to facilitate the evaporation of oil in the carbureter and the thorough mixing of the same with the entering air, the main cylinder 1 of the carbureter is provided with the wick-cylinder 4 above mentioned. This wick-cylinder consists of a foraminous-metal supporting-cylinder 23, about which is wrapped one or more layers of wick-cloth 24 and the interior of which is filled with wicking, preferably by sewing wick-cord through the cylinder in all directions, care being taken, however, to preserve a central passage for the spindle 16 of the oil-supply valve. The cylinder 23, with the layers of wicking wrapped about it and the mass of wicking within it, forms what may be termed a "cartridge" of absorbent material. This cartridge may be removed from the carbureter and another cartridge inserted when the old wicking has become clogged by unscrewing the end section 2 from the cylinder 1, the oil-supply pipe having first been disconnected at 19. I do not limit myself to the use of wicking, but may use other absorbent materials as well.

Across the mouth of the end section 2 of the carbureter is a screen 25, which prevents the passage of solid objects into the carbureter with the entering current of air. Across the outlet-valve opening is a second screen 26, which prevents any solid objects, such as particles of wicking, from passing into the outlet-chamber 7 or the passages and cylinder of the engine.

The operation of my invention is as follows: The carbureter being connected to the engine and to an oil-supply pipe and the valve 21 being open, when an admission-stroke of the engine begins the valve 7 is opened by suction and a mixture of air and gas is drawn from the interior of the carbureter through the chamber 6 and pipe 8 into the engine-cylinder and air is drawn through the screen 25 and passage 5 into the carbureter. When the valve 7 opens, its stem 9 engages with the collar 17 on the spindle 16 and opens the oil-supply valve 12. The oil in the groove or oil-carrier 14 of this valve is thus permitted to flow into the main cylinder 1 of the carbureter, where it is absorbed by the wicking; but only the oil which has accumulated in the groove 14 is thus admitted to the carbureter at each stroke of the valve, for the piston 13 of the valve closes the passage 15 as soon as the valve is even partly open, and the valve is opened and closed so rapidly that no perceptible escape of oil can take place while the edge of the groove 14 of the piston 13 is passing across the passage 15. The oil thus admitted into the wick-chamber and absorbed by the wicking diffuses itself throughout the mass of wicking, and since the entering current of air must pass through this mass of wicking to reach the outlet-chamber the air is brought into very intimate contact with the oil, which exists in the wicking in a very fine state of subdivision, and the evaporation of the oil is thereby facilitated, while the mass of wicking itself acts as a filter to prevent any of the oil being carried into the outlet-chamber in a fluid condition. Preferably the carbureter is arranged substantially horizontally, so that any excess of oil in the carbureter collects at the bottom, where it may flow off through a drip-pipe 27 into a suitable receptacle. Since the outlet-valve opening is considerably above the bottom of the wick-chamber of the carbureter, it is not possible for liquid oil to be carried into the outlet-chamber through flooding of the wick-chamber.

Preferably the inlet-valve of the engine should be operated by a speed-governor which does not permit the valve to open when the engine is running above its normal speed, such as an ordinary "hit-and-miss" governor. Where this is the case, the oil-inlet valve 12 is opened only when a charge of gas

is to be drawn into the engine-cylinder. The amount of oil admitted to the carbureter, therefore, is exactly proportioned to the demands of the engine. Since the groove or oil-carrier 14 in the oil-inlet valve has a definite capacity, the amount of oil admitted to the carbureter at each stroke of the engine may be accurately determined. The size of the groove is that required to admit sufficient oil to run the engine at the maximum power which it is intended to develop; but it is not necessary when the engine is running for a considerable time on an underload that the groove 14 should be completely filled prior to each stroke of the valve. When the engine is to be operated on an underload for a considerable length of time, the regulating-valve 21 may be partly closed, so restricting the amount of oil flowing into the groove 14, so that less oil is admitted to the carbureter at each stroke of the valve and a "poorer" gas is formed in the carbureter. The gas being poorer, the explosions in the engine-cylinder will take place more regularly than would be the case were the gas richer and the engine will operate more uniformly.

To facilitate the proper adjustment of the regulating-valve 21, its hand-wheel may be graduated, and a pointer 28 may be placed in close proximity thereto.

The grade of the oil used in oil-engines frequently varies, some oils being heavier than others. It is desirable that the amount of air admitted to the carbureter shall be that best adapted for the particular grade of oil used. For this reason I make the funnel 29 of the end section 2, which carries the strainer 25, removable, so that a perforated reducing-disk 30 may be placed in the passage 5 and held in place by the funnel 29. Fig. 3 shows such a disk in place, the screen 25 being broken away, and Fig. 4 shows one of the disks in detail. The carbureter may be provided with a number of these disks having different sizes of openings corresponding to the amount of air required by different grades of oil, and each disk may be marked with a number denoting the grade of oil with which it is intended to be used, as indicated in Figs. 3 and 4, in which the numerals "70" and "80" indicate according to an arbitrary scale the grades of oil with which the two disks shown in these figures are to be used.

In the end section 3 is a relief-valve 31, normally held closed by the action of a spring, which relieves pressure in the carbureter in case a "back-fire" or untimely explosion in the engine should take place.

Having thus completely described my invention, what I desire to secure by Letters Patent is—

1. In a carbureter, the combination, with a casing containing a valve-seat, a chamber adapted to receive a piston projecting from the valve, and an oil-supply passage communicating with said piston-chamber, of an oil-supply valve having a piston projecting into said piston-chamber and having in said piston an oil-carrier adapted to register with said supply-passage when the valve is closed, said piston being arranged also to close said supply-passage when the valve opens, and means for opening and closing said valve, substantially as described.

2. In a carbureter, the combination, with an oil-supply valve having an oil-carrier adapted to receive oil from a suitable passage, said valve being arranged to close said supply-passage when open, of means for opening and closing said valve, and a regulating-valve in said passage for regulating the flow of oil therethrough, substantially as described.

3. In a carbureter, the combination, with a casing containing a valve-seat, a chamber adapted to receive a piston projecting from the valve, and an oil-supply passage communicating with said piston-chamber, of an oil-supply valve having a piston projecting into said piston-chamber and having in said piston an oil-carrier adapted to register with said supply-passage when the valve is closed, said piston being arranged also to close said supply-passage when the valve opens, a passage connecting the piston-chamber in rear of said piston with the oil-supply passage, and means for opening and closing said valve, substantially as described.

4. In a carbureter, the combination, with a casing having a chamber provided with an air-inlet, an outlet-valve, an oil-supply passage communicating with the valve-chamber of an oil-supply valve, an oil-supply valve in said valve-chamber having an oil-carrier adapted to receive oil from said supply-passage when the valve is closed, said valve being arranged when open to close said supply-passage, and means for bringing the oil and air into intimate contact, of a valve-stem, passing through the said chamber of said casing and connecting the oil-supply valve and outlet-valve, whereby when said outlet-valve opens the oil-supply valve is also opened, substantially as described.

5. The herein-described absorbent cartridge for use in carbureters, consisting of a hollow base having wrapped about it layers of absorbent material, and having its interior filled with cords of absorbent material sewed through the walls of said base extending transversely across the interior of the cartridge, substantially as described.

6. The herein-described absorbent cartridge for use in carbureters, consisting of a tubular foraminous base having wrapped about it layers of an absorbent material, and having its interior filled with cords of absorbent material sewed through the openings in its sides and extending transversely across its interior, substantially as described.

7. In a carbureter, the combination, with a casing having a chamber adapted to contain absorbent material, an outlet-valve at one end of said chamber, an air-inlet and an oil-sup-

ply valve at the other end of said chamber, a stem for operating the oil-supply valve, passing through the outlet-valve and adapted to engage the same, so that when the outlet-valve opens the oil-supply valve will also be opened, and a spring for closing said oil-supply valve, substantially as described.

8. In a carbureter, the combination, with the main casing, of an end section closing said casing at one end and having an outlet-chamber adapted to be connected with the engine-cylinder, a valve-opening connecting said outlet-chamber and the interior of the main casing, another opening in the end section, opposite said valve-opening and closed by a removable plug, a valve adapted to seat in said valve-opening and having a stem passing through a bearing in the said removable plug, and a spring for closing said valve, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FERDINAND E. CANDA.

Witnesses:

LOUIS B. SMYSER,

HARRY M. MARBLE.