

No. 654,686.

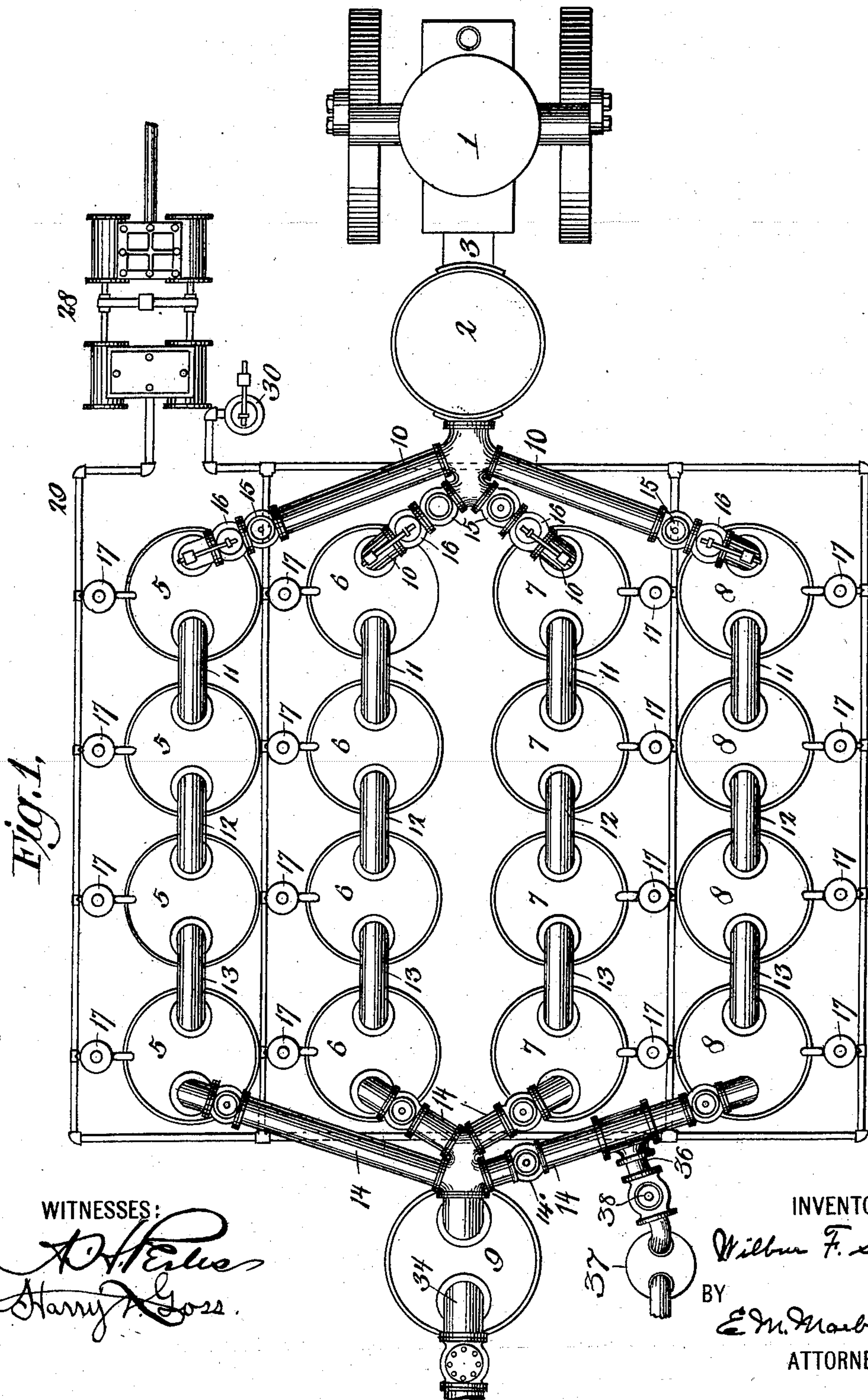
Patented July 31, 1900.

W. F. STEELE.
CARBURETER.

(Application filed Mar. 12, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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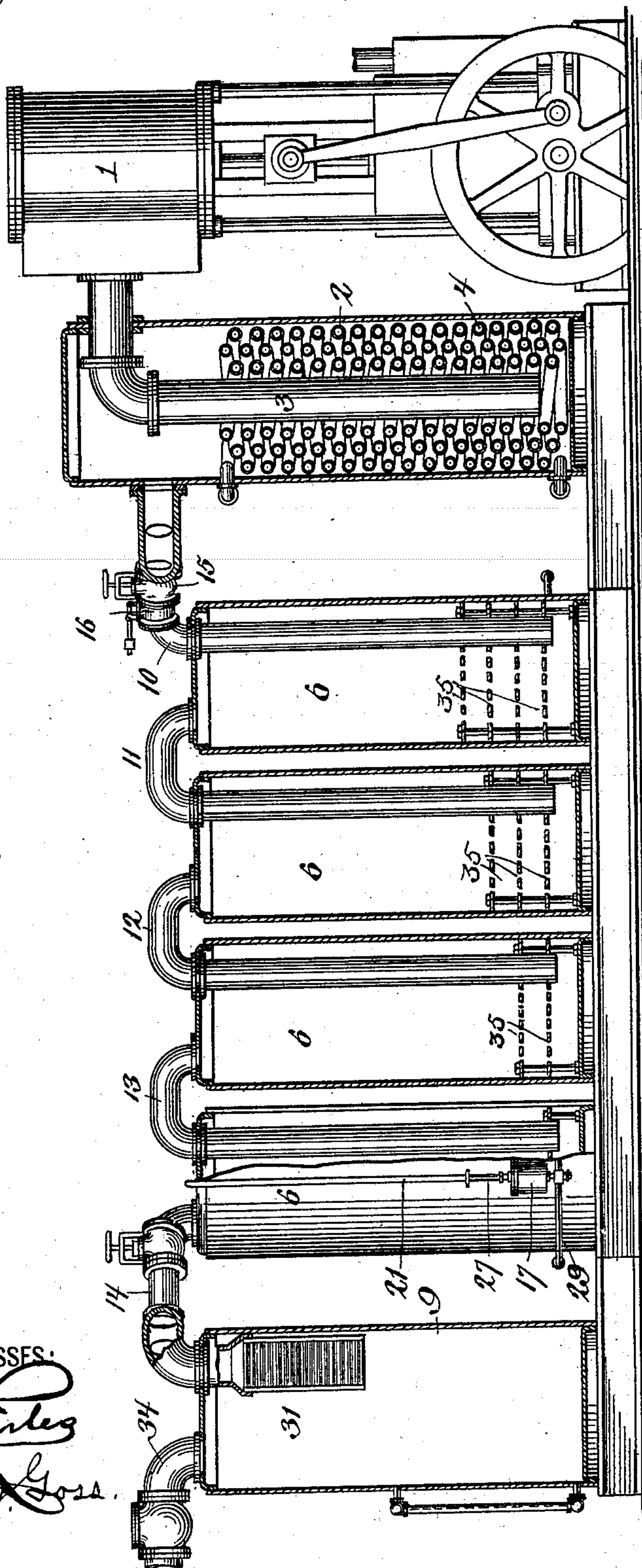


Fig. 2.

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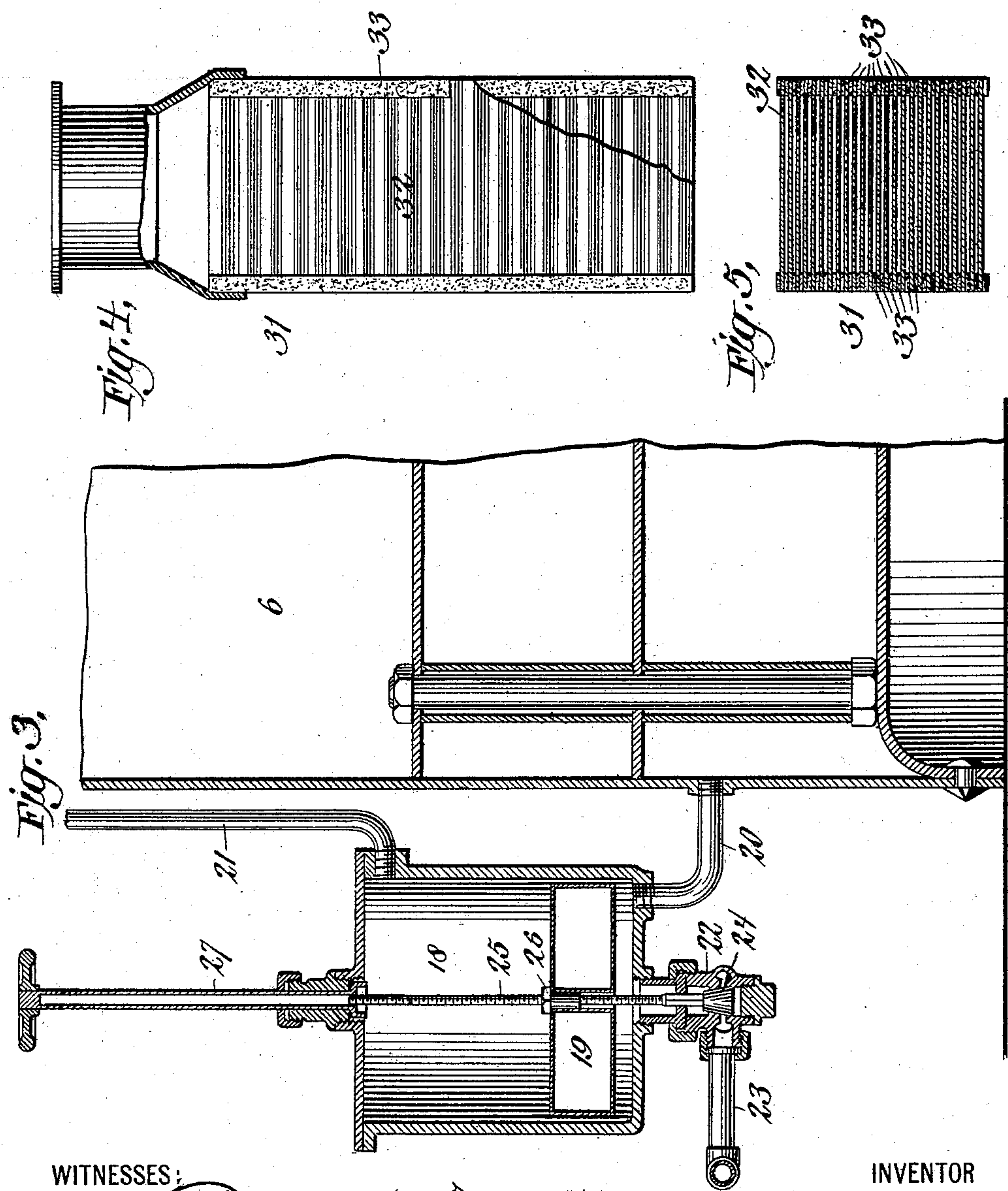
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

WILBUR F. STEELE, OF NEW YORK, N. Y.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 654,686, dated July 31, 1900.

Application filed March 12, 1900, Serial No. 8,305. (No model.)

To all whom it may concern:

Be it known that I, WILBUR F. STEELE, 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 improvements in gas-making apparatus of the type which produces a combustible gas by mixing hydrocarbon vapors with air; and my invention consists in the novel means employed for obtaining thorough mixture of air and hydrocarbon vapors in apparatus of large capacity, in the means employed for supplying oil to the carbureters automatically, and for maintaining proper level of oil therein, and generally in the novel combination, construction, and arrangement of the parts of the apparatus.

The objects of my invention are to obtain thorough mixture of air and hydrocarbon vapors in apparatus of large capacities, to maintain in the carbureters the proper level of oil automatically, and to make the apparatus as simple as possible, comparatively inexpensive, and automatic in its operation. These objects are attained in the invention 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 top view of a gas-making apparatus constructed in accordance with my invention. Fig. 2 is a longitudinal section of the same through the center of one of the carbureting units. Fig. 3 is a central vertical section of one of the adjustable float-valves for regulating the supply of oil to the carbureters, the figure showing also a portion of one of the carbureters. Fig. 4 is a vertical section of the oil-separator, and Fig. 5 is a horizontal section of such separator.

In the drawings, 1 designates a blowing-engine, which may be of any ordinary construction and for which any other suitable means for supplying air under pressure may be substituted.

2 designates a heater consisting of a tank

containing a pipe 3, connected to the delivery-orifice of the blower and also containing heating-coils 4.

5 5, 6 6, 7 7, and 8 8 designate separate carbureting units, each consisting of a plurality of carbureting chambers or compartments connected in series, while the several units are connected in multiple to the heater and also, preferably, to the scrubber 9. In the drawings I have shown each separate carbureting chamber or compartment as consisting of a separate cylindrical tank; but this construction, while convenient, is not essential, and the several chambers need not be separate structures.

The pipes which conduct the air from the heater 2 to the several carbureting units are designated by the numeral 10. Each such pipe extends nearly to the bottom of the first carbureter of the unit to which it is connected. A pipe 11 conveys the mixture of air and hydrocarbon vapor from the top of that carbureter to the lower portion of the next carbureter of the series, and so on. The last carbureters of the several series are connected to the scrubber 9 by pipes 14. The several carbureters are provided with transverse perforated plates 35, which serve to diffuse the entering air and to prevent it from rising in large bubbles and so from failing to mix thoroughly with the oil.

In each of the branch pipes 10 is a shut-off valve 15 and also an adjustable regulating-valve 16, by which the pressure of the air supplied to the carbureters is regulated as desired and kept uniform. The regulating-valves also serve to divide up the work equally between the several carbureting units and so to prevent an undue proportion of the work being done in any one or more units.

Heretofore it has been found practically impossible in gas-making plants of large capacity to obtain as thorough carburetion of the air as in smaller plants, notwithstanding the use of various devices for diffusing the air as much as possible. Such imperfect carburetion has been due to the fact that when the air is delivered at too-great pressure or through too large an orifice it passes up through the oil in masses, forcing the oil to one side or the other and not mixing properly with the oil, and this blowing aside of the oil

cannot be prevented satisfactorily by causing the air to discharge through a plurality of orifices in a single chamber or by other familiar expedients for overcoming such difficulties.

I have found, therefore, that there is a limit to the amount of effective work which can be done by a single series of carbureters of whatever size. The difficulty may be overcome and the desired capacity obtained by multiplying the number of complete plants employed; but this is not desirable, because of the expense of such plants and the additional attendance required. I have found that this difficulty may be overcome and a plant of any desired capacity obtained without increasing the number of blowing-engines, &c., by employing, instead of a single series of carbureters of large size, a plurality of sets of carbureters of less size, all connected to the same source of air-supply by separate branch connections provided with automatic regulating or equalizing valves 16, which divide up the work among the several carbureting units as desired. This arrangement is also desirable and advantageous because by adjusting the several equalizing-valves differently it is possible to obtain from one apparatus gas at different pressures simultaneously; but in such case of course that carbureting unit which is operating at a different pressure from the other units must be cut off from the common scrubber by means of a stop-valve in its delivery-pipe 14, the gas issuing from a separate outlet provided for that purpose and being passed through a separate scrubber. This is illustrated in Fig. 1, in which figure one of the pipes 14 is shown as provided with a branch 36, leading to a separate scrubber 37, a valve 38 being provided in pipe 36 for the purpose of closing said pipe. This pipe 14 is also provided with a valve 14' for closing communication between the carbureting-units 8 and the scrubber 9.

In order to supply to each carbureter the proper amount of oil and to maintain the oil in such carbureter at the proper level notwithstanding the difference in the air-pressures in the several carbureters of each series or unit, I provide each carbureter with a separate automatic admission float-valve 17. (Shown in detail in Fig. 3.) Each such valve consists of a float-chamber 18, having within it a float 19 and having pipes 20 and 21, leading, respectively, to the lower and to the upper portions of its corresponding carbureter. The casing is also connected at the bottom to a valve-casing 22, itself connected to an oil-supply pipe 23, and within such valve-casing is a valve-plug 24, connected to a valve-stem 25, which projects up through the float-chamber 18, passing through a central orifice in the float 19. The valve-stem is threaded and upon it is a nut 26, having a head adapted to be engaged by the lower end of a tubular regulating-stem 27, surrounding the valve-stem 25 and working in a stuffing-box in the top of the float-casing. In order that in its

normal operation the float 19 may not have to overcome the friction of this stuffing-box, the regulating-stem is normally raised, as shown; but when it is desired to adjust the valve said stem is pushed down until it engages the head of the nut 26, and said nut is then rotated by turning the stem 27. In this way the several float-valves may each be adjusted to shut off the supply of oil to its carbureter when such oil has reached any desired height. The object of connecting each float-casing to its corresponding carbureter at the top as well as at the bottom is to equalize the pressure in said float-chamber and carbureter.

The oil to supply the several carbureters is pumped by a pump 28, which runs continuously, from a supply-tank (not shown) into a main supply-pipe 29, to which and to its branches the several branch pipes 23 are connected. At its end the pipe 29 has an automatic relief-valve 30, which opens when the pressure in the oil-supply pipe reaches a predetermined point, as will be the case when all or a portion of the admission-valves 17 are closed, thus permitting any excess of oil to be returned to the supply-tank. Said relief-valve might be at any other point in the pipe 29; but by placing it at the end a better circulation of oil through the system is secured.

The gas from the several carbureting units is carried by the pipes 14 to an oil-separator 31 within the scrubber 9. This separator consists of a plurality of corrugated plates 32, placed close together, but separated slightly by narrow strips of asbestos or other suitable material 33. The gas passes downward between the plates 32, being prevented from escaping at the sides by the asbestos strips 33, and issuing at the bottom of the separator rises and passes out through a pipe 34. The oil which may be carried with the gas from the carbureters is thrown against the plates 32 as the gas passes through the separator and trickles downward, falling to the bottom of the scrubber, from whence it may be drawn off from time to time.

I do not limit myself to the number of carbureting units illustrated in the drawings, but may employ a greater or less number, as may be required by circumstances, and I may also employ a greater or less number of carbureters in each of such units. Neither do I limit myself to the class of float-valve herein described or to the other specific features of construction and arrangement.

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

1. In a gas-making apparatus, the combination, with means for supplying air under pressure, of a plurality of carbureters connected in multiple to such source of supply, automatic equalizing-valves interposed between the carbureters and such source of supply, by which valves the relative amount of work done in each of such carbureters may

be regulated automatically, a pump for supplying oil to the several carbureters, pipe connections leading from the pump to said carbureters, automatic valves for regulating the level of the oil in the several carbureters, and an automatic relief-valve in communication with the oil-supply devices.

2. In a gas-making apparatus, the combination, with a single blower, of a plurality of carbureters connected in multiple to such blower, automatic equalizing-valves interposed between the carbureters and the blower, by which valves the relative amount of work done in each of such carbureters may be regulated automatically, a pump for supplying oil to the several carbureters, pipe connections leading from the pump to said carbureters, automatic valves for regulating the level of the oil in the several carbureters, and an automatic relief-valve in communication with the oil-supply devices.

3. In a gas-making apparatus, the combination, with a series of carbureting-chambers, of a pump for supplying oil to such chambers, pipe connections leading from the pump to said chambers, automatic valves for regulating the level of the oil in the several chambers, and an automatic relief-valve in communication with the oil-supply devices.

4. In a gas-making apparatus, the combination, with a carbureting-chamber, and a source of oil-supply, of a float-valve interposed between such chamber and source of supply, and consisting of a valve-casing and valve, a float-chamber connected with said valve-casing, and also with the carbureting-chamber at points both above and below the normal level of the oil therein, a float in said chamber, a valve-stem connected to the valve and having an adjustable nut connected

thereto by screw-threads, said nut being adapted to be engaged by the float and lifted thereby, thereby closing the valve, and a regulating-stem, working in a stuffing-box in the casing, normally out of engagement with said nut, but adapted to be moved inward into engagement therewith for the purpose of adjusting the valve.

5. In a carbureting system the combination of a suitable air-supply, two or more series of carbureters, independent valve connections between the air-supply and each series of carbureters and suitable pressure-regulators in the said connections, the whole arranged to permit of any series of carbureters being cut out of the system or to permit of the different series of carbureters being worked independently.

6. In a carbureting system the combination of a suitable air-supply, two or more series of carbureters, independent connections between the air-supply and each series of carbureters and valves in said connections whereby each series of carbureters may be operated independently, substantially as set forth.

7. In a carbureting system the combination of a carbureter, a suitable oil-supply, a pump connecting such oil-supply and the carbureter and an automatic oil relief-valve in the oil-feed pipe adapted to open when the carbureter has been supplied with the desired quantity of oil, substantially as described.

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

WILBUR F. STEELE.

Witnesses:

E. H. TUCKER,
H. M. MARBLE.