

No. 749,768.

PATENTED JAN. 19, 1904.

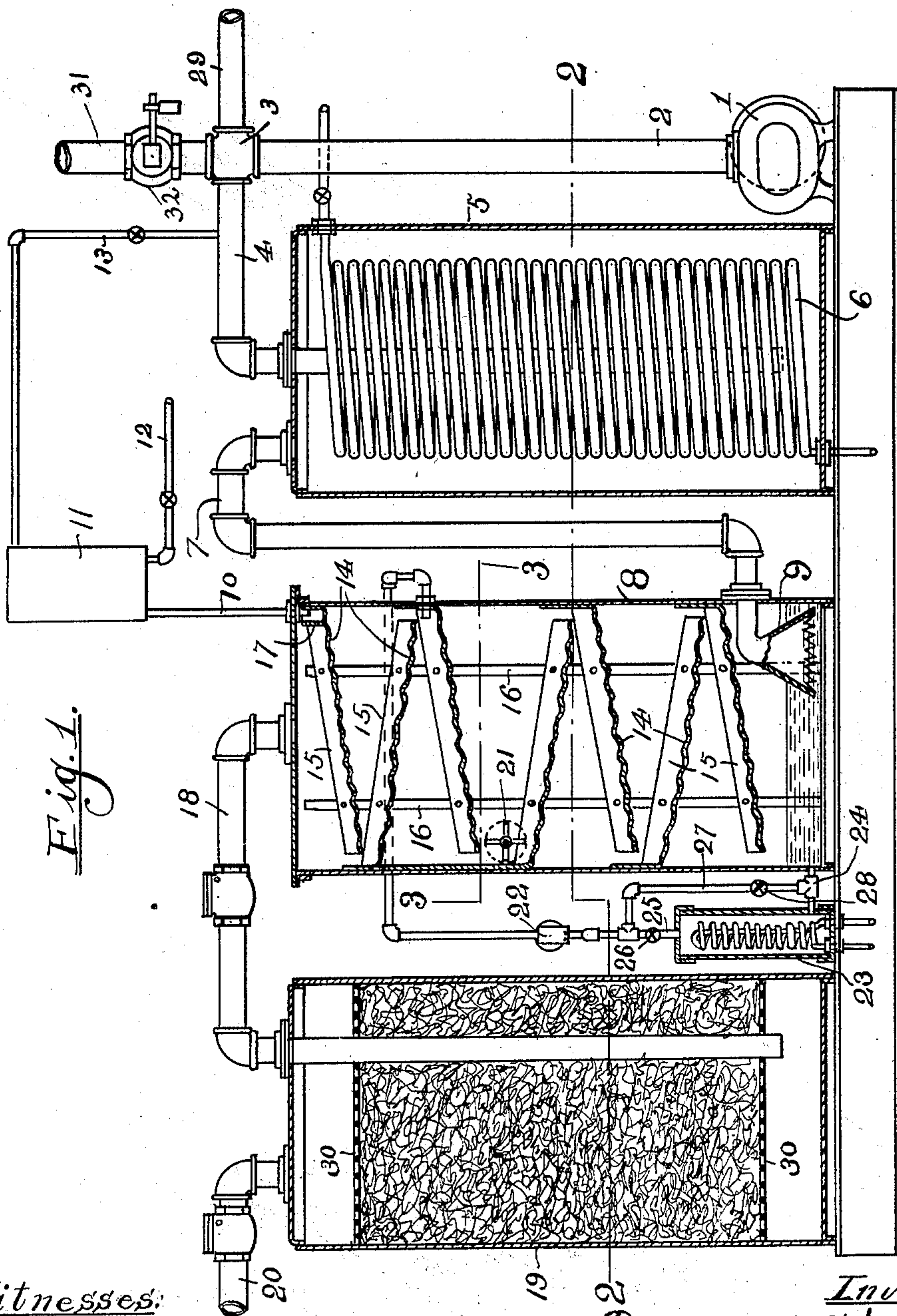
E. F. WILSON.

APPARATUS FOR PRODUCING CARBURETED AIR.

APPLICATION FILED OCT. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

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2 SHEETS—SHEET 2.

Fig. 2.

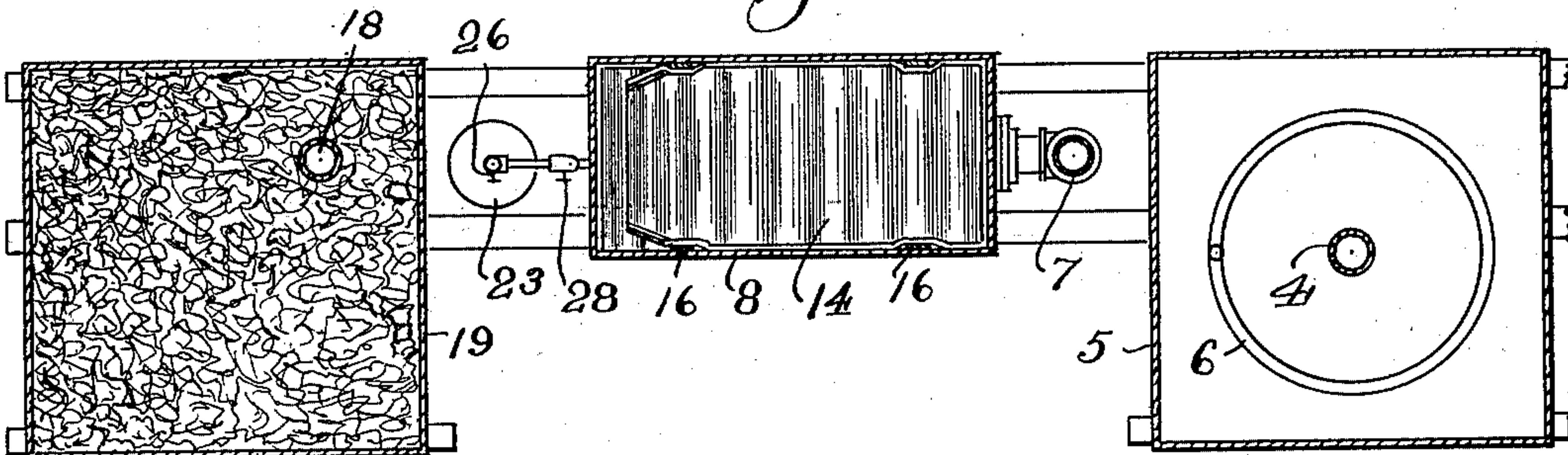


Fig. 3.

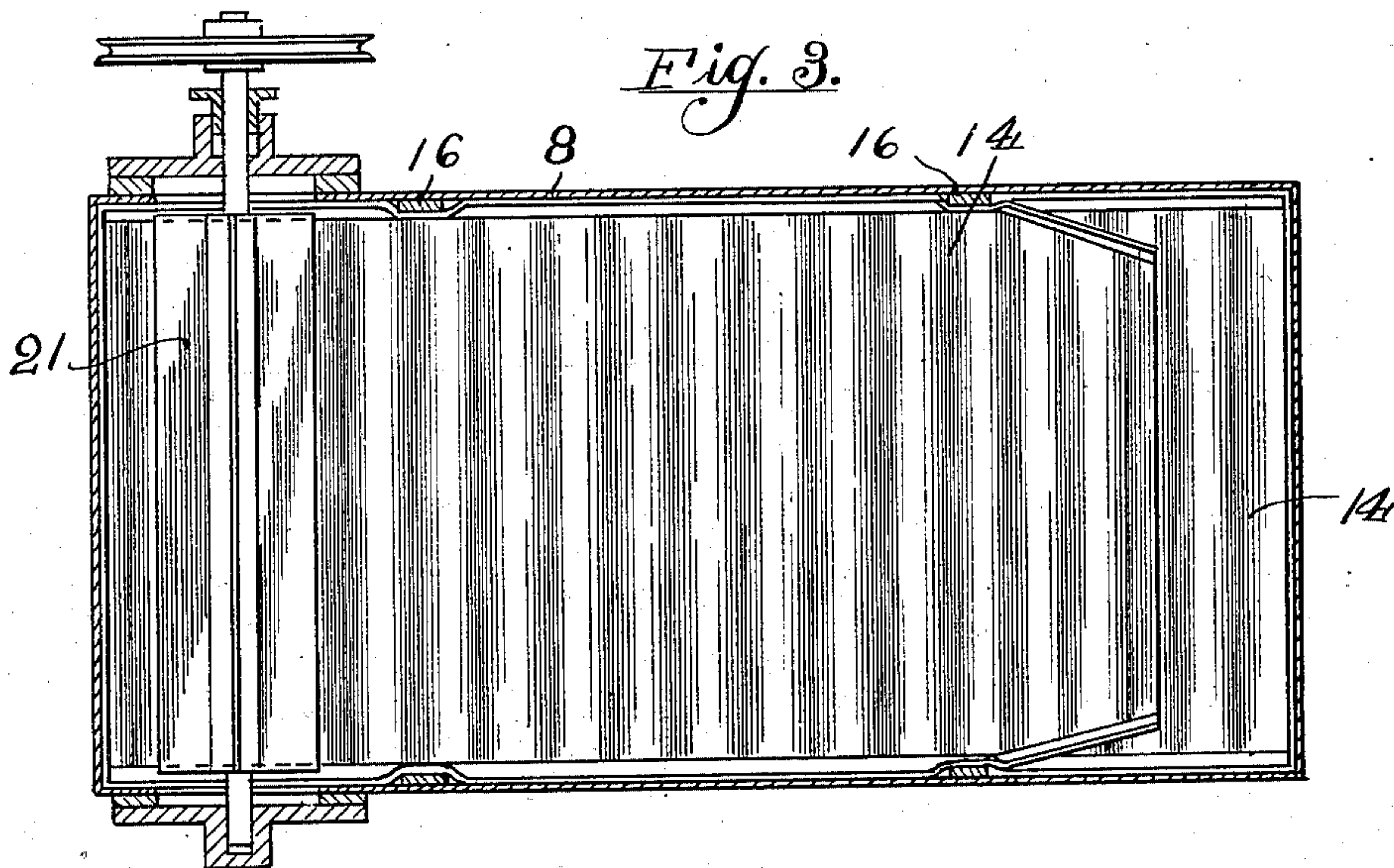
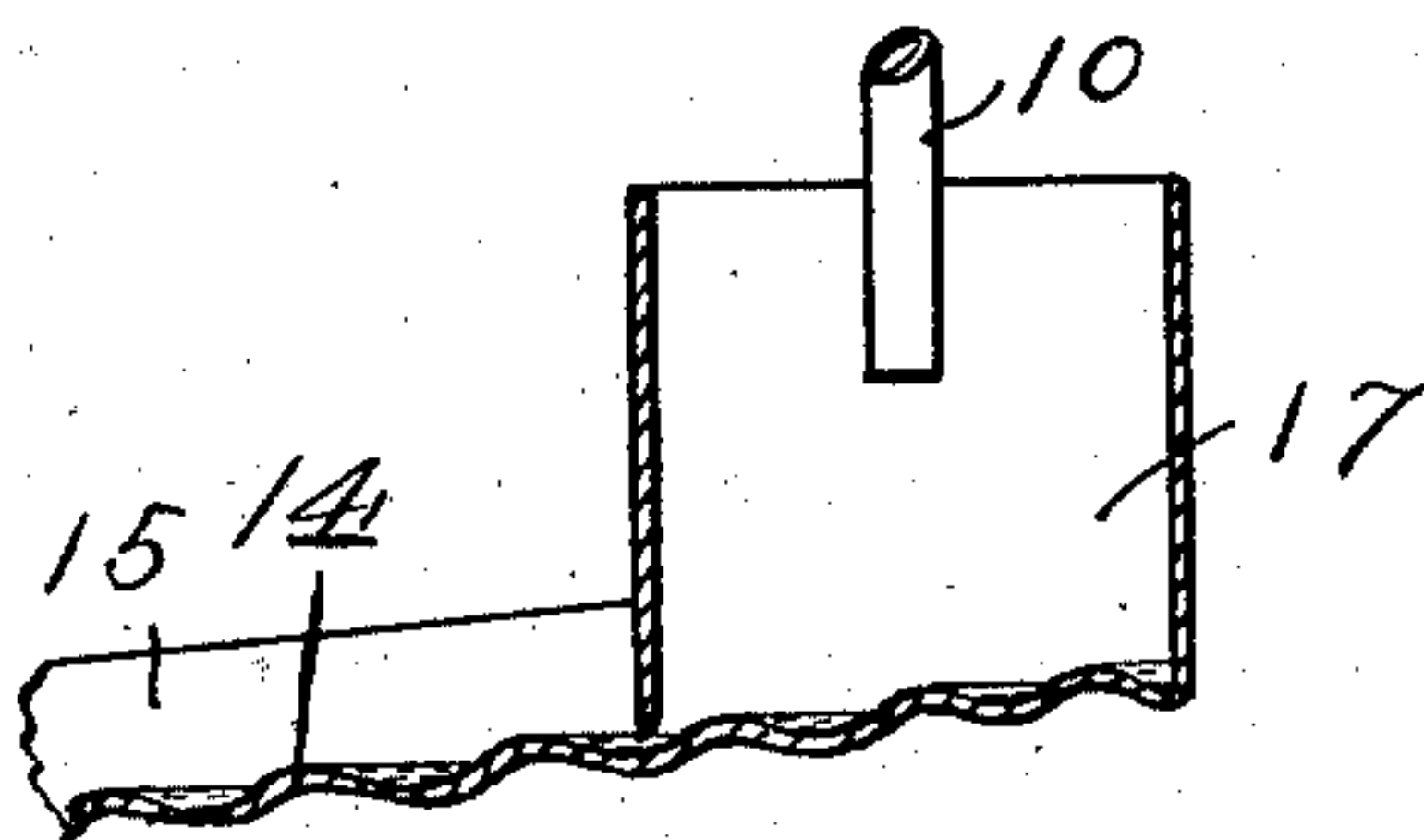


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD F. WILSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO GEORGE S. WELLES, OF CHICAGO, ILLINOIS.

APPARATUS FOR PRODUCING CARBURETED AIR.

SPECIFICATION forming part of Letters Patent No. 749,768, dated January 19, 1904.

Application filed October 19, 1903. Serial No. 177,643. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. WILSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Producing Carbureted Air; 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 a novel construction in an apparatus for carbureted air, the object being to provide simple and efficient means for producing carbureted air having great heating power; and it consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings, illustrating my invention, Figure 1 shows an apparatus for carbureting air constructed in accordance with my invention in vertical longitudinal section. Fig. 2 is a horizontal section of same on the line 2 2 of Fig. 1. Fig. 3 is a detail horizontal section, on an enlarged scale, on the line 3 3 of Fig. 1. Fig. 4 is a fragmentary detail section showing the inlet for the hydrocarbon fluid and the means for distributing the same uniformly over the carbureter-plates.

My said apparatus comprises an air-compressor 1, preferably of the low-pressure type, having large capacity and delivering air at a pressure of from three to five pounds. The said blower 1 is connected at its delivery end by means of a pipe 2 with the four-arm coupling 3, from which a pipe 4 leads into the bottom of a heating-chamber 5, containing a steam heating-coil 6, having connection with a source of supply of steam at its upper end and with an exhaust at its lower end. Leading from the upper end of said heating-chamber 5 is a pipe 7, entering the lower end of a carbureting-chamber 8, said pipe being provided at its inner end with an inverted funnel 9, having a serrated lower edge, which projects into the hydrocarbon liquid in the bottom of said chamber 8. Above said carbureter and connected with the upper end of same by

means of a valve-controlled pipe 10 is a tank 11, adapted to receive and contain the hydrocarbon liquid, said tank 11 being connected with a source of supply of such liquid by means of a valve-controlled pipe 12 and being connected at its upper end with the pipe 4 by means of a valve-controlled pipe 13. Said carbureting-chamber 8 is rectangular in cross-section, and within the same are mounted a plurality of alternately-oppositely-inclined, relatively-staggered, and laterally-corrugated plates 14, over which the hydrocarbon liquid flows in a zigzag direction through said chamber, and during such passage a practically rolling motion is imparted to such liquid and its passage arrested at intervals by the formation of little pools, which are continually changed and kept in agitation. Said plates 14 are so inclined relatively to the depth of the corrugations thereof as to cause the hydrocarbon liquid to collect in said corrugations, as shown in Fig. 4 on an enlarged scale. Said plates are, further, of less width at their lower ends and are provided with flanges 15 on their side edges, by means of which said plates are secured within said chamber 8, said plates being supported on uprights 16, secured to said flanges. Interposed between the flanges of the uppermost plate 14, adjacent the upper end thereof, is a transverse plate 17, between the lower edge of which and the upper face of said plate a narrow space is left through which oil introduced through said pipe 10 flows in a thin film. The gas-outlet from said chamber 8 is at the upper end thereof and is connected by means of a pipe 18 with the lower end of a storage-tank 19, from which the gas is conducted to points of consumption by means of the valve-controlled pipe 20. As my invention relates more directly to said carbureter 8, I will proceed to further describe the construction and operation thereof, said carbureter being the gas-generator proper, and hence obviously the important part of my apparatus. Interposed in the path of the hydrocarbon liquid at about the middle of said chamber 8 below the delivery end of one of the plates 14 is a rotary fan or agitator 21, upon which the

liquid flows and which is constantly rotated in a direction opposite to the flow of liquid and with sufficient rapidity to cause it to spray said liquid, and thus finely divide it, while at the same time it has the effect of agitating the partly-carbureted air and causing the latter to be intimately mixed with any fresh air which may have escaped contact with and hence has not been impregnated with hydrocarbon fluid. It also has the effect of preventing the slightest stratification of the liquid, so that the less volatile constituents are also continuously exposed to evaporation. The said liquid collects in the bottom of the chamber 8, and by reason of the fact that the delivery end of the funnel 9 is immersed therein the admitted air bubbles up through the same in a finely-divided state. This also has the effect of maintaining such liquid constantly agitated to prevent stratification thereof, and in order to continually reexpose such liquid to the air to exhaust it of all volatile constituents or insure its complete evaporation I provide a circulating-pump 22, which is connected at its suction end with the lower end of said chamber 8 and at its delivery end with the upper portion of said chamber, preferably so as to deliver such liquid upon the upper end of the plate which delivers the liquid upon said agitator 21. In order to render the liquid more volatile, if desired, I provide a tank 23 adjacent the lower end of said chamber 8 and connected with the latter by means of a pipe 24, while at its upper end said tank 23 is connected with the suction end of said pump 22 by means of the pipe 25, controlled by the valve 26. In said tank is a steam heating-coil, which serves to heat said liquid as it passes through said tank. I also provide a by-pass pipe 27, connected at one end with said pipe 24 and at its other end with the pipe 25 above the valve 26 therein, so that by closing said valve 26 and opening the valve 28 in said pipe 27 said liquid will pass directly from the lower end of the chamber 8 to said pump 22 without entering said tank 23.

It will be noted that my apparatus is so constructed that the air and hydrocarbon fluid always flow in opposite directions and are maintained in continuous agitation and circulation and finely divided, so as to expose a maximum surface of liquid constantly to the air, and by heating such air, and likewise the less volatile constituents of the liquid, the resulting carbureted air carries a very large amount of carbon and is consequently very rich and capable of producing an intense heat. In order to further insure a thoroughly-uniform gas at the point of consumption, I provide the tank 19 with two horizontal perforated partitions 30, one of which is located adjacent the bottom of said tank above the delivery end of said pipe 18 and the other of which is mounted adjacent the upper wall

of said tank, and between which said tank is filled with coke or the like, said plates and filling serving to again finely divide the carbureted air and insuring further admixture of the more and less saturated portions.

A blow-off pipe 31 rises from the four-way coupling 3, in which a pressure-regulating or safety valve 32 is interposed to prevent excessive pressure in any part of the apparatus.

Should the gas be too rich to permit perfect combustion at the burners, then it will become necessary to add air thereto at this point, and to this end the air-presser is connected with the burners by means of the pipe 29, so that compressed air may be added to the gas at such point of consumption, and thereby produce a flame of great force and heat intensity. Burners such as are used in connection with my said apparatus are well known, and illustration thereof is therefore omitted.

My said apparatus is exceedingly efficient and produces an excellent quality of gas at small cost, such gas being suitable for welding, brazing, and other metal-working purposes.

I claim as my invention—

1. In an apparatus for generating gas, the combination with a source of supply of a hydrocarbon liquid and a source of supply of air under pressure, of a carbureter comprising a sealed vessel having connection with said source of supply of liquid at its upper end and with said source of supply of air at its lower end, alternately-oppositely-inclined relatively-staggered plates, mounted one above the other in said vessel and over which the liquid passes zigzag through said vessel, an outlet for the carbureted air at the upper end of said vessel, and devices interposed in the path of said liquid below the delivery end of one of said plates for atomizing said liquid and agitating the air, substantially as described.

2. In an apparatus for generating gas, the combination with a source of supply of a hydrocarbon liquid and a source of supply of air under pressure, of a carbureter comprising a sealed vessel having connection with said source of supply of liquid at its upper end and with said source of supply of air at its lower end, alternately - oppositely - inclined relatively-staggered laterally-corrugated plates mounted one above the other in said vessel, over which said liquid flows zigzag there-through, an outlet for the carbureted air above the uppermost plate, and devices interposed in the path of said liquid below the delivery end of one of said plates for atomizing said liquid and agitating said air, substantially as described.

3. In an apparatus for generating gas, the combination with a source of supply of hydrocarbon liquid, and a source of supply of air under pressure, of a carbureter comprising a sealed vessel connected at its upper and lower ends with said sources of supply of liquid and

air respectively, a gas-outlet at the upper end of said vessel, and a plurality of alternately-oppositely-inclined relatively-staggered, laterally-corrugated plates mounted one above the other in said vessel over which said liquid flows zigzag therethrough, said plates being so inclined relatively to the depth of the corrugations therein as to permit the formation of little pools of liquid in each concave depression, said liquid and air being caused to pass through said vessel in opposite directions, substantially as and for the purpose described.

4. In an apparatus for generating gas, the combination with a source of supply of hydrocarbon liquid, and a source of supply of air under pressure, of a carbureter comprising a sealed vessel connected at its upper and lower ends with said sources of supply of liquid and air respectively, a gas-outlet at the upper end of said vessel, a plurality of alternately-oppositely-inclined relatively-staggered, laterally-corrugated plates mounted in said vessel one above the other over which said liquid and air pass zigzag therethrough in opposite directions, said plates being so inclined relatively to the depth of the corrugations therein as to cause the formation of little pools of liquid in each depression, and devices interposed between the ends of said zigzag passage in the path of said liquid and said air for simultaneously atomizing the former and agitating the latter, substantially as and for the purpose described.

5. In an apparatus for generating gas, the combination with a source of supply of hydrocarbon liquid, and a source of supply of air under pressure, of a carbureter comprising a sealed vessel connected at its upper and lower ends with said sources of supply of liquid and air respectively, means for heating said air interposed in said connection, a plurality of alternately-oppositely-inclined relatively-staggered plates mounted one above the other in said vessel and over which the liquid and air pass continuously in opposite directions, a gas-outlet above the uppermost plate, and a circulating-pump connected at its suction end with the lower end of said vessel and at its delivery end with the upper portion thereof and adapted to return liquid collecting at the bottom of said vessel upon one of said plates and cause it to repass through said vessel.

6. In an apparatus for generating gas, the combination with a source of supply of hydrocarbon liquid, and a source of supply of air under pressure, of a carbureter comprising a sealed vessel connected at its upper and lower ends with said sources of supply of liquid and air respectively, means for heating said air interposed in said connection, a plurality of alternately-oppositely-inclined relatively-staggered plates mounted one above the other in said vessel and over which the liquid and air pass continuously in opposite directions, a gas-

outlet above the uppermost plate, and a circulating-pump connected at its suction end with the lower end of said vessel and at its delivery end with the upper portion thereof and adapted to return liquid collecting at the bottom of said vessel upon one of said plates and cause it to repass through said vessel, and heating devices interposed in said connection.

7. In an apparatus for generating gas, the combination with a source of supply of hydrocarbon liquid, and a source of supply of air under pressure, of a carbureter comprising a sealed vessel connected at its upper and lower ends with said sources of supply, of liquid and air respectively, means for heating said air interposed in said connection, a plurality of alternately-oppositely-inclined relatively-staggered laterally-corrugated plates mounted one above the other in said vessel and over which said liquid and air pass zigzag in opposite directions therethrough, a gas-outlet in the upper end of said vessel, and a circulating-pump connected at its suction end with the lower end of said vessel and at its delivery end with the upper end of said vessel above the upper end of one of said plates.

8. In an apparatus for generating gas, the combination with a source of supply of hydrocarbon liquid, and a source of supply of air under pressure, of a carbureter comprising a sealed vessel connected at its upper and lower ends with said sources of supply, of liquid and air respectively, means for heating said air interposed in said connection, a plurality of alternately-oppositely-inclined relatively-staggered laterally-corrugated plates mounted one above the other in said vessel and over which said liquid and air pass zigzag in opposite directions therethrough, a gas-outlet in the upper end of said vessel, and a circulating-pump connected at its suction end with the lower end of said vessel and at its delivery end with the upper end of said vessel above the upper end of one of said plates, and heating devices interposed in said connection.

9. A carbureter comprising a sealed vessel having an inlet for hydrocarbon liquid at its upper end, an inlet for fluid to be carbureted at its lower end, an outlet for carbureted fluid at its upper end, a plurality of alternately-oppositely-inclined relatively-staggered laterally-corrugated plates mounted one above the other in said vessel, over which said liquid and the fluid to be carbureted pass in opposite direction, power-actuated devices interposed in the path of said liquid and fluid for atomizing the latter and agitating the former, and a circulating-pump connected at its suction end with the lower end of said carbureter and at its delivery end with the upper portion thereof above the said power-actuated atomizing and agitating devices.

10. A carbureter comprising a sealed vessel having an inlet for hydrocarbon liquid at its upper end, an inlet for fluid to be carbureted

at its lower end, an outlet for carbureted fluid at its upper end, a plurality of alternately-oppositely-inclined relatively-staggered laterally-corrugated plates mounted one above the other in said vessel, over which said liquid and the fluid to be carbureted pass in opposite direction, power-actuated devices interposed in the path of said liquid and fluid for atomizing the latter and agitating the former, and a circulating-pump connected at its suction end with the lower end of said carbureter and at its delivery end with the upper portion thereof above the said power-actuated atomizing and agitating devices, and heating devices interposed in said connection between said pump and said carbureter.

11. A carbureter comprising a sealed vessel having a zigzag passage leading from the upper to the lower end of same, said vessel being provided at its upper end with an inlet for hydrocarbon liquid and an outlet for carbureted fluid, and at its lower end with an inlet for fluid to be carbureted, the hydrocarbon liquid and fluid to be carbureted being adapted to pass through said zigzag passage in opposite directions, and power-actuated devices interposed in said passage between the ends of same and in the path of the liquid and fluid for simultaneously atomizing the former and agitating the latter.

12. A carbureter comprising a sealed vessel having an inlet for hydrocarbon liquid and an outlet for gas at its upper end, an inlet for fluid to be carbureted at its lower end, and having an inclined zigzag passage leading from the upper to the lower end of said vessel through which the hydrocarbon liquid and the fluid to be carbureted pass in opposite directions, power-actuated means between the ends of said passage in the path of said liquid and fluid for atomizing the former and agitating the latter, and means for returning liquid collecting in the bottom of said vessel into said passage above said power-actuated atomizing and agitating devices.

13. A carbureter comprising a sealed vessel having internal partitions adapted to form a zigzag passage leading from the upper to the lower end of same, and being provided with an inlet for hydrocarbon liquid and an outlet for gas at its upper end, and with an inlet for fluid to be carbureted at its lower end, said

liquid and fluid being adapted to pass through said zigzag passage in opposite directions, the walls of said passage being provided with recesses adapted to receive and retain little pools of liquid, and power-actuated atomizing and agitating devices located between the ends of the said zigzag passage in the path of said liquid and fluid.

14. A carbureter comprising a sealed vessel having internal partitions adapted to form a zigzag passage leading from the upper to the lower end of same, and being provided with an inlet for hydrocarbon liquid and an outlet for gas at its upper end, and with an inlet for fluid to be carbureted at its lower end, said liquid and fluid being adapted to pass through said zigzag passage in opposite directions, the walls of said passage being provided with recesses adapted to receive and retain little pools of liquid, power-actuated atomizing and agitating devices located between the ends of said zigzag passage in the path of said liquid and fluid, and means for returning liquid collecting in the bottom portion of said vessel into said passage above said atomizing and agitating devices.

15. A carbureter comprising a sealed vessel having internal partitions adapted to form a zigzag passage leading from the upper to the lower end of same, and being provided with an inlet for hydrocarbon liquid and an outlet for gas at its upper end, and with an inlet for fluid to be carbureted at its lower end, said liquid and fluid being adapted to pass through said zigzag passage in opposite directions, the walls of said passage being provided with recesses adapted to receive and retain little pools of liquid, and power-actuated atomizing and agitating devices located between the ends of said zigzag passage in the path of said liquid and fluid, means for returning liquid collecting in the bottom portion of said vessel into said passage above said atomizing and agitating devices, and means for heating said liquid during its return passage.

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

EDWARD F. WILSON.

Witnesses:

RUDOLPH WM. LOTZ,
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