No. 780,355. PATENTED JAN. 17, 1905.

J. M. KELLEY.

CARBURETER.

APPLICATION FILED OCT. 24, 1902.

3 SHEETS—SHEET 1.

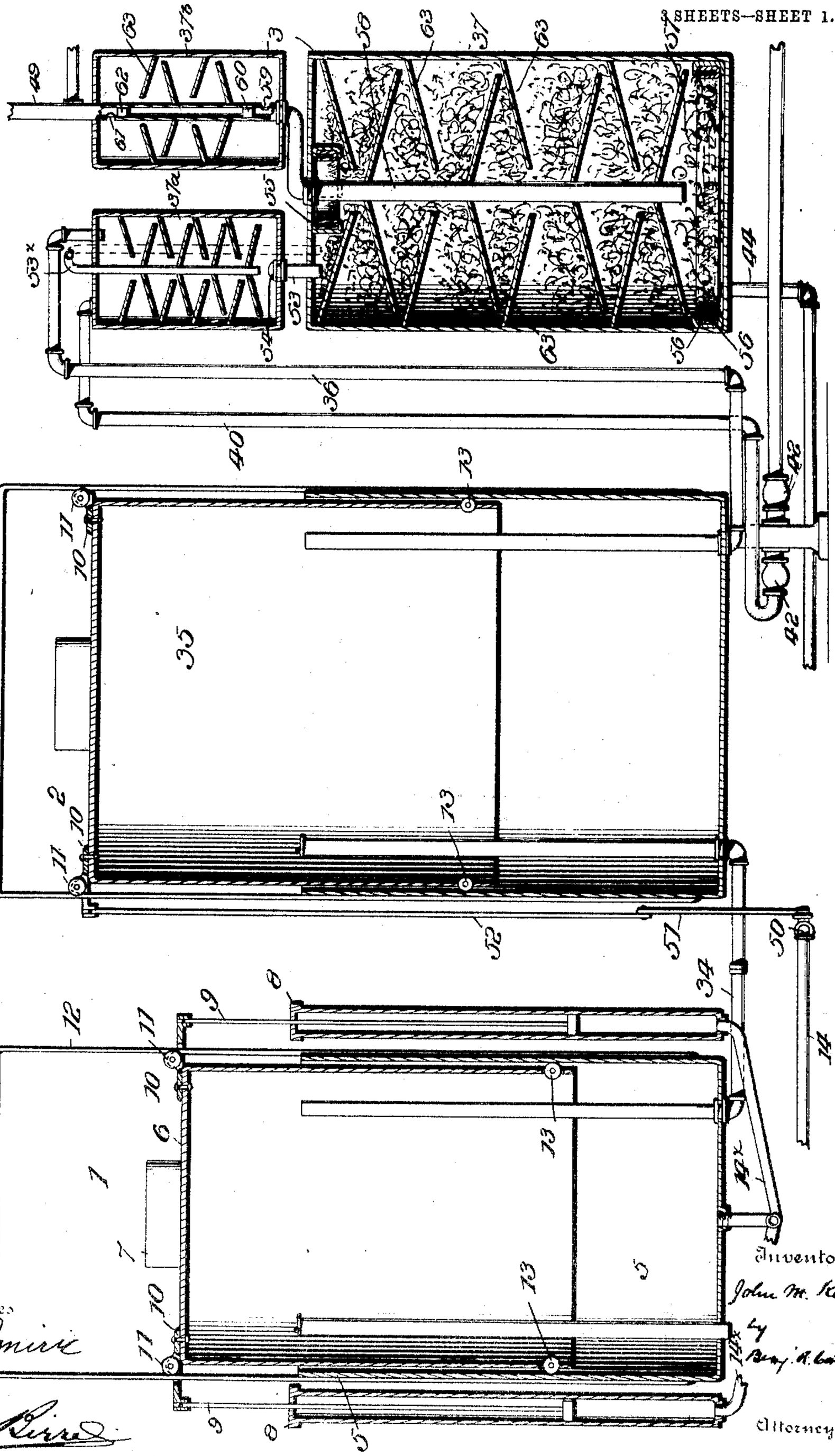

Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

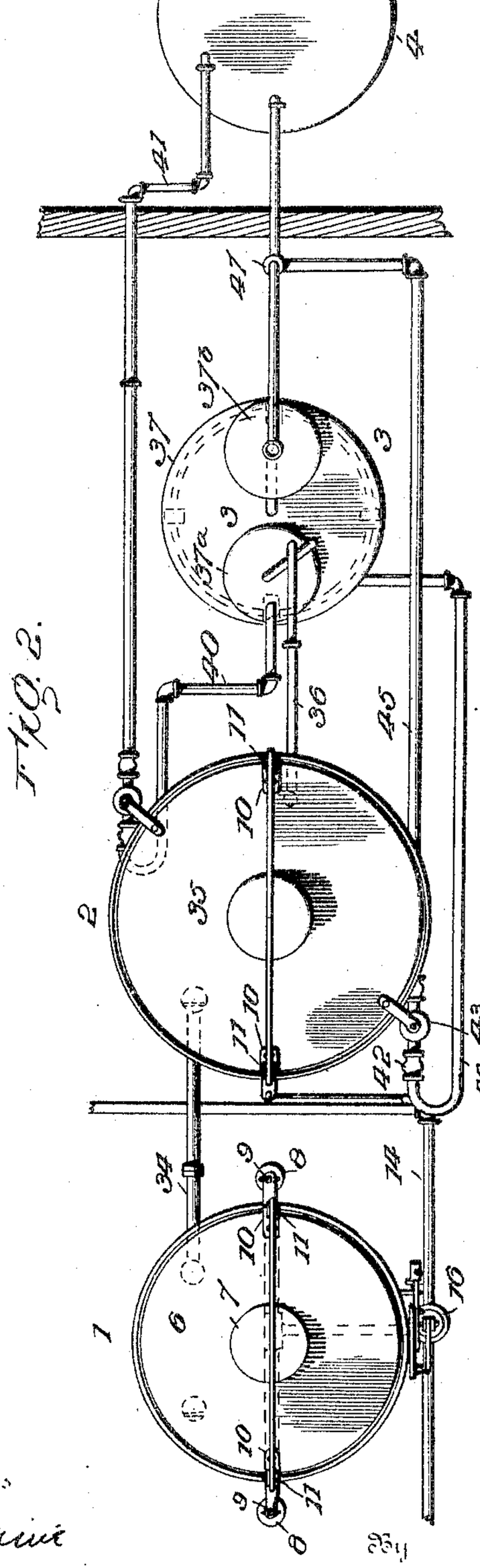

FIG. 2.

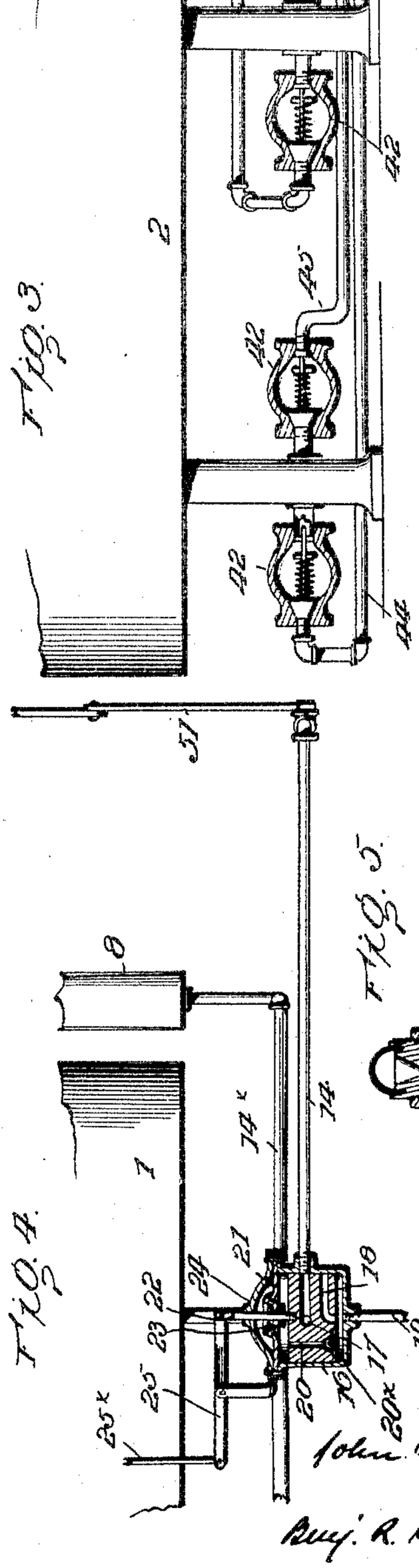

FIG. 3.

FIG. 4.

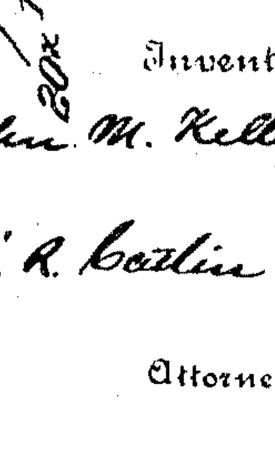

FIG. 5.

Witnesses

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3 SHEETS—SHEET 3.

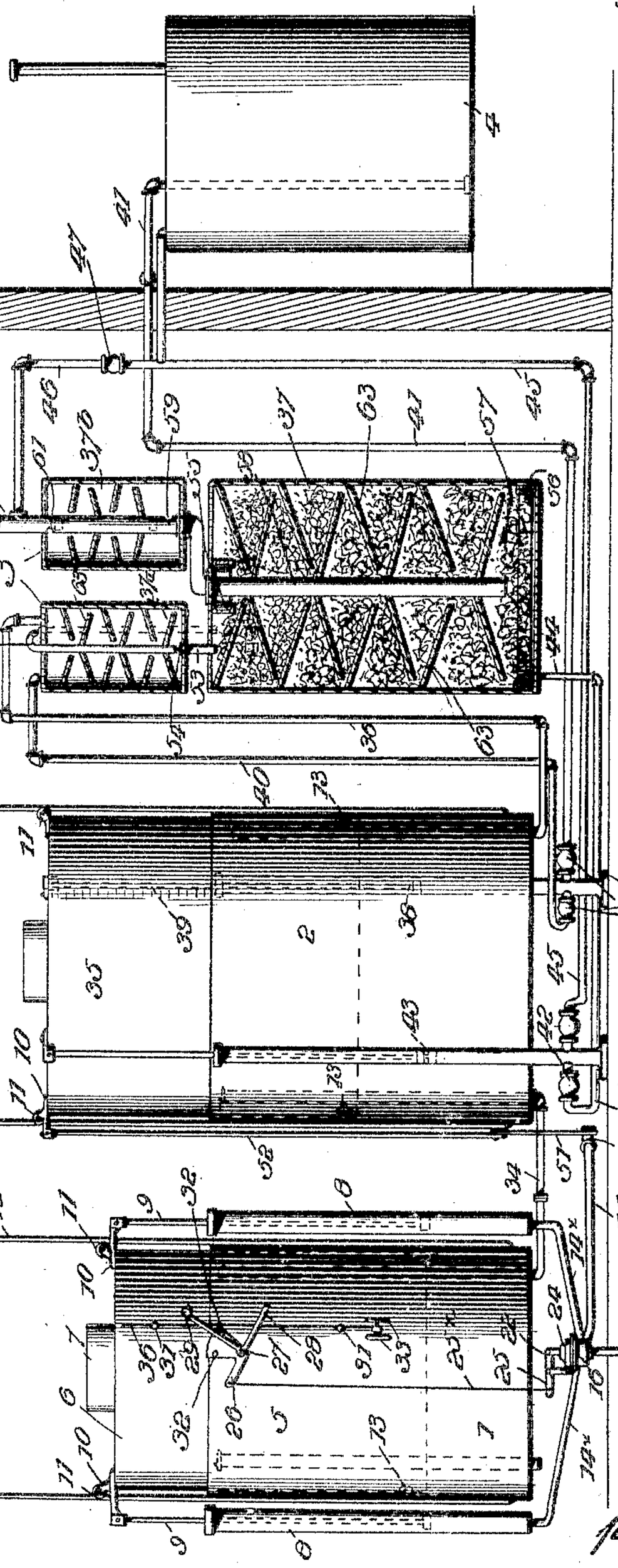

Fig. 6.

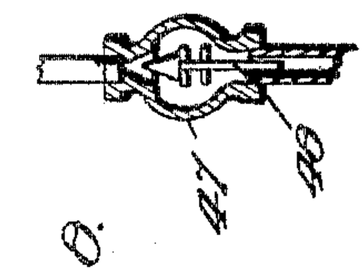

Fig. 8.

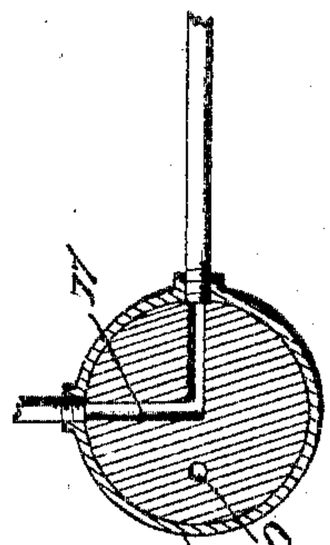

Fig. 7.

Witnesses

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No. 780,355. Patented January 17, 1905.

UNITED STATES PATENT OFFICE

JOHN M. KELLEY, OF ROCHESTER, NEW YORK.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 780,355, dated January 17, 1905.

Application filed October 24, 1902. Serial No. 128,600.

To all whom it may concern:

Be it known that I, JOHN M. KELLEY, a resident of Rochester, in the county of Monroe 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 pertains to make and use the same.

The invention relates to carbureters, and has for its object to insure certainty in the action of the mechanical devices and a uniform product.

The invention consists in the construction hereinafter described and pointed out.

In the accompanying drawings, Figure 1 is a side elevation of the apparatus, the carbureter proper comprising a series of members being shown in sections. Fig. 2 is a plan of the apparatus. Fig. 3 is a broken elevation of an air-transmitting receiver, check-valves being shown in section. Fig. 4 is a broken elevation of an air-blower, a water-controlling valve being shown in section. Fig. 5 is a section of a check-valve. Fig. 6 is an elevation of the apparatus, the carbureter proper being shown in section. Fig. 7 is a transverse section of the valve shown in Fig. 4. Fig. 8 is a section of a valve normally open.

Numeral 1 indicates an air-blower comprising a weighted bell, water-tank, and pumps. 2 denotes a secondary blower, transmitting air from the first blower to a carbureter; 3, a series of carbureting vessels, and 4 an oil-tank. As shown, these are arranged in a straight line for convenience, but any relative arrangement not inconsistent with the herein-described invention may be adopted.

The blower comprises the water-tank 5 and the bell 6, having a weight 7. Pumps to raise the bell and draw in air to fill the same are denoted by 8. The bell is connected to each of the piston-rods 9 of the pumps by a casting 10 fixed thereon and supporting the bell-guiding rollers 11, bearing on the rods 12, the same casting doing duty for both purposes. The bell may be further guided by rollers 13. Only two are shown, and for convenience they are illustrated immediately adjacent the pumps, though in practice if but two guide-rollers 13 are used they may be situated midway between the pumps. Two pumps are used to prevent the cocking of the bell and insure a steady rising in a straight line without noise or unnecessary friction, and also to insure that a certain valve-tripping rod be carried in a straight line and without binding, as will be further explained.

14 indicates a pipe leading from a water-main, and $14^{\times}$ represents branch pipes admitting water under pressure beneath the pump-pistons. 16 is a valve controlling the admission. It has an admission-port 17, (see Fig. 7,) a waste-port 18, communicating with a waste-pipe 19, and a relief-port 20. The latter permits the escape of water leaking above the valve-body and into the space between it and a flexible diaphragm 21. A float or check-valve $20^{\times}$ prevents the waste water filling the space immediately below the diaphragm. The valve-casing is packed at the top by the diaphragm, made, preferably, of hide or other suitable substance and provided with a corrugation or fold 23 to provide for movement of the diaphragm. The space between the casing and its cover 24 is supplied with oil for lubricating the plunger 22 and preserving the material of the diaphragm. The valve is actuated by its rod 22, connected to its lever 25, which in turn is connected by a rod $25^{\times}$ to a bell-crank lever 26, having a pivot or fulcrum 27. This pivot is a stud fixed to the water-tank and supports also a bell-crank lever 28, having a weight 29. To the bell is connected a rod 30, provided with pins 31, adapted to engage the lever 28.

The descent of the bell 6 moves the upper pin 31 against the upper arm of the lever 28 and moves it sufficiently from its normally stable position so that it falls against one of two pins 32, connected to lever 26, and actuates said lever to lift the rod $25^{\times}$ and operate lever 25 to raise the valve body and put its admission-port in communication with the branch pipes communicating with the pumps. The pumps then act to raise the bell until the lower pin 31 engages the lever 28 and moves its weighted arm over to its other side of its center of gravity, whereupon it falls against

a pin 32 and actuates lever 26, depressing rod $25^{\times}$ and closing the valve-admission port, at the same time opening the waste-port. During the descent of bell 6 its contained air is forced into the secondary blower, thereby raising bell 35, which in ascending lifts arm 51 by means of the connecting-rod 52, with the effect to close valve 50, completely shutting off water-pressure from the water-controlling valve. (Shown in Fig. 4.) As soon as the bell 35 is practically emptied of air or has forced the predetermined quantity to the carbureter its continued downward movement will open the valve 50 and allow access of water to the water-controlling valve, Fig. 4, which thereupon admits water to the pumps and raises the bell 6, drawing in another supply of air until the admission-port 17 is closed by the before-described tripping device. This fresh supply of air is then automatically forced into the bell 35, with the effect to raise it and close valve 50, as before stated, the operation being continuous and automatic.

To guide the rod 30, one or more wheels 33 are connected thereto and adapted to run on the tank. This obviates the swaying or displacement of the rod and coöperates with the means used for moving the bell in a straight line.

Air is expelled by the weighted bell of the blower through a pipe 34 to fill or partially fill an air-receiving and transmitting-bell 35 of a secondary blower.

36 is a pipe whereby air is conveyed from the bell 35 to a preliminary carbureter 37^{a}.

38 is a piston of a pump actuated by the bell 35. The rising of the bell 35, occupying about three-seconds of time, lifts the piston 38 of the carbureter-supply oil-pump and draws an adjusted amount of gasolene from the bottom of the tank 4 through a check-valve 42. On the descent of the bell 35 its contained air and the gasolene in the supply-pump are expelled in any adjusted proportion to produce uniformly any desired density or richness of gas, whatever be the number of lights in use and however irregular or intermittent their use may be.

39 indicates a piston-rod provided with a scale or with marks corresponding to liquids of different grades or specific gravities, the range of the piston being fixed by the selected points of connection of the piston-rod to the bell.

40 is a pipe conveying oil to the preliminary carbureter 37^{a}, and 41 is a pipe whereby it is drawn from the bottom of the tank 4, and 42 represents check-valves.

43 denotes the piston of a pump operated by the bell.

44 is a pipe whereby it withdraws residual oil from the main carbureter 37, and 45 a pipe whereby it returns said oil to the tank 4. An extension 46 of pipe 45 has a check-valve 47, provided with a guide-stem 48. (See Fig. 8.) This valve is made of such size and weight that air-pressure from the pump cannot close it. The accidental rise of a liquid column would float and close it. By this construction the oil and carbureted air are separated, the oil going to the tank and the carbureted air to a main 49 or to any desired conduit or holder. The possibility of air being compressed in tank 4 by the action of the pump 43 with the effect to force oil out of the tank is thus avoided.

The bell 35 is adapted to actuate a valve 50 in the water-admission pipe 14 by means of a lever 51 and a connecting-rod 52.

Referring to the preliminary carbureter, 53 denotes an overflow-pipe extending a short distance above the bottom.

54 denotes a float-valve. (See Fig. 5.)

$53^{\times}$ denotes a pipe to convey air partially carbureted from the preliminary carbureter 37^{a} to the main carbureter.

55 is a perforated metal or wire ring or frame covered with fibrous material and situated in the top of the main carbureter to retard the downward flow of the oil and carburet the air passing through the said fibrous material. 56 is a similar ring, having a like operation at the lower chamber 57 of said carbureter.

The conduit 58 conducts the carbureted air from chamber 57 to the bottom of the finishing carbureter or drier 37^{b}. The pipe extends up through said carbureter. It has an outlet-opening 59 below a plug 60. A similar opening at the top is denoted by 61 and plug by 62.

Oppositely-inclined diaphragms connecting alternately with the outer wall of the carbureter and the central pipe are denoted by 63. The spaces between these diaphragms are filled with charcoal or equivalent material. The air and gasolene (or oil) flows down through the material supported on the diaphragms, moving alternately toward and from the center, thereby thoroughly carbureting the air.

By the devices described the action of the primary blower is made smooth and uniform and the actuation of the water-admission pipes certain. The secondary blower or transmitter obviates the effects of variations in the action of the primary blower. The action of the pump for liquid can be regulated to suit different grades. Surplus gasolene (or oil) is regularly removed from the primary and main carbureters and returned to the tank. The gasolene and air are compelled to keep company in a path or conduit which is alternately contracted at the center of the carbureter and widened at its circumference, and a final mixture or blending of gasolene and air is effected after the previously carbureted air is conducted upwardly through a delivery-pipe connected with the main carbureter, where

separation may occur by gravity, the carbureted air thus separated receiving a final treatment before entering the main or outlet pipe.

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

1. The combination in a carbureting apparatus of a carbureting vessel, a tank, a conduit whereby oil or gasolene may pass from the tank to the vessel, a conduit whereby surplus liquid may be drained from the carbureting vessel and returned to the tank, a bell to supply air to the carbureting vessel and a plurality of pumps each operatively connected to the bell and also connected with the conduits respectively to supply oil to the vessel and return the surplus to the tank.

2. The combination in a carbureting apparatus of a carbureting vessel, a tank, a conduit whereby oil or gasolene may pass from the tank to the vessel, a conduit whereby surplus liquid may be drained from the carbureting vessel and returned to the tank, a bell to supply air to the carbureting vessel, and pumps connected with the conduits respectively to supply oil to the vessel and return the surplus to the tank, said pumps being actuated by the bell, and both the air and oil conduits admitting their contents to the top of the carbureting vessel.

3. The combination of a carbureter, an oil or gasolene tank, a bell to supply air to the carbureter, a pump having a piston-rod operatively connected to the bell and the pump connected by conduits with the tank and carbureter respectively to supply oil to the latter, and means whereby the action of the air-supplying bell and oil-supplying pump may be relatively varied, said oil-pump being situated adjacent the bell and its piston attached directly thereto.

4. The combination in a carbureting apparatus, of a carbureting vessel, a tank, a conduit whereby the oil or gasolene may pass from the tank to the vessel, a conduit whereby the liquid may be drained from the carbureting vessel and returned to the tank, a conduit for supplying air to the carbureting vessel, and means operative to positively and simultaneously force the fluids through the several conduits, said means being common to the air and oil supply.

5. The combination in a carbureting apparatus, of a carbureting vessel, a tank, a conduit whereby the oil or gasolene may pass from the tank to the vessel, a conduit whereby the liquid may be drained from the carbureting vessel and returned to the tank, a conduit for supplying air to the carbureting vessel, and means operative to positively and simultaneously force the fluids through the several conduits, said means being common to the air and oil supply and the oil and air conduits communicating with the top of the carbureting vessel.

6. The combination in a carbureting apparatus of a carbureting vessel, a tank, a conduit whereby oil or gasolene may pass from the tank to the vessel, a conduit for supplying air to the vessel, and constantly-operative automatically-controlled means for forcing the oil, and air, and drained liquid through the several conduits to the said vessel.

7. The combination in a carbureting apparatus of a carbureting vessel, a tank, a conduit whereby oil or gasolene may pass from the tank to the vessel, a conduit for supplying air to the vessel, constantly-operative automatically-controlled means for forcing the oil and air through the conduits to the vessel, and a conduit for draining the vessel of residual liquid, said means also regularly forcing the drained liquid through the latter conduit, said conduit having an extension provided with a valve 47 to separate air and liquid as set forth.

8. The combination of an oil-tank, a main carbureting vessel, a preliminary carbureting vessel above the main vessel, means for supplying said preliminary carbureter with fresh air, and means for supplying said preliminary carbureter with fresh oil, and separate conduits, one for oil and one for partially-carbureted air, both leading downward into the main carbureter.

9. The combination of a main carbureting vessel, a preliminary carbureting vessel above the main vessel, means for supplying the said preliminary carbureter with air and oil, and separate conduits, one for oil and one for partially-carbureted air, whereby the vessels communicate, the oil-conduit being provided with a float-valve, and the carbureted-air conduit extending and conducting upwardly through the preliminary carbureter.

10. The combination of a main carbureting vessel, a preliminary carbureting vessel above the main vessel, means for supplying the said preliminary carbureter with air and oil, and separate conduits, one for oil and one for partially-carbureted air, whereby the vessels communicate, and a third vessel above and communicating with the main carbureter for finishing and drying the carbureted air.

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

JOHN M. KELLEY.

Witnesses:
I. J. FISHER,
FRED. B. KING.