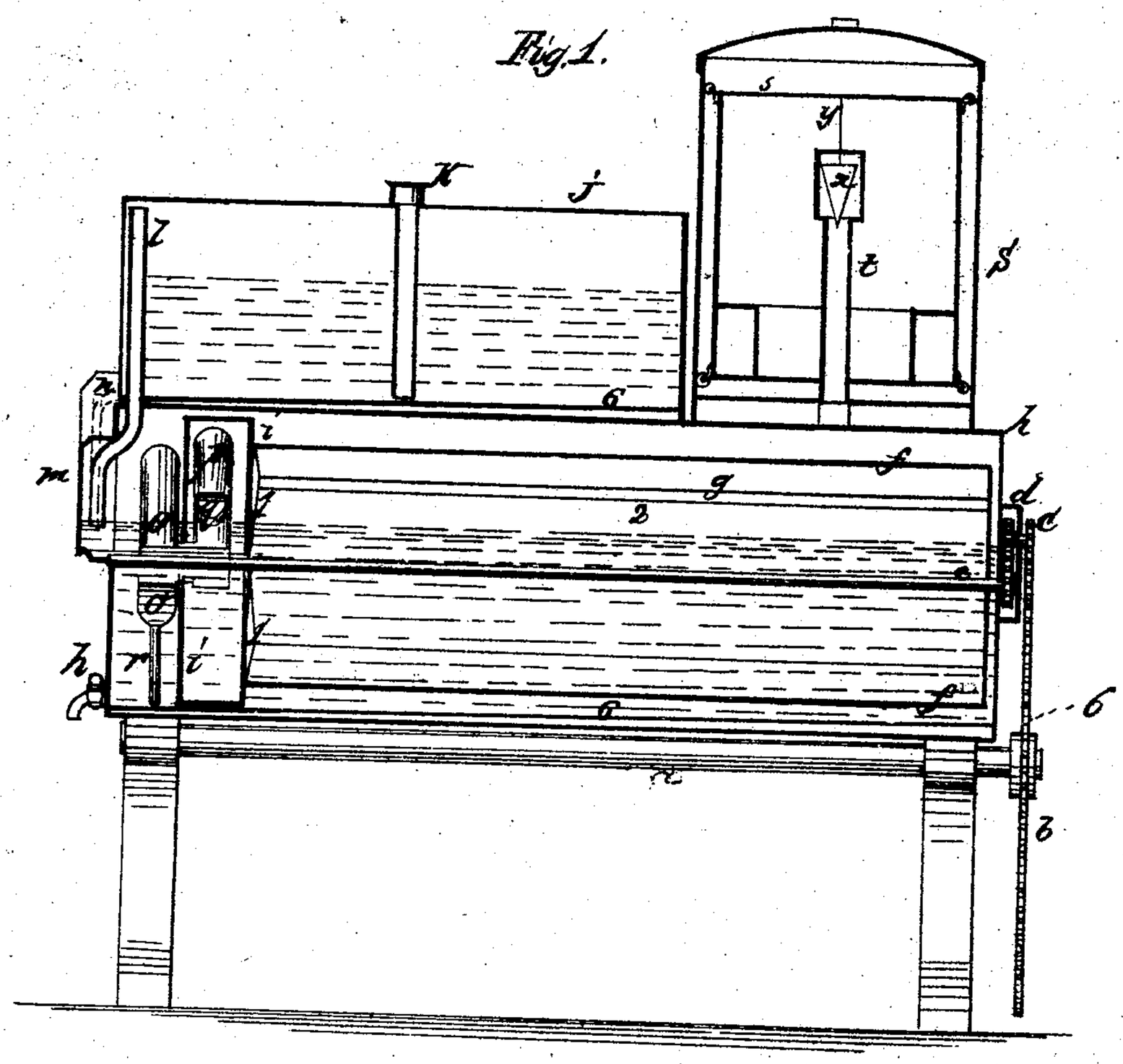
Sheet 1-2 Sheets.

J. MacDougall.

Portable Gas Apparatus & Carbureter.

No. 71514 Patented Nov. 26, 1867.

Fig. 1.



Witnesses,
Gustav Berg
John C Pollie

Inventor
John MacDougall

Sheet 2 - 2 Sheets.

J. MacDougall.

Portable Gas Apparatus & Carbureter.

No. 71514

Fig. 2. Patented Nov. 26, 1867.

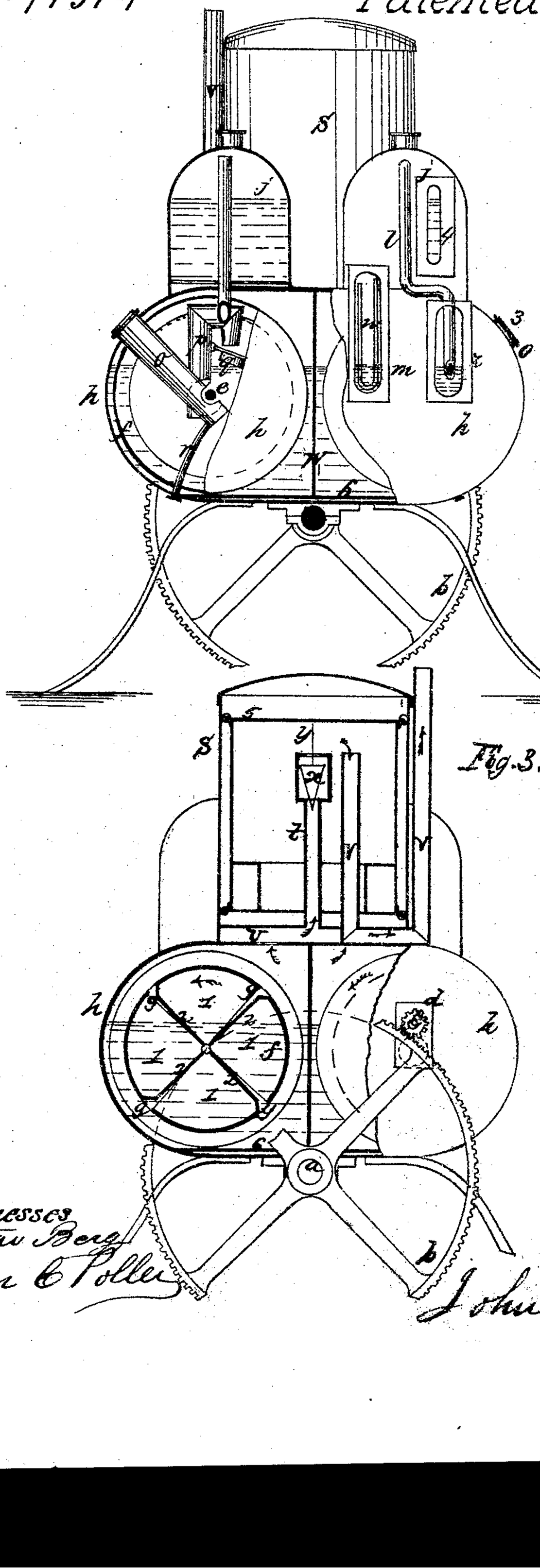


Fig. 3.

Witnesses
Gustav Berg
John C Poller

Inventor:
John MacDougall

United States Patent Office.

JOHN MACDOUGALL, OF NEW YORK, N. Y.

Letters Patent No. 71,514, *dated November* 26, 1867.

IMPROVED PORTABLE GAS-APPARATUS AND CARBURETTER.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN MACDOUGALL, of 79 Nassau street, in the city of New York, in the county and State of New York, have invented a new and useful Improvement in Portable Gas-Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 is a vertical longitudinal section of a gas-apparatus that contains my improvement.

Figure 2 is an elevation of one end, looking from the left, portions of the end being broken away.

Figure 3 is an elevation, partly in section, of one end, looking from the right.

Similar letters indicate corresponding parts.

My improvement relates to the construction and arrangement of certain parts of portable machines or apparatus for manufacturing illuminating-gas, wherein common atmospheric air is mixed with the vapors of hydrocarbon liquids.

One feature of my invention is the form and the mode of arranging the air-tube that admits fresh air to the liquid, its mouth facing downwards, so that the liquid cannot enter it. Another feature is the use of a floating valve, which is so arranged as to close the mouth of the tube when the liquid rises to the height of the tube. Another feature is the application to the air-tube of a pipe, which conducts away any condensed matter that may collect in the said tube. Another feature is the application of a cap or valve to the outer end of the tube, to provide against the escape of vapor. Another feature is the giving the air-tube such a shape, where it goes through the end of the rotating vessel, or its jacket, that it wholly or partially surrounds the shaft of said vessel, whereby the opening for the shaft and tube can be made of small extent. Another feature is the enclosing that end of the rotating vessel where power is applied within a jacket, and arranging intermediate gear within the jacket in such a manner as to prevent leakage of vapor or liquid to a great degree. Another feature is the application, on the bottom of those vessels of the apparatus, rotating or stationary, which contain the hydrocarbon liquid, of inclined surfaces or bottoms, which enable me to draw off heavy or rancid oil and refuse matters from time to time with facility, and without stopping the machine. Another feature is the arrangement and combination, in the same frame, of two independent machines, each connected with the same driving-shaft. Another feature is an automatic feeder for supplying oil to the rotating vessel. Other features not above mentioned will be hereafter specified.

The letter *a* designates the driving-shaft of the machine. On one end it carries a large gear-wheel, *b*, which gives motion to both the rotating vessels or shells *f f* at the same time, if desired. The machine is supported upon standards, which are attached to the bottom of an outer vessel or jacket, *h*, that encloses the rotating vessels, and at the same time holds the hydrocarbon liquid in which the vessels revolve, a partition being provided throughout the whole length of the outer vessel *h* to form two distinct compartments, one for each vessel or shell *f*. Both of these compartments are made to open above into the bottom of the gasometer *s*, through holes U, one of which is seen in fig. 3. The vessels or shells *f* are made and fitted up in the same manner, and therefore only one will be described in explanation of my invention. The vessel or shell *f* is fixed to its shaft, *e*, one end of which has a bearing in the adjacent end of vessel *h*, and the other goes through the wall of said vessel, and enters a jacket, *d*. which also encloses a pinion on that end of the shaft, and also a driving-gear, which is placed over the pinion, and whose shaft goes through the upper part of jacket *d*, and has on its outer end a pinion, *c*, that meshes with the teeth of large wheel *b*. The shaft of the outer pinion *c* is in such a position as always to be above the level at which the hydrocarbon liquid stands in the vessel *h*, and consequently no leakage can take place at the joints of the shafts above mentioned. Either of the pinions *c* that communicate motion respectively from the large wheel *b* to the rotating vessels or shells *f*, is put out of gear with wheel *b*, at the pleasure of the operator, whenever it is desired to run only one vessel or shell, *f*. The vessel or shell *f* has radial partitions, 2, four in number in this example, which divide it into four distinct compartments, each of which has in its circumference an opening, *g*, that extends the whole length of the vessel. The openings *g* are placed near to the partitions on their left-hand side, observing fig. 2, so that during the revolution of the vessel, which is towards the left, there will be an opportunity for the admission of air into the compartments while

their circumference is above or out of the liquid, which is represented in dark color at about the height it stands when the machine is in operation. The left-hand end of the vessel or shell *f* is divided radially to conform to the arrangement of the compartments, a radial opening being made in each, as is represented in figs. 1 and 3, through which the liquid and the air at that end of the outer vessel are allowed to flow into and out of the vessel *f*. To the left of vessel or shell *f* I provide a circular apartment, *i*, whose walls are fixed on shaft *e*, so as to turn with it. The apartment *i* has not a separate wall on its side towards the vessel or shelf *f*, but the divided end, 1, 1, 1, 1, of that vessel forms the right-hand side of the said apartment, and consequently there is uninterrupted communication between them. Atmospheric air is admitted or conducted into the apartment *i* by means of the bent air-pipe *o*, composed of two parallel pipes, united by a horizontal pipe, the latter going through the left-hand end of the apartment *i* in the opening made for the shaft *e*, and being made concave on the side towards that shaft, so as partly to surround it, as is shown in figs. 1 and 2. The horizontal pipe, if preferred, is made in the form of an annulus, so as wholly to surround the shaft. The outer part of pipe *o* extends through the outer case or vessel *h*, and is fixed thereto, and its outer end is supplied with a valve or cover, 3, which can be arranged so as to be closed automatically by means of a cord leading to any apartment in a house, the cover being kept open while the apparatus is in operation, so as to admit a supply of air. This arrangement, in controlling the cover of the air-pipe, enables one to shut off the air and close the apparatus when the machine is not in active operation without being compelled to go down to the place where the apparatus is situated. That part of the air-supply pipe which is situated within the apartment *i* is marked *p*. It is arranged in the upper part of said apartment, and has a double elbow, for the purpose of making its end, which is above the surface of the hydrocarbon liquid, face downwards towards the surface of the said liquid, the end being provided with a floating valve, *q*, hinged to the pipe, and hanging down and floating on the liquid, which raises it and closes the end of the pipe when said liquid exceeds its proper height sufficiently for that purpose, and thereby prevents the liquid from flowing into the pipe. The air-tube or pipe *o* is also provided with an escape-pipe, *r*, which extends from its lowest point through the bottom of the case or vessel *h*, for the purpose of discharging any condensed matter that may collect therein. The supply of liquid is contained in an upper vessel, *j*, from which the liquid descends through a supply-pipe, *n*, of a U-shape, that leaves the vessel *j* near its bottom at the left-hand end, (see fig. 1,) and enters a small outer apartment, *m*, which extends about as low as the level of shaft *e*, and communicates with the interior of vessel or case *h* through a perforation in the adjacent wall of the latter, through which the hydrocarbon liquid enters said vessel *h* from the small outer apartment *m*, the intercommunication allowing the liquid to stand at the same height in each, and a long vertical window to receive a pane of glass being made in apartment *m*, so as to show the height of the liquid. The supply-tube *n*, after entering the apartment *m*, is first carried downwards towards its bottom, and is then turned up into the form of the letter U, its extremity, which is open, being about as high as the bottom of the supply-vessel *j*. The passage or flow of the hydrocarbon liquid from the vessel *j* into the vessel *h* is accomplished automatically, by means of the pressure of the air, as I will next proceed to explain. The letter *l* designates an air-tube, which opens into the upper part of vessel *j*, above the surface of the liquid therein, and is taken thence downwards into an outer apartment, *z*, which, like apartment *m*, is arranged on the exterior of vessel or case *h*, communicating therewith also by means of perforations, and having also a window-opening suitable to receive a pane of glass or other transparent material. The bottom of tube *l* opens in apartment *z*, and is arranged at such a point as to be a little below the line or level at which it is desirable that the hydrocarbon liquid shall stand in the vessel or case *h*. Accordingly, whenever said liquid falls below that line, and exposes the lower end of tube *l*, the air in vessel or case *h* is free to enter said tube and go upwards into the tank *j* and supply the partial vacuum produced by the flow of the oil through the supply-pipe *n*, and produce an equilibrium of pressure in both the tank *j* and vessel *h*, and consequently the oil is free to run down through the supply-pipe *n* until the lower end of tube *l* is again covered, when the flow of oil will cease, and remain interrupted until the lower end of tube *l* is again uncovered. The said lower end of that tube is cut off at an angle, as shown in the drawing, to prevent the oil from being carried up into the tube with the air. By means of this arrangement and construction the oil is constantly and automatically supplied to the carburetting-vessel *h* without interrupting the rotation of vessel or shell *f*, and without other attention than to keep a proper supply in the tank *j*. For the purpose of being able to discover the level of the oil in the tank *j*, I form a gauge, 4, at one end thereof, like those shown at *m* and *z* at the end of case *h*. The air which is collected in case *h* is trapped by means of the openings *g* in the rotating vessel or shell *f*, and by means of the openings along the edges of its end plates 1, and being confined therein during the time the respective compartments are immersed, the confined air is consequently brought thoroughly into contact, and is intermixed with the liquid which is contained in the compartment, and the said air becomes charged with the vapors of the liquid, and escaping again through the openings *g*, and the said end openings, is free to rise through the orifice U and enter the conducting-pipe *t* of the gasometer, the top of which pipe has a valve-opening, through which the gas or carburetted air passes into the weighted receiving-chamber 5, which is arranged in the ordinary manner to rise and fall in the outer case *s*, according to the quantity of gas contained in it. The valve, opening in the top of pipe *t*, is closed by a valve of the form, in this example, of an inverted cone, whose base forms the valve and closes the valve-opening by being drawn upwards against it, when the vessel 5 moves upwards high enough. The valve is attached to the top of the receiving-vessel 5 by a rigid arm, *y*, which acts on the valve to draw it upwards and force it downwards by positive force. The gas is let off to a main or to the distributing-pipes through a pipe, V, which, for convenience sake, I place near to or alongside the receiving-pipe *t*, and which goes through the bottom of the gasometer, as shown in the drawing. The tank *j* is supplied with oil through a pipe, K.

In order to be able to remove from the apparatus the heavier oils and rancid and refuse matters, without being compelled to stop its operations, I form in the vessel or case *h*, and also in the tank *j*, double bottoms 6,

the upper one being inclined towards one end so as to facilitate the descent and collection of such matters at the lower end, whence they are drawn off through ordinary pipes and faucets.

It will be observed that the valve *x* is so formed and arranged in the pipe *t* that its vertex or pointed end guides the valve straight in its ascent and descent, and its base or broad end is the part that comes against the valve-seat, the opening in which is closed or opened at once by the valve. The valve is not in danger of sticking fast to the valve-seat, as where it hangs from a flexible cord, but is pushed away from the valve-seat by positive force, through the agency of the rigid arm *y*.

What I claim as new, and desire to secure by Letters Patent, is—

1. The air-tube *o–p*, arranged around the shaft *e*, at the place where it passes through the end of the rotating vessel, substantially as described.

2. Arranging the mouth of the branch *p* of the air-pipe *o–p* in such a manner that it opens downwards over the surface of the oil, substantially as described.

3. The floating hinged valve *q*, arranged substantially as described, under the mouth of the air-pipe *o–p*.

4. The escape-pipe *r*, for the discharge or escape of condensed matters from the pipe *o–p*, substantially as described.

5. The application of a valve or cover to the outer end of air-pipe *o*, to close it when the apparatus is not in operation, so as to prevent the escape of vapor, substantially as specified.

6. Enclosing the geared end of shaft *e* within a jacket, and setting the shaft of the gear that drives said shaft in the upper part of the jacket, so as to prevent the oil from leaking at the end of shaft *e*, substantially as shown.

7. The inclined double bottoms 6, in the oil-containing vessels *h*, *j*, or either of them, substantially as and for the purpose described.

8. The U-shaped pipe *n*, leading from the supply-tank *j*, and terminating in the outer apartment *m*, substantially as described.

9. The air-conducting tube *l*, leading from the air-space of tank *j*, and terminating in the outer apartment *z*, when its lower end is cut off at an angle, substantially as and for the purpose described.

10. The arrangement of the inverted conical valve *x*, in the pipe *t*, in such a manner that its base closes the valve-opening of said pipe, and its narrow end operates to guide the valve, and keep it straight in its movements, substantially as shown.

11. The connection of the top of the receiving-vessel *t* with the valve *x*, by means of a rigid arm *y*, whereby the valve is moved back and forth by positive force, substantially as set forth.

JOHN MACDOUGALL.

Witnesses:

W. HAUFF,

GUSTAV BERG.