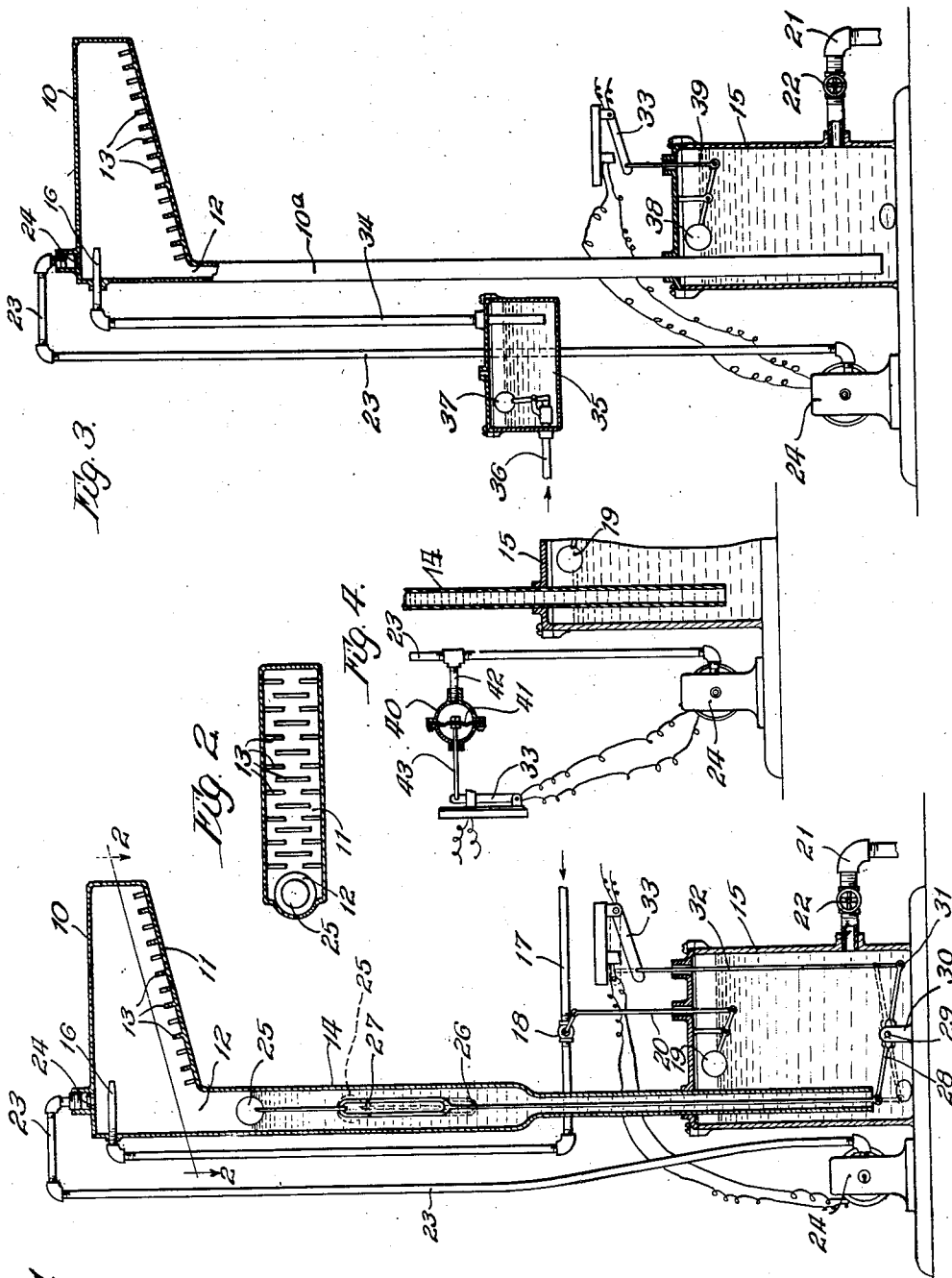


B. SKIDMORE, JR.
 APPARATUS FOR SEPARATING GASES FROM LIQUIDS.
 APPLICATION FILED FEB. 21, 1921.

1,403,650.

Patented Jan. 17, 1922.



Inventor:
 Benjamin Skidmore Jr.
 By: J. Jochum & Co.

UNITED STATES PATENT OFFICE.

BENJAMIN SKIDMORE, JR., OF CHICAGO, ILLINOIS.

APPARATUS FOR SEPARATING GASES FROM LIQUIDS.

1,403,650.

Specification of Letters Patent. Patented Jan. 17, 1922.

Application filed February 21, 1921. Serial No. 446,750.

To all whom it may concern:

Be it known that I, BENJAMIN SKIDMORE, Jr., 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 Separating Gases from Liquids, of which the following is a specification.

This invention relates to improvements in apparatus for separating gases from liquids and one of the objects of the invention is to provide an improved apparatus of this character which will be simple and compact in construction, effective, efficient and automatic in operation.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawing illustrating this invention and in which—

Figure 1 is a view partly in vertical section and partly in elevation of one form of apparatus.

Figure 2 is a detail sectional view taken on line 2—2, Figure 1.

Figure 3 is a view similar to Figure 1 of another form of the invention.

Figure 4 is a detail view partly in vertical section and partly in elevation of still another form of the invention.

Referring more particularly to the drawing the numeral 10, designates a chamber which may be of any desired size and configuration, but is preferably provided with an inclined bottom 11, leading to a discharge outlet 12. The bottom 11, is preferably provided with any desired number of baffles 13, which are arranged in staggered relation so that when the liquid is delivered into the chamber, in a manner to be hereinafter set forth, it will flow from the chamber in a tortuous passage so as to permit of a thorough separation of the gases from the liquid.

Leading from the chamber 10 and communicating with the outlet opening 12, is an upright chamber or column 14, the lower end of which extends into a reservoir 15, of any desired size and capacity, and this reservoir is located below the barometric level of the chamber 10, and is adapted to

receive the liquid from the chamber through the column 14.

Discharging into the chamber 10, at any desired point is a nozzle 16, and being of the shape shown, introduces or delivers the liquid into the chamber 10 in a finely divided form thereby subjecting larger areas of the liquid to the action of the vacuum which receives its supply from any suitable source through a pipe 17. Arranged in the pipe 17, is a valve 18, which is adapted to be controlled by a float 19, located in the reservoir 15, and which float is connected by means of a link 20, to the valve 18, so that as the liquid rises and falls in the reservoir 15, the valve 18, will be respectively closed and opened and thereby automatically cut off or open the supply of liquid for the nozzle 16.

Leading from the reservoir 15, is a delivery pipe 21, and a valve 22 may be provided for controlling the discharge of the liquid from the reservoir.

Connected with the chamber 10, is a pipe or conduit 23, which is preferably provided with a valve 24, therein adapted to be automatically actuated by the suction created in the pipe 23.

This pipe 23, is provided as a means whereby a vacuum may be produced within the chamber 10, and to that end the pipe 23, is connected with any suitable vacuum producing device diagrammatically represented at 24, so that when the vacuum producing device 24, is in operation a vacuum will be produced in the chamber 10.

The liquid is introduced into the chamber 10, in such a manner that it will be disintegrated or broken up or the particles freely separated and the liquid will flow through and out of the chamber in eddies or in tortuous passages produced preferably by the staggered arrangement of the baffles 13. The liquid being introduced into the vacuum chamber 10 in finely divided form, any gases in the liquid will be rapidly released and the gases will be removed through the suction pipe 23. The liquid flowing from the chamber 10, will be delivered into the reservoir 15, and as the liquid accumulates in the reservoir, the float 19, will be operated to close the valve 18, and thereby shut off the supply of liquid.

It will be manifest that as the liquid is delivered from the chamber 10, it will ac-

cumulate in the column 14, and in the reservoir 15, and if the vacuum producing device 24, continues to operate after the valve 18 is closed, the liquid contained in the column 14, will rise to the barometric level of the chamber 10. In order to utilize this rising movement of the column of liquid under the effects of the vacuum, there may be provided in the chamber 14, a float 25, which is preferably connected with a rod 26, through the medium of a slot connection 27, so that the float 25 will be adapted to rise and fall for a predetermined distance independently with respect to the rod 26. This rod 26 is preferably connected to a lever 28, pivotally mounted intermediate its ends as at 29, upon a fulcrum 30. The end 31, of the lever 28, is connected by means of a link 32 with a cut out device 33, such as a knife switch for controlling the circuit to the vacuum producing device 24.

Under normal conditions, and when the apparatus is operating, that is to say when the valve 18 is opened and liquid is being supplied to the chamber 10, while the suction creating device is operating, the height of the liquid in the column 14, will be below the barometric level of the chamber 10, so that the float 25, will assume approximately the position shown in Figure 1, in dotted lines, that is to say the float will be in a position that it will not influence the cut out device 33 but, when the valve 18, is closed and the suction creating device 24, is operating, then the height of the liquid in the column 14, will be raised to the barometric level causing the float 25, to rise and this rising of the float 25, will operate to draw upon the rod 26, rock the lever 28 about its fulcrum 29, and actuate the cut out device 33 to render the vacuum producing device 24 inactive.

In the form of the invention shown in Figure 3, the liquid is supplied to the nozzle 16, through the pipe 34, which receives its supply from a tank 35, through a supply pipe 36, and which supply pipe is controlled automatically by a float 37.

The chamber 10, in this form of the invention, is connected with the reservoir 15, through the medium of the pipe 10*, and the cut out 33 is preferably controlled by a float 38, which is arranged within the reservoir 15, and which float is connected by means of a link 39 with the cut out 33, so that when the liquid in the reservoir 15, reaches a predetermined level it will cause the float 38, to actuate the cut out 33, and thereby render the suction producing device 24, inactive.

In the form of the invention shown in Figure 4, the operation of the suction creating device 24, is automatically controlled by the vacuum and to that end there may be provided a diaphragm chamber 40, pro-

vided with a diaphragm 41 therein. The chamber 40 on one side of the diaphragm 41, has communication by means of a pipe or passage 42, with the suction pipe 23. Connected with the diaphragm 41, and extending from the other side thereof is a rod or element 43, which is connected with the cut out 33.

This diaphragm 41, is of such a strength that when the valve 18, is open and the suction creating device 24, is in operation, the diaphragm will not be influenced by the vacuum or suction but, when the valve 18, is closed to shut off the supply of liquid and the suction creating device 24, is in operation, the suction or vacuum will then operate upon the diaphragm 41, and cause the latter, through the medium of the connection 43, to actuate the cut out 33, and thereby render the suction creating device 24 inactive.

Obviously, when the valve 22, is opened to discharge some of the liquid from the reservoir 15, the float therein will automatically render its connected part active.

It will also be obvious that the rod 26, may be made of any desired length according to the degree of vacuum that it is desired to maintain in the chamber 10.

It is thought that the operation of this apparatus will be clearly understood from the foregoing and while the preferred forms have been herein shown and described, it is to be understood that it is not desired to be limited to any specific means for controlling the degree of vacuum in the separating chamber 10, and therefore it is also to be understood that various changes may be made in the details of construction and in the combination and arrangement of several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:

1. An apparatus for separating gases from liquids embodying a chamber, a reservoir having communication with the chamber for receiving the liquid therefrom, means for producing a vacuum in the chamber, means whereby such vacuum will cause the liquid to be delivered into the chamber in a finely divided form, means for controlling the supply of liquid to the chamber, and means influenced by the said vacuum for controlling the vacuum producing means.

2. An apparatus for separating gases from liquids embodying a chamber, a reservoir having communication with the chamber for receiving the liquid therefrom and disposed below the barometric level of the chamber, means for producing a vacuum in the chamber, means whereby such vacuum will cause a liquid to be delivered into the chamber, means for controlling the supply of liquid to the chamber, and means influenced by the

said vacuum for controlling the vacuum producing means.

3. An apparatus for separating gases from liquids embodying a chamber, a reservoir
5 having communication with the chamber for receiving the liquid therefrom and disposed below the barometric level of the chamber, means for controlling the delivery of liquid from the said reservoir, means for producing
10 a vacuum in the chamber, means whereby such vacuum will cause a liquid to be delivered into the chamber, means for controlling the supply of liquid to the chamber, and means influenced by the said vacuum for
15 controlling the vacuum producing means.

4. An apparatus for separating gases from liquids embodying a chamber, a reservoir having communication with the chamber for receiving liquid therefrom and disposed be-
20 low the barometric level of the chamber, means for controlling the delivery of the liquid from the reservoir, means for producing a vacuum in the chamber, a cut out for the vacuum producing means, and means in-
25 fluenced by the vacuum at a predetermined stage of the operation of the said apparatus for actuating the said cut out to render the said vacuum producing means inactive.

5. An apparatus for separating gases from
30 liquids embodying a chamber, a reservoir having communication with the chamber for receiving the liquid therefrom, means for producing a vacuum in the chamber, means whereby such vacuum will assist in deliver-
35 ing a liquid into the chamber, and means

operating automatically for controlling the said vacuum producing means and which controlling means is itself influenced by the vacuum.

6. An apparatus for separating gases from
40 liquids embodying a chamber, a reservoir having communication with the chamber for receiving liquid therefrom and disposed below the barometric level of the chamber, means for controlling the delivery of the
45 liquid from the reservoir, means for producing a vacuum in the chamber, a cut out for the vacuum producing means, and means influenced by the vacuum at a predetermined stage of the operation of the said apparatus
50 for actuating the said cut out to render the said vacuum producing means inactive, the last recited means embodying a diaphragm operatively connected with the said cut out.

7. An apparatus for separating gases from
55 liquids embodying a chamber, a liquid holder in communication with the chamber for receiving the liquid therefrom, means for producing a vacuum in the chamber, means whereby such vacuum will assist in deliver-
60 ing a liquid in a finely divided form into the chamber, and means operating automatically for controlling the said vacuum producing means and which controlling means is itself
65 influenced by the vacuum.

In testimony whereof I have signed my name to this specification, on this 15th day of February, A. D. 1921.

BENJAMIN SKIDMORE, JR.