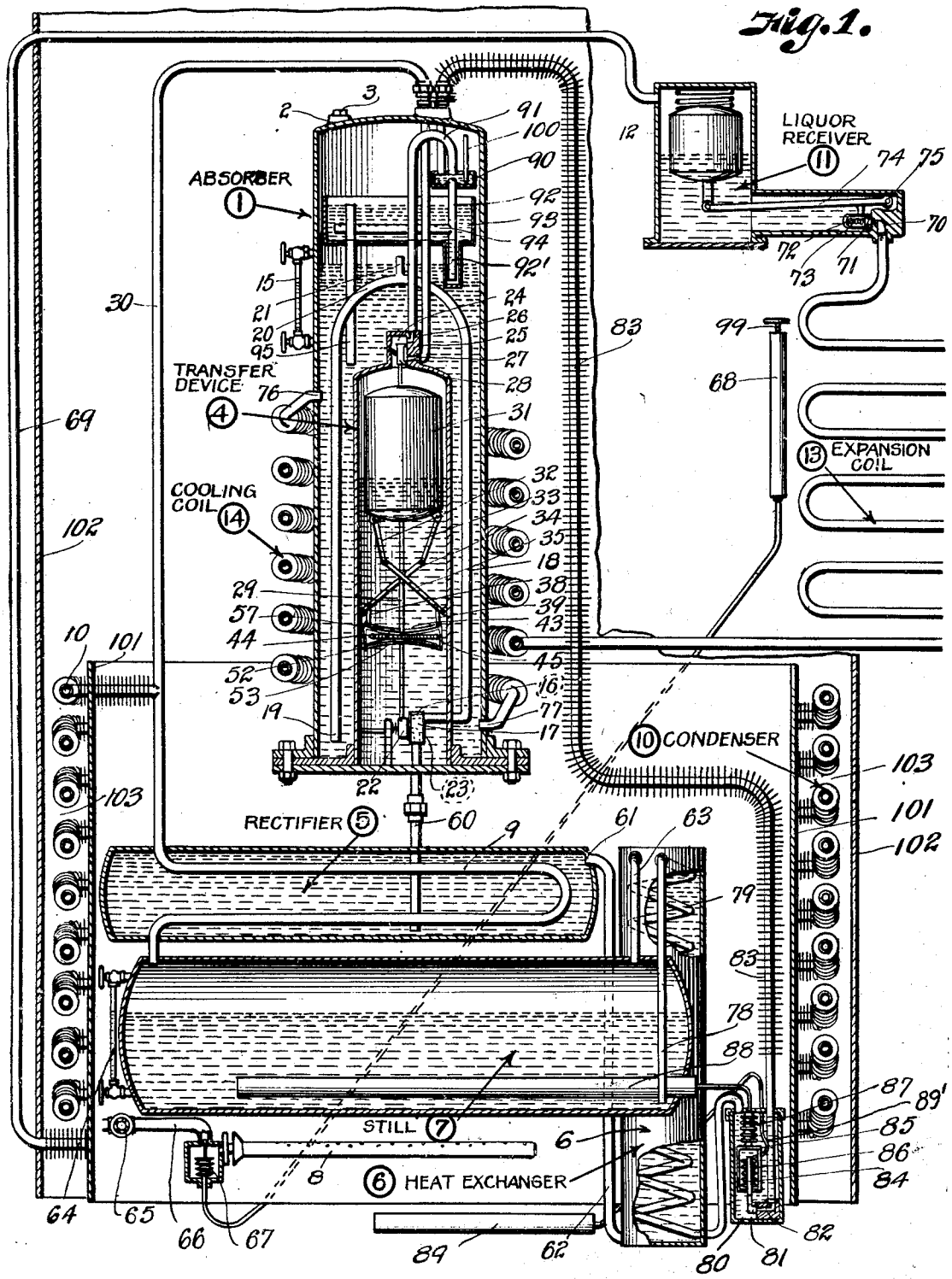
April 25, 1933. R. E. SCHURTZ 1,905,308

REFRIGERATING SYSTEM

Filed April 28, 1923 2 Sheets-Sheet 1

Fig. 1.



INVENTOR
Ralph E. Schurtz
BY
ATTORNEY

April 25, 1933. R. E. SCHURTZ 1,905,308

REFRIGERATING SYSTEM

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Fig. 2.

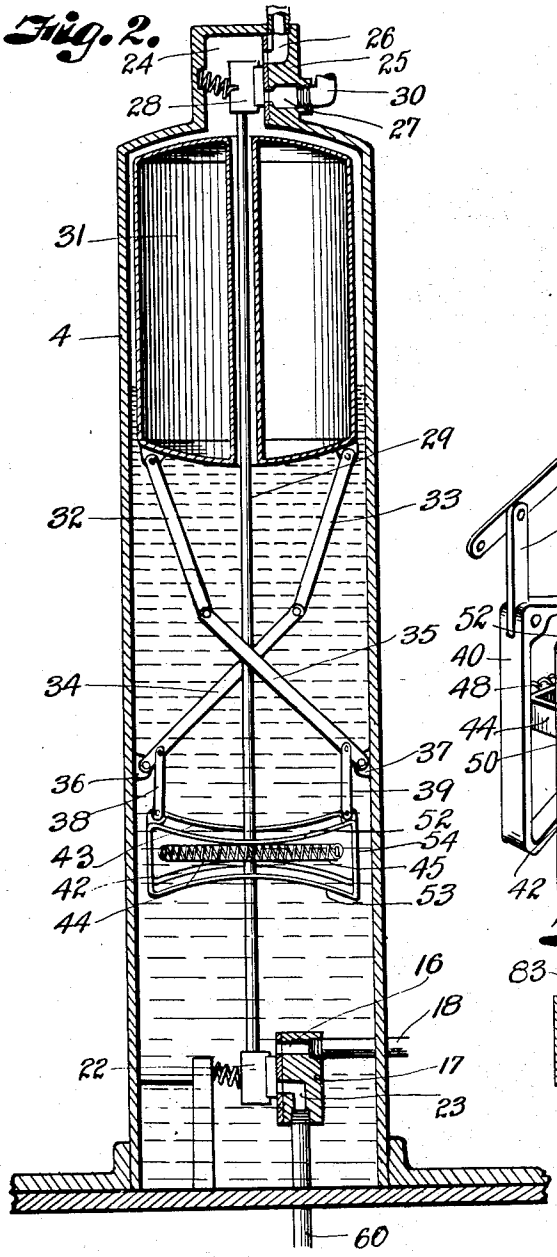


Fig. 3.

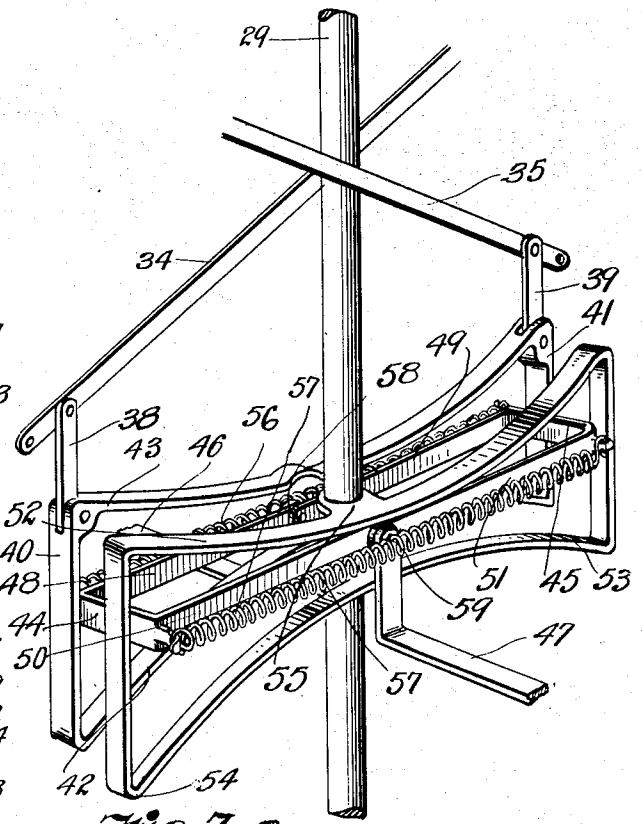


Fig. 7.

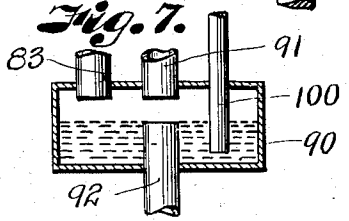


Fig. 4.

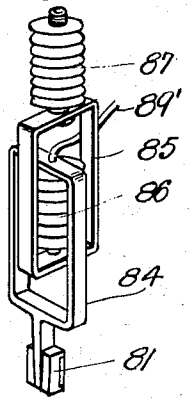


Fig. 5.

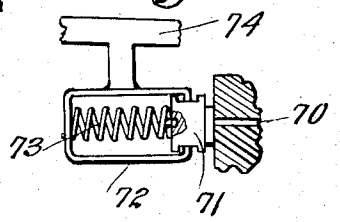
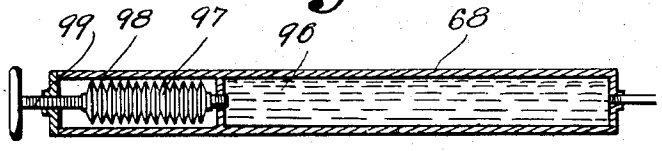


Fig. 6.



INVENTOR
Ralph E. Schurtz
BY
ATTORNEY

Patented Apr. 25, 1933 1,905,308

UNITED STATES PATENT OFFICE

RALPH E. SCHURTZ, OF KANSAS CITY, MISSOURI, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO R. W. BAILEY AND C. T. JOBES, OF KANSAS CITY, MISSOURI

REFRIGERATING SYSTEM

Application filed April 28, 1923. Serial No. 635,240.

This invention relates to refrigeration and it is a continuation in part of an application filed by me December 20, 1918, Serial No. 267,614.

The primary object of the invention is to provide an improved refrigeration system of the absorption type in which the refrigerant can be automatically controlled so that the active or gaseous content may be separated from the inactive or liquid content and passed through an expansion coil or coils to reduce the temperature of the zone in which the coil or coils may be located. Then it is reabsorbed by the inactive content and again separated and re-passed to the expansion coil in a continuous cycle, the flow of the gaseous content of the refrigerant being automatically controlled in a novel manner.

The invention is particularly applicable to a continuous distillation and continuous absorption system, there being certain arrangements and automatically controlled devices shown which will regulate the amount of heat applied to the refrigerant when the gaseous content is absorbed by the liquid content; the controlling devices being actuated in response to variations in temperature in the zone surrounding the expansion coil.

The invention generically includes an absorber, a refrigerant transfer device for transferring the refrigerant from the absorber to a still preferably though a rectifier, and it may also include a heat exchanger for cooling the liquid content of the refrigerant before it is delivered to the absorber so as to provide an absorbing liquid in the absorber at a temperature low enough to efficiently absorb the active gaseous content of the refrigerant.

There are other novel more or less important details incorporated in the illustrated embodiment of the invention, such as condensing coils, thermostatically controlled devices, float valves and the like, all of which will be specifically described hereinafter, reference being had to the accompanying drawings, in which

Fig. 1 is a diagrammatic view of a refrigerating system constructed in accordance with my invention, certain parts being shown in section.

Fig. 2 is an enlarged, vertical, longitudinal, sectional view through the refrigerant transfer device.

Fig. 3 is an enlarged detail, perspective view of a valve controlling mechanism within the transfer device.

Fig. 4 is an enlarged view of a valve controlling thermostat for controlling the feed of relatively weak refrigerant from the still to the absorber.

Fig. 5 is an enlarged view of part of the float-controlled valve in the receiver for controlling the feed of the active content of the refrigerant from the receiver to the expansion coil,

Fig. 6 is a vertical, longitudinal, sectional view through a preferred form of thermostat in the zone about the expansion coil to control the thermostatically-actuated valve for the burner, and

Fig. 7 is a vertical sectional view of a liquid seal.

Referring now to the drawings by numerals of reference:

1 designates an absorber and supply tank into which the refrigerant may be initially introduced through an inlet port 2, closed by a cap or plug 3. The refrigerant discharges into a transfer device shown as an elongated, closed chamber 4, which may be conveniently located within the absorber and which, in turn, discharges into a rectifier 5 from which the refrigerant may pass into a heat exchanger 6. The heat exchanger discharges into a still 7 having a burner 8. A coil 9 in the rectifier leads from the still to a condenser coil 10 delivering liquid ammonia to a receiver 11 having an outlet under the control of a float 12. The outlet of the receiver communicates with an expansion coil 13 into which the active content of the refrigerant will be fed in varying proportions, dependent upon the volume of refrigerant in the receiver. The outlet end of the expansion coil communicates with a cooling coil 14, exterior to but forming part of the absorber, where the gases will be re-absorbed by the liquid content, it being desirable to

form a rich mixture of the active and inactive contents of the refrigerant in the absorber 1 before it is transferred to the still and the system is so constructed that as the liquor in the still 7 becomes weak, additional rich liquor will be fed to it to maintain it at the proper richness to enable the system to function.

The peculiarly novel operations of the system and the structural details of the specific mechanisms selected for illustrative purposes will now be described.

The present invention is not limited in its use to any particular refrigerant but I recommend aqua-ammonia because this medium is well known, easily procurable and is recognized by refrigeration engineers as particularly adaptable for use in absorption machines. The ammonia gas will be referred to as the "active content" because it is the element which is active in producing the drop in temperature about the expansion coil, and the water I will refer to as the "inactive content" because its main purpose is to serve as an absorption vehicle for the gas.

When the refrigerant, for example, aqua-ammonia, is first introduced into the supply tank and absorber 1, it will have the requisite strength, the strength being estimated in view of the particular system into which it is to be introduced.

When the refrigerant is introduced into the tank 1, the level will rise relatively high so that the height can be observed through the sight gauge 15. The transfer device is sealed off from the absorber tank 1 except for an inlet port 16 in the valve seat or block 17 and an outlet port 26 to be hereinafter referred to. The port 16 communicates with the discharge end of a pipe 18, which is in the form of a vertical loop having its inlet end 19 near the bottom of the tank 1 and its discharge end extending through the wall of the tank 4 and communicating with the port 16.

At the top or intermediate arched portion 20 of the pipe 18 is a vent 21, extending above the level of the refrigerant. When the level of the refrigerant rises above the pipe, that is, above the top of the arched portion but not above the vent 21, the liquid will flow into the tank 4 where its level will rise.

During the filling or partial filling of the tank 4, the slide valve 22 bearing against the valve seat or block 17 will uncover the port 16, but it will be covering the outlet port 23 in the seat 17. Therefore, the liquid will accumulate in the tank 4. At the top of the tank 4 is a recess having a vertical valve seat 25 therein provided with an upper outlet port 26 and an inlet port 27 therebelow. When the valve 22 closes the port 23 and opens the port 16, the valve 28 on a vertical rod or valve stem 29 in the tank 4 will be closing the inlet port 27 and uncovering the port 26.

The port 27 communicates with the still 7 through the branch 30 of the pipe 9 so that the pressure within the still 7 and the pressure within the transfer device will be equalized to permit the liquor to flow by gravity from the tank 4 through port 23 into tank 5, when the valves 22 and 28 are shifted so as to open ports 23 and 27 and close ports 16 and 26. The movements of the valves 22 and 28 will be simultaneous due to the fact that they are rigidly connected by the rod or stem 29.

I have shown a novel means for actuating said valves in response to the accumulating liquor in the transfer tank 4. Loosely sleeved upon the stem 29 is a float 31. The float 31 supports two depending links 32 and 33, which are pivoted thereto and which, in turn, are pivoted to the upper ends of the two inclined levers 34 and 35, pivotally supported on the brackets 36 and 37 within the transfer tank 4.

Near the lower ends of the levers 34 and 35 are hung two links 38 and 39, pivotally secured to a frame consisting of two end bars 40 and 41, connected by the bowed lower bar 42 and the bowed upper par 43. The two bars 42 and 43 are bowed inwardly; that is, one toward the other, and they are adapted to contact with two pivoted U-shaped frame members 44 and 45. The inner ends of the frame members 44 and 45 are pivoted on brackets 46 and 47 supported within the tank 4. Their outer spring-connected ends may move up and down and two complementary arms 48 and 49 of the frame members 44 and 45 are at all times in the path of movement of the bowed portions 42 and 43 of the frame carried by the links 38 and 39. The opposite complementary arms 50 and 51 of the frame members 44 and 45 are at all times in line with the inwardly bowed members 52 and 53 of the frame 54, which is rigidly fastened to the rod 29 by a bracket 55.

The opposite ends of the frame members 44 and 45 on each side are connected by tension springs 56 and 57. The springs are shown as coil springs and with the frames 44—45 at a midway position, the axes of the springs pass through the transverse centers of the pivots 58 and 59 for the frame members 44 and 45. When the float 31 rises a determined distance, the levers 34 and 35 will be swung upward, and through the links 38 and 39 will exert an upward pull on the frame 40, 41, 42 and 43. The lower bowed bar 42 will contact with the arms 48 and 49 on opposite sides of the pivot 58 so as to slightly tilt the ends of the frame members 44 and 45 in an upward direction. This will throw the longitudinal axis of each spring 49 and 50 slightly above the dead center or pivot points 58 and 59; then the springs will quickly snap

the ends of the frame members 44 and 45 upwardly, throwing them into contact with the bowed bar 52 of the frame rigid on the stem 29. The springs are strong enough to raise the stem 29 and with it the valves 22 and 28. Therefore, the ports 16 and 26 will be closed and the ports 23 and 27 will be opened. This final action is independent of the float.

Owing to balancing of pressure in the tank 4 and still by admission of gas from the still through the pipe 30 and port 27, the liquor will now discharge from the transfer device or tank 4 the port 23, through pipe 60, and rectifier tank 5 until the lowest level in the tank 4 is reached, this being determined by the float.

As the float moves downwardly, the bowed bar 43 will ride on the upper edges of the arms 48 and 49, pressing them downwardly until their connected outer ends move downwardly past dead center. The springs will then exert a quick snapping action to pull the free ends of the frame members 48 and 49 downwardly, causing them to strike against the bowed bar 53 with sufficient force and with sufficient movement to reverse the action of the valve stem 29 whereby the valves 22 and 28 will uncover the ports 16 and 26 and cover the ports 23 and 27. As liquid continues to flow into the tank 1, the transfer tank 4 will again fill and the cycle of operation incident to movement of the float will thus continue as long as liquor flows from the absorber.

All the while the float will be rising and falling to introduce successive charges into the tank 4 and to cause the successive charges to be transferred from the absorber tank to the rectifier tank. The rectifier tank will overflow through port 61 and pipe 62 into the heat exchanger tank 6 and as the heat exchanger tank 6 becomes filled, the liquor will pass from the top thereof through the pipe 63 into the still 7.

It is not desired that the still be completely filled but I recommend that it be filled about two-thirds initially. Then there will be strong liquor in the absorber 1, in the transfer tank 4, in the rectifier 5, in the heat exchanger tank 6 and in the still 7. The filler cap 3 may now be replaced and the burner 8 lighted, generating ammonia gas in the still.

It is to be noted that when the charge of rich liquor passes from the transfer device, the space above the low liquid level therein contains gas which has entered from the still and replaced the liquid passed to the still. The open port 26 permits the gas in the transfer device to escape through pipe 91, pipe 92 and finally a perforated ring 94 so it can bubble through the weak liquor in the pan 93 and be thereby absorbed. Since the gas passing from the transfer device will be absorbed by the weak liquor in the pan 93 (as will be explained) there will be no appreciable increase of pressure in absorber and expansion coil. The weak liquor from the still coming in through pipe 83 enters first a closed box or pan 90, then passes down through the pipe 92 and out through the perforations in the ring 94 or down through the open end extension 92′ of pipe 92. This extension is accommodated in a well which forms a continuation of the bottom of the pan 93.

Fuel is supplied to the burner 8 by opening the valve 65 in the supply pipe 66 for the burner. The burner is controlled by a thermostatic element 67 under the control of a thermostat 68 adjacent to the expansion coil, but since no refrigeration has taken place, the temperature about the refrigerating coil 13 will be high enough to allow the thermostatic element 67 to expand and consequently permit the maximum flow of fuel through the pipe 66 to the burner 8. When the burner is operating and the liquor in the still 7 is heated, the ammonia vapor passing from the still 7 will carry with it some water vapor and, passing through the rectifier coil or loop 9 in the rectifier tank 5 the heat exchange will result in condensing the water vapor, permitting to drain back into the still 7 while the anhydrous ammonia or the active content of the refrigerant will fill the branch pipe 30 but mainly enter the condenser coil 10, where it will be subjected to the action of a cooling fluid, such as air or water. The anhydrous ammonia will there be reduced to the liquid phase and from the condensing coil 10 it will pass through the pipe 69 to the receiver tank 11, in which is located the float 12. The float 12 controls the outlet 70 through the medium of a slide valve 71, slidably mounted in the yoke 72 and urged on its seat by the spring 73 (Fig. 5).

The yoke 72 is connected to a lever 74, pivoted at 75 within the receiver and one end of the lever 74 is connected to the float. When the float rises and falls, the valve 71 will uncover and cover the port 70. The loose connection between the valve 71 and the yoke 72 permits the valve to be self-seating so as to eliminate liability of leakage. Opening of the port 70, permits the liquefied active refrigerant content, to pass into the expansion coil 13, where heat will be taken up in the usual way, the liquefied ammonia being reconverted to the gaseous phase and finally it will pass into the liquor-cooling coils 14, shown as surrounding and in communication with the absorber at the top and bottom of the coil, as indicated at 76 and 77 both below the low level of liquor in the absorber.

When the gas enters the coil 14 it will be entrained by the weak liquor also causing by its absorption a change in the specific gravity

of the liquor in the coil so that the lighter enriched liquor will pass into the tank 1 through port 76, the heavier, relatively poor liquor entering the coil from the tank 1 through port 77, thereby setting up a circulation in coil 41 so that the liquor from the bottom of the tank will be continuously feeding up through the coil 14 to combine with the gas preparatory to circulating back into the tank 1. Heat of absorption is also rapidly diffused by the coil 14.

Of course, the tank 1 will be replenished by weak liquor from the still 7 but the volume will be augmented too, by incoming gas which combines with the liquor in coil 14 so that when the level in the tank 1 is high enough, there will be a rise in the level of the liquor in the transfer tank 4, causing the float 31 to operate as described.

Since the liquor that has just left the absorber and the transfer device will be very rich in gaseous content, it will replenish the weak liquor in the still 7 so as to bring it up to the requisite strength to permit the proper amount of ammonia gas to continue to be distilled off.

Should the float 12 recede, due to the fact that inadequate amounts of liquid ammonia were being supplied to the receiver, the thermostatic element 68 will be effective in operating the element 67 to increase the effective port area of the pipe 66 and cause more heat to be applied to the still 7.

If the fire from the burner 8 is too hot and distillation is too rapid, there will be an excess accumulation of liquefied ammonia in the receiver; therefore, the rising float will feed a relatively large amount of refrigerant to the coil 13, bringing the temperature very low. The thermostatic element 68 will then function to operate the valve and the element 67 to vary the port area of the pipe 66 and cause the flame to diminish and thus slow up the distillation in the still 7.

In order to move weak liquor from the still to the absorber, I may utilize a pipe 78, the inlet end of which is near the bottom of the still 7. The pipe 78 projects through the top of the still and enters the upper part of the heat exchanger tank 6, where it is formed in a coil 79, the lower part of the coil discharging into a valved box 80 in which there is a thermostatically controlled valve 81 for covering the effective area of an effluent port 82 communicating with the return pipe 83 which discharges into the top of the tank 1. The valve 81 is connected to a yoke or loop 84 (see Figs. 1 and 4) which is in open link connection with a yoke or loop 85.

Forming an extensible connection between the two loops there is a bellows thermostatic element 86 expansible longitudinally of the links and on the upper portion of the yoke 85 there is a similar bellows thermostat 87. The bellows thermostat 87 is in communication with a thermostatic element 88 in the still 7 and the thermostatic element 89 outside the still communicates with the bellows 86 through a flexible pipe 89'. The thermostatic element 88 is subjected to the temperature of the liquor in the still 7 while the thermostatic element 89 is subjected to the temperature of the condenser cooling medium. When there is a rise in the temperature of the condenser cooling medium, the thermostatic element 89 expands and causes the bellows 86 to expand which requires the bellows 87 to expand a greater distance to effect opening movement of the valve 81 than when the temperature of the condenser cooling medium is lower; it being obvious that when the bellows 86 expands, the lap of the valve 81 in one direction will be increased. Then it will require higher temperature in the still 7 and consequent increased expansion of the thermostatic bellows 87 to overcome the lap to open the port closed by the valve 81.

The purpose of the opposing thermostats 88 and 89 is to maintain uniform strength of the refrigerant liquor in the still 7, irrespective of variations in the temperature of the condenser cooling medium which cause variations in the condensing pressures in the coil 10. This is done by causing the valve 81 to open at lower temperature in the still 7 during cold weather than in warmer weather and vice versa.

When the thermostatic elements 88 and 89 cause the opening of the valve port 70, the pressure within the still can force the weak liquor from the still through pipe 78 and through the coil 79 where there will be a heat exchange between the outgoing liquor and the incoming liquor passing from the rectifier 5 to the still. The outgoing liquor will be forced through pipe 83, through the top of the tank 1 and into the box, trap or pan 90 in the top of the tank 1 and as this liquor is very weak, due to the fact that the ammonia has been distilled off before it passes through pipe 83, it is apparent that gas which has escaped through the port 26 and through the gooseneck pipe 91 will be partly absorbed by the body of weak liquor in the pan 90. Liquor will overflow from the pan 90 through the pipe 92 into the bottom of an absorber pan 93 below the pan 90. In overflowing it will mix in the pipe 92 and pan 93 with incoming gas from 91 and some gas will also bubble through the horizontal perforate ring or tube 94 submerged in the bottom of the liquid in the absorber pan 93 and there be absorbed. Since the relatively weak liquor will have absorbed the gas in the pan 93, it will be enriched and as the liquor accumulates in the pan 93 it may overflow through a pipe 95 into the main portion of the absorber tank 1 and accumulate along with the absorbed gas passing from the coil 13 so as to add volume, by which, when the level rises

high enough, liquor will pass into the transfer tank 4, through the pipe 18, as above explained.

Since the pressure in the still 7 will be effective to force the weak liquor out of still 7 through the coil 79, controlling valve box 80, through pipe 83 and mix it with the highly enriched liquor in tank 1, it is apparent that the incoming liquor subsequently supplied through the transfer tank, pipe 60, rectifier 9, pipe 62, heat exchange tank 6, and pipe 63 will be rich enough to approximately maintain the liquor in the still constant as to strength. While the opening and closing of the valve ports 16, 23, 26 and 27 are intermittent, the system is truly a continuous one because the intermittent operations will continuously take place and at such intervals as are required to keep the system in constant operation. The burner must operate constantly, as is apparent, and the thermostat 68 only modulates its action.

I may use any preferred form of thermostat, that is, any thermostat which best recommends itself for the purpose but I prefer to construct the thermostatic elements 68, 88 and 89 in the form of tubes containing some expansible medium. In order to vary the temperature at which the thermostat 68 will function (see Fig. 6), I may provide at the end of its chamber 96 an expansible and contractible bellows 97 in the chamber 98, controlled by the screw 99, operated by a handle so that by turning the handle and contracting the bellows 97 pressure may be created in the body in the chamber 96 to cause some of the fluid to pass into the bellows 67 and by reversing the operation of the screw so as to expand the bellows 87, the pressure will be relieved so that there will have to be a higher rise in temperature before the thermostat will operate the thermostatic element 67 which controls the port area of the pipe 66.

If the pressure in the absorber should rise higher than that in the transfer device when the two are in open communication to permit liquid to pass from the absorber into the transfer device, the gas would pass down through pipe 100, situated at the top of the absorber tank 1 and having its lower end submerged in the trap or pan 90. As the gas passes through the pipe and discharges at the bottom, it will bubble up through the liquid in the pan 90 and pass to the tank 4 through pipe 91. Pressure will predominate on the liquor, however, owing to the slight head of liquor at the lower end of the pipe 100.

It will be apparent that partitions or baffles can be arranged between the furnace or burner 8, the still, rectifier, etc., on the one hand and the coil 10 on the other so as to insulate the coil from the heat and to this purpose I provide a wall or baffle 101 surrounded by an outer wall 102, the coil being in the space 103 between them. The coil can be cooled by water, air or any other suitable means, as heretofore explained.

From the foregoing it will be apparent that once the system is primed, it will be entirely automatic in its operation so long as heat is supplied to the still, the amount of heat being variable in response to the thermostatically controlled valve which regulates the amount of fuel furnished the heater. The heater or burner is merely illustrative of one embodiment of my invention, it being obvious that the device will function with any kind of heater, even without the automatic control, provided hand control is used. However, I prefer to use a heat source which can be controlled in response to variations in temperature in the ice box or in the zone adjacent to the coil 13 since such a control will eliminate the necessity for individual attention and it has been the aim of this invention to so construct a refrigerating system that once having been installed, it will continue to function in a simple and efficient manner without individual attention from time to time unless it is such attention as may be required for inspection or repairs after long periods of use.

If more than one coil 13 is used, the desired number of coils can bleed off the receiver 11 below the level of the port 70, in which event each coil will have an individual control.

While I have shown a gas heater 8, it is to be understood that any suitable form of heater may be used.

What I claim and desire to secure by Letters-Patent is:

1. In an absorption system of refrigeration including an absorber, a still, a condenser and an evaporator, a transfer device for transferring liquor from the absorber into the still, the transfer device including a tank having an inlet communicating with the absorber and an outlet communicating with the still, float-actuated means for opening the outlet and closing the inlet when a predetermined amount of liquor has flowed into the transfer device from the absorber, and a valve for opening and closing a pressure relief port at the top of the transfer device to maintain the port open while the liquor is flowing from the absorber into the transfer device.

2. In an absorption system of refrigeration, an absorber tank, a transfer tank within the absorber tank having an inlet port communicating with the absorber, a rectifier tank, a ported connection between the transfer tank and the rectifier tank, a valve mechanism for alternately closing the inlet port and simultaneously opening said ported connection, and opening the inlet port and closing the ported connection, a still, means for permitting the liquor to

flow from the rectifier tank into the still, a condenser, a pipe leading from the still and passing through the rectifier tank, the discharge end of the pipe communicating with the condenser, an evaporator, a connection between the condenser and evaporator, and a connection between the evaporator and the absorber tank, said connection comprising a cooling coil.

3. In an absorption refrigeration system of the character described including a still, a condenser, an evaporator and an absorber, a transfer tank having a valved inlet port below the liquid level in the absorber, intermittent operating means for the valve, a rectifier tank, a valve connection between the transfer tank and the rectifier tank, the last mentioned valve being operatively connected to said intermittent operating means and closed when the first valve is open, a liquor duct between the rectifier tank and the still, a pipe for distillation products connecting the still to the condenser passing through the rectifier tank and having a branch between the rectifier tank and the transfer tank connected to the top of the transfer tank, a valve for the branch pipe operatively connected to said intermittent operating means to open with the second named valve, a conduit connecting the condenser and evaporator including a condensed refrigerant receiver, an expansion valve in the conduit next the evaporator, and a conduit connecting the evaporator and absorber below the liquid level in the latter and including a liquor containing coil connected at both ends to the absorber.

4. In a refrigerating system of the character described including a still and absorber, means constantly operative to transfer to the still liquor in excess of a predetermined quantity in the absorber sufficient for continuous absorption, a separate liquor conduit from the still below liquor level to the absorber and a thermostatic valve device in the conduit responsive to heat in the still to effect opening movement of the valve at high temperature.

5. In an absorption refrigeration system of the character described including a still and an absorber, means to move weak liquor from the still to the absorber, a chambered transfer device, means to permit flow of liquor from the absorber to the transfer device, and means to alternately permit flow of liquid from the transfer device to the still, means operative with the last named means for admitting vapor pressure from the still to the transfer device, means for relieving still pressure from the transfer device to the absorber after a transfer operation and including separate means in the system for absorbing the relieved vapor from the transfer device, whereby rise of pressure in the absorber obstructing normal functioning is obviated.

6. In a refrigeration system of the character described including an absorber, a still, a condenser connected with the still, a liquefied gas collector receiving from the condenser, an evaporator receiving from the collector and discharging to the absorber, means tending to operate continuously for transferring liquor from the absorber to the still, means for transferring weak liquor from the still to the absorber, and a heat supply for the still; the inclusion and combination therewith of means to maintain a definite minimum quantity of liquid in the absorber, a device in the collector responsive to liquid quantity variation therein to control flow to the evaporator from the collector as the quantity in the collector varies, a thermostat associated with the evaporator, a control for the heat supply and operative connection between the thermostat and control.

7. In a refrigeration system of the character described including an absorber, a still, a condenser connected to receive the still vapor output, a liquefied gas collector receiving from the condenser, an evaporator receiving from the collector and discharging to the absorber, means tending to operate continuously for transferring liquor from the absorber to the still, means for transferring weak liquor from the still to the absorber and a heat supply for the still; the inclusion and combination therewith of means to maintain approximately uniform strength and quantity of liquor in the still and absorber and a quantity of liquefied gas in the collector proportionate to the demand for refrigerant in the output comprising a thermostat operatively associated with the still to control the transfer of liquor from the still to the absorber in relation to the liquor strength, a device responsive to liquid quantity variation in the collector to effect evaporation in proportion to the quantity of liquid refrigerant, a heater for the still, a control therefor, a thermostat responsive to variation in temperature adjacent the evaporator, and operative connections betweeen the last named thermostat and the heat control.

8. In a refrigeration system of the character described, a still and absorber connected in an orbital liquor conduit circuit, a gas conduit connecting the still and absorber including a condenser and an expansion chamber, said system being constructed for automatic movement of absorbent solvent in said circuit, a continuously operative heater for the still, a heat modulating device and operating means therefor including a heat responsive device exposed adjacent the said expansion chamber, to be influenced by the refrigerative effect thereof.

9. In an absorption refrigeration system including a still and an absorber, a transfer device constructed to permit flow of liquor

from the absorber to the transfer device, and from the transfer device to the still and means for admitting vapor pressure of the still to the absorber including means in the system separate from the main body of liquor in the absorber for absorbing vapor which gains access to the absorber from the still, whereby rise of pressure in the absorber obstructing normal functioning is obviated.

In testimony whereof I affix my signature.

RALPH E. SCHURTZ.