June 27, 1933. E. E. ALLYNE 1,916,032

REFRIGERATING APPARATUS

Filed July 1, 1931 4 Sheets-Sheet 1

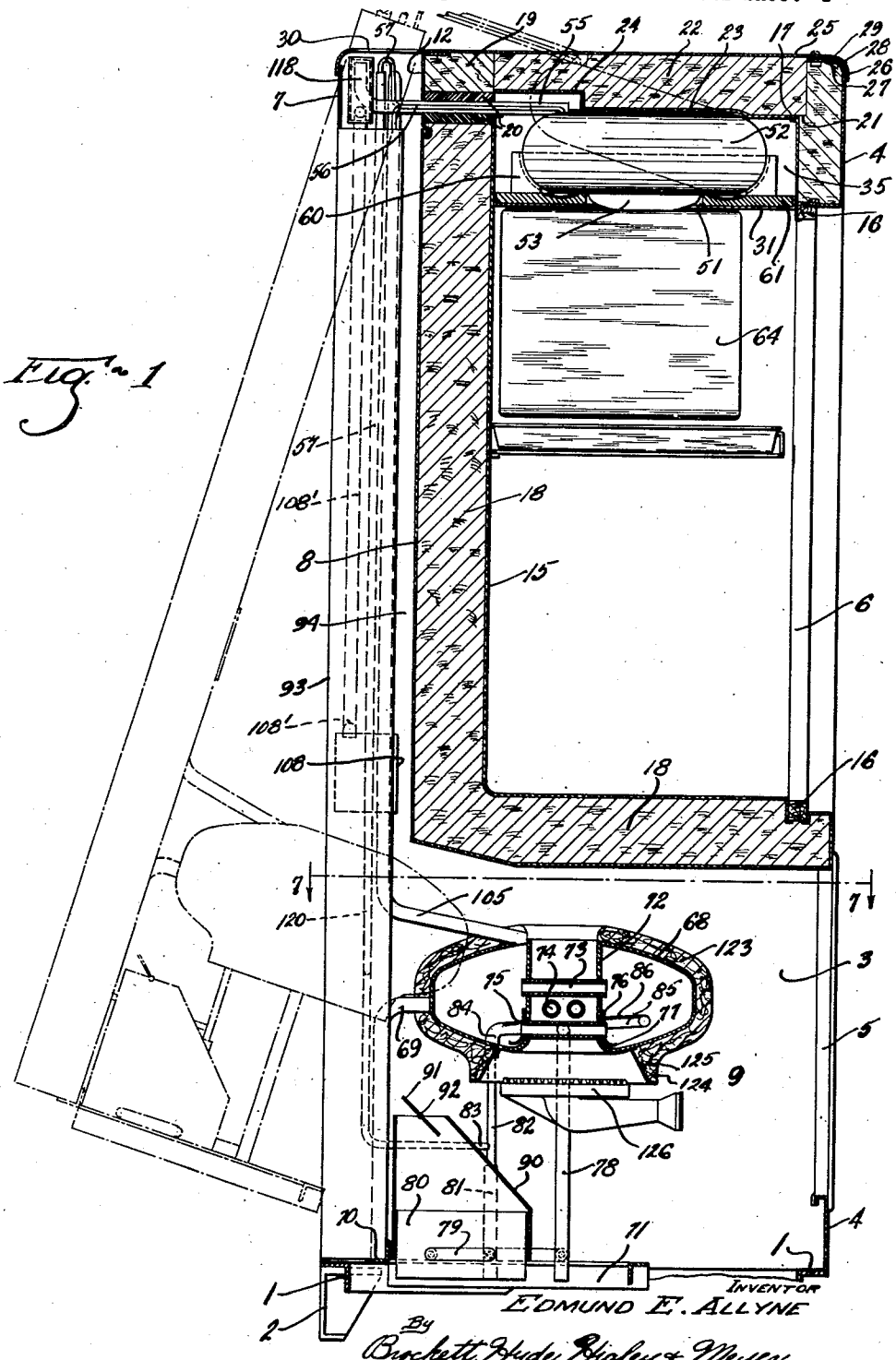


Fig. 1

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June 27, 1933. E. E. ALLYNE 1,916,032

REFRIGERATING APPARATUS

Filed July 1, 1931 4 Sheets-Sheet 2

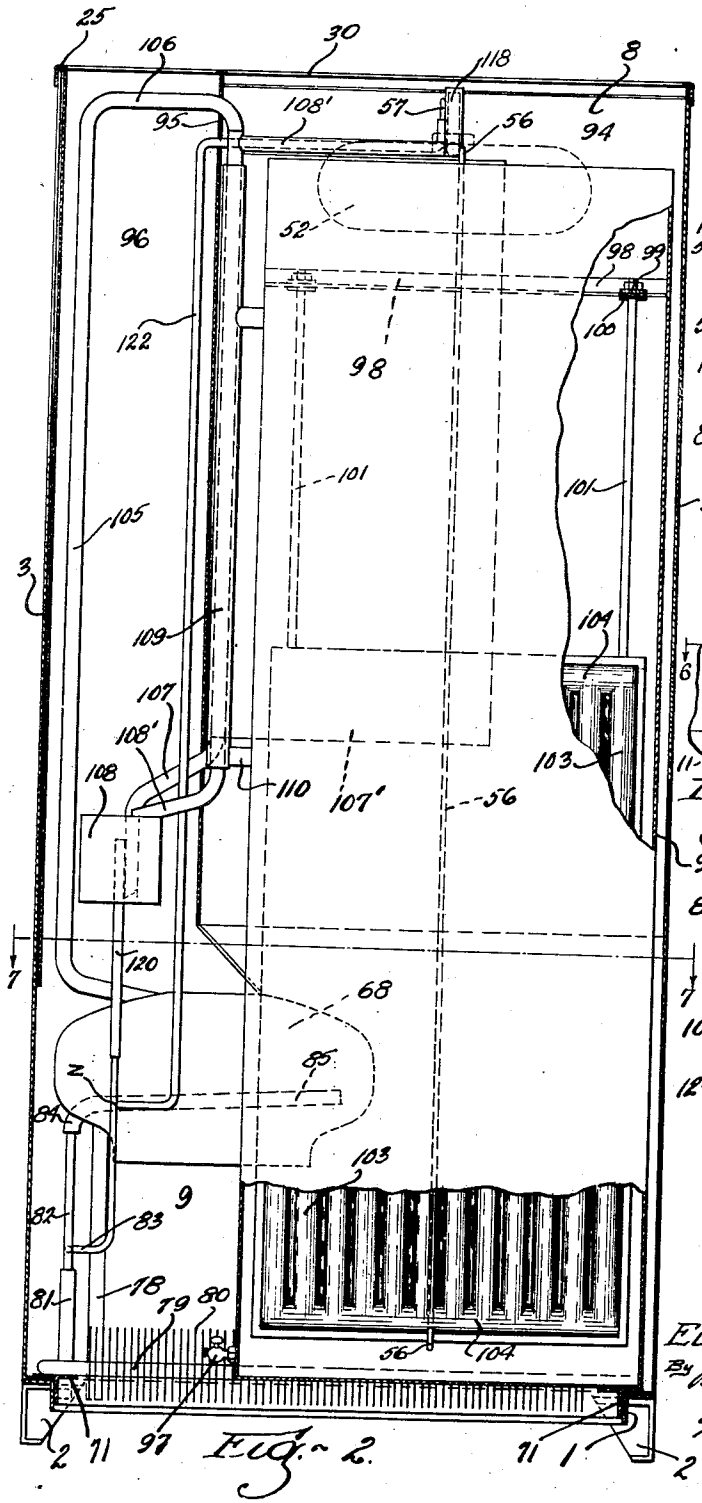


Fig. 2.

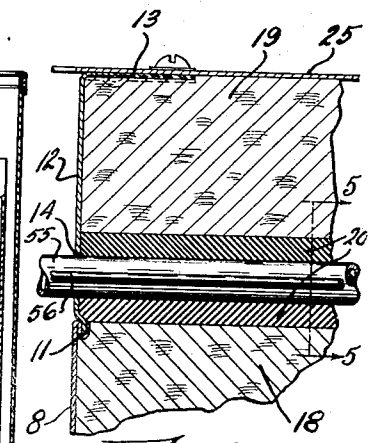


Fig. 3

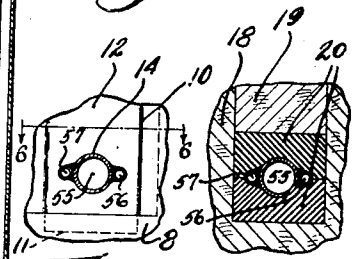


Fig. 4 Fig. 5

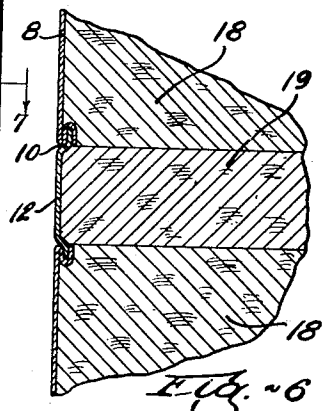


Fig. 6

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REFRIGERATING APPARATUS

Filed July 1, 1931 4 Sheets-Sheet 3

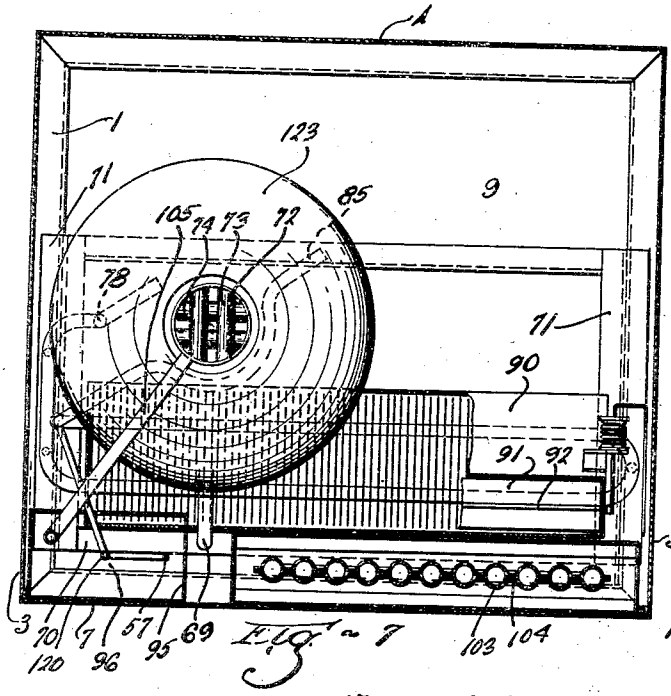


Fig. 7

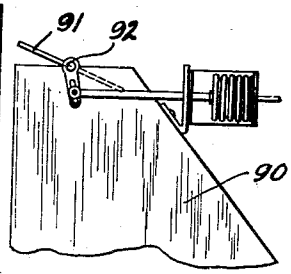


Fig. 10

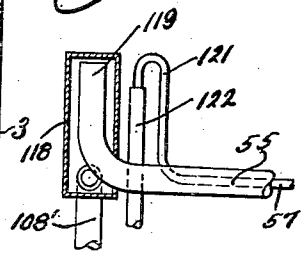


Fig. 11

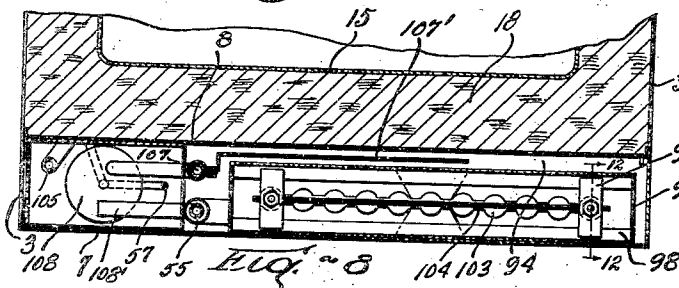


Fig. 8

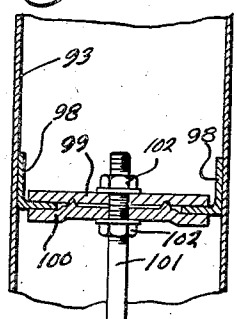


Fig. 12

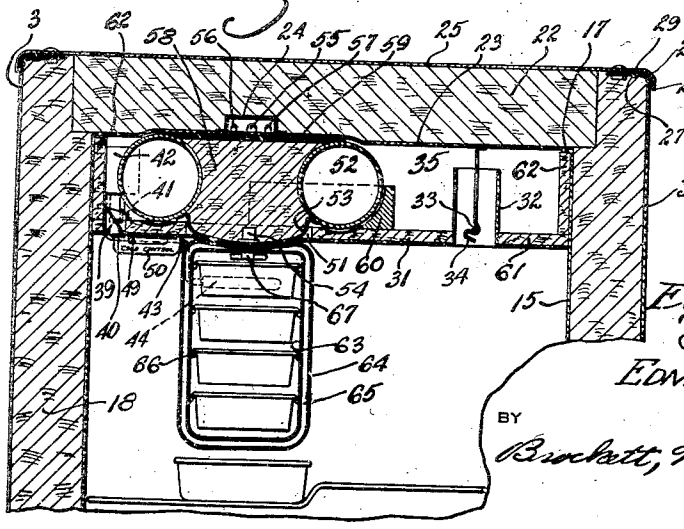


Fig. 9

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REFRIGERATING APPARATUS

Filed July 1, 1931 4 Sheets-Sheet 4

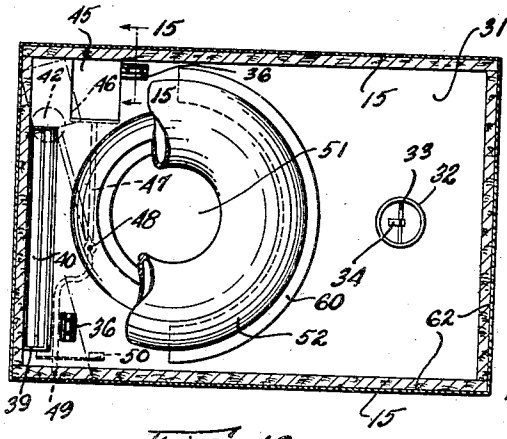


Fig. 13

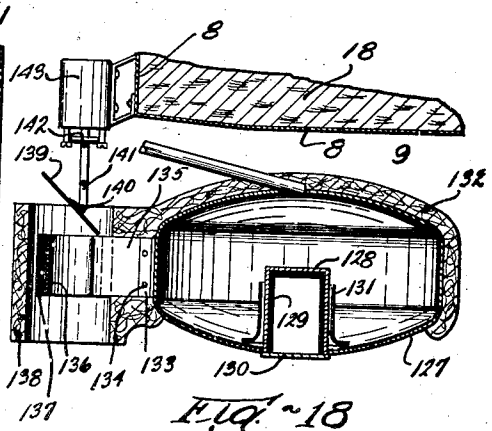


Fig. 18

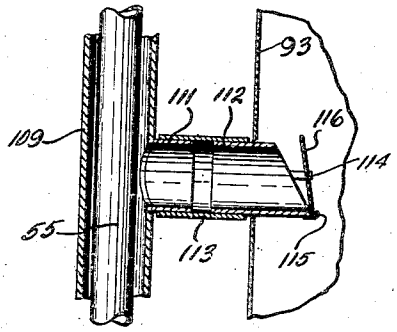


Fig. 14

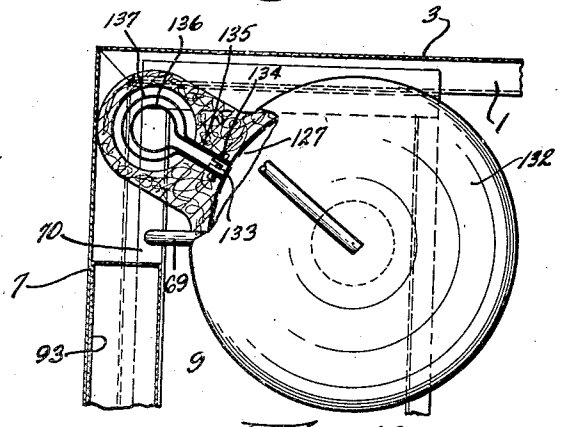


Fig. 19

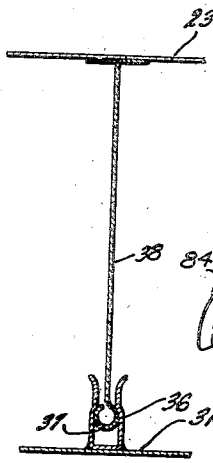


Fig. 15

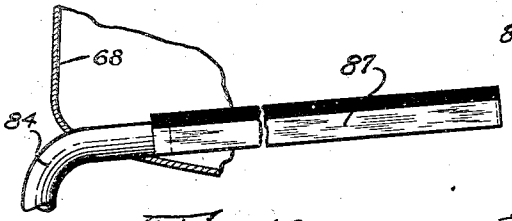


Fig. 16

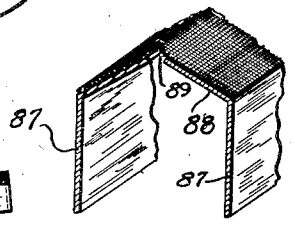


Fig. 17

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Patented June 27, 1933 1,916,032

UNITED STATES PATENT OFFICE

EDMUND E. ALLYNE, OF CLEVELAND, OHIO

REFRIGERATING APPARATUS

Application filed July 1, 1931. Serial No. 548,135.

This invention relates to refrigerating apparatus of the absorption type.

The object of this invention is to improve the general operation and effectiveness of absorption refrigerating apparatus and one specific improvement resides in a distributing means for the gas to the still whereby it is prevented from rising in any volume and is subjected to the weaker liquor of the still in such a way that the weak liquor as soon as it is enriched by the gas is permitted to pass away freely from the gas so that it may be brought in absorbing contact with additional weak liquor, such arrangement improving and vitalizing the absorption operation during the refrigerating cycle.

Another feature is to improve the arrangement of the evaporator and freezing unit construction so that it is effective for heat absorption in the refrigerating chamber on the one hand and yet is capable of being controlled to give the best possible results from a refrigeration standpoint and yet conserve the supply of refrigerant and avoid its undue dissipation.

Still another feature of the invention is the provision of a false ceiling arrangement in the refrigerating compartment to provide an evaporator chamber for receiving the heat from the refrigerating compartment, together with suitable controls for regulating the passage of the heat to the evaporator compartment thereby making it possible to more effectively regulate the overall temperature of the box and to prevent undue heat transfer from the evaporator to the freezing unit during the heating period.

Another feature of the invention is the gas rectifying and cooling means for the gas passing from the still to the evaporator storage, whereby not only is the entire undesirable still liquor vapor content of the gas removed, but the useful gas content is cooled to a dense vapor just above the condensing point and ready to be rapidly condensed in the evaporator and condenser. In the specific embodiment shown, the hot gas from the still rises and descends in a hairpin loop connected at its two ends to the top of the still and to a liquid seal or trap, producing some rectification of the undesirable still liquor. It is then forced to pass through the trap liquor, which is at a lower temperature than the liquor in the still, so that much, if not all, of the undesirable boiler liquor vapor is thrown down in this hairpin loop and the trap and returns to the still and does not pass beyond the trap. Beyond the trap the gas passes to the evaporator storage through a cooling device or cooling means in addition to whatever cooling effect is produced by the hairpin loop and the trap. This cooling device not only further throws down any still liquor vapors but very materially lowers the temperature of the useful gas and in so doing delivers such gas in a more or less condensed or heavy vapor form to the evaporator storage and from thence, if not condensed, to the condenser where final condensation and liquefaction takes place. In this way pressure throughout the apparatus does not rise and the useful refrigerating gas is held in a more dense vapor in the evaporator and condenser.

A further improvement resides in the flue arrangement for the water tank and condenser and for the still; another in the still construction with additional heat dissipating means for the electrical still; and further other improvements as will be disclosed by the specific description thereof.

Invention also resides in the details set forth in the following description, drawings and claims.

Referring to the drawings, Fig. 1 is a view in vertical section from front to rear showing the parts in elevation; Fig. 2 is a rear elevation with parts broken away and in section; Fig. 3 is a detail vertical sectional view of the upper rear corner of the refrigerating chamber; Fig. 4 is a rear elevation with the several pipes in section; Fig. 5 is a section substantially on the line 5—5 of Fig. 3; Fig. 6 is a horizontal section upon the line 6—6, Fig. 4; Fig. 7 is a horizontal section through Figs. 1 and 2 above the still; Fig. 8 is a fragmental sectional view through the rear upper part of the box; Fig. 9 is a view partly in section and elevation taken through the evaporator and freezing unit in the upper portion of the re-

frigerating chamber and the top of the box; Fig. 10 is an enlarged detail of the stack and damper control for the cooling loop; Fig. 11 is an enlarged detail partly in elevation and section showing a portion of the assembly of the pipes or conduits at the top of the risers in the top of the cabinet and particularly shows the gas supply and return pipe conduit connections between the trap and the evaporator storage; Fig. 12 is a section on the line 12—12 of Fig. 8, showing the supporting means for the condenser in the water tank; Fig. 13 is a horizontal section just above the evaporator storage showing the openings and the controls in top plan in the false ceiling; Fig. 14 is an enlarged detail sectional view showing the upper water connection and control between the water tank and the rectifier jacket; Fig. 15 is a detail sectional view showing one of the supporting devices for the false ceiling; Fig. 16 is an enlarged detail view showing the gas distributor in the still-absorber in side elevation; Fig. 17 is an enlarged perspective view of a portion of this distributor; Fig. 18 is a sectional view of a modified form of still-absorver particularly adapted for various types of heating devices and showing a heat dissipator connected in heat transfer relation with the still to increase heat absorption during the refrigerating cycle and preventing transfer of heat during the heating cycle; and Fig. 19 is a top plan view partly in section showing this same device illustrated in Fig. 18.

In the embodiment shown in the drawings, the apparatus includes a cabinet comprising a lower open framework of angles 1 in substantially rectangular formation with one of the flanges extending vertically downward, as shown in Fig. 1. To the under side of this frame are the corner legs 2 which space the entire apparatus from the floor and permit air to pass in at the bottom of the cabinet. This frame supports the entire apparatus including the cabinet as well as the refrigerating unit which is removably secured or supported therein.

The cabinet proper is supported upon this base frame and comprises suitable sides 3 of sheet metal or the like and a front 4 provided with an apparatus door closed opening, indicated at 5, and a main refrigerating chamber opening, indicated at 6. The back of this cabinet is open except for a rear closing plate indicated at 7, and the bottom is also open as a result of the rectangular base frame 1.

Secured in the upper part of this cabinet is an outer shell 8 for the refrigerating chamber and this shell extends to the main door opening 6, as indicated in Fig. 1, and is spaced from the base frame 1 to provide an apparatus chamber 9. This shell may also extend around and along the sides 3. Its top is open and at the rear near the top edge it is provided with a vertical upwardly opening slot 10, Fig. 4. The metal at this opening is formed to provide a marginal channel thereabout, indicated at 11, Fig. 3, so that a closing plate 12 may be slid down within these channels to close this opening. This plate is provided with an upper horizontal flange 13 and the plate is provided with an opening 14 for receiving the several conduits or pipes leading to the evaporator, as will more fully appear. Within this outer shell and spaced therefrom is an inner shell 15 of substantially the shape of the outer shell and connected to it at the front by a suitable wooden frame, indicated at 16. Suitable flanges and recesses are provided between the edges of these two shells and the frame at the front of the cabinet to form a seal. This inner shell, like the other one, is open at its top but it only reaches the point indicated at 17, which is below the upper edge of the outer shell. This is clearly shown in Fig. 1. Between these two shells is suitable insulation 18 arranged between the shells in the usual manner. At the opening or slot 10, however, Figs. 3, 4, 5 and 6, the insulation is slotted to correspond thereto and is closed by an upper plug 19 and below it by upper and lower rubber, or the like, adaptors 20 for nesting about the conduits. The insulation at the back of the box and about the parts just described terminates at the outer surface of the inner shell, as shown in Fig. 1. The insulation at the front is preferably stepped or shouldered as at 21 for supporting a suitable top insulating block 22, but this block further rests upon an inner cover plate, indicated at 23, resting upon inwardly extending flanges formed at the upper edge of the inner shell. The cover plate 23 is provided with an upwardly extending housing 24 forming a channel or groove for the conduits extending to the evaporator. The sides and front of the box as well as the rear wall fit within a top cover plate 25 having marginal depending flanges 26 extending over all of the sides including the front and rear walls. Preferably along the upper front edge, the two side edges and the rear edge portions are inwardly extending flanges 27 all provided with depressions 28 for receiving a suitable packing 29 adapted to engage the under side of the main cover and prevent heat loss. This top plate 25 is also provided with a suitable opening 30 across the rear in alignment with the main and the auxiliary flues to permit the passage of heat and products of combustion.

Arranged in the top of the refrigerating compartment thus formed and spaced from the inner cover plate 23 is a false ceiling 31, Figs. 1, 9 and 13, of substantially the size and cross sectional shape of the refrigerating compartment. This plate is provided with an upwardly extending stack or draft tubular arrangement 32 of elongated rectangular construction, as shown in Fig. 13, and having ex-

tending across the same a suitable rod 33 adapted to be engaged by spring latches, indicated at 34, Fig. 9, which extend down from the cover plate 23 through the stack. This stack permits heat from the refrigerating compartment to pass up into the evaporator storage chamber 35 formed by this false ceiling. As shown in Fig. 15, this false ceiling 31 is also provided with upwardly opening U-shaped spring clips 36 which snap onto suitable heads 37 provided at the lower ends of supporting strips 38 secured to the inner cover plate 23. From the foregoing, it will be seen that this false ceiling may be removed from below by access thereto through the refrigerating compartment.

The false ceiling may be provided with another stack 39, Fig. 13, having therein a suitable damper 40 provided with an operating arm 41 connected to a thermally operated motor means 42 connected to a tube 43 having its terminal thermostatic element 44 in the refrigerating unit, as shown in Fig. 9, or in the refrigerating compartment. As the temperature of the refrigerating unit or the refrigerating compartment drops below a predetermined minimum this damper is closed to impede as far as its effectiveness is concerned the transmission of heat from the upper part of the refrigerating compartment to the evaporator storage chamber 35.

The ceiling plate may be further provided with another opening 45, Fig. 13, adapted to be closed by the shutter 46 connected to one end of an operating lever 47 pivoted at 48 to the false ceiling and extending out to the front in a hand piece 49, Fig. 9, extending through a suitable control plate 50. The damper arrangement just described furnishes a means whereby the operator may produce a variation in the temperatures of the box to suit his own desire.

This same ceiling plate is still further provided, as shown best in Fig. 9, with an evaporator exposing opening 51. This opening as shown, is to one side of the center and substantially midway between front and rear of the ceiling plate 31. Arranged above this opening is a combined evaporator and storage, indicated at 52. It is preferably in the form of a doughnut or a hollow annulus. It has secured to its lower inner curved surface a downwardly extending heat transfer plate 53 having a downwardly extending convex lower surface. This plate carries a suitable stud 54 threaded at its lower end to permit of a removable application of a freezing unit, as will appear.

Connected in the uppermost portion of this doughnut, which is horizontally arranged, as shown, is a centrally disposed main gas supply and return pipe 55 which leads directly to a trap, as will appear. This pipe extends through the housing 24 in the inner cover plate, as shown in Fig. 9, and beside it on the left-hand side, Fig. 9, is a condenser pipe 56 which also enters the top of the evaporator storage. It too passes back through the housing 24 and leads down vertically with the other pipes in the group, as will appear. On the opposite side of the main gas supply and return pipe 55 is a drain pipe 57, which enters the evaporator storage 52 and extends to a point near the bottom thereof. This drain pipe likewise passes back through the housing 24 to the rear. All of these three pipes are in horizontal more or less symmetrical relation, as clearly shown in Figs. 3, 4 and 5, and this arrangement assists in permitting of the ready assembly and disassembly of the unit in the cabinet.

It may be desirable to diminish the effective heat distributing area of the evaporator storage and for this purpose the inner hole in the doughnut, so to speak, above the plate 53 is packed with suitable insulating material 58, Fig. 9, and closed at the top by a suitable rubber or other gasket 59, below the inner cover plate 23. The right-hand outer lower half of the evaporator storage may be protected by a suitable shaped insulating block, indicated at 60. This block has a suitable surface conforming to the configuration of the outer wall of the right-hand half of the evaporator storage. If necessary the evaporator storage chamber 35 may be lined with a lower plate 61 and side plates 62 of heat insulating material.

The heat transfer plate 53, as above intimated, is adapted to receive the freezing unit which is preferably in the form of a hollow rectangular member including an inner housing 63 and an outer housing 64 spaced therefrom and providing a brine space 65 therebetween. This brine freezing unit is of a vertical elongated rectangular form open at the front and the rear and the inner wall is provided with suitable ice tray-holding cleats 66. The upper wall is provided with an opening for receiving the threaded shank of the stud 54 and a suitable wing nut 67 is applied to this threaded shank to hold the freezing unit in place. The upper surface of this freezing unit closely adjacent the concave surface of the heat transfer plate is concaved with its concavity less in curvature than the outer convex face of the plate to provide a space therebetween for the accumulation of frost to vary the heat transfer between the evaporator storage and the freezing unit. That is to say, during the heating period there is naturally a de-frosting of the evaporator storage and a tendency for this de-frosting to extend to the upper portion of the freezing unit. Hence, some of the frost which lies between the heat transfer plate and the upper part of the freezing unit is melted and runs away so that a minimum of heat from the evaporator storage during the heating cycle is transmitted to the freezing unit,

and on the other hand during the refrigerating cycle the building up of frost at this point tends to automatically increase effective heat transfer from the freezing unit to the evaporator storage so that this arrangement automatically becomes a regulating means for nicely controlling the proper heat transfers between the evaporator storage and the freezing unit with proper respect to the various cycles in the apparatus.

Arranged in the apparatus compartment 9 is a still-absorber and it comprises a hollow doughnut or annular shaped member 68 provided with a downwardly extending supporting rod 69 extending down to a unit or auxiliary frame including a rear angle iron 70 and side angles 71. This unit frame rests upon the main base frame 1. This still-absorber is vertically spaced from this frame, as shown in Fig. 9.

Since the still-absorber just referred to is of doughnut shape it obviously has an inner vertical tube, indicated at 72, and this tube may be provided with cross tubes 73 and 74 which cross the opening in the tube and serve as additional heating and cooling means for the liquor in the still. Some of these tubes, as the lower ones, may extend inwardly into the annular space within the still-absorber, as at 75, and there pass through an inner surrounding sleeve 76 spaced from the tube 72 and extending out in a skirt 77 to co-act with the tube 72 in producing somewhat of a percolator action during heating.

Communicating with the liquor in the still-absorber is a downwardly extending loop leg 78 connected to a horizontally disposed cooling loop 79 secured to and arranged upon the unit frame. This loop preferably extends across the back of the box as shown in Fig. 7 and is provided with a multiplicity of heat radiating fins 80. At the other end this loop is connected to a gas return loop leg 81 extending upward and restricted to a smaller leg 82 where it is connected to the gas return pipe 83 which leads the returning gas to this tube 82 during the refrigerating cycle. The upper end of this tube 82 is enlarged, as at 84, and enters the still where it is connected to a gas distributor which may be in the form of an upwardly inclining pipe 85 perforated at its top, as indicated at 86. The returning gas bubbles up through the still liquor in the tube 82, is partially absorbed thereby, producing a somewhat enriched mixture which has a normal tendency to rise in this tube and also produces, by its bubbling effect, a sort of pumping action in this tube all resulting in a circulation through the loop and out into the distributor. Any unabsorbed bubbles or gas in this pipe 82 and its connected parts 84 and 85 are split up by the perforations 86 and are absorbed by the boiler liquor. When absorbed they enrich the liquor and cause it to rise in the still, bringing weaker liquor in contact with the gas bubbles.

The inclined perforated construction of the distributor pipe 85 is important because it tends to carry the gas in whatever formation it may have to various portions of the still where it may meet with as much weak liquor as possible.

An improved form of distributor is set forth in Figs. 16 and 17. Here the pipe 84 enters one end of a shed-shaped channel comprising side walls 87 and inclined upper walls 88 extending toward each other and providing a slot, as indicated at 89. Above this slot 88 is a suitable layer of wire mesh, 50 wire mesh having been found effective. The outer end of this inverted channel shaped distributor is open and the bottom thereof is also open for free access of the weaker liquor from the still. It is preferable to arrange this device as near the bottom of the still as possible and to have it slightly inclined away from the gas inlet. In its passage along the wire mesh its upper surface is disturbed by the wires of the mesh and it is thought that this disturbance has a tendency to promote absorption. In any event, relatively weak liquor may have free access through the bottom of the distributor to this gas and when enriched by it it has a tendency to rise about the bubble or globule of gas and this tendency is not materially resisted by the wire mesh which permits the enriched liquor to pass vertically upwardly to the top of the still, it being understood that rich liquor is lighter than weak liquor. The wire mesh should be of such fineness that it will at all times prevent the free flow of gas to the surface of the liquid in the still and yet should permit free flow of rich liquor past the distributor so that new weak liquor may take its place. A free vertical circulation is therefore permitted of the weaker liquor past the gas as it is confined in the distributor.

In some installations it may be found advisable to control the temperature of the apparatus by retarding absorption through reducing the cooling effect of the loop and such an arrangement is shown in Figs. 1 and 10. It comprises a housing 90 suitably formed open at its bottom and top with a suitable damper in one of said openings, as shown in the top, such a damper as indicated at 91 is pivoted at the center 92 and may be connected to any suitable control mechanism of the many types available for the purpose. This housing preferably encloses the loop fins and loop and obviously the damper may be operated to retard or increase the circulation of air through the loop and past the fins.

Mounted in the angle of the angle iron 70 of the unit frame is an impounded water tank, indicated at 93. It is of book form in that it is relatively thin from back to front

and fits nicely within the main condenser flue extending up at the back of the apparatus compartment into this flue. This condenser flue is between the rearwardly extended side portions of the cabinet and at the back and is generally indicated at 94 in Fig. 2. It is formed by a vertically disposed diaphragm or partition 95. This flue occupies most of the flue space at the back of the box, but leaves another smaller flue 96 for conveying away the heat and products of combustion from the still.

The water tank may be open at the top and may, therefore, be filled in this way. At the bottom it is provided with a drain cock 97. At various points, preferably on the inside of the water tank are bracing angles, one 98 being shown in Fig. 2. These angles are arranged in opposed pairs on the opposite inner sides of the tank and these particular angles shown serve to support a main condenser by the use of upper and lower straps 99 and 100, being clamped to the upper and lower surfaces of the flanges of these angles. They are clamped together by threaded bolts 101 provided with nuts 102. These bolts or rods 101 are secured to the condenser.

The condenser is preferably formed of pressed metal sheets seam welded and including vertical ribs 103 communicating with transverse ribs, one top and one bottom 104, all of which form a plurality of vertical tubular portions connected by top and bottom headers. This condenser is secured to the lower ends of the bolts or rods 101 and is held in place by them. The lower header of the condenser is connected to the condenser pipe 56 which leads to the top of the storage evaporator.

It will be seen from the foregoing that the condenser holding clamps comprising the plates 99 and 100 may be released and the tank swung outwardly at the bottom and withdrawn from the condenser, all other necessary connections being disconnected.

Extending from the top of the still up through the flue 96 is the gas riser 105 which extends in a horizontal portion 106, Fig. 2, through the partition 95 and thence downwardly in a leg 107, where it extends back into the flue 96 and continues in pipe formation to a point near the bottom of the trap or liquid seal 108. This down leg 107 may be provided with a heat radiating fin 107′ wrapped around the down leg 107 and extending into the main condenser flue. Leading from the gas space of the trap is an evaporator gas pipe 108′ preferably provided with a water jacket 109 connected at 110 to a low point in the impounded water tank and at a higher point with the water tank. This upper connection is shown in Fig. 14 and it includes a pair of aligned tubes 111 and 112 in the two parts respectively, both telescoping into a flexible hose or other connection 113. The inner end of the connection 112 is cut at an angle of 60° so that it inclines downwardly within the water tank. It is provided with a bail 114 spaced from and across the open end and a flap valve hook or carrier 115 at the bottom. This bail and this carrier support a flap valve 116, which normally has a tendency to seat itself upon the beveled end of the connection 112 and stop circulation. However, when the thermo-siphon effect through the water jacket 109 is too great the flap valve opens and permits escape of the heated water. In this way a proper relatively low temperature may be automatically maintained in pipe 108′. This pipe 108′ passes up and communicates with the bottom of a trap or housing 118 located above the evaporator. This housing also contains a riser 119 open near the top of the housing and becoming the gas return pipe 55 to and from the evaporator. The operation of this trap formed by the housing 118 prevents any liquid ammonia resulting from the foaming of the evaporator passing up beyond the pipe 119 and assures its drain back into the evaporator.

The drain pipe 57, Figs. 5 and 9, preferably extends back, as shown in Fig. 11, along with the other pipes leading to the evaporator and thence upward in a gooseneck or loop 121 to a point above the top of the evaporator storage. The outer down leg enters a somewhat larger pipe 122 and passes down with the other piping or conduits in the flue 96 to a point, such as Z, in the overflow pipe 120 from the trap 108 to the loop leg. This point Z is preferably located at substantially the normal level of the liquor in the still but is not critical in its location in this regard. The only important point to be borne in mind is that at the beginning of the heating period this point Z must be submerged with still liquor so as to form a seal.

Assuming that the still is charged with an ammonia water solution and that heat is applied to the still, the gas is driven off and rises through the riser 105 and thence down through the rectifier into the trap below the level of liquid therein. It then rises through the liquid in the trap and up through the gas supply and return pipe 55 to the evaporator through which it passes and thence down through the condenser pipe 56 to the bottom of the condenser. If any still liquor should collect at any time in the evaporator then there is a seal at the evaporator end of the drain 57 and also a seal at the lower end of the drain by the submergence of the point Z which results in a compressible gaseous medium being trapped between these two seals in the drain and sometime during the heating period, probably at the beginning before condensing pressure is reached, this gaseous medium is compressed between its two seals to the extent of resulting in the

liquid forming the upper seal being forced up over the gooseneck and thence trickling down through the larger portion of the drain pipe 122. From the foregoing it will be seen that no considerable quantity of still liquor is permitted to collect in the evaporator.

When the boiling-over of the refrigerant has been completed and there is a deposit of liquefied refrigerant in the condenser and the heat is turned off, there will be a drop in pressure at the still due to cooling and contraction and a suction will be created resulting in gas pressure in the top of the condenser forcing its charge up into the evaporator where it remains until it is exhausted during the refrigerating cycle, or in other words the absorption cycle. The returning gas passes down through the pipe 55 to the trap and is not permitted to pass up through the pipe 107 but must pass through the overflow pipe 120 to the restricted pipe 82 of the gas return leg of the loop from whence it passes up through this tube creating circulation through the loop and finally finding its way to the gas distributor whatever type is used.

In Figs. 1 and 7 the still is shown provided with an insulating jacket 123 coned out as at 124 for forming a burner opening and protected by a suitable conical metal shield 125 secured at this point. A suitable burner 126 is arranged below this opening and therefore the opening in the doughnut so that its flames and heat pass up through the central tube 72.

In Fig. 18, a still arrangement is shown which may be utilized for various types of heating devices and it is in the form of a lozenge-shaped hollow receptacle, indicated at 127, having in its bottom wall a well 128 extending up into the still and opening out at the bottom. This well may receive an electrical heating unit of the proper shape, not shown, or it may receive a closure comprising an inner cup 129 preferably of metal having high heat conductivity. It fits snugly within the well and is provided at its bottom with a closing cap or plate 130.

By this arrangement it will be seen that this type of still may be used with an electrical heating unit, or it may be used with a gas or oil flame type of heating device when the cup is applied. This cup snugly fits the inner wall of the well and when heated expands into intimate heat conducting relation therewith. The bottom cap of course prevents the flame from passing up into the cup.

Where electricity is used as the heating medium, the still is of circular lozenge form, as shown in Fig. 18, with the upwardly and inwardly extending dome 128 for insertion of the electrical heating unit and surrounded by a tube 131 like the tube 76. Here the insulation 132 is entirely around the still except at the bottom. Extending from the still into the insulation is a heat radiating device comprising a channel 133 welded to the still and having secured to it by bolts 134 a flat copper heat transfer device. It includes parallel portions 135 and inner and outer loops 136 and 137 arranged vertically so that air may pass readily through and between them. These loops are arranged in a suitable circular casing 138 also arranged in the insulation. This casing may be closed by a damper 139 pivoted at its center 140 and connected by suitable linkage 141 with the plunger 142 of a solenoid 143 connected in the circuit to the heating unit, not shown. When current is applied to the heating unit this damper is closed so that no cooling effect may be had upon the still as a result of circulation of air past it.

What I claim is:

1. In an absorber for absorption refrigerating apparatus, a distributor in the form of a member located in the weak liquor having communication at its bottom and top with the absorbent in the absorber, and wire mesh covering the upper communication and of sufficient fineness to trap the gas thereunder.

2. In an absorber for absorption refrigerating apparatus, a distributor in the form of a channel open at the bottom with a relatively narrow slot along its top, and wire mesh extending over said slot.

3. In an absorber for absorption refrigerating apparatus, a distributor in the form of an inclined member open at the bottom with a relatively narrow slot along its top, and wire mesh extending over said slot.

4. In absorption refrigerating apparatus, a still-absorber, evaporator and condenser connected in operative cycle, a cooling loop extending downward from the still-absorber and having the gas return connected to one leg of said loop, and an elongated distributor for receiving the gas from the gas return leg of the loop and having an open bottom and a foraminous top providing finely divided openings for resisting the free passage of the gas and permitting free passage of the enriched absorbent, said distributor being arranged within said still-absorber, sloping upwardly from its connection with said loop.

5. In refrigerating apparatus of the class described, a gas distributor in the form of a channel open at its bottom and having a longitudinal slot at the top, and fine wire mesh extending over said slot.

6. In absorption refrigerating apparatus, a cabinet having a heat insulated refrigerating chamber, a false ceiling in said chamber and forming a heat collecting compartment above it, an evaporator in said compartment, said ceiling being provided with an opening for exposing a portion of said evaporator to the refrigerating chamber, a refrigerating

unit comprising a still absorber, evaporator and condenser connected in operative cycle with said evaporator, and a freezing unit in said chamber in heat transfer relation with said evaporator by way of said opening.

7. Refrigerating apparatus as in claim 6, wherein the evaporator is provided with an extension projecting through the opening in the ceiling and the freezing unit has a portion fitting said extension, and means is provided for removably securing the refrigerating unit to said extension.

8. Refrigerating apparatus as in claim 6, wherein the evaporator is provided with a portion extending through the opening in the ceiling and having a convex bottom member and the freezing unit is also provided with a concave upper wall, the concavity being different from that of the convexity of the bottom member of the evaporator, and means is provided for clamping the surfaces of said parts of the evaporator and freezing unit parts together in heat transfer relation.

9. In refrigerating apparatus, a cabinet open at its top and having a refrigerating chamber also open at its top, a false ceiling spaced from the top of the refrigerating chamber and having an opening therein for exposing a portion of the evaporator to the refrigerating chamber, an apparatus compartment in the casing below the refrigerating chamber, a rear flue extending up the back of the refrigerating compartment and communicating with the apparatus compartment, a refrigerating unit including a still-absorber, evaporator and condenser connected in operative cycle as a unit, means for movably maintaining said unit in said cabinet with a portion of its evaporator exposed through the opening in the false ceiling and with its still-absorber in the apparatus compartment, and a removable top for the box and for said refrigerating chamber.

10. In refrigerating apparatus, a cabinet open at the bottom and having a base frame supporting it away from the floor, an upper refrigerating chamber open at its top and front and of less depth overall than the depth of the cabinet, to provide a flue at the rear, a conduit recess in the rear wall of the refrigerating compartment near the top, a refrigerating unit comprising a still-absorber and evaporator connected in operative cycle and of C-shape in side elevation with the still-absorber and evaporator extending forward, a base frame for said unit adapted to rest upon the base frame of the cabinet, said unit being mounted in the cabinet for tilting insertion and removal and suitable separate heat insulated tops for the refrigerating chamber and for the cabinet.

11. In refrigerating apparatus, a cabinet open at its bottom, a refrigerating chamber in the upper part of said cabinet and of less depth overall than the cabinet to provide a flue at the rear, means for separating said flue into a main condenser flue and an auxiliary still flue, and a refrigerating unit comprising a still-absorber, evaporator and condenser connected in operative cycle, and a water tank in the condenser flue and substantially coextensive vertically therewith, said condenser being of substantially less vertical dimension and located in the lower part of said tank.

12. The combination with a condenser water tank in absorption refrigerating apparatus of a rectifier, a jacket about a portion of said rectifier, suitable thermo-siphon connections between the jacket and water tank, and means for retarding the flow of the water from the water tank through said jacket pending a predetermined temperature in said jacket relative to that in said tank.

13. The combination with a condenser water tank in absorption refrigerating apparatus of a rectifier, a jacket about a portion of said rectifier, suitable thermo-siphon connections between the jacket and water tank, and means for regulating the flow of the water from the water tank through said jacket, and comprising a valve seat in one of the water connections and a flap valve yieldably closing said connection and adapted to be opened by predetermined pressure on its jacket side to permit thermal circulation of the water through said jacket.

14. In refrigerating apparatus, a cabinet, a refrigerating compartment therein, an evaporator storage in the upper part of said refrigerating chamber, a false ceiling having an opening exposing a portion of the evaporator to the refrigerating chamber, and means accessible from the refrigerating chamber for releasing said ceiling.

15. In refrigerating apparatus, a cabinet, a refrigerating compartment therein, an evaporator storage in the upper part of said refrigerating chamber, a false ceiling having an opening exposing a portion of the evaporator to the refrigerating chamber, means accessible from the refrigerating chamber for releasing said ceiling, a freezing unit, and means for removably securing said freezing unit to the exposed portion of said evaporator.

16. The combination with an absorption refrigerating circuit, of a hollow annular still-absorber forming a central flue, a circulating sleeve within said absorber surrounding and spaced from the central flue, and cross tubes communicating with the space within the absorber and extending across the flue, some of said tubes extending through said sleeve.

17. In refrigerating apparatus, a still-absorber having a heat radiating device, a housing for said device provided with an opening of keyhole shape, and the device

being of flat metal bent into keyhole shape in cross section.

18. In absorption refrigerating apparatus, a still, a heater well open at the bottom and extending up into the still and adapted to receive an electrical heating unit, a closure for the bottom of said well, and means connected therewith and extending up into heat transferring contact with the walls of the well for transmitting the heat from the closure to the well and to the liquor in the still.

19. Absorption refrigerating apparatus as in claim 18, wherein the closure comprises a lower plate and a heat transmitting cup within the well and adapted to be expanded by heat to engage the well sides.

In testimony whereof I hereby affix my signature.

EDMUND E. ALLYNE.