

July 9, 1929.

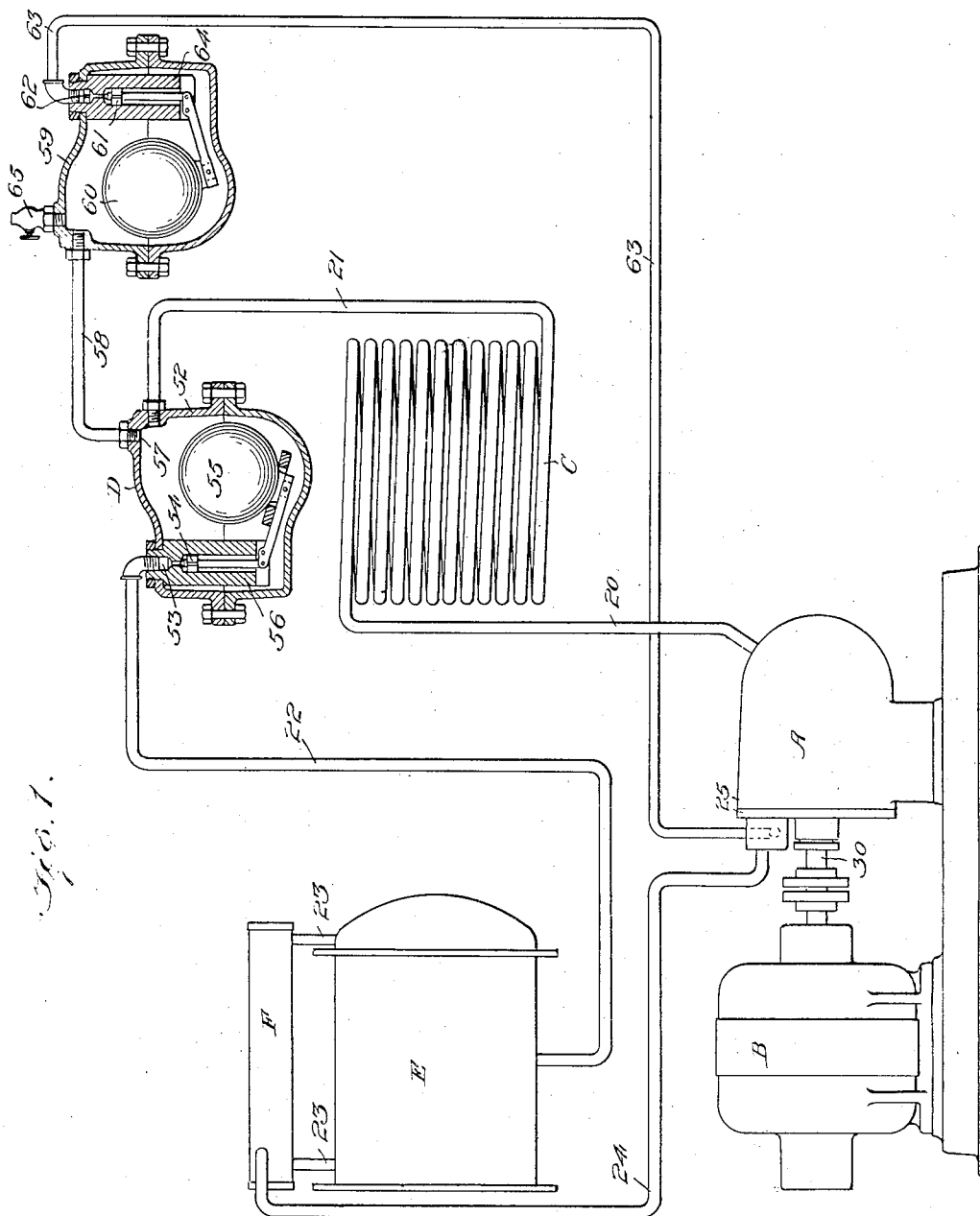
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1,720,171

ELECTRIC REFRIGERATING APPARATUS

Filed June 12, 1926

6 Sheets-Sheet 1



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ELECTRIC REFRIGERATING APPARATUS

Filed June 12, 1926

6 Sheets-Sheet 2

Fig. 3

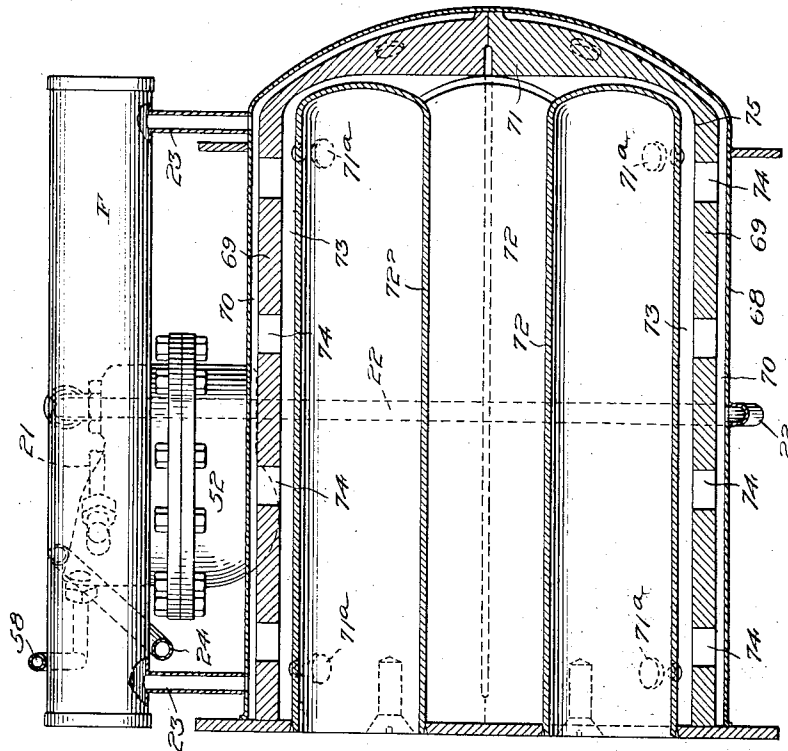
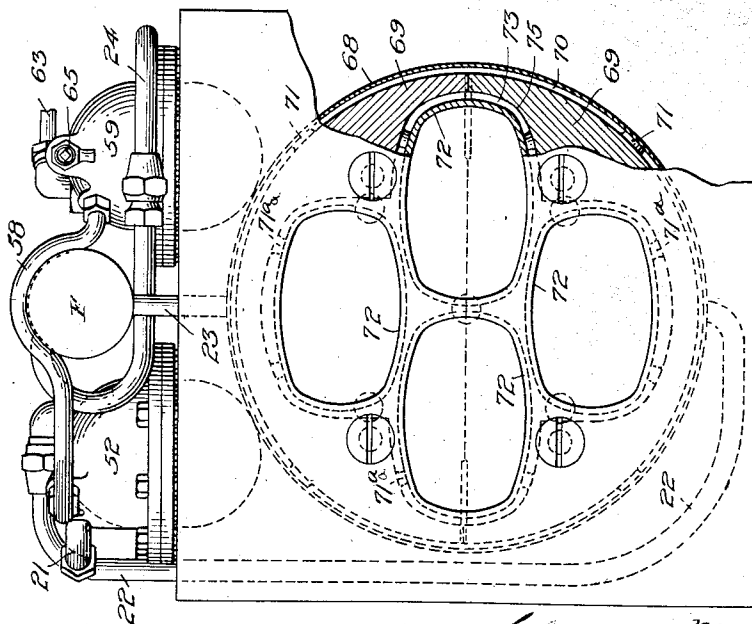


Fig. 2



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ELECTRIC REFRIGERATING APPARATUS

Filed June 12, 1926

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Fig. 4

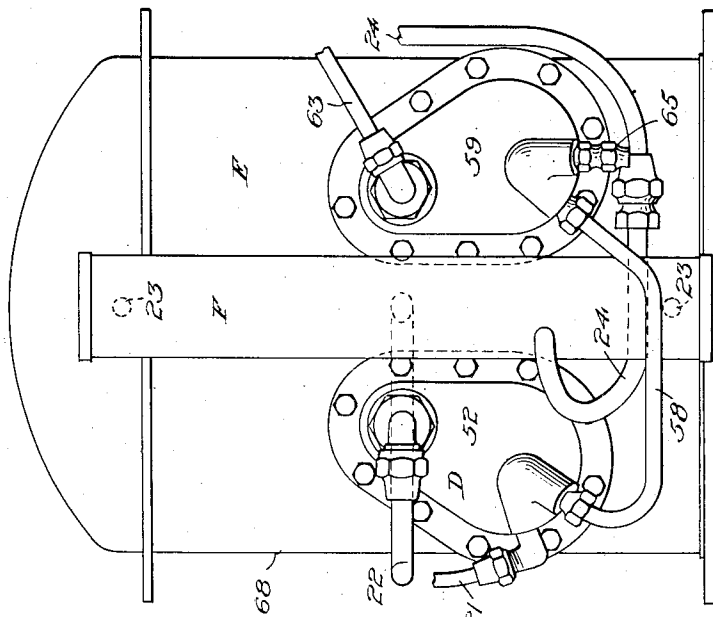
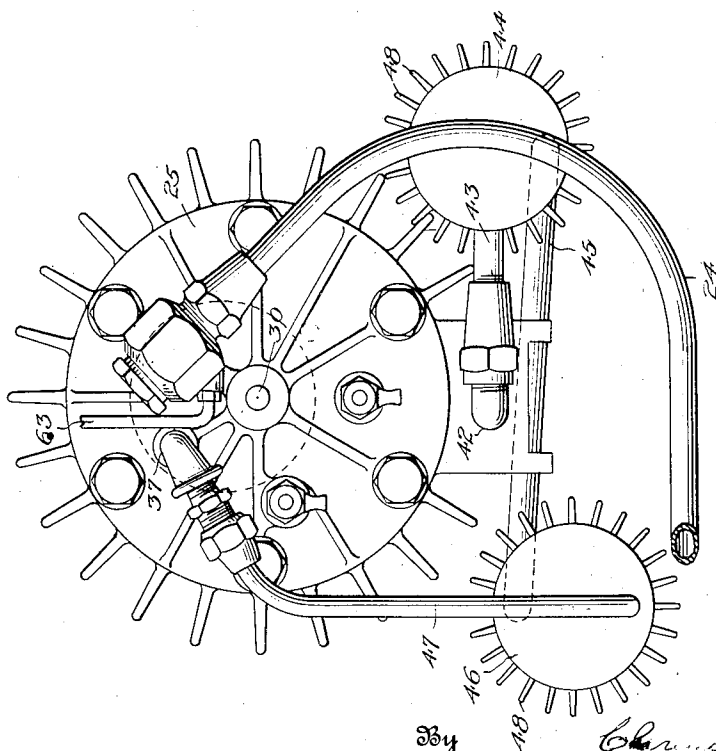


Fig. 5



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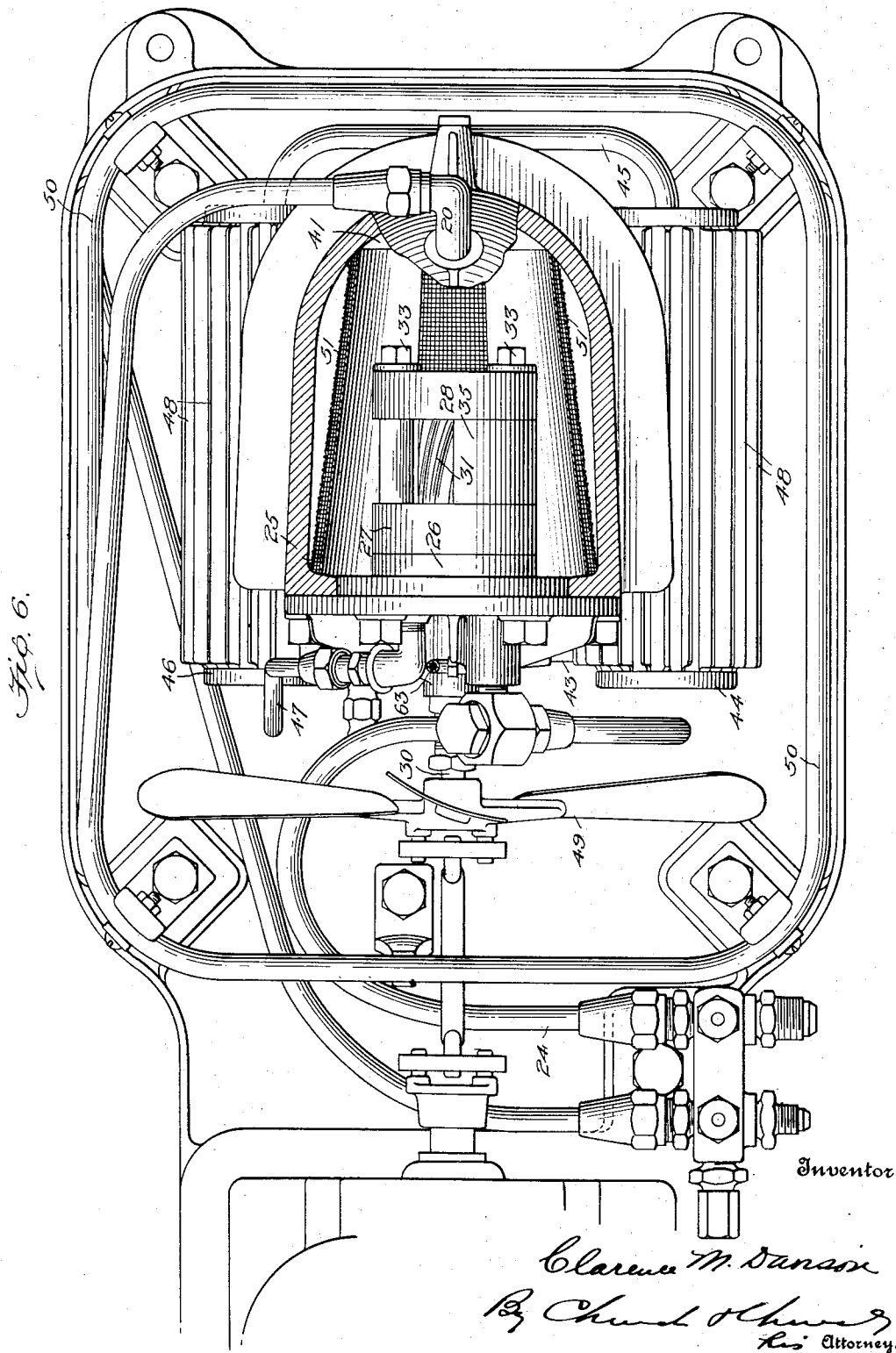
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ELECTRIC REFRIGERATING APPARATUS

Filed June 12, 1926

6 Sheets-Sheet 4



July 9, 1929.

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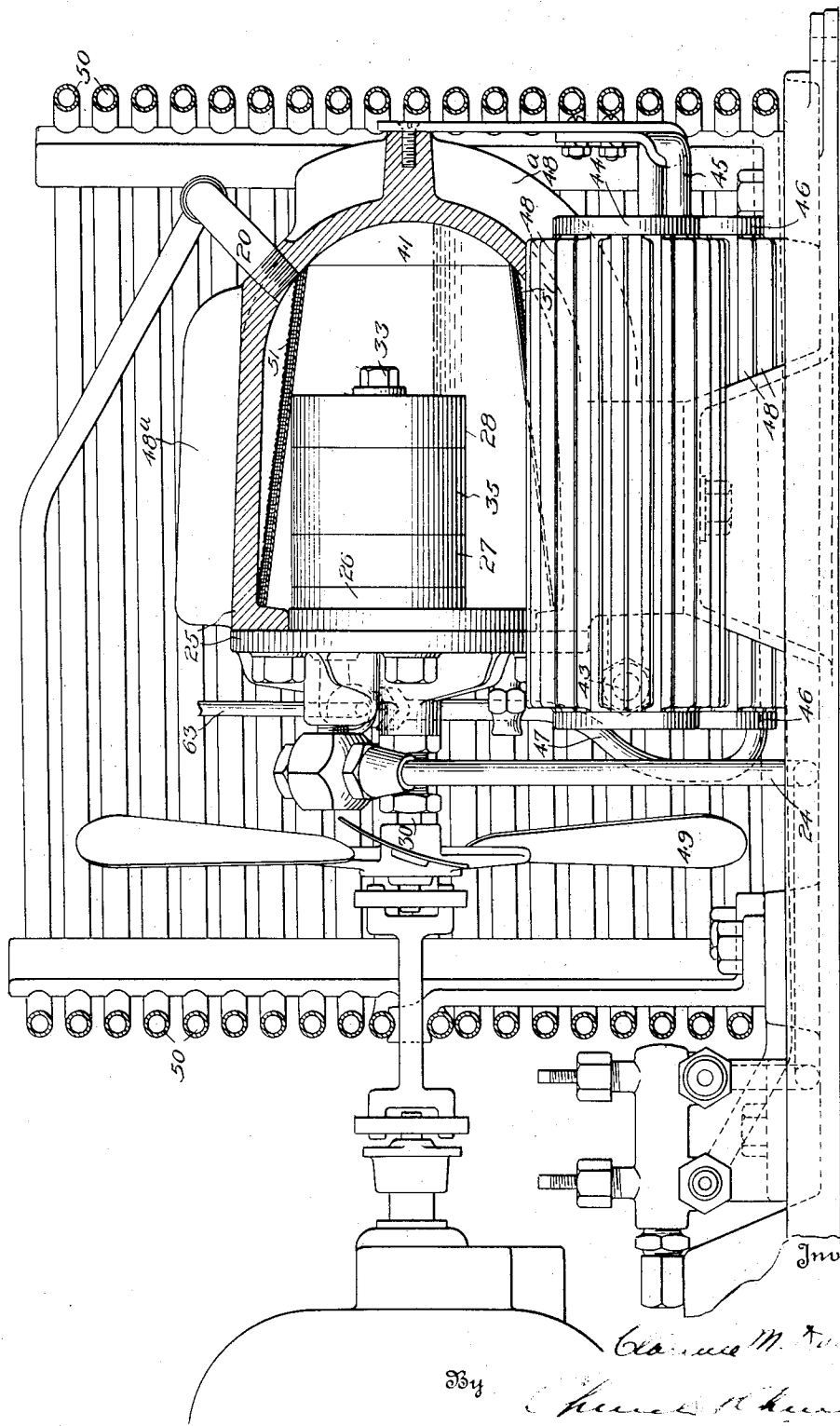
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ELECTRIC REFRIGERATING APPARATUS

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Fig. 7.



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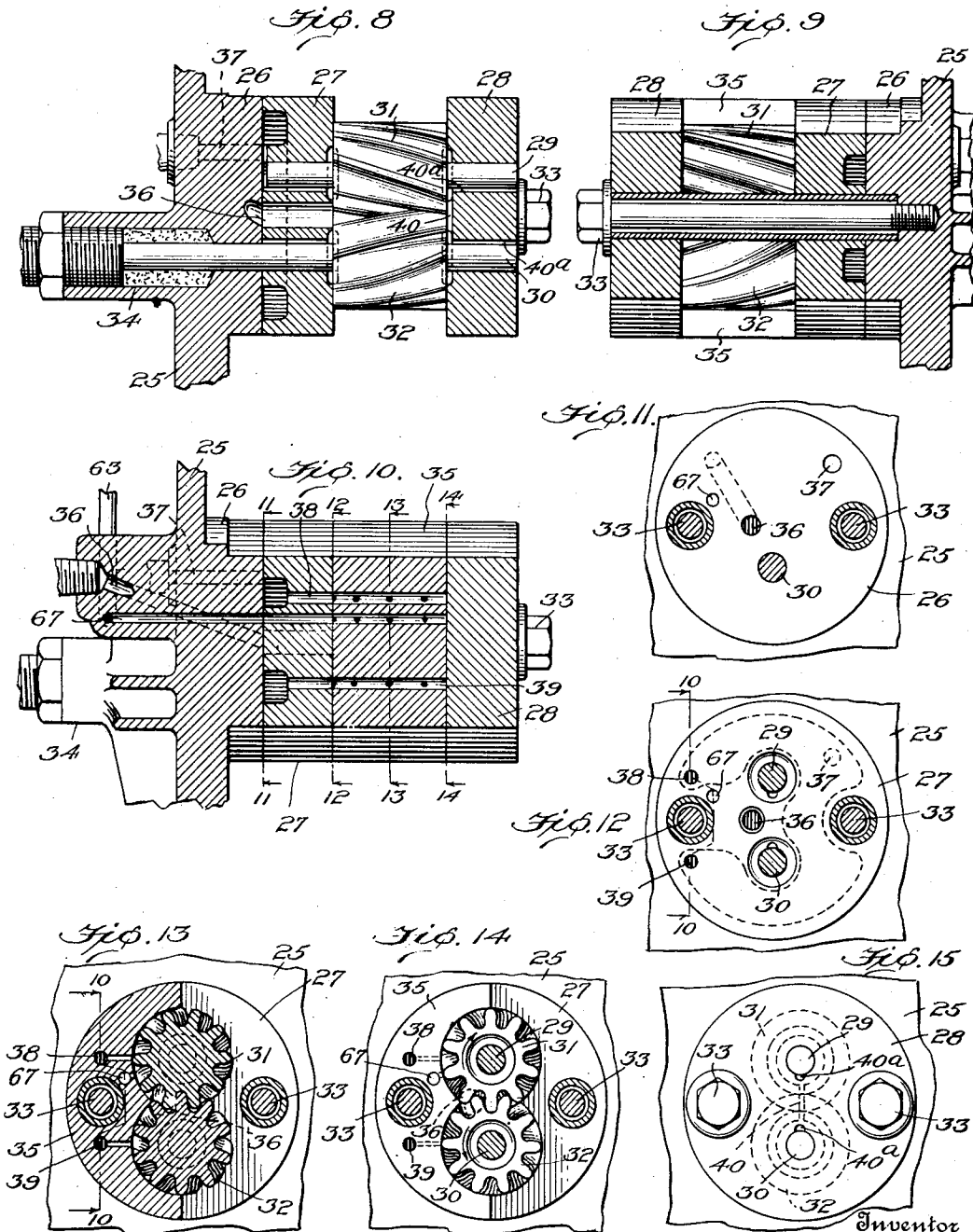
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ELECTRIC REFRIGERATING APPARATUS

Filed June 12, 1926

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE.

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ELECTRIC REFRIGERATING APPARATUS.

Application filed June 12, 1926. Serial No. 115,532.

This invention relates to refrigerating apparatus and particularly to that type of apparatus known as electric refrigerating apparatus primarily adapted for household uses. However, while the present invention is shown embodied in an apparatus or system of this type, there are certain features which may, of course, be utilized in refrigerating systems different from the specific form shown.

Generally stated, the primary object of the invention is to increase the efficiency of the apparatus without appreciably affecting adversely its cost of production or operation. Stated more in detail, one object is to provide a novel form of cooling element or unit which is so constructed that after the refrigerating chambers have been reduced to the desired temperature and the circulation of the cooling medium stopped, such decreased temperature within the chambers will be maintained for a considerable period of time without again circulating a refrigerating medium through the unit. This is preferably accomplished by providing in the cooling unit a mass of material of high thermo-capacity and relatively low thermo-conductivity whose temperature will be reduced by the refrigerating medium when the latter is being circulated through the cooling unit to refrigerate articles within the cooling chambers. With this arrangement, after the circulation of the medium has ceased, if a door of the refrigerator should be opened, the relatively hot air that would be thus admitted would not necessitate the immediate operation of the fluid circulating mechanisms for purposes of compensating for the decrease of temperature within the cabinet as the heat units thus admitted would be compensated for by the mass of material of high thermal capacity.

A further object is to reduce the quantity of refrigerating medium or chemical that must be circulated through the cooling element or unit. In the present instance this reduction of chemical is accomplished by having the circulating passages in the cooling unit made of comparatively small cross sectional dimensions so that when the chemical is introduced therein under reduced pressure ebullition and gasification thereof will take place with such rapidity and violence that it is only necessary to partially fill the pas-

sages with the liquid chemical due to the fact that this violent ebullition causes the passages to be entirely and completely filled with the liquid chemical mixed with the resulting chemical gas.

In the system shown the gasified refrigerating chemical is returned from the cooling element to a compressor where it is placed under pressure in a series of pockets or compartments, these pockets or compartments being sealed after the introduction of the chemical therein by a suitable sealing fluid such as oil and another object of the invention is to prevent any of this sealing fluid being carried from the compressor to the cooling unit by the refrigerating chemical when the latter is forced by the compressor through the usual condenser and cooling unit. This sealing fluid or oil is so acted upon by the compressor as to cause it to become foamy and it is this foam that is apt to be carried out of the compressor with the refrigerating chemical but, in the present instance, after the chemical and any oil that might happen to be carried thereby has passed from the compressor the two substances are separated so that none of the oil can reach the cooling unit. This is preferably done after the cooling medium has been passed through the condenser and has been transformed to its liquid state. In the preferred arrangement this separated or extracted oil is preferably returned to the compressor to again take up its duty of aiding in the compression of the refrigerating chemical which is returned from the cooling unit to the compressor, this return of the oil being separate from the return of the refrigerating chemical so that the efficiency of the compressor in effecting a flow of the returned chemical is not adversely affected.

There is a continuous circulation of the oil in and through the compressor, the oil being used over and over again in effecting a seal of the chemical and placing the same under compression but, as has been mentioned, this usage of the oil causes it to become foamy so that even if it should not escape from the compressor, nevertheless, in its foamy condition it would not function efficiently for the purpose of placing the chemical under compression. For this reason the invention also contemplates means for continuously circulating the body of oil not only through the

compressor but through a reservoir or container where the oil may temporarily rest and be cooled and liquefied, that is, the foam reduced to a true liquid state so that it will function properly as a compressing agent in the compressor. This not only increases the efficiency of the compressor but, it has been found that if some means are not provided for maintaining the viscosity of the oil or sealing fluid in its true liquid state, the compressor will ultimately become inoperable due to the fact that the oil is incapable of creating the proper pressure on the chemical within the compressor. In the type of compressor shown the chemical is compressed in a series of pockets formed in a rotatable member and to facilitate this cooling and liquefying of the oil the driving means for rotating said pocketed member are also adapted to drive a fan so positioned as to direct a blast of air over the reservoir or container in which the oil is cooled.

In the accompanying drawings,—

Figure 1 is a more or less diagrammatic illustration of an electric refrigerating system.

Fig. 2 is a front end view, partly in section, showing the cooling unit in more or less detail.

Fig. 3 is a longitudinal sectional view of the cooling unit.

Fig. 4 is a top plan view of said unit.

Fig. 5 is an end view of the compressor and oil cooler therefor.

Fig. 6 is a top plan of the condenser, with the compressor pump casing shown in section.

Fig. 7 is a vertical sectional view of the condenser and compressor pump casing.

Fig. 8 is a longitudinal section view taken from one side of the pump for the compressor.

Fig. 9 is a similar view from the opposite side of said pump.

Fig. 10 is a sectional view on line 10—10 of Fig. 12.

Fig. 11 is a similar view on line 11—11 of Fig. 10.

Fig. 12 is a section on line 12—12 of Fig. 10.

Fig. 13 is a sectional view on line 13—13 of Fig. 10.

Fig. 14 is a sectional view on the line 14—14 of Fig. 10.

Fig. 15 is an end view of the pump.

While features contemplated by the present invention are not limited to use in a refrigerating system of any particular design there is shown in the present instance a system with which such features have been used with very satisfactory results.

In this system there is a compressor A driven by a motor B for compressing and circulating the refrigerating chemical through the system. The refrigerating chemical in gaseous form passes from the casing of compressor A through a pipe 20 to the condenser

C where it is liquefied and from whence it flows by pipe 21 preferably to a tank D which may be used for purposes which will hereinafter be more fully described. Through tank D the liquefied chemical flows by way of pipe 22 to the cooling element or unit E where it is gasified upon taking up the heat units present in said cooling element. The chemical thus gasified in the cooling element flows through pipes 23 to a drum F and from said drum it is returned by a pipe 24 to the compressor A where it is again placed under pressure and circulated through the system as just described.

In the compressor there is a pump which comprises a rotatable member having a series of cavities or pockets therein in which the gasified refrigerating chemical is pocketed and placed under pressure after which it is discharged from said pockets into a chamber within the compressor casing where it is accumulated and forced through the system. In the preferred construction, the compressor casing 25 has an inwardly extending boss 26 with which a bearing plate 27 registers. Spaced from bearing plate 27 is a second bearing plate 28 in registry therewith and journaled in said plates are a pair of spindles 29—30 on which are mounted intermeshing spirally cut gears 31—32. The bearing plates 27—28 are secured to boss 26 by means of screw bolts 33. Spindle 30 extends not only through the bearing plates but also through a stuffing box 34 to the exterior of casing 25 where it is coupled in any suitable manner to the motor B whereby a rotary motion may be imparted thereto. Located between the bearing plates 27—28 and mounted on the screw bolts 33 is a semi-circular housing 35 whose interior face is suitably curved or dished to partially surround the gears 31—32, the inner surface of said housing engaging the crowns of the teeth of said gears. Considering the space between each two adjacent teeth of each gear as a pocket it will be seen that when a tooth of one gear intermeshes between two teeth of the other gear all of the air that might be between said two teeth will be expelled but as the intermeshing tooth moves from between said two teeth there will be a tendency of air to again rush into the space between said two teeth. For this reason the boss 26 and bearing plate 27 are formed with a duct 36 for supplying the gasified refrigerating chemical to one end of the gears at the point where the intermeshing teeth of said gears begin to separate or diverge with the result that a body of gas will be introduced into the space between each two adjacent teeth as said teeth pass over the gas port in bearing plate 27. The gas thus flowing into the cavity formed by each pair of teeth will be pocketed between said teeth, the housing 35 and the two bearing plates at the ends of the teeth. Preferably, the gears are cut with spiral teeth

and are so mounted that said teeth engage each other first on the intake end or the end at which port 36 is located. Consequently, as they are rotated past the port 36 there will be a space between the root of the tooth on one gear and the corresponding crown on the other and owing to the fact that the gears are spirally cut such space gradually increases as the gears rotate further and consequently the gas from the intake port flows into this space.

Also formed in said casing 25 and boss 26 is an oil duct 37 having channels leading to ports 38—39 in the inner face of bearing plate 27 and as the spaces between the teeth of the gears previously filled with gas pass these ports a small quantity of oil under pressure is injected between the teeth. This oil performs two functions. First, it acts as a seal and, secondly, it compresses the body of gas formerly introduced between the teeth. After the gas has thus been sealed and compressed in the cavities or pockets the teeth move into registry with relief groove 40 in bearing plate 28 which might be termed the discharge end of the pump and at this point the oil is permitted to escape through said groove 40 and grooves 40^a formed in the journals of spindles 29, 30, into the chamber 41 within the compressor casing. The gas under pressure escapes from the pockets after the latter pass the housing 35 and this gas and oil, upon coming into the chamber 41 in the compressor casing tend to separate due to the oil being of greater specific gravity than the gas, the oil accumulating in the bottom of the chamber and the gas in the top thereof. As these successive increments of gas under pressure are discharged into the chamber there is built up a pressure over the surface of the oil in the bottom of chamber sufficient to force the oil from said chamber through an oil cooling element, to be later described, and back to the duct 37 where it is again introduced into the spaces between the teeth of the gears 31—32. The construction and operation of the pump is described in greater detail in applicant's Patent No. 1,634,023, dated June 28, 1927.

In operation it has been found that the oil passing through the compressor or compressor pump is caused to become quite foamy with the result that when a portion of the oil containing foam is introduced into the space between the gear teeth it is not capable of exerting the desired degree of pressure and seal on the previously introduced gas because of the air carried by the bubbles constituting the foam. The gas might be compressed to a certain extent but undoubtedly it is not compressed to the extent that it would be if the entire body of oil was in its true liquid state. In fact it has been found that in the absence of some means for maintaining the oil in a liquid state the compressor after continued operation at high pressure for an extended period of time will become inoperative due to

its inability to build up a pressure in chamber 41.

To remedy this defect and increase the efficiency of the oil as a seal and compressing agent, and thereby increase the efficiency of the compressor, said oil is adapted to be drawn off from the bottom of chamber 41 through a duct 42 to which is connected a pipe 43 for delivering the oil into the upper portion of a reservoir or container 44 in which the oil, then containing more or less foam, may temporarily lie or, so to speak, rest during which time the foam will be dissipated. All of the foam may not disappear, small air bubbles remaining in the liquid oil, but these are cleared up by having the discharge pipe 45 for reservoir 44 located close to the bottom of said reservoir so that practically only the liquid oil will pass into said pipe while the foamy portion thereof will remain on the surface of the oil at a point above said discharge pipe. This discharge pipe 45 leads to the top of a second reservoir 46 where the oil is given another rest which, in normal operation, has been found sufficient to practically entirely eliminate all foam. Like in the case of reservoir 44, reservoir 46 also discharges at a point near its bottom through a pipe 47 which leads to the oil duct 37.

To facilitate the dissipation of the foam carried by the oil into the reservoirs 44, 46, said reservoirs are formed on the exterior with fins 48 to augment the radiation of heat that may be transferred from the oil to the material of which said reservoirs are formed. In addition, a fan 49 is mounted on the exterior end of spindle 30 so as to direct a blast of air over said reservoirs. This fan also maintains a circulation of air around the compressor casing which is also provided with the heat dissipating fins 48^a.

By reason of the pressure built up by the compressor the chemical gas is forced through pipe 20 to and through the coils 50 of condenser C where it is liquefied. Usually, the liquefied chemical then passes on to the cooling unit, but in systems where oil is used in the compressor, as in the present case, it has been found that particles of oil are carried off from the compressor by the gas, through the condenser and into the cooling element at which point they have a very detrimental effect on the operation or effectiveness of the apparatus. The quantity of oil thus carried by the chemical gas can be somewhat reduced by a filter such as a screen 51 surrounding the pump in chamber 41 of the compressor but even where such screen is used it has been found that the gas still carries off a sufficient quantity of the oil so as to have an appreciable effect on the efficiency of the apparatus. In view of this, the present invention contemplates the provision of means between the compressor and the cooling element, preferably between the condenser and cooling ele-

ment, for thoroughly separating from the gas any oil which might be carried thereby. In its preferred form this separator, indicated generally by the reference character D, comprises a casing 52 having a chamber therein to which the liquid chemical and oil incidentally carried thereby is delivered by the pipe 21 from the condenser C. In the upper portion of the casing 52 is an outlet port 53 adapted to be closed by a float operated valve 54. The float 55 for operating said valve is of a weight that cannot be affected or buoyed by the oil but can be raised only by the chemical due to the fact that said chemical, which is then in a liquid state, has a greater specific gravity than the oil. With this arrangement the liquid chemical collects in the bottom of casing 52 until it has reached a height therein sufficient to raise the float 55 to a point where the valve 53 will be opened to permit the discharge of the chemical from the tank. Valves 53 is inaccessible to any oil that may be on top of the liquid chemical because of the provision of a depending housing 56 within chamber 52. Said housing extends down into said chamber to a point below that to which the float must be raised before said valve will be opened, or, stated reversely, the valve will always be closed by the float before the chemical is depleted or exhausted beyond the point below the lower end of housing 56. This prevents the oil entering housing 56 and passing through the valve. Because of the accumulation of chemical within casing 52 the oil must necessarily be removed from said casing and this is accomplished by providing an outlet 57 through which the oil may pass into a pipe 58 leading to the chamber of a second float valve casing 59. The oil is accumulated in this second chamber 59 until it reaches a level sufficiently high to raise float 60 which actuates the valve 61 controlling the flow of oil through the port 62 in said casing. When the oil in casing 59 has reached the point where port 62 will be opened then the oil will be exhausted from said casing through pipe 63. Some gas, of course, will escape through port 57 in casing 52 into casing 59 and as it cannot escape through valve 62 on account of the housing 64 extending down in casing 59 below the lowest level to which the oil may drop, a relief valve 65 is provided for permitting the escape of permanent gas trapped in said casing. Oil exhausted from casing 59 through pipe 63 is preferably returned to the compressor and for this purpose pipe 63 communicates with a duct terminating in port 67 in bearing plate 26. In this connection it will be noted that the port 67 is located intermediate gas port 36 and oil port 38 with the result that as each pair of teeth of the gear 31 pass from port 36 and over port 67 some of the returned oil will be injected between the teeth resulting in a partial com-

pression of the gas. This compression is only partial because the returned oil is not under as great pressure as the body of oil in the bottom of chamber 41 of the compressor.

While this separation of the oil from chemical may, on the surface, appear to be a matter of little moment such is not the fact because several advantages are secured. First, the reduced efficiency of systems, such as the present one, caused by the presence of oil in the gas interfering with the transfer or exchange of heat units in the cooling unit is eliminated and efficiency of the present system is increased by reason of the fact that there is no loss or consumption of heat units in chilling or cooling particles of oil passing through said cooling unit; second, by segregating the oil and returning it to the compressor separately from the chemical a partial compression of the chemical in the compressor may be obtained before the final pressure is placed upon it by the oil normally stored in the bottom of the compressor chamber; and thirdly, having separated the oil from the chemical when the gasified chemical is returned from the cooling unit to the compressor the cavity between each pair of teeth is practically filled to its utmost capacity by the chemical gas alone, no energy, so to speak, being utilized in effecting a flow of oil into said cavity at the time the gas is being introduced.

Passing from separating tank 52 the chemical, in liquid form, flows by pipe 22 into suitable passages arranged in the cooling element for abstracting the heat units from chambers within said cooling element in which articles to be refrigerated are located. The features heretofore described, can of course, be used with other types of cooling elements or units but it is preferred that the unit be constructed as illustrated in Figs. 2 and 3. In this construction there is an outer casing 68 within which there is a container 69 preferably cylindrical, a relatively narrow chemical circulating passage 70 being provided between the casing and container to which the chemical is supplied by pipe 22 at the bottom thereof. The container 69 is composed of a mass of material 71 of high thermal capacity and low thermal conductivity formed with cavities in which are located the metallic shells 72 forming the compartments for receiving the trays or other holders for the articles to be refrigerated. For bringing the chemical into intimate contact with the walls of the shells 72 there is a fluid circulating passage 73 extending around each of the shells as well as between the shells. The shells 72, container 69 and casing 68 are held in proper spaced relation by suitable studs 71^a formed on the container 69. The chemical has access to this passage by way of ports 74 provided at longitudinally spaced points in the bottom and top of mass 71 and elongated

passages 75 extending practically the entire length of mass 71 and connecting ports 74 with the passage 73.

Preferably the shells 72 are arranged as shown so that as the chemical passes around the sides of the lowermost shell it will impinge against the bottoms of the two next uppermost shells which will act as baffles causing the current of chemical to be broken up, portions thereof being diverted around opposite sides of said next uppermost shells. Likewise, as the chemical flowing between the two intermediate shells comes into contact with the uppermost shell of the group it will also be broken up or part of it diverted around one side of the uppermost shell and part of it diverted around the opposite side of the shell, the entire volume of chemical ultimately passing through the upper passages 75 and ports 74 into the upper passage 70 from whence it will flow through the pipes 23 into the gas drum F located above the cooling element. From the drum F the gas is returned by pipe 24 to the port 36 in the bearing plate of the compressor pump.

In order to reduce the quantity of chemical necessary to effect the proper exchange of heat units in the cooling unit the passages 70 and 73 are made of very narrow cross section so that when the liquid chemical is released into said passages under a reduced pressure violent ebullition and gasification of the chemical will result, the expanded chemical completely filling the entire passages above the static level that the liquid may assume when not being circulated in the passages.

With some types of refrigerating systems in present-day use it has been found that after the temperature in the cooling unit has been reduced to the desired point and the system has temporarily ceased to operate, said unit is so sensitive that if a door is opened the cooling unit is affected to the extent that the system must again be immediately placed in operation to maintain the unit at the desired reduced temperature. In the present case, however, this instantaneous renewal of operation of the system is eliminated by the provision of the mass of material of high thermal capacity and of low thermal conductivity in the cooling unit. When the present system is in operation the temperature of this mass, which is preferably of cast iron, is reduced and after the system has been put out of operation, if a door of the cabinet should be opened and relatively hot air admitted, the heat units of such air will be absorbed by the mass 71. That is, there will be an exchange of heat units between the relatively hot air and the mass 71, due to the relatively low thermal conductivity of said mass and little, if any, effect will be had upon the interiors of the shells 72. The cast iron being of high thermal capacity a large volume of heat units may be taken up by it before it is again necessary for

the system to resume operation. For convenience in manufacture and assembly this mass of iron is cast in two semi-circular sections which can be readily inserted in the container 69.

What I claim is:

1. In a refrigerating system, a cooling unit having a passage for a refrigerating medium which is gasified in said unit, a compressor for primarily forcing said medium and incidentally a sealing liquid toward and from said cooling unit, means for introducing a sealing liquid into said compressor, means for extracting the sealing liquid from the refrigerating medium before the latter reaches the cooling unit, means for returning the refrigerating medium in gaseous form from the cooling unit to the compressor, and a separate return for the extracted sealing liquid to said compressor.

2. In a refrigerating system, the combination of a compressor comprising a casing, intermeshing spirally cut gears, means for introducing a sealing liquid under pressure into spaces between intermeshing teeth of said gears, of a condenser to which said refrigerating medium and sealing fluid is supplied from said compressor and in which said medium is condensed, a cooling unit to which the condensed medium is supplied from the condenser and in which said medium is gasified, means interposed between the condenser and cooling unit for extracting the sealing fluid from the refrigerating medium, means for returning the gasified medium to the compressor and introducing it into the spaces between intermeshing teeth before the sealing fluid is introduced therein, and means for returning the separated sealing fluid to the compressor and introducing it into the spaces between intermeshing teeth after a body of the refrigerating medium has been introduced but before the first mentioned introduction of sealing fluid has taken place.

3. In a refrigerating system, the combination of a compressor comprising a casing, intermeshing spirally cut gears, means for introducing a sealing fluid under pressure into spaces between intermeshing teeth of said gears, of a condenser to which said refrigerating medium and sealing fluid is supplied from said compressor and in which said medium is condensed, a cooling unit to which the condensed medium is supplied from the condenser and in which said medium is gasified, means interposed between the condenser and cooling unit for extracting the sealing fluid from the refrigerating medium, means for returning the gasified medium to the compressor and introducing it into the spaces between intermeshing teeth before the sealing fluid is introduced therein, and means for returning the separated sealing fluid to the compressor and introducing it into the spaces between intermeshing teeth after a body of

the refrigerating medium has been introduced but before the first mentioned introduction of sealing fluid has taken place, the returned sealing fluid being introduced between said gear teeth under one pressure and the subsequent introduced fluid being introduced under a greater pressure.

4. In a refrigerating system, a cooling unit in which a refrigerating chemical is adapted to be gasified, a compressor for forcing the refrigerating chemical to the cooling unit and to which said chemical in gasified form is returned from said cooling unit, a connection for supplying a sealing fluid to said compressor for placing the gasified chemical under pressure, means between said compressor and cooling unit for extracting from the refrigerating chemical any sealing fluid that may incidentally or accidentally be carried from the compressor toward the cooling unit by the circulating refrigerating chemical, and means for returning said extracted sealing fluid to the compressor separate from the gasified chemical being returned from the cooling unit to said compressor and separate from the said connections for supplying sealing fluid to the compressor.

5. In a refrigerating system, a cooling unit in which a refrigerating chemical is adapted to be gasified, a compressor for forcing the refrigerating chemical to the cooling unit and to which said chemical in gasified form is returned from said cooling unit, a connection for supplying a sealing fluid to said compressor for placing the gasified chemical under pressure, means between said compressor and cooling unit for extracting from the refrigerating chemical any sealing fluid that may incidentally or accidentally be carried from the compressor toward the cooling unit by the circulating refrigerating chemical, and means for returning the extracted sealing fluid to the compressor and introducing it into said compressor for purposes of compressing the gasified chemical returned to said compressor, said returned sealing fluid being introduced into said compressor at a point intermediate the points of introduction of said chemical and the point where the sealing fluid was originally introduced.

6. In a refrigerating system in which a refrigerating chemical and a sealing fluid are utilized, a condenser, a cooling unit, a compressor embodying a rotatable member having a series of pockets therein, means for successively filling and evacuating said pockets, a connection for returning the chemical in gaseous form from the cooling unit and introducing it into the pockets of said compressor member after said pockets have been evacuated, means for introducing sealing fluid in the said pockets after the gasified chemical has been introduced therein, means for extracting from the chemical any sealing fluid carried thereby from the compressor,

and means for returning said extracted fluid to the compressor and introducing it into said pockets after the gasified chemical has been introduced therein but before the first mentioned introduction of sealing fluid into said pockets.

7. In a refrigerating system in which a refrigerating chemical and a sealing fluid are utilized, a condenser, a cooling unit, a compressor embodying a rotatable member having a series of pockets therein, means for successively filling and evacuating said pockets, a connection for returning the chemical in gaseous form from the cooling unit and introducing it into the pockets of said compressor member after said pockets have been evacuated, means for introducing sealing fluid in the said pockets after the gasified chemical has been introduced therein, means for extracting from the chemical any sealing fluid carried thereby from the compressor, and means for returning said extracted fluid to the compressor and introducing it into said pockets after the gasified chemical has been introduced therein but before the first mentioned introduction of sealing fluid into said pockets, the extracted sealing fluid being introduced into said pockets under one pressure and the subsequently introduced sealing fluid being under a greater pressure.

8. In a refrigerating system in which a refrigerating chemical and a sealing fluid are utilized, a cooling unit, a condenser, a compressor for forcing the chemical to the condenser and cooling unit, means intermediate the condenser and cooling unit for trapping any sealing fluid carried by the chemical, said means comprising a chamber to which the chemical and the sealing fluid are fed, an outlet valve for said chamber, said valve being movable to open position only by the accumulation of a predetermined quantity of chemical within said chamber, a second outlet in said chamber through which the sealing fluid is forced by the accumulation of chemical within said chamber, and a second chamber within which the sealing fluid forced from the first chamber is accumulated.

9. In a refrigerating system in which a refrigerating chemical and a sealing fluid are utilized, a cooling unit, a condenser, a compressor for forcing the chemical to the condenser and cooling unit, means intermediate the condenser and cooling unit for trapping any sealing fluid carried by the chemical, said means comprising a chamber to which the chemical and the sealing fluid are fed, an outlet valve for said chamber, said valve being movable to open position only by the accumulation of a predetermined quantity of chemical within said chamber, a second outlet in said chamber through which the sealing fluid is forced by the accumulation of chemical within said chamber, and a second chamber in

which the sealing fluid forced from the first chamber is accumulated, said second chamber having an outlet, a normally closed valve for said outlet, and means for opening said valve operable upon the accumulation of a predetermined quantity of sealing fluid within said second chamber.

10. In a refrigerating system in which a refrigerating chemical and a sealing fluid are utilized, a cooling unit, a condenser, a compressor for forcing the chemical to the condenser and cooling unit, means intermediate the condenser and cooling unit for trapping any sealing fluid carried by the chemical, said means comprising a chamber to which the chemical and the sealing fluid are fed, an outlet valve for said chamber, said valve being movable to open position only by the accumulation of a predetermined quantity of chemical within said chamber, a second outlet in said chamber through which the sealing fluid is forced by the accumulation of chemical within said chamber, a second chamber in which the sealing fluid forced from the first chamber is accumulated, and means for returning the trapped fluid from the second chamber to the compressor.

11. In a refrigerating system in which a refrigerating chemical and a sealing fluid are utilized, a cooling unit, a condenser, a compressor for forcing the chemical to the condenser and cooling unit, means intermediate the condenser and cooling unit for trapping any sealing fluid carried by the chemical, said

means comprising a chamber to which the chemical and the sealing fluid are fed, an outlet valve for said chamber, said valve being movable to open position only by the accumulation of a predetermined quantity of chemical within said chamber, a second outlet in said chamber through which the sealing fluid is forced by the accumulation of chemical within said chamber, a second chamber in which the sealing fluid forced from the first chamber is accumulated, means for returning the trapped fluid to the compressor, and means for immediately returning the chemical in gasified form from the cooling unit to said compressor.

12. In a refrigerating system in which a chemical and a sealing fluid are utilized, a cooling unit, a condenser, a compressor for forcing the chemical through the condenser and cooling unit, and means interposed between the condenser and cooling unit for trapping any sealing fluid carried by the chemical, said means comprising a chamber to which the chemical and sealing fluid are fed, a normally closed valve controlled outlet in said chamber for the chemical, means inoperable but operable by the accumulation of a predetermined quantity of chemical within said chamber for opening said outlet, and a second outlet in said chamber through which any sealing fluid fed into said chamber may flow.

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