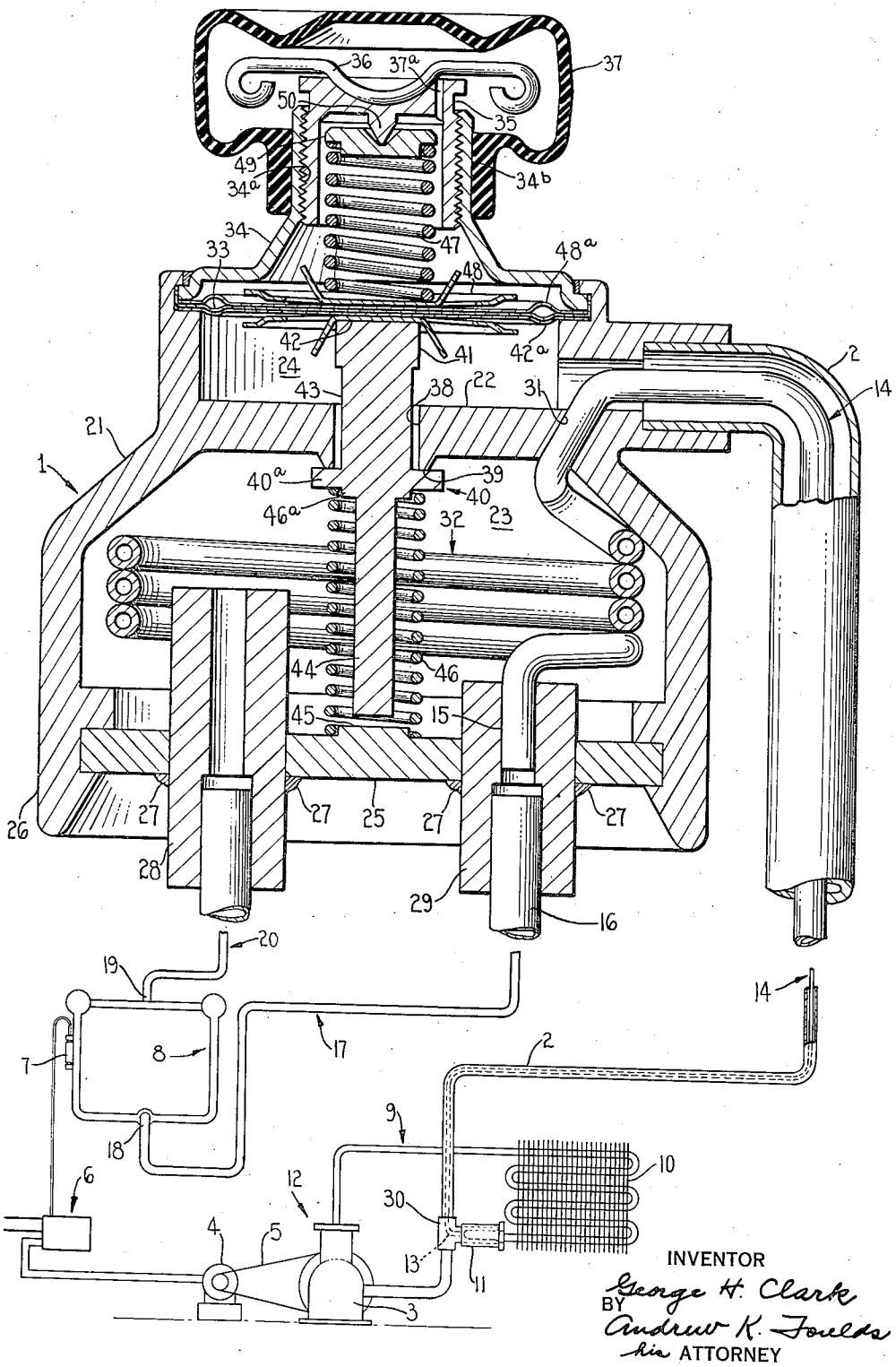
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REFRIGERATING APPARATUS

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REFRIGERATING APPARATUS

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16 Claims. (Cl. 62—3)

My invention relates to new and useful improvements in refrigerating apparatus and more particularly to flow controlling devices for controlling the flow of refrigerant in a refrigerating system.

An object of my invention is to provide a device operable to control the flow of refrigerant medium in a refrigerating system so that a motor of small power output may be used in a system which without my invention would require a motor of larger power output.

Another object of my invention is to provide a device operable to prevent overloading of the refrigerant compressor motor due to warm evaporator temperature at time of pull-down.

Another object of my invention is to provide means to prevent overloading of the motor by limiting the suction line pressures to the condensing unit.

Another object of my invention is to provide a means for controlling the flow of refrigerant to a refrigerating unit so that the motor is effectively unloaded each cycle during normal operation of the system.

Another object of my invention is to cool the liquid being supplied to the evaporator to thereby prevent vaporization of the supplied liquid prior to reaching the evaporator.

Another object of my invention is to provide a combined heat exchanger and pressure regulating unit for controlling the loading of the condensing unit and the supply of refrigerant medium to the evaporating unit.

Another object of my invention is to provide novel means for controlling the supply of refrigerant medium to an evaporator.

Other objects will be apparent from a reading of the specification and claims.

The invention consists in the improved construction and combination of parts, to be more fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawing, to be taken as a part of this specification, I have fully and clearly illustrated a preferred embodiment of my invention, in which drawing—

The figure is a view in vertical central section of a control device embodying my invention and shown in cooperative relation in a refrigerating system which is diagrammatically illustrated.

Referring to the drawing by characters of reference, 1 designates generally my control device connected to a refrigerating system comprising a suction line 2 leading from the device 1 to a refrigerant compressor 3 driven by an electric motor 4 in a convenient manner, such as by a belt 5. The operation of the motor 4 is controlled by suitable means which may be a switch 6 having a temperature sensitive bulb 7 responsive to temperatures of the cooling unit or evaporator 8. The discharge outlet of the compressor 3 is connected by means of a conduit 9 to the inlet end of a radiator or condenser 10 which has its other or outlet end connected to a strainer member 11. The compressor 3, conduit 9, condenser 10, motor 4 and belt 5 comprise what is known to the art as a condensing unit, and which is generally designated in the drawing by the numeral 12. The strainer member 11 is connected intermediate the outlet of the condenser 10 and one end 13 of a liquid feeding or so-called capillary tube, generally designated 14, and removes any foreign matter which might be in the refrigerant and might clog the tube 14. The other end 15 of the capillary tube 14 is communicatively connected to one end 16 of a conduit member 17 having its other end connected to the inlet 18 of the evaporator or cooling element 8. The outlet 19 of the evaporator 8 is connected by means of a conduit 20 to the control device 1, and communicates therethrough with the suction line 2. The particular way in which the tube 14 is connected to the liquid feeding conduit 17, and the suction conduit 20 is connected through the device 1 to the suction line 2 will be more particularly pointed out hereinafter. The control device 1, conduits 17 and 20, as well as the evaporator 8, are preferably located in the space to be refrigerated.

The control device 1 comprises a body or hollow conduit member 21 open at either end and having an integral, transverse wall 22 separating the body 21 into two open ended chambers 23, 24, which chambers may be termed the valve inlet and valve outlet chambers, respectively. The chamber 23 is preferably of larger capacity than chamber 22 which, considering its cooperating parts, is kept as small as manufacture makes economically feasible. The chamber 23 is closed at its open end by means of a plate member 25 suitably secured in and sealed to the end portion 26 of the conduit member 21. The plate member 25 has a pair of apertures therethrough in which are secured and sealed, by suitable means such as solder 27, tubular conduit members 28, 29.

The end portions of the members 28, 29 which are external of the chamber 23 receive the conduits 20, 17, respectively, which conduits are se-

cured in fluid-tight relation therein. The member 28 is open at its other end directly to the chamber 23 to establish communication between the outlet side 19 of the evaporator 8 and the chamber 23. The end of the member 29 located within chamber 23 receives the end 15 of the capillary tube 14 to establish a fluid-tight communication system extending from the condensing unit 12 through tube 14 and the conduit 17 to the inlet 18 of the evaporator 8.

Preferably the portion of the tube 14 between the condenser end 13 and the chamber 23 is maintained as short as possible and the tube 14 preferably extends from the condensing unit 12 through a suitable fitting 30 and through the interior of the suction line 2 to the valve body 21. The internal bore of the suction tube or line 2 should be substintially larger than the external diameter of the tube 14 so that the refrigerant vapors will pass through the tube to the compressor 3 with but slight frictional losses. The tube 14 passes through an aperture 31 in the transverse wall 22 and thence the tube 14 passes into the chamber 23 where the remainder of the tube is coiled into a helix, or other suitable form 32. It is desired to locate within chamber 23 as much of the tube 14 as is practical, for a purpose to be hereinafter described. The tube 14 is sealed within the aperture 31 in fluid-tight relation to the wall 22 so that the fluid within chamber 23 will not pass through aperture 31 and thence to the suction line 2 or chamber 24.

The open end of chamber 24 is closed by means of a diaphragm 33 sealed in fluid-tight relationship to the body 21 to thereby render the chamber 24 a pressure responsive chamber. Overlying the diaphragm 33 and secured to the body 21 in fluid-tight relationship is a cap member 34 having a centrally disposed internally threaded aperture 34^a within an extended portion 34^b of the cap member 34. Screwthreaded into the aperture 34^a is an adjustment cap member 35 having a cross bar 36 which is rigidly secured to the member 35 and serves as a convenient handle for screwing the member 35 relative to the cap member 34 for purposes to be hereinafter described. A readily flexible and resilient cap member 37, which may be made of rubber or similar material, is placed on and in such a manner that it will cooperate with the portion 34^b and the interior of member 34 to form a sealed chamber over the diaphragm 33. The resilient member 37 in its inert state is preferably of such a dimension that it must be flexed or stretched when in its cooperative position on the portion 34^b of the cap member 34 to insure a substantially fluid-tight seal between the members 34 and 37. Upon flexing of the diaphragm 33 a portion of the fluid within cap member 34, due to the volume change within the member 34, is forced through an aperture 37^a in the member 35, which aperture leads from the interior of the cap member 34 to the interior of resilient member 37. The resilient member 37 will adjust itself to the change in fluid content by a slight change in volume, and it may thus be seen that as the diaphragm 33 flexes, the fluid enclosed by members 34, 37 remains confined and the resilient member 37 acts as a breather chamber for the chamber defined by member 34 and diaphragm 33. The purpose of this construction is to prevent undue moisture depositing within the cap member 34 or on the diaphragm 33, due to the cool conditions of the diaphragm 33 or member 34, which may exist under some types of operation and which would occur if the surrounding atmospheric air, which inevitably contains various quantities of water vapor, were continually being admitted and emitted.

Concentric with the threaded aperture 34a and extending through the transverse wall 22 is an aperture 38, preferably circular in cross-section, which serves as a passageway connecting the chambers 23, 24. Integral with the transverse wall 22 and extending therefrom into chamber 23 around the aperture 38 is an annular seating surface or valve seat 39. A valve member 40 has a disk portion 40^a which cooperates with the seat 39 to control flow of fluid through aperture 38. One end portion 41 of the valve member 40 extends upwardly from the portion 40^a through the aperture 38 into chamber 24 and has its end surface abutting against an abutment member 42, which member 42 is carried adjacent the underside of the diaphragm 33 in a suitable manner, such as by a spider member 42^a, and the member 42 is free to move therewith. A section 43 of the end portion 41 which is within the aperture 38 may be rectangular in cross-section and have a diagonal dimension slightly less than the diameter of the aperture 38 to provide segmental passageways for the passage of fluid from chamber 23 to chamber 24. The corners of the section 43 guide the valve member 40 in its reciprocation in the aperture 38. Extending downward from the portion 40^a is a portion 44 of reduced diameter which abuts against a raised portion or abutment 45 on the plate member 25 to limit movement of the valve member 40 in a valve opening direction and also to limit inward flexing of the diaphragm 33. The raised portion 45 also serves to locate one end of a helical coil spring 46 having its other end positioned by a shoulder portion 46^a on the member 40 adjacent the portion 40^a. The spring 46 acts to urge the valve member 40 toward closed position.

Located above the diaphragm 33 is a second helical coil spring 47 having one end thereof abutting against an abutment member 48. The member 48 is supported by means of a spider member 48^a having engagement with the upper side of the diaphragm 33, and in such a manner that the abutment member 48 is free to move with the diaphragm 33. The upper or opposite end of the spring 47 abuts against an abutment or spring seat member 49. Within the hollow cap member 35 and projecting downward from the upper end wall thereof, there is a bearing member 50 having a conical or pointed end portion which is received in a socket or recess, preferably conical, in the top face of seat member 49 so that it makes a point contact at the center of rotation of the member 35. The member 49 is thereby permitted to adjust itself to the plane of the abutting surface of the spring 47, and the spring is allowed to adjust itself to a more even engagement with and to evenly distribute its resilient force over the entire surface of the abutment member 48. This point contact also reduces to a minimum the friction opposing screwing movement of the member 35 within the threaded aperture 34^a due to the reduction of the frictional force between the members 49 and 35.

The operation of my device will be more clearly pointed out as follows: The control device 1 may, for purposes of exposition, be studied first from the liquid feeding viewpoint and secondly from the viewpoint of a suction line pressure control valve member. The liquid feeding or capillary tube element 14 is preferably a small bore conduit member and should be so proportioned that

when the condenser 10 is condensing the gaseous refrigerant vapor compressed by the compressor 3 at condenser temperatures, the restriction to flow or pressure drop of the liquid so condensed in the condenser 10 and flowing through the tube 14 from the strainer member 11 to the inlet 16 of the member 17 at the rate substantially equal to the rate at which the liquid is condensed, is substantially equal to the difference in pressure between that necessary to condense the vapor at condenser temperature and that necessary to maintain the refrigerant in the evaporator at a sufficiently low temperature for proper cooling of the evaporator 8. By so proportioning the tube 14 relative to the capacity of the refrigerating system, I am able to maintain sufficient pressure in the condenser 10 so that at the refrigerant temperature in the condenser the refrigerant vapor will condense to liquid form. The tube 14 is also proportioned so that normally only condensed liquid flows through the tube 14 to the evaporator 8 and at a rate substantially equal to the rate at which the refrigerant is condensed in the condenser 10. The liquid condensed in the condenser 10 therefore does not tend to fill up the condenser and thereby reduce the condensing or heat radiating capacity of the condenser 10 with constant temperature condensing medium, air in the present instance, and constant condensing temperature of the refrigerant. I have found from past experience that with a condensing unit such as is normally used in the art for household or domestic refrigeration purposes, a tube of .031 inch diameter bore and of 8.5 feet in length operates satisfactorily with dichlorodifluoromethane (Freon 12) at the normal operating temperatures and pressures found in a domestic refrigeration system. I have also found that a tube having an internal diameter bore of .040 inches and being 12 feet long will work satisfactorily in a methyl chloride system designed for household or domestic refrigeration and employing a condensing unit having approximately 1000 cubic in./min. displacement. It is to be understood that other diameter bores and lengths of tubing may be employed with similar results for the same conditions of operation. When different operating temperature or pressure conditions are desired, or different sizes of condensing units are employed, it is well known and evident to those skilled in the art that the length and bore of the tube will be required to be altered in accordance with any change in the refrigerating system elements. The operation of the tube 14 under normal temperature or operating conditions, to be hereinafter described, is similar to but distinguishes from that of the prior art capillary tube as will be evident from the specification.

The control valve will now be described as a suction line pressure control and it will be assumed, for purposes of exposition, that the system is located within a 70° F. room and the condensing unit has not been operating for a considerable period of time so that the entire refrigerating system has assumed ambient or room temperature. It is an inherent characteristic of a capillary tube refrigerating system that the liquid refrigerant during the "off" periods of the condensing unit will be in the evaporator or low side cooling coil and such operation is well known to those skilled in the art. In the system embodying my control device, the adjustable cap member 35 is so positioned relative to the member 34 that the tension or force exerted by the spring 47, plus the force exerted by the pressure of the fluid or atmospheric pressure acting on the upperside or spring 47 side of the diaphragm will be so balanced against the force of spring 46 and the pressure acting on the diaphragm within chamber 24 that the valve member 40 will be in closed position when the pressure within chamber 24 is slightly in excess of a pressure equal to the upper limit of the pressure which is maintained within the evaporator 8 during the time the evaporator is functioning to maintain the desired normal cooling temperatures. In the case of a household refrigerating system, I have found that an average evaporator temperature of 15° F. is satisfactory in most instances, but I have found that there are times when the desired evaporator temperature may be as high or higher than 30° F. Regardless of the exact temperature under which the evaporator is operated, the valve will function in much the same manner, the only difference being that with change in desired evaporator temperature, the adjustment of the member 35 must be changed so that the pressure in chamber 24 at which the valve 40 will close is raised or lowered to thereby determine the predetermined maximum pressure above which the valve 40 will begin to throttle the evaporator outlet to the suction line to limit the pressure on the suction side of compressor 3 to prevent the motor 4 from overloading. It is also to be understood that the evaporator may be operated over a range of evaporator temperatures below the temperature corresponding to the predetermined maximum temperature, without change in the valve setting, by merely changing the temperature at which the bulb 7 will operate the switch 6 controlling the motor 4. It is not impossible for the refrigerant pressure in the evaporator to be above the predetermined pressure in case of temperature rise above the desired evaporator temperature, but such rise will cause the valve 40 to throttle the refrigerant flow to the compressor 3 and the system will not be operating at maximum compressor suction pressure.

The condensing unit for preferred operation is so proportioned relative to the operating temperature of the evaporator and the control valve that when the highest evaporator temperature is being maintained, or the pressure of the refrigerant therein is as high as will occur during normal operation, the motor 4 will be operating at its continuous maximum power output. In actual practice a small margin of safety is maintained to prevent damage to the condensing unit should more power be required for any reason.

The cap member 35 is so adjusted that upon pressure in excess of the normal operating pressure in the chamber 24 the valve 40 will move to closed position and further increase in pressure therein, due to refrigerant pressure in the evaporator 8, is prevented. When the condensing unit is started under the condition assumed hereinbefore, and commonly known to the art as "pull-down," the pressure within the suction line is substantially that of normal operation, while the evaporator pressures are greatly in excess of the normal operating pressure and the evaporator pressure is directly determined by ambient temperature. Upon start of the condensing unit the pressures in the suction line 2 and chamber 24 are lowered slightly, and with the slight lowering of pressure the force acting on the diaphragm 33 will be unbalanced and the valve member 40 will move toward open position to admit vapor from the chamber 23 at a rate sufficient to maintain the maximum pressure for

which the valve is set to close. In this manner I am able to start my condensing unit and operate the compressor at suction and discharge pressures during "pull-down," which are but slightly above normal but not enough to injuriously affect the motor, and I am therefore not required to install a larger capacity motor to "pull-down" the system to prevent thereby a serious motor overload, so that after the unit has been brought to operating temperatures and pressures I use only a portion of the power output which the motor is capable of producing. The advantages of using the motor 4 at maximum output at normal refrigerating pressures will be evident to those skilled in the art. As the temperature and pressure of the evaporator is lowered during "pull-down," the valve 40 will gradually open wider in an effort to maintain the predetermined pressure within the chamber 24. As the pressure within the evaporator 8 lowers to normal operating pressure, the valve 40 moves to wide open position and remains in that position so long as the pressure in the evaporator 8 remains below the predetermined pressure for which the valve 40 is set to close.

As pointed out hereinbefore, the evaporator outlet conduit 20 discharges into the chamber 23 in which the helical coil 32 of the tubing 14 is also located. This chamber 23 serves as a combination liquid trap and heat exchanger to prevent the passage of liquid refrigerant from the evaporator to the suction line 2. Any liquid coming through the conduit 20 is evaporated in the chamber 23 either by the heat of the ambient medium conducted thereto through the walls of the casing 21 or from the heat of the condensed, relatively warm refrigerant in the helical coil 32 of the tubing 14. It was pointed out hereinbefore that it was preferable to maintain the suction line 2 and the portion of the tube 14 located therein, or the portion between the end 13 and the aperture 31, as short as is conveniently possible. In this manner I locate as much of the tube 14 as is possible in the chamber 23, and therefore as much of the warm liquid refrigerant flowing to the evaporator 8 in heat exchange relation with the cold suction vapor from the evaporator as is possible. Additional heat exchange will be accomplished along the portion of the tube 14 which is located within the suction line 2. This portion within suction line 2 is at the higher temperature, the liquid refrigerant dropping in temperature and pressure as it flows through the capillary tube 14, and this portion within suction line 2 is also in contact with the warmest suction line vapors. The heat exchange system is, broadly speaking, therefore of the well known counter-flow type. In event of any leak by the valve 40 from chamber 23 to chamber 24, which might occur during periods when the pressure within the evaporator 8 and chamber 23 are above the predetermined pressure at which valve 40 is set to close, a high pressure may be developed in the suction line 2 and chamber 24. If the chamber 24 is as small as possible and the suction line 2 is as short as possible, the actual volume of high pressure vapor is relatively small and the temporary overload on the motor 4 is easily handled thereby. It may also be pointed out that in such a condition the differential across the compressor 3 is low and a low motor starting torque only is necessary, in fact, less torque than would be required had the valve 40 not allowed vapor to leak from chamber 23 to chamber 24.

In the prior art capillary tube systems in which a pressure limiting device such as has been invented by me and disclosed herein has not been incorporated, at "pull-down" from a high back or suction pressure on the compressor, the compressor handled a relatively great quantity of refrigerant as measured in pounds per minute. At the start of a "pull-down," the actual mass of fluid handled at high suction pressures by the compressor at constant speed is also greater than at low suction pressures. The liquid therefore can not flow through the capillary tube as fast as it accumulates in the condenser, and it begins to back up into the condenser to eliminate a portion of the condenser from acting to condense the vapor discharged from the compressor 3. Pressure within the condenser in such a case, and in prior art systems, would continue to rise at an accelerated rate until such time as the increased pressure establishes a sufficient differential with respect to evaporator pressure to force the condensed refrigerant liquid through the capillary tube as fast as the liquid is condensed. With my device, however, I limit the maximum amount of refrigerant handled by my compressor in a given period of time by holding the pressure of the vapor admitted to the compressor 3 below a predetermined maximum pressure. Although the pressure within the condenser 10 will rise on "pull-down" with my apparatus, the increase is less than that of the prior systems and the pressure differential across the compressor 3 is maintained by my apparatus substantially constant. The power required to drive the compressor 3 is proportional to the pressure across the compressor, and also to the absolute pressure of the refrigerant admitted to the compressor for discharge at a higher pressure. With my apparatus I prevent a substantial increase in pressure differential across the compressor and reduce the rate of refrigerant circulated therethrough to thereby eliminate a major factor which requires that a large motor be used in a refrigerating system to take care of the high power required under "pull-down" conditions.

It may be seen therefore that I have invented an improved capillary tube refrigerating system which will operate with a smaller condensing unit driving motor and which in many ways accomplishes the results obtained with the more expensive thermostatic expansion valve systems. A slight leak by my pressure controlling valve is of substantially no detriment to my system and in fact, as pointed out hereinbefore, may actually be beneficial to operation.

What I claim and desire to secure by Letters Patent of the United States is:

1. In a refrigerating system, a condensing unit having an inlet and an outlet, a cooling means having an inlet and an outlet, conduit means connecting said unit inlet to said cooling means outlet, conduit means comprising a capillary tube feed device connecting said cooling means inlet to said unit outlet, and pressure sensitive means interposed in said first-named conduit means and operable to limit the pressure at said unit inlet.

2. In a refrigerating system, a condensing unit having an inlet and an outlet, a cooling means having an inlet and an outlet, conduit means connecting said unit inlet to said cooling means outlet, conduit means comprising a capillary tube feed device connecting said cooling means inlet to said unit outlet, said first-named and said second-named conduit means being in heat exchange relation, and pressure sensitive means in-

terposed in said first-named conduit means and operable to limit the pressure at said unit inlet.

3. In a refrigerating system, a condensing unit having an inlet and an outlet, a cooling means having an inlet and an outlet, conduit means connecting said unit inlet to said cooling means outlet, conduit means comprising a capillary tube feed device connecting said cooling means inlet to said unit outlet, pressure sensitive means interposed in said first-named conduit means and operable to limit the pressure at said unit inlet, and means for adjusting said inlet pressure.

4. In an apparatus of the character described for controlling flow of fluid, a casing having an inlet chamber and an outlet chamber separated by a wall, said wall having an aperture therethrough defining a valve port, pressure means responsive to the fluid pressure in said outlet chamber, valve means cooperating with said port to control flow of fluid through said aperture, said pressure means being operable to actuate said valve means to close said port to flow of fluid upon a predetermined pressure in said outlet chamber, and conduit means within said inlet chamber and in heat exchange relation with the fluid in said inlet chamber.

5. In an apparatus of the character described, a casing having an inlet chamber and an outlet chamber separated by an internal casing wall, said wall having an aperture therethrough defining a valve port, a diaphragm forming a wall of and responsive to fluid pressures in said outlet chamber, valve means cooperating with said port to control flow of fluid through said aperture, longitudinally movable means interconnecting said diaphragm and said valve means, said diaphragm being operable through said longitudinally movable means to actuate said valve means to close said port to flow of fluid upon a predetermined pressure in said outlet chamber, and resilient means overlying and abutting said diaphragm and operable to control said predetermined pressure.

6. In an apparatus of the character described for controlling flow of fluid, a casing having an inlet chamber and an outlet chamber separated by an internal casing wall, said wall having an aperture therethrough defining a valve port, pressure responsive means forming part of said outlet chamber, valve means cooperating with said port to control flow of fluid through said aperture, said pressure means being operable to actuate said valve means to close said port to flow of fluid upon a predetermined pressure in said outlet chamber, and a pressure reducing liquid feeding device within said inlet chamber and in heat exchange relationship with the fluid in said inlet chamber.

7. In an apparatus of the character described, a hollow cylindrical member having open ends and having an internal transverse wall, said wall having an aperture therethrough, a seat portion on said wall surrounding said aperture, a valve member cooperable with said seat portion to control flow of fluid through said aperture, a plate member hermetically secured to one open end portion of and cooperable with said cylindrical member to define an inlet chamber, a diaphragm member closing and sealing the other open end portion of and cooperable with said cylindrical member to define an expansible-contractible pressure outlet chamber, an outlet passageway leading from said outlet chamber, an inlet passageway leading to said inlet chamber, and resilient means urging said valve member into valve closed position, said valve member having a portion thereof operatively connected to said diaphragm member for operation thereby so that upon a predetermined maximum pressure in said outlet chamber said valve member will be held in closed position.

8. In an apparatus of the character described, a hollow cylindrical member having open ends and having an internal transverse wall, said wall having an aperture therethrough, a seat portion on said wall surrounding said aperture, a valve member cooperable with said seat portion to control flow of fluid through said aperture, a plate member hermetically secured to one open end portion and cooperable with said cylindrical member to define an inlet chamber, a diaphragm member closing and sealing the other open end portion of and cooperable with said cylindrical member to define an expansible-contractible pressure outlet chamber, an outlet passageway leading from said outlet chamber, an inlet passageway leading to said inlet chamber, resilient means urging said valve member into valve closed position, said valve member having a portion thereof operatively connected to said diaphragm member for operation thereby so that upon a predetermined maximum pressure in said outlet chamber said valve member will be held in closed position, and means overlying said diaphragm and operable to prevent excess movement thereof upon a high pressure in said outlet chamber.

9. In an apparatus of the character described, a hollow cylindrical member having open ends and having an internal transverse wall, said wall having an aperture therethrough, a seat portion on said wall surrounding said aperture, a valve member cooperable with said seat portion to control flow of fluid through said aperture, a plate member hermetically secured to one open end portion of and cooperable with said cylindrical member to define an inlet chamber, a diaphragm member closing and sealing the other open end portion of and cooperable with said cylindrical member to define an expansible-contractible pressure outlet chamber, an outlet passageway leading from said outlet chamber, an inlet passageway leading to said inlet chamber, resilient means urging said valve member into valve closed position, said valve member having a portion thereof operatively connected to said diaphragm member for operation thereby so that upon a predetermined maximum pressure in said outlet chamber said valve member will be held in closed position, means overlying said diaphragm member and operable to prevent excess movement thereof upon a high pressure in said outlet chamber, and means for varying said predetermined pressure.

10. In an apparatus of the character described, a hollow cylindrical member having open ends and having an internal transverse wall, a plate member hermetically secured to one open end portion of and cooperable with said cylindrical member to define an inlet chamber, a diaphragm member closing and sealing the other open end portion of and cooperable with said cylindrical member to define an expansible-contractible pressure outlet chamber, said wall having an aperture therethrough, a seat portion on said wall surrounding said aperture, a valve member extending through said aperture and having an outwardly extending flange cooperable with said seat portion to control flow of fluid through

said aperture, said plate member having a raised portion within said inlet chamber aligned with said aperture, said valve member having a portion within said inlet chamber cooperable with said raised portion to limit movement of said valve member in one direction, said valve member having a portion in said outlet chamber operatively engaged by said diaphragm member for movement in said one direction, resilient means in said inlet chamber urging said valve member into valve closed positon, an outlet passageway leading from said outlet chamber, and inlet passageway leading to said inlet chamber, said valve member being operable to stop fluid flow through said aperture upon a predetermined maximum pressure in said outlet chamber, and means overlying said diaphragm member and operable to prevent excess movement thereof upon a high pressure in said outlet chamber.

11. In an apparatus of the character described for controlling flow of fluid, a casing having an inlet chamber and an outlet chamber separated by an internal casing wall, said wall having an aperture therethrough defining a valve port, pressure responsive means forming part of said outlet chamber, valve means cooperating with said port to control flow of fluid through said aperture, said pressure means being operable to actuate said valve means to close said port to flow of fluid upon a predetermined pressure in said outlet chamber, and means within said inlet chamber and in heat exchange relationship with the fluid in said inlet chamber.

12. In an apparatus of the character described for controlling flow of fluid, a casing having an inlet chamber and an outlet chamber separated by an internal casing wall, means communicatively connecting said chambers and including a valve port, pressure responsive means sensitive to the pressure within said outlet chamber, valve means cooperating with said port to control flow of fluid through said coonnecting means, said pressure means being operable to actuate said valve means to close said port to flow of fluid upon a predetermined pressure in said outlet chamber, and a pressure reducing liquid feeding device within said inlet chamber and in heat exchange relationship with the fluid in said inlet chamber.

13. In a refrigerating system, a condensing unit having an inlet and an outlet, a cooling means having an inlet and an outlet, conduit means connecting said unit inlet to said cooling means outlet, conduit means comprising a capillary tube feed device connecting said cooling means inlet to said unit outlet, a pressure sensitive means interposed in said first-named conduit means and operable to limit the pressure at said unit inlet, and heat exchange means positioned in said first-named conduit intermediate said cooling means and said pressure means.

14. In a refrigerating system, a condensing unit having an inlet and an outlet, a cooling means having an inlet and an outlet, conduit means connecting said unit inlet to said cooling means outlet, conduit means comprising a capillary tube feed device connecting said cooling means inlet to said unit outlet, a pressure sensitive means interposed in said first-named conduit means and operable to limit the pressure at said unit inlet, and a chambered means interposed between said cooling means and said pressure means, said capilliary device having a portion within said chambered means and in heat exchange relation with the refrigerant therein.

15. In a refrigerating system, a condensing unit having an inlet and an outlet, a cooling means having an inlet and an outlet, conduit means connecting said unit inlet to said cooling means outlet, conduit means comprising a capilliary tube feed device connecting said cooling means inlet to said unit outlet, and pressure means interposed in said first-named conduit means, said pressure means being sensitive to the inlet pressure of said unit thereby to maintain a predetermined substantially constant limit of pressure at said unit inlet.

16. In an apparatus of the character described, a hollow tubular member having open ends and having an internal transverse wall, said wall having an aperture therethrough, a valve member cooperable with and operable to control flow of fluid through said aperture, a plate member hermetically secured to one open end portion of and cooperable with said cylindrical member to define an inlet chamber, a diaphragm member closing and sealing the other open end portion of and cooperable with said cylindrical member to define an expansible-contractible pressure outlet chamber, an outlet passageway leading from said outlet chamber, an inlet passageway leading to said inlet chamber, and means cooperable with said valve member and operable upon a predetermined maximum pressure in said outlet chamber to move said valve member to closed position.

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