

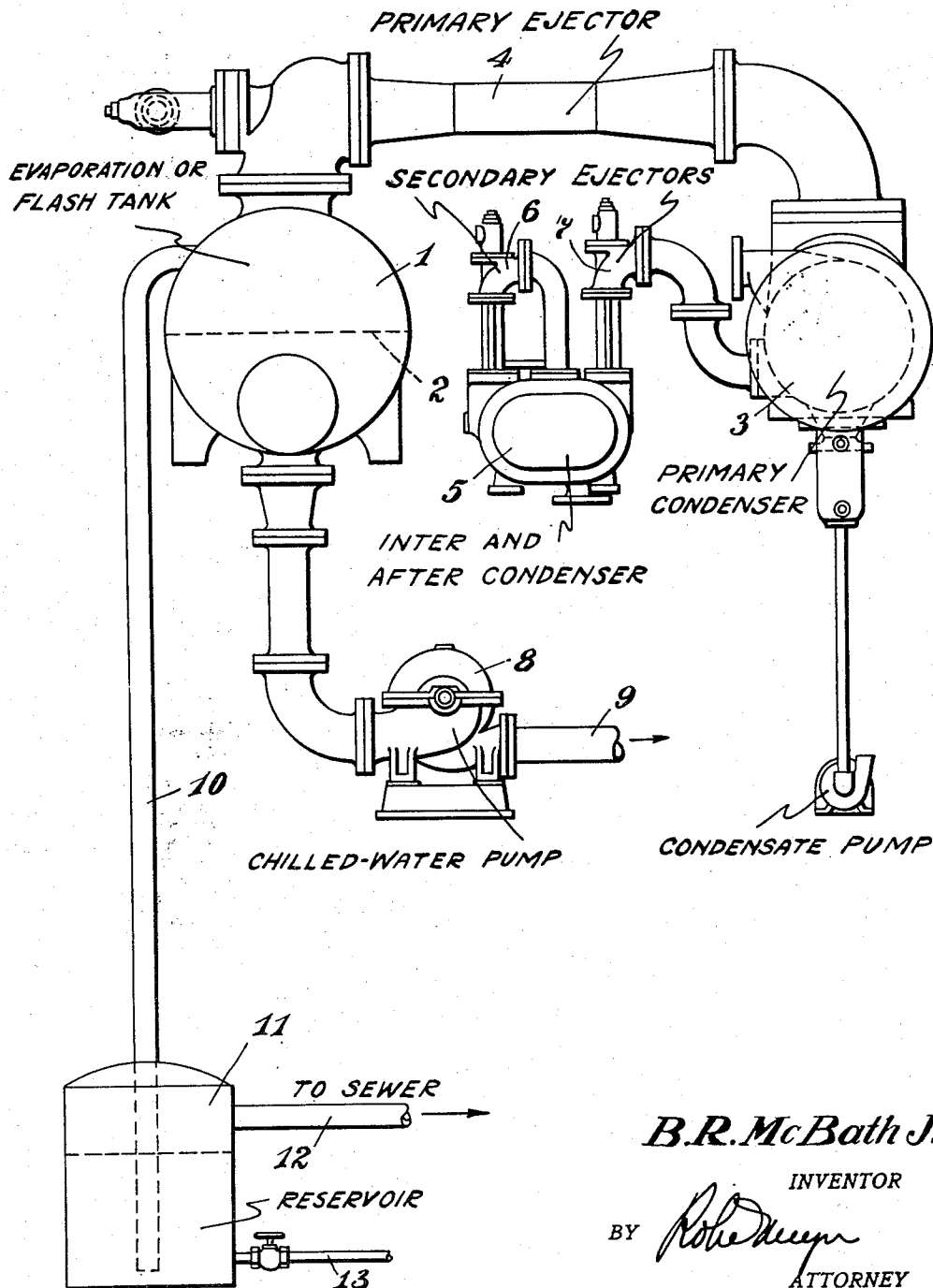
Jan. 18, 1938.

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2,105,545

SAFETY APPLIANCE FOR STEAM JET REFRIGERATION APPARATUS

Filed June 19, 1934



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2,105,545

SAFETY APPLIANCE FOR STEAM JET REFRIGERATION APPARATUS

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Application June 19, 1934, Serial No. 731,389

6 Claims. (Cl. 62-152)

This invention relates to steam jet refrigeration apparatus and an object of the present invention is to provide a safety device associated with the flash tank of such installations which will bleed pressure from the flash tank if the pressure therein reaches a stage bordering on danger or goes above a predetermined degree.

In steam jet refrigeration apparatus the evaporator or flash tank, due to the method of operation, may be subjected to the building up therein of excessive pressure sufficient to burst the tank should its companion mechanism, especially the automatically operated control valves, fail to function properly.

The present invention comprehends the provision of safety means to prevent bursting of the flash tank, which safety means is in itself free from any automatically operating mechanisms, relying on a column of water or other liquid to control the bleeding of excessive pressure from the flash tank. The liquid is equal in feet of liquid to the difference between the absolute pressure in the flash tank and the absolute pressure at the end of the column remote from the flash tank expressed in feet of liquid which provides control of the bleeding of excessive pressure from the flash tank.

With these and other objects in view as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawing which shows a diagrammatic layout of a steam jet refrigerating apparatus having the improved safety appliance attached thereto, and the features forming the invention will be specifically pointed out in the claims.

Referring more particularly to the drawing, the steam jet refrigerating apparatus illustrated may be of any conventional type or layout embodying an evaporator or flash tank of any approved type in which is maintained a predetermined level of water or other liquid as indicated by the dotted line 2. The apparatus includes the primary condenser 3 which is connected to the flash tank 1 by the primary ejector 4 and to the inter- and after-cooler 5 by the secondary ejectors 6 and 7. The chilled water is pumped from the evaporator or flash tank 1 by the chilled water pump 8 and is delivered through the discharge pipe 9 to any suitable type of cooling system.

A pipe 10 opens into the flash tank or evaporator 1 above the water level therein and the lower end of the pipe 10 opens out into a reser-

voir 11. The reservoir 11 has a predetermined quantity of liquid such as water or the like therein and, as clearly shown in the drawing, the pipe 10 projects below the liquid level in the reservoir. An overflow pipe 12 is connected to the reservoir above the normal liquid level therein and may be connected to a sewer or to any other suitable outlet.

When the flash tank or evaporator 1, is not in operation, there will be no water or liquid in the down-pipe 10, as any liquid therein will pass into the reservoir 11. Of course the lower end of the down-pipe will have water or other liquid therein to a height equal to the depth of insertion of the pipe 10 into the liquid in the reservoir. As soon as the steam jet refrigerating apparatus is placed in operation the vacuum maintained in the flash tank 1 will lift water or liquid from the reservoir 11 upwardly in the pipe 10, until the liquid reaches a height in the down-pipe equal to the pressure expressed in feet of liquid between the absolute pressure carried in the flash tank, and the absolute pressure in the reservoir 11, which in most cases is atmospheric pressure.

Should the pressure rise in the flash tank, such increasing pressure acting on the liquid column in the pipe 10, will force the liquid downwardly and into the reservoir 11. If the pressure in the tank 1 becomes so great as to be dangerous, such pressure, acting through the pipe 10 will force the liquid in the reservoir 11 upwardly and out through the overflow pipe 12 providing a bleed-off for the pressure from the evaporator or flash tank 1, and preventing any liability of bursting of such tank.

If it is so desired a liquid or make-up water supply line as indicated at 13 may be provided for refilling the reservoir 11.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown but that they may be widely modified within the invention defined by the claims.

What is claimed is:

1. In a steam jet refrigeration system, the combination with a flash tank having a normal water level therein, of a safety bleed-off pipe connected to said tank above the normal water level in the tank, a reservoir, said pipe opening into said reservoir, said reservoir having a quantity of liquid therein to build up a back pressure in said pipe.

2. In a steam jet refrigeration system, the combination with a flash tank having a normal

water level therein, of a safety bleed-off pipe connected to said tank above the normal water level in the tank, a reservoir, said pipe opening into said reservoir, said reservoir having a quantity
5 of liquid therein to build up a back pressure in said pipe, and an overflow pipe connected to said reservoir above the normal liquid level therein.

10 3. In a steam jet refrigeration system, the combination with a flash tank having a normal water level therein, of a safety bleed-off pipe connected to said tank above the normal water level in the tank, a reservoir at the outlet end of said pipe and having liquid therein, said pipe
15 being of such length that the normal pressure difference between the interior of the flash tank and the interior of the reservoir will raise a column of water in the pipe a height equal in feet of water to the difference between the absolute
20 pressure in the flash tank and the absolute pressure in the reservoir, whereby when said absolute pressure difference is reversed pressure will bleed from said flash tank to said reservoir.

25 4. In a steam jet refrigeration system, the combination with a flash tank having a normal water level therein, of a safety bleed-off pipe connected to said tank above the normal water level in the tank, a reservoir at the outlet end of said pipe and having liquid therein, said pipe
30 being of such length that the normal pressure difference between the interior of the flash tank and the interior of the reservoir will raise a column of water in the pipe a height equal in feet of water to the difference between the ab-
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solute pressure in the flash tank and the absolute pressure in the reservoir, whereby when said absolute pressure difference is reversed pressure will bleed from said flash tank to said reservoir, and an overflow connected to said reservoir above
5 the normal liquid level therein.

5. In a safety appliance for steam jet refrigeration systems including a flash tank, a safety bleed-off pipe connected to said tank above the normal water level therein, a reservoir, said pipe
10 opening into said reservoir, said reservoir having a quantity of liquid therein to build up a back pressure in said pipe.

6. In a safety appliance for steam jet refrigeration systems including a flash tank having a
15 normal water level therein, a safety bleed off pipe connected to said tank above the normal water level in the tank, a reservoir at the outlet end of said pipe and having liquid therein, said
20 pipe being of such length that the normal pressure difference between the interior of the flash tank and the interior of the reservoir will raise a column of water in the pipe a height equal in feet of water to the difference between the absolute pressure in the flash tank and the absolute
25 pressure in the reservoir, whereby when said absolute pressure difference is reversed pressure will bleed from said flash tank to said reservoir, and an overflow connected to said reservoir above the normal liquid level therein whereby a
30 seal will be maintained through said bleed off pipe to said flash tank at all times.

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