Feb. 27, 1940. R. HINTZE 2,191,659

COLD PRODUCING PLANT

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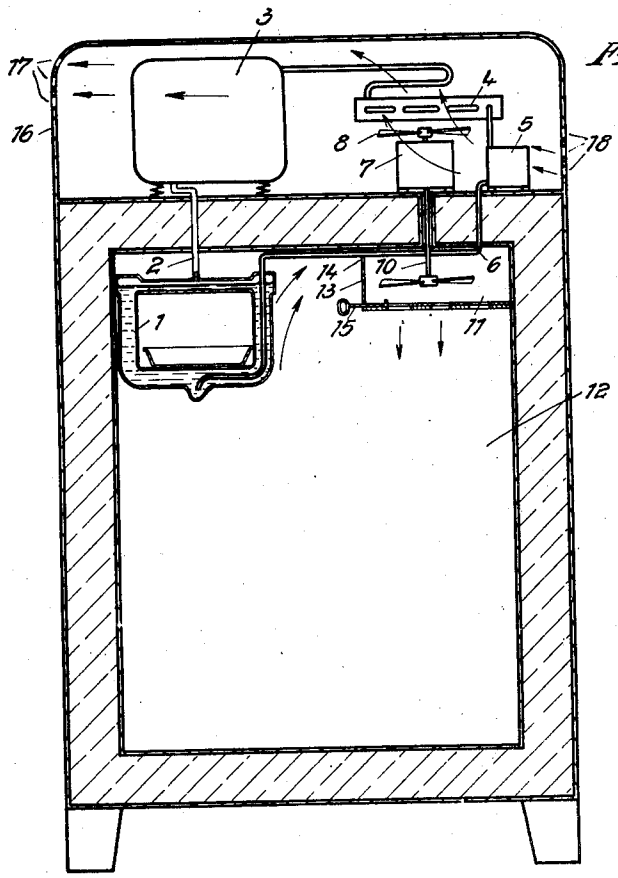


Fig. 1

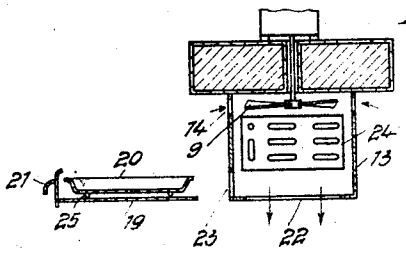


Fig. 3

Rudolf Hintze
Inventor
by Lincoln
Attys.

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Fig. 2

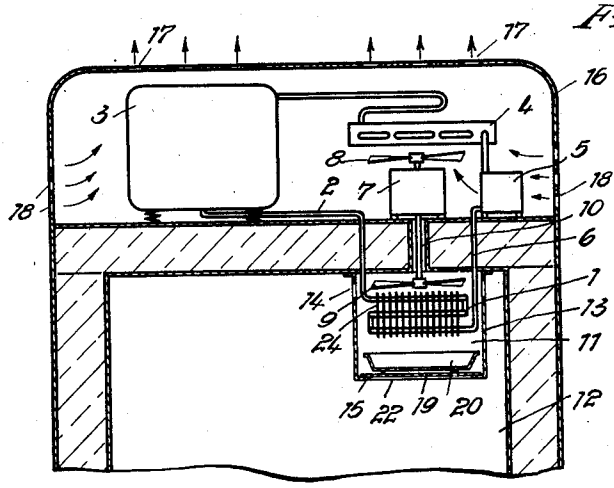
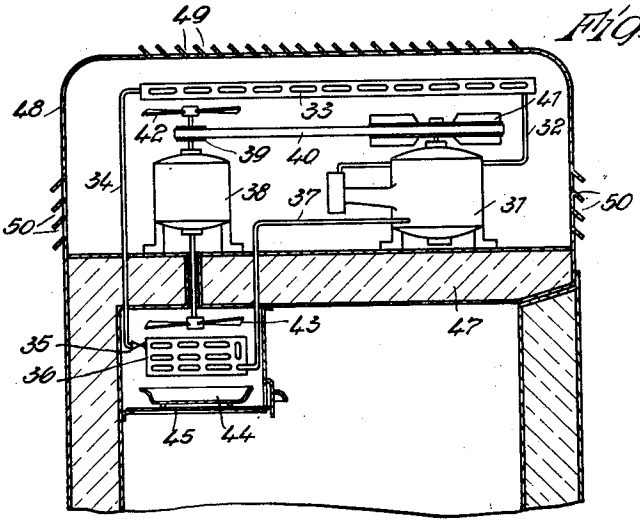


Fig. 4



Rudolf Hintze Inventor
by Hughes Attys

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UNITED STATES PATENT OFFICE

2,191,659

COLD PRODUCING PLANT

Rudolf Hintze, Berlin-Charlottenburg, Germany, assignor to Siemens-Schuckertwerke Aktiengesellschaft, Berlin-Siemensstadt, Germany, a corporation of Germany

Application June 2, 1937, Serial No. 145,962
In Germany June 3, 1936

3 Claims. (Cl. 62—102)

It is known to make use in the construction of cold producing plants of fans impelling an air current. Fans have been employed, for instance, in the case of direct air-cooled compression refrigerating machines and absorption refrigerating machines to impel the cooling air currents leading to the heat-emanating parts, for instance, the condenser. It is also known to arrange for the purpose of uniform distribution of the cold in cooling rooms fans which impel the cooling room air in such a manner that it passes in continuous circulation along the cold-emanating parts of the plant.

The invention relates in particular to cold producing plants of the last-named kind and refers to an improvement of such plants, the invention consisting in the use of a regulating element, which permits of changing at will the air current in the cooling room produced by the fan. For driving the fan, circulating the cooling room air, preferably a motor arranged outside the insulated cooling room is used, and according to the invention the shaft of such motor passes through the cooling room insulation. In that case the driving motor of the fan circulating the cooling room air may be used to also drive a second fan cooling the heat-emanating parts of the refrigerating machine. This will permit of obtaining at the same time thorough cooling of the heat-emanating parts of the refrigerating machine, for instance, the condenser and the compressor, and good and adjustable distribution of the cooling effect in the cooling room.

My invention is illustrated in the accompanying drawings, in which Figure 1 shows in sectional elevation a compression refrigerating machine in which is used a common driving motor for a fan for cooling the heat-emanating parts of the refrigerating machine and a second fan for circulating the cooling room air.

Figure 2 shows in similar view another mode of construction in which the fan circulating the cooling room air, together with the evaporator of the refrigerating machine and an ice tray is installed in a special compartment of the cooling room.

Figure 3 shows a sectional side elevation of the special cooling room compartment of Figure 2, a drawer carrying an ice tray being removed, and

Figure 4 shows in sectional elevation a further mode of construction of the invention, in which the compression driving motor itself is driving the fan for circulating the cooling room air.

In Figure 1 the evaporator of the refrigerating machine is denoted by 1. The refrigerating medium is withdrawn from the evaporator through a pipe 2 connected to the compressor 3, mounted on top of the refrigerator. The compressed refrigerating medium enters an air-cooled condenser 4 and from there passes into a container 5, in which is installed a regulating element, regulating the quantity of the liquefied refrigerating medium flowing to the evaporator through the pipe 6. On top of the refrigerator is mounted the driving motor 7 of the fan 8. This fan impels a current of cooling air over the condenser 4 of the refrigerating machine. The cooling air is drawn-in through the inlet openings 18 arranged at the side of the hood 16 and after having absorbed the waste heat of the refrigerating machine escapes through the openings 17.

The shaft 10 of the motor 7 extends also from the other side of the motor and passes through the upper wall of the refrigerator. It carries a fan 9 serving for circulating the cooling room air. The fan 9 is arranged in a compartment 11 separated by a hood 13 from the actual cooling room 12. The hood is provided at the upper portions with inlet openings 14 for the cooling room air and at the lower portion with outlet openings for the air moved by the fan. The lower outlet openings may be closed more or less by hand by means of a slide 15 as shown in the figure. This permits of regulating the movement of the air circulated by the fan 9. The ice tray, arranged in the evaporator of the refrigerating machine, is denoted by 20.

Figure 2 shows by way of example another mode of construction of the invention. As far as the individual parts of this modification correspond to those of Figure 1, the same symbols have been employed. In the present case the evaporator 1 of the refrigerating machine and the fan 9, serving for circulating the cooling room air, are installed in a compartment 11 divided from the cooling room by the hood 13. The evaporator consists of pipes and cooling ribs 24. The compartment 11 is provided below the evaporator 1 with a space for accommodating an ice tray 20. The lower opening 22 of the compartment 11 is closed, when inserting the ice tray, by a slide 19, rigidly connected to the ice tray 20, so that after having inserted the tray, the air cannot be blown into the cooling room by the fan 9.

Figure 3 is a side view of the compartment 11, shown in section. The drawer carrying the

ice tray 20 has been pulled-out of the compartment. The tray 20 is rigidly connected by feet 25 with the drawer 19, the front part of which is designed as handle 21. The arrangement shown of the ice tray provided with feet results in the special advantage that when producing ice, the air in the compartment 11 can reach the ice drawer also from below. For normal cooling the ice drawer is removed from the compartment 11, so that the cooling room air is blown downwards from above over the evaporator by means of the fan 9, as shown in Figure 3, whereby the cooling room air enters the compartment 11 by the inlet opening 14 and leaves it through the lower opening 22.

While in the examples disclosed in Figures 1 and 2 the compressor driving motor is constructionally combined with the compressor, Figure 4 shows an embodiment of the invention in which the driving motor is separated from the compressor. The refrigerating medium passes from the compressor 31 to the condenser 33 by means of the pipe 32. The condensate flows through the pipe 34 over a regulating element 35 to the evaporator 36; the vapour of the refrigerating medium is again drawn-in by the compressor by means of the pipe 37. The driving motor 38 of the compressor has a vertically arranged shaft and drives the compressor by way of the belt drive 39, 40, 41. The pulley 41 is designed as a fan. This fan and the fan 42, arranged on the shaft of the driving motor, impel a current of cooling air which enters through the openings 50 of the covering hood 48, is directed by the fans over the heat-emanating surfaces of the motor 38 and the compressor 31, and after having absorbed the condensed heat escapes through the upper openings 49 of the hood.

The shaft of the compressor motor passes through the cover 47 of the cooling room insulation and at its lower end carries the fan 43, serving for circulating the cooling room air. In the present case, similar to that shown in Figures 2 and 3, an ice tray 44 combined with a slide 45, serves for preventing circulation of the cooling room air during ice production.

What I claim is:

1. A refrigerating arrangement having a thermically insulated cooling chamber subdivided into two compartments one serving for storing the goods to be cooled, the other containing the heat absorbing element of said arrangement, a fan disposed in the compartment of said heat absorbing element and arranged above said element, a motor for actuating said fan arranged outside on top of said chamber and having a vertical shaft connected with said fan through the heat insulating wall of said chamber, and means associated with said compartment of said heat absorbing element for regulating the flow of air impelled by said fan through said latter compartment, said means comprising openings in the wall parting said two compartments and a closure member for selectively covering and uncovering one of said openings.

2. A refrigerating arrangement having a thermically insulated cooling chamber, a heat absorbing element in said chamber, a hood enclosing said element so as to form a compartment for ice production, said hood having an air inlet in its top portion and an air outlet in its bottom portion, a fan arranged in said chamber for circulating the air in said chamber, a motor for actuating said fan arranged outside of said chamber and having a shaft connected with said fan through the heat insulating wall of said chamber, and an ice tray device designed to cover said air outlet when placed on the bottom of said hood.

3. A refrigerating arrangement having a thermically insulated cooling chamber, a heat absorbing element in said chamber, a hood enclosing said element so as to form a compartment for ice production, said hood having an air inlet in its top portion and an air outlet in its bottom portion, a fan arranged in said chamber for circulating the air in said chamber, a motor for actuating said fan arranged outside of said chamber and having a shaft connected with said fan through the heat insulating wall of said chamber, a removable slide designed to be placed on the bottom of said hood so as to close said air outlet, and an ice tray mounted on said slide so as to leave an interstice between its bottom and said slide allowing the air to pass below said tray when said outlet is closed by said slide.

RUDOLF HINTZE.