An object of the invention is to provide a small refrigerator system which is compact in its arrangement and may be easily applied to the usual refrigerator accommodating block ice without any material alterations in the construction thereof.

A further object is to protect the device from being a source of annoyance on account of ammonia fumes by incorporating in the system a number of safety devices.

Another important object is to provide means which, when the device is not operating, will act to lower the pressure of the refrigerating medium thus eliminating the cause of leaks.

Other important objects of the invention will be apparent from the following description of a preferred embodiment.

In the drawings annexed hereto and forming a part of this specification and in which I have shown a complete machine as applied to a refrigerator:

Figure 1 is a front elevation of a refrigerating chest embodying my invention.

Figure 2 is a view in side elevation of the refrigerating system with the side plate removed.

Figure 3 is a view in end elevation of the refrigerating system with the end plate removed.

Figure 4 is a top plan view of the refrigerating system with the top plate removed.

Figure 5 is a diagrammatic view of the refrigerating system.

Figure 6 is a side elevation of the ammonia absorbing safety wick.

Figure 7 is an end elevation of the ammonia absorbing wick.

Figure 8 is a vertical section through the expansion valve.

Figure 9 is a vertical section through the aspirator.

Figure 10 is a detail view showing a means of making a tight joint between the walls of the refrigerator system casing and the pipes leading out therefrom.

In detail:

The invention consists of an air tight casing 1 preferably mounted on the top of a refrigerator A having an ice compartment B and other food compartments.

Within the casing 1 is an ammonia compressor 2 of any suitable type, a condenser shell 3 housing a condensing coil 4 within which is a receiving drum 5. The compressor may be driven by an electric motor or the equivalent. A belt or otherwise connected to the crank shaft 6 of the compressor 2 and running in an air tight stuffing box 7 in the wall of the casing 1.

The discharge 8 of the compressor 2 is connected with an oil filter or remover 9 for extracting the oil from the compressed refrigerating medium. The oil filter comprises a shell 10 containing a number of baffles 11 around which the compressed refrigerating medium passes leaving the oil contained therein. The highly compressed ammonia gas leaves the oil filter at 12 and enters a condensing coil 4 of spiral form constructed of a single length of pipe spirally coiled. The spiral coil is, as previously stated, enclosed in a condenser shell 3 of cylindrical form and water is fed into this shell at 13 and leaves at 14 thus cooling the highly compressed refrigerant and converting it into a liquid. The cooling water leaving at 14 passes through an aspirator 15 opening at 16 to the inside of the casing 1 and serving to receive any escaped refrigerant medium. The aspirator 15 comprises a nozzle 17 discharging into a Venturi tube outlet 18 drawing air into the opening 16 and thus serving to decrease the pressure in the enclosure so that proper ventilation is insured. The water finally leaving the casing at 19.

The refrigerant medium on leaving the condenser coil 4 enters an expansion valve 20 at 21. The expansion valve consists of a casing having an inlet 21 and an outlet 22 cut off from each other by a valve 23 operating against a seat 24 and closing in the direction of the low pressure side. The stem of the valve 23 is extended and connects with a diaphragm 25 closing the top of the expansion valve casing and secured in place by a ring 26 bolted, or otherwise held in
place and having a bracket 27 accommodating an adjusting screw 28 for varying the tension on a spring 29 operating on the diaphragm 25 so that the pressure in the low pressure or vaporization side of the system may be kept as nearly atmospheric pressure as is possible and have the system operate efficiently.

On leaving the expansion valve the refrigerating medium in the expansion stage and ready to absorb heat from anything surrounding it enters the vaporization or refrigerating coil 30 which is a single length of spirally coiled tube. The expanded refrigerant medium on leaving this coil 30 which is located in the compartment B of the refrigerator A enters a connection 31 which leads both to the compressor 2 and to the receiving drum 5. The receiving drum 5 contains a high grade of charcoal having the property of absorbing a large portion of the expanded ammonia gas, therefore when the system is shut down the charcoal absorbing this gas slightly increases the pressure on the low pressure side of the machine and there is a marked tendency for the pressure throughout the system to reduce to approximately twenty pounds which, of course, is a decided help in avoiding leaks.

At each point where a pipe leaves the enclosure 1 is an airtight stuffing box 32 preventing escape of ammonia fumes and likewise the shaft 6 of the compressor is similarly protected.

A cotton wick 33 is supported in the casing 1 by means of a horizontal nozzle 34 secured to the lower end of an L-shaped pipe 35 which is connected to a water supply pipe. A trough 36 is secured to the lower end of the wick and is secured to an L-shaped pipe 37 which is connected to the pipe 14 adjacent to the aspirator.

As noted the apparatus, exclusive of the motor and the coils 30, is entirely enclosed in the practically air-tight casing 1. The only outlet to this case is through the outlet 18 of the aspirator 15 through which the water from the condenser passes. It is obvious that should any refrigerating medium leak from the system, it will pass out through the outlet 18 and come in contact with the water and be absorbed. In order to augment the effect of the absorption properties of the water in preventing any refrigerating medium from getting out of the casing, the wick 33 with the nozzle 34 and the draining trough 36 is provided to present a much greater surface for the amount of water used, and hence will absorb more readily any small amount of ammonia that may be present in the case. Inasmuch as there is a slight flow of water continuously through this wick, it will of course quickly carry to the drain trough 36 any refrigerating medium absorbed thereby. The primary function of both the wick 33 and the aspirator 15 is to provide a means of absorbing any refrigerating medium that may leak out in the casing 1 and consequently prevent any escape of the fumes of the refrigerating medium to the atmosphere on the outside of the casing.

While, in the foregoing, I have described a special embodiment of the invention it is nevertheless to be understood that, in practice, I, may resort to any and all modifications falling within the scope of the appended claim.

I claim as my invention:

1. A refrigerating system comprising a casing, means for compressing the refrigerating medium used in the system, means for extracting the oil from the compressed refrigerating medium, means for cooling the compressed refrigerating medium after the oil is extracted therefrom, means for conveying the cooled compressed medium through the system and thence back to the compressor, a water saturated cotton wick arranged within the casing and being adapted to collect any escaping refrigerating medium from the system, a water supply pipe in communication with the wick, means associated with the wick to convey the escaped refrigerating medium from the system and means for increasing the volumetric capacity of the system.

In testimony whereof I affix my signature.

CURTISS L. HILL.