July 28, 1936. H. F. SMITH 2,049,230

REFRIGERATING APPARATUS

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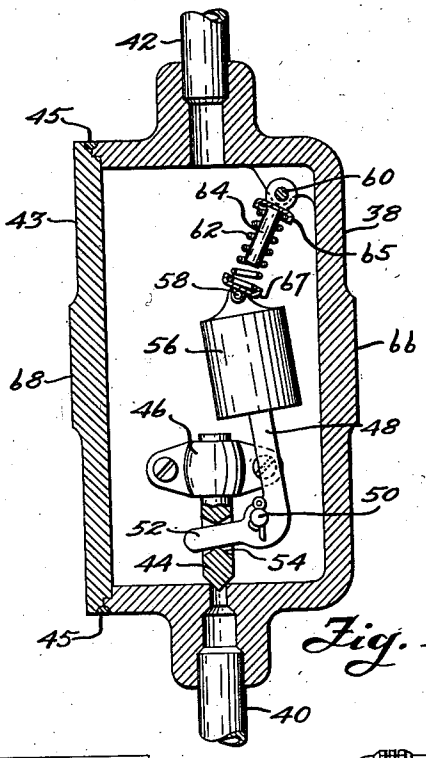


Fig. 1

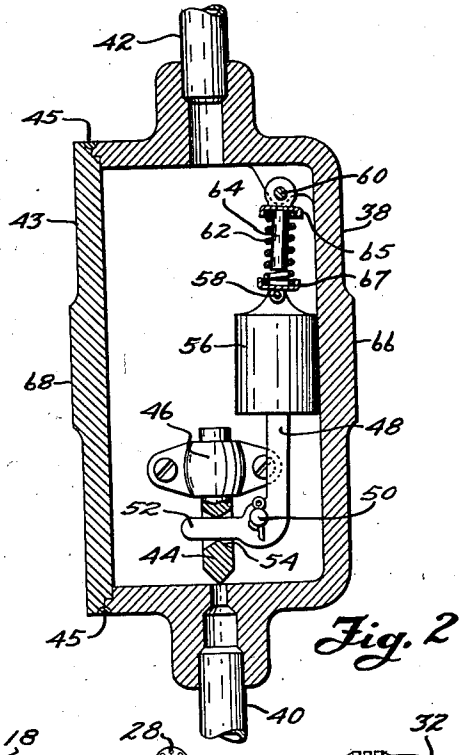


Fig. 2

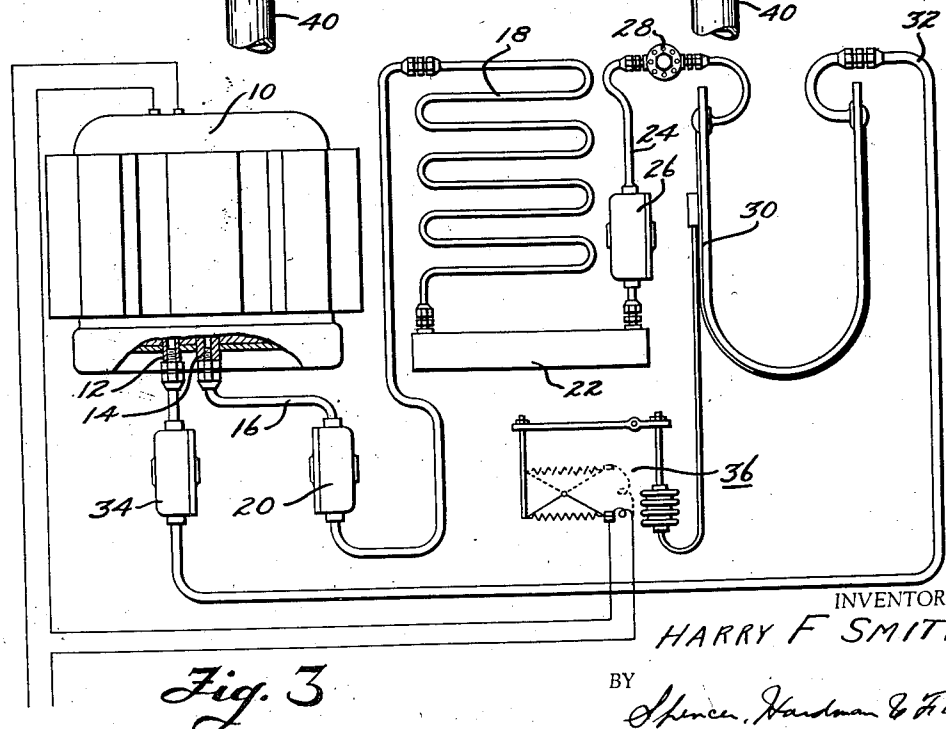


Fig. 3

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REFRIGERATING APPARATUS

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4 Claims. (Cl. 137—139)

This invention relates to refrigerating apparatus and more particularly to a service valve for closing communication between various parts of the apparatus when it is desired to perform service operations thereon.

It is an object of the invention to provide a service valve in which the valve mechanism is hermetically sealed within the refrigerating system.

Another object is to provide a service valve of the character described which is operable from the outside of the system without opening the hermetically sealed casing within which the valve mechanism is located.

A further object is to provide a service valve located within a hermetically sealed casing which is operated by inertia.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a longitudinal cross sectional view of a valve mechanism embodying the present invention and showing the valve in closed position;

Fig. 2 is a view corresponding to Fig. 1, but showing the valve in open position; and

Fig. 3 is a diagrammatic view of a refrigerating system incorporating a plurality of the valves shown in Figs. 1 and 2.

Referring first to the refrigerating apparatus shown in Fig. 3, there is provided a motor-compressor unit 10 having an inlet 12 and an outlet 14. Compressed refrigerant is delivered from outlet 14 through a conduit 16 to a condenser 18 for liquefaction therein. A service valve 20 is interposed in the conduit 16 for closing communication between the compressor and the condenser for service operations. The condenser 18 delivers liquid refrigerant to a receiver 22, whence liquid refrigerant is delivered by means of a conduit 24 having a service valve 26 therein to an expansion valve 28. The expansion valve 28 controls the expansion of refrigerant into an evaporator 30, whence expanded refrigerant is delivered by means of a conduit 32 to the inlet connection 12 of the compressor 10. A service valve 34 is interposed in the conduit 32. Evaporation of refrigerant in the evaporator 30 causes withdrawal of heat from the cabinet or other object to be cooled (not shown) and in order to maintain a substantially constant temperature at the evaporator 30, a thermostatic snap switch 36 is provided for controlling the circuit of the motor in the motor-compressor unit 10.

Each of the service valves 20, 26, and 34 is of similar construction and may comprise a hermetically sealed casing 38 having an inlet connection 40 at one end and an outlet connection 42 at the opposite end. The casing 38 may be closed by a cover 43 sealed thereto at 45 as by soldering or welding. A valve 44 is mounted to slide in a bracket 46 in alignment with the inlet connection 40 and is movable to open and close said inlet. Valve 44 is operated by means of a bell crank 48 pivoted at 50 and having an arm 52 extending through an aperture 54 in the valve 44. The other arm of the bell crank 48 carries a weight 56 having a pivot 58 at its upper end. Between the pivot 58 and a pivot 60 located on the housing, there is mounted a compression spring 62 which is supported by means of a cylindrical guide 64 and end fittings 65 and 67. The housing 38 is preferably provided at its opposite sides with upraised bosses 66 and 68 for a purpose later to be described.

In operation, should it become necessary to perform service operations upon any portion of the refrigerating apparatus, the refrigerant may be substantially exhausted from that portion of the apparatus by closing one or more of the service valves and causing the compressor 10 to exhaust refrigerant from the portion which it is desired to repair or adjust. In order to close the service valve, which is normally in the open position shown in Fig. 2, it is necessary only to strike the casing 38 a sharp blow with a hammer delivered on the striking boss 68. The resilience and flexibility of the refrigerant conduits permit a slight sideward bodily displacement of the housing 38 and due to the inertia of the weight 56, the bell crank 48 will move to the position shown in Fig. 1 closing the valve 44. The compression spring 62 acts as an over-center snap action mechanism to normally maintain the weight 56 in either one position or the other. After the refrigerant is exhausted from the portion of the system which is to be adjusted, replaced or repaired, the desired service operations may be performed thereon, after which the service valves which were closed may be opened by striking each of them a sharp blow on the striking boss 66 which will again give the housing 38 a bodily movement in the opposite direction, causing the weight 56 by its inertia to move to the position shown in Fig. 2.

It will thus be seen that the present invention provides a means for temporarily cutting off a portion of the refrigerating apparatus from the

remainder thereof, which means is permanently sealed within the refrigerating system and is operable from the outside without breaking the hermetic seal.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a refrigerating apparatus, a service valve comprising in combination a hermetically sealed casing, inlet and outlet conduits communicating with said casing, a valve in the casing for controlling communication between said conduits, means located entirely within said casing for operating said valve, said means including a weight inside the casing and operable from the outside by inertia, and snap acting means tending to retain said valve in either open or closed position.

2. In a refrigerating apparatus, a service valve comprising in combination a hermetically sealed casing, inlet and outlet conduits communicating with said casing, a valve in the casing for controlling communication between said conduits, means located entirely within said casing for operating said valve, said means including a weight inside the casing and operable from the outside by inertia, and over-center toggle mechanism resiliently tending to retain said valve in either open or closed position.

3. An inertia operated valve including a casing having an inlet and an outlet, a valve means for controlling the flow of fluid through the casing, said valve means being movable between open and closed positions, said valve means including a pivoted weighted portion operable by inertia to move the valve into either open or closed position, said pivoted weighted portion having its pivot generally beneath it and being movable from one side of the point directly above its pivot to the other to move the valve to and from open and closed positions.

4. An inertia operated valve including a casing having an inlet and an outlet, a valve means for controlling the flow of fluid through the casing, said valve means being movable between open and closed positions, said valve means including a weighted portion operable by inertia to move the valve into either open or closed position, said valve means including a valve and spring means for urging the valve into either open or closed position and for resiliently holding the valve in open and closed positions whenever the valve is moved to either open or closed position.

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