Dec. 5, 1933. H. S. ESTLER 1,937,555

EXPANSION DEVICE

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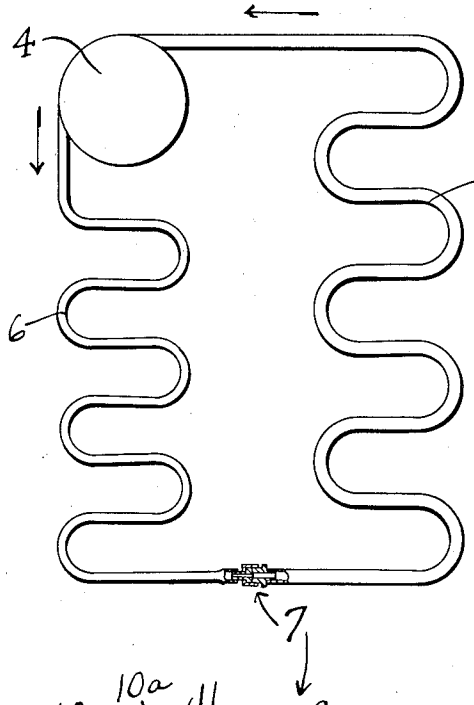


Fig. 1

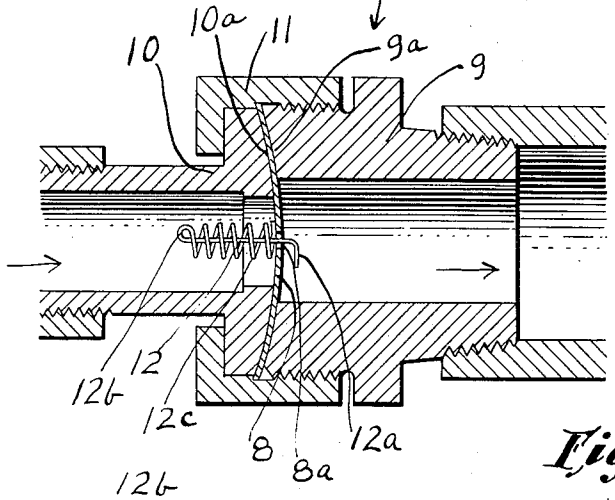


Fig. 2

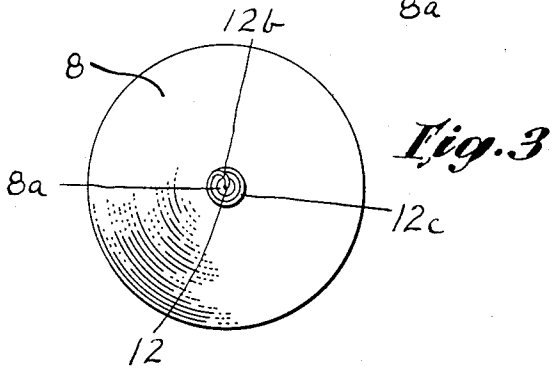


Fig. 3

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EXPANSION DEVICE

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4 Claims. (Cl. 62—127)

This invention relates to heat transforming apparatus and more particularly to refrigerating systems of the type having low and high pressure sides and expansion devices between such sides.

In some refrigerating systems, such as those operating on the vapor-gas principle as set forth in U. S. Patent No. 1,619,196, issued March 1, 1927 to Ransom W. Davenport, a small orifice provides communication between the condenser and the evaporator and remains open at all times. Such small orifices sometimes become clogged and impair the operation of the system.

One object of the invention is to devise ways and means for maintaining an open connection through the expansion device of a refrigerating system. Another object is to provide an expansion device having a self-clearing orifice. Other objects will be apparent from the detailed description which follows.

To prevent clogging of the orifice means are provided on the expansion device movable automatically to dislodge foreign matter. The means may take the form of a member extending through the orifice and resiliently mounted for movement as a result of changes in pressure within the system. The member may comprise a pin having a portion wound into a coil to engage one side of an expansion device and with a stop, such as a bent portion, on the other end to engage the other side of the device.

In order to illustrate the invention one concrete embodiment thereof is shown in the accompanying drawing in which:

Fig. 1 is a diagrammatic illustration of a closed cycle heat transforming system of the compressor-condenser-evaporator type;

Fig. 2 is an enlarged detail sectional view of the feeding or expansion device; and

Fig. 3 is a plan view of the disk control member shown in Fig. 2.

The heat transforming system illustrated in Fig. 1 comprises a pump or compressor 4 connected to evaporator 5 and discharging the fluid drawn from the latter at higher pressure and temperature into a condenser 6 whence the products of the condenser are returned to evaporator 5 through an expansion device indicated generally at 7. The feeding or expansion device is of the continuously open orifice type to adapt the apparatus to operate on the vapor-gas principle, as set forth in the patent previously referred to, with a working substance comprising a volatile liquid and an incondensible gas which is inert to and insoluble in the liquid.

While the feeding or expansion device may take any suitable or desired form which will provide an open orifice or nozzle, it is herein shown as comprising a disk 8 having a central perforation 8*a*. The disk may be mounted in a simple fitting or union having a part 9 secured to the evaporator connection and a part 10 secured to the condenser connection, these parts having clamping faces 9*a* and 10*a* which are forced together by a nut 11 rotatably mounted on part 10 and having a screw threaded connection with part 9. Feeding disk 8 is interposed between clamping faces 9*a* and 10*a* as indicated in Fig. 2 after the manner of a gasket and provides a tight seal between the same, the perforation 8*a* being disposed axially of the fluid conduit.

In order to free orifice 8*a* of any foreign matter within the system which might tend to clog the same, a suitable member is arranged to move within the orifice at certain times to dislodge such foreign matter. The form of clearing member herein shown as the preferred construction comprises a pin 12 which extends through orifice 8*a* having one end bent as indicated at 12*a* to provide a stop which normally engages the right face of disk 8 as viewed in Fig. 2. The opposite end of pin 12 at a point remote from the left side of disk 8 is reversely bent at 12*b* and wound about pin 12 into a spring coil 12*c* which resiliently forces pin 12 to the left and normally maintains its stop end 12*a* in engagement with the right side of disk 8.

When the pump or compressor 4 is in operation, pin 12 is pushed by the pressure of the working substance against the tension of spring coil 12*c* through orifice 8*a* to the right so that stop end 12*a* is out of contact with the right face of the disk 8 and takes substantially the position shown in Fig. 2. When pump or compressor 4 shuts down and the pressures on opposite sides of feeding disk 8 approach each other, spring coil 12*c* moves the pin to the left until stop end 12*a* again engages the right side of disk 8. Thus there is axial movement of pin 12 through orifice 8*a* both at the beginning of the running period and at the end of the same so that the orifice is cleared of any foreign matter that may tend to clog it.

While the invention has been herein disclosed in what is now considered to be a preferred form, it is to be understood that the invention is not limited to the specific details thereof but covers all changes, modifications, and adaptations within the scope of the appended claims.

I claim as my invention:

1. An expansion member having an orifice therethrough, a pin extending through said orifice on both sides, said pin having a coil spring encircling the same and engaging one face of said member and having a bent end engaging the other side of said member to form a stop.

2. An expansion member comprising a plate having an orifice, a pin extending therethrough, and resilient means integral with said pin for supporting the pin upon said plate.

3. An expansion device for use in refrigerating systems, and comprising a plate having an orifice, a pin extending through the orifice and having axial movement relatively thereto, and portions connected to said pin and adapted to engage opposite sides of the plate for supporting said pin, one of said portions being yieldable with respect to said pin.

4. An expansion member comprising a plate having an orifice therethrough, a pin extending through said orifice, means connected to the pin and adapted to engage one side of the plate at all times to support the pin, said pin having a portion movable with respect to the orifice and adapted to engage the other side of the plate.

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