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M. O. CRAWFORD ET AL

2,118,295

PRESSURE REDUCING DEVICE

Filed Dec. 26, 1935

Fig. 1

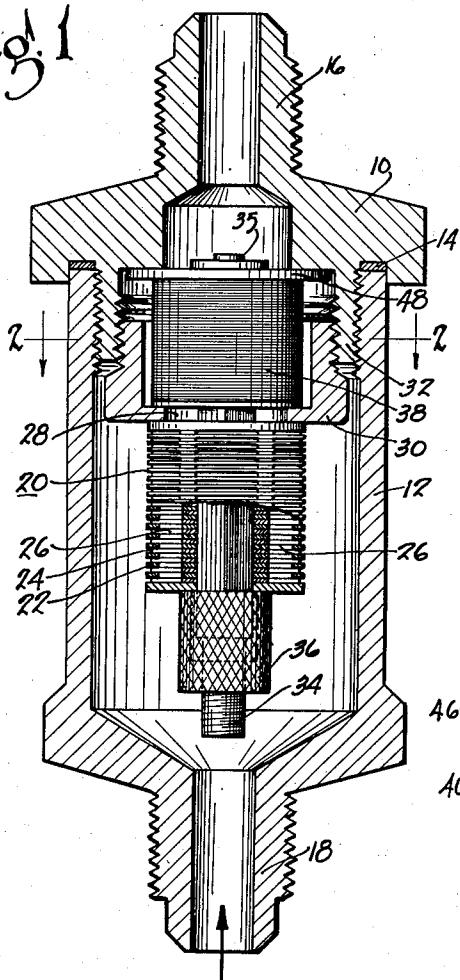


Fig. 2

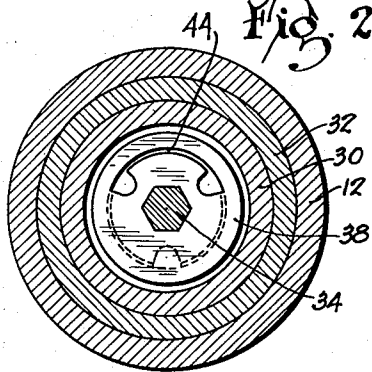


Fig. 3

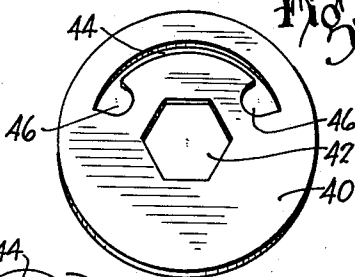


Fig. 4

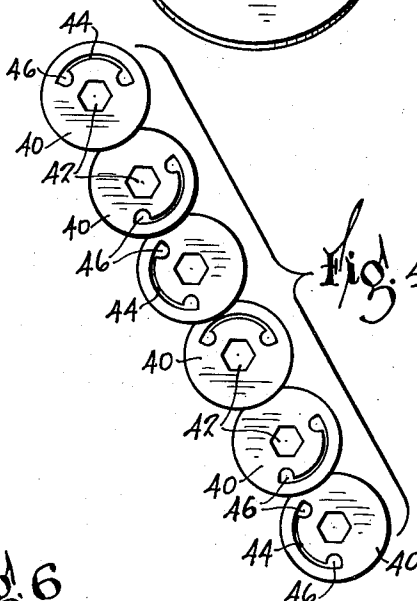


Fig. 5

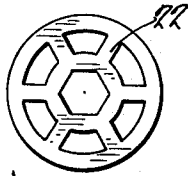
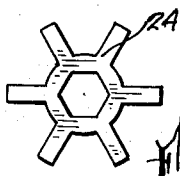


Fig. 6



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PRESSURE REDUCING DEVICE

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Application December 26, 1935, Serial No. 56,224

5 Claims. (Cl. 138—42)

This invention relates to a device for reducing the pressure of a fluid by passing the same through a restricted passage.

In numerous types of mechanisms, such as mechanical refrigerators, chemical apparatus, etc., it is necessary to reduce the pressure of a gas or a liquid, and this may be done by passing it through a restricted orifice inserted in the conduit which carries the gas or liquid.

The present invention comprises a tortuous passage of restricted cross-section, through which the fluid may pass, its movement therethrough being retarded by its friction against the walls of the passage.

An object of the invention is to produce an improved pressure reducing device which is cheap and simple to manufacture, and which may be readily assembled and disassembled, as for cleaning or repair.

A further object of the invention is to produce a pressure reducing device which is simple and dependable in action and not likely to get out of order.

A further object of the invention is to produce a combined filtering and pressure reducing unit of compact and simplified construction, which may be readily inserted in the fluid line.

Further objects and advantages of the invention will be apparent from the following description, taken in connection with the appended drawing, in which:

Figure 1 is a longitudinal section through a device embodying the invention;

Figure 2 is a horizontal cross section taken on the line 2—2 of Figure 1;

Figure 3 is an enlarged perspective view of one of the perforated disks forming part of the pressure reducing unit;

Figure 4 is an exploded view showing the angular relation of the assembled plates; and

Figures 5 and 6 show plates which may be used to make up the filter unit.

Referring specifically to the drawing, the device shown in Figure 1 comprises an outer casing made up of an upper portion 10 and a lower portion 12, held in fluid-tight relation to each other by interengaging threads, and sealed by a gasket 14. The upper and lower portions are provided with threaded nipples 16, 18, to allow the device to be connected in the fluid line in the usual manner.

The filtering and pressure reducing assembly is designed to be completely assembled before being inserted in the casing. The filtering unit 20 may be of the type disclosed in Heftler Patent No.

1,641,485, wherein fluid flows, preferably inwardly, through the spaces between a series of superposed laminae indicated at 22 and 24 in Figures 5 and 6, to a series of vertical conduits 26 which are arranged to register with holes 28 formed in a metallic cup 30. Cup 30 is threaded into a depending flange 32 formed on upper portion 10. A stem 34, of hexagonal or other non-circular cross-section, extends centrally through the assembly to maintain the laminae in proper position relative to each other, and is provided with a head 35 at its upper end and a knurled nut 36 at its lower end. The pressure reducing unit proper is denoted by the numeral 38, and comprises a series of superposed disks 40, each having a non-circular hole 42 at its center to receive the stem 34. Disks 40 may be readily formed by stamping.

Each of the disks 40 is provided with a curved slot 44 which extends over an arc of 120 degrees on a circle spaced within the periphery of the disk to leave an outer rim between the slot and the periphery. Each end of the slot is formed with an enlarged aperture 46 as shown, and the disks are assembled as indicated in Figure 4, so that one enlarged end of each slot registers with an end of the slot above it, while its opposite end registers with an end of the slot below it. The slots themselves do not register with each other, but instead are rotated 120 degrees relative to each other and form restricted passages for the fluid, which traverses the length of one slot, then passes through apertures 46 to the next one, and so on until the entire unit 38 has been traversed. During its passage, the pressure of the fluid is reduced by the friction of the fluid against the walls of the passages. The cross section of the passage is in the form of a rectangle of very small dimensions. Two of the sides of this rectangle lie in the edges of the curved slot 44 of a given disk 40; the other two sides lie in the faces of the two adjacent disks. The fluid, flowing upwardly from nipple 18, thus first passes through the filter 20, thence through holes 28 to the slot in the lowermost disk of unit 38, thence through unit 38, and out nipple 16. A washer 48 at the top of the unit 38 holds the disks in their assembled relation and is apertured after the manner of the lamina shown in Figure 5 to permit the fluid to flow through it.

It will be understood that the functioning of the device is independent of the position in which it may be placed, so that the terms "upper", "lower", etc. should be interpreted accordingly. It will also be understood that the flow through the de-

vice may be in the reverse direction if desired, although the arrangement shown in Figure 1 is preferred.

We claim:

- 5 1. A pressure reducing unit comprising a series of identical elements directly superposed on each other in fluid-tight relation, each element being formed with a slot registering over only a portion of its length with the slots of the contiguous
10 elements.
2. A pressure reducing unit comprising a series of stampings directly superposed in indexed relation and compressed to prevent passage of fluid therebetween, each stamping being formed with
15 an arcuate slot registering over only a portion of its length with the slots of the contiguous stampings.
3. A filtering and pressure reducing device comprising a series of superposed laminae forming a
20 filtering unit, a series of directly superposed elements forming a pressure reducing unit positioned in communicating relation to the filtering unit, and common means for maintaining both units in assembled relation.

4. A filtering and pressure reducing device comprising a casing having an inlet and an outlet, a series of superposed laminae forming a filtering unit, a series of directly superposed slotted
5 plates forming a pressure reducing unit positioned in communicating relation to the filtering unit, common means for maintaining the laminae and plates in assembled and indexed relation, and a threaded member for securing the resulting assembly in place in the casing.

5. A device of the class described comprising a casing having separable inlet and outlet portions, a series of superposed laminae having central non-circular apertures and forming a filtering
10 unit, a series of directly superposed plates having central non-circular apertures and peripheral slots forming a pressure reducing unit communicating with the filtering unit, and means engaging said apertures and one of said portions for
15 maintaining said laminae and plates in assembled and indexed relation and for securing the resulting assembly in place in the casing.

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