Aug. 21, 1956 W. S. JAMES 2,759,610

PLEATED PAPER FILTER ELEMENT

Filed Jan. 16, 1953

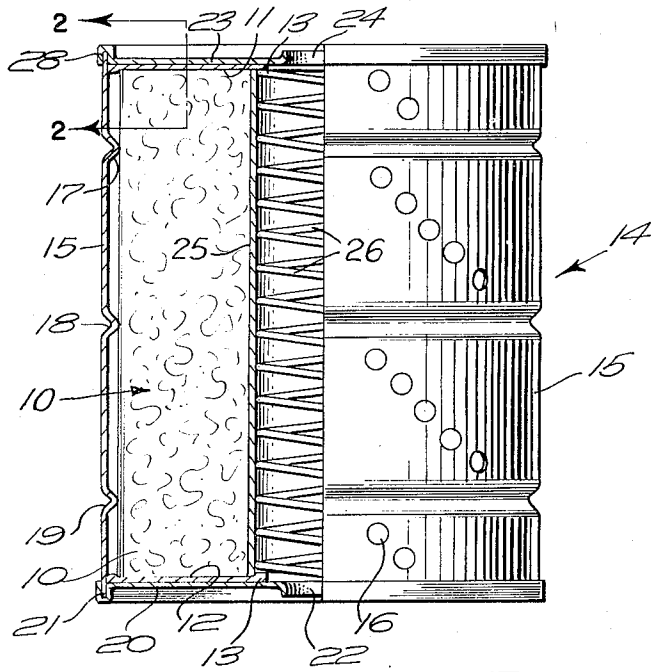


FIG. 1

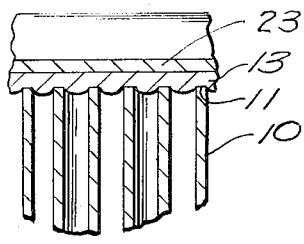


FIG. 2

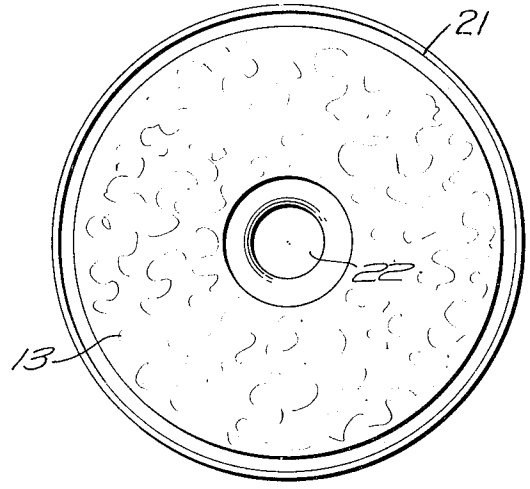


FIG. 3

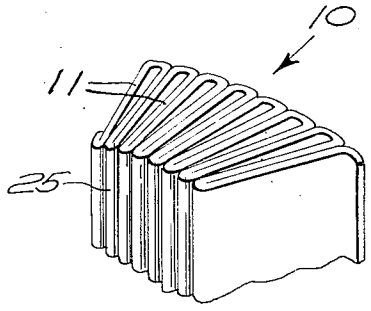


FIG. 4

INVENTOR.
WILLIAM S. JAMES
BY
Barlow & Barlow
ATTORNEYS

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PLEATED PAPER FILTER ELEMENT

William S. James, Providence, R. I.

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1 Claim. (Cl. 210—169)

This invention relates to a filter element, more particularly of the type embodying the pleated paper.

One of the objects of this invention is to provide a seal for the pleated ends of the paper of simple and inexpensive construction.

Another object of the invention is to provide a seal which will be sufficient to exclude contaminant to be removed from the liquid filter although permitting passage of the filtrate.

Another object of the invention is to provide a material which may seal by pressure being applied without the need of adhesive.

Another object of the invention is to support the paper in the shape desired against pressures to which it may be subjected.

Another object of this invention is to support the pleated paper in a generally annular form against pressures tending to force the same inwardly.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claim.

In the accompanying drawings:

Fig. 1 is an elevation partly in section showing the filter element;

Fig. 2 is a fragmental sectional view on a greatly enlarged scale showing the sealing means at the end of the pleated paper wall;

Fig. 3 is a plan view looking at the inner side of one of the end walls of the element;

Fig. 4 is a perspective view of the pleated paper which forms the filter element.

In proceeding with this invention, I provide paper in a pleated form, arranging the same generally in the shape of an annulus and then supporting this pleated paper in a metal can having a cylindrical wall with inwardly extending ribs and a helical coil at the center to engage the inner edge of the annular pleats. The bottom of the can is provided with a gasket as likewise is the top of the can provided with a gasket which will be pressed against the ends of the pleats sufficiently to provide a seal against the passage of contaminant carried by the liquid to be filtered. This gasket may be permeable to filtrate in the same manner that the paper is, thus an absolute seal need not be provided but merely one which will prevent the passage of the contaminant to be removed.

With reference to the drawings, **10** designates generally pleated paper in which the plane of each of the pleats extends generally radially of an annular form of the pleated paper. This paper thus formed has its upper edges **11** and lower edges **12** in engagement with a soft gasket **13** of cotton in a felted form or some similar material which may be indented as shown in Fig. 2 by the edges such as **11** of the pleated paper. One form of felt gasket which is satisfactory is that disclosed is Pat. No. 2,528,793, November 7, 1950.

I have shown this annular pleated paper as positioned within a can designated generally **14** having cylindrical outer wall **15** with openings **16** arranged throughout its surface. The wall is rolled inwardly to provide ribs at **17**, **18** and **19** so as to space the outer edge of the pleated annulus inwardly from the cylindrical wall. The bottom **20** is a metal wall which is rolled into engagement with the wall **15** as at **21** to provide a seal while along the

inner surface of the bottom wall **20** there is this soft gasket **13** which may be of a size and shape to be positioned on the bottom wall centrally thereof while having an open center. The bottom wall of this can is provided with an opening **22** which is flanged outwardly. This wall may be permanent with the cylindrical wall **15** of the can prior to loading of the can with the annular pleated paper. The top wall **23** of the can is formed separate and has a central opening **24**.

The pleated paper in annular form is dropped into the can before the top wall **23** is applied and then there is positioned within the center opening of the pleated form and against the edges **25** thereof a cylindrical member in the form of a helix or wire spring **26** which is of a size to engage the edges **25** of the pleats and prevent the pleats from being forced radially inwardly. The spring assists in maintaining the pleats against the ribs **17**, **18** and **19** and also centralize the opening through the pleated form within the can. This opening will register with the openings **22** and **24** in the ends of the can. After the helix is in place, gasket **13** of soft material is positioned on the upper end of the pleats and then the can top is placed in position, pressure is applied, and the top is rolled into sealed engagement as at **28**. There is sufficient pressure provided on the ends of the can and toward each other so that a good seal against passage of the contaminant is formed at the ends of the pleats. Should there by any irregularities in the axial length of the can, the pressure will be sufficient to compress the can **15** axially by forcing the ribs **17**, **18** and **19** inwardly to an extent necessary to cause the can to conform to a desired length. In some cases, the pressure applied could be sufficient to place the gaskets **13** under a predetermined pressure for sealing as the ribs are compressed.

In operation, the liquid passes through the openings **16** in the cylindrical wall **15** thence through the pleated paper or possibly through the sealing gasket **13** to the center opening while leaving its contaminant deposited on the paper or on the sealing gasket. By this means, a very inexpensive contaminant seal is provided for the ends of the pleated paper. The pleated paper is well supported both against pressures inwardly or pressures outwardly and a satisfactory cartridge is formed.

I claim:

A filter comprising a can having a cylindrical wall and end walls firmly secured thereto, a filter member in the can and comprising an annulus formed of filtrate permeable paper provided with pleats that extend parallel to the axis of the annulus, a soft fibrous gasket having resilient properties confined between each end wall of the can and the ends of said pleats, and said cylindrical wall having a plurality of annular inwardly protruding, hollow ribs adapted to hold the pleats away from the sides of the can and buckle under pressure to make the can wall longitudinally compressible, whereby said ends can be forced against the resilient gaskets by compressing the can longitudinally to reduce its length and thereby embed the ends of the pleats permanently in these gaskets to close the ends of such pleats.

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