July 10, 1962 H. W. FARREY 3,043,436

PACKING RING

Filed March 4, 1960

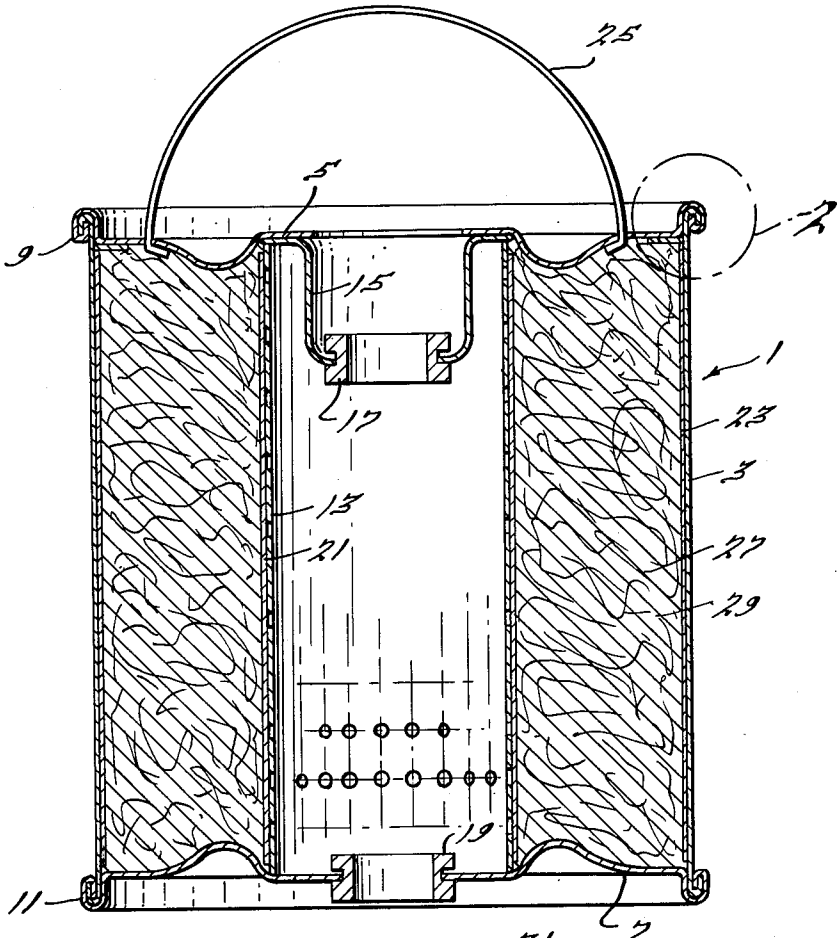


FIG. 1.

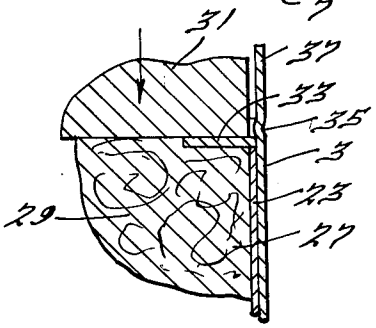


FIG. 3.

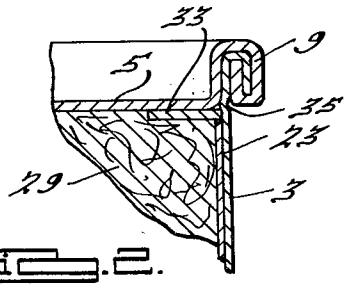


FIG. 2.

INVENTOR.
Harold W. Farrey.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

United States Patent Office

3,043,436
Patented July 10, 1962

1

3,043,436

PACKING RING

Harold W. Farrey, Racine, Wis., assignor to Walker Manufacturing Company, Racine, Wis., a corporation of Delaware

Filed Mar. 4, 1960, Ser. No. 12,806
3 Claims. (Cl. 210—484)

This invention relates to filter cartridges and, in particular, refers to the type of filter unit in which a compressed filter media is confined within a receptacle.

Fibrous materials of various types are often used as a filter media in oil filters and filters for other applications. It is usually desired to compress this material to a certain extent so as to obtain sufficient density for proper filtration, and also to prevent by-passing around the ends of the filter media. This has created a problem, particularly when waste material is inserted in can-type containers, because so much waste material is inserted to obtain the proper density that it was extremely difficult, if not impossible, to use all the required waste material and still be able to attach the end cap on the container. The waste material springs back beyond the end of the can and makes it extremely difficult to fit the end cap in place and attach it to the end of the can.

The present invention overcomes this difficulty by means of a packing ring which is snapped in place in the end of the can and engages a portion of the waste material that is exposed and holds it in compressed condition. The remaining portion of the waste engages the end cap, which can now be mechanically or otherwise secured to the end of the can, and provides enough pressure to prevent by-passing.

The invention is illustrated in the accompanying drawings in which:

FIGURE 1 is a vertical cross-section through a typical filter cartridge employing waste material and utilizing the retainer ring of this invention;

FIGURE 2 is an enlarged view of the structure shown within the circle 2 in FIG. 1; and

FIGURE 3 is an enlarged view showing one stage in the process of inserting the waste material in the filter can.

In FIG. 1 the filter cartridge 1 has an outer metal shell 3 which is perforated. The opposite ends of the shell 3 are closed by top and bottom end caps 5 and 7, respectively, which are interlocked in joints 9 and 11, respectively, with the top and bottom ends of the container 3. Extending between the end caps 5 and 7 is a perforated center tube 13. It is held in place by the pressure of the end caps. Clamped between the top of the center tube 13 and the top end cap 5 is a bracket 15 that carries a grommet or bushing 17. This is aligned with a bushing 19 that is carried by the bottom end cap 7, the two bushings or grommets 17 and 19 serving to engage a suitable standpipe (not shown) in the filter device in which the cartridge 1 is inserted. A sheet of tissue paper 21, shown considerably exaggerated in thickness in the drawings, may be wrapped around the center tube 13, and, if desired, a similar sheet of tissue paper 23 may be wrapped around the inside of the container 3 to cover the perforations in it. A handle 25 may extend through suitable openings in the top end cap

2

5 and be supported by it. Within the annular space 27 defined by the center tube 13 and the container 3 is packed the filter media 29, in this case a compressible fibrous waste type material available on the open market.

The waste material 29 is inserted in the can 3 at a stage of assembly in which the bottom end cap has been attached to the container 3 and the center tube 13 has been inserted but the top end cap 5 is not attached in joint 9 to the container 3, i.e. the top of the can is open. At this stage it is possible, obviously, to insert the waste material 29 into the space 27 by funneling it in through the top of the can. In order to obtain the required density for proper filtration, and also to prevent by-passing around the interface between the waste material and the top and bottom end caps it is ordinarily necessary to insert a considerably greater volume of material than would, if uncompressed, occupy the volume of the space 27. Thus, it is necessary by means of a ram 31 to compress the material 29 into the space 27. When this is done, however, the material will spring back the moment pressure of the ram 31 is removed. When this occurs it is extremely difficult or impossible to force the end cap 5 in proper position so that it can be attached to the end of the can in the joint 9, said joint normally being formed by means of conventional spinning tools.

In accordance with the invention the packing or retainer ring 33 which is of the same diameter as the inner diameter of can 3, is placed on top of the waste material under the ram 31 and pressed by it downwardly unit it snaps under a series of dimples or sheared tongues 35 that are pressed or sheared in the wall of the container 3. They hold the ring 33 against upward displacement and when the ram 31 is removed the packing ring 33 will hold the material 29 in place, particularly around the outer periphery, so that the cap 5 can be put in position and interlocked at 9 with the end 37 of the can 3. When confined under pressure in this manner the fibrous material 29 will bear against the inward faces of the end caps 5 and 9 and prevent by-passing of oil along these faces from the can 3 to the center tube 13 and force the oil to pass through the fibrous material 29.

Various modifications are within the scope of the invention. For example the ring need not touch the entire periphery of the wall and can be of wire form. Also it can be secured to the center tube instead of the outer wall.

I claim:

1. The method of packing compressible filter material in a tubular container comprising positioning a retainer ring between the material and a compression ram and utilizing the ram to force the material into the container and the ring into the container until the ring snaps behind the shoulder on the container to hold the material compressed in the container, removing the ram from the container, and attaching an end cap to the container over the ring.

2. In a filter unit, a container having a wall defining a chamber, compressed filter material filling the chamber, a retainer member in the chamber and connected to the wall and engaging the compressed material to prevent expansion thereof, said retainer member being materially less wide than said chamber, and an end cap attached to the wall and engaging the the filter material

adjacent the retainer member and defining an end of the chamber.

3. A filter unit comprising a container having a chamber, compressible material confined under compression in and completely filling the chamber, said container including a tubular member and an end cap closing at least a part of the end of the tubular member to provide one end of the chamber, and a filter material retainer in the chamber attached to the tubular member and engaging the end cap and the filter material and holding the material under compression.

References Cited in the file of this patent

UNITED STATES PATENTS

927,801	Jenkins	July 13, 1909
2,547,857	Cook	Apr. 3, 1951
2,584,771	Wilkinson	Feb. 5, 1952
2,630,227	Rodwell	Mar. 3, 1953
2,833,415	Wilkinson	May 6, 1958

FOREIGN PATENTS

587,865	Canada	Dec. 1, 1959