June 8, 1948. C. W. SIMONSEN 2,442,964

CLOSURE FOR CYLINDRICAL OPENINGS

Filed Aug. 10, 1945

Fig 2

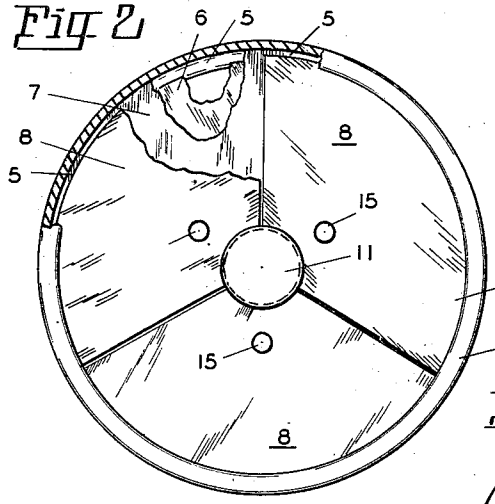


Fig 5

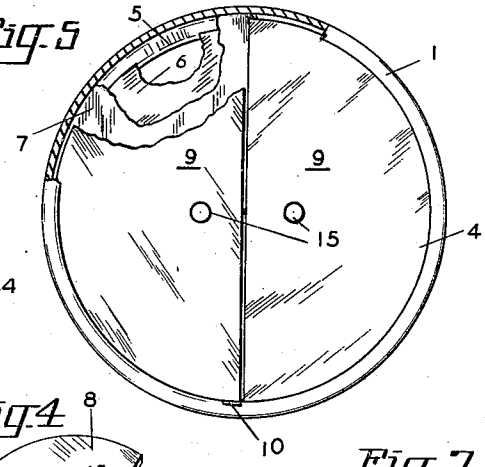


Fig 4

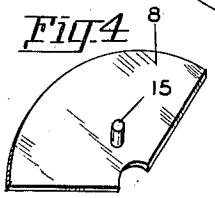
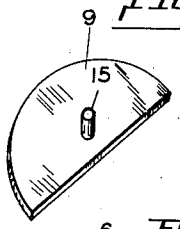


Fig 7



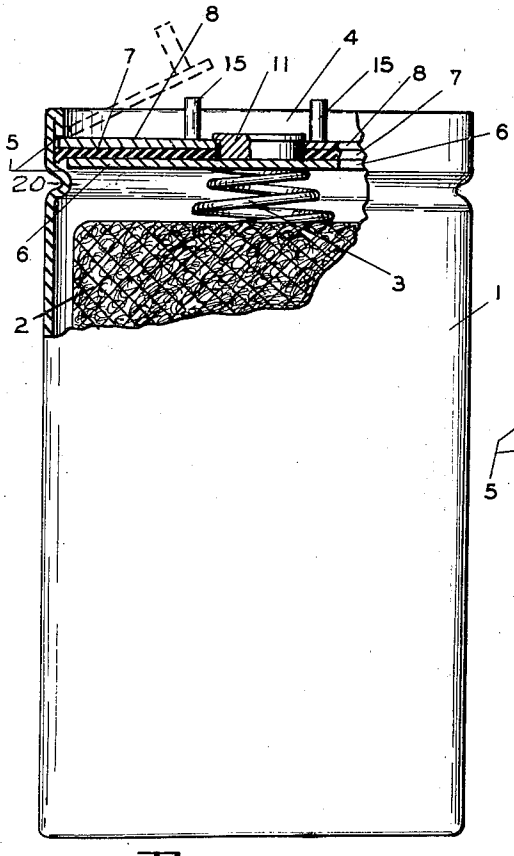


Fig 1

Fig 3

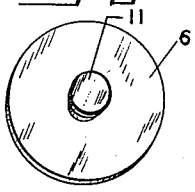
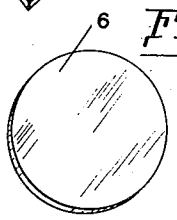


Fig 6



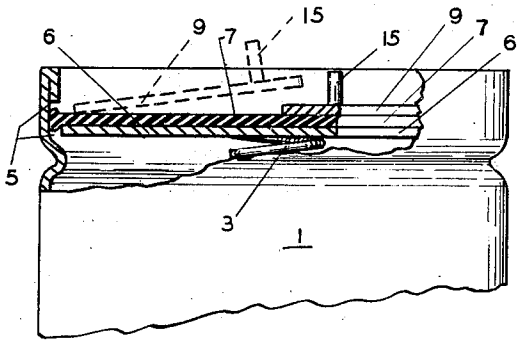


Fig 6

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CLOSURE FOR CYLINDRICAL OPENINGS

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Application August 10, 1945, Serial No. 610,141

2 Claims. (Cl. 220—46)

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This invention relates to a closure for a circular opening, being especially applicable to closing the top of an oil filter container, such as every truck, bus and passenger automobile now carries as standard equipment. These filter cans contain renewable cotton filter elements and for larger vehicles are as much as six inches in diameter to carry an oil pressure up to fifty pounds per square inch and more. Practically all are now made with a heavy threaded tube in the center that passes through the removable top and is held by a nut, which to withstand a stress that may exceed twelve thousand pounds and hold the edge oil tight, leaves something to be desired. The material of the can is necessarily too light to hold a circle of studs.

It is the object of this invention to provide a closure that falls well under the weight limits of the current art, costs less and opening and closing requires only light tools and in the smaller sizes no tools at all as compared to the twelve or fourteen inch wrench required for larger sizes of the current filter cans with a central heavy nut.

The invention, in its best form as I now know it after adequate service test, is illustrated in drawings forming a part hereof and explained in this specification.

In the drawings:

Fig. 1 is an elevation of a filter can, partly sectioned to show a contained filter cartridge and the closure means of the invention;

Fig. 2 shows the partly sectioned top view of Fig. 1;

Fig. 3 is a perspective at reduced scale of the pressure plate where used with more than two sectors of locking plate, both hereinafter fully described;

Fig. 4 is a perspective of a three part sector of a locking plate at reduced scale, being a reduction of the ones (any one) shown in Fig. 2;

Fig. 5 is a plan view of a two part plate, interchangeable with the three sectored plate shown in Fig. 2, allowing for a slight difference in scale, used with a filter can such as that shown in Fig. 6 in which the "can" or body will be considered to be identical except perhaps in size with the one shown in Fig. 1;

Fig. 6 is the topmost portion of a filter can with the closure of Fig. 5 type, a two sector locking plate;

Fig. 7 is a reduced perspective of one sector of a locking plate such as used in Figs. 5 and 6; and

Fig. 8 is a reduced perspective of a plain disc locking plate as used with the two sector locking device.

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Further describing the drawings: 1 is a "can," being the body of a pressure vessel as used in a renewable cartridge oil filter, 2 is the cartridge, essentially a mass of cotton, of which the types are many and variant and 3 is the helical spring, usually found in all types of renewable cartridge filters, which are so well known as to need no further description.

The can 1 is provided with an outlet nozzle 4, immediately inside of which is formed a two shouldered annular groove 5. The lowermost shoulder is of less inside diameter than the uppermost shoulder, the inside of which constitutes the outlet nozzle, previously mentioned as indicated by numeral 4. A circular pressure plate 6 should be of such size that it will just pass through the nozzle 4, past the upper shoulder of the groove 5 and rest on the lower shoulder; the two shoulders defining the groove. Superposed on the pressure plate 6, when it rests on the lowermost shoulder or when it is supported thereabove by the spring 3 as shown in Figs. 1 and 6, is a sealing member shown as a disc of resilient rubber 7, which is in contact by its perimeter with the bottom of the groove 5. Owing to the pressure of the spring, it will be initially leak proof if properly fashioned and as pressure increases within the filter it will be expanded more and more tightly into the interstitial spaces that occur between the perimeters of the plates and the groove. The sealing member is shown to be annular in shape in Fig. 1 where a three sectored locking plate is used and a disc in Fig. 6 where only two sectors make a complete locking plate. A sector of the two part kind can be removed by finger pressure on one, near the center, when there is zero fluid pressure within the filter to slip the radial boundary of one sector over the other, then the topmost is pressed down by one corner to an angular position whereupon it will pass out, which manipulation is made more facile by a shallow groove such as shown at 10 in Fig. 5. The three sectored locking plate sectors are identified by numeral 8 and the two sectored plates by numeral 9.

When more than two sectors are used, it will be necessary to hold their inner ends by a washer such as 11, preferably slightly undercut, welded to the plate. Where only two are used the washer is not needed but the points where the arcuate meet the radial boundaries rest in the groove at diametrically opposite points and constitute locking means to hold them in under pressure. A pin such as 15 made rigidly upstanding in each sector of the locking plate, helps in their manipulation but also identifies the upper side of each.

The inwardly projecting shoulder 20 may be omitted and the pressure plate 6 will be allowed to rest on the spring 3, which in turn will rest upon or form a part of the filter element 2.

Having disclosed my invention so that those skilled in the art to which it appertains can make and use it, what I claim as new and desire to secure by Letters Patent is:

1. Closure means for a circular outlet nozzle provided with an annular two shoulder groove within the nozzle portion, the inner shoulder being of less diameter than the nozzle, comprising a circular pressure plate adapted to enter the nozzle and rest on the said inner shoulder, a resilient sealing member to cover the edge of the pressure plate and rest against the inner perimeter of the groove and a sectored locking plate of such form that its arcuate boundaries will lie within the groove with radii abutting to lock the pressure plate and seal against being forced out through the nozzle.

2. Closure means for a circular vessel opening, said opening in the form of a nozzle provided with an inside annular groove, and a plate support inside of said annular groove; comprising a circular plate that will pass through said nozzle and rest on said support, a resilient packing disc larger than said plate to rest thereon with its perimeter within said groove, a pair of semicircular plates adapted to be placed with their arcuate boundaries in said groove and their sides in abutting contact, to sustain pressure applied from within the vessel.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
238,790	Ladd	Mar. 15, 1881
929,974	McNutt	Aug. 3, 1909
1,161,203	Ellis	Nov. 23, 1915
1,276,363	Hodge et al.	Aug. 20, 1918
2,089,609	Houghton	Aug. 10, 1937
2,273,186	Fischer (1)	Feb. 17, 1942
2,296,710	Fischer (2)	Sept. 22, 1942