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R. N. BURCKHALTER

2,076,936

OIL FILTER

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Fig. 1

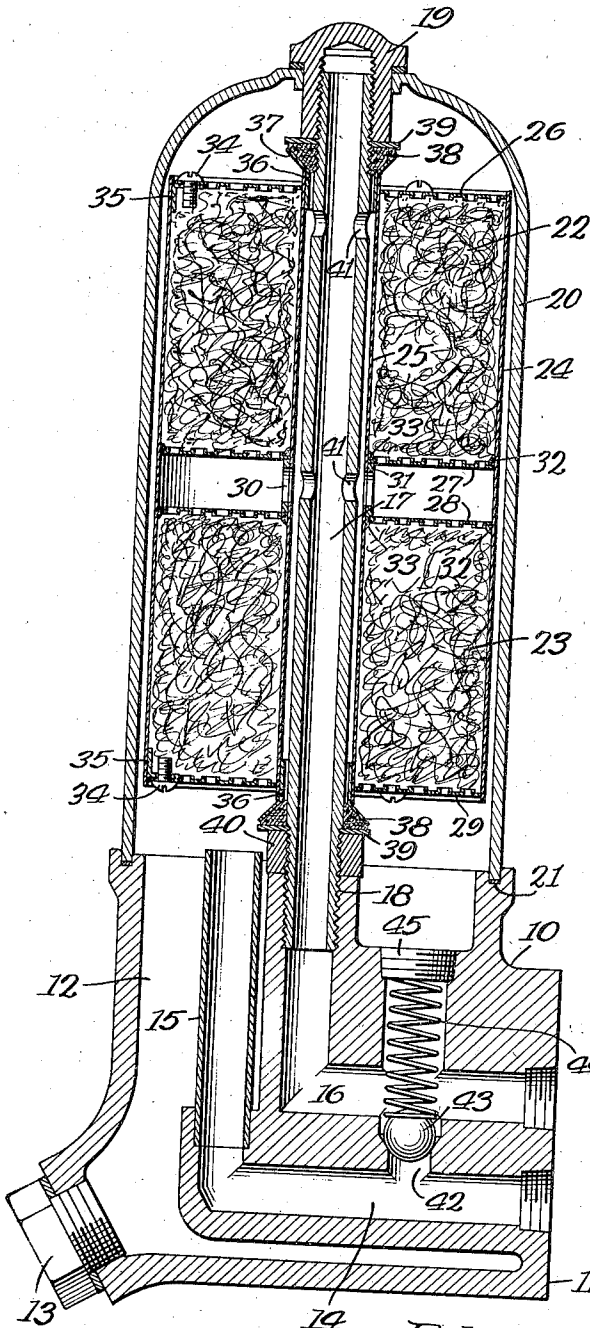


Fig. 2

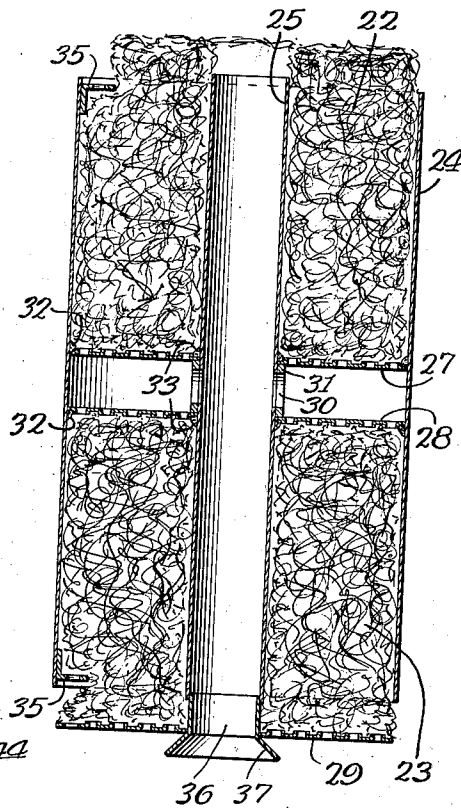
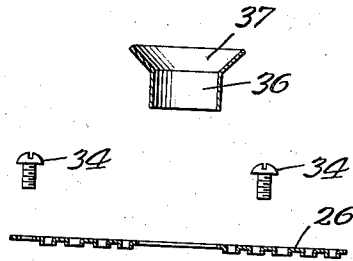
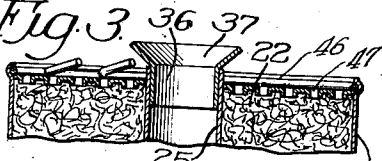


Fig. 3



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UNITED STATES PATENT OFFICE

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OIL FILTER

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3 Claims. (Cl. 210—134)

The principal object of this invention is to provide a simple, cheap filter affording generous surface area and thickness of filtering material in a small casing that can be readily refilled with filtering material after a suitable tour of service. Further objects and advantages of the invention will appear as the description is read in connection with the accompanying drawing in which

Fig. 1 is a vertical sectional view through an oil filter especially adapted for internal combustion engines,

Fig. 2 is a similar vertical section through the filter cartridge, parts of which are displaced to indicate how it is made up, and

Fig. 3 is a fragmentary view in vertical section showing a modification.

But this drawing and the specific description are used for the purpose of disclosure only and should not be interpreted as unnecessarily limiting the claims.

The filter shown in Fig. 1 includes a base casting 10, having a flat machined face 11, adapted to fit against a pad on an engine casing, or the like, when the base is bolted in place. The base includes a generous oil chamber 12 that may be drained by removing a plug 13. It also includes an inlet port, or passage 14, fitted with a delivery tube 15 and an outlet port or passage 16, extended by a tube 17 threaded into the socket 18 and receiving, at its upper end, a cap nut 19 by which a shell 20 is held with its lower edge in the groove 21, on top of the base casting.

The filtering is done by two fibrous filter elements 22 and 23 confined between two concentric cylinders or tubes, 24, 25, by four perforated heads 26, 27, 28 and 29.

The preferred material is shredded cotton uniformly distributed and only compacted enough to give a slight resiliency when the heads 26 and 29 are pressed into the position shown in Fig. 1. Of course, other fibrous material such as wool, hair, asbestos and mixtures of cotton and cattle hair, cotton and wool, cotton or wool and steel wool, may be used, as preference dictates.

These filter elements are loose and open, allowing the oil or other liquid to readily permeate, but they catch and hold even fine colloidal solid matter entrained in the liquid, until the whole element becomes fairly charged with such material.

The inner cylinder 25 is perforated near the middle, as indicated at 30, and fitted with a short ring or sleeve 31, which forms shoulders against which the perforated heads 27 and 28 rest, and these are made fast by soldering at 32 and 33.

The heads 26 and 29 are secured in place by screws 34, passing through the heads and into threaded lugs 35 welded to the inner surface of the outer cylinder 24. These heads are made readily detachable to permit the filtering material to be replaced with ease.

This filter is intended for use when the operator can and will service the filter when the fibrous material becomes fairly well charged with colloidal carbon, and other solids, which condition will be indicated by the oil showing slight discoloration. It is then that the fibrous material is to be removed and replaced by new material. Sometimes the change will be required when only ordinary cotton waste and the like are available, and the operator can renew his filter quickly with supplies always at hand.

The ends of the inner tube, or cylinder, 25 are equipped with fittings 36, having flaring flanges 37 to cooperate with cork washers 38 when the cartridge is in place on the outlet tube 17. Before being compressed these washers are generally rectangular in form and they are backed up by metal washers 39, the lower of which rests on a lock nut 40, which secures the tube in place in the socket 18.

When in operation the oil enters the port 14 and is delivered through a tube 15 into the chamber enclosed by the shell 20. There it divides itself into two streams, each entering one of the perforated heads 26 or 29, and passing through the corresponding intermediate head 27 or 28, to the perforations 30, and thence through the perforations 41 in the outlet tube 17, leading to the outlet port 16.

The pressure differences between the outlet and the inlet should be kept rather low, three to three and one-half pounds being preferred. This is accomplished by means of a bypass 42 connecting the inlet and outlet ports 14 and 16 and controlled by a ball valve 43 urged to its seat by a spring 44, adjusted by a stud 45.

By providing two filter elements the speed of flow through each is cut in half, which, in effect, doubles the capacity of the filter.

The heads 27 and 28 which separate the two elements are, for convenience in manufacture, made like the heads 26 and 29, but they can take any form that will prevent the filter material from crowding into the discharge openings 30.

When the filter material is to be renewed the cap 19 is removed which permits the shell 20 to be taken off and then the cartridge can be readily slipped off the outlet tube 17. Removing the

screws 34 releases the heads 26 and 29, and the clogged filter material can be readily removed with a hook, or other tool.

New clean filter material can be distributed in the corresponding chambers until they assume about the condition shown in Fig. 2. Then one fitting 36, and the corresponding head can be replaced, as shown at the bottom of Fig. 2, and gradually moved to final position while the fibrous material is pressed inwardly with the fingers or tool. Replacing the screws completes the operation.

This form of fastening means is only one of many that will readily appear to those skilled in the art.

Many prefer the ordinary split ring 46 and flange 47, as shown in Fig. 3.

In this particular embodiment, the outer cylinder 24 is five and three-quarters inches long and three and seven-sixteenths inches in diameter, and the other dimensions are substantially in proportion.

I claim as my invention:—

1. A filter comprising a base and a hollow stem mounted thereon, concentric cylinders spaced apart, two fibrous filter elements between the

cylinders and confined by four perforate heads, the adjacent two heads being spaced apart to provide a chamber and the two remote heads being detachable to permit replacement of the filter elements, the cylinder surfaces engaged by the filter elements being imperforate whereby fluid to be filtered is prevented from passing radially through the filter elements, the inner cylinder being mounted over and spaced radially from the stem and having an opening into said chamber, means sealing the ends of said inner cylinder to said stem, and the stem having an opening for liquid passing through said chamber.

2. A filter as claimed in claim 1 including means spacing the inner cylinder from the stem and sealing the ends of said cylinder from said stem comprising spaced bushings over the stem and within the inner cylinder.

3. A filter as claimed in claim 1 including means spacing the inner cylinder from the stem comprising a pair of bushings over the stem and within the inner cylinder, each of said bushings having a flared end for receiving packing surrounding said stem.

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