

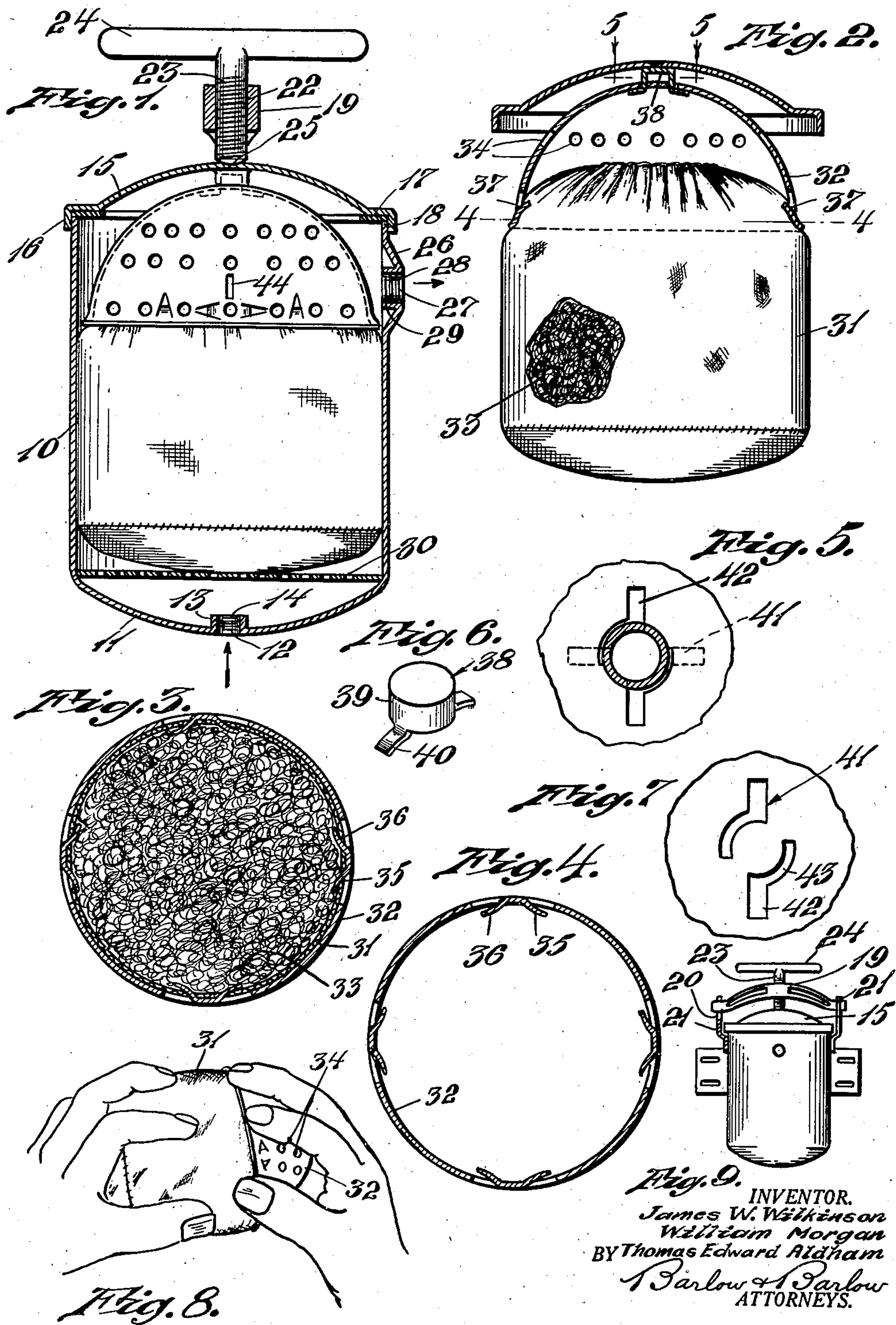
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J. W. WILKINSON ET AL

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OIL FILTER

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INVENTOR.
James W. Wilkinson
William Morgan
BY Thomas Edward Aldham
Parlow & Parlow
ATTORNEYS.

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OIL FILTER

James W. Wilkinson and William Morgan, Leicester, Mass., and Thomas Edward Aldham, Providence, R. I., assignors to Fleming Manufacturing Company, a corporation of Rhode Island

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9 Claims. (Cl. 210—131)

This invention relates to an oil filter, more particularly of the type to be used in connection with an internal combustion engine such as an automobile engine. One of the objects of the invention is to provide an inexpensive filter with a removable cartridge so that the accumulation of impurities gathered in the cartridge from the oil may be thrown away with the used cartridge and the same replaced from time to time with a fresh cartridge whereby the oil will be kept clean.

Another object of the invention is to enable the filter cartridge to be removed with the cover for the outer casing by means of the cover for the casing acting as a handle for manipulation.

Another object of the invention is to provide a cartridge which, although attached to the cover to be removed therewith, may be detached from the cover to be thrown away and a new one replaced in position on the cover for insertion into the casing.

Another object of the invention is the provision of a cartridge which may be detached from the cover without touching the hands to the dirty used cartridge.

Another object of the invention is the provision of a bag cartridge and a mechanical connection between the bag and an upper portion of the cartridge which is mounted on the bag and which serves as a spacer to locate the bag with reference to the outlet opening and also a means for detachably connecting the cartridge to the cover.

Another and more specific object of the invention is the provision of spurs on the attaching member to be inserted into the fabric of a bag cartridge by a relative movement of the two parts whereby the bag is securely attached to this spacing member and forms with it a unit which will be placed into or removed from the casing and thrown away as a complete assembly.

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 claims.

In the accompanying drawing:

Fig. 1 is a sectional view through the filter assembly;

Fig. 2 is an elevation of the bag portion of the cartridge and showing the spacing part and cover for the casing in section with a portion of the bag broken away to show its interior;

Fig. 3 is a sectional view through the bag portion of the cartridge and its cap along one part of the attachment and on substantially line 3—3 of Fig. 2;

Fig. 4 is a sectional view like Fig. 3 with the bag omitted;

Fig. 5 is a sectional view on line 4—4 of Fig. 2, showing the interlocking connection between the cartridge and the cover;

Fig. 6 is a perspective view of a fragmental portion of the detachable means for connecting the cover to the cap member of the cartridge.

Fig. 7 is a top plan view of the central portion of the spacing member which is attached to the bag part of the cartridge;

Fig. 8 is a perspective view of the hands of a person attaching the bag to the cap member of the cartridge;

Fig. 9 is largely an elevation of the assembly at right angles to that shown in Fig. 1 with a part in section.

Oil filters for automotive use require in some instances an inexpensive filter. It is also desirable that connections of pipes and the like be not disturbed in the replacing of the cartridge when the same may have become saturated or have collected therein a material amount of impurities gathered from the oil which is circulated through the same; and in order to provide for this a cartridge is inserted in the casing which may be removed and discarded when occasion requires; and we have provided a simple, inexpensive cartridge which consists of a fabric bag of filter material and a cap attached to this bag, the attachment of the cap to the bag being by a very simple expedient which may be easily and quickly applied, and we have in turn provided a detachable connection between the cap and the cover for the casing which will enable the cover to act as a handle to withdraw the cartridge from the casing after which the cartridge may be detached from the cover to be discarded; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawing, 10 designates the casing which is of generally cylindrical shape with an integral outwardly bulging end or bottom wall 11 having an opening 12 with an intumed collar 13 about the opening which is threaded as at 14 for connection to a conduit for insertion of oil into the casing. A cover 15 for the body portion 10 of the casing is provided with a flange 16 to extend over the outer upper peripheral edge of the casing with a washer 17 between the cover and the upper edge 18 of the casing for sealing the same when the cover is forced downwardly and clamped in such position. Any suit-

able clamp may be provided for forcing the cover into closed position, but we have illustrated as one form a bar 19 which extends over the top of the cover with its ends located in openings 20 in the upstanding ears 21 which are fixed to the outer surface of the casing. Through the center of this bar 19 we provide a threaded opening 22 for the reception of the threaded stud 23 and handle 24, which stud engages a recess 25 in the top of the cover so that as the handle is turned the stud will force the cover downwardly to compress the washer 17 and form an effective seal between the cover and the upper edge of the casing.

This casing bulges outwardly as at 26 with an outlet opening 27 in the wall at this point. The stock about this opening 27 is turned inwardly as at 28 to provide a collar which is threaded as at 29 to receive the outlet connection for a conduit to return the oil to the circulating system of the engine or the like, which oil is passed through the filter for cleansing thereof. A supporting wall 30 may extend across the lower end of the casing, as illustrated in Fig. 1, to span the bulging bottom, although this is not essential for the operation of the filter.

The cartridge consists of a bag part 31 and a cap part 32. The bag part is of flexible porous material through which oil may seep or be forced, usually of cloth or cotton fabric in which some suitable filter medium such as cotton waste 33 is packed which may or may not be supported by some rigid or semi-rigid material. The waste is preferably chemically treated so as to cause the filter medium to be more effective in use.

The cap 32 consists of a dome-shaped piece of material of a rigid character, usually metal, the same being provided with a plurality of openings 34 so that oil which may be forced up into the cap may easily flow therefrom. This cap has a plurality of spurs 35 and 36 cut from the stock of the cap and deflected inwardly, such as shown in Fig. 4, which spurs are located in pairs at intervals about the dome member or cap near its edge. We have shown in Fig. 4 these spurs as comprising four sets, although any convenient number may be had. There are also spurs 37 provided by cutting from the stock of the cap and deflecting the same inwardly, these spurs being pointed upwardly, as illustrated in Fig. 2.

For assembly of the bag to the cap we grasp the bag in one hand and the cap in the other, as shown in Fig. 8, and force both of these firmly into contact. Then, by a relative rotative motion between the dome-shaped cap and the bag we cause the spurs such as 36 to pierce through the fabric of the bag and then by similarly rotating in the opposite direction we cause the other spurs such as 35 to pierce through the fabric of the bag. Thus, these spurs become firmly attached to the bag, whereas by rocking action of the dome-shaped cap about the bag we cause the spurs 37 to pierce through the fabric and become attached to the bag. Thus, by this simple operation the cap is attached to the bag permanently and in use is handled as a unit to be inserted or taken from the casing and after use the complete assembly is discarded.

It is desirable to detachably connect this cartridge to the cover 15 and we provide a member, such as shown in Fig. 5, which is welded to the under surface of the cover. This member is designated generally 38, see Fig. 6, and consists of a center portion 39 with arms 40 extending outwardly from this member, which form one

attaching part, while the other attaching part of the detachable connection between the cap and the cover is formed in the cap by cutting slots 41 in the top of the cap. Thus, the cap and cover may be detachably connected by the fingers 40 of the member 38 passing through the wide portions 42 of the slots in the cap and then by relative rotation being moved into the narrow portions 43 of the slots to extend beneath the cap, as shown in dotted lines in Fig. 5. Further, a slot, such as designated in Fig. 1 at 44, is provided for the reception of a screw driver.

After use of the filter the cover may be detached from the casing which, when lifted, draws with it the cartridge comprising both the cap and the bag. This cartridge may then be held by inserting a screw driver in the slot 44 and by rotation of the cover with reference to the cartridge the same may be detached from the cartridge and discarded without touching the oily cartridge with the hand. Thereafter, the new cartridge may be substituted for the used one by locking the cap onto the cover and the same inserted into the casing and the cover fastened down in a manner which will require but a minute or two to complete the manipulation.

The cap serves not only as a means for detachably connecting the cartridge to the cover but also as a means for spacing the bag downwardly from the outlet opening 27 so that the bag will not clog this opening, it being understood that the pressure of the oil entering through the inlet opening 13 will tend to force the cartridge upwardly or toward the cover and being held or limited in its upward movement by the cap will expand the cartridge and form a tight seal between the bag and the inner surface of the casing 10.

The foregoing description is directed solely towards the construction illustrated, but we desire it to be understood that we reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

We claim:

1. In an oil filter, an outer casing comprising a hollow body and a cover therefor, inlet and outlet openings in said casing adjacent the upper and lower parts thereof, a cartridge within the casing comprising a flexible bag of filter material, means to position the cartridge inwardly from the lower opening, and rigid means connected to the bag to position the cartridge inwardly from the upper opening and provided with one part of a detachable means for connection to the cover, the other part of the detachable means being carried by said cover.

2. In an oil filter, an outer casing comprising a hollow body and a cover therefor and having an inlet opening in the lower part of the casing and an outlet opening in the upper part thereof, a cartridge comprising a flexible bag of filter material in said casing, and rigid means connected to the bag and detachably connected to the cover and serving to space the cartridge bag inwardly of the outlet opening.

3. In an oil filter, an outer casing comprising a hollow body and a cover therefor and having an inlet opening in the lower part of the casing and an outlet opening in the upper part thereof, a cartridge comprising a flexible bag of filter material in said casing, and a rigid dome-shaped member connected to the bag and detachably

connected to the cover and serving to space the cartridge bag inwardly of the outlet opening.

4. In an oil filter, an outer casing comprising a hollow body and a cover therefor and having an inlet opening in the lower part of the casing and an outlet opening in the upper part thereof, a cartridge comprising a flexible bag of filter material in said casing, and a rigid dome-shaped member connected to the bag and provided with one part of a detachably interlocking connection, and a member fixed on the cover providing the other part of said detachable connection.

5. A removable cartridge for a filter comprising a bag of filter material, and a rigid dome-shaped cap fixed to the bag and removable therewith as a unit, said cap being relatively steep and shaped to space the bag inwardly of the casing for the same.

6. A removable cartridge for a filter comprising a bag of filter material, and a rigid cap fixed to the bag and removable therewith as a unit, said cap carrying one part of means to detachably

connect the same to a portion of the casing into which it is inserted.

7. A removable cartridge for a filter comprising a bag of filter material, a dome-shaped cap, and mechanical means to fix the cap to the bag by relative movements of the cap and bag comprising spurs provided on the cap to pierce and interlock with the bag, said spurs extending inwardly of the cap and disposed in generally opposite directions at intervals about the inner circumferential face of the cap near its edge.

8. A removable cartridge for a filter comprising a bag of filter material, a rigid cap provided with integral means to fix the cap to the bag.

9. A removable cartridge for a filter comprising a bag of filter material, a dome-shaped cap, and spurs integral with the cap to fix the cap to the bag, said spurs piercing the bag and interlocking therewith.

JAMES W. WILKINSON.

WILLIAM MORGAN.

THOMAS EDWARD ALDHAM.

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