June 8, 1943. A. R. WHITE 2,320,990

OIL REFINER PACK

Filed Jan. 8, 1940 2 Sheets-Sheet 1

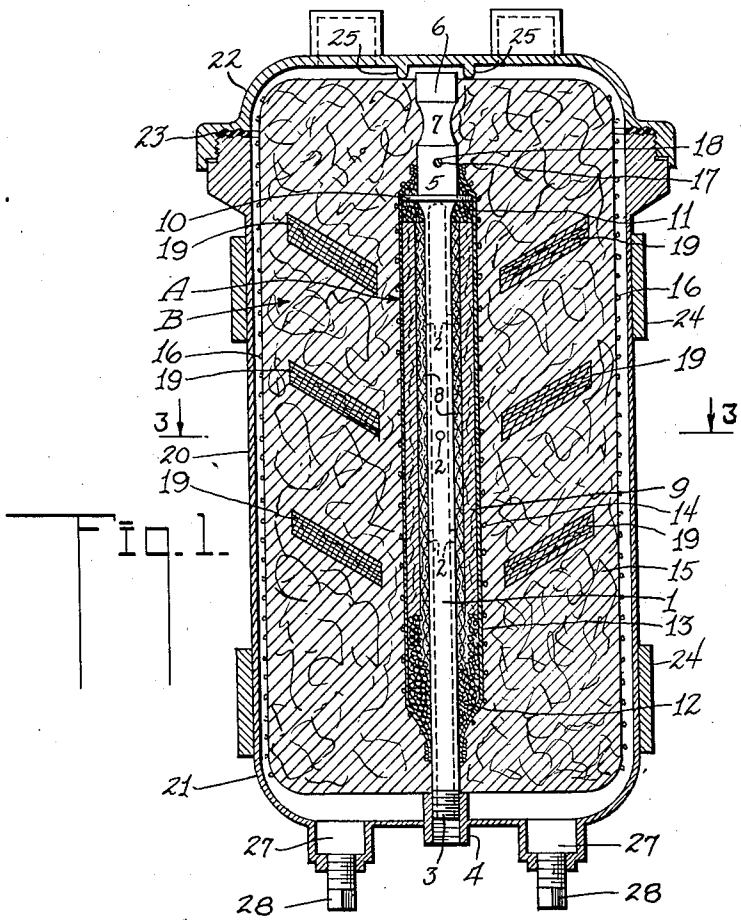


Fig. 1.

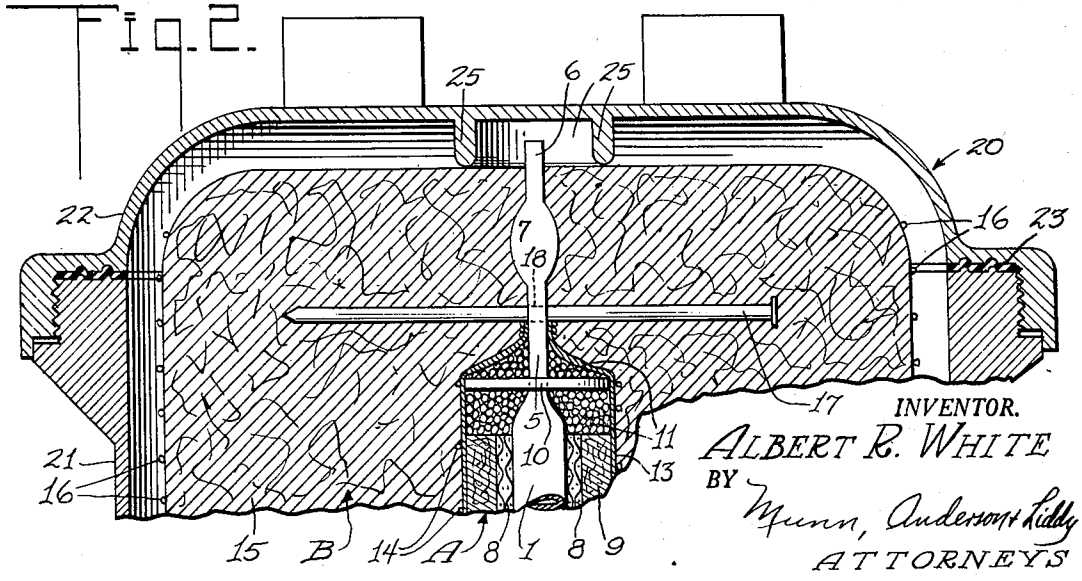


Fig. 2.

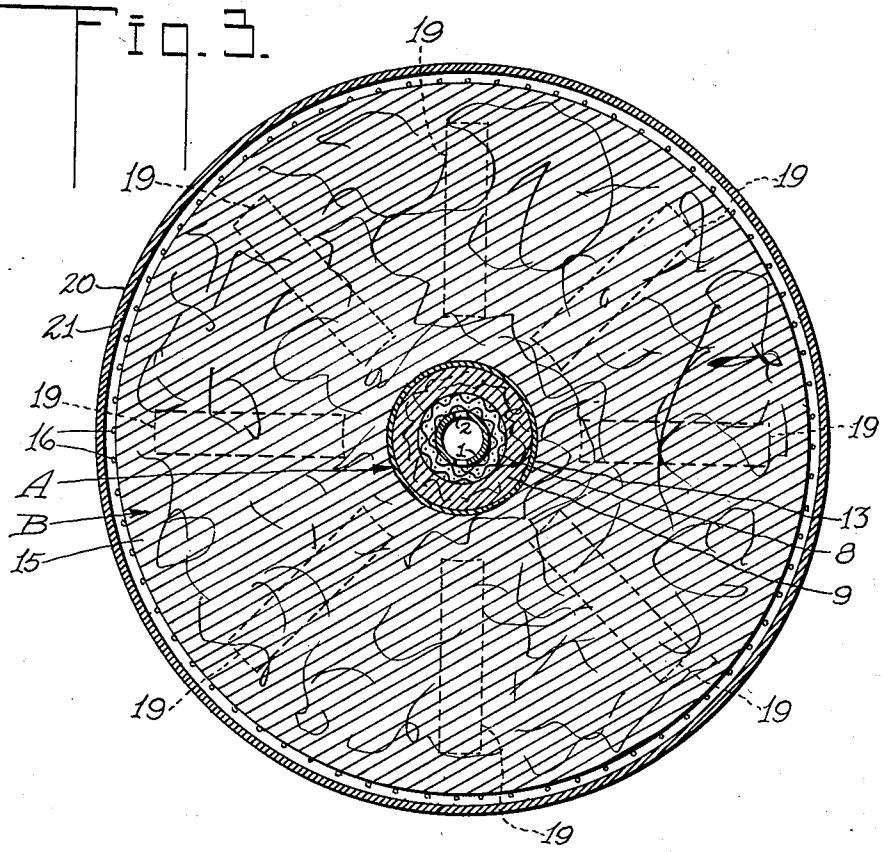
INVENTOR.
ALBERT R. WHITE
BY
Munn, Anderson & Liddy
ATTORNEYS

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Fig. 3.



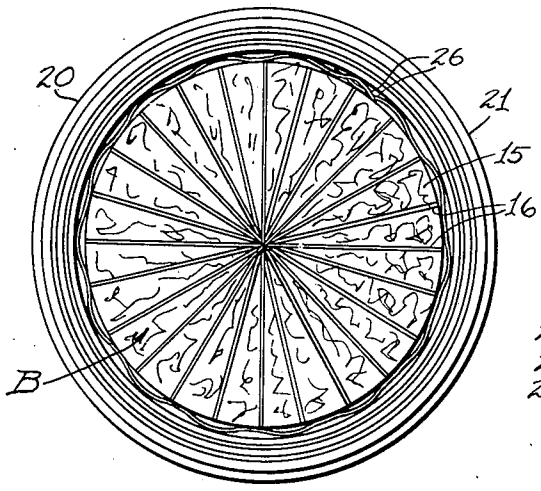


Fig. 4.

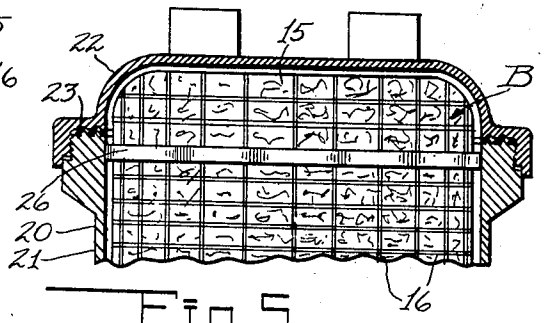


Fig. 5.

INVENTOR
ALBERT R. WHITE
BY
Munn, Anderson & Liddy
ATTORNEY

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2,320,990

OIL REFINER PACK

Albert R. White, Glendale, Calif.

Application January 8, 1940, Serial No. 312,986

9 Claims. (Cl. 210—131)

My invention relates to improvements in an oil refiner pack, and it consists of the combinations, constructions and arrangements hereinafter described and claimed.

An object of my invention is to provide an improvement over the form of the oil refiner pack shown in my co-pending applications, Serial No. 234,968, filed October 14, 1938, now Patent No. 2,274,113, and on an Oil refiner pack, Serial No. 274,953, filed May 22, 1939, now Patent No. 2,279,699. In application Serial No. 234,968, now Patent No. 2,274,113, I show an oil refiner pack in which the body is keyed to a centrally disposed oil outlet tube. The tube is enclosed in a screen and the screen is enclosed in a loofah sponge. In application Serial No. 274,953, now Patent No. 2,279,699, I show oil conveying wicks that extend from the outer periphery of the pack to the interior for the purpose of more rapidly conveying oil to the central portion of the pack and causing this portion to cooperate with the rest of the body in refining oil.

I have found that when the wicks extend from the outer pack periphery to the core, too great a quantity of oil is immediately delivered to the center of the pack to permit proper cleaning. In the present form of the invention, I have therefore used wicks whose outer ends are spaced inwardly from the pack periphery, and whose inner ends are spaced a slight distance from the pack core. This causes the oil to flow through an appreciable portion of the pack before reaching the wicks and thus reduces the rapidity of oil flow. The oil flow is again slowed up as it passes from the inner ends of the wicks to the core.

A further object of my invention is to provide a central core for the pack which comprises the perforated outlet tube, the screen and the loofah sponge. The oil outlet tubing extends entirely through the pack and has its upper end received in a cup-shaped portion formed in the inner surface of the casing cover. The rim or flange of the cup holds the top of the tube against too great a lateral movement and this will prevent the bottom of the tube from breaking at the point where it is connected to the casing outlet.

I provide novel means for preventing the oil from moving downwardly along the sides of the tube and passing directly into the tube interior through the perforations. This is accomplished by wrapping string or other oil refining material tightly around the tube near each end thereof. The tightly wound string prevents the oil from flowing inwardly along the sides of the tube to the tube perforations. The pack core consisting of the tube, screen, and loofah sponge, together with the tightly wound string, is enclosed in a fabric sleeve. The oil refining material is then built up around the core.

The pack is keyed to the core by any suitable means such as a pin passed through an opening in the oil outlet tube. A modified form of invention for holding the top of the pack against lateral movement with respect to the casing, comprises a corrugated strip of resilient material placed around the pack near its top and bearing against the interior of the casing wall.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming a part of this application, in which

Figure 1 is a vertical section through the pack showing it mounted in the casing;

Figure 2 is an enlarged sectional view of the upper portion of Figure 1 and taken at right angles thereto;

Figure 3 is an enlarged horizontal section taken along the line 3—3 of Figure 1;

Figure 4 is a top plan view of the pack and casing with the cover removed and illustrating the corrugated strip or marcel spacing member for holding the top of the pack against lateral movement; and

Figure 5 is a side elevation of Figure 4 showing the pack in elevation and the casing in section.

In carrying out my invention, I provide a pack which comprises a core A and a body portion B. The core A consists of a central tube 1 provided with a number of openings 2 for receiving oil. One end of the tube is threaded at 3 and is removably disposed in an interiorly threaded boss 4 of an oil refiner casing. Near the top of the tube, I provide a flattened portion 5 which will close the interior of the tube at this point. The tube is again flattened at its end, as at 6 and the two flattened portions are separated from each other by a cylindrical portion 7. The flattened portions seal the top of the tube and therefore any oil entering the tube interior through the openings 2 can only pass from the tube through the outlet end 3. The flattened end 6 closes the top of the tube.

The core A includes the tube 1, a screen 8 and a loofah sponge 9. The screen 8 is wrapped around the tube at a point below the flattened portion 5 and covers the tube open-

ings 2. The screen itself is enclosed in the loofah sponge 9 and the purpose of the sponge is to remove water from the oil while permitting the oil to pass therethrough. I have also provided novel means for preventing oil flowing inwardly from the tube ends and along the outer wall of the tube from the outside of the pack toward the openings 2 and entering the openings. A disc 10 is disposed adjacent to the flattened portion 5 and string 11 or other oil filtering material is wrapped tightly around the tube portions disposed adjacent to the disc 10. The string 11 retards and filters any oil that might flow along the outer wall of the tube from the outside of the pack. I also provide similar oil filtering material near the lower end of the tube. A string or other filtering material 12 is wrapped tightly around the tube 1 and extends below the lower end of the screen 8 and the loofah sponge 9.

I enclose the screen 8, sponge 9 and the windings of string 11 and 12 in a cloth sleeve 13 and the sleeve is held in position by a helical winding of string shown at 14. The upper and lower ends of the cloth casing are closed down upon the tube and are tightly held in place by the string 14 whose ends are wrapped a number of times about the tube portions as clearly shown in Figure 1 of the drawings.

I have described the construction of the central core A and I will now set forth the particular construction of the pack body B. The body is composed of an oil filtering material which may be in the form of cotton waste and I have indicated the material by the reference numeral 15. The fibrous material forming the body is spiculated to form a multiplicity of criss-crossing threads throughout the entire body. This will increase the oil refining action of the body. The multiplicity of criss-crossed small fibrous pieces in the body will give a spring-like construction thereto and permit it to change in size with variations in oil pressure. In order to obtain small pieces of waste cotton, I first preferably pull the cotton waste apart and then repack it into the shape of the body 15. The waste upon being pulled apart is cut up in small pieces and these pieces will arrange themselves in a multiplicity of criss-cross patterns when they are again packed together. The cotton waste has a high cellulose content and is slightly alkaline or neutral and will therefore remove acids from the oil up to the saturation point of the pack.

The pack body 15 is enclosed in a casing of string 16 or other yielding retaining means, and this string covers all parts of the exterior body surface. Figure 1 shows the flat portion 6 of the tube projecting above the top of the pack and shows the threaded portion 3 extending below the bottom of the pack. The body 15 is keyed to the tube by means of a pin 17, see Figure 2, that is passed through an opening 18 formed in the flat portion 5. This pin or nail 17 causes the tube 1 to rotate when the pack is rotated and thus the tube can be screwed into and from the boss 4.

In my co-pending application Serial No. 274,953, I show wicks extending from the periphery of the pack to the center. I have found that these wicks convey too great a quantity of oil to the pack core. In the present case I show wicks 19 extending from a point spaced inwardly from the pack periphery to a point spaced from the central core. This will cause the oil to flow through a portion of the pack material before it reaches the wick ends. The wicks will more rapidly convey the oil toward the center of the pack than will the material forming the pack. Since the wicks terminate a spaced distance from the central core, the oil will again have to flow through the pack body after it leaves the wicks and before it reaches the core. This construction gives the advantage of causing the inner portions of the pack body to be used for oil refining purposes to the same degree as the outer portions of the filtering material.

In Figure 3, I show the wicks extending radially from the core and in Figure 1 I show the wicks inclined downwardly at a slight angle. The wicks may assume any desired position so long as they will be spaced from the periphery and from the core. Each wick is preferably formed from a plurality of layers (see Figure 1) of oil cleaning material. The layers extend throughout the length of the wicks and the oil will more readily pass along between adjacent layers from the outer ends of the wicks to the inner ends. The wicks themselves will act as oil refining means as well as more rapid oil conveyors.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

The oil refiner pack is removably disposed in the boss 4 of the oil refiner casing 20. The casing is described and claimed in my co-pending application, Serial No. 312,987, filed January 8, 1940, and therefore will not be described in detail in this application except where it cooperates with the pack. The casing has a body portion 21 for receiving the pack and a cover 22 screwed down upon the body portion. A gasket 23 is placed between the cover 22 and body 21. Brackets 24 or other suitable means secure the casing to a supporting surface not shown.

The purpose for the flat tube portion 6 projecting above the pack top is to provide means for holding the top of the pack centered. The interior of the cover 22 has an inwardly extending annular flange 25, see Figures 1 and 2, for receiving the flat portion 6. The flange 25 holds the flat portion 6 from moving laterally in the casing and this prevents the tube 1 from breaking off at its connection with the boss 4.

Another means for holding the top of the pack from lateral movement is shown in Figures 4 and 5. A strip of corrugated strip spring metal 26 is bent around the pack and bears against the casing interior near the rim of the body 21. The strip holds the pack top in position. The tube 1 need not project through the pack top when the spring strip 26 is used and this is the reason why Figure 4, shows the tube 1 covered by the pack. Figure 5 shows the cover 22 without the flange 25 and illustrates the position of the strip 26.

The pack offers a combined wide surface area for cleaning the oil and a solid mass of oil cleaning material between the pack surface and the core. The pack is screwed into the casing and removed therefrom as a unit. The oil enters an opening (not shown) in the casing wall and leaves through the boss 4. The pack is spaced from the interior surfaces of the casing except for the connection with the boss 4 and this permits oil under pressure from the engine (not shown) to entirely enclose the pack. The oil will therefore flow inwardly into the pack from all surfaces thereof.

The wicks aid in causing all interior portions of the oil pack to perform their oil cleaning functions. This prevents the outer portions of the pack from loading up with foreign material more quickly than the inner portions. The string casing 16 permits the pack to breathe as the oil pressures vary and this will cause the side wall of the pack to flex and drop any foreign matter adhering thereto. This foreign material will gravitate to the casing bottom and be retained in the oil sumps 27, see Figure 1. Screw plugs 28 can be removed from the sumps from time to time to permit the foreign matter to drain out.

The closed end 6 of the tube projects beyond the top of the pack in order to be received within the flange 25, and the oil is prevented from entering the pack along the outer side of the tube 1 and passing directly to the openings 2 because of the tightly wound string or fibrous material 11 and the disc 10 that will deflect any such flow of oil back into the pack body. The same holds true should any oil tend to pass upwardly along the tube from the lower end of the pack. The soft cotton cord or string 12 deflects oil into the pack for cleaning and cleans any oil passing through the cord. The oil is cleaned as it passes through the pack and it gives up any water vapor as it flows through the loofah sponge 9. The casing or retaining fabric 13 for the core is preferably linen or muslin and further acts as a fine screen for the oil.

While I have shown only the preferred forms of my invention, it should be understood that various changes or modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. An oil refiner pack comprising a perforated oil outlet tube closed at one end, a disc mounted on the tube near the closed end, oil absorbing and deflecting means wrapped tightly about the tube adjacent to the disc, the other end of the tube also having oil absorbing and deflecting means wrapped tightly therearound, and oil refining material enclosing the tube with the exception of the open end.

2. A core for an oil refiner pack comprising a perforated oil outlet tube closed at one end, a screen covering the perforations, a loofah sponge enclosing the screen, oil deflecting and cleaning material wrapped tightly about the tube adjacent to the ends of the screen and sponge, and a fabric sleeve enclosing the screen, sponge, and oil deflecting material.

3. A core for an oil refiner pack comprising a perforated oil outlet tube closed at one end, a screen covering the perforations, a loofah sponge enclosing the screen, oil deflecting and cleaning material wrapped tightly about the tube adjacent to the ends of the screen and sponge, and a fabric sleeve enclosing the screen, sponge, and oil deflecting material, said oil deflecting material also including a disc secured to the tube and covered by the fabric sleeve.

4. In an oil cleaning pack, a perforated oil outlet tube, a body formed from oil cleaning material and enclosing the tube except the outlet end, and wicks placed in certain portions of the body and being downwardly inclined toward the tube for permitting the oil to flow more quickly through these portions toward the tube, the inclination of the wicks also aiding the oil flow therethrough due to gravity, said wicks being entirely embedded in the body.

5. An oil cleaning pack comprising a core having a perforated oil outlet tube, oil deflecting and cleaning string disposed adjacent to and wrapped terial 11 and the disc 10 that will deflect any tightly around each end of the tube for causing any oil flowing along the tube wall to be deflected away from the wall, some of the oil passing through the string and being cleaned, and an oil refining body enclosing the core.

6. In an oil cleaning pack, a core having a perforated oil outlet tube closed at one end and open at the other, oil refining and deflecting string disposed adjacent to and wrapped tightly around each end of the tube to cause any oil flowing along the tube wall to be deflected therefrom, some of the oil passing through the string and being cleaned, the portion of the perforated tube lying between the tube ends being free of the string, and a body formed from oil cleaning material and enclosing the perforated portion of the tube.

7. In an oil cleaning pack, a core having a perforated oil outlet tube with one closed end, a screen enclosing the perforated portion of the tube, a loofah sponge enclosing the screen, oil cleaning and deflecting string wrapped tightly around the tube and adjacent to the ends of the screen, and an oil filtering fabric enclosing the sponge and oil deflecting string.

8. In an oil cleaning pack, a core having a perforated oil outlet tube with one closed end, a screen enclosing the perforated portion of the tube, a loofah sponge enclosing the screen, oil cleaning and deflecting string wrapped tightly around the tube and adjacent to the ends of the screen, and an oil deflecting impervious member disposed near the closed end of the tube.

9. An oil cleaning pack comprising a core having a perforated tube closed at one end, a screen covering the perforations, a loofah sponge covering the screen, oil deflecting string wrapped tightly around the tube adjacent to the ends of the screen, a fabric enclosing the sponge and oil deflecting string and having its ends secured to the tube, a body of oil cleaning material enclosing the core, wicks embedded in the body for rapidly conveying oil toward the body portion disposed near the tube, thereby causing interior portions of the body to function sooner as oil cleaning means, and a yielding retaining member for the body permitting the body to flex under varying oil pressures.

ALBERT R. WHITE.