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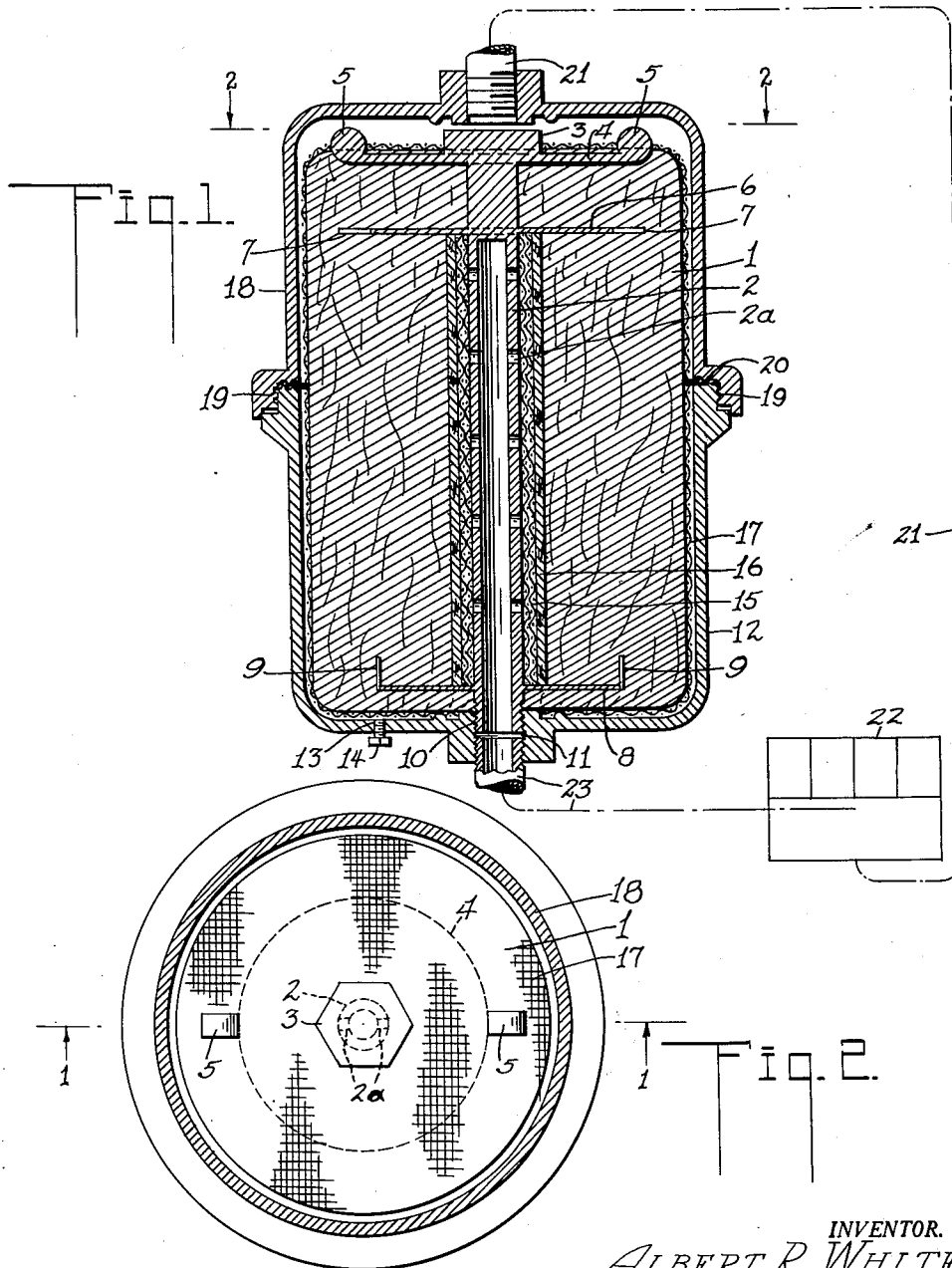
A. R. WHITE

2,279,699

OIL REFINER PACK

Filed May 22, 1939

2 Sheets-Sheet 1



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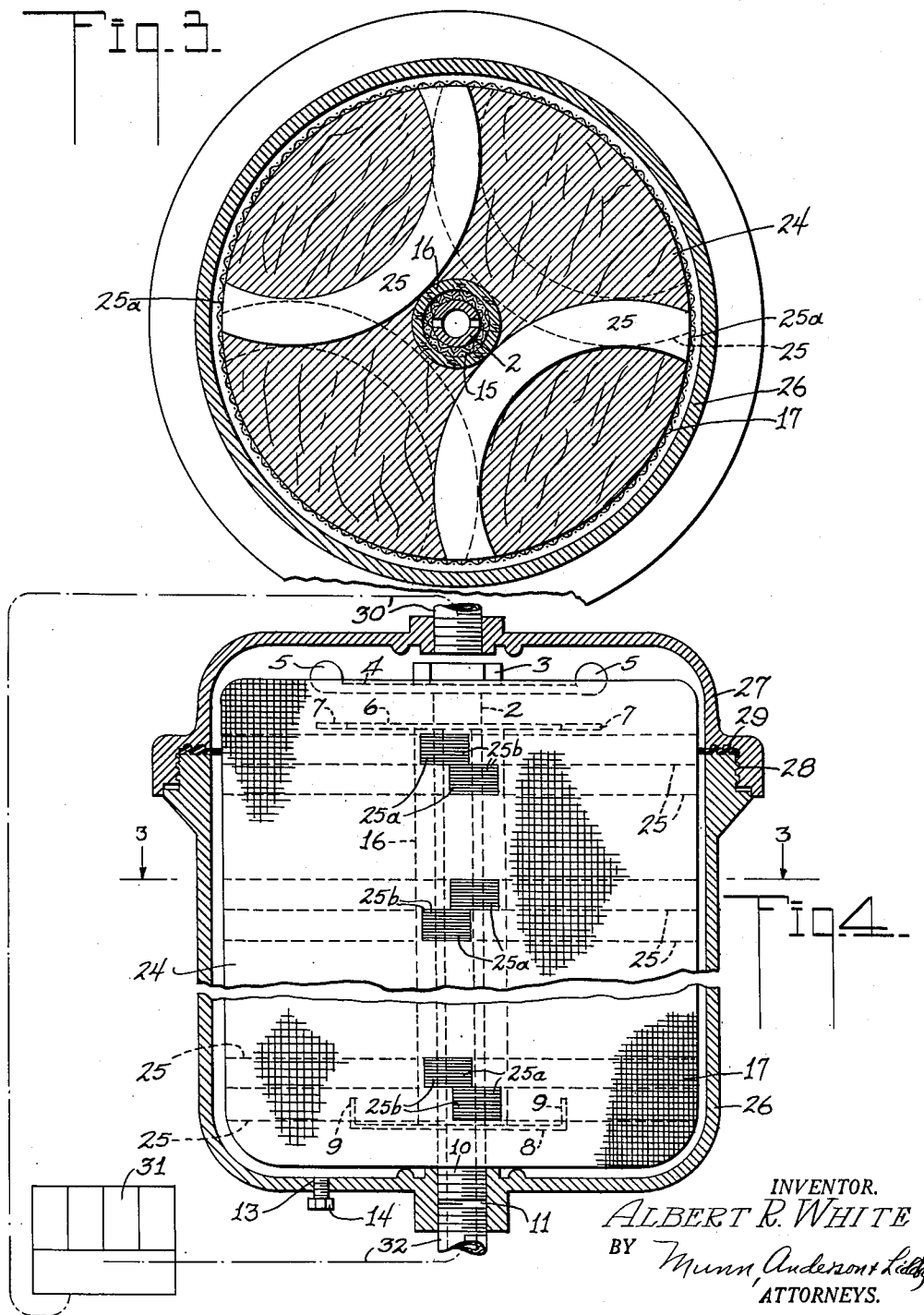
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UNITED STATES PATENT OFFICE

2,279,699

OIL REFINER PACK

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Application May 22, 1939, Serial No. 274,953

6 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 improved oil refiner pack over the form of my invention shown in my co-pending application, Serial No. 234,968, filed October 14, 1938. In the co-pending case, I show an oil refiner pack in which a centrally disposed and perforated outlet pipe has a screen and a sponge placed around it so that oil entering the pack will have to pass to the center of the pack and therefore the oil will be cleaned and the water removed therefrom before the oil reaches the outlet pipe. In the present invention, the perforated outlet pipe and the means for connecting the fiber pack to the outlet pipe are made in a single casting and this does away with the necessity of placing a nail in the opening in the pipe for securing the pipe to the pack as shown in my co-pending application, Serial No. 234,969.

In a modified form of the present pack, I provide wicks that extend from the periphery of the pack and inwardly toward the center to act as ducts for carrying the oil more quickly from the periphery toward the center of the pack. The outer surface of the pack soon becomes covered with a layer of sludge from the oil and this sludge slows up and eventually stops the flow of oil through the pack, even though the interior of the pack disposed near the outlet pipe may still be clean. The special oil passageways formed by the wicks permits the oil to quickly pass into the interior of the pack where it may be cleansed by a portion of the filtering material that has not become contaminated. The waste material forming the pack is spiculated or formed into a multiplicity of needle-like bodies or threads. These spicules or threads are arranged in criss-crossing relation throughout the entire pack which will increase its refining action. The cotton waste has a high cellulose content and the pack is slightly alkaline or neutral and will remove acids from the oil up to the saturation point of the pack.

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 along the line 1—1 of Figure 2, through the refiner pack and casing

and illustrates how the outlet pipe is cast and has integral discs and arms;

Figure 2 is a section along the line 2—2 of Figure 1;

Figure 3 is a modified form of the filter and is a section taken substantially along the line 3—3 of Figure 4; and

Figure 4 is a side elevation of the refiner pack and a section of the casing shown in Figure 3.

In carrying out my invention, I will first describe the form of the oil refiner pack shown in Figures 1 and 2. The pack indicated generally at 1 is formed from cotton waste or the like, in which the waste has been pulled apart and then placed together to form a finer criss-crossing of the threads. The material is placed around a perforated outlet pipe 2. Figure 2 shows the pipe provided with a nut 3 and a disc 4, both being cast integral with the pipe. The disc has handles 5 and Figure 1 shows that the handles and the nut project above the top of the pack for a purpose hereinafter described.

I provide means for preventing the pack 1 from rotating around the pipe 2. Near the disc 4, I mount a second disc 6 that is also integral with the pipe and is cast as a part thereof. The disc 6 has projections 7 that extend into the pack and prevent rotation between the pack and the disc. Still another disc 8 is disposed near the bottom of the pipe 2 and is integral therewith. The projections 9 in this disc are bent upwardly and act to unite the refining material 1 with the pipe 2 so that a rotation of the pack will rotate the pipe. The pipe extends below the bottom disc 8 and is threaded at 10 so as to be removably received in a threaded bore 11 in the lower portion 12 of an oil filter casing. The lower portion has a drain opening 13 closed by a plug 14.

The perforations 2a in the pipe 2 are covered by two layers of a screen 15 and the screen preferably extends between the discs 6 and 8. Around the screen 15 I dispose a layer of a loofah sponge 16 and this sponge will remove water from the oil without stopping the oil from passing there-through. The refining material 1 is covered by means of a screen 17 that will permit the oil pack to be compressed when the oil pressure increases and to expand when the oil pressure is reduced. This "breathing" action of the pack causes the screen to loosen the sludge accumulating on the outer surface of the pack and this sludge will drop to the bottom of the casing where it will be trapped and be kept separated from the normal flow of oil. The lower portion 12 of the casing is threaded to receive an upper

portion or cover 18 that may be screwed down upon the threaded portion 19. A gasket 20 is placed between the two parts 12 and 18 of the casing. The construction of the casing is the same as that described and claimed in my co-pending application Serial No. 234,969, and therefore no further description need be given.

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

It will be noted from Figure 1 that the handle 5 and the nut 3 project above the top of the pack 1. This permits the pack to be screwed into the threaded opening 11 by using a wrench on the nut 3 or by using the hands in rotating the handles 5. The cover 18 has an oil inlet pipe 21 leading from an engine indicated diagrammatically at 22. The oil enters the casing by means of the pipe 21 and then fills the space between the pack and the interior surface of the casing. The pressure of the oil entering the casing causes it to be forced through the pack and into the outlet pipe 2. The oil is cleaned during this movement by the pack 1 and the moisture is removed by the sponge 16. The oil then leaves the device through the pipe 2 which communicates with a return oil pipe 23. The pipe 23 conveys the oil back to the crankcase of the engine and this completes the cycle.

The novel features of the invention includes the forming of the pipe 2, discs 4, 6 and 8, and nut 3 by a single casting. The oil cleaning material is held against rotation with respect to the discs and pipe by the projections 7 and 9. A sturdy and efficient oil refiner pack is thus provided.

In Figures 3 and 4 I show a slightly modified form of oil refining pack. In this form of the device, the pack 24 has wicks 25 placed therein at different elevations. I have found the best results from wicks arranged in groups of four, the wicks themselves being in the shape of an arc. Figure 3 shows two of the wicks in one group lying in one plane and the other two wicks of the same group lying immediately below the first two. The ends 25a of the wicks extend to the periphery of the pack 24 while the middle portions lie close to the center of the pack. Each wick is formed from a plurality of layers of oil cleaning material shown at 25b in Figure 4. The layers are placed in a horizontal plane and the oil will more readily pass along between the adjacent layers in the wicks toward the center of the pack and in this way the oil will reach the center of the pack more quickly. This will cause the center of the pack to be used for oil cleaning purposes even though the outer surface of the pack becomes contaminated with a layer of sludge. The oil entering the interior of the pack by means of wicks, will be cleaned by the wicks and by that portion of the pack disposed nearer the center. The entire pack will therefore be used in the cleaning of oil before the pack reaches a condition where it will not be able to continue cleaning the oil. Without the wicks, the layer of sludge on the pack and the foreign material embedded in the pack adjacent to the periphery will possibly stop the pack from functioning as a cleaner even though the interior of the pack still has a sufficient amount of clean filtering material to cause the device to function for a considerable longer period of time before a new pack is needed. With the provision of the wicks, this disadvantage is overcome and the en-

tire interior of the pack is gradually used for absorbing foreign matter from the oil.

In Figure 4 I show three groups of wicks, each group containing four wicks. It is obvious that the number of wicks in each group, the number of groups, and the particular arrangement of the wicks may be altered so long as the wicks will quickly carry the oil to the pack center. I have found that the best results are obtained by providing each wick with twenty-four layers of material, although I do not wish to be confined to any exact number.

The pack 24 is built exactly the same as the pack 1 except that it has wicks. Like reference numerals will therefore be applied to parts in the pack 24 that are similar to the pack 1. The construction of the casing is the same as that shown in my co-pending application Serial No. 234,969, and it has a lower portion 26 and a cover 27 threaded to the portion 26 at 28. A gasket 29 is placed between the cover and the portion 26. An inlet pipe 30 leads from an engine 31 to the top of the cover and an outlet pipe 32 communicates with the pipe 2 and conveys the oil back to the crankcase of the engine.

As already stated, the cotton waste used in making the oil refiner pack, is pulled apart to reduce the length of the threads and prevent wadding. The pack will be spiculiform in construction and the smaller fibers will criss-cross with each other to a far greater degree than is otherwise possible. The density of the pack will be uniform throughout and the cleaning effect of the pack on the oil will be greater. In fact, the oil refining action of the pack is equivalent to clay as a cleaner. Clay has an abrasive action to the moving parts of the engine and therefore the elimination of this material as an oil refiner without lessening the oil refining advantages of the pack, produces a more efficient oil cleaner. The mechanical treating of the cotton waste by pulling it apart in the manner stated and then reassembling it in criss-cross fashion, does away with the necessity of using clay or other abrasive cleaners that might get into the oil stream because the criss-crossed fibers thoroughly clean the oil.

The multiplicity of criss-crossed small pieces also gives a spring-like construction to the pack and permits it to change in size due to changes in oil pressures. This gives a breathing action to the pack and causes sludge which normally might adhere to the wall of the pack, to drop to the casing bottom and out of the path of the main oil stream. The pack will refine the oil by removing water and acid and by removing solids.

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 refining pack comprising a perforated oil outlet pipe, an oil refining material disposed around the pipe, one end of the pipe being closed and having an oil-deflecting disc integral therewith, the disc having handles that project above the top of the pack to give unobstructed access to the handles, the opposite end of the pipe being threaded and projecting beyond the bottom of the pack, said handles being positioned for use in screwing the threaded pipe portion into a threaded bore.

2. An oil refining pack comprising a perforated

oil outlet pipe, an oil refining material disposed around the pipe, one end of the pipe being closed and having an oil-deflecting disc integral therewith, the disc having handles that project above the top of the pack to give unobstructed access to the handles, the opposite end of the pipe being threaded and projecting beyond the bottom of the pack, said handles being positioned for use in screwing the threaded pipe portion into a threaded bore, and means connecting the refining material to the pipe so that both can be rotated as a unit in response to turning movement imparted to said handles.

3. An oil refiner pack comprising a quantity of oil refining material arranged into a body, a perforated pipe centrally disposed in the body and having its outlet extending beyond the body, and wicks extending from an outer section of the pack and inwardly for acting as oil conductors to facilitate the flow of oil from the periphery of the pack, toward the center.

4. In an oil refiner having a central perforated pipe, oil refining material enclosing the pipe except for one end, wicks placed in the material and having their ends lying flush with the periphery of the refining material, said wicks being

arcuate in shape with their mid-portions disposed close to the pipe.

5. An oil refiner pack comprising a perforated pipe, a screen disposed around the pipe, a layer of sponge disposed around the screen, a body of oil refining material enclosing the screen, sponge and pipe with the exception of the outlet end of the pipe, and wicks placed in the material and having their ends lying flush with the pack periphery, said wicks extending close to the sponge for quickly conveying the oil from the outside of the pack to the center.

6. An oil refiner pack comprising a perforated oil outlet pipe, an oil refining material disposed around the pipe, the pipe extending entirely through the material, one end of the pipe being closed and carrying an integral disc and nut, the nut projecting beyond the end of the material, said disc having handles that project beyond the same end of the material, the opposite end of the pipe being threaded, said pipe being screwed into a threaded bore of a casing by first manually turning the handles for initially rotating the pipe into the bore and then using a wrench for rotating the nut for tightening the pipe in place.

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