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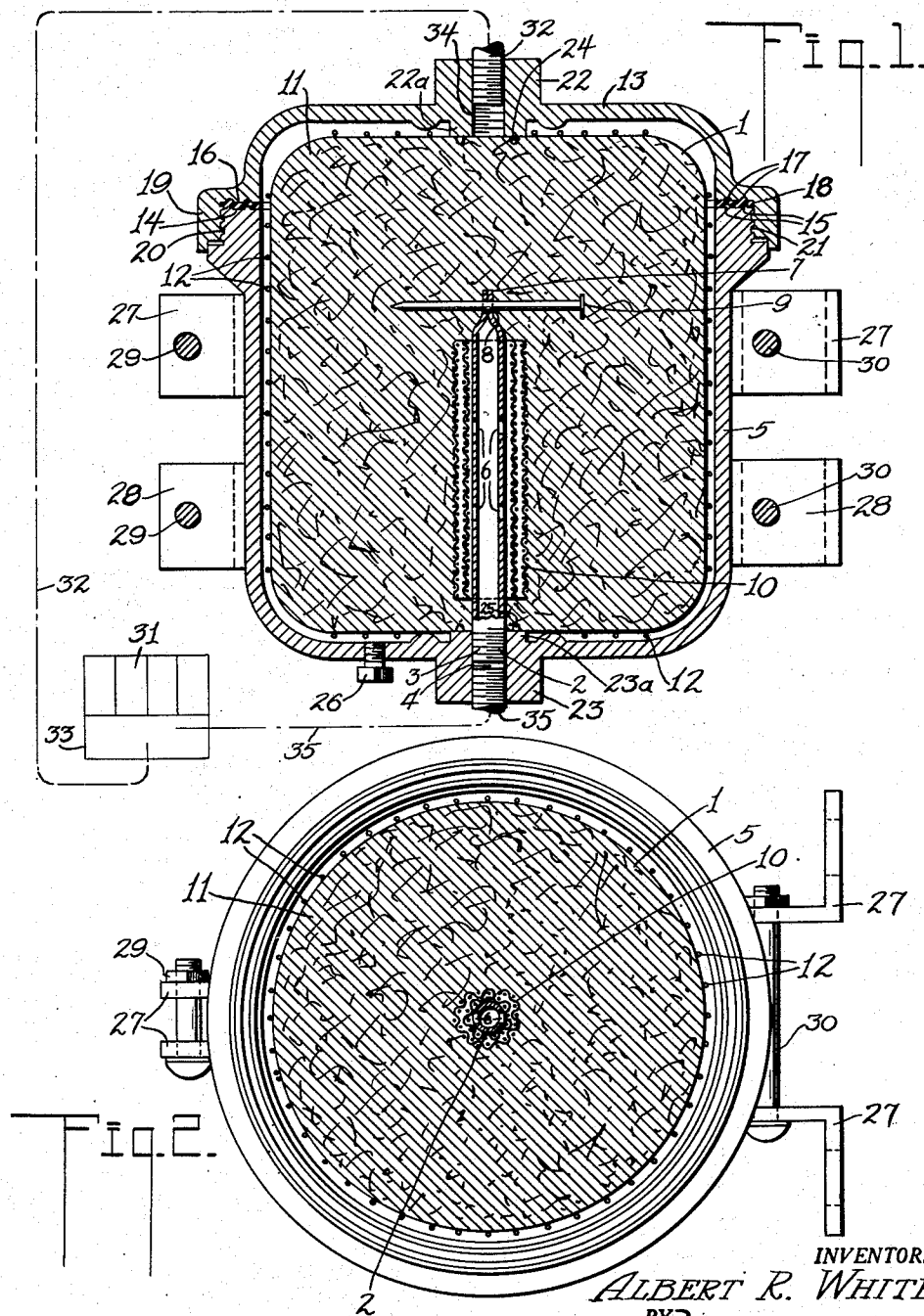
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2,274,113

OIL REFINER PACK

Filed Oct. 14, 1938

2 Sheets-Sheet 1



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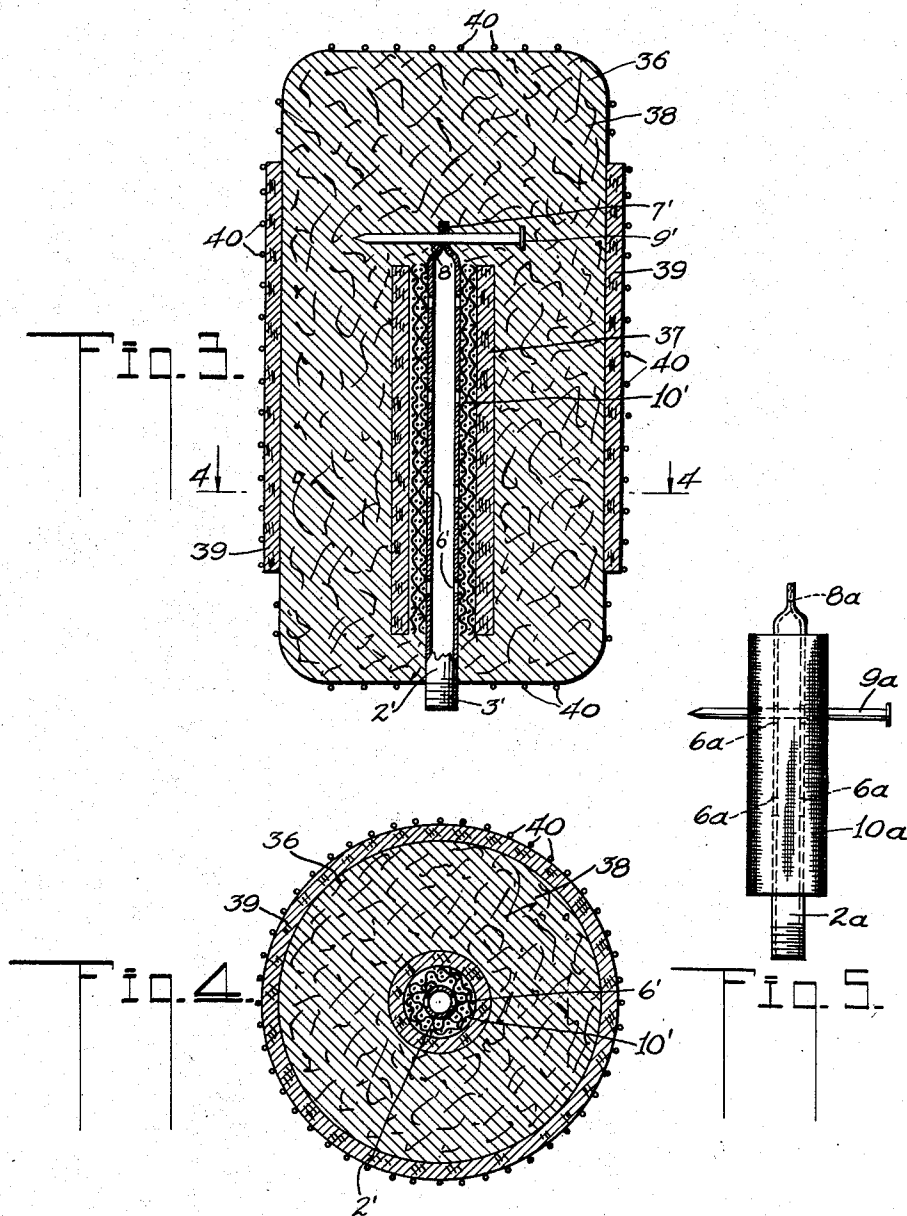
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2,274,113

OIL REFINER PACK

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Application October 14, 1938, Serial No. 234,968

6 Claims. (Cl. 210—131)

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

An object of my invention is to provide an oil refiner pack which is designed to be placed in the oil refiner casing shown in my co-pending application Serial No. 234,969, filed October 14, 1938 now Patent No. 2,249,071. The oil refiner pack comprises a body of filtering material enclosing an oil outlet pipe. The material is preferably formed from cellulose or cotton fabric that has been separated into small pieces and then these pieces are bunched together to form a body of uniform density throughout.

The pipe is preferably perforated and the perforated portion is enclosed in a screen that will prevent the filtering material from passing into the openings. The inner end of the pipe is closed and carries a member such as a nail that is embedded in the filtering material and acts as a key for securing the pipe to the pack so that a rotation of the pack will also rotate the pipe.

The filtering material is held in the proper shape by means of string or other suitable enclosing means that is wrapped around the outside of the pack. The fluffy condition of the filtering material makes the pack resilient in that it can be compressed when subjected to high oil pressure and then it will expand when the oil pressure is reduced. This flexing of the outer surface of the pack will cause any foreign matter adhering to the outer surface, to be freed from the surface, and to drop to the bottom of the casing. The casing bottom acts as a trap for retaining the foreign matter. In this simple way the pack is self-cleaning and the foreign matter is removed from the oil stream.

In a modified form of pack, I provide a layer of water-absorbing material, such as cork or a loofah sponge for surrounding the screen and a second layer of cork or sponge for surrounding the exterior surface of the pack. This modified form of pack is primarily used in oil refiner casings connected with marine engines where it is desired to remove water from the oil. The cork or sponge will absorb the water, but will not absorb the oil. It is possible to pass the nail through an opening provided in the closed end of the pipe or it may be passed through certain of the aligned perforations in the pipe. In the latter case, the nail will be forced through the screen and will aid in holding the screen in position on the pipe.

The device is extremely simple in construction

and is durable and efficient for the purpose intended.

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

10 Figure 1 is a vertical section through a pack and casing, showing the interior construction of the pack;

15 Figure 2 shows a top plan view of the casing with the cover removed and the pack is shown in section;

Figure 3 is a vertical section through a modified form of an oil refiner pack;

Figure 4 is a section along the line 4—4 of Figure 3; and

20 Figure 5 is a view of another modified form of the invention.

In the form of the invention shown in Figures 1 and 2, an oil refiner pack is indicated generally at 1. This pack consists of a pipe 2 that is threaded at 3 and is designed to be screwed into a threaded bore 4 of a casing 5. The pipe 2 is perforated at 6 and has its inner end closed as at 7. The closed end of the pipe has an opening 8 therein for receiving a member 9 such as a nail. A screen 10 encircles a portion of the pipe 2 and covers the openings 6.

30 The oil filtering portion of the pack is composed of cellulose material indicated generally at 11 and the particles of the material are separated from each other in order to prevent any compact portions from forming. The particles when separated in this manner and then brought together, will provide a filtering body that is resilient in construction. The material is placed around the pipe 2 so that it will enclose all of the pipe with the exception of the threaded portion 3. Any suitable means may be used for holding the material together to form the shape shown. In Figures 1 and 2, I show a string 12 45 that is wrapped around the material 11 and holds it in proper position. The screen 10 prevents particles of the material from passing through the openings 6 and the nail 9 acts as a key for connecting the body 11 with the pipe 2 so that a rotation of the body will rotate the pipe and cause it to enter the threaded bore 4 or be removed therefrom.

50 The casing 5 and cover 13 are of special design and are described and claimed in my co-pending application Serial No. 234,969, filed Oc-

tober 14, 1938 now Patent No. 2,249,071. The casing 5 has a shoulder 14 provided with two concentric ridges 15. The cover 13 has a shoulder 16 that has two concentric grooves 17. A rubber gasket 18 is placed between the two shoulders. The cover 13 also has a flange 19 that is internally threaded at 20 and the threads mesh with a threaded portion 21 on the casing 5. The cover when screwed into place, will cause the ridges 15 to force the gasket 18 into the grooves 17 and thus make an oil-tight seal.

The cover 13 is further provided with a projection 22 that is non-circular in shape and this projection is adapted to receive a wrench or other tool when the cover is secured to the casing or removed therefrom. In like manner, the casing 5 has a projection 23 that is also non-circular in shape. A wrench may be applied to the casing for holding it against rotation when the cover is applied or removed. Both projections 22 and 23 have inwardly extending portions 22a and 23a and each of these portions carry pins 24 and 25 respectively, that are designed to engage with the oil refiner pack which will prevent its accidental rotation within the casing. The bottom of the casing carries a drain plug 26.

The casing is removably secured to a support, not shown, by clamps 27 and 28. Each clamp is composed of two strips that are held together by bolts 29 and 30. An engine is shown diagrammatically at 31 in Figure 1, and an oil inlet pipe 32 leads from the crank case 33 of the engine to an oil inlet bore 34 in the projection 22. A return oil pipe 35 leads from the oil outlet bore 4 back to the crank case 33 and completes the oil circuit.

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

As the engine 31 changes its speed, the oil pump, not shown, will force oil at varying pressures through the pipe 32 and into the casing 5. When this oil pressure is high, the refiner pack 1 will be compressed and reduced in size, due to the yielding quality of the material forming the pack. Any foreign particles carried by the oil will be filtered out by the pack and a good portion of these foreign particles will adhere to the outer surface of the pack. When now the engine 31 reduces its speed, the oil pressure will likewise be reduced and the resiliency of the pack will cause it to expand and to return to its normal size. These continued variations in the oil pressure produces a flexing of the outer surface of the pack, and this flexing will remove sludge that has adhered to the outer surface of the pack and permit it to drop by gravity to the bottom of the casing. This sludge cannot enter the return pipe 35 because the pipe 2 closes the bore 4. In this simple way, the pack will clean itself and will have a much longer life than would otherwise be possible.

It is a well known fact that lubricating oil does not wear out from use, but only loses its value through becoming contaminated with foreign matter. Rerefinned oil is better than new oil because the more unstabled portions of the lubricating oil will be removed. Oil is subjected to oxidation in an engine and the more unstabled portions of the lubricating oil will be oxidized. After the oxidized portion of the oil is removed, the remaining oil should be more stable and durable than the original oil.

In Figures 3 and 4 of the invention, I show a slightly modified form of the oil refining pack.

This form of the device is designed for the large oil refiner casing shown in my co-pending application. Figures 3 and 4 show the pack on a smaller scale than the pack shown in Figures 1 and 2. The pack 36 has a pipe, screen, and nail, similar to that shown in Figure 1 and therefore corresponding reference numerals will be given except that they will be primed. Around the screen 10', I dispose a layer of water-absorbent material such as cork 37 or loofah sponge. This cork or sponge will absorb water, but will not absorb oil and in this way water is removed from the oil by the cork or sponge before the oil reaches the pipe 2'.

A body of cellulose or cotton fiber 38 encloses the layer of cork or sponge and also the entire pipe assembly with the exception of the threaded pipe end 3'. If desired, the outer surface of the pack 36 may have a second layer of cork 39 or sponge disposed therearound. This additional layer of cork or sponge is usually provided where the pack refines oil used in marine engines. The material composing the pack is held together by string 40 or any other suitable enclosing means is wound around the pack 36 and the outer layer of cork 39 or sponge for holding the material 38 and layer 39 in place. The nail 9' again acts as a key between the body 38 and the pipe 2' so that a rotation of the body will screw the pipe into the bore in the casing (not shown) or remove the pipe therefrom.

The operation of this form of the device is similar to that shown in Figures 1 and 2 with the addition that the cork or loofah sponge will remove water from the oil. It is obvious that the pack shown in Figure 1 can also be provided with a layer of cork or sponge around the screen 10, if desired. The sponges 37 and 39 act as dehydrators and hold the water until an oil temperature of 130° F., or above, is reached within the casing that houses the pack. At this temperature, vaporization of the water commences and the moisture in the sponges is released. These moisture vapors follow the same outlet from the refiner casing as that taken by the oil and each are conveyed to the warmer crank case where the water vapor will escape from the motor through the breather pipe or ventilating system.

The form of the pack shown in Figures 3 and 4 will also remove the heavy solids from the oil and these solids in turn are removed from the pack by precipitation caused by the "breathing" or pulsating action of the side wall of the pack. These solids are retained in the bottom of the casing at what may be termed the trap section of the casing. Some of the finer solids will find their way into the pack and will precipitate into the lower portion thereof.

In Figure 5, I show a slightly modified form of the pipe assembly. In this form the pipe 2a is similar to the pipe 2 and a screen 10a, similar to the screen 10, encircles the perforated portion of the pipe. The nail 9a instead of being passed through the opening 8a in the closed end of the pipe, is forced through the coiled screen 10a and also through two of the aligned perforations 6a in the pipe. The nail in this instance performs the double function of acting as a key between the pack and the pipe, and also acting as a fastening means for aiding in securing the screen 10a to the pipe. In all other respects this form of the device is identical to that shown in Figure 1 and therefore needs no further description.

The pack is formed of a filtering material that

is of uniform density throughout. To achieve this, fibrous material is used and separated into its particles after which it is brought together to form the filtering body. Care is taken when forming the material into the desired shape, that no places exist where the material is compacted. The particles of the material will arrange themselves in a criss-cross manner so that maximum filtering efficiency will result and also the pack will be compressible when subjected to varying oil pressures. The string holding the material in shape will give during the changes in size of the pack due to oil pressure changes. The wall of the pack flexes during the changes in the size of the filtering body and it is this feature that makes the wall of the pack self-cleaning.

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 article of manufacture comprising a perforated pipe, a screen enclosing the perforated portion of the pipe, and an elongated fastening member passed through the screen and certain of the pipe openings for securing the screen to the pipe, the ends of the fastening member extending beyond the screen to form a key adapted for anchorage in a surrounding filtering pack.

2. In an oil filter, a perforated pipe having a closed end and a threaded end, a screen enclosing the perforated portion of the pipe, and an elongated key passed through the closed end of

the pipe and extending radially beyond the screen from the pipe.

3. In an oil filter, a perforated pipe, a screen enclosing the perforations, a sponge enclosing the screen, and an elongated key secured to the pipe and extending radially therefrom, the key being adapted for anchorage in a surrounding filtering pack.

4. An oil refiner pack comprising a perforated oil outlet pipe, a screen enclosing the perforated portion of the pipe, a body of fibrous oil refining material enclosing the screen and the pipe with the exception of one end, said body being of uniform density throughout, a key connecting the body with the pipe so that a rotation of the body will rotate the key, and yielding means for holding all sides of the body in the proper shape.

5. In an oil refining pack, a body of fibrous oil refining material, a perforated oil outlet pipe embedded in the body and having one end extending beyond the body, and a key connecting the pipe with the material so that a rotation of the body will rotate the pipe.

6. In an oil refining pack, a perforated oil outlet pipe, a screen enclosing the perforations, a fastening member extending through the screen and certain of the perforations, and a fibrous oil refining medium enclosing the screen and pipe with the exception of the outlet end of the pipe, said fastening member acting as a key between the medium and pipe so that a rotation of the medium will rotate the pipe.

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