July 3, 1945. A. C. KRACKLAUER 2,379,582

FILTER

Filed April 1, 1943

Fig. 1

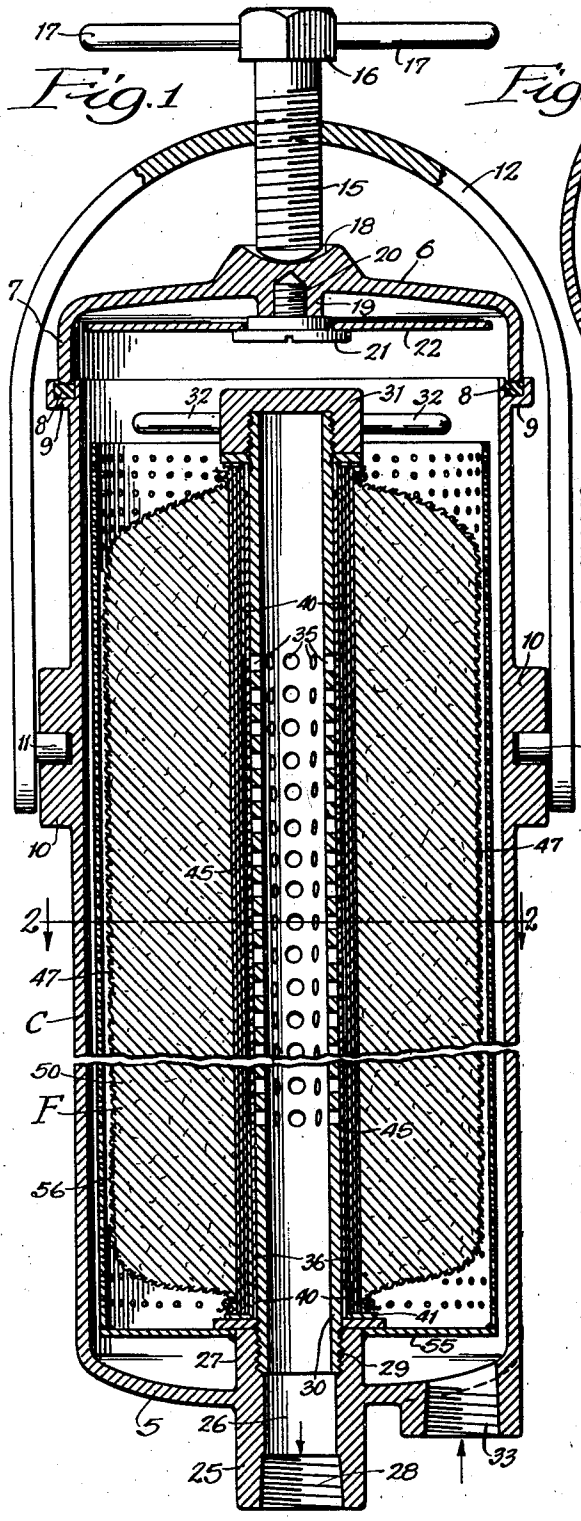


Fig. 2

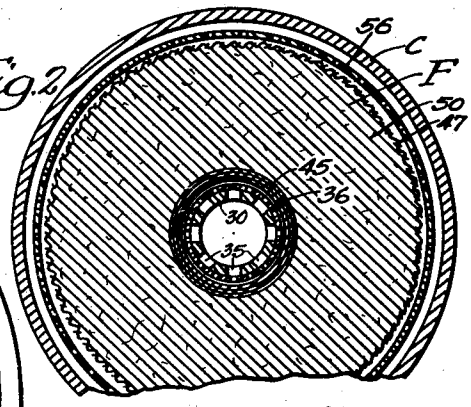
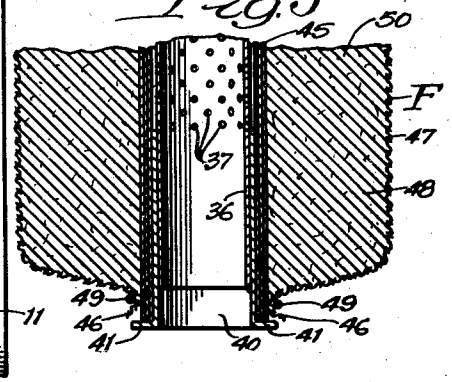


Fig. 3



INVENTOR
ALOYSIUS C. KRACKLAUER

BY Banning and Banning
ATTORNEYS

Patented July 3, 1945 2,379,582

UNITED STATES PATENT OFFICE

2,379,582

FILTER

Aloysius C. Kracklauer, Mundelein, Ill., assignor to Sparkler Manufacturing Company, Mundelein, Ill., a copartnership composed of William J. Kracklauer, Violet W. Kracklauer, and himself

Application April 1, 1943, Serial No. 481,443

5 Claims. (Cl. 210—183)

This invention pertains to a filter which may be used to advantage in a water system, for either household or industrial use, or for the filtering of oil, or other fluids. More particularly, the present improvements relate to the cartridge or filter unit which is removably positioned within a casing through which is circulated the liquid that is to undergo filtering treatment.

The present filter cartridge is in the form of an elongated bag or sack which is converged at both ends and then extended to provide necks which are tightly secured about a tubular core which is removably fitted over a fixedly mounted pipe extending centrally through the casing. With exhaustion of its useful life the filter cartridge may be easily removed from the casing to permit substitution of a fresh cartridge in its place. The construction of the cartridge is simple and inexpensive, but very effective for its intended purposes, all as will hereinafter be pointed out.

A suggestive embodiment of my invention is set forth in the accompanying drawing, wherein—

Figure 1 is a central longitudinal section through a filter cartridge containing therewithin a cartridge which embodies the present improvements;

Fig. 2 is a transverse section, taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary detail in section of the lower end portion of the filter cartridge per se.

As shown, I employ a casing C wherein is an elongated cylindrical chamber closed at the lower end by a fixed bottom 5 and at its upper end by a removable cover 6 with flanges 7 adapted to seat against a gasket 8 which is supported within an annular groove 9 that is extended around this end of the casing. On the exterior of the casing is a pair of oppositely disposed bosses 10 each having therein a socket for the reception of a trunnion 11, one of which extends inwardly from a point near each free end of a bail 12 which extends around and over the cover 6. At a central point, substantially in coincidence with the axis of the casing, the bail is provided with an opening interiorly threaded for the reception of a bolt 15 at whose outer end is a head 16 from which are extended pins 17 forming an operating handle. The inner end of the bolt which is desirably rounded bears against a seat 18 formed on the outer side of the cover. When advanced, the bolt will press the cover tightly against the gasketed seat to establish a seal therewith. By retracting the bolt, and then swinging the bail to one side, the cover may be easily removed to afford access to the chamber interiorly of the casing.

On the inner side of the cover is an axial socketed boss 19 internally screw-threaded to receive a bolt 20 whose head 21 affords a mounting for a cover plate 22, foraminous or otherwise, the purpose of which will hereafter appear. This plate may be secured removably in place by the bolt 20 to be kept out of the way as a spare against the time of its being needed for active use.

Extending downwardly from the casing battom is a boss 25 through which is an axial passageway 26 which continues on into the casing within an upper extension 27 of the boss. At its lower end the boss is interiorly threaded at 28 to facilitate connection with an outlet pipe, not shown, and other interior threads 29 are formed in its upper end region to afford a mounting for an axial pipe 30 whose connecting end is exteriorly threaded whereby to be removably secured thereto. The upper pipe end which terminates proximate to the cover is exteriorly threaded for reception thereon of a cap nut 31 from which may be extended pins 32 forming a convenient operating means therefor. This cap, when fitted over the pipe end, and advanced thereupon, affords a closure for the pipe end, and also cooperates in securing the filter cartridge in place, as will presently be explained. An inlet for the casing is also provided in an opening 33 extended through its bottom wall in an off-center position thereupon. This opening is desirably interiorly threaded to facilitate connection therewith of an inlet pipe, not shown.

The axial pipe 30 is foraminous throughout its central region by the provision through its walls of numerous openings 35 which are desirably located at various points circumferentially thereof. This pipe, which is supported only at its lower end, furnishes in conjunction with the upper end of the boss 27 a mounting whereon may be removably fitted a hollow filter cartridge F whose construction may clearly be understood by reference to Fig. 4. Here I have shown a core in the form of a central tube 36 of a diameter to freely fit over the pipe 30 and be supported thereby, when the cartridge is introduced within the casing. This core which is relatively thin is foraminous throughout its central region as by the provision of numerous small openings 37 extending through the tube at various circumferential places and for a length thereupon which is substantially coincident with the foraminous area of the axial pipe 30. To each end of the tubular core is affixed a collar 40, connected thereto as by welding, and extending slightly beyond the proximate core end where an outturned flange 41 is formed.

The core furnishes a mounting for a multiple wrapping of paper 45, such as filter paper whose ends lie adjacent the outturned flanges 41 so as to be confined and protected thereby. Fitted around the wrappings at each end is the neck 46 of an elongated fabric bag or sack 47 which, through most of its length, is of a cylindrical contour with ends 48 converged inwardly and then extended outwardly to provide the necks already referred to. As by a flexible medium 49, such as a string, cord or wire, each end of the filter bag may be tied around its neck to connect tightly with the wrapping that surrounds the core, the bag being thereby held fixedly in place for the accommodation therewithin of a filling which affords a filtering medium, such, for example, as a suitable activated carbon compound.

After wrapping of the paper around the core for perhaps two or three convolutions, a spread of some infusorial or diatomaceous earth is laid thereon, and the paper is then wrapped around the core for another convolution or so to trap and hold the diatomaceous earth in place. Also, upon the bag fabric, while flat, I spread an activated carbon compound 50, the fabric being then wound around one or more times preliminiary to drawing in of its ends for tying, as by a cord or wire, around the collar-reinforced core to form therewith a closure which will confine the bag contents against escape. Carbon particles are very fine, but nevertheless may not escape from the present cartridge due to the firm securement of opposite ends of the fabric bag to the core adjacent the outturned flanges of the collars thereon. When a fresh cartridge is installed in the present filter, it is unnecessary that water or other fluid be circulated through it for an initial period to flush out loose particles inasmuch as they are effectively and always confined in place therewithin. If the carbon compound be introduced as a slurry, it is then advantageous that the fabric be formed initially into a bag open at the top and tied at its lower end to the core; the slurry may then be poured in at the open end following which the bag is tied in place at that end.

In the construction shown (see Fig. 1), the boss 27 supports at its inner end a circular plate 55, secured fixedly to the boss as by welding, the plate being united to an upstanding cylindrical wall 56 which surrounds the filter cartridge, desirably in spaced relation thereto. The plate 55 which may be foraminous or otherwise forms the bottom for a basket which is defined by the wall 56 which is of foraminous character.

In operation, the liquid entering through the inlet 32 passes upwardly within the casing chamber and gradually works its way laterally into the filter cartridge. In this movement it is required to pass through the filtering medium, and finally through the wrappings of filter paper with infusorial or diatomaceous earth incorporated therewith. In its passage through the cartridge the fluid under treatment is relieved of its odors, tastes, color, impurities, etc., prior to escape through the foraminous core and axial pipe for downward descent therefrom and out through the passageway 26. The same course is followed, in the event that a prepared filter cartridge be not used, but a filling of waste, toweling, etc., be placed within the basket. In either event, the fluid under treatment must pass eventually through the filter paper windings loaded with infusorial or diatomaceous earth before escaping into the axial pipe by which it is conducted to the point of outlet. The filter unit itself comprises a multi-ply wrapping of filter paper with interspersed earth forming in itself a composite filtering core. The outermost convolution of the wrapping is effectively secured by the ties applied to opposite ends of the surrounding bag. These bag ends which converge inwardly are drawn in to make a relatively stable pack of the contained filtering material, and because the bag ends are tightly secured escape of all filtering material from both the core wrappings and the bag exteriorly thereof is prevented. The filter unit is self-contained to the extent that it needs no external support from the surrounding basket which, as shown, may stand in spaced relation thereto. Filtering will accordingly take place a first time through the composite core and then a second time through the pack to the exterior thereof.

It is apparent that a filter of the kind under description may be used with various liquids, circulated at widely ranging pressures, and that in operation the substitution of a fresh filter cartridge for one that is exhausted can be performed simply and quickly, and with little or no interruption in the filtering process. The cartridge is not only effective for its intended purposes, but is also very inexpensive to make, so that after its period of usefulness has ended a discard thereof, rather than any attempted freshening, will prove most advantageous. However, if freshening is preferred, the bag will readily open up upon being disconnected from the core, and if the fabric be still in good condition it may again be used by spreading thereon a new supply of filter material and then closing the bag once more after application to the core.

I claim:

1. A filter cartridge having a core which comprises a formanious tube, a filter paper wrapping extended through several closely wound convolutions around the tube, and a spread of diatomaceous earth between certain convolutions of the paper held entirely between opposed surfaces thereof, together with a filling of carbon compound arranged around the paper wrapping, an enclosure for the carbon compound in the form of a surrounding textile bag having its ends drawn in and extended outwardly in the form of necks parallel to the core, and a tie extending tightly around each neck for securing the bag firmly to outermost convolution of the paper wrapping whereby to maintain pressure between the several convolutions of the wrapping and between the wrapping and the foraminous tube interiorly thereof to confine therein the spread of diotomaceous earth.

2. A filter cartridge in which is comprised an elongated cylindrical bag with indrawn ends terminating in outwardly extended necks, a core arranged axially within the bag and extended through the necks at opposite ends thereof, the core comprising a foraminous tube, a wrapping of filter paper extending through several convolutions around the tube, and a spread of diatomaceous earth between certain of the paper convolutions held entirely between opposed surfaces thereof, means tightly surrounding each neck to transmit pressure therefrom through the several paper convolutions to the tube interiorly thereof to provide a tight closure at the bag end and to confine between said convolutions the spread of diatomaceous earth, and a carbon compound filling confined in place within the bag.

3. A filter cartridge in which is comprised an elongated cylindrical bag closed at opposite ends and terminating in outstanding necks, a core ar-

ranged axially within the bag and extending outwardly through the necks threof, the core comprising a foraminous tube, a wrapping of filter paper extending through several convolutions around the tube, and a pair of collars closely surrounding the tube and disposed inwardly of the wrapping, one adjacent each end thereof, each collar having an outturned flange extending past the proximate end of the wrapping, a tie extending around each bag neck to transmit pressure therefrom through the several paper wrappings to the collar interiorly thereof to provide a tight closure at the bag end and to maintain the wrapping of filter paper in the form of a hollow core, each tie being located contiguous to and held against displacement axially of the core by the flange of one of the collars, and a filling of filter material confined in place within the bag.

4. In a filter, the combination of an elongated casing having an inlet and an outlet, a foraminous pipe connected with the outlet and supported at one end within the casing to extend longitudinally thereof, and a filter cartridge within the casing, the cartridge comprising a hollow composite filtering core made up of multiple windings slidable over the pipe and laterally supported thereby, a filtering material surrounding the core, a bag converging at opposite ends to surround the filtering material and confining the same in the space therewithin, the bag when installed within the casing remaining spaced from the elongated surrounding casing and the ends of the bag being extended outwardly, means for laterally drawing in and connecting opposite outwardly extending ends of the bag to the core multiple windings acting also to maintain the same in the form of a hollow core, means located beyond said drawing and connecting means for preventing displacement of the same axially of the core and means removably fitted to the pipe engageable with the core to secure the filter cartridge immovably but releasably within the casing.

5. A filter in which is comprised an elongated cylindrical casing closed at one end and open at the other, the closed end of the casing being provided with an integral hollow boss forming an outlet opening and having an extension projecting into the casing, said casing being also provided with an inlet opening, a pipe connected to and supported by the extension of said hollow boss and extending axially within the casing, a filter cartridge comprising a hollow composite filtering core, a filtering material surrounding the core, a textile covering surrounding the filtering material, means for laterally drawing in the textile fabric at opposite ends for tight connection to the filtering core, whereby to unite the same for removable fitting over the axial pipe, the cartridge being supported laterally in a fixed position solely by the pipe, means for securing the filter cartridge in operative position around the pipe, a basket immovably mounted within the casing on the extension of said hollow boss and having foraminous cylindrical walls extending between the walls of the filter cartridge and casing in spaced relation to each and formed with one open end adjacent the open end of the casing, and a removable closure for the open end of the casing.

ALOYSIUS C. KRACKLAUER.