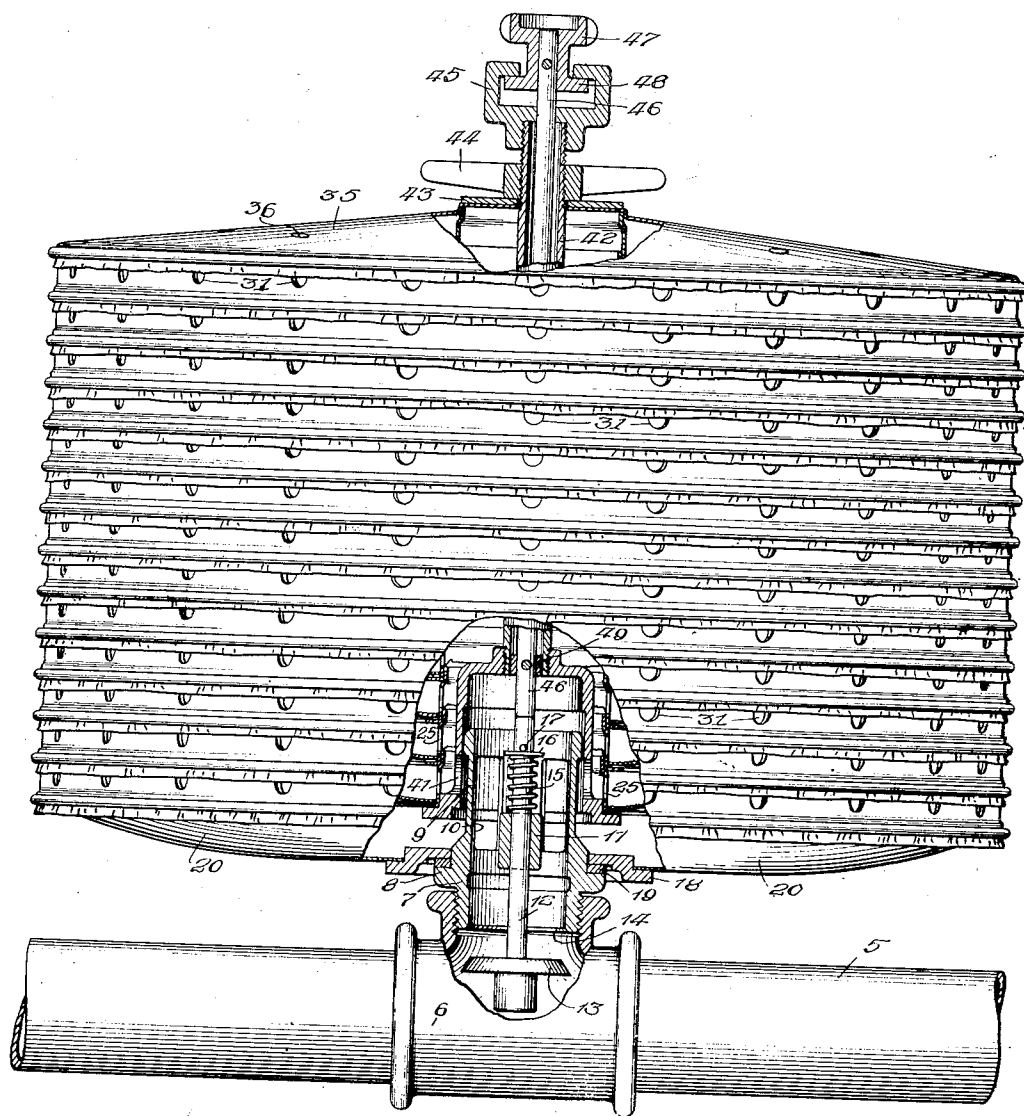


1,295,006.

D. A. COREY,
FILTER.
APPLICATION FILED MAY 7, 1917.

Patented Feb. 18, 1919.
3 SHEETS—SHEET 1.

Fig. 1.



Witness:
R. L. Farrington

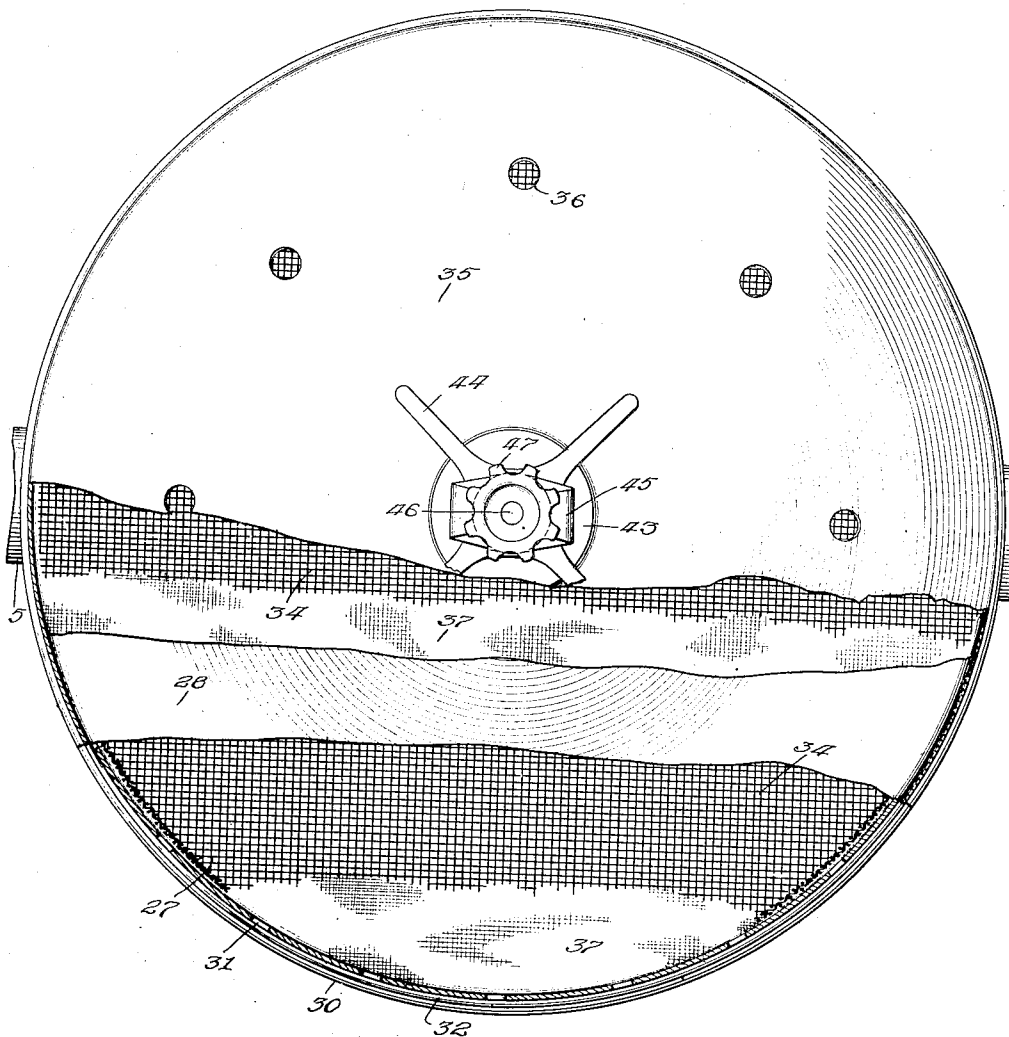
Inventor,
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APPLICATION FILED MAY 7, 1917.

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3 SHEETS—SHEET 2.

Fig. 2.



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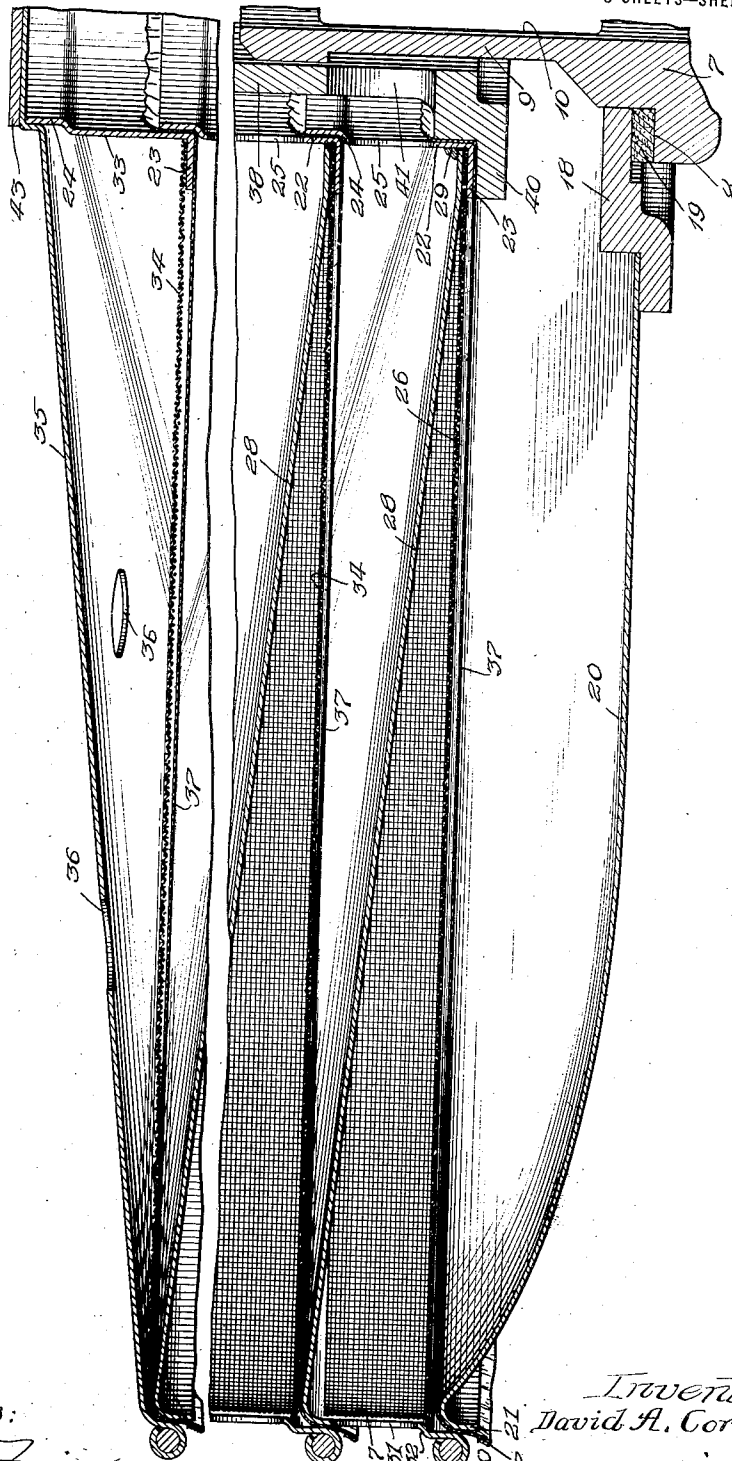
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

DAVID A. COREY, OF FORT WAYNE, INDIANA.

FILTER.

1,295,006.

Specification of Letters Patent.

Patented Feb. 18, 1919.

Application filed May 7, 1917. Serial No. 166,800.

To all whom it may concern:

Be it known that I, DAVID A. COREY, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Filters, of which the following is a specification.

This invention relates to a filter for liquids, and is more particularly described and intended as an oil filter in which the liquid is admitted at the center and discharged at the periphery of a number of separable sections, preferably circular in form, although they may be of any desired conformation. The invention consists in the features of novelty in the construction, combination and arrangement of the several parts.

In the accompanying drawings—

Figure 1 is a side elevation of a filter constructed in accordance with the principles of this invention broken away at the top and bottom to show parts in section.

Fig. 2 is a top view with a portion of some sections broken away to show the parts more clearly; and

Fig. 3 is a sectional view of portions of the filter.

One of the most important requirements of a filter of this kind is to provide as great a filtering surface as possible for a minimum space. It is also desirable to provide a filter which can be easily varied in size, and therefore in capacity, and at the same time to permit of the greatest accessibility for cleaning and replacing the filtering elements. The present invention is designed and intended to meet all these requirements and to direct the liquid filtered from one section of the filter upwardly into the next filter section from which it is discharged.

This filter is intended to be placed in a tank or receptacle, either alone or with a number of similar filters, and any, or all of them may be connected to a common pipe or header 5, which is provided at suitable intervals with a fitting 6 to which the filter is connected. This fitting is preferably in the form of a T, and into it is threaded a supporting member 7, having an outwardly extending flange 8 and an upwardly extending portion 9 provided with perforations 10. Within the portion 9, which is preferably tubular and open at the top, is a cross-bar 11 forming a bearing for a valve stem 12, which carries a valve 13 at its lower end to cooperate with a seat 14 at

the lower end of the supporting member 7, and the upper end of the valve stem extends above the bearing 11 and is provided with a spring 15 bearing at one end against the cross-piece 11, and at the outer end against a washer 16, which is held in place by a pin 17, or other suitable means, so that the spring tends to keep the valve 13 in its seat.

Upheld by the flange 8 is a supporting ring 18, with a packing 19 between the flange and ring. Supported by the ring 18, and affixed thereto, preferably by solder, or the like, is a supporting pan 20 which is rounded upwardly toward its outer edge forming a shallow dish with its edge 21 curved downwardly or beaded to present a smooth upper surface.

Above and supported by the beaded edge of the supporting pan 20 are a plurality of filter sections, each complete and separate in itself, which are removable separately, or altogether, and may be varied in number to vary the capacity of the filter.

Each section comprises a tubular central member or collar 22, formed with a flange 23 at the lower end, and an offset portion 24 at the upper end with a plurality of intermediate perforations 25. Extending laterally from the member 22 is a screen 26 which fits over the perforated portion of the member 22 resting against the flange 23 thereof, and at the outer edge is formed with an upright portion 27. Also supported by the member 22 is a plate or disk 28 which fits over the perforated portion of the member 22, and may be held against the inner edge of the screen 26 by solder 29, although this is not necessary. This plate 28 extends upwardly and outwardly from the member 22 and above the upright portion 27 of the screen 26 where it is bent downwardly below the horizontal portion of the screen and formed with a beaded edge 30 which is slightly larger, or in the present case, of greater diameter than the edge of the pan 20. In the downwardly bent portion of the plate 28 are a plurality of perforations 31, and the beaded portion at the edge is provided with an offset 32, so that the upper bend of each plate is of the same outer diameter as that of the pan 20, so that the filter sections can be used interchangeably and placed one upon the other, or upon the edge of the pan 20.

The top section of the filter comprises a

central member 33 similar to the member 22, with the exception that it need not be perforated about the upright portion. A flat or horizontal screen 34 is supported by the flange 23, but the outer edge of the screen is not turned up. A lid or cover 35 is supported by the top of the member 33 and extends downwardly over the outer edge of the screen 34 fitting tightly over the bent outer edge of the plate 28 of the filter section immediately below it. In the cover are openings 36 through which filtered liquid may escape.

In order to complete each filter section, a filtering element 37 is placed below each screen 26 and 34 so that it is interposed between the inner and outer edges of the section next below it, or in the case of the lowermost filter section, between the beaded edge 30 and the edge 21 of the pan 20. Likewise the uppermost filtering element is clamped at the outer edge between the outer edge of the lid or cover 35 and the bent edge of the plate 28 immediately below it. The center of each filtering element 37 is formed with a perforation slightly less in diameter than the diameter of the member 22, so that the inner edge of each filtering member 37 is clamped between the adjacent members or collars 22, thus holding and clamping the filtering elements 37 tightly at the inner and outer edges thereof, the weight of the sections above pressing upon the filtering elements so that they are drawn tightly between the inner and outer edges, stretching the material over the screens.

In order to support and simultaneously remove all of the filter sections, a member 38 which fits loosely over the supporting member is provided with a flange 40 which extends under and forms a seat for the lowermost collar 22, also forming means for clamping the innermost end of the lower filtering element 37 against the lowermost collar 22. Above the flanged portion 40 are a plurality of perforations 41, which communicating with the openings 10 of the supporting member 9, provide an uninterrupted passage for the liquid to be filtered from the pipe 5 into the central chamber formed by the superposed collars 22. This member 38 is held in place by an attached pipe 42 which extends upwardly through the central chamber and through a hole in the cover 35. Threaded on the upper end of the pipe are a plate 43, a handle clamping member 44, and an undercut valve member 45. It is evident that by compressing the plate 43 against the top 35, all of the filter sections will be compressed between the flange 40 of the member 38 and the plate 43, thereby offering additional means for compressing the filtering elements 37 between the filter sections, and also providing means for remov-

ing or positioning all of the filter sections at the same time.

To operate the valve 13 independently, a rod 46 is inserted through the pipe 42 which bears at its lower end against the upper end of the valve stem 12. The upper end of the rod 46 is provided with a handle 47 with a flange 48 which is engageable below the undercut portions of the member 45, and is also disengageable therefrom by rotating it part way. The spring 15 which tends to close the valve 13 also tends to move the rod 46 outwardly so that by turning the handle 47 to clear the flanges 48 of the undercut portion, the valve will be seated, and this can be accomplished as desired for shutting off the fluid from the filter. Near the lower end of the rod 46 a collar 49 is attached thereto for centering the rod in the tube 42, so that it will bear directly against the upper end of the valve stem 12.

It is obvious that the capacity of the filter may be varied by varying the number of sections of which the filter is composed. It will be necessary also to vary the length of the pipe 42, or at least the length of the external threads, in order that the filtering elements may be removed as a unit, or held firmly clamped together.

In operation it will be seen that the liquid which enters through the perforations 25 of one collar 22 does not pass from the filter through the outer perforations 31 of this section, but passes instead through a filter element 37 above the perforations 25 and through the screen 26 of the section next above it, and outwardly through the perforation 31 of the section next above it. This is true even of the uppermost complete section before the liquid from it passes through the perforations 36 in the cover. The filter material 37 may be of any suitable substance, such as fabric of wire, fiber, or cloth, depending upon the character of the liquid to be filtered. One of the principal advantages of the entire construction which is very valuable in the filtration of oil, and similar liquids, is that all of the parts of which the filter is constructed are easily and quickly separated and removed or assembled, so that each separate part can be quickly and thoroughly cleaned.

By having opposite inlets and outlets in the filter pans or sections and directing the fluid to be filtered upwardly through the filter media, each pan acts as a receptacle for holding the precipitate or impurities from the fluid filter, allowing the same to collect in the pans, from which it may be easily removed when the pans or sections are separated for cleaning. This greatly increases the filtering efficiency as the precipitate does not clog the filtering medium in any of the sections.

While the preferred construction, combination and arrangement of parts is specifically shown and described in the present application, it is obvious that those skilled in the art to which this invention appertains may make various changes without departing from the spirit and scope of the invention.

I claim:—

1. In a filter, the combination of a plurality of separate sections with fluid inlets and outlets opposite the inlets, a filtering medium between the sections, each section having an inclined surface for directing fluid from the inlet of one section upwardly through the filtering medium above it and from the outlet of the next adjacent section and extending below the plane of the lower edge of the inlet to form a space for holding dirt and precipitation.

2. In a filter, a plurality of separable sections each comprising an upright collar with perforations in the upright portion, and a laterally extending upwardly inclined disk with a downwardly extending rim having perforations therein, and a screen extending horizontally from the collar and turned up at the edge to cover the perforations of the rim.

3. In a filter, a plurality of similar sections each having a disk inclined upwardly from the center with a downturned perforated edge, and a horizontally extending screen with an upturned edge to cover the perforations of the disk.

4. In a filter, a plurality of separate sections each comprising a disk and a central upright perforated collar, and a depending perforated edge; the collar and edge overlapping the corresponding portions of an adjacent section; and a flexible filtering medium engaged by the overlapping outer edge portions and drawn tight and clamped between the adjacent sections by their movement in positioning one upon the other.

5. In a filter, the combination of similar sections each having an inlet and an outlet, and means forming a passageway from the inlet of one section to the outlet of an adjacent one, a flexible filtering medium disposed at the bottom of each section and extending across the said passageway, and reticulate means for extending over and distending the filtering medium in the passageway to prevent the collapse of the medium against the wall thereof due to clogging and to the flow of the liquid.

6. In a filter, a plurality of similar sections each having a central shell fitting within the shell above, and a disk extending laterally in all directions therefrom and turned downwardly at the outer edge to fit over the next lower section, the central member and the downwardly turned edge being

formed with perforations to provide an inlet and outlet for the sections, and a flexible filtering member disposed between adjacent sections and clamped and stretched between the said central members and between the overlapping edges as one section is placed over the other.

7. In a filter, the combination with a plurality of sections each having an upright central member and an outer rim which overlap the same parts of an adjacent section, means forming a passage from one section through the bottom of the next adjacent section, a rigid screen disposed between adjacent sections, and a filter cloth having a central perforation through which said central member extends and engaged at the inner and outer edges between the central members and rims of adjacent sections, and drawn tightly against the screen by the engagement of the overlapping portions of the sections.

8. In a filter, the combination of separable sections each having an upright central collar and an outer edge which fits over and is supported by the section below it, a lower supporting means for all of the sections comprising a pan having an outer edge of substantially the same size as the sections so that any one of them will fit downwardly over it, and a centrally perforated flexible filtering member through which the collar extends fitting over the collar and engaged and stretched by said overlapping edges.

9. In a filter, the combination with sections each having an upstanding collar forming an inner edge and having a depending outer edge fitting over the next section below it, of a support for the sections having an outer edge of the same diameter as that of the sections, and flexible filtering material with a perforation for said collar and interposed between each of the sections and between the lowermost section and the said support and all of said filtering materials being drawn tight and held in place by the engagement of the edges of the sections with the material.

10. In a filter, the combination of separable sections each comprising a central member insertible within a similar member, a laterally extending filter screen, and a filtering material engaged between adjacent central members and stretched and extended over the screen.

11. In a filter, the combination with separable sections each having a central collar member insertible within the other, a screen extending from the collar, a filter cloth positioned below the screen and clamped at the center by the collars, means for engaging the outer edges of the filter cloths for distending them over the screens, and means for directing fluid to be filtered from one

section upwardly through the section above it so it will pass first through the filtering cloth and then through the screen.

12. In a filter, the combination of centrally perforated separable sections fitting one within the other, of means for supporting all of the sections at the outer edge of the lowermost one, and means extending through the central perforation for engaging the bottom of the lowermost section by which all of the sections can be raised independently of the supporting means at the outer edge thereof.

13. In a filter, the combination of a plurality of sections insertible one within the other and having a central passageway, of means for supporting the sections at the outer edge of the lowermost one, a member in the passageway having a flange extending below and engaging the bottom of the lowermost section independent of said supporting means, a member attached thereto and extending through the top of the passageway, and means attachable to the last-named member for clamping the sections against the said flange for holding all of them together.

14. In a filter, a supporting member, a supporting pan extending therefrom, a plurality of separable sections each having an outer edge which fits over the other section or over the edge of the pan, and each having a central perforated collar insertible one within the other and forming a central passageway, means for admitting liquid to the pan and to the said passageway, a filtering medium at the bottom of each section, and means for directing liquid to be filtered from each section through the filtering material and into the section above it, the liquid also flowing from the said pan to the lowermost filtering medium into the lowermost section.

15. In a filter, the combination with a tubular supporting member, of a plurality of sections having a central passageway into which the said tubular member extends and supported at the periphery from the said tubular member, a valve carried by the tubular member for admitting fluid to be filtered to the said sections through the passageway, and means for opening or closing the valve at will.

16. In a filter, the combination with a supporting member, of a plurality of separate filter sections supported thereby and inserted one within another and having a central passageway above the supporting member, a spring-pressed valve for admitting liquid to be filtered through the supporting member, a rod extending through the said passage and above the filter sections, and means cooperating with the rod for pressing it in engagement with the valve against the action of the valve spring.

17. In a filter, the combination with a tubular supporting member, of a plurality of filter sections supported thereby, a spring-pressed valve in the supporting member for admitting liquid therethrough to the filter having a stem which extends upwardly, a control for the valve comprising an undercut member secured to the filter sections, and a rod movable free from and to engage the undercut member and operative to contact with the valve stem in one position to hold the valve open against the tension of the spring.

18. In a filter, the combination with a tubular supporting member, a valve disposed therein with an upwardly extending stem, a spring tending to seat the valve, and a sectional filter comprising means to bind the sections together with a central passageway disposed over the tubular member, and a controllable contact rod carried with the filter sections and operable to engage the end of the valve stem for opening it.

19. In a filter, the combination with a valved supporting member, of a sectional filter supported thereby and having a central passageway over the member, means for binding the filter sections together comprising a flanged member extending below the lowermost section and over the supporting member, a threaded pipe secured to the flanged member, a plate at the top of the sections, a handled member threaded on the pipe and movable against the plate, and a rod extending through the pipe and adapted to engage the valve for opening it, a control for the rod comprising an undercut member secured to the pipe, and a rotatable handle with a flange engageable with and disengageable from the undercut member.

20. In a filter, the combination with a supply pipe, of a tubular supporting member connected thereto, a valve mounted in the supporting member, a spring tending to close the valve, a plurality of separable filter sections, means for supporting them at the periphery from the said supporting member, the filter sections having central nesting collars forming a passageway, means engaging the bottom of the lowermost section and on top of the uppermost section for binding the sections together, a valve control comprising a rod for engaging the valve stem, and means for holding the rod in adjusted position.

21. In a filter, the combination with a plurality of separate sections each having a central hollow collar and a peripheral rim and insertible one within the other, a flexible filtering medium interposed between adjacent sections drawn tight and clamped at the inner and outer edges thereof by the contact of the sections when superposed, and additional means extending within the collar

and engaging below the collar only of the lowermost section for clamping the sections together.

22. In a filter, the combination of a tubular supporting member having an extending flange and lateral apertures above the flange, of a plurality of filter sections insertible one within the other and each having a central collar forming a passageway, means for supporting the sections from the flange of said supporting member, and means for clamping the filter sections together comprising a perforated member disposed within the passageway and engaging under the lowermost section thereby allowing free passage of fluid through the perforations thereof and through the apertures of the supporting member.

23. In a filter, a tubular supporting mem-

ber, a plurality of filter sections each having a central collar insertible within one of the other collars and forming a central passageway, the said collars being formed with perforations to admit liquid from the passageway to the sections, and a clamping member for the sections disposed within the said passageway and fitting loosely over the end of the supporting member with perforations therethrough to permit the passage of liquid from the supporting member into the said passageway.

In testimony whereof I have signed my name to this specification on this 3rd day of May, A. D. 1917.

DAVID A. COREY.

Witnesses:

J. R. MATLACK,
A. H. MOHR.