

W. W. NUGENT.

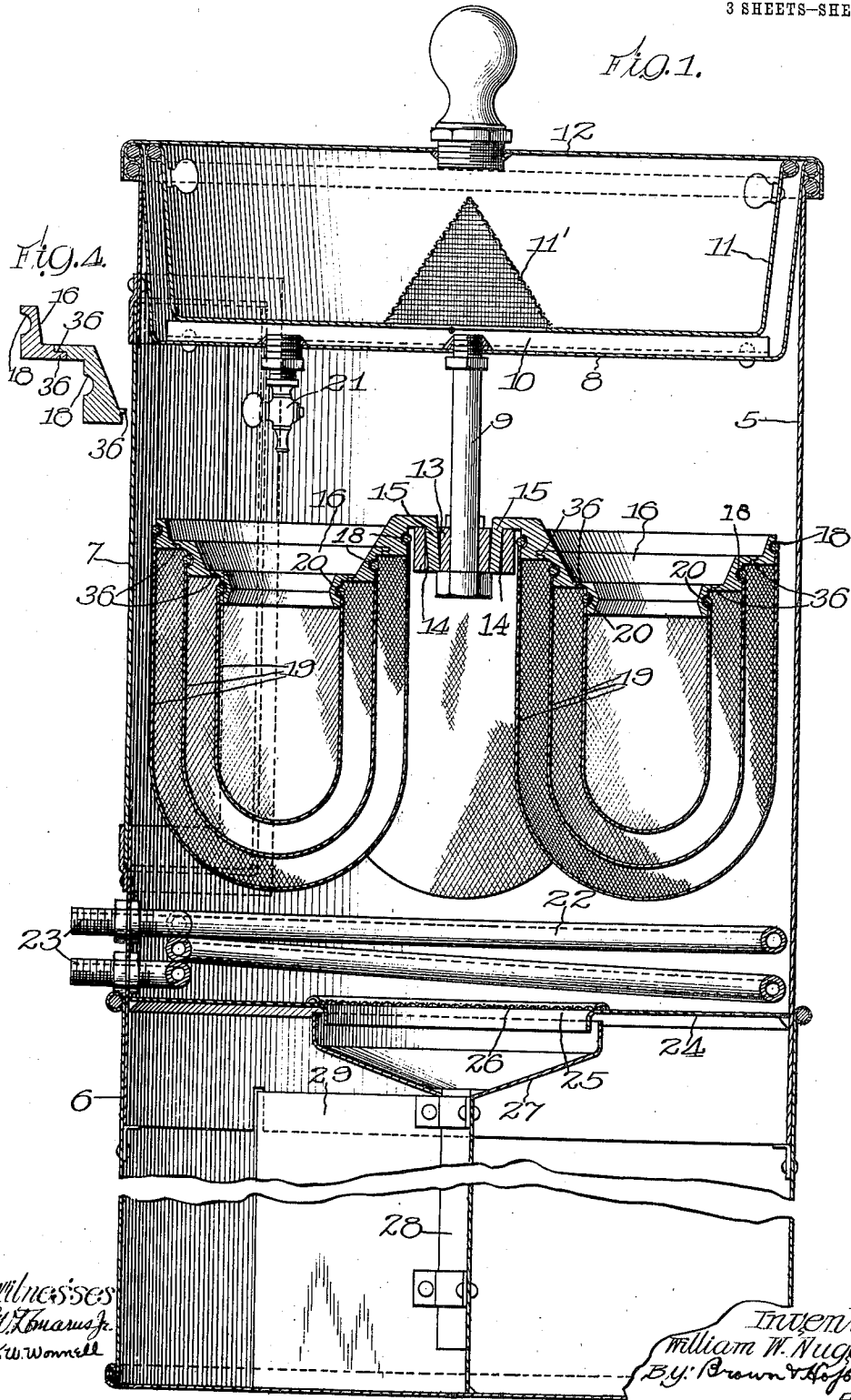
FILTER.

APPLICATION FILED MAR. 8, 1911.

1,044,074.

Patented Nov. 12, 1912.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 2.

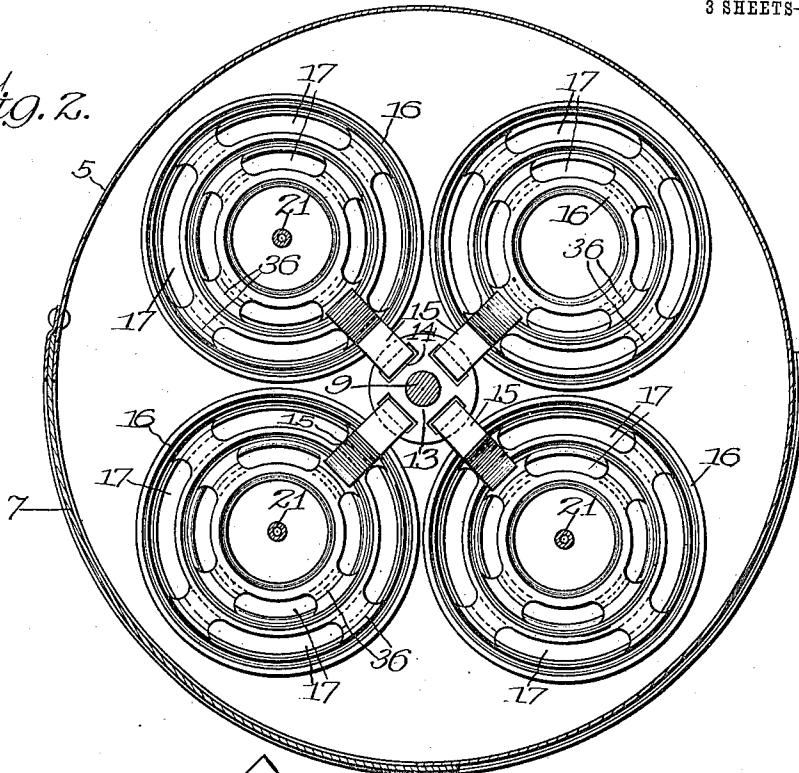
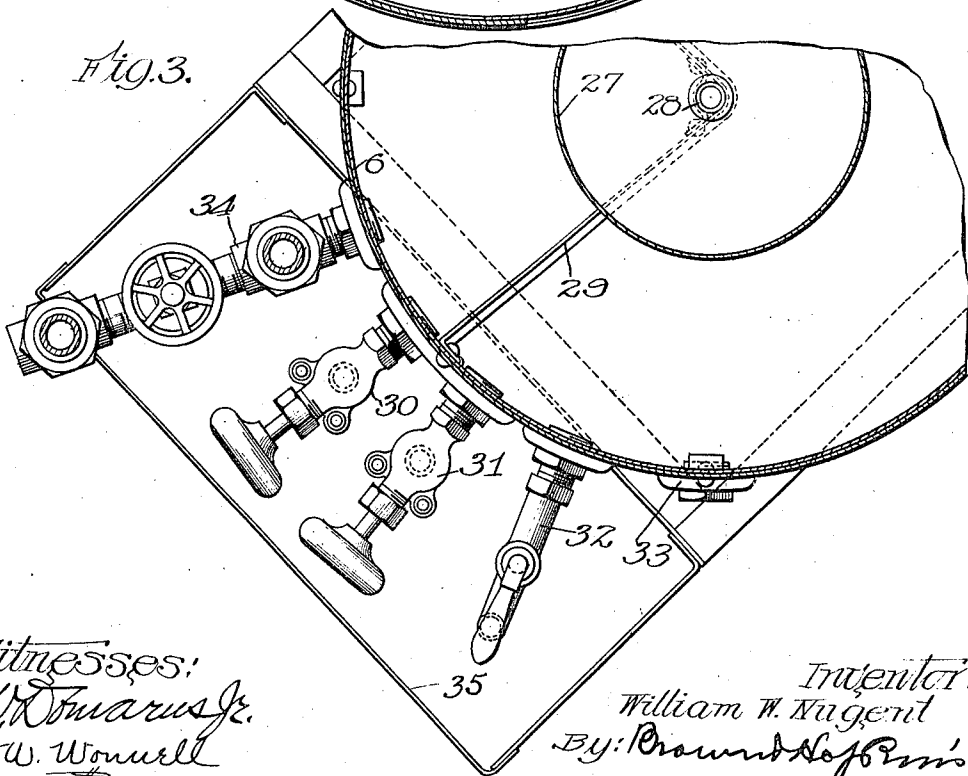


Fig. 3.



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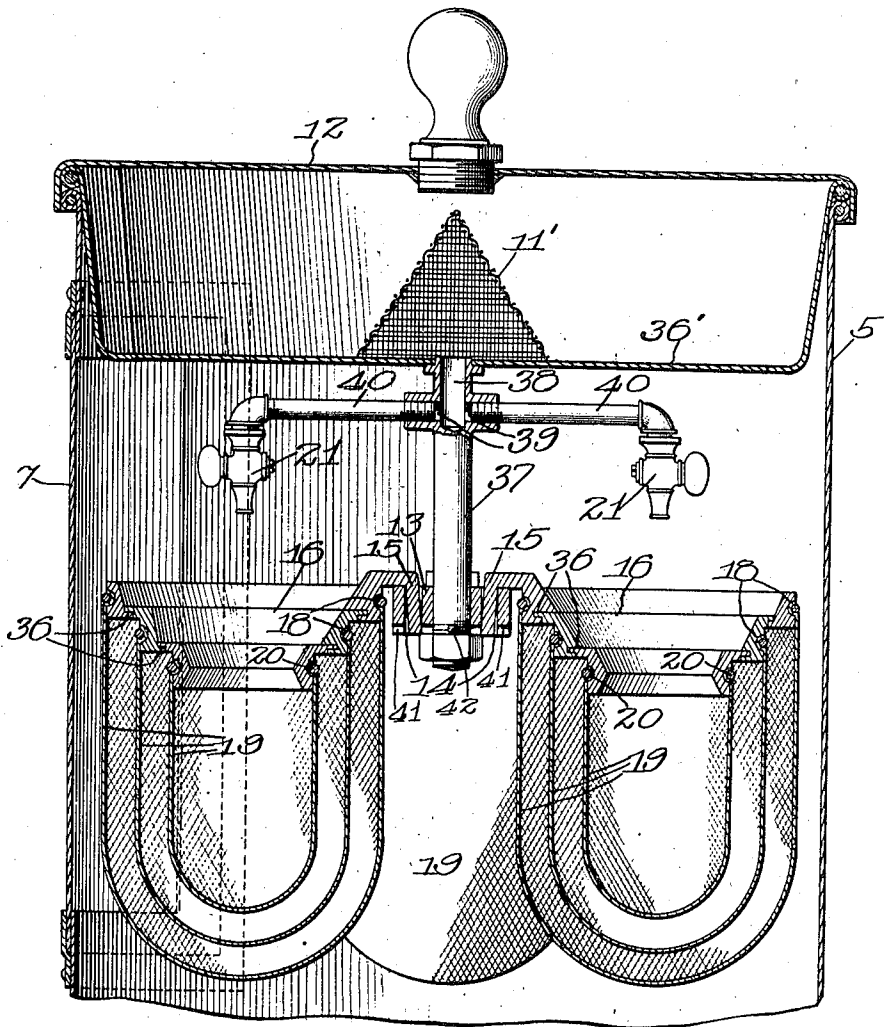
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3 SHEETS-SHEET 3.

Fig. 5.



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# UNITED STATES PATENT OFFICE.

WILLIAM W. NUGENT, OF CHICAGO, ILLINOIS.

## FILTER.

1,044,074.

Specification of Letters Patent. Patented Nov. 12, 1912.

Application filed March 8, 1911. Serial No. 613,127.

To all whom it may concern:

Be it known that I, WILLIAM W. NUGENT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Filters, of which the following is a specification.

This invention relates to a filter more particularly described as a device of this character which is adapted to separate impurities or to remove foreign matter from liquids, and as such it has for its primary object to provide a convenient, simple and inexpensive device which is effective and efficient in operation.

Another object is to provide filtering elements which are rotatable, interchangeable and removable.

The invention consists in the construction, combination and arrangement generally described in the specification and more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation of an embodiment of my invention. Fig. 2 is a plan view of the filtering devices. Fig. 3 is a plan view of the storage chamber and the cocks connected thereto. Fig. 4 is a detail view of the engaging lips of the filter holder members. Fig. 5 shows a modification of Fig. 1.

Referring now more particularly to the drawings the receptacle 5 is preferably mounted upon the storage chamber or section 6 and is provided with a sliding door 7 which communicates with the interior of the receptacle. A tray 8 is provided which is adapted to be inserted in the receptacle 5 at its upper end, the upper edge of the tray 8 engaging the upper edge of the receptacle 5. In the bottom of this tray 8, an axle bolt 9 is secured and the bottom of the tray is suitably strengthened by the braces 10. These braces 10 extend upwardly providing a passageway for liquid in the interstices between the braces and being adapted by their upward projection to provide a support for a second tray 11, which does not extend above the edge of the first tray 8. In the bottom of tray 11 is an opening about which an inverted cone 11' of reticulated material is placed. A lid 12 extends over the edges of the trays and of the receptacle 5 providing a cover therefor.

A collar 13 is rotatable about the axle bolt 9 and is provided with a plurality of openings 14 in which a projecting lug 15 of

a filtering device 16 is adapted to be inserted. These filtering devices are formed with a supporting frame preferably of a funnel-shape formation arranged in a series of converging steps through which are concentric apertures 17. In the outer surface of these frames are grooves 18, and a plurality of reticulated sacks or receivers 19 are adapted to be arranged one within the other and to be secured in the said grooves by means of rings 20. These receivers 19 are preferably of a successive fineness of mesh and are arranged so that the one of finest mesh is outside. It will be noticed that the receivers are arranged so that the one of smallest diameter is within the others and is preferably arranged so that its upper edge is lower than that of each succeeding receiver.

In the tray 8, directly above and in line with the filtering devices as they are arranged about the axle bolt 9, are stop cocks 21, and by reference to Fig. 2 it will be seen that they are arranged in accordance with the arrangement of the said filtering devices, one of the stop cocks being omitted in the present exemplification for the purpose of facilitating the removal of any one of the filtering devices for the purposes of adjustment or cleaning. Since these filtering devices are all alike, it is evident that they are interchangeable and may be readily removed from the receptacle when the sliding door 7 is opened without interfering or disturbing the flow of oil to the other filtering devices.

Adjacent the bottom of the receptacle 5 is a heating coil 22 with outside connections 23, the purpose and object of the same being to heat the fluid in its filtered condition thereby facilitating its passage into the lower chamber by rendering it more viscous.

In the bottom 24 of the receptacle is an opening 25 which is provided with a reticulated partition 26 opening into a funnel shaped receiver 27 in the receiving chamber 6. This funnel 27 communicates with the downwardly extending pipe 28 which has an opening near the bottom of the said chamber but does not extend entirely to the floor thereof. In the storage chamber 6 into which the pipe 28 extends is a sectional partition 29 embracing in the present embodiment substantially one quarter of the chamber. This partition extends upwardly and the fluid which comes down through

the pipe 28 fills the sectional portion of the chamber and flows over the partition 29 into the larger compartment. In this storage section of the filter the water gage cock 30 and the water sealing outlet device 34 are connected with the sectional portion, and the oil gage cock 31, the oil faucet 32 and the outlet plug 33 are connected with the larger compartment. A drip apron 35 is also shown in Fig. 3.

Thus it is seen that a liquid to be filtered is poured in the upper tray 11 and passes downward through the cone of reticulated material and the opening in the bottom of the first tray to the tray 8 to remove any foreign matters from the liquid. From the tray 8 the liquid is directed downwardly through the cocks 21 into the filtering devices, and from the latter through the opening 25 into the storage chamber below.

The holders 16 are preferably composed of a series of members with engaging lips 36 (see Figs. 1 and 4). Each member supports one of the reticulated receivers 19 and is removable from within the next larger receiver without disturbing it or any of the other receivers and without interfering with the filtering action. The function of the apertures 17 and the utility of the funnel shape is clearly evident: for if the innermost receiver into which the fluid is directed, becomes clogged or does not dispose of the fluid rapidly enough, the fluid overflows into the next receiver through the apertures 17, the upper edge of the next receiver being higher than that of the filled receiver.

When the fluid to be filtered is a mixture of oil and water, the bottom or storage section is adapted to separate the water from the oil in a well known manner, the various cocks, gages, and faucets being arranged and provided to facilitate the withdrawal of oil and water from their respective chambers.

A modification of Fig. 1 is shown by Fig. 5 in which one of the upper trays is eliminated, and the structure of the axle bolt is changed. In this exemplification the edge of the tray 36<sup>+</sup> engages the edge of the receptacle 5, the tray supporting the axle bolt 37. This bolt 37 is preferably attached adjacent the center of the tray and is formed with a hollowed out portion 38 which opens into the tray and over which opening the filter cone 11' of reticulated material is placed. Opening out from the hollowed out portion 38 are a number of passageways 39 into which the pipes 40 are fitted. At the end of each pipe 40 there is placed a stop-cock 21 which is adapted to control the flow of fluid to the filtering members below, as previously set forth. In this modification it is necessary to provide the bolt 37 with a nut and threaded portion at its lower end, and the collar 14 is preferably provided with slots 41 in which a pin

42 positioned in a hole through the bolt is adapted to engage when the collar is seated at the end of the bolt 37. The object of this arrangement is to retain the filtering receptacles in position below the stop cocks 21. The collar 14 and the holders 16 are freely movable and the collar may be rotated with respect to the bolt 37 by lifting it up free of the pin 42.

Although I have indicated that four filtering receivers are employed, it is contemplated that any number may be used, and that various other changes may be made without departing from the spirit and scope of the invention.

What is claimed as new is—

1. In a filter, the combination with a receptacle, of a rotary group of independent interchangeable filter members, and means for feeding fluid to be filtered simultaneously to several of said members.

2. In a filter, the combination with a receptacle, of an axis therein, an annular group of filter members revolubly mounted about said axis the individual filter members of said group being freely interchangeable, and individual fluid supplying apparatus adapted to direct a liquid to be filtered into said members in whatever positions they may happen to be.

3. In a filter, the combination with a receptacle, of an axis in the receptacle, individual filtering members revoluble about the axis and interchangeably mounted thereon, and fluid supply means adapted to feed some of said filtering members in their several positions.

4. In a filter, the combination with a receptacle, of an axis mounted therein, a plurality of groups of filtering members constituting a rotary series, the parts of which are interchangeably supported by the axis and rotatable about the same, and fluid supply apparatus common to and capable of feeding fluid to some of said groups simultaneously.

5. In a filter, the combination with a receptacle, of an axis mounted therein, suspended filtering members arranged in groups about said axis and rotatable to interchange positions, said groups being removable and interchangeable, and means to direct a fluid to be filtered into some of said groups.

6. In a filter, the combination with a receptacle, of an axis mounted therein, filtering devices supported by the axis comprising a plurality of depending reticular members arranged one within the other and having overflow passages at their upper portions, and means to direct a fluid to be filtered into the innermost chamber.

7. In a filter, the combination with a receptacle, of an axis mounted therein, filtering devices supported by the axis compris-

ing a plurality of depending reticular members arranged one within the other and spaced apart, overflow passages interconnecting said members at their upper portions, and fluid feeding apparatus adapted to supply fluid to be filtered into the innermost member.

8. In a filter, the combination with a receptacle, individual filtering devices arranged in a movable series and each comprising supporting frames, reticulated members depending from the frames one within the other, and means for directing a fluid to be filtered into the innermost member.

9. In a filter, the combination with a receptacle, of an axis within the receptacle, filtering devices arranged about the axis and comprising supporting frames provided with a series of concentric overflow apertures, reticulated members depending from a frame between the apertures and arranged one within the other, and means to direct a fluid to be filtered into the innermost member, said frames being interchangeable and rotatable about the axis.

10. In a filter, the combination with a receptacle, of an axis supported within the receptacle, filtering devices supported by and rotatable about the axis, said devices comprising a supporting frame formed with a converging inner depending portion with concentric apertures, and reticular members arranged one within the other depending from the frame between the apertures.

11. In a filter, the combination with a receptacle, of an axis supported within the receptacle, filtering devices supported by and rotatable about the axis, said devices comprising a supporting frame formed with a converging inner depending portion with ring-shaped interstices, reticular members depending from the frame, closed at the bottom and arranged one within the other, the said frames being interchangeable in their positions about the axis, and means to direct a fluid to be filtered into any of the filtering devices.

12. In a filter, the combination with a receptacle, of an axis supported within the receptacle, filtering devices supported by and rotatable about the axis, said devices comprising a supporting frame formed with a converging inner depending portion with ring-shaped interstices, the outer face portion thereof between the interstices being formed with encircling grooves, depending reticular sacks of different diameters adapted to be placed one within the next larger, means to secure the sacks to the frame about the said grooves, and means to direct a fluid to be filtered into the innermost sack.

13. In a filter, the combination with a receptacle, of an axis supported within the receptacle, filtering devices, means rotatably to support the said devices upon the axis,

said devices comprising a supporting frame with step-like converging gradations having apertures concentrically arranged therein, the outer surface of the frame being formed with encircling grooves, reticular sacks of different diameters and of different fineness of mesh and disposed one within the other, means to removably secure the sacks in the grooves, and stop-cocks to direct a fluid to be filtered into the innermost sack.

14. In a filter, the combination of a receptacle, a removable tray adapted to be inserted in the receptacle and supporting an axle in the bottom thereof, a collar rotatable on said axle and provided with openings, filtering devices provided with portions to engage in said openings, said devices being removable therefrom and interchangeable, and comprising a series of reticular sacks concentrically mounted one within the other, and means to direct a fluid to be filtered from the said tray into certain of the filtering devices.

15. In a filter, the combination of a receptacle, a removable tray adapted to be supported in the receptacle and having an axle bolt secured in the bottom thereof, supporting braces for the bottom of the tray, a collar rotatable on the said bolt and provided with openings, filtering devices having projecting lugs removably to engage in said openings, said devices being interchangeable and provided with a plurality of depending reticular sacks, and cocks in the bottom of said trays to direct liquid to be filtered into certain of the said sacks.

16. In a filter, the combination of a receptacle, a removable tray adapted to be supported in the receptacle and having an axle bolt secured in the bottom thereof, supporting braces for the bottom of the tray upwardly extending therein, a second tray placed within, the first resting on said braces and provided with a reticular cone in the center thereof, a collar rotatable on the bolt, filtering devices, means removably and interchangeably to hold the said devices in the collar, the said devices comprising a holder, a series of reticular sacks arranged one within the other and spaced apart, each succeeding outer sack being mounted higher than the inner ones, means to secure the sacks to the support, and stop-cocks in the bottom of the tray to direct liquid into the innermost of the said reticular sacks in any desired device.

17. In a filter, the combination of a receptacle, a removable tray adapted to be supported within the receptacle with its rim above the rim of the receptacle, the bottom of the tray supporting an axle bolt and strengthened by braces projecting upwardly therein, a second tray adapted to be seated on said braces and provided adjacent

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- the center with an inverted reticular cone over an opening in the bottom thereof, a collar rotatable about the axle bolt, filtering members each comprising a plurality of reticulated receivers concentrically arranged and spaced apart, a holder, and means to secure the receivers to the holder, a slidable door in the said receptacle and stop-cocks in the bottom of the first mentioned tray to direct fluid from the tray to any of the filtering members, the said door being opened to turn the cocks or to rotate, remove or change the said filtering members.
18. In a filter, the combination with a receptacle, of an axis supported within the receptacle, filtering devices supported by and rotatable about the axis, said devices comprising a supporting frame made up of separate members having interengaging lips and formed with step-like converging gradations having apertures concentrically arranged in said steps, the outer surface of the said members being formed with encircling grooves, reticulated sacks of different diameters, means to secure the sacks one within the other about the said members, and means to direct a fluid to be filtered into the innermost sack.
19. In a filter, the combination of filtering devices each comprising a funnel shaped supporting sack composed of a series of members inserted one within another, apertures between adjacent members, reticulated sacks, means for securing the sacks to the said members, the top edge of the inner sack being disposed below the top edge of each succeeding outer sack to allow the overflow from the inner one to flow through the said apertures into the next outer sack, and means to direct fluid to be filtered into the inner sacks.
20. In a filter, the combination of a receptacle, a removable tray supported within the receptacle with its rim above the rim of the receptacle, the bottom of the tray supporting an axle bolt provided with a chamber communicating with the interior of the tray, filtering members, means removably and rotatably to support the said members from the axle bolt, and means to direct a fluid to be filtered from the said chamber to each of the said filtering members.
21. In a filter, the combination of a receptacle, a removable tray supported within the receptacle with its rim above the rim of the receptacle, the bottom of the tray supporting an axle bolt provided with a chamber communicating with the interior of the tray, filtering members, means removably and rotatably to support the said members from the axle bolt, outlets leading from the axle bolt chamber, pipes connected thereto, and outlet cocks attached to the pipes and operative to direct fluid into the filtering members.
22. In a multiple oil filter, a suitable housing forming a chamber, in combination with an unfiltered fluid containing device positioned at the top of said housing and having a plurality of feeding outlets, a plurality of independent strainers within said housing, each adapted to receive fluid from one of said outlets, and rotary mechanism for interchanging said strainers with respect to said outlets.
23. In a multiple oil filter, a suitable housing forming a chamber, in combination with an unfiltered fluid containing device positioned at the top of said housing and having a plurality of feeding outlets, a plurality of independent strainers within said housing, each adapted to receive fluid from one of said outlets, rotary mechanism for interchanging said strainers with respect to said outlets, and a door in said housing through which each individual strainer may be removed without disturbing the others.
24. An oil filter comprising oil feeding apparatus, in combination with a series of strainers adapted to receive unfiltered oil therefrom, each comprising a plurality of separably mounted straining members concentrically nested one within the other, and receiving chambers adapted to collect the filtered fluid from said strainers.
25. An oil filter of the class described, comprising a suitable casing having unfiltered fluid collecting apparatus in its lower portion, in combination with an intermediate series of movable strainers adapted to receive the unfiltered oil from said feeding apparatus and deliver filtered fluid to said receiving apparatus, and supporting mechanism for said strainers to permit the interchange of one strainer for the other.
26. In a device of the class described, a straining or filtering mechanism comprising a plurality of concentrically nested straining members, one supporting the other and graduated in height to permit an overflow of fluid between said members.
27. In a device of the class described, a filter composed of a plurality of concentric interfitting frames, one supporting the other and different levels, overflow passages in said frames, and a straining fabric suspended from each of said frames in nested relation.
28. In a filter of the class described, a chambered casing, in combination with upper and lower straining devices, and an intermediate series of strainers interchangeably and rotatably mounted and arranged to receive unfiltered fluid from said upper straining member and deliver it to said lower straining member.
29. In a filter of the class described, a chambered casing, in combination with upper and lower straining devices, and an intermediate series of strainers interchangeably and rotatably mounted and arranged to

receive unfiltered fluid from said upper straining member and deliver it to said lower straining member, and a heater for said device.

5 30. A self contained filter of the class described, comprising a casing having upper, a lower and an intermediate compartments and fluid straining walls separating said compartments, a plurality of oil feeders in said upper compartments, a group of independent filters in said intermediate compartment occupying interchangeable positions with relation to said feeders, and a common support for said filters movable to shift each filter into relation with any  
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15 feeder.

31. A self contained filter of the class described, comprising a casing having upper, a lower and an intermediate compartments

and fluid straining walls separating said 20 compartments, a plurality of oil feeders in said upper compartments, a group of independent filters in said intermediate compartment occupying interchangeable portions with relation to said feeders, and each 25 feeder being detachably mounted on said support to permit its removal without disturbing the operation of the other filters, and a common support for said filters movable to shift each filter into relation with 30 any feeder.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 24th day of February A. D. 1911.

WILLIAM W. NUGENT.

KENT W. WONWELL,  
NINA J. HALSNE.