H. F. MARANVILLE.

FILTER.

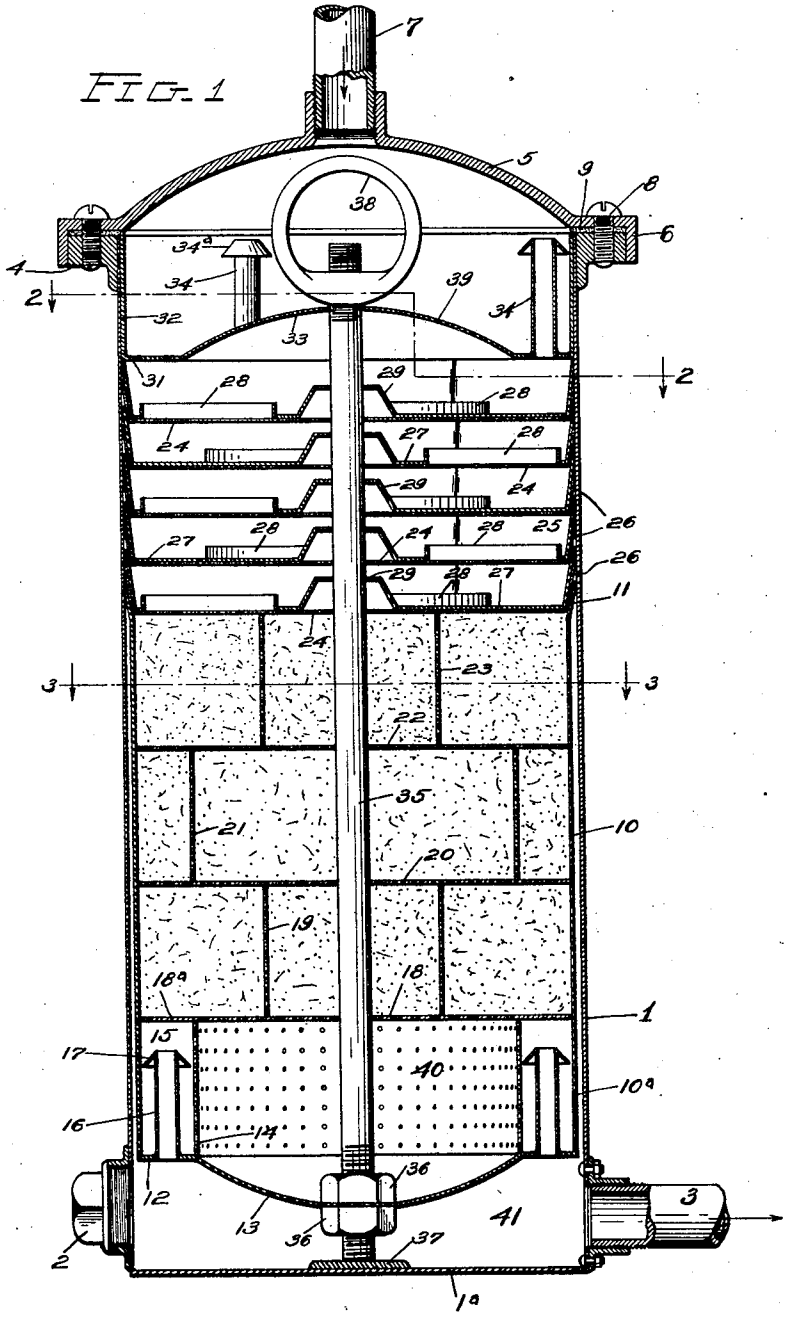
APPLICATION FILED FEB. 26, 1912.

1,077,619.

Patented Nov. 4, 1913.

2 SHEETS—SHEET 1.

FIG. 1




Witnesses:

Chas. L. Watt

Bowman B. West.

Inventor

Harvey F. Maranville,

By Hull & Smith,

Attys.

H. F. MARANVILLE.

FILTER.

APPLICATION FILED FEB. 26, 1912.

1,077,619.

Patented Nov. 4, 1913.

2 SHEETS—SHEET 2.

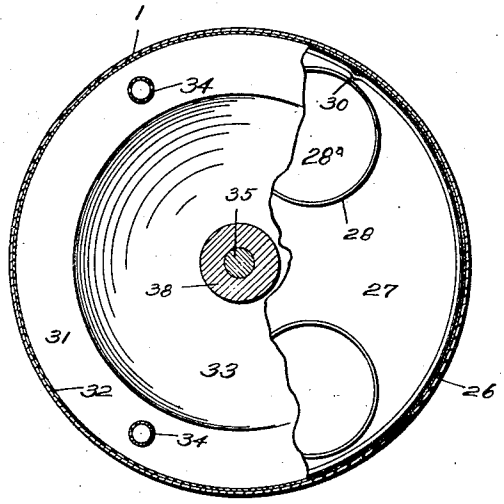



FIG. 2

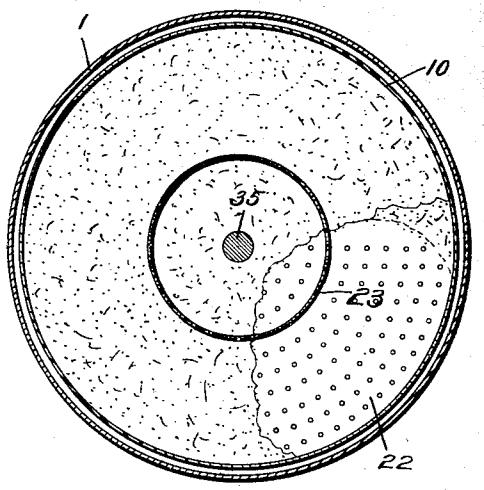



FIG. 3

FIG. 4

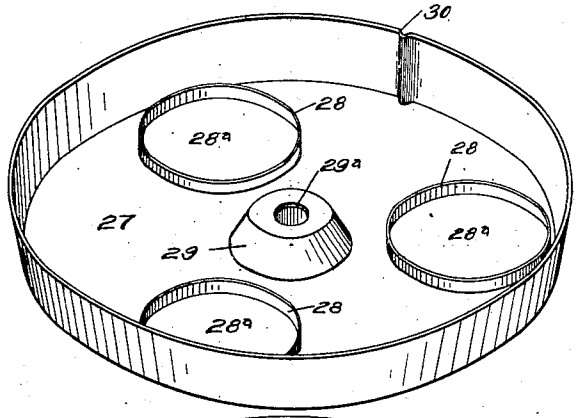
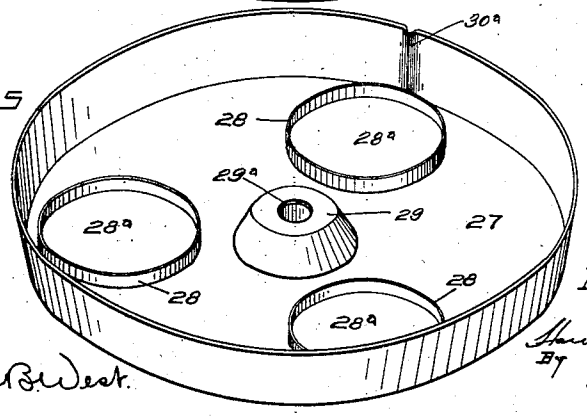



FIG. 5




Witnesses =
Chas. Abott
Brennan B. West.

Inventor
Harvey F. Maranville,
By Hull & Smith,
Attys.

# UNITED STATES PATENT OFFICE.

HARVEY F. MARANVILLE, OF AKRON, OHIO, ASSIGNOR TO THE PERFECTION SPRING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

## FILTER.

1,077,619. Specification of Letters Patent. Patented Nov. 4, 1913.

Application filed February 26, 1912. Serial No. 679,887.

*To all whom it may concern:*

Be it known that I, HARVEY F. MARANVILLE, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Filters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to filters, and more especially to filters that are employed and particularly adapted for use with automobiles.

It is the general purpose of the invention to provide a filter which will effectively remove the sediment from the oil and leave the latter in a clean condition without the necessity for using water for the purpose of washing the oil; also to provide a filter which may be assembled and disassembled in a particularly convenient manner.

With the foregoing objects in view, the invention may be described further and more generally as consisting of the combinations of elements embodied in the claims hereto annexed and illustrated in the drawings made part hereof, wherein—

Figure 1 represents a vertical sectional view of a filter constructed in accordance with my invention; Fig. 2 a sectional view corresponding to the line 2—2 of Fig. 1; Fig. 3 a sectional view corresponding to the line 3—3 of Fig. 1; and Figs. 4 and 5 perspective views of two of the filtering pans.

Describing by reference characters the various parts of the invention illustrated herein, 1 denotes the outer shell or casing of the filter, which may be of sheet metal. This shell is preferably cylindrical in shape and is provided above the bottom thereof with a clean out opening having a plug 2 threaded therein and with a supply pipe 3 for delivering the oil from a point adjacent to and slightly above the bottom. At its upper end the casing is provided with an angle iron flange 4, which may be soldered or otherwise secured thereto, the flange providing means for securing the cover 5 in place. This cover is of relatively heavy metal having a down-turned flange 6 adapted to slip over and embrace the outer cylindrical surface of the flange 4. The cover is provided with a central inlet pipe 7 for the oil to be filtered, and the rim portion of the cover is secured to the flange 4 by means of screws 8, there being a gasket 9 interposed between the flange and the cover. Within the casing there are removably mounted two series of filtering elements and a sediment pan, the assembly being detachably united and adapted for simultaneous insertion and removal. The pans of the upper series are arranged not only to filter the oil, but each is capable of collecting and retaining a part of the sediment in the oil supplied thereto from above without the employment of filtering cloth or material for this purpose. Beneath the filtering pans is a series of filtering elements so arranged as to effectively separate the fine sediment which may be contained within the oil after passing through the pans and to retain all of this sediment, whereby the oil delivered will be pure. The preliminary sediment pan, the filtering pans, and the lower filtering elements all comprise a unitary assembly. The manner in which the various parts are assembled and arranged will now be described.

10 denotes a sheet metal casing, which is of somewhat smaller diameter than the diameter of the casing 1 and which has its upper edge flared outwardly, as shown at 11, to contact with the inner wall of the casing 1. The bottom of the casing 10 comprises an outer annular portion 12, which is substantially parallel with the bottom of the casing 1, and this annular portion merges with a rounded depressed central portion 13. A perforated ring 14 is soldered to the inner edge of the annulus 12 and forms with the wall of the casing 10 an annular chamber 15 having tubes 16 therein communicating at their top with this chamber and at their bottom with the chamber 41 formed between the bottom of the casing 10 and the bottom of the casing 1. Each tube 16 is provided with a frusto-conical hood 17. The parts comprising the lower portion $10^a$ of the casing 10 and those designated by the numerals 12 to 17, inclusive, constitute the lowest filter element of the lower series. Three filtering elements are shown above this lowermost filtering element. The one next above the lowermost will now be described. This element consists of a bottom plate 18 which is adapted to rest upon the top of the annular screen 14 and contact at its outer edge with the inner wall of the casing 10. At its outer edge the plate 18 is imperforate above the annular chamber 15, as shown at $18^a$, that part of the plate within

and above the screen 14 being perforated. A perforated ring or screen 19 is secured at its lower edge to the plate 18 and is of considerably less diameter than the screen 14 and the chamber therebeneath.

The filtering element above the one just described comprises a bottom plate 20, which extends outwardly to and contacts with the inner surface of the casing 10 and is perforated throughout its extent. This chamber is provided with a perforated ring or screen 21, which is preferably of the same diameter as the ring 14 and is secured at its lower edge to the plate 20.

Above the filtering chamber just described is another, being the uppermost chamber of the lower series, said chamber comprising a perforated plate 22 similar to the plate 20 and a perforated ring or screen 23, of preferably the same diameter and similar to the ring 19 and secured at its lower edge to the plate 22, as by soldering. The upper edge of the ring 23 is in substantially the plane of the lower edge of the flared top 11 of the casing 10.

The upper series of filtering elements or filtering pans will now be described:—The upper series comprises a plurality of pans nesting one within another and each of which is provided in its bottom with a plurality of apertures surrounded by upwardly projecting flanges, with cloth extending across the bottom of each pan beneath the openings and along the outwardly flared side of the pan. Five such filtering pans are shown. Beneath the lowermost pan there is stretched a layer of cloth 24, the cloth being of such extent that the outer edge is turned up and interposed between the flared top 11 of the casing 10 and the outwardly flared side 25 of the pan, as shown at 26, (Fig. 1). The bottom 27 of the pan bears against the cloth and is provided with a plurality of openings, three such openings being shown (see Figs. 4 and 5). Each opening is surrounded by an upwardly projecting flange 28 and the central portion of the bottom of each pan is pressed upwardly in frusto-conical shape, as shown at 29, to a height above that of the flanges 28.

The pan next above the one described is constructed in identical manner, being provided with a cloth 24 across the apertured bottom 27, the cloth being turned up at its outer edge, as shown at 26, between the flared wall 25 of the pan and the similar flared wall of the pan next between. The cloth preferably is extended upwardly to the top of its associated pan in each instance and being also clamped between the top of each pan and the casing 1. The remaining three pans of this series will be constructed in the same manner as the ones just described.

In assembling the pans, it is desirable to have the flange openings $28^a$ out of vertical alinement in order that the oil filtered through the cloth extending across the bottoms of the openings of one pan may not fall directly into the openings of the pan next beneath. For the purpose of insuring this staggered relation of the openings in assembling the pans, each pan will be provided with a rib pressed inwardly from the flaring wall thereof, these ribs being adapted to fit each over that of the pan next therebeneath and the ribs being so spaced around the walls of the pans that, when assembled, the apertures of adjacent pans in the vertical series will be out of alinement. This arrangement will be clear from Figs. 4 and 5, wherein two pans of a series are shown. When assembled with the rib 30 of the upper pan slidably engaging the rib $30^a$ of the lower pan, the apertures $28^a$ of the upper pan will be out of alinement with the corresponding apertures of the pan therebeneath. For instance, assuming that the apertures $28^a$ are substantially 60 degrees in width, measured on an arc described from the center of the pan, there will be a difference of 60 degrees between the positions of the ribs of the adjacent pans.

At the top of the filtering pans, the sediment pan referred to hereinbefore is located. This pan is similar in general appearance to the bottom filtering element of the lower series, having an annular, flat portion 31 at the outer edge of the bottom, with a side wall 32 projecting upwardly from the outer edge 31 and adapted to fit snugly within the upper part of the casing 1. The central portion of the bottom of the pan is bulged upwardly, as shown at 33, being bent in the opposite direction from the bottom 13 of the lowermost filtering element. A plurality of tubes 34, similar to the tubes 16, are carried by the bottom portion 31 of the pan and are each provided with a frusto-conical hood $34^a$.

The series of filtering elements designated by the numbers 10 to 34, inclusive, are connected by means of a bolt 35, which passes through perforations $29^a$ in the frusto-conical central portion of the bottoms of the filtering pans, through the central portions of the perforated plates 18, 20 and 22, and through the bottom plates 13 and 33. The bottom of the lowermost filtering element is clamped to the rod by means of a pair of clamping nuts 36, the bottom of the rod resting in the reinforced central portion 37 of the casing bottom $1^a$. A ring, or other suitable manipulating device 38, is threaded onto the upper end of the rod 35. When assembled, the upper edge of the wall 32 of the uppermost sediment pan bears against the gasket 9, which is interposed between the cover 5 and the flange 4.

Oil supplied through the connection 7 ac-

cumulates within the sediment pan 39 at the top of the casing 1, where it overflows the tops of the tubes 34, leaving much of the heavy sediment in the pan. The hoods 34ª tend to prevent sediment from working up over the tops of the tubes and entering the same. From the tubes 34 the oil is discharged into the uppermost pan of the series between the apertures formed in the bottom of the pan. The oil overflows the flanges 28 and is strained by the cloth 24 beneath the apertures. Owing to the staggered relation of the apertures, oil from each upper pan is discharged at one side of the apertures in the pan immediately therebeneath, with the result that a large proportion of the sediment in the oil is collected in the pans and the oil is comparatively free from sediment prior to overflowing the flanges, 28.

The oil from the lowest pan of the series flows into the uppermost filtering element and passes through the boneblack in the filtering elements, collecting in the chamber 40 formed in the lowermost element, whence it passes into the annular chamber 15. When the oil has reached the proper height in the annular chamber, it overflows through the tubes 16 into the chamber 41 provided in the bottom of the casing 1, and is supplied thence to the point of use through the pipe 3.

The screens 19, 21 and 23 are used for the purpose of subdividing the boneblack in each filtering chamber into separate masses and the screens in adjacent filtering elements are staggered in the manner shown for the purpose of preventing the possibility of any coinciding breaking lines being established in the boneblack in the different elements. The tendency to establish such lines is naturally greatest in the vicinity of a screen or the casing 10. The narrow width of the annular space in the filtering element having the screen 21 makes it practically impossible for a breaking line to be established in the boneblack close to the casing wall. For the same reason, it will be practically impossible for a breaking line to be established adjacent to the inner wall of the screens 19 and 23. Such being the case, it will be impossible for breaking lines to be established in the various filtering elements which will coincide and permit the oil to flow through any open space extending from the top to the bottom of the series of filtering elements.

Any sediment which may finally remain in the oil passing into the chamber 15 is prevented from being discharged into the chamber 41 by reason of the intercepting hoods 17 at the tops of the tubes 16.

By the construction shown and described herein, a very efficient form of filter is obtained and one which is particularly well adapted for use with motor vehicles. If necessary to renew, repair, or make any changes in the filtering pans or elements contained in the assembly within the casing 1, it will be necessary only to remove the cover 5 and lift out the entire assembly by the ring 38, whereupon the various parts may be conveniently removed from the rod 35 and new filtering material be inserted or new parts be substituted for those formerly in place.

Having thus described my invention, what I claim is:

1. In a filter, the combination of a casing having an inlet at the top thereof and an outlet at the bottom thereof, a series of filtering pans, each having one or more openings in the bottom thereof provided with upwardly projecting flanges, the apertures in adjacent pans being out of alinement, and a filtering cloth extending across the openings in each of said pans and beneath the bottom of said pan.

2. In a filter, the combination of a casing having an inlet near one end thereof and an outlet near the other end thereof, a series of filtering pans, each having one or more openings in the bottom thereof provided with upwardly projecting flanges, the apertures in the pans being staggered, and a filtering cloth extending across the openings in said pans.

3. In a filter, the combination of a casing having an inlet and an outlet, a series of filtering pans in said casing between the inlet and the outlet, each pan having an aperture in the bottom thereof surrounded by an upwardly projecting flange, the aperture in one pan being staggered with respect to those in the adjacent pans, said pans having their side walls flared outwardly and adapted to nest one within the other, and a filtering cloth extending across the bottom of each pan and upwardly along the flaring side wall of the pan.

4. In a filter, the combination of a casing having an inlet and an outlet, a casing within the former casing and having a plurality of filtering elements therein, the end of the second casing which is directed toward the inlet being flared outwardly to contact with the wall of the first casing, a series of pans interposed between the second casing and the inlet and having flared side walls and openings in their bottoms, and cloth beneath the bottom of each pan and extending across said openings and upwardly along the flaring side wall of each pan.

5. In a filter, the combination of a casing, having an inlet and an outlet, a series of filtering devices in said casing between the inlet and the outlet, and a pan above said devices and located beneath the inlet, said pan having a depressed bottom portion and one or more overflow tubes projecting upwardly from such depressed portion, each of said

tubes being provided with a downwardly inclined hood near the top thereof.

6. In a filter, the combination of a casing having an inlet near the top thereof and an outlet near the bottom thereof, a pan located beneath the inlet and having an elevated central portion and a depressed annular portion surrounding the central portion, said pan having one or more overflow tubes projecting upwardly from the depressed portion and each having a downwardly directed hood carried by the upper end thereof, and one or more filtering elements interposed between said pan and the outlet.

7. In a filter, the combination of a casing having an inlet and an outlet, a pan located beneath the inlet and having an elevated central portion and a depressed annular portion surrounding the central portion, said pan having one or more overflow tubes projecting upwardly from the depressed portion, and filtering means interposed between said pan and the outlet.

8. In a filter, the combination of a casing having an inlet and an outlet, a filtering element interposed between the inlet and the outlet and comprising a central chamber, a screen surrounding and defining said chamber, there being an annular chamber located outside of said screen, one or more overflow tubes projecting upwardly from the bottom of the annular chamber, and a plurality of filtering elements interposed between the inlet and the central chamber and arranged to discharge filtered liquid into the central chamber.

9. In a filter, the combination of a casing having an inlet and an outlet, a filtering element interposed between the inlet and the outlet, and comprising a central chamber having filtering material therein, a screen inclosing the filtering material and defining the chamber, there being an annular chamber located outside of said screen one or more overflow tubes projecting upwardly from the bottom of the annular chamber and each having a hood projecting downwardly from the upper end thereof, and a plurality of filtering elements interposed between the inlet and the central chamber and arranged to discharge into the central chamber.

10. In a filter, the combination of a casing having an inlet and an outlet, a casing within the former casing and having an open end directed toward the inlet end having its opposite end closed, a screen projecting from the closed end of the second casing and spaced from the side wall of said casing, a perforated plate within said second casing and abutting against said screen, an annular screen on the perforated plate, a perforated plate in the second casing bearing against the second screen, an annular screen mounted on the last-mentioned plate, the screens being of different diameter, whereby they are out of alinement, and filtering material within the chambers formed by the second or inner casing, the plates, and the screens.

11. In a filter, the combination of a casing having an open end and having its opposite end closed, a screen projecting from the closed end of the casing and spaced from the side wall of said casing, a perforated plate within said casing and abutting against said screen, an annular screen on the perforated plate, the screens being of different diameter, whereby they are out of alinement, and filtering material within the chambers formed by the casing, the plates and the screens.

12. In a filter, the combination of a casing having an inlet and an outlet, a casing removably fitted within the former casing between the inlet and the outlet and having a partition across one end and the other end open and flaring to engage with the side wall of the exterior casing, a plurality of plates extending transversely of the second casing and dividing it into a plurality of filtering chambers, an annular screen within each of said chambers, the screens in adjacent chambers being of different diameter, and filtering material in said chambers.

13. As a new article of manufacture, a combined sediment and filtering pan having a flaring side wall, an upwardly projecting center and a plurality of apertures in the bottom, between the center and the side wall, said apertures being provided with upwardly projecting flanges of less height than the central projection and the side wall, and cloth extending across the bottom of said pan and the apertures therein.

14. As a new article of manufacture, a combined sediment and filtering pan having a flaring side wall, a plurality of flanged apertures in the bottom thereof, and cloth extending across said bottom and the apertures and along the flared wall.

15. In a filter, the combination of a casing having a flared top, a plurality of combined filtering and sediment pans adapted to nest one within the other, the lowermost pan nesting within the flared end of the casing, a sediment pan on top of the uppermost filtering and sediment pan having one or more overflow tubes extending above its bottom, and a bolt connecting said pan and the bottom of the casing and extending through the bottoms of the pans.

16. In a filter, the combination of a casing having having a bottom wall and having its upper end outwardly flared, perforated plates dividing the casing into a plurality of filtering chambers, there being filtering material in said chambers, a series of combined filtering and sediment removing pans having flared side walls and nesting one

within the other, with the lowermost pan of the series nesting in the flaring top of the casing, a sediment pan on top of the uppermost pan of said series, and a bolt extending through the last-mentioned pan and connected to said pan and the bottom of the casing.

17. In a filter, the combination of a casing having a bottom wall, perforated plates dividing the casing into a plurality of filtering chambers, there being filtering material in said chambers, a series of combined filtering and sediment removing pans adapted to rest one on top of the other, with the lowermost pan of the series on top of the casing, a sediment pan on top of the uppermost pan of said series, and a bolt extending through the last-mentioned pan and connected to said pan and the bottom of the casing.

18. In a filter, the combination of a casing having an inlet and an outlet, a series of filtering devices interposed between the inlet and the outlet, and a final filtering device interposed between the inlet and the outlet and having a central chamber for receiving the oil supplied thereto from the other filtering elements, a screen surrounding and inclosing said chamber and spaced from the outer wall of the final filtering element to provide an annular chamber with such wall, there being overflow tubes located in said annular chamber and each having a downwardly directed hood at the top.

19. In a filter, the combination of a casing having an open upper end and a closed bottom, a screen projecting from the bottom of the casing and spaced from the outer wall of said casing, a plate within said casing and abutting against said screen and being perforated within the area defined by said screen and being imperforated outside of such area, and filtering material in said casing above said plate, there being one or more overflow tubes projecting upwardly from the bottom of the casing into the annular chamber formed between the screen and the outer wall of the casing.

20. In a filter, the combination of a casing having an inlet and an outlet, a plurality of combined filtering and sediment pans in said casing between the inlet and the outlet, each of said pans being provided with an aperture in the bottom thereof surrounded by an upwardly projecting flange and each having a device adapted to engage and position it with reference to an adjacent pan of the series, the interengaging devices being so spaced on adjacent pans that, when in engagement, the apertures of one pan are out of alinement with those of an adjacent pan.

21. In a filter, the combination of a casing having an inlet and an outlet, a plurality of combined filtering and sediment pans in said casing between the inlet and the outlet, each of said pans being provided with spaced apertures in the bottom thereof surrounded by upwardly projecting flanges and each having an inwardly projecting rib on the outer wall thereof, said walls being flared to enable the pans to nest one within another with the rib of one pan fitting within the hollow of the rib of the pan next above, the ribs being so spaced on adjacent pans that, when in engagement, the apertures of one pan are out of alinement with those of an adjacent pan.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

HARVEY F. MARANVILLE.

Witnesses:

HAROLD S. SMITH,

BRENNAN B. WEST.