E. J. SWEETLAND.

FILTER.

APPLICATION FILED JULY 2, 1913.

1,344,215. Patented June 22, 1920.

FIG. 1.

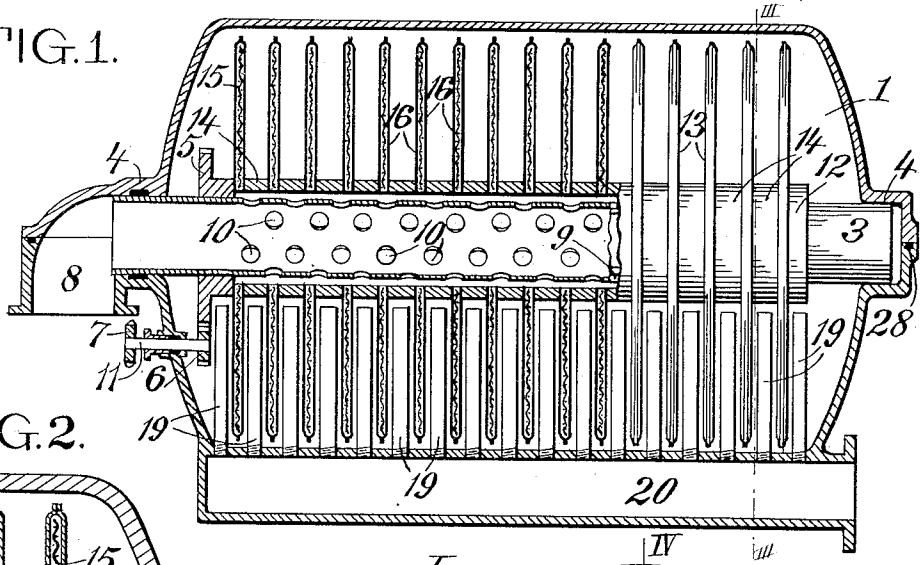


FIG. 2.

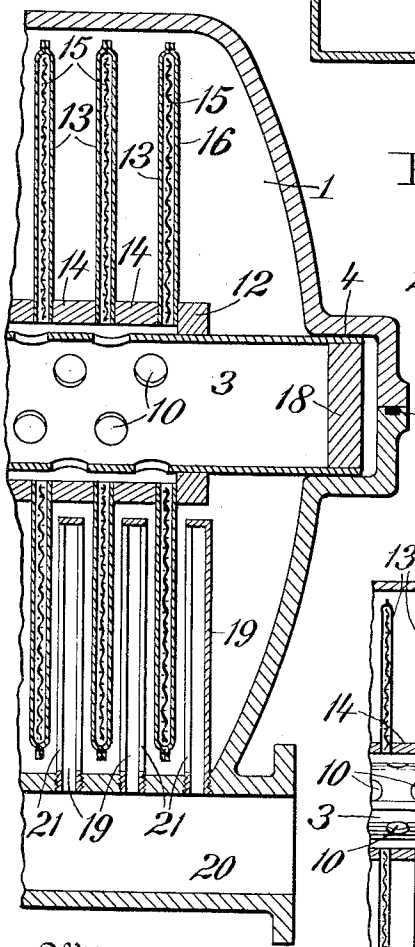


FIG. 3.

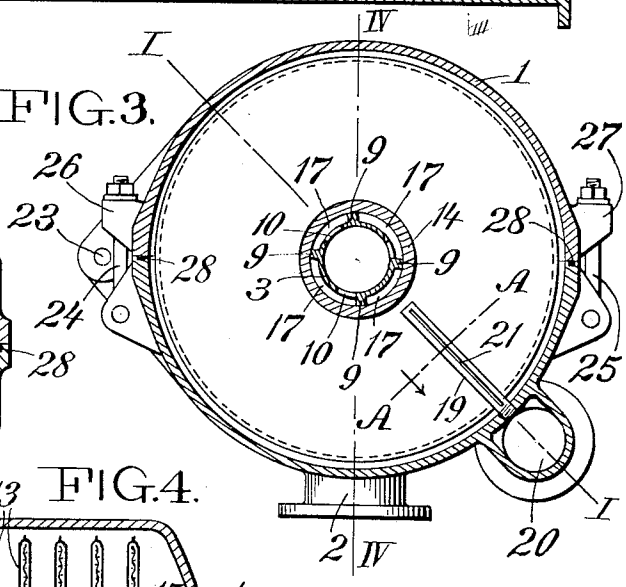


FIG. 4.

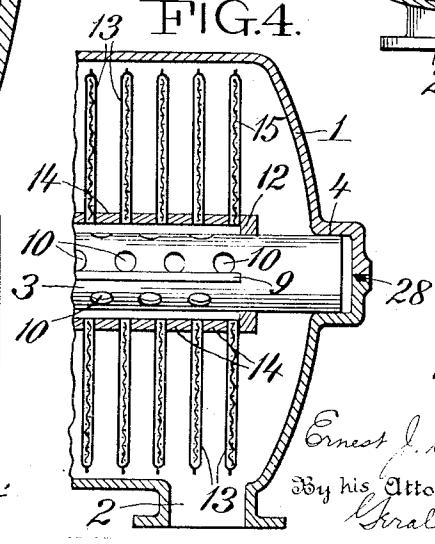
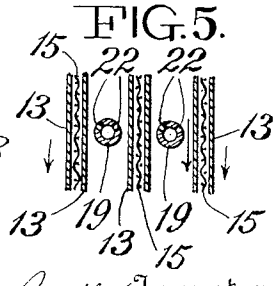


FIG. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

ERNEST J. SWEETLAND, OF MONTCLAIR, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED FILTERS CORPORATION, A CORPORATION OF DELAWARE.

FILTER.

1,344,215. Specification of Letters Patent. Patented June 22, 1920.

Application filed July 2, 1913. Serial No. 776,901.

To all whom it may concern:

Be it known that I, ERNEST J. SWEETLAND, a citizen of the United States, residing in Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Filters, of which the following is a specification.

My invention relates to apparatus for filtering liquids containing matter held in suspension, and is particularly designed for use where the recovery of the solid matter in a dry state is not requisite. My chief object has been to construct such a device in which rapid and efficient cleaning of the filtering members may be accomplished without opening the filter casing and with a comparatively low water pressure. In obtaining this result I use spaced filter leaves which may be moved relatively to a fluid jet or stream, so that every square inch of filter cloth, or other filtering medium used, is brought within close range of the sluicing stream. There thus results high efficiency combined with ease and rapidity of manipulation.

In the accompanying drawings which form a part of this specification, Figure 1 is a longitudinal transverse sectional view of my improved filter; Fig. 2 is a fragmentary view, similar to Fig. 1, on an enlarged scale; Fig. 3 is a transverse sectional view on line III—III of Fig. 1; Fig. 4 is a fragmentary longitudinal sectional view on line IV—IV of Fig. 3; Fig. 5 is a fragmentary view of a modification of my apparatus taken on a line corresponding to the line A—A of Fig. 3.

Referring to the drawings in detail, the numeral 1 designates the casing of a filter provided with an inlet pipe 2. Within the casing is a centrally disposed pipe 3 rotatably mounted in the bearings 4 formed in the casing. Upon one end of the pipe is mounted a gear 5, meshing with a gear 6, whose shaft 11 passes through a stuffing box in the casing and carries on its outer extremity a sprocket wheel 7. The pipe 3 is provided with a plurality of ribs 9 running longitudinally along the pipe. A portion of the pipe is perforated with the holes 10. Between the gear 5 and collar 12, which are adjacent to the respective ends of the perforated section, and which fit tightly upon the periphery of the pipe, are a plurality of filter leaves 13 spaced by the rings 14 and supported by the ribs 9. Each filter leaf consists of a disk of wire mesh or screen 15 which supports and is surrounded by a closely fitting envelop 16 of cloth or other filtering medium.

There is thus formed about the periphery of the pipe 3 a series of chambers 17 running longitudinally along the pipe between the gear 5 and collar 12. These chambers afford communication between the interior of the various filter leaves and the interior of the pipe through the medium of the perforations in the pipe. A plug 18 is fitted into one end of the pipe, but the other end has free communication with the outlet 8. It will thus be apparent that liquid forced into the interior of the casing through the inlet pipe 2 is free to pass through the filtering cloth or other filtering medium of the filter leaves or disks, flowing through the center of the leaves into the chambers 17, through the perforations 10 into the pipe 3, and thence through the outlet pipe 8. If a fluid containing matter in suspension is admitted to the casing through the inlet pipe, the solid matter will be retained by the filter leaves and the clear filtrate may be drawn off through the outlet pipe 8.

In order to clean the filter leaves of the matter which is deposited on them in the process of filtering liquids admitted to the filter, I provide a plurality of pipes 19 entering the spaces between the filter disks and preferably radially disposed with reference thereto. Each of these pipes communicates with a sluicing fluid conduit 20 and is further provided with longitudinal slits or orifices 21 capable of projecting a stream of sluicing water or other fluid against the faces of the adjacent leaves or disks, between which the pipe enters. In the process of cleaning the disks, sluicing water or other fluid is admitted under pressure into the conduit 20 and thence into the individual sluicing pipes. Meanwhile the pipe 3 is rotated through any suitable agency such as the sprocket wheel 7, and every portion of both faces of each leaf is brought within short range of the stream projected from the pipe adjacent to that disk. In some cases it will be desirable to rotate the pipe 3 and the disks or leaves carried thereby at a high rate of speed, so as to accelerate the throwing off of the residue on the disks or leaves by the added action of centrifugal force, but in common use of the

device a slow rotation of the parts is usually desirable. In Figs. 2 and 3 I have indicated that the slots through which the water or other sluicing fluid is projected from the pipes 19 are substantially perpendicular to the faces of the adjacent filter leaves. In order to get a more efficient cleansing of the filter leaves, I may construct the device in the manner shown in Fig. 5, in which the pipes 19 are provided with slots 22 which will throw streams of water oblique to the faces of the adjacent filter leaves and in a direction opposed to the direction of rotation of these leaves, so that the foreign matter deposited upon the leaves will be cut from the surface of the leaves as though by a knife.

The structure which I have described is adapted for quick and efficient cleaning of the filter members without disturbing the filter casing, but for purposes of repairs and the like, I preferably form the casing of two parts, as indicated in Fig. 3, hinging them together at 23 and providing the swing bolts 24 and 25 engaging lugs 26 and 27, respectively for the purpose of locking the casing in its closed position, a gasket 28 forming a fluid-tight joint between the two parts when they are closed.

While I have illustrated and described only certain improved embodiments of my invention, I realize that it is susceptible of wide modification and I do not desire to be limited to the precise structure shown and described. For example, it is within the scope of my invention to clean the filter leaves by mechanical agitation resultant upon the rotation of the leaves within the casing after the latter has been filled with suitable cleaning fluid, without resorting to the streams thrown from the pipes 19. If a particularly thorough washing of the filter leaves is requisite, as for example where boiler feed water containing oil has been filtered, the body of the filter may be partly filled with soapsuds, or any other cleansing agent, and the leaves revolved, and if desired steam may be introduced into the filter leaves through the filtrate pipe to maintain a high temperature during the cleansing process.

Having thus described my invention, I claim:

1. In a filter, in combination, a casing, a plurality of spaced filter leaves therein, and an inclined pipe interposed between adjacent leaves, said pipe having means for projecting a uniform fluid stream against a face of said leaves and toward the bottom of the casing.

2. In a filter, in combination, a plurality of spaced filter leaves therein arranged on a substantially horizontal axis and a nozzle for projecting a sluicing stream across one-half the face of each leaf, each nozzle being supported beneath said axis and pointing toward the bottom of the casing.

3. In a filter, in combination, a casing, a plurality of vertically disposed spaced filter leaves therein, means for projecting a single solid fluid stream obliquely against the face of each leaf, from a source parallel to the leaf and means for rotating said leaves in the opposed direction.

4. In a filter, in combination, a casing, a plurality of spaced filter leaves mounted in said casing upon a substantially horizontal axis, a discharge outlet at the bottom of the casing and a pipe entering between each pair of leaves having means for projecting a knife-like stream of washing fluid upon the leaf for washing foreign matter toward said discharge outlet.

5. In a filter, in combination, a casing a discharge outlet at the bottom thereof, a plurality of spaced filter leaves therein arranged on a substantially horizontal axis and means for projecting a single sluicing stream across one-half the face of each leaf, said means being supported beneath said axis and above said discharge outlet.

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