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2 Sheets-Sheet 1

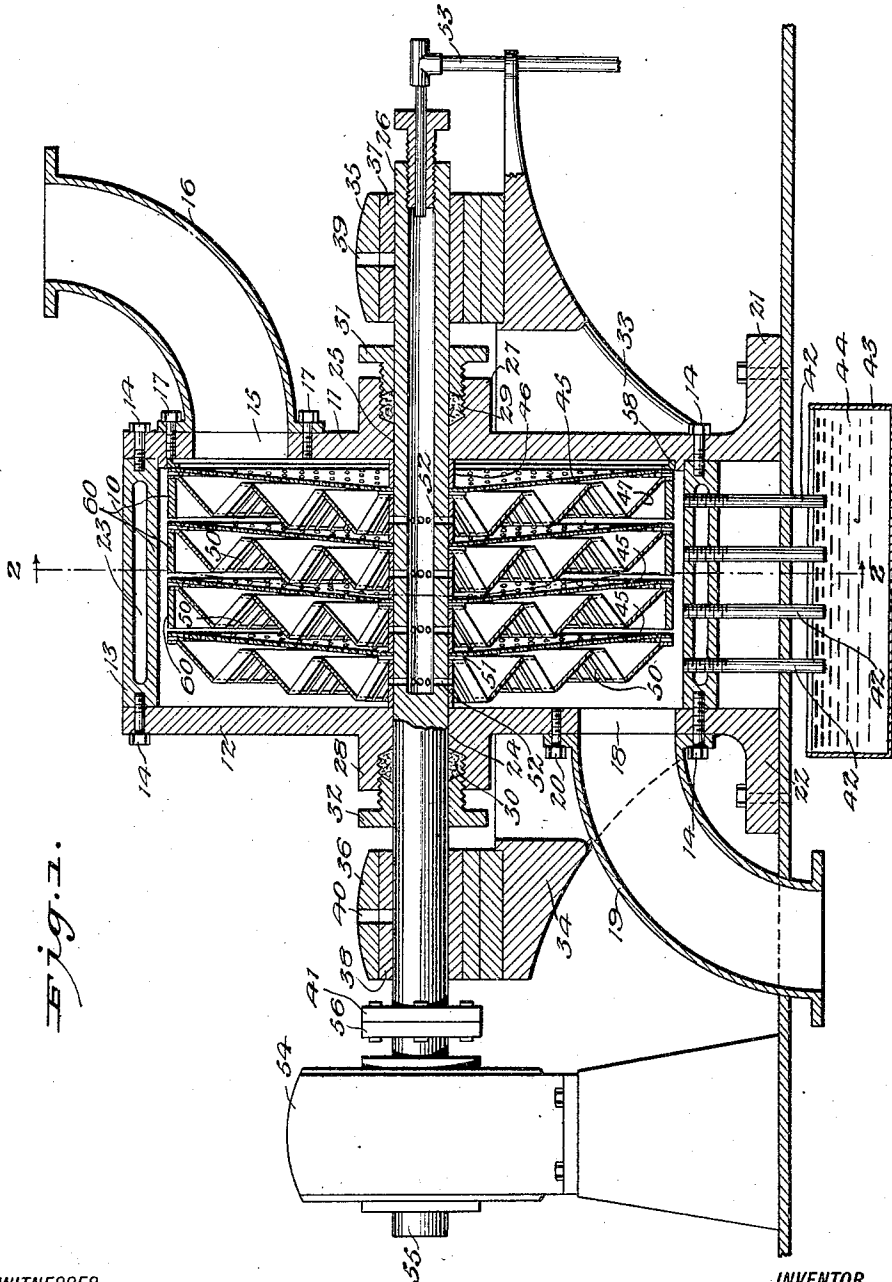


Fig. 1.

WITNESSES

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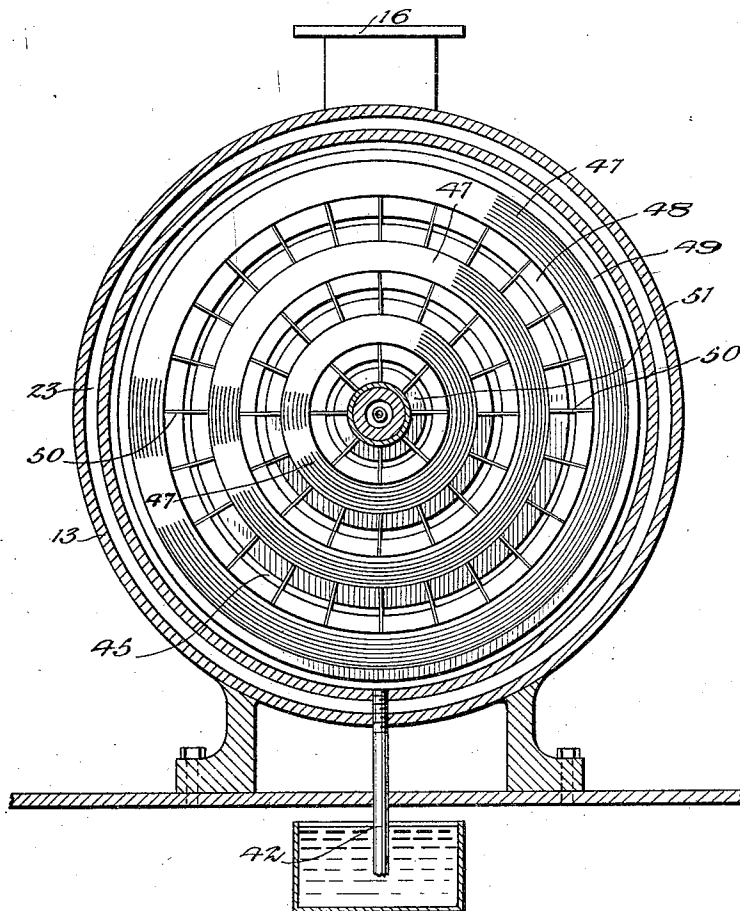
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2 Sheets-Sheet 2

Fig. 2.



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This invention relates to separators primarily designed for use in removing suspended particles from gases.

The general object of the invention is the provision of an efficient and durable separator supplied with washing liquid for collecting from gases particles contained in suspension.

A further object of the invention is the provision of a separator supplied with means for the removal of the particles collected from the gases without allowing the escape of the gases through said means.

These objects are accomplished by providing a plurality of rotary screens to which a washing liquid is supplied and forced to travel outward over the screens by centrifugal force, and associating with the screens, means for forcing the gases through the screens and washing liquid and supplying, in conjunction with the washing liquid, means for removing the washing liquid, including the particles removed from the gases, thrown off from the rotary screens.

These and other objects of the invention will be more clearly understood from the following detailed description and accompanying drawings, in which—

Figure 1 is a longitudinal vertical section through the separator; and

Figure 2 is a section along the line 2—2, Figure 1.

Referring to the above-mentioned drawings, two end walls 11 and 12, supported by feet 21 and 22, respectively, are mounted spaced from one another, as shown in Figure 1. Supported between these end walls by means of set screws 14 is an annular member 13 which with the end walls forms a casing assemblage 10. Near the top of this casing assemblage an opening 15 extends through the end wall 11 and a gas outlet pipe 16 attached to the end wall 11 by set screws 17 registers with this opening 15. Near the bottom of the casing an opening 18 extends through the end wall 12, and a gas inlet pipe 19 attached to the inlet wall 12 by set screws 20 registers with this opening 18. The gas inlet 19 is connected with an impeller, not shown, so as to force the gas through the separator. Extending through the end walls 11 and 12, respectively, are openings 25 and 24 that are concentric with the annular member 13. Extending through these openings in the end walls and supported therein is a hollow

shaft 26. Integral with the end walls 11 and 12 and concentric with the openings 25 and 24, respectively, are hubs 27 and 28. The internal diameter of these hubs is greater than the diameter of the hollow shaft thus providing a space between the inner face of the hub and the shaft. Thus we have provided packing boxes in which packing 29 and 30 is located and retained in position by the collars 31 and 32 which make threaded engagement with internal threads provided on the inner face of the hubs 27 and 28.

Attached to the end walls 11 and 12 are supports 33 and 34 carrying bearing boxes 35 and 36. Mounted in these bearing boxes are bearings 37 and 38 which support the shaft 26. Extending through the bearing box 35 and bearing 37 is an opening 39, and through the bearing box 36 and the bearing 38 an opening 40. These openings 39 and 40 serve as grease cups for supplying a lubricant to the shaft 26.

The annular member 13 is provided with an annular chamber 23. Any cooling medium may be circulated in this annular chamber forming a cooling jacket for the casing assemblage 10. Extending through the bottom of this annular member 13 are a plurality of drain pipes 42 for carrying off fluid that may collect in the bottom of the casing assemblage 10. These drain pipes 42 extend into a tank 43 filled with liquid 44. This liquid forms a seal for the drain pipes so that the gases passing through the casing do not escape.

A plurality of circular dish-shaped screens 45 are mounted on the shaft 26 and spaced from one another and from the end walls 11 and 12 by spacing collars 46. These circular dish-shaped screens are so mounted that they slope away from the end wall 12 through which the inlet pipe 19 feeds the gases. Mounted on each screen are a plurality of plates 47 having their bases spaced from the screen. Each plate 47 is the shape of the shell of a conic frustum having its upper and lower edges 48 and 49, respectively, bent inward and outward, and lying in planes at right angles to its axis. These plates are of different diameters and one is mounted inside the other in a concentric arrangement, as shown in Figure 2. The top edge of the each plate is connected to the bottom edge of the next plate lying inside by means of a plurality of plates 50, the planes of which

lie along radial lines, the upper edge of the smallest plate on each screen being connected to a ring 51 mounted on the centre of each screen. These screens are fixed to the shaft 26 so that they rotate with it.

Rings 60 are associated with the dish-shaped screens 45 and insure the passage of the gases through the screens. A ring 58 is carried by the screen mounted next the outlet end of the separator. This ring cooperates with an annular flange 59 attached to the end wall 11 to prevent the escape of gas from the chamber between the end wall and the end screen, around the casing, and back to the inlet opening.

Extending through the wall of the hollow shaft 26 are a plurality of circumferential lines of openings 52, a circumferential line of openings being provided for each screen mounted on the shaft. These circumferential lines of openings 52 are so located that the washing liquid delivered through a pipe 53 is projected onto the inner plate 47 mounted on the screens and so distributed over the screens. The pipe 53 through which the washing liquid is fed to the hollow shaft may be associated with any means for pumping the washing liquid into the separator.

Various types of prime movers may be provided for driving the shaft 26. In this case an electric motor 54 having a motor shaft 55 is provided. The motor shaft 55 is connected to the hollow shaft 26 by means of coupling disks 41 and 56, each attached to the shafts 26 and 55, respectively.

In the operation of this machine, the prime mover is first set in motion, rotating the screens 45. The washing liquid is then fed through the hollow shaft 26 and the circumferential lines of openings 52 between the screens 45. The centrifugal force caused by the rotation of the screens forces the washing liquid to flow outward and to be finally thrown off the screens onto the wall of the annular member 13. The gases containing particles in suspension are fed through the pipe 19 into the casing, and are forced between the plates 47 against the screens 45. The washing liquid with the impurities then flows around the inner wall of the annular member and collects in the bottom of the casing, whence it is conveyed by the drain pipe 42 into the tank 43. The washing liquid used will depend upon what is to be separated from the gas. For separating tar from gas, light tar oils would be used; for separating ammonia, water; for separating benzole, what is known as wash oil; and for separating cyanide soda ferro solution in water.

The screens 45 may be constructed from perforated plates and the size of the openings in the plate will have an influence on the filtering. The number of plates 47 that are used in conjunction with each screen will

depend on the diameter of the screen. The number of screens used on the shaft will depend on the filtering effect it is desired to obtain.

I would state in conclusion that while the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the exact details since manifestly the same can be considerably varied without departing from the spirit of the invention as defined in the appended claims.

Claims:—

1. In a separator for filtering gases, a plurality of filtering dish-shaped screens, and a plurality of concentric members carried by each screen for directing the flow of gases therethrough.

2. A device for filtering gases, comprising a casing having a water jacket, a plurality of rotary dish-shaped screens mounted in said casing, means carried by each screen for forcing the gases therethrough, means for directing upon each screen a washing liquid for collecting the solid particles forced through the screens, and means for removing from the casing the particles collected from the gases by the washing liquid on the said rotary screens.

3. A device for removing from gases the particles contained in suspension, comprising a casing provided with inlet and outlet means for the gases, dish-shaped rotary screens mounted in the casing sloping away from the inlet for the gases, means for supplying the screens with a layer of a washing liquid, means carried by the screens for forcing the gases through the screens and the layer of washing liquid, said means being spaced from the screens at their outer edges so as to allow the delivery of the washing liquid and particles carried thereby to the casing, and means for removing from the casing washing fluid containing the particles.

4. A device for washing gases to remove the particles contained in suspension, comprising a casing having gas inlet and outlet openings, a hollow shaft rotatably mounted in said casing, said shaft being provided with a plurality of circumferential lines of openings extending radially through the wall of the shaft, means for projecting a washing liquid into the casing through said hollow shaft and circumferential lines of openings, a plurality of disk-shaped apertured plates mounted on said shaft, means carried by each plate for forcing the gases through them and for directing the washing liquid onto the plates to form a layer of the washing liquid thereon, and means for removing from the casing the washing liquid and the collected particles, said means forming a seal to prevent the escape of the gases from the casing.

5. In a gas filter, a plurality of rotary filtering screens, plates each the shape of the shell of a conic frustum mounted on the filtering screens providing means for directing the gases through the screens.
6. In a gas filter, a plurality of rotary filtering screens, plates each the shape of the shell of a conic frustum mounted on the filtering screens providing means for directing the gases through the screens, and a plurality of rings positioned between the plates and the screens for preventing the flow of the gases between said plates and filtering screens.

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