

Nov. 24, 1931.

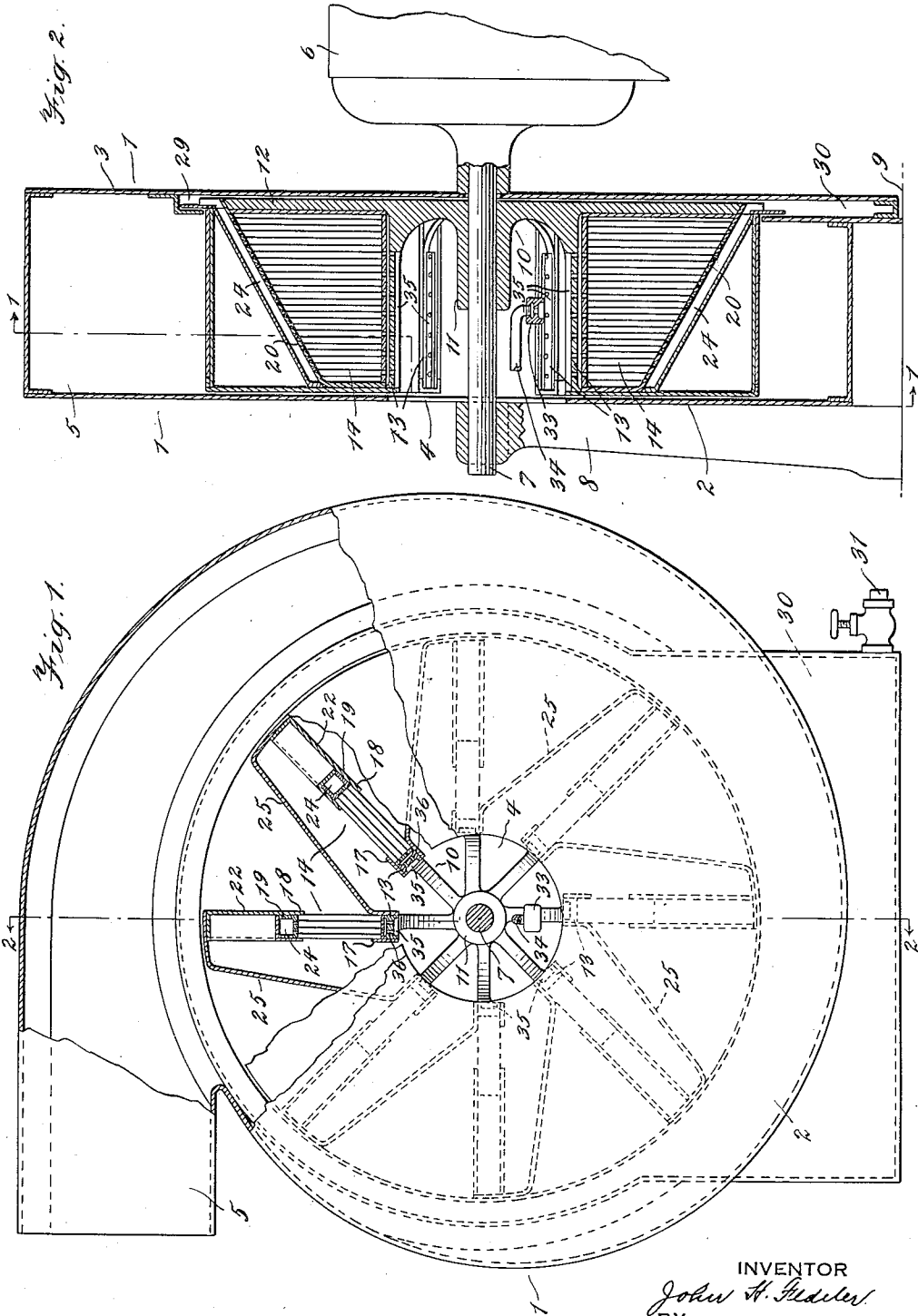
J. H. FEDELER

1,833,674

AIR FILTERING DEVICE

Filed June 12, 1929

3 Sheets-Sheet 1



INVENTOR

John H. Fedeler

BY

Gifford, Scull & Burgess
his ATTORNEYS

Nov. 24, 1931.

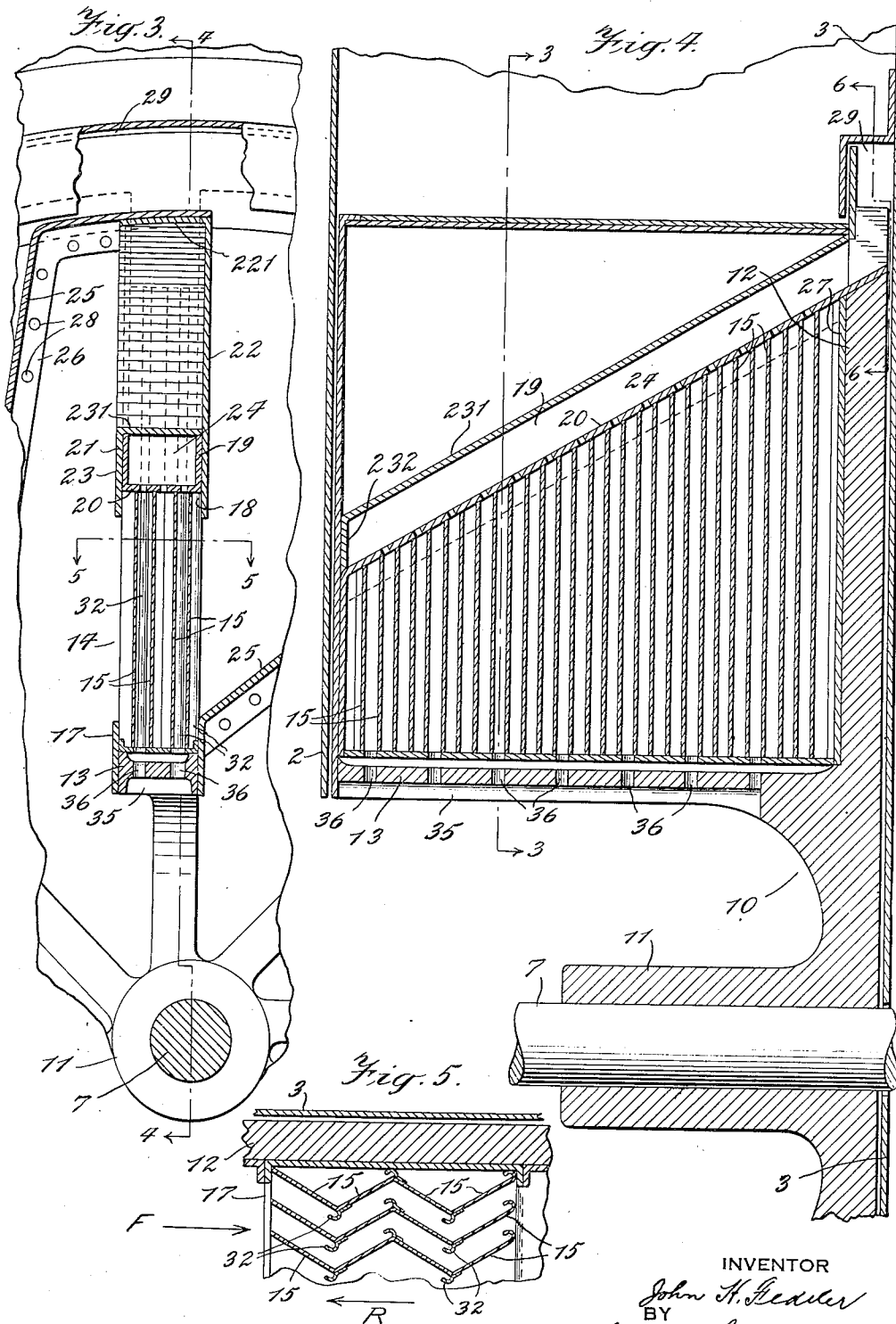
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Fig. 6.

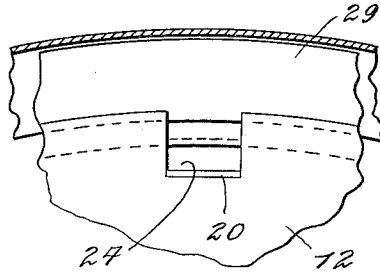


Fig. 7.

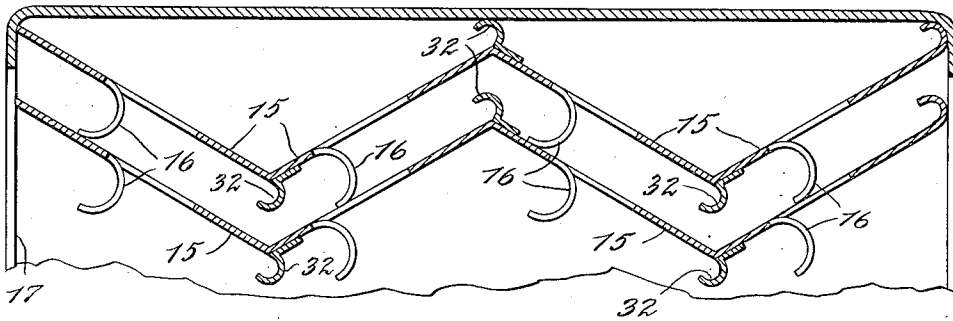
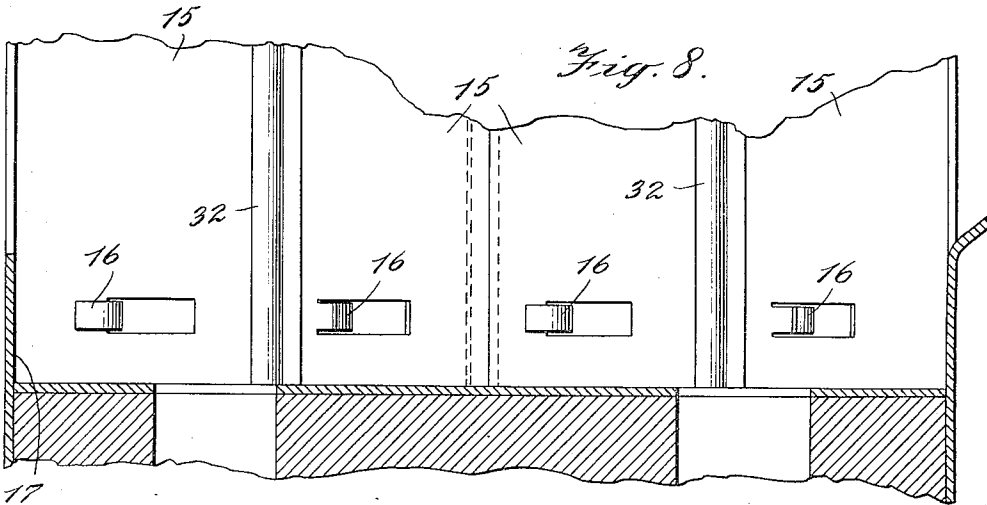


Fig. 8.



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UNITED STATES PATENT OFFICE

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AIR FILTERING DEVICE

Application filed June 12, 1929. Serial No. 370,215.

My invention more particularly relates to an air filtering system in which filter units are mounted radially on a rotary member, with means for collecting and removing the dust carried by the air which passes through the filter media.

My invention will best be understood by reference to the accompanying drawings, in which I have illustrated a preferred embodiment thereof, and in which Fig. 1 is an end view of the filtering device, partially in section, taken on the line 1—1 of Fig. 2; Fig. 2 is a section taken on the line 2—2 of Fig. 1; Fig. 3 is a sectional view taken on the line 3—3 of Fig. 4, and illustrating one of the filter units; Fig. 4 is a section taken on the line 4—4 of Fig. 3; Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 3, enlarged to show details of the filter unit; Fig. 6 is a detail sectional view taken on the line 6—6 of Fig. 4; Fig. 7 is a further view of the fragmentary view on an enlarged scale, illustrating the means by which the angularly formed plates of a filter unit may be spaced from each other, and Fig. 8 is a bottom plan sectional view of Fig. 7 illustrating the pieces stamped out from the metal plates and forming spacing members.

Like reference characters indicate like parts throughout the drawings.

Referring now to the drawings, 1 indicates generally a casing, preferably in spiral form, provided with a front plate 2 and a back plate 3, the front plate of the casing being provided with an air inlet opening 4, and the casing being provided with an air outlet opening 5, as indicated in Fig. 1.

The device is actuated by any suitable mechanism illustrated as an electric motor 6, the shaft 7 of which has one of its bearings in a standard 8 mounted on a base 9.

A rotor indicated generally at 10 is mounted on the shaft 7 and is rotatable within the casing. The rotor preferably comprises a hub 11 as best shown in Fig. 2, and which is secured to the shaft. A plate 12 extends outwardly from the hub 11, and arms 13 extend from said plate transversely substantially to the front side of the casing as illustrated in Fig. 2.

A plurality of gas cleaning filter units indicated generally at 14 are supported on respective arms 13. Each of the filter units preferably comprises a plurality of angularly arranged plates 15 as illustrated in Fig. 5. Preferably, the plates are spaced by stamped out portions 16 as indicated in Figs. 7 and 8.

The inner ends of the filter units are received in a trough 17 which is formed on the outer sides of the arms 13, while the outer ends of the units are received in inwardly facing troughs 18, each of which is partially formed by the inner side of an outwardly facing channel plate 19 (Fig. 3), the bottom portion of which is perforated as indicated at 20. The channel plate 19 is received in an inwardly facing channel member 21 which is shown as comprising an angular plate 22 on one side of the filter, as best shown in Fig. 3, and which extends inwardly past the channel plate 19. The outer end of the plate 22 is bent to substantially the horizontal as indicated at 221.

The inwardly facing channel member 21 also, in the embodiment illustrated, comprises an angle iron 23, one side of which extends downwardly past the side of the channel plate 19, and the top side 231 of which may be welded or otherwise secured to the plate 22. The top side 231 is bent outwardly at its front end as at 232 to close the front end of a dust passage 24 which is formed by the two channel members 19 and 21, and which is upwardly inclined from the front to the rear of the filter device as illustrated in Fig. 4.

Blades 25 are preferably secured to the plates 22 and extend inwardly in front of the filter unit as best shown in Fig. 1. The blades 25 are preferably provided with flanges 26 (see Fig. 3), which may be secured to the back plate 27 of the rotor as by rivets 28. The outer and rear inclined end of the dust passage 24 communicates with a dust chamber 29 extending around the filter unit and having an enlarged portion at the bottom as at 30 as shown in Figs. 1 and 2, with which a valve outlet pipe 31 communicates.

It will of course be understood that the back plate 3 of the casing may be provided

with suitable glass covered peepholes or any other desired indicator (not shown in the drawings), by which the contents of the chamber may be viewed.

5 The plates 15 are preferably provided at their angular portions with radially extending troughs 32 which are shown as secured to the angular plates 25. Obviously, however, the plates could be crimped to form the troughs, so that the plates and troughs would
10 form a single member.

The filter unit rotates in the direction indicated by the arrow R in Fig. 5, while the air passes through the filter unit in the direction indicated by the arrow F. The air passing between the angularly spaced plates, therefore, strikes the sides thereof, and while the air is directed around a given trough to the next portion of the passage, the solid particles carried by the air are caught by the troughs 32 and forced outwardly due to centrifugal force, and received in the troughs 18 and forced outwardly through the passages 24.

The filter device is, in the embodiment illustrated, sprayed by a suitable spraying nozzle 33 to which suitable fluid, such as water or a viscous material, is introduced through an inlet pipe 34. In this case, the liquid is sprayed into channels 35 formed in the inner sides of the arms 13, which channels are provided with perforations 36. The channels 35 thus serve to distribute the fluid transversely across the filtering device, and it is forced through the passages 36 to the filter units.

35 While I have illustrated a spray extending inwardly into the device, it will be understood that a spray could be introduced through the opening 4 in the front of the filter device.

The operation of my invention will readily be understood from the foregoing description and is as follows:

The motor rotates the rotor of the filtering device, and the blades 25, through centrifugal action, draw the air through the inlet 4, thence through the filter units and force it out into the spiral passage leading to the outlet 5. As the air passes through the tortuous passages formed by the spaced plates 15 of the filter units, the dust is caught by the troughs 32 and forced radially to the enclosed dust passage 24 which carries the dust to the rear end and delivers it to the dust chamber 29 from which it falls to the lower portion and may be discharged through the outlet pipe 31.

55 When the filter unit is sprayed moreover, the liquid with which it is sprayed is always thrown outwardly through the passages 20 and 24 to the dust chamber and may be discharged with the dust.

60 While I have described a particular form of filter unit for carrying out my invention, it will of course be understood that numerous devices could be employed without departing from the spirit of my invention and
65 without exceeding the scope of my claims.

It will be seen therefore, that my device comprises a very simple and effective arrangement for removal of dust and for spraying the filter units when desirable with a suitable air conditioning medium, any excess of which is also removed together with any dust that is collected from the dust laden air.

My invention provides a means for changing the direction of a film or body of air, and the dust particles which are carried thereby and which are of a higher specific gravity than the air itself, do not change their direction so readily and are caught in the troughs and carried to the dust passage.

I claim:

1. In an air filter device, a rotatable member comprising a filter medium mounted thereon having spaced angularly formed plates providing tortuous passages through which the air is forced, means for rotating said member, said rotation forcing air through said passages, and associated means comprising troughs mounted on said plates for collecting and removing dust carried by said air.

2. In an air filter device, a rotor comprising a radially extending filter for removing foreign particles from a gas, passing through said filter in a direction generally perpendicular to the axis of the rotor, and means for removing the foreign matter in a direction different from that of the moving gas passing through the filter.

3. In an air filter device, a rotor comprising a radially extending filter comprising a plurality of plates forming angles with each other and providing tortuous passages for the flow of gases therebetween, troughs located at the angles between said plates and facing the flow of gases for removing foreign particles from the gases, the particles received in said troughs being removed from the filter members by centrifugal action.

4. In an air filter device, a casing having an air inlet adjacent its center and an air outlet adjacent its periphery, a rotor mounted within said casing and having outwardly extending blades adapted to force air through the casing from the inlet to the outlet, outwardly extending filter units associated with said blades and through which the air is forced by the blades during its travel from the inlet to the outlet.

5. In an air filter device, a casing having an air inlet adjacent its center and an air outlet adjacent its periphery, a rotor mounted within said casing and having outwardly extending blades adapted to force air through the casing from the inlet to the outlet, outwardly extending filter units associated with said blades and through which the air is forced by the blades during its travel from the inlet to the outlet, and means to clean said units by centrifugal action.

6. In an air filter device, a casing having

an air inlet adjacent its center and an air outlet adjacent its periphery, a rotor mounted within said casing and having outwardly extending blades adapted to force air through the casing from the inlet to the outlet, outwardly extending filter units associated with said blades and through which the air is forced by the blades during its travel from the inlet to the outlet, each of said units comprising outwardly extending plates between which the air flows, and means forming a passage at the outer end of the plates into which dust from said air is discharged by centrifugal action.

7. In an air filter device, a casing having an air inlet adjacent its center and an air outlet adjacent its periphery, a rotor mounted within said casing and having outwardly extending blades adapted to force air through the casing from the inlet to the outlet, outwardly extending filter units associated with said blades and through which the air is forced by the blades during its travel from the inlet to the outlet, each of said units comprising outwardly extending plates between which the air flows, means forming a passage at the outer end of the plates into which dust from said air is discharged by centrifugal action, said passage extending lengthwise of the axis of rotation of the rotor, and a dust chamber communicating with the passages on the various units.

8. In an air filter device, a casing having an air inlet adjacent its center and an air outlet adjacent its periphery, a rotor mounted within said casing and having outwardly extending blades adapted to force air through the casing from the inlet to the outlet, outwardly extending filter units associated with said blades and through which the air is forced by the blades during its travel from the inlet to the outlet, each of said units comprising outwardly extending plates between which the air flows, means forming a passage at the outer end of the plates into which dust from said air is discharged by centrifugal action, said passage extending lengthwise of the axis of rotation of the rotor but inclined thereto, and a dust chamber communicating with the passages on the various units.

9. In an air filter device, a shaft having thereon a plurality of radially extending units, each unit having a plurality of tortuous passages for air, said passages being formed by walls extending outwardly from the shaft, means to direct air through said passages, means to rotate said shaft to thereby cause dust deposited in said passages to be forced outwardly by centrifugal force, and means to collect said dust thus forced outwardly.

10. In a device of the class described, a shaft having thereon a filter extending outwardly from the shaft and provided with a plurality of air separating passages extend-

ing circumferentially of the shaft, the walls of said passages extending outwardly from the shaft, a plate extending outwardly from the shaft and longitudinally thereof and spaced from the filter, means to rotate said shaft to thereby cause dust deposited in said passages to be forced outwardly by centrifugal force, and means to collect said dust thus forced outwardly.

11. In a device of the class described, a shaft having thereon a filter extending outwardly from the shaft and provided with a plurality of air separating passages extending circumferentially of the shaft, the walls of said passages extending outwardly from the shaft and longitudinally thereof and spaced from the filter, means to rotate said shaft to thereby cause dust deposited in said passages to be forced outwardly by centrifugal force, and means to collect said dust thus forced outwardly, said dust collecting means comprising a passage extending longitudinally of the shaft at the outer ends of said first-named passages.

12. In a device of the class described, a shaft having thereon a filter extending outwardly from the shaft and provided with a plurality of air separating passages extending circumferentially of the shaft, the walls of said passages extending outwardly from the shaft, a plate extending outwardly from the shaft and longitudinally thereof and spaced from the filter, means to rotate said shaft to thereby cause dust deposited in said passages to be forced outwardly by centrifugal force, and means to collect said dust thus forced outwardly, said dust collecting means comprising a passage extending longitudinally of the shaft at the outer ends of said first-named passages and inclined outwardly with respect to the shaft.

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