March 25, 1941. R. L. NASH 2,236,273

AIR STRAINER

Filed Feb. 15, 1939

Fig. 1

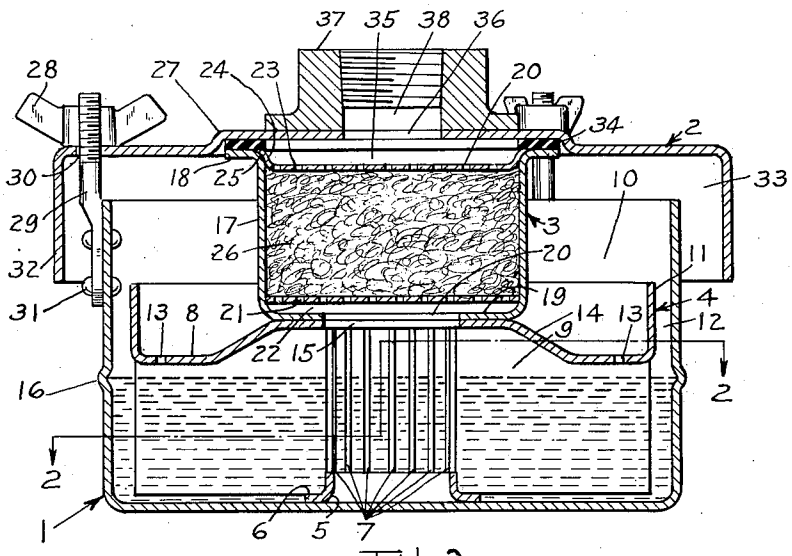
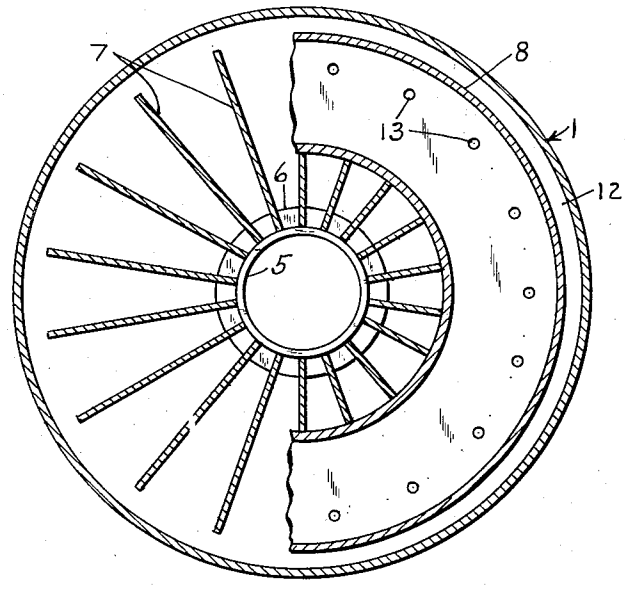


Fig. 2



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AIR STRAINER

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2 Claims. (Cl. 183—15)

This invention relates to air strainers, and more particularly to the type of strainer adapted for use in conjunction with internal combustion engines and fluid compressors.

Fluid strainers of the type to be hereinafter more specifically described are subjected to operation under widely varying conditions. The continued successful operation of the engine or compressor to which the strainer is applied is frequently dependent upon the condition and efficiency of the strainer. Therefore, improved means have been provided in the present device to insure long periods of efficient operation by providing an oil bath type strainer arranged to produce progressive cleaning of the air passed therethrough and which at the same time has large capacity for collecting coarse or heavy dirt.

It is highly desirable that strainers of this type be adapted to be easily assembled and taken apart so as to facilitate the removal, inspection, cleaning, renewal and replacement of the dirt collecting mediums without necessitating the dismantling of any pipe connections.

A principal object of the present invention is to provide an improved air strainer of the oil bath type with large dirt retaining capacity.

Another object of the present invention is to provide an oil bath type suction strainer which provides for progressive cleaning of the air passed therethrough and which may readily be assembled and taken apart.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the accompanying drawing, Fig. 1 is a vertical sectional view of an air strainer constructed in accordance with the teachings of the present invention; Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1.

As shown in Fig. 1 of the drawing, the air cleaning device comprises a casing having a cup shaped portion 1 and a cover 2, and further comprises an air strainer portion 3 and a dirt collecting portion 4, both of which portions are enclosed by the casing.

The dirt collecting portion 4 is located below the strainer portion 3 and may comprise a centrally disposed and vertically extending tubular member 5, having an annular flange 6 at its lower end which rests on the bottom inner wall of the casing portion 1. Welded or otherwise secured to the exterior vertical surface of the tubular member 5 are a plurality of spaced radially extending and vertically disposed dirt collecting plates 7. Resting on the upper edge of these plates, and secured thereto by welding or otherwise, is a horizontal pan or plate 8 which divides the interior of the casing 1 into a chamber 9 adapted to contain a quantity of liquid and an air inlet chamber 10. This plate is generally of shallow cup shape and is of such diameter that an upstanding peripheral flange 11 forms an annular passage 12 between the outer surface of the flange 11 and the interior wall of the casing 1, which connects the chambers 9 and 10. The chambers are also connected by a plurality of peripherally spaced openings 13 in the plate 8. This plate also has a raised central portion 14 which is provided with a central opening 15, which communicates with the space between the radially spaced plates 7 and the bottom wall of the casing 1.

The chamber 9 is adapted to contain a quantity of suitable liquid, such as oil, the normal level of which is determined by a visible groove 16 which extends around the interior wall of the casing 1.

The strainer portion 3 may comprise a cylindrical center portion 17 having at one end an outwardly projecting annular flange 18 and at the opposite end an inwardly projecting annular flange 19, forming at this end a central aperture 20. The flange 19 is welded or otherwise attached to the upper face of the raised central portion 14 of the pan or plate 8, so that the aperture 20 is in alignment with the opening 15.

A screen wire or other foraminated section 21 is disposed in the casing 17 which at its periphery is welded or otherwise secured to the side wall in spaced relation to the inner surface of the annular flange 19, thus forming between this surface and the section 21 a chamber 22.

The open end of the center cylindrical portion 17 is closed by a screen wire or other foraminated member 23 having an annular flange 24 which is adapted to engage the peripheral surface 25 of the portion 17. The upper edge of this flange extends to the top surface of the flange 18, as shown in Fig. 1 of the drawing.

A quantity of suitable straining material 26 such as hair, felt, shredded metal or glass wool is disposed in the space between the foraminated sections 21 and 23.

The cover portion 2 has a raised central portion 27 which rests on the strainer portion 3 and is held securely in place by wing nuts 28. These wing nuts engage the cover and are adapted to make screwthreaded engagement with bolts 29, the threaded end of which projects through holes 30 peripherally spaced in the cover 2. The bolts 29 are attached at their opposite ends as by rivets 31, to the outer edge at the open end of the cup shaped casing 1.

The cover 2 is also provided with a downwardly projecting annular flange 32 of such diameter that an annular passage 33 is formed between the inner surface of this flange and the outer surface of the cup shaped portion 1. This passage connects chamber 10 with the atmos-

phere, thereby providing an air inlet passage to the cleaning device.

A sealing gasket **34** is interposed between the raised central portion **27** of the cover **2** and the strainer portion **3**, as shown, thus forming an outlet chamber **35** between the foraminated section **23** and the cover.

The gasket **34** prevents leakage between the inlet chamber **10** and the outlet chamber **35** and also holds the foraminated section **23** in position when compressed upon tightening the wing nuts **28**.

For the purpose of connecting the cleaning device to the suction inlet of a device, such as a fluid compressor, a pipe boss **37** is welded or otherwise attached to the top of the raised central portion **27** of the cover portion **2**. The boss **37** is provided with a pipe threaded central opening **38** which aligns with an outlet opening **36** in the cover above chamber **35**.

Assuming an installation on a railway vehicle in normal operation of the air strainer device, due to vibration, the oil in chamber **9** will be splashed over the radially projecting surfaces of the dirt collecting plates **7** and over the underside of the horizontal pan or plate **8**. The oil will also pass through the openings **13** to the upper surface of this plate, so that these surfaces as well as a portion of the side wall of casing **1** above the normal oil level will become oil moist. However, it might be mentioned here that the pan and dirt collecting plates prevent excessive splashing of oil, which might otherwise be splashed out of the strainer.

Fluid passing from the atmosphere through the strainer device, enters by way of annular inlet passage **33** and flows to inlet chamber **10**, from which it passes by way of passage **12** to chamber **9**. In flowing from chamber **10** over and in contact with the upstanding peripheral flange **11** to chamber **9** any heavy particles of foreign matter in the air will be removed by falling into the shallow cup shaped pan or plate **8** and will adhere to the oil moist surfaces. Other particles of foreign matter will also adhere to the oil moist surfaces of passage **12** and the underside of plate **8** in chamber **9**.

The partially purified air in chamber **9** then passes through the spaces between the dirt collecting plates **7** where other foreign particles in the air will be removed, the smaller particles adhering to the oil moist surfaces of the dirt collecting plates while the larger particles will fall into the oil.

The movement of oil due to vehicle movement will more or less continually wash the collected dirt off the radially spaced dirt collecting plates and from the underside of the plate or pan **8**.

From the spaces between the radially spaced plates **7**, air will pass to the outlet passage **38** by way of opening **15**, aperture **20**, chamber **22** through the straining material **26**, chamber **35** and opening **36**. In passing through the straining material **26** the remaining fine particles of dirt will be removed.

As will now be evident, the air straining device provided by this invention is constructed in such a manner that it is capable of collecting large quantities of coarse or heavy dirt without becoming clogged, which will obviously prolong the effective life of the strainer between cleaning periods.

The strainer device is best cleaned by first dismantling it. This may be done by unscrewing the wing nuts **28** upon which the cup shaped portion **1** containing the strainer and dirt collecting portions **3** and **4** is readily separated from the cover **2**. The connected strainer and dirt collecting portions **3** and **4** are then removed from the cup shaped portion **1**, after which the straining material **26** and the oil in chamber **9** may be removed.

While one embodiment of the cleaning device provided by this invention has been illustrated and described in detail it should be understood that the invention is not limited to these details of construction and that numerous changes and modifications may be made without departing from the scope of the following claims.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an air cleaning device, in combination, a casing having an inlet passage, an outlet passage and a liquid containing sump at the bottom thereof, means in the form of a pan adapted to be kept moist with liquid from said sump and disposed in said casing above the static level of liquid in the sump and forming therebetween an air chamber and comprising an upstanding annular flange which together with the casing defines an air duct therebetween through which incoming air may flow to said chamber, said flange being constructed and arranged to direct the flow of at least part of the incoming air across the surface of the pan before it flows through said duct, a plurality of radially spaced plates disposed in said chamber and extending into said sump and also being adapted to be kept moist with liquid from said sump, a fibrous straining medium disposed in a chamber above said pan and in advance of said outlet passage, said pan, plates and straining medium being so arranged as to cause air entering said inlet passage to first flow at least in part across the surface of said pan and to then flow in a single annular path through said duct to the chamber between the liquid level and the under side of said pan and then in a plurality of paths between said plates and finally in a single path upwardly through and in contact with said fibrous straining medium to said outlet passage.

2. In an air cleaning device, in combination, a casing having an inlet passage, an outlet passage and a liquid containing sump at the bottom thereof, means in the form of a horizontal pan adapted to be kept moist with a liquid medium and having a centrally disposed aperture, said pan being of sufficient size to substantially separate said sump from the upper region of the casing and being so disposed in said casing above the static level of liquid in said sump as to form an air chamber therebetween, a fibrous air straining medium disposed in said casing intermediate said pan and the top of said casing and in communication with said aperture, a plurality of radially spaced plates also adapted to be kept moist with liquid from said sump and located below said pan and extending into said sump, said pan, plates and fibrous medium being so disposed in said casing as to cause air entering said inlet passage to first flow in a single annular path over and in contact with said pan to the chamber between the liquid level in the sump and the bottom of the pan, then in a plurality of paths between and in contact with said plates, then in a single vertical path through said aperture, and finally in a single path through and in contact with said straining medium to said outlet passage.

RICHARD L. NASH.