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1,578,611

A. M. SANBORN

AIR CLEANER

Filed April 14, 1925

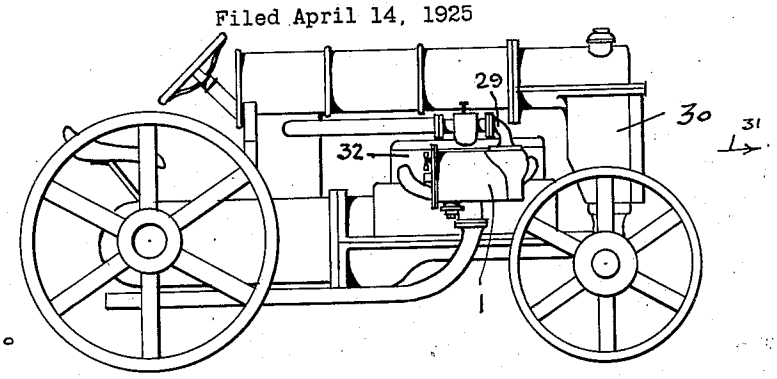


Fig. 2.

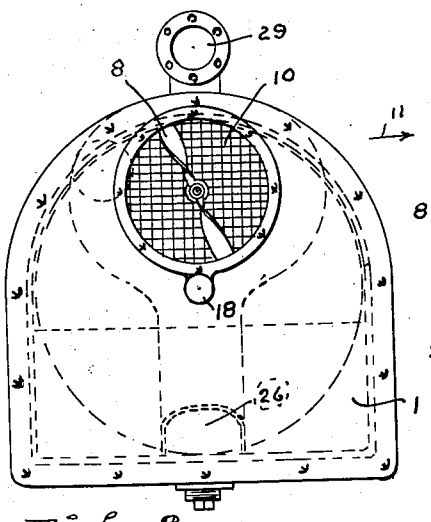


Fig. 3.

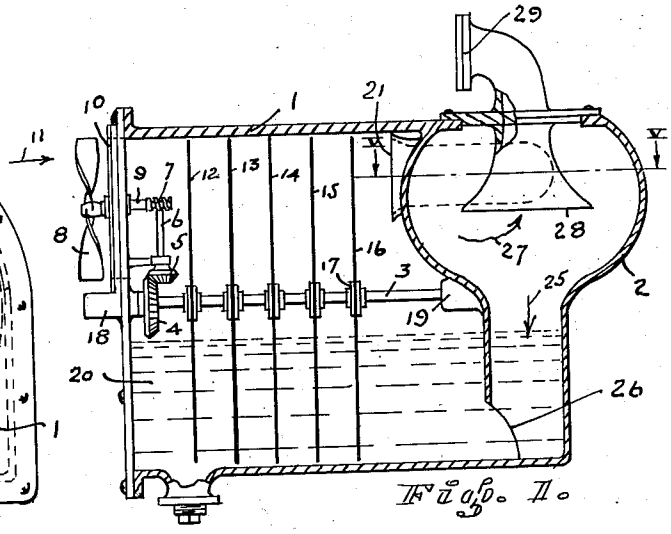


Fig. 1.

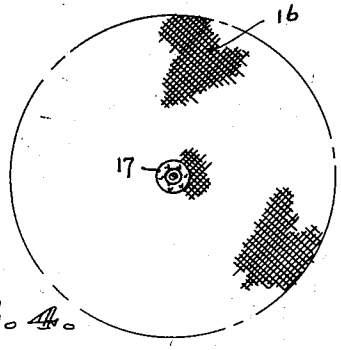


Fig. 4.

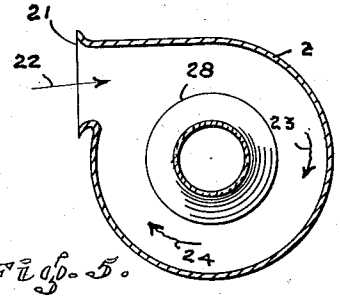


Fig. 5.

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UNITED STATES PATENT OFFICE.

AUGUSTUS M. SANBORN, OF PORTERVILLE, CALIFORNIA.

AIR CLEANER.

Application filed April 14, 1925. Serial No. 22,995.

To all whom it may concern:

Be it known that I, AUGUSTUS M. SANBORN, citizen of the United States, residing at Porterville, county of Tulare, State of California, have invented new and useful Improvements in Air Cleaners, of which the following is a specification.

My invention has for its object means and method for removing dust and other foreign particles from air to be mixed with gasoline, or from other suitable hydro-carbon mixtures, preparatory to use in internal explosive engines.

Other objects will appear from the drawings and specification which follow.

These objects I accomplish by removing the foreign particles from the air in transit by causing them to adhere to or be absorbed by liquid films.

The liquid films are continually renewed and in that way provide fresh air contacting surfaces from which the passing air abstracts more or less of the liquid particles.

The clean air which will carry liquid particles from its passage through the screens is now given a circular motion so that the entrained particles of liquid are thrown outward by centrifugal force and collected and then preferably returned to the body of liquid from which the renewing films are produced.

By referring to the accompanying drawing my invention will be made clear.

In the drawing:

Fig. 1 indicates in longitudinal cross-section of one form of apparatus employing my invention.

Fig. 2 is a partial cross-section and side view of the application of the apparatus of my invention to a motor vehicle.

Fig. 3 is a front view of the apparatus of Fig. 1.

Fig. 4 is a fragmentary front view of one of the screens employed in Fig. 1.

Fig. 5 is a cross section through a portion of Fig. 1 on the line V—V thereof.

Throughout the figures similar numerals refer to identical parts.

A casing is indicated by the numeral 1, whose rear portion may advantageously be formed as a portion of the centrifugal draft box 2.

At 3 is a shaft rotated by conventional gears 4 and 5 connecting spindle 6 and worm and worm wheel 7, from the fan 8 carried on the shaft 9.

An inlet opening is provided with a screen 10 whereby air that passes the fan 8 in the direction of the arrow 11 enters the casing after being strained of larger particles.

At 12, 13, 14, 15, 16 are a plurality of screen members preferably of wire mesh. Each of these is mounted upon a suitable hub, one of which is shown at 17, and carried upon the shaft 3.

The shaft 3 is supported in bearings 18, 19 and the lower portion of the casing is adapted to contain a body of oil or other suitable liquid 20.

The lower portions of the screen dip into this liquid and as the screens rotate their upper portions are kept continually wetted with the liquid 20.

At 21 is a discharge port from the body of the container 1 by which the clarified air is conveyed in the direction of the arrow 22 into the centrifugal chamber 2. It is now whirled as indicated by the arrows 23, 24 during which the centrifugal force of the heavier particles of liquid, which have been entrained in the clarified air, are thrown outward against the walls of the centrifugal chamber 2 and there collect in drops and descend through the neck in the direction of the arrow 25 and through the opening 26 are restored to the liquid body.

The clarified air following the path of the arrow 27 now enters the throat member 28 and through suitable connections passes into the carburetor inlet 29 of the motor vehicle 30.

The action is as follows:

The motor vehicle 30 traveling in the direction 31 establishes an air current against the fan 8 causing the fan to rotate and through the shaft 9, worm and worm wheel 7 connecting shaft 6, gears 4 and 5 communicates a rotative movement to the shaft 3; and I have found that it is preferable to have this rate of rotation much slower than the rotation of the fan.

There is also, of course, a current of air set up by the suction of the engine drawing the air through the carburetor and therefore through the screen 10. This suction also causes the rotation of the fan 8 and therefore of the discs so that the rotation of the discs are insured under any conditions of operation.

I do not wish to be confined to the specific means shown and described for rotating the discs, as they might be driven mechanically

from the engine or otherwise without departing from the spirit of my invention.

While I have shown in the drawing an oil body 20 with a portion of the discs exposed thereabove, between the hubs and the oil surface it may in some cases be advantageous to employ a higher liquid level or a larger diameter hub so as to insure a complete wetting of the entire disc up to the hub line during its emersion in the liquid body although in most instances, especially when a viscous fluid is employed, I have found that the rotation of the discs carries a large volume of the liquid upward and about the outer portions and that as the disc rotates the flow downward of this liquid completely covers the entire screen down to and including the hub portions thus insuring completely wetted screens at all times.

If a very slow rotation is employed this is less effective and the perforated portions of the screens should dip fully into the liquid 20.

The conventional gear connections are designed for this purpose to suit the requirements in any particular case.

The air passes the fan 8, enters through the relatively coarse screen 10 and thence successively through the upper portions of the wetted screen discs 12, 13, 14, 15 and 16 whereby every particle of the flowing air is exposed to the surface action of liquid films on the screen mesh and adjacent walls, the screens preferably being of a diameter but very slightly less than the internal diameter of the upper portion of the container 1. These liquid films abstract the dust and dirt particles.

When the air has arrived at the throat inlet 21 it will have been cleaned of all its entrained dust and dirt but will, during its passage, have picked up liquid particles which will be carried by the stream of air in the direction of the arrow 22 and centrifugally whirled within the chamber 2 during which action the liquid particles will be thrown off on the walls of the chamber 2 and will collect and descend in the direction of the arrow 25 through the outlet 26 back into the original liquid body 20.

The cleaned air, now freed from its liquid particles passes into the throat 28 in the direction of the arrow 27 and thence to the internal explosive engine 32.

I claim:

1. An air cleaner comprising a chamber having a lower portion adapted to contain a liquid, a plurality of discs having small perforations mounted on a shaft and adapted to rotate within and in close proximity to the upper portion of said chamber, means for rotating said discs whereby their upper portions are continuallly retained wetted by said liquid, an inlet to said chamber for air that passes through said wetted portions, an annular receiver having a substantially tangential entering passage for said air a central outlet for said air and a passage from said receiver into said lower portion of said chamber.

2. An air cleaner as set forth in claim 1 wherein a fan is positioned within the path of entering air and actuates said means for rotating said discs.

AUGUSTUS M. SANBORN.