

July 18, 1933.

R. R. GENTRY

1,918,531

AIR WASHER

Filed Feb. 29, 1932

2 Sheets-Sheet 1

*Fig. 1*

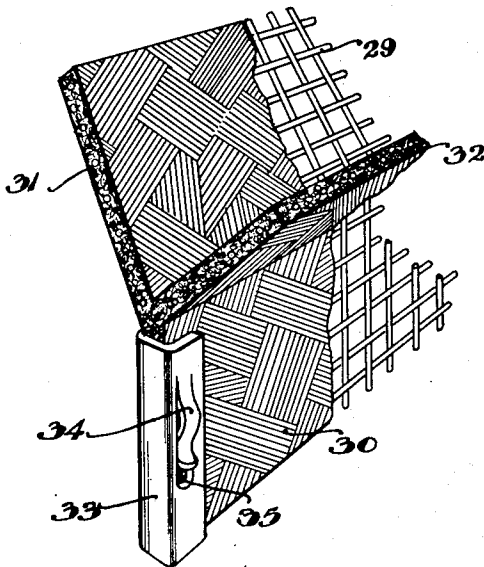
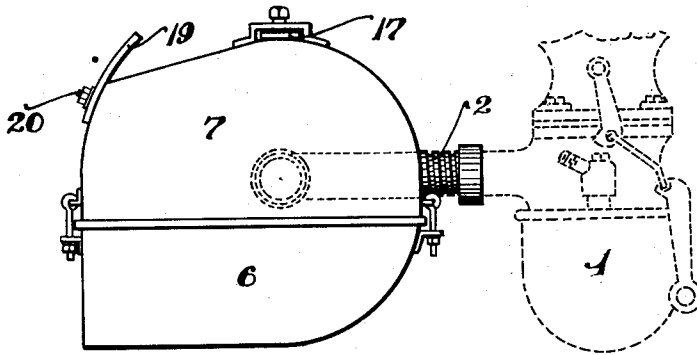


*Fig. 2*

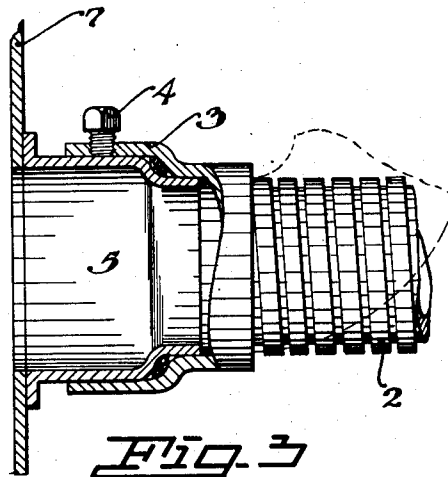


*Fig. 3*

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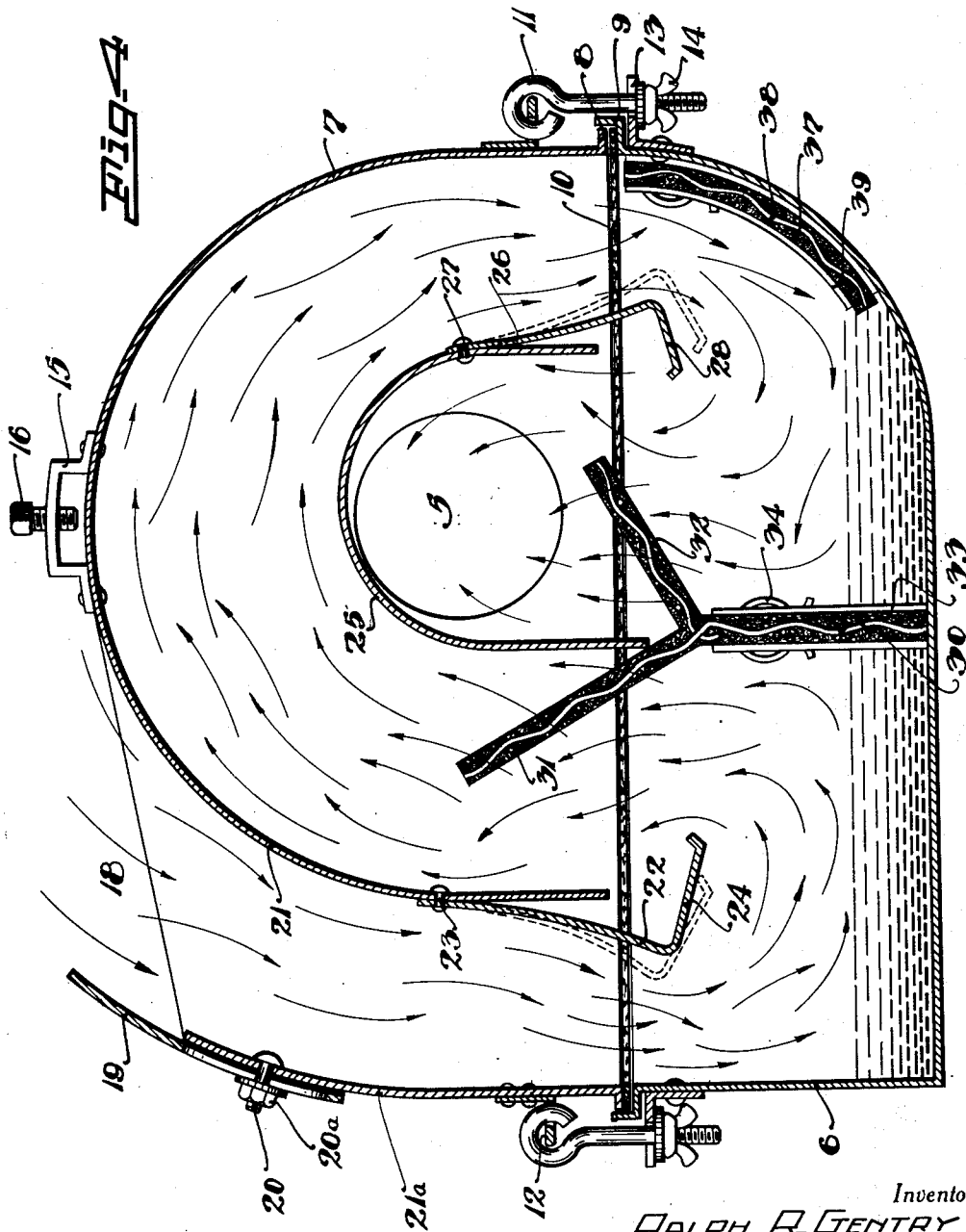
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## UNITED STATES PATENT OFFICE

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## AIR WASHER

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My present invention relates to an improved air washer for use with the air supply of carburetors for internal combustion engines, especially such engines as are employed as motors for automotive vehicles. The air washer is employed as an attachment to the carburetor and performs the functions of filtering the air and separating therefrom dust and other extraneous particles that might have a deleterious effect upon the fuel charges supplied to the engine from the carburetor.

The primary object of the invention is the provision of an effective device used in connection with the air supply of the carburetor for the above purpose, and in carrying out my invention I employ a helicoid casing within which centrifugal force is utilized for separating coarse dust particles, or solids, from the whirling air currents. Porous and absorbent filtering elements, which are pervious to the air currents, are also employed, for separating the finer particles of dust; and in addition I utilize oil, and capillary attraction for saturating or permeating the filtering elements, to provide surfaces on which the separated particles are collected.

The invention consists in certain novel combinations and arrangements of parts, involving means responsive to pressure of the inflowing air currents, for carrying out the above purposes. In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined according to one mode I have thus far devised for the practical application of the principles of my invention, but it will be understood that various changes and alterations may be made in the exemplifying structure, within the scope of my claims, without departing from the principles of my invention.

Figure 1 is an exterior view of the air washer, according to my invention, shown attached to a carburetor, and the latter is illustrated in dotted lines.

Figure 2 is a perspective view showing details of construction of a Y-shaped filter, mounted transversely of the washer casing,

and showing fastening or retaining means therefor.

Figure 3 is an enlarged detail view of one of the connections to the washer, parts being shown in section.

Figure 4 is an enlarged, vertical, longitudinal section of the washer.

In order that the utility, and the general relation of parts of the washer may readily be understood I have shown in Figure 1, by dotted lines, a conventional carburetor 1 from which leads the flexible, armored, air tube 2, which is secured by the attaching collar 3 and bolt 4 to the outlet nozzle 5, at one side of the washer, and it will be understood that the filtered or washed air passes through the flexible air tube to the carburetor for mixture with the fuel charge.

The washer as a whole comprises two separable parts, as the lower oil tank 6 and the upper separating casing 7 and the adjoining edges of these separable parts are provided with complementary flanges 8 and 9, with a gasket 10 between them to insure an airtight and liquid tight joint. The separable casing and tank are secured together by means of a suitable number of eye-bolts 11 pivotally suspended at 12 to the casing, and the bolts co-act with slotted brackets 13 riveted to the tank walls. The bolts are secured by means of wing nuts 14, and it will be apparent that when the nuts are loosened, the bolts may be swung clear of the slotted brackets to permit "dropping" of the tank for the purpose of replenishing the oil supply therein, and for cleaning or replacing the filter pads.

At the top of the casing a looped strap 15 is secured, and the bolt 16 threaded in the strap may be used for fastening the washer on a bracket 17 that is supported from an appropriate part of the motor with which the carburetor is employed.

Air enters the casing through the intake port 18 which is located at the top of the casing and to the rear thereof, and the air currents may be created by suction from the engine, or by blasts from the fan that is usually employed for cooling the motor, as well as by currents of air created by a traveling

automotive vehicle. In the latter instance, the air currents may be directed through the intake port by the use of an adjustable intake plate or cowl 19 that is slotted to fit over a clamp bolt 20. The bolt is secured in the casing wall, and a clamp nut 20a is employed on the bolt to secure the cowl in adjusted position, so that the air currents striking the cowl may be deflected downwardly to and through the intake port 18 of the casing. If the forced draft is not desired, the cowl 19 may be lowered to position where it will be inactive, and the suction from the engine is then utilized for drawing air into the intake port.

The interior of the casing is provided with a helicoid formation to insure a tortuous or helical passage of the air currents through the washer from the intake port 18 to the outlet port 5 at the side of the casing, and the whirling air currents, by centrifugal force, separate the heavier particles of dust from the air during their passage through the washer.

The upper part of the casing 7, as shown is of semi-circular shape, and the outer, front wall of the casing merges with a curved, interior partition 21, which is spaced from the complementary back wall 21a of the casing to form a passage from the intake port to the oil tank. The partition 21 terminates at the bottom of the casing, just above its joint with the oil tank, and at the lower end of the partition a flexible, resilient, deflector plate 22 is supported and attached at its upper end at 23 to the partition. This deflector plate extends transversely of the intake passage and projects downwardly into the oil tank, and the lower end of the plate is fashioned with an angular flange 24 projecting toward the front of the washer. The deflector plate due to its resiliency and formation, projects into the intake passage, but it is responsive to air pressure, and under required pressure the plate is pushed flat against the lower end of the partition 21. During high-speed driving of an automotive vehicle and under a maximum suction, the air currents drawn through the intake port and passage are sufficient to flex the plate and increase the area of the intake passage, but under less pressure, the deflector plate or regulator plate, due to its resiliency, swings out automatically to decrease the cross area of the intake passage.

In Figure 4 the arrows indicate the direction and movement of the air currents through the casing, and the latter is provided with an interior inverted U-shaped partition 25 partially surrounding the side, outlet port 5, and concentric with the front wall of the casing and its large interior partition 21. The rear end wall of the inverted U-shaped partition projects slightly into the oil tank, but the front end wall of this partition ter-

minates just above the bottom edge of the casing.

On the front end wall of the inverted U-shaped partition a second deflector or regulator plate 26 is attached at 27 and provided with an angular flange 28 depending into the upper portion of the oil tank. This regulator plate, although disposed in position reverse to that of the plate 22, performs the same functions as that plate 22, and is responsive to the varying degrees of pressure of the moving air currents.

Within the oil tank a Y-shaped, transversely disposed, partition and filter is located, and this partition is built up on a reticulated or perforated frame 29, Y-shaped in cross section, and located in the tank so that its lower or vertical body-portion 30 is vertically aligned with the rear end wall of the inverted U-shaped partition 25 in the casing 7. The wings 31 and 32 diverge from the upper part of this vertical body, the former to one side of the back wall of the U-shaped partition and the latter to the opposite side of the same back wall. This vertical body and the two wings are built up, on the skeleton or reticulated frame, from felt, or other porous and absorbent material that is pervious to the air currents, and which material, by capillary attraction will absorb oil from the bottom of the oil tank.

Thus the body and wings of this filter are saturated or permeated with oil, due to capillary attraction, and as the air currents flow into the oil tank, some of the heavy particles fall directly into the oil contained in the bottom of the tank, other particles strike and stick to the oiled surface of the body filter 30, and other particles impinge against and stick to the inclined face of the wing 31 of the filter.

Some of the air currents pass through the filter mat 30 and are filtered, while other currents are filtered by passage through the pervious deflector-mat 31, which directs still other currents of air against the inner side of the partition 21.

In this manner the air currents are directed in a spiral or helical passage through the casing, and the centrifugal force created thereby tends to separate the heavier particles, which are dropped into the oil at the bottom of the tank.

The Y-filter is removable and replaceable so that it may be cleaned and returned to the tank for use, or a new filter may be substituted for a worn one. For this purpose the tank is provided with a pair of grooved, metallic holders 33 secured at opposite sides of the tank against the inner faces of its walls, and the opposite ends or edges of the body 30 of the Y-filter are slid down into these holders. The holders are fashioned with spring retaining fingers or blades 34, struck, or pressed from the metal of the holders, and

they project through slots 35 in one wall of the holders, to bear against the face of the body 30 of the filter and retain it in position.

At the front of the oil tank a second filter pad or mat 87 is built upon its frame 38, and this mat is held in holders 39 similar to the holders 33. One edge of the mat projects into the oil in the tank, and due to capillary attraction, the mat absorbs oil for the purpose of collecting particles of dust that impinge against the face of the mat near the end of the helical passage.

The air currents also impinge against the under side of the wing 32 of the filter, as they zig-zag toward the outlet port 5, and particles of dust are caught on the face of the filter while some of the air currents pass through the wing toward the port 5.

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

1. In an air-washer the combination with an oil tank, of a separable casing having an intake port and an outlet port and mounted on the tank, means for fastening the casing and tank, means within the washer forming a helicoid passage for air currents between the intake port and the outlet port, and said means including filters pervious to air and adapted to deflect the air currents.

2. The combination with an oil tank having a Y-shaped filtering partition therein, of a detachable casing mounted on said tank, said casing comprising a pair of inverted U-shaped, concentric walls, the inner wall having alinement with the body of the Y-shaped filter, an intake passage on the casing opening to the tank at one side of the filter, and an outlet passage in the casing opening from the other side of the filter.

3. In an air washer the combination with an oil tank, of a separable casing having an

intake port and an outlet port, means in the casing and tank forming a helicoid passage for air currents, said means including filters impervious to air and adapted to deflect air currents, and a deflector plate mounted in the casing and responsive to pressure of air currents for diverting or deflecting the air currents.

4. In an air washer, the combination with an oil tank and a separable casing, and means in the washer forming a helical passage between an intake port in the casing and an outlet port, of an angular resilient deflector plate attached to the casing adjacent the inlet port and projecting into the oil tank and responsive to pressure of air currents for varying the cross area of the passage.

5. In an air washer, the combination with an oil tank having a pair of opposed holders therein, a Y-shaped filter element of absorbent material and pervious to air mounted in said holders, and means for retaining the filter in the holders, of a separable casing mounted on the tank, and means in the casing co-acting with the filter for forming a helicoid passage between an inlet and an outlet of the washer.

6. In an air washer, the combination with an oil tank having a pair of opposed, grooved holders therein, a Y-shaped partition of absorbent material and pervious to air mounted in the holders, and resilient retaining fingers on the holders for said partition, of a casing mounted on the tank and having an inlet to said tank, said casing having a pair of inverted U-shaped partitions therein co-acting with the Y-partition to form a helicoid passage in the washer between said inlet and an outlet, and means adjacent the inlet responsive to air pressure for governing the cross area of the inlet.

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