July 1, 1941. Z. RIDDLE 2,247,786

AIR CLEANER

Filed June 20, 1939 2 Sheets-Sheet 1

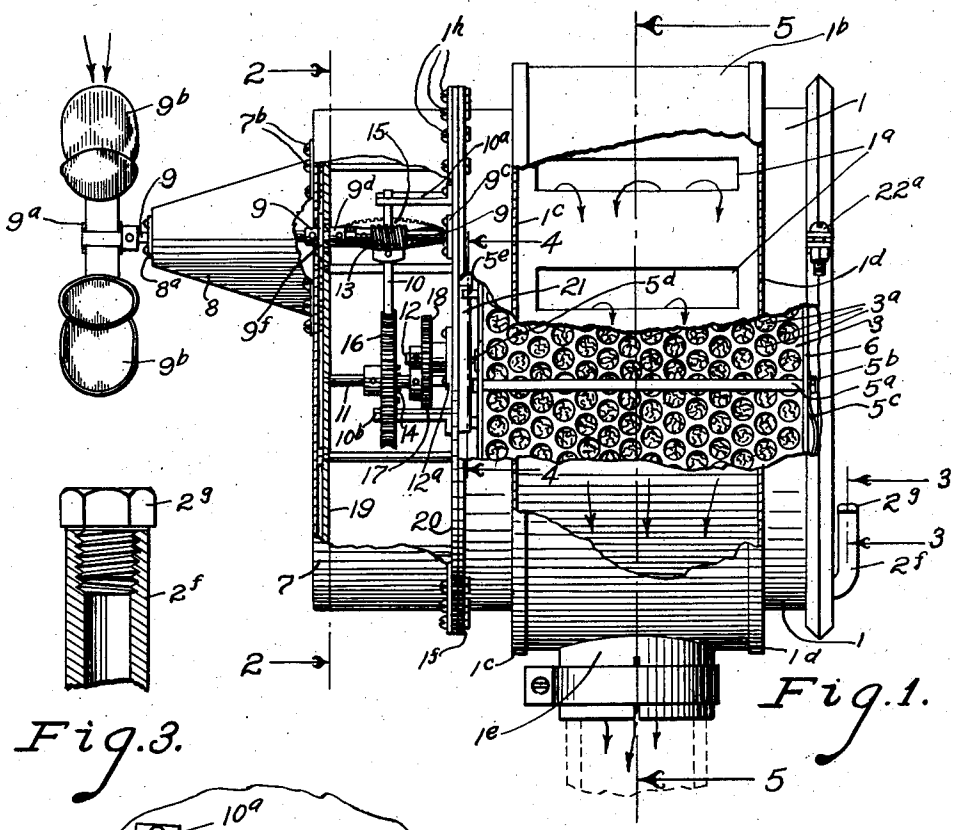


Fig. 1.

Fig. 3.

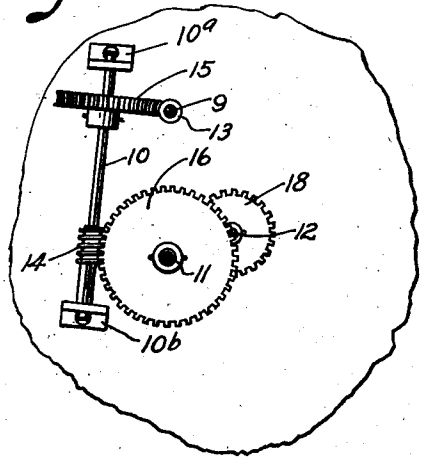


Fig. 2.

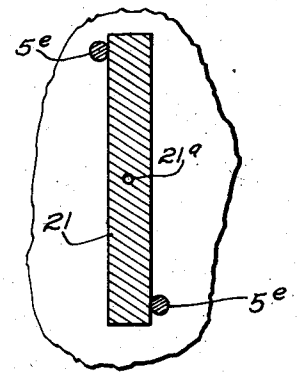


Fig. 4.

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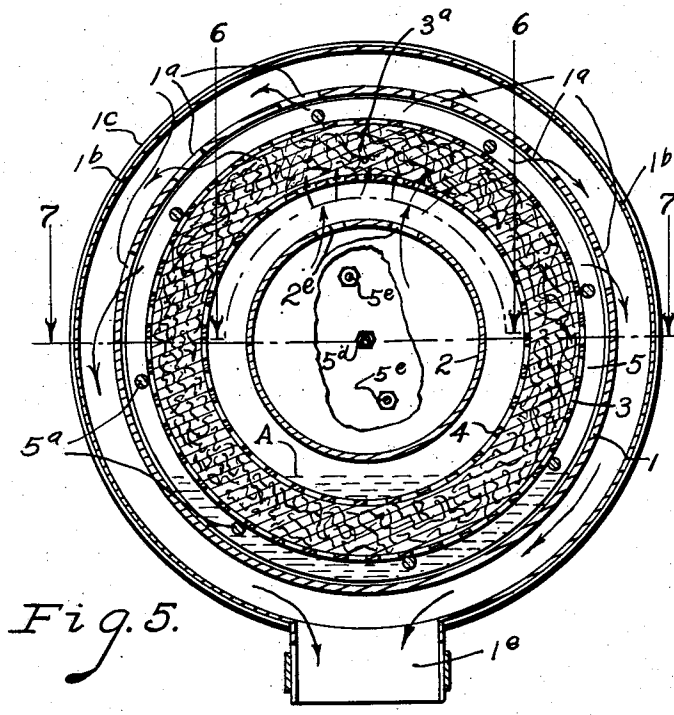


Fig. 5.

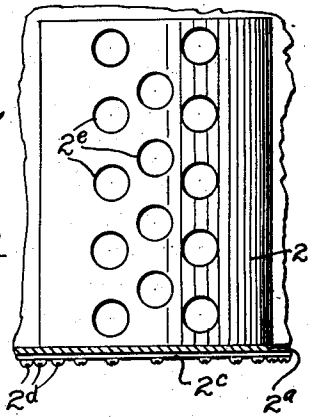


Fig. 6.

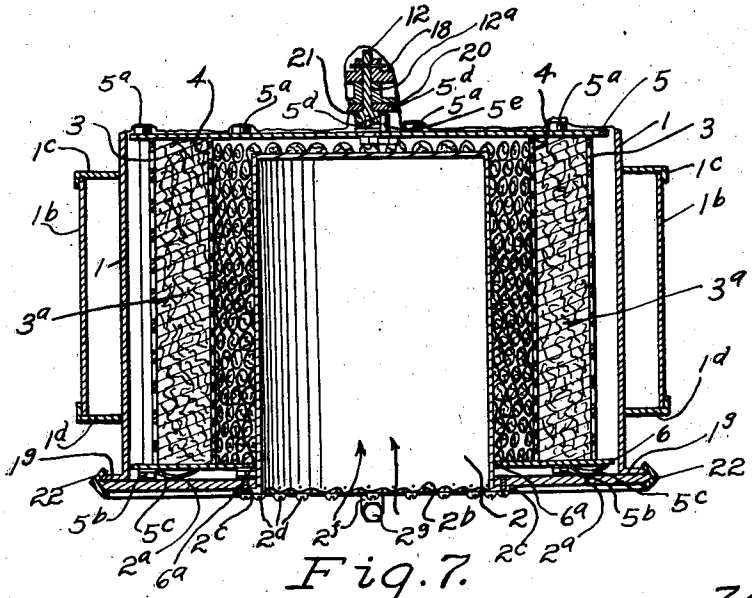


Fig. 7.

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UNITED STATES PATENT OFFICE

2,247,786

AIR CLEANER

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Application June 20, 1939, Serial No. 280,085

3 Claims. (Cl. 183—9)

My invention relates to an air cleaner for use in connection with automobile, or other vehicle motors, or the like and the objects of my invention are:

First, to provide an air cleaner of this class in which the air filter is constantly rotated through oil automatically;

Second, to provide an air cleaner of this class which is automatically controlled and operated;

Third, to provide an air cleaner of this class which minimizes the restriction of the air intake;

Fourth, to provide an air cleaner of this class which may be easily flushed and cleaned;

Fifth, to provide an air cleaner of this class in which the air filter is rotated by relative movement of the air with the motor;

Sixth, to provide an air cleaner of this class which is applicable for use in connection with any motor;

Seventh, to provide an air cleaner of this class which is readily and easily attached to the motor for use;

Eighth, to provide an air cleaner of this class in which the filter rotating speed is varied substantially with the speed of the vehicle upon which the cleaner is mounted; and

Ninth, to provide an air cleaner of this class which is very simple and economical of construction, efficient in its action and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this application in which:

Figure 1 is an elevational view of my air cleaner showing portions broken away and in section to facilitate the illustration; Fig. 2 is a fragmentary sectional view taken from the line 2—2 of Fig. 1; Fig. 3 is an enlarged fragmentary sectional view taken from the line 3—3 of Fig. 1; Fig. 4 is an enlarged fragmentary sectional view taken from the line 4—4 of Fig. 1; Fig. 5 is a fragmentary sectional view taken from the line 5—5 of Fig. 1; Fig. 6 is a fragmentary sectional view taken from the line 6—6 of Fig. 5 and Fig. 7 is a fragmentary sectional view taken from the line 7—7 of Fig. 5.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings.

The outer casing 1, inner casing 2, intermediate casing 3, partition 4, casing members 5 and 6, gear casing 7, gear shaft casing and support 8, shafts 9, 10, 11 and 12, worm pinions 13 and 14, worm gears 15 and 16 and spur gears 17 and 18, gear supporting discs 19 and 20, bar 21 and the sealing clamp member 22 constitute the principal parts of my air cleaner.

The outer casing 1 is of substantially hollow cylindrical shape and is provided in its upper side above the center with elongated holes 1*a*, over which is secured an annular casing portion 1*b* by means of the casing portions 1*c* and 1*a*, as shown best in Figs. 1, 5 and 7 of the drawings. Secured to said casing portion 1*b* at its lower side is a conventional air cleaner connection 1*e*, which may be arranged in connection with the carburetor of a motor. The outer casing 1 is provided with flange portions 1*f* and 1*g*. The flange portion 1*f*, the gear supporting disc 20 and the gear casing 7 are secured together by means of the bolts 1*h*. To the flange portion 1*g* is clamped and sealed the annular inner casing support 2*a* by means of the annular V shaped sealing clamp member 22 and its respective bolt 22*a*. The normally lower side of the outer casing 1 is imperforate and serves as an oil reservoir, as shown best in Fig. 5.

The inner casing 2 is of substantially hollow cylindrical shape, enclosed at one end and covered at its open end with a screen portion 2*b* which is soldered or otherwise secured thereto. The inner casing is secured to its support 2*a* by means of an annular flange 2*c* by the bolts 2*d*, as shown best in Fig. 7. It will be noted that the inner casing 2 is mounted centrally in the outer casing 1 and is provided with holes 2*e* in its upper side. Secured in and communicating with both sides of said inner casing support 2*a* is a hollow upwardly extending tube 2*f* in the upper end of which is screw threaded a plug 2*g* as shown best in Figs. 1 and 3 of the drawings. It will be noted that said tube 2*f* extends upwardly to substantially the oil level in the outer casing 1, as shown in Fig. 5 of the drawings.

Positioned between the intermediate casing 3 and the partition 4 is an annular mass of metal filter wire 3*a* as shown best in Figs. 5 and 7. It will be noted that the intermediate casing 3 and the partitions 4 are annular and foraminous and are clamped between the casing members 5 and 6 by means of the rods 5*a* and nuts 5*b* which are screw threaded on the ends of the rods 5*a*. Se-

cured on the end of each rod 5a adjacent the casing member 6 is a plate spring 5c which engages the inner casing support 2a and holds said casing member in place. It will be noted that the casing members 5 and 6 are of substantially flat circular shape and that the casing member 6 is provided with a central hole 6a through which the inner casing 2 extends. Secured in and extending from the center of the casing member 5 is a pin 5d. Also spaced therefrom are lugs 5e as shown best in Figs. 1 and 7 of the drawings. This pin 5d is fitted in a hole 21a of the bar 21, and engaging the side of each end of the bar 21 is one of the lugs 5e as shown best in Figs. 1, 4 and 7 of the drawings.

The gear casing 7 is substantially hollow cylindrical in shape and is provided with a flanged portion 7a in which are fitted the bolts 7h. Secured to said gear casing 7 by means of the bolts 7b is the gear shaft casing and support 8, which is of substantially hollow frusto conical shape and is fitted at its smaller end with a fiber bearing 8a in which the gear shaft 9 is journalled. On one end of the gear shaft 9 is a wind wheel 9a which is provided with concavo-convex blade portions 9b. The gear shaft 9 is journalled at its one end in a fiber bearing 9c which is secured to the gear supporting disc 20, and secured to said shaft 9 is the worm pinion 13 and the hubs 9d and 9e. Intermediate said fiber bearings 8a and the fiber bearing 9c the gear shaft 9 is journalled in a third fiber bearing 9f which is secured to the gear supporting disc 19. It will be noted that the hubs 9d and 9e fit adjacent the gear supporting disc 19 and the fiber bearing 9f respectively and are for the purpose of reducing the end play of the gear shaft 9.

The gear shaft 10 is journalled in the brackets 10a and 10b and mounted on the gear shaft 10 adjacent the bracket 10b is the worm pinion 14 which meshes with the worm gear 16. Mounted on the gear shaft 10 intermediate said worm pinion 14 and the bracket 10a is the worm gear 15 which meshes with the worm pinion 13.

The gear shaft 11 is journalled in the gear supporting discs 19 and 20 and mounted on said gear shaft 11 are the worm gears 16 and spur gear 17. The spur gear 17 meshes with the spur gear 18 which is mounted on the gear shaft 12. The gear shaft 12 is journalled in a journal member 12a which is secured to the gear supporting disc 20 and said shaft 12 extends through said supporting disc 20. On the one end of the gear shaft 12 is the bar 21 as shown best in Figs. 1 and 7 of the drawings.

The operation of my air cleaner is substantially as follows:

Assuming that the air cleaner is attached to the carburetor of an automobile motor, and that the automobile is in motion, the current of air acting on the concavo-convex blade portions 9b of the air wheel 9a turns the gear shaft 9. The bar 21 is turned by means of the gear shafts 9, 10, 11 and 12, the worm pinions 13 and 14 and the worm gears 15 and 16 and spur gears 17 and 18. The casing members 5 and 6, the intermediate casing 3, partition 4, wire filter mass 3a and the rods 5a are all revolved inside the outer casing 1 and through the oil A by means of the lug portions 5e in engagement with the bar 21. It will be noted that one complete revolution of the bar 21 occurs approximately once every hour, while the air cleaner is in operation.

The air entering the inner casing 2 through the screen 2b passes upwardly through the holes 2e, the partition 4, wire filter mass 3a, intermediate casing 3 and the holes 1a of the outer casing 1 and downwardly inside the casing portions 1b, 1c and 1d and into the carburetor through the connection 1e, all as shown by arrows in Figs. 5 and 7 of the drawings. It will be here noted that the wire filter mass 3a being constantly rotated through the oil A readily collects dirt, sand and other undesirable matter from the air as it passes through said filter mass 3a.

If it is desired to clean the air cleaner, the bolt 22a of the sealing clamp member 22 is loosened and said sealing clamp member 22 is removed permitting the inner casing 2 and its respective support to be removed and also permitting the removal of the filter mass 3a, and its respective casing members. When it is desired to supply new oil to the oil filter, the plug 2g is removed and oil is supplied through the tube 2f.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

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

1. In an air cleaner of the class described, the combination of an outer casing provided with perforated portions in its upper side, an inner casing open at one end and provided with perforated portions in its upper side and positioned in said outer casing, a revolubly mounted filter mass positioned intermediate said casings and a casing portion surrounding said outer casing enclosing said perforated portions thereof, said casing portion surrounding said outer casing provided with a downdraft carburetor connection air conductor portion at its lower side.

2. In an air cleaner of the class described, the combination of an inner air inlet casing, a revolubly mounted filter mass surrounding said inner casing, an outer casing enclosing said revolubly mounted filter mass and a casing portion surrounding said outer casing provided with an air conductor connection portion at its lower side, said inner casing and outer casing each provided with perforations in their upper side communicating with the interior of said casing portion surrounding said outer casing.

3. In an air cleaner of the class described, the combination of an inner air inlet casing, a revolubly mounted filter mass surrounding said inner casing, an outer casing enclosing said revolubly mounted filter mass and a casing portion surrounding said outer casing provided with an air conductor connection portion at its lower side, said inner casing and outer casing each provided with perforations in their upper side communicating with the interior of said casing portion surrounding said outer casing, and an oil reservoir in said outer casing around the lower portion of said revolubly mounted filter mass.

ZELIE RIDDLE.