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E. R. HEWITT ET AL

AIR FILTER

Filed March 8, 1926

Fig. 1.

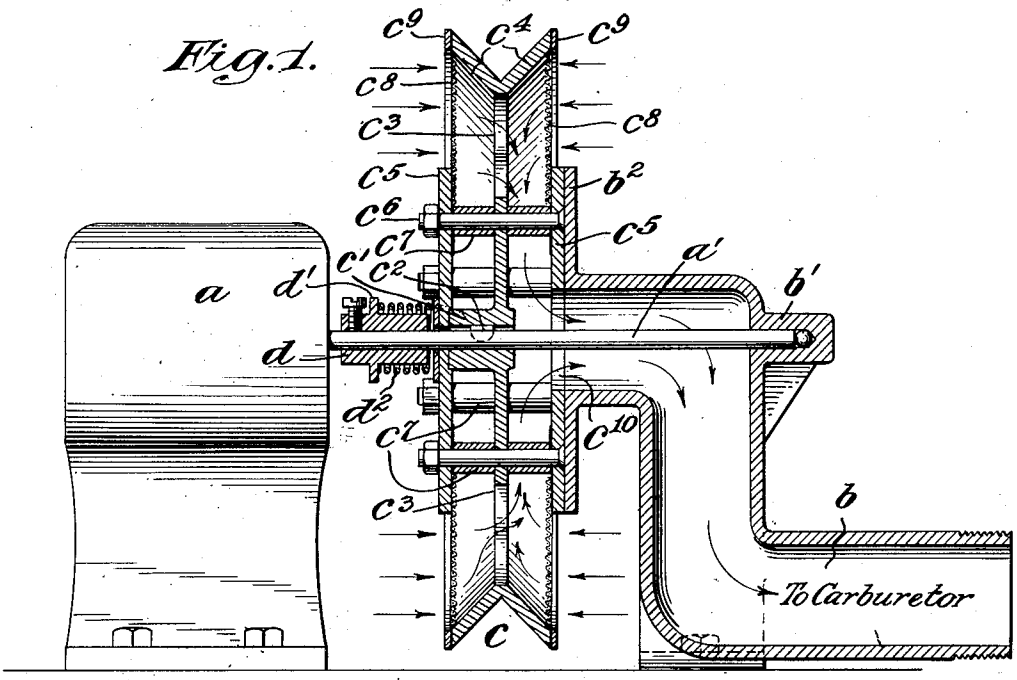
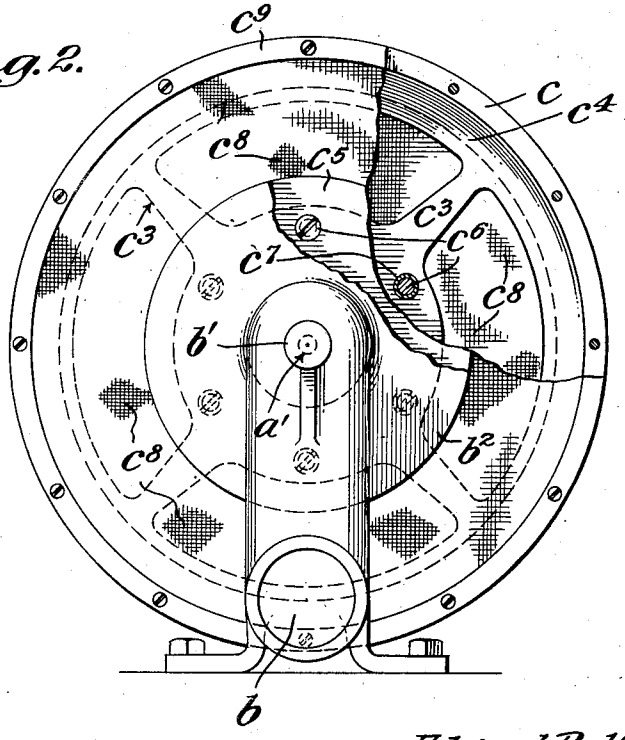


Fig. 2.



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UNITED STATES PATENT OFFICE.

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AIR FILTER.

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Great difficulty has been experienced in supplying clean air to the carburetors of internal combustion motors and various forms of screens or filters have been suggested, the purpose of which has been to remove foreign particles from the air supply.

It has been found that cleaning such devices presents a very serious problem and the user is confronted with the necessity of repeatedly removing parts of the device to clean them, and discard the collected matter. So great has been this limitation that the successful use of such cleaners has been seriously handicapped and the demand for an efficient air filter which does not require repeated inspection and cleaning has become very great.

The object of the present invention is to provide a filter which is highly efficient in removing the harmful foreign particles from the air supplied to the carburetor of an internal combustion motor and which requires little or no attention in operation. Its use is particularly advantageous in rail cars where great volumes of air are consumed and where the necessity of cleaning such air becomes very great.

Reference will now be had to the accompanying drawings for a more detailed description of the device wherein:

Figure 1 shows a side elevation, partly in section, of a form of the proposed device.

Figure 2 shows a front elevation partly in section, of the rotor and air conduit.

In Figure 1, a designates a suitable electric motor with an armature shaft a' extending outwardly and journaled at its end in a suitable bearing in the conduit section. Conduit b carries the air to the carburetor and is provided with a bearing b' in which the armature shaft is mounted. The conduit is provided at its end with an annular flange b^2 which serves as a bearing to prevent air from reaching the conduit without passing through the screen.

Mounted on the shaft a' is a rotor c which is suitably keyed at its hub c' to said shaft by a key c^2. The rotor is of a spider formation with arms c^3 which carry, at their outer extremities, outwardly extending diverging walls c^4 which may, if desired, be curved or straight as shown.

Discs c^5 are mounted on the spider by bolts c^6 and spacers c^7. At the outer extremities of the diverging walls c^4 screens c^8 are secured and extend therefrom to the discs c^5 to which they are secured. Rim c^9 may clamp the screen to the walls. The disc c^5 which abuts flange b^2 is provided with a central aperture c^{10} which co-operates with the conduit b to permit free flow of air thereto.

A sleeve d is mounted on shaft a between the motor and the rotor and is provided with a flange d' which seats a spring d^2. This spring insures a close contact between disc c^5 and flange b^2 and prevents air from passing therethrough.

In the operation of this device the filtering depends upon the speed of rotation of the screen rather than its mesh, and it is therefore given a definite and constant speed of rotation. The electric motor shown may be very small, since the device requires little power to operate it. The center of the screen is covered up by the discs so that a definite speed is given to the screen at its smallest diameter.

It is understood that the speed of the screen is not related to the speed of the engine itself, although such could be the case if necessary or desirable. The speed of the air passing through the screen should be substantially less than the rate of revolution of the screen itself. The particles of dust and dirt carried by the air are hit by the wires of the screen and bounced off at right angles to the air stream.

It has been found that when the velocity of the screen is $1\frac{3}{10}$ times the speed of the air stream, all the larger particles are thrown off and the only particles which pass through are very minute and would probably pass through a three or four hundred mesh. The above was found to be true after introducing a continuous flow of molder's sand into the air stream at a point directly in front of the screen. With a screen velocity of three or more times that of the air, no particles which could possibly damage the motor, pass through at all.

Any small particles which might penetrate the screen will be thrown outwardly by centrifugal force and deflected by the diverging walls to the outer circumference of the screen where they will pass out of the device.

From the above it will be seen that a de-

vice is provided which is highly efficient and which may be used with great advantage where particularly large volumes of air are desired.

What I claim is:

1. In a filtering device, a hollow rotor, the outer side thereof formed as outwardly diverging walls extending from an inwardly located apex to the outer end extremities of each transverse side of the rotor, screens mounted in the transverse sides thereof, means to withdraw a filtered medium from the interior of the rotor and means to rotate the same.

2. In a filtering device, a rotor comprising a hub, a spider mounted thereon, outwardly extending diverging walls carried by the spider, spaced discs axially mounted on opposed sides of the spider and in the plane of the outer extremities of the diverging walls, annular screens mounted between said extremities and said discs, means to withdraw the filtered medium from the rotor and means to rotate the same.

3. In a filtering device, a conduit for receiving a filtered medium, a shaft journaled at one end in the conduit, a rotor mounted on the shaft and comprising a hub, a spider mounted thereon, outwardly extending diverging walls carried by the spider, spaced discs axially mounted on opposed sides of the spider and in the plane of the outer extremities of the diverging walls, annular screens mounted between said extremities and said discs, an annular flange on the conduit and abutting one of the spaced discs, an aperture in said last named disc communicating with the conduit, means for urging the rotor against the flange and means for rotating said shaft and rotor.

This specification signed this 5th day of March A. D. 1926.

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