March 25, 1930. C. F. HEINSS, SR 1,752,081

DUST SEPARATOR FOR INTERNAL COMBUSTION ENGINES

Filed Nov. 14, 1924

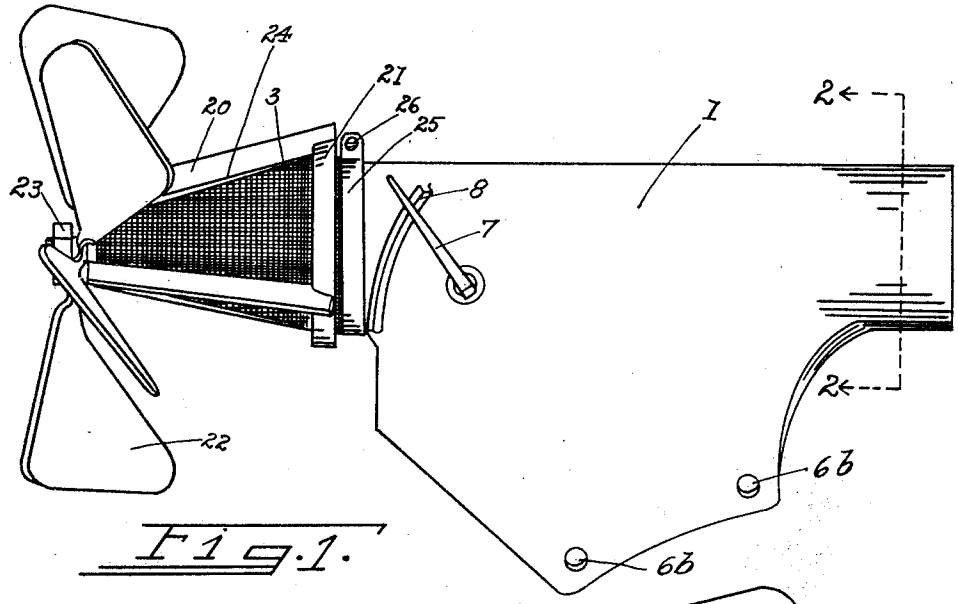


Fig. 1.

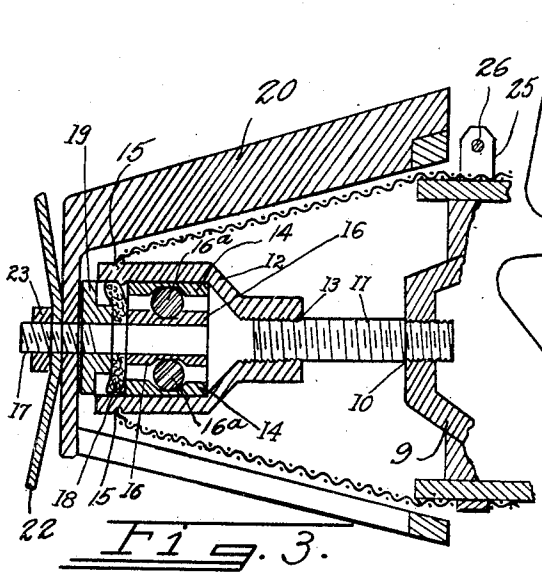


Fig. 3.

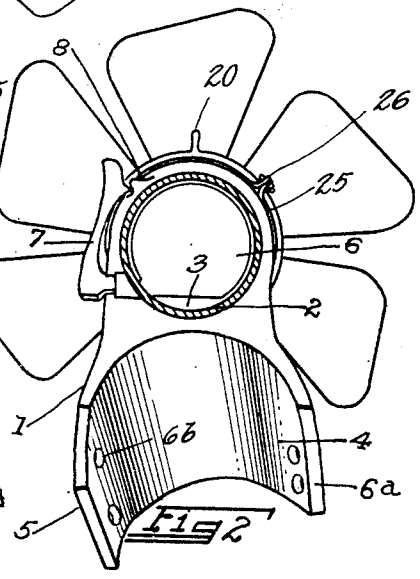


Fig 2

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UNITED STATES PATENT OFFICE

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DUST SEPARATOR FOR INTERNAL-COMBUSTION ENGINES

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This invention relates to a development of a simple, effective construction of a dust separator to be attached to the air intake of a carbureter through which the fuel is being vaporized for an internal combustion engine, such as is commonly used for propelling automobiles, tractors, and the like.

It is my object to provide an efficient means of removing all traces of dust from the air before it passes to the carbureter, and to provide this in an inexpensive, simple device, without any necessity of providing any means for operating it other than is contained in its automatic self contained structure.

The particularly usefulness of a device for separating the dust from air passing to the intake to the carbureter has been clearly demonstrated in successive successful tests of my device attached to automobiles in various sections of the country. A test on two identical makes of new cars, one equipped with my device and the other not equipped with it, showed that the condition of the motor on the engine equipped with my device was apparently unchanged after the car had been driven a thousand miles, whereas in the other car which was not equipped with my device, the same length of use under the same conditions, revealed considerable pitting and wear on the valve seats, piston rings and cylinder walls, and gritty deposits in the crank case which had caused appreciable wear to all the moving parts and bearings in it.

Referring to the accompanying drawing:

Figure 1 represents a side elevation of the assembled device.

Figure 2 a back elevation drawn along the lines 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 a longitudinal section showing the supporting structure of my device.

In the drawings a suitable casting 1 is provided with a rear aperture 2 for admitting filtered air to the carbureter, with a forward aperture 3 at the opposite end of the casting for admitting air from the separator, and a downward positioned aperture 4 with curved sides 5 and 6^a to fit about the hot air exhaust line coming from the engine. In the particular construction described the curved sides of the lower portion of the casting are provided with holes 6^b for inserting bolts to clamp the device in position, though this is not essential to its construction. A butterfly valve 6 is provided for controlling the supply of filtered air admitted to the carbureter. The particular valve shown is actuated by an outside arm 7, the end of which in passing over a grooved slide 8 engages in the grooves and is thus held in any desired position. The foregoing are merely simple means of supplying air from the filter to the carbureter intake and as the mechanism for filtering the air forms the essential feature of my invention, the particular construction of the parts leading back from it are of no particular importance and are shown in order to clearly explain a practical method of supporting my inventive structure.

As a support for my device from the casting 1 I have provided several arms 9 forming a cone shaped bracket and a threaded hole 10 in it to take a threaded shaft 11 in it. In the illustration these bracket arms are a part of the casting but they may be separately applied if so desired. The shaft 11 extends away from the air intake and has a round hollow cup shaped housing 12 attached to it by threads 13. A bearing 14 is mounted within the housing which may be a ball bearing or a roller bearing of any satisfactory size or shape. The particular type shown has outer bearing surface 14 or a cone held in position in the housing by punched depressions 15 in the exterior of the housing which cause the metal on the inner sides to be likewise depressed and form a compressed lug holding the forward end of the bearing in fixed position in the housing. Balls 16^a provide a rotational bearing with the hollow inner bearing surface or cup 16. Compressed or attached within the cup of the bearing assembly is another shaft 17 which is threaded at its forward end. Lubrication is provided for the bearing by applying grease or oil from the front opening in the housing and said lubricant is kept free from dust by the fibrous washer 18 which is held in position by a washer 19 mounted on the shaft outside it.

A cone-shaped fan casting is mounted on the shaft 17 next to the washer. This fan has vanes 20 with flat sides positioned parallel to radial lines from the shaft support and extending backwardly toward the air intake pipe 3 where a ring 21 holds the vanes in fixed position. This fan has no bearing other than the front support on the shaft 17. Next forwardly mounted on the shaft is another fan 22 which is locked tight against the backward extending fan 20 by means of the nut 23 screwed onto the front end of the shaft. Within the two fans extending the entire distance of the backward extending vanes of the inner fan is a cone-shaped screen 24 which is held by a clamping circular strap 25 and a bolt 26 passing through holes in the two bent out ends of the strap. I do not wish to be limited to the particular method of supporting this screen as the cone-shaped screen may be mounted between the hub of the inner fan with the backward extending vanes and the washer next inside it on the rotating shaft and thus have no bearing surface on the casting about the opening 3 of the intake pipe.

Having described the construction of my device, a brief explanation of its operation is as follows. The current of air from the radiator fan or the forward movement of the vehicle in which it is mounted, rushes against the outside fan 22 causing it to rotate rapidly. The inner fan with its vanes rotating over the entire surface of the conical screen are also propelled at a very high speed, and any dust or particles in the air is centrifugally ejected away from the screen allowing only the cleaned air to pass through. Any particles which are drawn through to the screen are whirled along its surface toward the large end of the cone and are so ejected without passing through it.

Having thus described the essential features of my invention and the generic construction necessary for its successful operation, what I claim is:—

1. In a centrifugal air separator for carbureter intakes, a cone-shaped screen surrounding the aperture to said intake, means for supporting said screen, a centrifugal fan rotatable exteriorly over the surface of said screen with means to support said centrifugal fan and a second fan rigidly attached to said centrifugal fan to supply the motive force necessary for the rotation of said centrifugal fan.

2. In a device of the character specified, a cone-shaped screen, means for attaching said screen to a carburetor air intake pipe, a cone-shaped centrifugal fan, and a shaft for mounting same in a position surrounding said screen, a second fan with means for attaching same to the cone-shaped fan with blades on the second fan projecting into the pathway of the air from an automobile radiator.

3. In a centrifugal air separator for a carburetor having an air intake, a cone-shaped screen surrounding said intake, a centrifugal fan, with means for mounting said fan so that the blades thereof will sweep over the surface of said screen, and means affected by abnormal air pressure exteriorly of said intake operatively connected with said fan.

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