Dec. 6, 1938. B. B. CARY 2,139,630

FAN ASSEMBLY

Filed Nov. 13, 1937

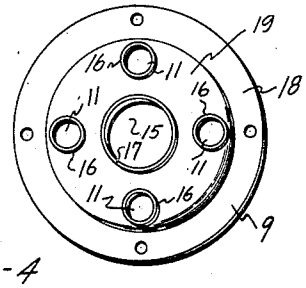


Fig-4

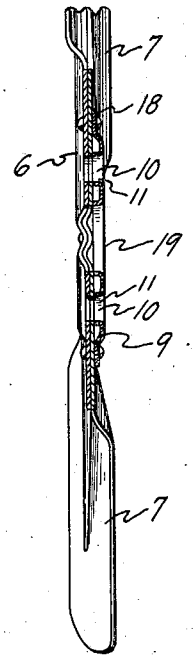


Fig-3

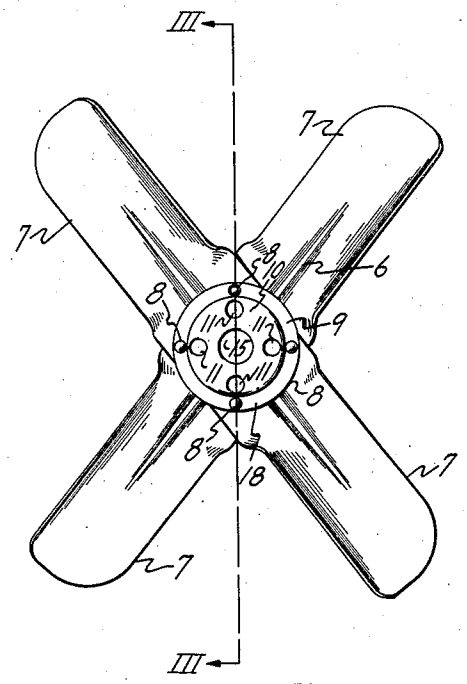


Fig-2

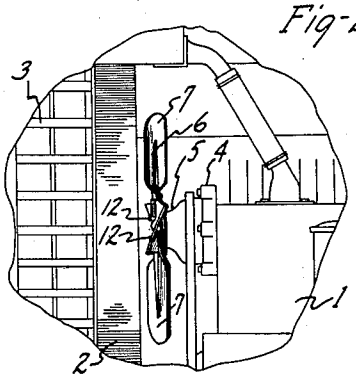


Fig-1

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FAN ASSEMBLY

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6 Claims. (Cl. 170—173)

This invention relates to cooling fans for automotive engines and particularly to a fan assembly designed to project the fan forwardly into a desired spaced relation with the radiator core.

In the design of automotive engines it is required for maximum cooling efficiency that the fan be disposed within a predetermined minimum distance from the radiator core. Certain considerations sometimes result in the fan of a parts manufacturer, when secured to the engine fan mounting of an automobile, being spaced further away from the radiator core than is desired for best operating practice. In the past, the fan has been projected toward the radiator core in such a case by forming the fan blades in such a manner that they are axially offset from the hub. Such a construction, however, is not desirable for the reason that it not only increases the cost of manufacture of fans, but also results in an undesirable stressing of the fan blades due to the moment created by the centrifugal force when the fan is rotated thereby necessitating a stronger and heavier fan.

An object of the present invention is to eliminate the necessity of offset fan blades by providing a spacing plate secured to the fan during manufacture and serving to position a fan having linearly opposed blades forwardly of the fan mounting.

Another object of the invention is to provide a spacing plate having a plurality of devices thereon for spacing the same from the fan.

These and other objects will be apparent from the following specification when taken with the accompanying drawing, in which

Fig. 1 is a partial view under the hood of an automobile engine showing the radiator and the fan assembly according to the present invention,

Fig. 2 is an elevation of the rear side of the fan assembly disclosing the spacing plate,

Fig. 3 is a section on the line III—III of Fig. 2, and

Fig. 4 is a side elevation of the inside of the spacing plate.

Referring particularly to the drawing, the reference character 1 indicates an automobile engine. Disposed forwardly of the engine is a radiator core 2 in front of which is a radiator grill 3. Mounted on the front of the engine 1 is a water pump 4 having disposed on the front thereof in driving relation thereto a fan mounting 5, to which is bolted the fan 6.

The fan 6 is formed of sheet metal of two sets of oppositely extending aligned blades 7. To the rear side of the fan 6 is secured by rivets 8 a spacing plate 9. The rivets 8 serve not only to secure the spacing plate 9 but also to connect the two sets of blades 7. Disposed through the hub of the fan 6 are openings 10 in alignment with openings 11 in the spacing plate 9. Through the aligned openings 10 and 11 project screws 12, as shown particularly in Fig. 1, for securing the fan assembly to the fan mounting 5.

The spacing plate 9 is annular in configuration, having a central opening 15. As disclosed particularly in Figs. 3 and 4, the openings 11 and 15 in the spacing plate 9 have drawn at the edges thereof annular axially extending, cylindrical, spacing portions 16 and 17. The spacing plate 9 is also provided with an annular border 18, which is axially offset from the outer face 19 of the spacing plate 9 into the plane of the inner ends of the annular spacing portions 16 and 17 so that the inner face of the spacing plate 9 may lie flat against the hub of the fan 6, as shown particularly in Fig. 3. The spacing plate 9 is thus provided with a fan mounting engagement surface 19, which is spaced away from the hub of the fan 6 a distance equal to the axial length of the annular spacing portions 16 and 17.

From the foregoing description, it will be apparent that by the present invention it is possible to space the fan 6 forwardly from the fan mounting 5 a distance determined by the axial length of the spacing portions 16 and 17 of the spacing plate 9, and thus to have linearly aligned blades 7 in which, during rotation, no moment as the result of centrifugal force is set up. The entire assembly is fabricated from sheet metal stock and is considerably lighter in weight than would be a similar one having the blades formed to be axially offset from the hub.

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

1. A fan of the character described, comprising a plurality of blades having a hub, and a plate secured to the rear side of said hub, said hub and plate having disposed therebetween a plurality of separating devices, said hub and plate having a central rotative axis and said separating devices being spaced from and spaced about said axis.

2. A fan of the character described, comprising a plurality of blades having a hub, said blades and hub being in substantially the same plane, and a plate secured to the rear side of said hub, said hub and plate having disposed therebetween a plurality of spaced separating devices.

3. A fan of the character described, comprising a plurality of blades having a hub, said blades

and hub being in substantially the same plane, a plate secured to the rear side of said hub, and a plurality of axially extending cylinders disposed between said plate and hub for separating said plate and hub, said hub and plate having a central rotative axis and said axially extending cylinders being spaced from and spaced about said axis.

4. A fan of the character described, comprising a plurality of blades having a hub, said hub having a plurality of openings therethrough for receiving securing screws, a spacing plate secured to said hub, a plurality of openings in said plate corresponding to and in alignment with the openings in said hub, and a plurality of cylinders integral with said plate and normal thereto disposed about the openings in said plate and between said plate and hub for spacing said plate from said hub.

5. A fan of the character described comprising a plurality of blades having a hub, said blades and hub being in substantially the same plane, said hub having a plurality of openings therethrough for receiving securing screws, and a plate secured to said hub, said plate having a plurality of openings corresponding to and in alignment with the openings in said hub and an additional opening in the center thereof, each of the openings in said plate having thereabout normally extending cylinders integral with said plate for spacing said plate from said hub, said plate also having an annular portion at the outer edge thereof normally displaced therefrom toward and into engagement with said hub.

6. A spacing plate of the character described having a plurality of openings therethrough, said openings being bordered on one side by cylinders extending normal to said plate, said cylinders having the free ends thereof in a plane, the outer edge of said plate having an annular portion thereof deflected out of the plane of said plate into the plane of the free ends of said cylinders.

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