Sept. 29, 1959 E. E. HANS ET AL 2,906,349

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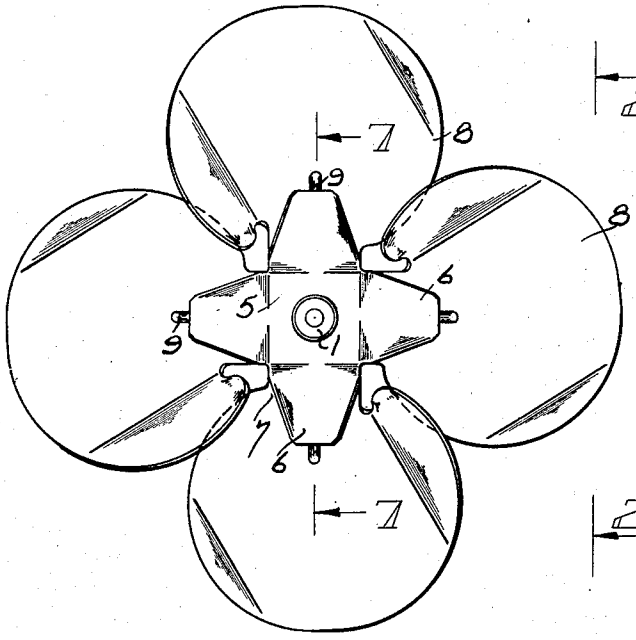


Fig. 1

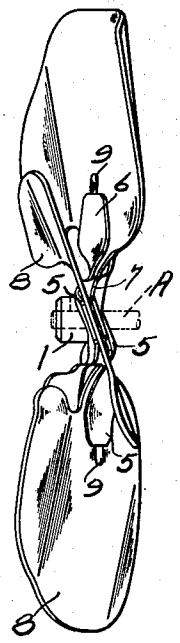


Fig. 2

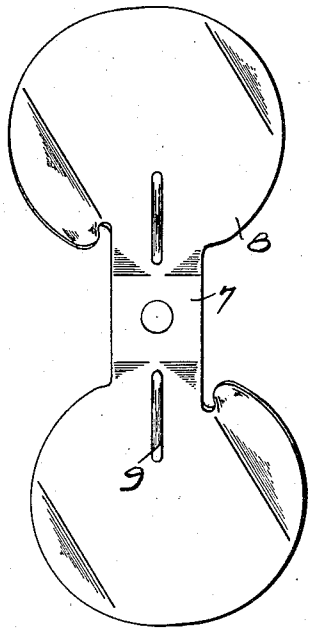


Fig. 3

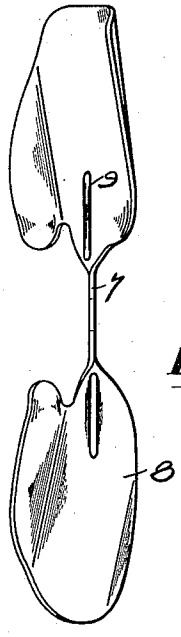


Fig. 4

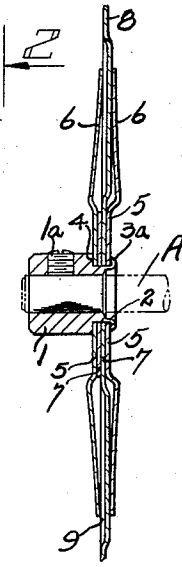


Fig. 7

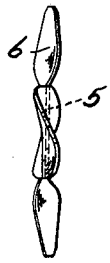


Fig. 5

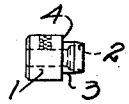


Fig. 6

INVENTORS
Edmund E. Hans
BY Donald F. Wuerfel.
Gerald J. Baldwin

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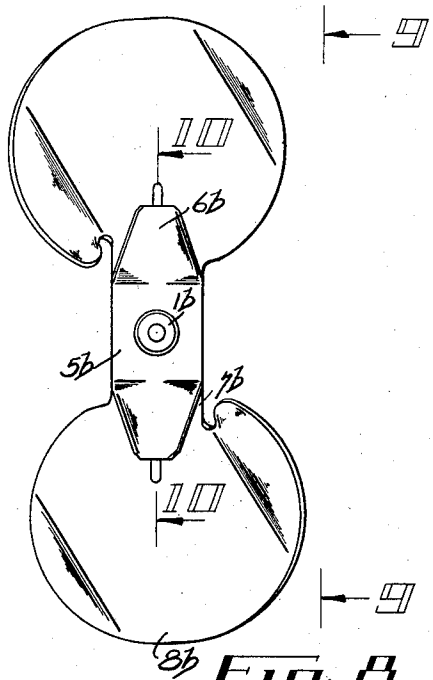


Fig. 8

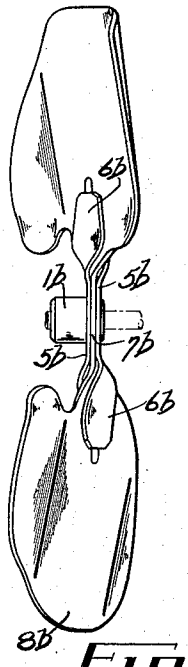


Fig. 9

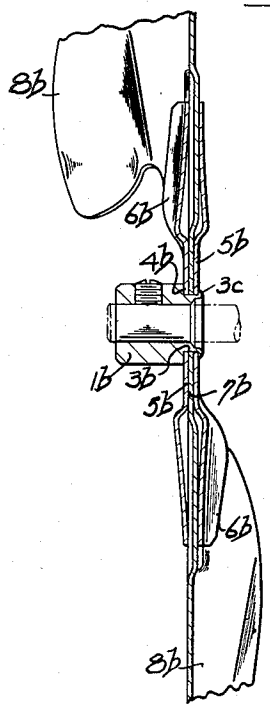


Fig. 10

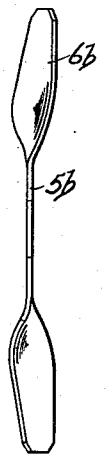


Fig. 11

INVENTORS
Edmund E. Hans
BY Donald F. Wuerfel
Donald F. Baldwin

United States Patent Office 2,906,349
Patented Sept. 29, 1959

2,906,349

FANS

Edmund E. Hans and Donald F. Wuerfel, Detroit, Mich.; said Wuerfel assignor to said Hans

Application December 2, 1955, Serial No. 550,686

1 Claim. (Cl. 170—173)

This invention relates to improvements in fans. At the present time it is a common practice to secure upon a hub one or more webs or blade carrying members from each of which integral blades extend, to secure reinforcing flanges on the hub, and to rivet the flanges to the blades adjacent their inner extremities, thereby forming a rigid assembly. However this rigidity renders the blades very liable to crack or break from their webs unless quite heavy stock is used, and this in turn renders the webs and their blades quite heavy and results in a high starting torque. Again the use of rivets, or other similar means, for securing the flanges to the blades renders balancing of the fans necessary when their assembly is complete.

It is an object of this invention to provide a fan of this general order which requires no balancing when assembled.

Another object of the invention is to provide such a fan wherein the webs or blade carrying members and their blades may be made of very light stock so that the starting torque is quite low.

Yet another object of the invention is to provide such a fan including a hub having one or more webs or blade carrying members mounted thereon from which blades project, and wherein pads having resilient radial fingers are also mounted on the hub so that the said fingers bear against opposite sides of the blades thereby supporting them against deformation during rotation of the fan, and reinforcing the blades and their carrying members to materially reduce the possibility of cracking or breakage of the blades from their members.

A further object of the invention is to provide such a fan which is cheap and simple to manufacture; wherein the webs and their blades may all be identical and are susceptible of being made in one operation, and all the pads, including their fingers may also be identical and are susceptible of being made in a single operation.

Having thus stated some of the objects and advantages of the invention we will now describe it in detail with the aid of the accompanying drawings, in which:

Figure 1 is a front elevation of the invention, and

Figure 2 is a side view thereof, taken on the line 2—2 of Figure 1.

Figure 3 is a front view of one of the blade carrying members and the blades thereon, and

Figure 4 is a side view thereof taken on the line 4—4 of Figure 3.

Figure 5 is a side view of one of the resilient pads.

Figure 6 is an elevation of the hub before the pads and blade carrying members are mounted thereon.

Figure 7 is an enlarged section on the line 7—7 of Figure 1.

Figure 8 is a front view showing a modified form of the invention, and

Figure 9 is a side view thereof taken on the line 9—9 of Figure 8.

Figure 10 is an enlarged section on the line 10—10 of Figure 8, and

Figure 11 is a side view, also enlarged, showing one of the pads used in Figure 8.

Referring first to Figures 1 to 7, inclusive, 1 designates a hub which is suitably secured upon a shaft A as by a screw 1*a*. The bore of the hub is increased for a short distance from one extremity, as shown at 2 in Figures 6 and 7, and from the same extremity and for a greater distance the outside diameter of the hub is tapered as shown in Figure 6 to form a shank 3 of increasing diameter toward its inner extremity which terminates in an annular shoulder 4. 5 denotes two identical resilient pads, usually made of spring steel, from each of which, in the present instance, four resilient fingers 6 project radially; these fingers are of course integral with their pads. One of the pads 5 is mounted on the shank and bears against the shoulder 4. Mounted also on the shank 3 are two central webs or blade carrying members 7. Integral with and projecting radially from each of blade carrying members are two diametrically opposed blades 8. The webs are relatively so positioned on the shanks that the blades extending from one of them are spaced angularly equidistant between the blades on the other web. The other resilient pad 5 is mounted on the shank 3 outwardly of the webs 7 and the outer extremity of the shank is outwardly rolled or riveted as shown at 3*a* in Figure 7, to retain the webs and pads in contact with one another.

The webs or blade carrying members 7 and the central portions of the resilient pads 5 are all flat and are held in contact with one another between the shoulder 4 and the riveted extremity 3*a* of the shank 3. All the blades are similarly curved to discharge air when the hub is rotated about its axis, and the fingers 6 each bear against one side of one blade, so that supporting pressure is exerted against both sides of each blade adjacent its inner extremity. The pressure thus exerted against opposite sides of all the blades materially strengthens them, renders them far less liable to crack or break than if they were laterally unsupported, and protects them against distortion or deformation. It will also be noted that though the fingers 6 throughout their radial length conform substantially to the shape of the blades 8 they are preferably spaced slightly from the latter intermediately of their length so that only transversely at their extremities do the fingers exert pressure against the blades. The latter may also be further strengthened by forming ribs therein as shown at 9.

In the modification shown in Figures 8 to 11, inclusive, the arrangement is the same as that previously described except that on the shank 3*b* of the hub 1*b* only a single web or blade carrying member 7*b* is provided which is supported between two resilient pads 5*b* one of which bears against the shoulder 4*b* while the other is supported by the riveted extremity 3*c* of the shank 3*b*. Radial fingers 6*b* integral with the pads 5*b* are opposed to one another and exert pressure against opposite sides of the blades 8*b* which project from the web 7*b*.

While in the foregoing fans are shown and described having either a single blade carrying member or a plurality of such members from which, in either case, two blades project, it is understood that any desired number of blades may project either from a single member or from each of a plurality of members if desired. Moreover, in any event, each pad must be provided with as many fingers as the fan has blades, and one finger must bear against each side of each blade.

What we claim is:

A fan including a hub adapted to be mounted for rotation, an apertured plate-like blade-carrying member

formed of sheet material and received over the hub, a pair of identical blades integral with said member at opposite edges thereof and extending radially outwardly relative to the hub, a pair of identical apertured pads received over the hub on opposite sides of the blade-carrying member, each pad being formed of sheet material and having a plate-like central portion surrounding the aperture through the pad and being of substantially the same size and shape as the blade-carrying member to lie juxtaposed against substantially the entire area of the plate-like blade-carrying member, means on said hub bearing against said pads urging them tightly toward the blade-carrying member to reinforce the same from the aperture therethrough radially outwardly to the blades over substantially the entire area of the blade-carrying member, each pad having a pair of integral identical resilient fingers at opposite edges extending radially outwardly relative to the hub

equal distances on each side of each blade and overlying opposite sides of each blade, said fingers at their outer ends bearing against the faces of the blades radially outwardly of the blade-carrying member and spaced laterally from the faces of the blades between such outer end and the integral connection with said central portions of the pads.

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