United States Patent [19]

Albertzart

[11] **3,825,369**

[45] **July 23, 1974**

[54] **LIGHTWEIGHT FAN**

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[52] **U.S. Cl.** **416/229,** 416/210, 416/241

[51] **Int. Cl.** **F04d 29/38**

[58] **Field of Search** ..... 416/229, 230, 241 A, 224, 416/210

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Primary Examiner—Everette A. Powell, Jr.

[57] **ABSTRACT**

A lightweight automotive fan having a plastic core and high strength metal sheets applied to the front and rear faces of the core.

3 Claims, 3 Drawing Figures

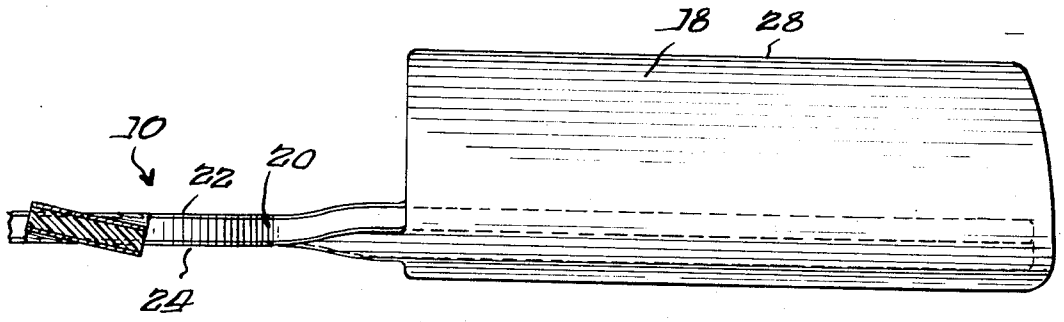


Fig. 1.

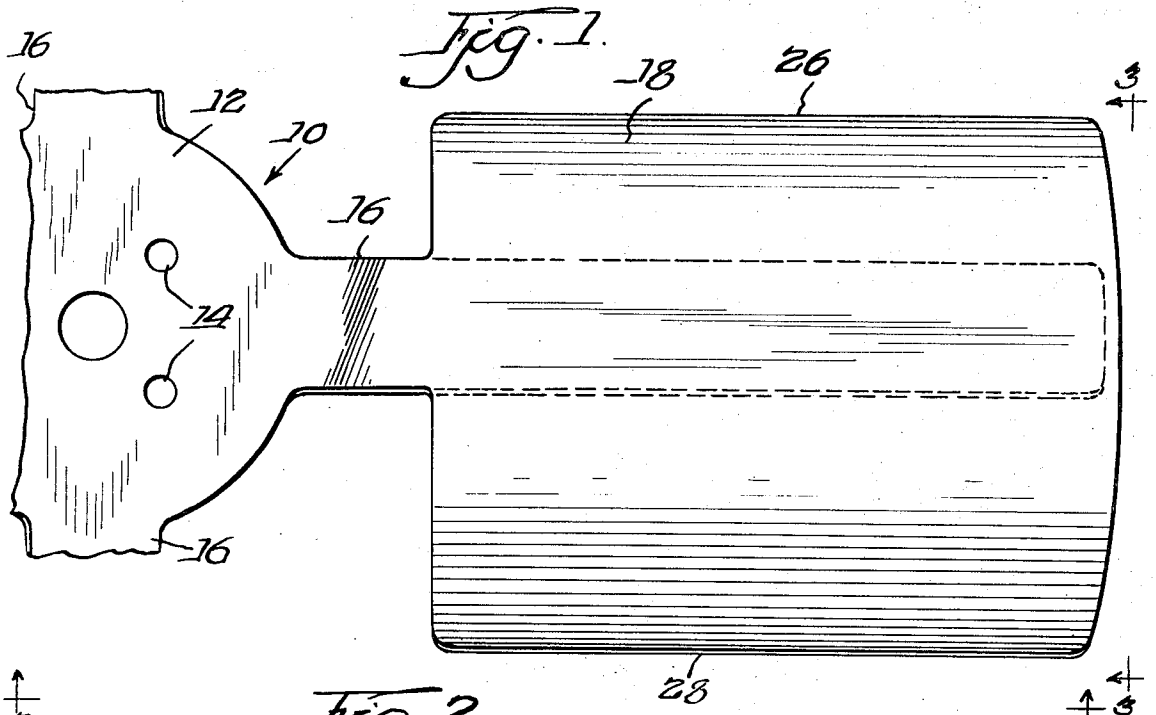


Fig. 2.

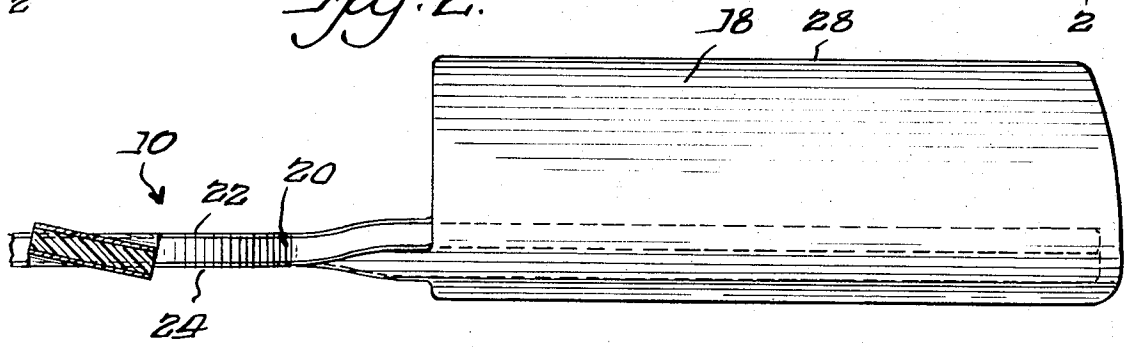
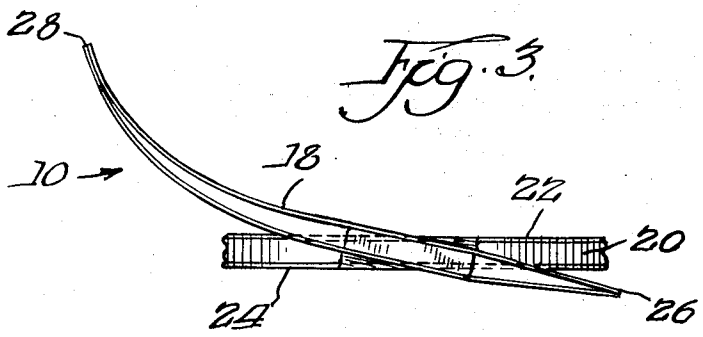


Fig. 3.



LIGHTWEIGHT FAN

BACKGROUND OF THE INVENTION

This invention is related to automotive fans and in particular to a lightweight fan.

Automotive fans are subjected to extremely high stresses and must be fairly large to pump a sufficient amount of air in most applications. To fulfill the necessary requirements for an automotive fan, most of the prior fans have been constructed from metal. For this reason, automotive fans are quite heavy and require a considerable amount of power to operate. Moreover, the weight of the fan applies stresses to other components of the vehicle.

All plastic automotive fans have been utilized in the past. These fans have not been sufficiently strong for use in high stress applications.

SUMMARY OF THE INVENTION

This invention responds to the problems of the prior art by presenting a fan which is not only light in weight but also is strong enough to be used in high stress applications. In a preferred embodiment, the hub and spider arms of the fan are formed from a plastic material. The front and rear faces of the hub and spider arms are covered with high strength thin sheets of metal which also may be used to form the fan blades.

In a preferred embodiment of the invention the metal facings are formed from a single piece of high strength stainless steel. The metal facings may be bonded to the plastic by a resin such as an epoxy resin.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of this invention will become more apparent in the following detailed description of a preferred embodiment when read in conjunction with the Figures in which:

FIG. **1** is a rear view of a portion of a fan embodying the principles of this invention.

FIG. **2** is a bottom view of the portion of the fan depicted in FIG. **1**, taken along line **2—2.**

FIG. **3** is an end view of the fan depicted in FIG. **1**, taken along line **3—3.**

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the Figures, wherein like reference numerals indicate like parts, a fan is denoted generally by the reference numeral **10.** The fan **10** includes a hub portion **12** which includes mounting holes **14.** A plurality of spider arms **16** emanate radially from the hub **12.** The spider arms **16** may be asymmetrically spaced if it is desired. The spider arms **16** link the hub **12** and the fan blade **18.**

As is most clearly shown in FIGS. **2** and **3** the fan **10** includes a central non-metallic core **20** which is preferably a plastic material and thin metal members **22, 24** on the front and rear faces of the plastic core **20.** The plastic core **20** includes a central portion in the shape of the hub **12** and a plurality of rectangular arms **16** which emanate radially from the hub **12.** The arms **16** are twisted with respect to the plane of the hub **12.** The metal facing members **22, 24** include a hub shaped portion, an arm shaped portion and a portion which defines the fan blade **18.**

The facing members **22, 24** are substantially coextensive with the plastic member **20** and may be tightly bonded thereto by the use of an epoxy resin or the like. The portions of the metal facings **22, 24** which define the blades **18** may be bonded at the leading edge **26** and the trailing edge **28** by processes well known in the art such as soldering and brazing among others.

The plastic core **20** by virtue of its thickness gives the fan **10** the requisite stiffness. The metal facing members **22, 24** by virtue of their high tensile strength give the composite fan the necessary strength. In a preferred embodiment of this invention the plastic member **20** was made from polypropylene and the facing members **22, 24** were made from a high strength stainless steel. The combined strength of the facing material and stiffness of the core provides a rugged fan which is still of quite light weight.

Although it is preferred to construct the facing materials from a single sheet, they may be made of separate pieces. Furthermore, in some applications the spider arm **16** may be shorter than that illustrated in the preferred embodiment such that the end of the blade may be joined along with the leading and trailing edges.

What is claimed is:

1. A lightweight automotive fan comprising:

a one-piece plastic core member defining a central hub portion and a plurality of arms extending radially from said hub for stiffening the blade portions of said fan; and

thin metal facing sheet members bonded to the front and rear portions of said core member;

said facing sheet members substantially covering said faces of said core member and defining a hub portion, a relatively narrow intermediate arm portion, and a relatively wide fan blade portion of greater dimension than said arm portion of said core member sandwiched between said fan blade portions of said facing sheet members;

said fan blade portions of said facing sheet members being joined to each other at their respective leading and trailing edges and being curved rearwardly to form a radially untwisted, airfoil shaped fan blade.

2. The automotive fan set forth in claim **1** wherein said plastic is polypropylene and said metal facing members are stainless steel.

3. The automotive fan set forth in claim **1** wherein said facing members are substantially identically shaped.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,825,369 Dated July 23, 1974

Inventor(s) R. Richard Albertzart

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Colum 2, line 55, change claim "1" to read claim --2--.

Signed and Sealed this

sixteenth Day of *September 1975*

[SEAL]

Attest:

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