April 8, 1941. A. O. SAMUELS 2,237,451

FAN CONSTRUCTION

Filed Nov. 9, 1937 2 Sheets-Sheet 1

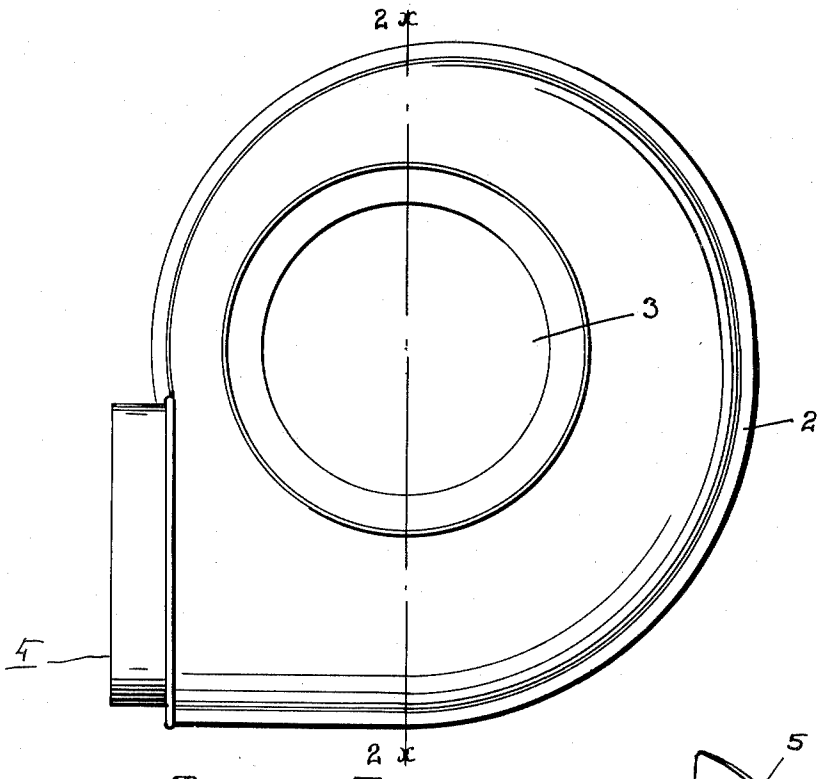

FIG 1

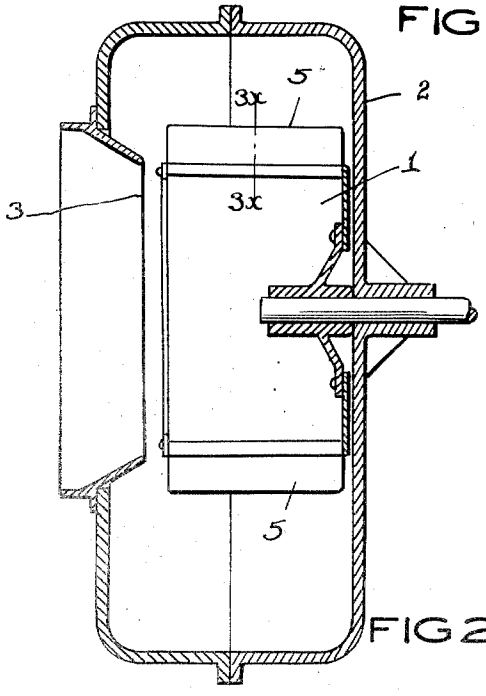

FIG 2

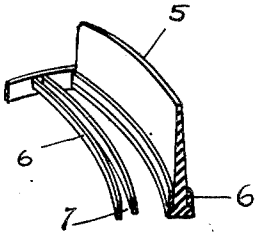

FIG 3

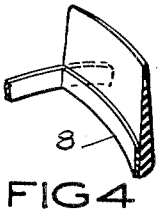

FIG 4

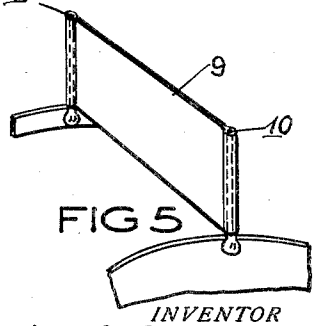

FIG 5

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FAN CONSTRUCTION

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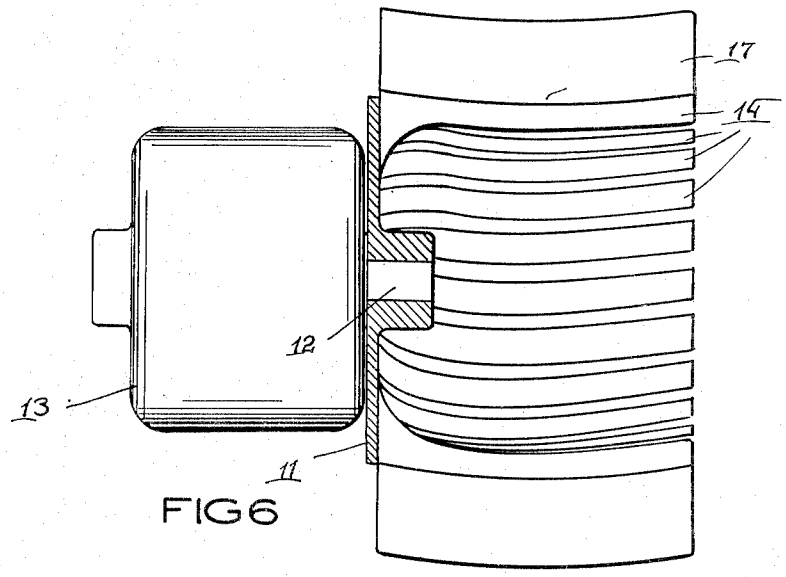

FIG 6

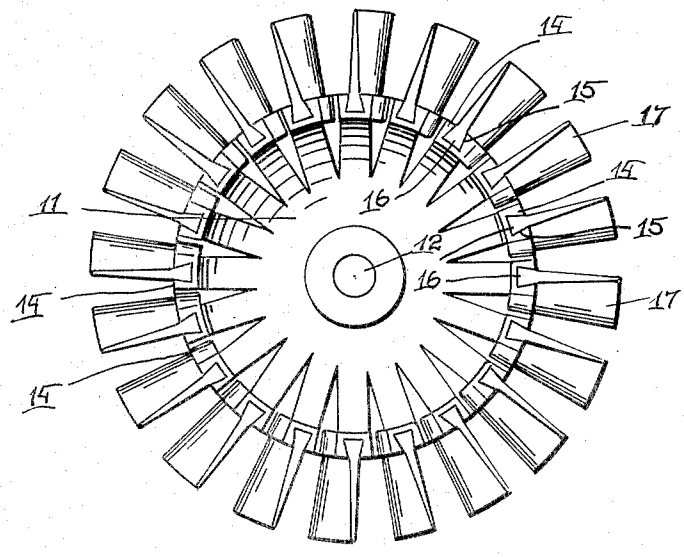

FIG 7

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Patented Apr. 8, 1941 2,237,451

UNITED STATES PATENT OFFICE

2,237,451

FAN CONSTRUCTION

Abe O. Samuels, Rochester, N. Y., assignor, by mesne assignments, to Seaboard Commercial Corporation, New York, N. Y., a corporation of Delaware

Application November 9, 1937, Serial No. 173,662

2 Claims. (Cl. 230—134)

In electric and other fans of the centrifugal type in which the blades are arranged substantially parallel to the axis of rotation, the blades have heretofore been made of substantially unyielding metal or other rigid material which could not yield if any object were intruded into the path of such blade but would damage or destroy such object. Metal blades are furthermore subject to chemical corrosion which gradually destroys them, especially when the fan is operated to carry off vapors or gases containing chemicals which either cause corrosion or set up electrolysis in the metal blades.

My present invention relates to such fans and has for one of its objects to provide a fan of this type with flexible fan blades of suitable material and shape to give the blades stability for an efficient operation of the fan, combined with sufficient flexibility to cause any portion of the moving blades to yield when a stationary rigid or semi-rigid member is brought in contact with them, and to be self restoring to normal position when the intruded member is withdrawn.

A further object of this invention is to provide a fan of this type with blades made of non-metallic material so as to make them non-corrosive and resistant to the chemical action and electrolysis.

All these and other objects and attendant advantages will become more readily apparent from the detailed description of several embodiments of the invention which follows, reference being had to the accompanying drawings in which

Figure 1 is a side elevation of a conventional form of centrifugal fan.

Figure 2 is a cross section thereof taken on the line 2*x*—2*x* of Figure 1.

Figure 3 is a detail perspective and sectional view of one form of my novel blade and its mounting as used for the rotor of the centrifugal fan.

Figure 4 is a detail perspective view and section of modified form of my novel blade and its mounting.

Figure 5 is a detail perspective view of still another modified form of my novel blade and its mounting.

Figure 6 shows a sectional view of a modified form of a centrifugal fan provided with my novel blades as it appears mounted to a fan motor.

Figure 7 is a front elevation of the fan illustrated in Figure 6.

In the figures reference numeral 1 indicates the rotor of a centrifugal fan which is mounted to rotate in the housing 2. The intake opening 3 of the housing is located in the side of the housing axially in line with the hollow center of the rotor and the exhaust. The outlet opening 4 of the housing is located at one end of the housing substantially tangential to the rotor. The action of the rotor causes air or gases to enter the intake opening 3 into the hollow center thereof and be expelled therefrom and forced out of the outlet 4 in the casing by the radially arranged fan blades 5 of the rotor.

The fan blades 5 are made of suitable non-metallic material and shape so that when mounted they will have stability for an efficient displacement of air or gases in the operation of the fan, combined with sufficient flexibility to cause any portion of the moving blades to yield when a stationary rigid or semi-rigid member is brought in contact with them, and to be self-restoring to normal position when the contacting member is withdrawn. Rubber or fabric or a combination of the two have been found to be suitable material for the blades especially in view of the fact that this material is substantially non-corrosive and resistant to the chemical action to which metal blades of a fan are usually subjected.

In Figure 3 I have illustrated one form of mounting for such blades in which the rotor is provided with a plurality of curved mounting ribs 6 which are slotted with an outwardly tapering slot 7. The blades 5 are inserted into these slots so as to be curvedly held in place therein to give the otherwise flexible blades sufficient stability for the displacement of air on the rotation of the fan. The blades, as shown in Figure 3, may have a tapering cross section which will increase the stability of the blade.

In Figure 4 I have shown a similar blade with a simplified mounting in which the base of the blade is vulcanized or otherwise suitably fastened to one side of the curved rib 8.

In the modification illustrated in Figure 5, the flexible blade comprises a substantially thin sheet member 9 which is anchored to the spaced posts 10, 10 carried by the rotor and held stretched between them.

In Figures 6 and 7 the rotor comprises the spider member 11 which is keyed to the armature shaft 12 of the motor 13. Concentrically grouped on the spider and axially extending from it are the curved supporting arms 14, 14 which are provided with the dovetailed shaped slots 15 to receive the dovetailed base edges 16 of the flexible blades 17 and hold these blades curved in a radial position.

I claim:

1. A fan comprising a rotor, substantially ax-

ially arranged supporting ribs carried by said rotor and uniformly and circumferentially spaced thereon, and flexible and resilient blades held erect by said supporting ribs to provide for the passage of air from the inside of the rotor to the outer edges of said blades.

2. A fan of the centrifugal type comprising a rotor, circumferentially spaced pairs of ribs carried by said rotor and held uniformly spaced radially from the center of rotation of the rotor at one end thereof, a flexible blade held clamped with its base between each pair of ribs to provide yielding walls for the unobstructed passage of air from the inside of the rotor to the outside thereof.

ABE O. SAMUELS.