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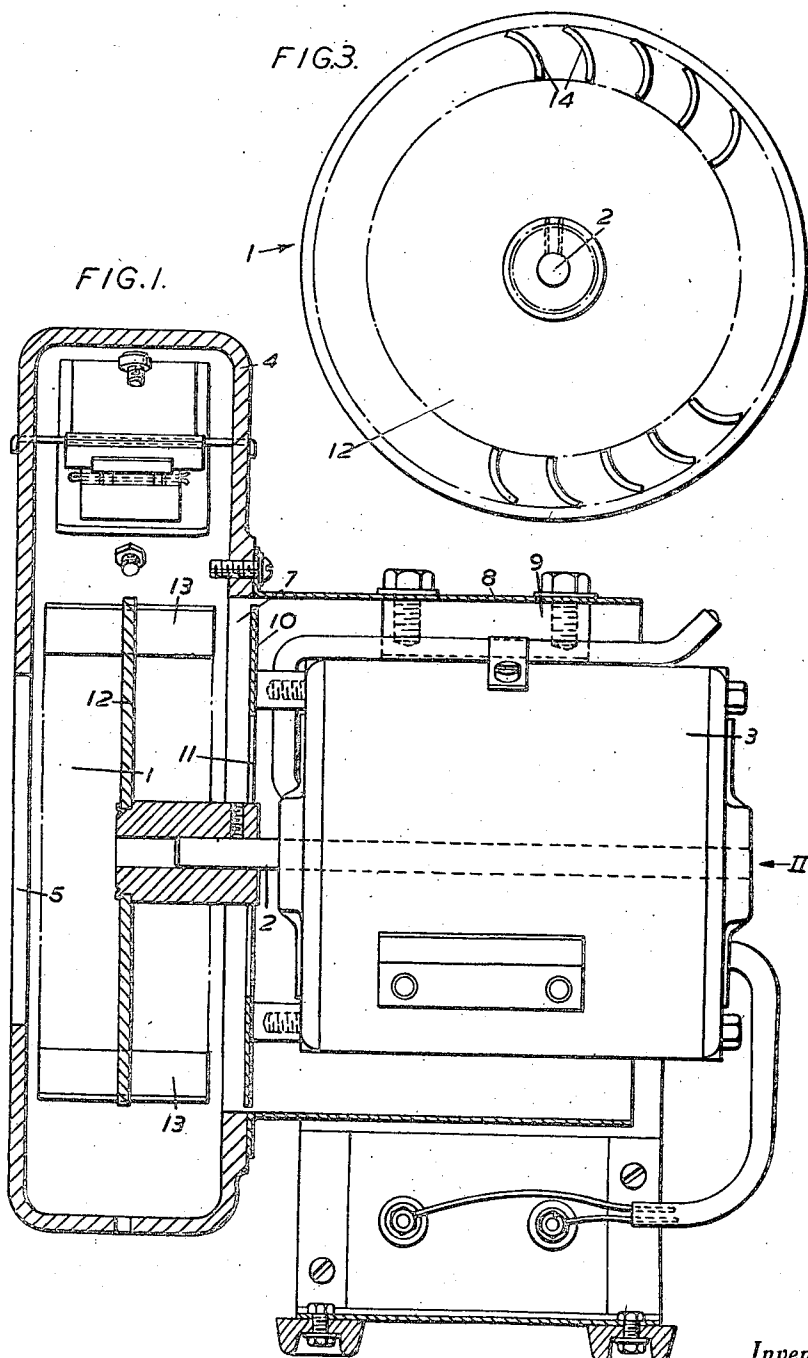
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ROTARY FAN OR THE LIKE

Filed Nov. 12, 1948

2 Sheets-Sheet 1



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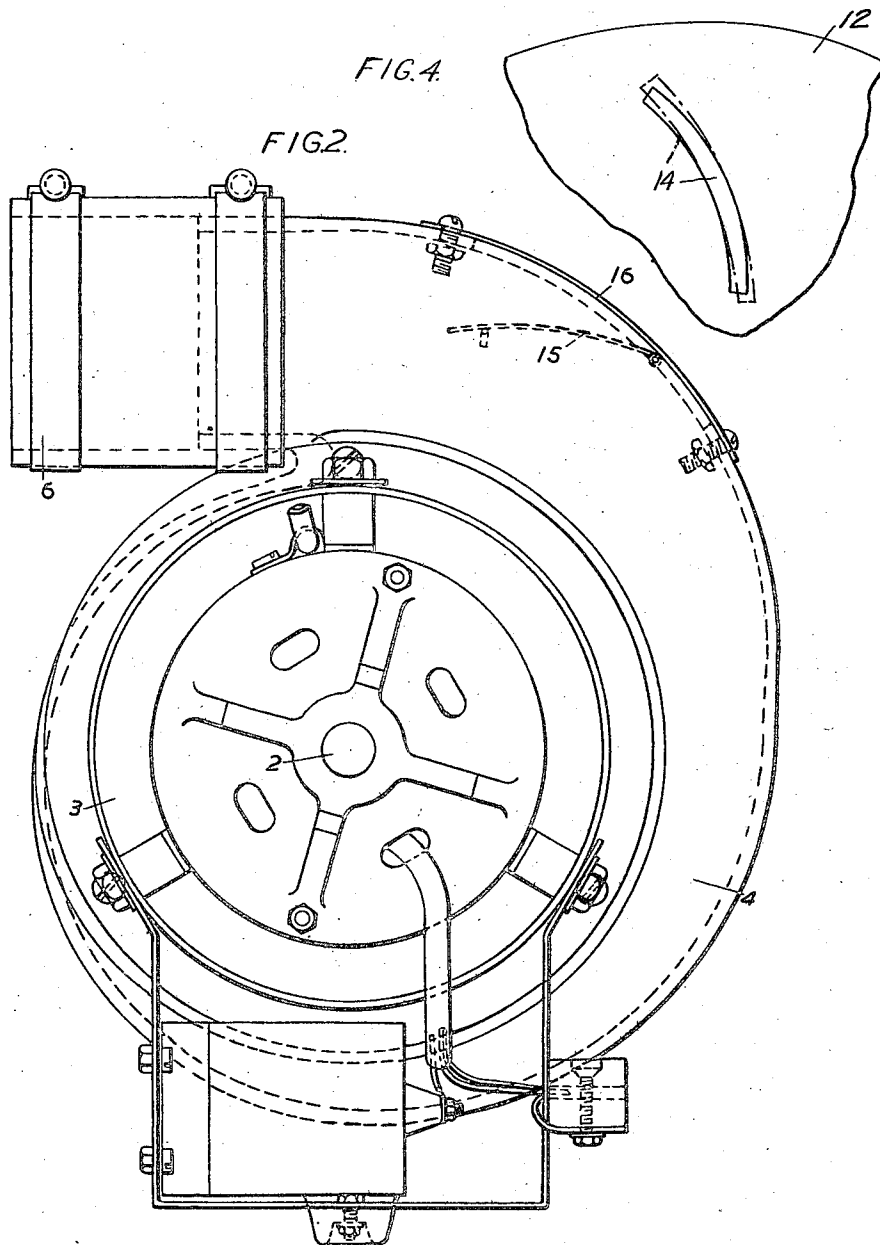
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UNITED STATES PATENT OFFICE

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ROTARY FAN OR THE LIKE

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In Great Britain November 17, 1947

4 Claims. (Cl. 230-134)

1 This invention relates to rotary fans or the like machines and especially, though not essentially to cases where it is necessary to keep the motor body cool by passing intake air to the fan over or through the motor body, and fans used for supplying air to the grate of a boiler in a domestic hot water or steam heating installation.

From one aspect, the invention provides a fan rotor in which the blades are mounted in an approximately central partition of the rotor, the blades passing through slots in the partition and being locked therein by the relative shapes of the slots and the blade section. For example, the blades can be formed with a camber at one end corresponding in contour with the slot in the partition but with a different camber at the middle of the blade, so that in forcing the blade into position a pressure is set up in the attempt to adjust to the correct camber which causes the blade to lock. Alternatively the blades and the slots are initially of the same section and after assembly the material surrounding the slots or of the blades (or both) is deformed as by peening to lock the blades in the slots. In some cases both methods may be used.

Such an arrangement is particularly advantageous when for reasons of weight the fan rotor is made of a light alloy such as aluminium alloy so that welding of the blades to the disc would be difficult or impossible.

Other parts of the invention are embodied in the preferred form which will now be described in some detail by way of example with reference to the accompanying drawings in which:

Fig. 1 is a section of a fan in accordance with the invention,

Fig. 2 is a view in the direction of the arrow II of Fig. 1,

Fig. 3 is a front view of the fan rotor, and

Figure 4 is an enlarged fragmentary view in elevation of a portion of the fan rotor with one of the blades and illustrating the relatively different conformation of the blades and their slots.

In this form, the fan rotor 1 is mounted on the shaft 2 of an induction motor 3, chosen because of the need in domestic heating installations for silent operation. The rotor is housed in a casing 4 of the usual volute form with an opening or eye 5 in the front through which air is drawn by the rotor and delivered through a substantially tangential outlet 6.

On the motor side of this casing is an opening 7 of sufficient diameter to allow the withdrawal of the rotor. Surrounding this opening is a casing 8 in which the motor is housed, an annular

2 passage 9 for air being provided between the casing and the motor body.

Attached to the motor body but free from the casing is a baffle plate 10 closing the opening 7 in the fan casing except for a central aperture 11 around the motor shaft. By this means air drawn in between the motor body and its casing is directed inwardly over the end of the motor and into the center of the rotor. Furthermore, this arrangement enables the motor and the fan rotor to be withdrawn from the casing without disassembling them.

The fan rotor 1 comprises a disc 12 mounted on the shaft 2 centrally of the casing. The blades 13 which are of cambered cross section are mounted around this disc and project on each side of it.

As the fan rotates air is drawn in from both sides of the disc, part through the eye in the casing and part over the motor body and through the aperture in the baffle plate. The motor, which being of the induction type, is likely to run hot, is thus efficiently cooled.

Means may be provided for varying the effective area of the eye of the casing to vary the amount of air passing through it to the rotor.

The blades 13 of the fan are at one end of the correct contour to fit the slots 14 in the disc. Towards the middle they are given rather more (or if preferred, less) camber, as illustrated in phantom lines in Figure 4, so that they tighten in the slots as they are forced into position and so lock themselves.

Alternatively the slots and the blades may be locked together after the blades have been passed through the slots, by peening the metal of the disc at the edges of the slots so as to press hard against the blades.

An air flap 15 can be conveniently provided in the casing near the outlet. When the fan is running this flap is closed by the air pressure against an opening 16 in the casing. When the fan is not running, this flap opens, allowing the air to be drawn through the opening to the outlet from the fan. Extra induced air is thus provided for the fire (to which the fan supplies air) during idling periods.

The material employed for the rotor is preferably aluminium or similar alloy, but may be of plastic or any other light material so as to reduce the weight to a minimum on the motor shaft. The fan body can be made up from light metal or other pressings, or from castings in metal or other materials and can be adjusted in width to vary the output air pressure of the fan.

It will be understood that the invention is not

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restricted to the details of the preferred form described which may be varied without departing from the broad ideas underlying the invention.

I claim:

1. A fan rotor comprising an approximately central partition having a plurality of closed ended slots circumferentially spaced therein and radially spaced inwardly from the periphery thereof, a plurality of blades passing through said slots and extending as cantilevers on either side of said partition, the section of said blades at the locus of assembly and the shape of said slots being different and co-operating in binding said blades in position.

2. A fan rotor comprising an approximately central partition having a plurality of closed ended slots circumferentially spaced therein and radially spaced inwardly from the periphery thereof, a plurality of blades passing through said slots and extending as cantilevers on either side of said partition, said blades having a normal sectional contour at the locus of assembly differing from the shape of said slots and being locked in position by deformation in said slots.

3. A fan rotor according to claim 2 in which the blade has a camber at the end corresponding in contour with the slot and has a different camber at the middle.

4. The method of forming a fan rotor which comprises providing a plate-like radial support, forming a plurality of circumferentially spaced closed ended slots of selected curvature through

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said support, providing a plurality of curved blade elements with a selected curvature at the locus of assembly with said support which differs from the curvature of said slots, and inserting said blades respectively into said slots with said locus of assembly within said slots to lock said blades in position by pressure due to difference of curvature between said blades and the sides of said slots.

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