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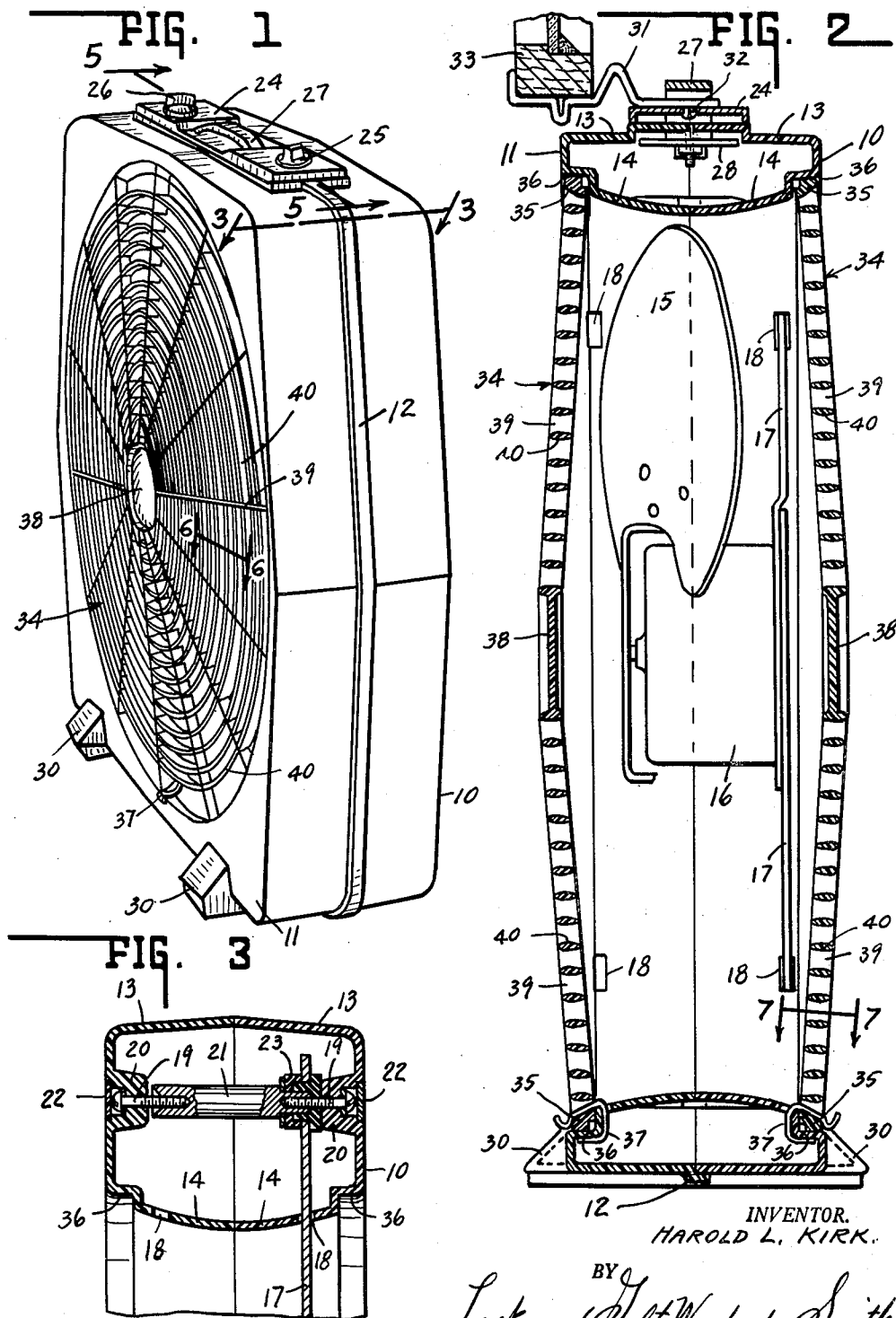
H. L. KIRK

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FAN HOUSING AND PROTECTIVE GRILL

Filed Dec. 3, 1956

3 Sheets-Sheet 1



INVENTOR.
HAROLD L. KIRK.

BY
Lockwood, Salt, Woodward & Smith.
ATTORNEYS.

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H. L. KIRK

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FIG. 4

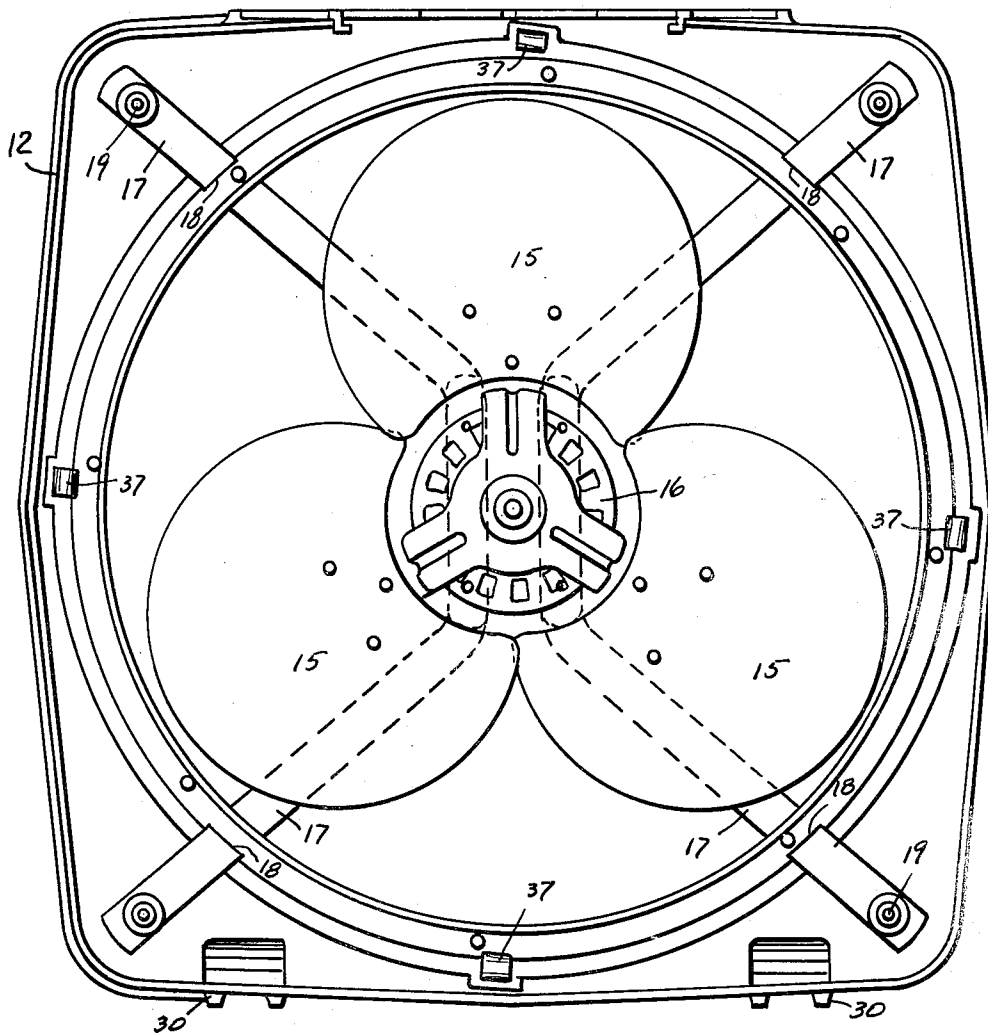
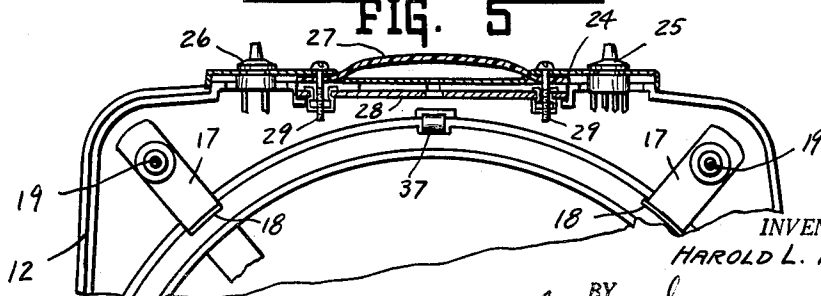


FIG. 5



INVENTOR.
HAROLD L. KIRK.

BY

Lockwood, Salt, Woodard & Smith
ATTORNEYS.

Aug. 30, 1960

H. L. KIRK

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FIG. 6

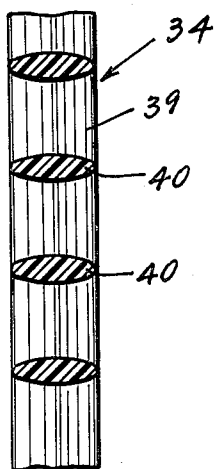
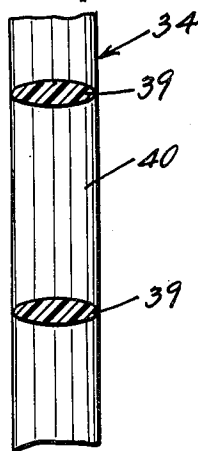


FIG. 7



INVENTOR.

HAROLD L. KIRK.

BY

Lockwood, Salt, Woodard & Smith
ATTORNEYS.

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2,950,859

FAN HOUSING AND PROTECTIVE GRILL

Harold L. Kirk, Indianapolis, Ind., assignor to Meier Electric and Machine Company, Inc., Indianapolis, Ind., a corporation

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2 Claims. (Cl. 230—259)

This invention relates to a fan housing adapted to receive a bladed fan and driving motor therefor with the usual mounting spider. It is of the direct air circulating or room ventilating type capable of standing freely upon a floor or suitable support, or be mounted in a window.

It is the purpose of this invention to provide an attractively designed highly efficient housing for the rotating fan blades formed of two substantially identical front and rear sections, preferably of plastic, whereby the same forming die structure may be employed for each, and when mated they completely house the fan and mount the control unit therefor. Thus, the front and back of the housing are identical and interchangeable. In this manner the parts and assembly of the housing are greatly simplified, resulting in the economical production of a sturdy and attractive fan of this type.

An important feature of the invention lies in the airfoil formation of the protective grill removably locked in the air passage openings provided in the respective front and back housing sections, and wherein said openings are formed by an inner venturi tube integrally formed with the respective housing sections adjacent the throat of which the fan blades rotate. Such air foil and venturi formations in the housing sections may be economically produced from a plastic material by the casting thereof. The airfoil formation has the effect of intercepting and bending the airstreams passing therethrough into a straightened flow of air with a minimum of diffusion, such as to project it over a distance substantially greater than the usual fan of this type. To that end each of the annular guard rings and associated spider ribs is substantially oval in cross section with a thickened central bulge tapering inwardly to forward and rear feathered edges. In association therewith the annular opening in the housing is divided by a venturi type ring decreasing in a circumference from the forward and rear edges to the circumferential reduced central air restricting throat portion.

A further feature of the invention resides in the unbalanced numbers of ribbed sections of the protective grills defined by the radial ribs to eliminate vibration and pulsing of the air flow. This is accomplished by providing such a number of sections relative to the number of the fan blades and the poles of the motor that the latter are not evenly divisible therein. Through the indivisibility of the number of blades and poles of the motor into the number of ribbed sections, the usual vibratory action and pulsing is eliminated through the unbalanced relation thereof. Thus, as shown herein there is provided fourteen sections in association with a three blade fan and a six pole motor. Since three and six are not evenly divisible into fourteen, the desired unbalancing is obtained.

Other features of the invention reside in the structure of the mating front and back panels of the housing, together with the means for interlocking them into a unitary structure in supporting and housing relation with the fan, motor mounting and control panel therefor. Other fea-

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tures of the invention will be more particularly set forth in the following specifications and as illustrated in the accompanying drawings.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a perspective view of the assembled fan housing.

Fig. 2 is a central vertical section therethrough showing the motor driven fan mounted therein, and with portions broken away.

Fig. 3 is an enlarged section taken on the line 3—3 of Fig. 1.

Fig. 4 is a rear plan view of the front section of the housing with the motor-driven fan mounted therein, but with the protective grill removed.

Fig. 5 is a section taken on the line 5—5 of Fig. 1.

Fig. 6 is an enlarged radial section through a portion of the protective grill on the line 6—6 of Fig. 1.

Fig. 7 is an enlarged arcuate section taken through the protective grill on the line 7—7 of Fig. 2.

In the drawings there is shown a fan housing formed of two identical front and rear sections, there being a front section 10 and a rear section 11 joined within a peripheral inwardly stepped rib 12 formed on opposed sides of each section. Each section is formed with an outer casing portion 13, half of which carries the stepped rib 12 and the other half of which is adapted to be secured in abutting relation with the mating section within its said rib. Said sections are also each provided with an inwardly curved inner peripheral wall 14 defining the fan receiving opening with decreasing diameter toward the center to provide a venturi tube-like shell for the air passing therethrough.

The fan unit is mounted in the front section and comprises a rotative fan having three blades 15 driven by a motor 16 carried on a rigid spider 17 comprising four radially disposed legs extending into and secured at each corner of the housing section after passing through slots 18 in the venturi shell 14. The two sections, including the fan spider, are secured together by the screws 19 extending through and imbedded in the integrally formed bosses 20. For this purpose a spacer stud 21 is provided for receiving the screws at opposite ends, the heads of the screws being recessed in the bosses with the recesses closed by a plug 22. A rubber silencing grommet 23 mounts the fan spider on the stud, all as shown in Fig. 3.

For control of the motor there is provided a control mounting plate 24 which mounts a control switch 25 and a thermo switch 26 at each end thereof. Intermediate the end portions of said plate there is secured a carrying hand strap 27. Spaced from said mounting plate 24, but secured thereto, there is a clamping plate 28 so spaced that when loosened the upper abutting portion of the housing sections may be slipped in between said plates, whereupon the plates are brought together in clamping relation therewith by the clamping screws 29, as shown in Fig. 5. The bottom portion of the housing sections are each formed or cast with spaced flat supporting skids 30 projecting from opposite sides thereof. Said skids are adapted to support the fan unit on a floor, window ledge or the like. When mounted on a window ledge a window clip 31 is removably secured by a button fastener 32 in the center of the control plate, which clip extends laterally into embracing relation with the window sash, as indicated at 33.

Mounted within each housing section flush with the outer face thereof there is an annular protective grill 34. The outer ring 35 defining each grill is seated in a formed recess indicated at 36 and removably clamped therein by the spring clips 37. The protective grills are

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of cast plastic with a solid central disc 38 from which a series of ribs 39 of spider-like formation radiate outwardly to the ring 35 to define a predetermined number of intermediate ribbed sections. As herein shown, there are fourteen such ribs defining fourteen pie-shaped rib sections for association with a three-bladed fan and a six pole motor. It is noted that this provides an unbalanced relation between the sections, blades and motor, whereby the number of blades and the poles of the motor are not evenly divisible into the number of sections. By means of this unbalanced arrangement, vibration and pulsation will be dampened. Any number of ribbed sections may be employed so long as the number of blades and the number of poles of the motor are not evenly divisible therein.

Integrally formed of plastic with the ribs 39, there is provided a concentric series of annular guard rings 40 evenly spaced apart from the disc 38 to the outer ring 35. Both the ribs 39 and the rings 40 are ellipsoidal in cross section, being thicker at their central portions and tapering outwardly to a feathered edge. This cross section form of the protective grill provides an airfoil of a character to straighten out the air stream initially deflected thereby. Thus, the air flow issuing from the protective grill will be directed in straight parallel relation such as to greatly increase the throw of the air current produced by the fan in conjunction with the surrounding venturi shell 14.

While the invention has been shown and described in some detail in the drawings and foregoing description, they are to be considered as illustrative and not restrictive in character, as other modifications may readily suggest themselves to persons skilled in this art and within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. A fan housing formed of two substantially identical mating sections, means for securing said sections in mating abutting relation to provide a housing encircling a bladed air propelling fan and driving motor therefor, said housing when assembled having an outer peripheral wall with inturned marginal areas joining a concavo-convex inner wall extending between said marginal areas and spaced from said outer wall, said inner wall providing a venturi tube encircling fan blades with its restricted throat portion lying in the center plane of rotation of said blades and closely approaching the outer tips thereof

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to thereby induce a venturi action to the air flow passing therethrough, studs spanning the space between said inturned marginal areas and intermediate said inner and outer walls, and support members carried on said studs and extending through said inner wall to support said fan and drive motor concentrically with the area bounded by said housing.

2. A fan housing formed of two substantially identical mating sections, means for securing said sections in mating abutting relation to provide a housing encircling a bladed air propelling fan and driving motor therefor, said housing when assembled having an outer peripheral wall with inturned marginal areas joining a concavo-convex inner wall extending between said marginal areas and spaced from said outer wall, said inner wall providing a venturi tube encircling said fan blades with its restricted throat portion lying in the center plane of rotation of said blades and closely approaching the outer tips thereof to thereby induce a venturi action to the air flow passing therethrough, studs spanning the space between said inturned marginal areas and intermediate said inner and outer walls, and support members carried on said studs and extending through said inner wall to support said fan and drive motor concentrically with the area bounded by said housing, the junctions of said inturned marginal areas and said inner wall being formed to provide support means for grill members extending across the area bounded by said housing.

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