

**March 17, 1953**

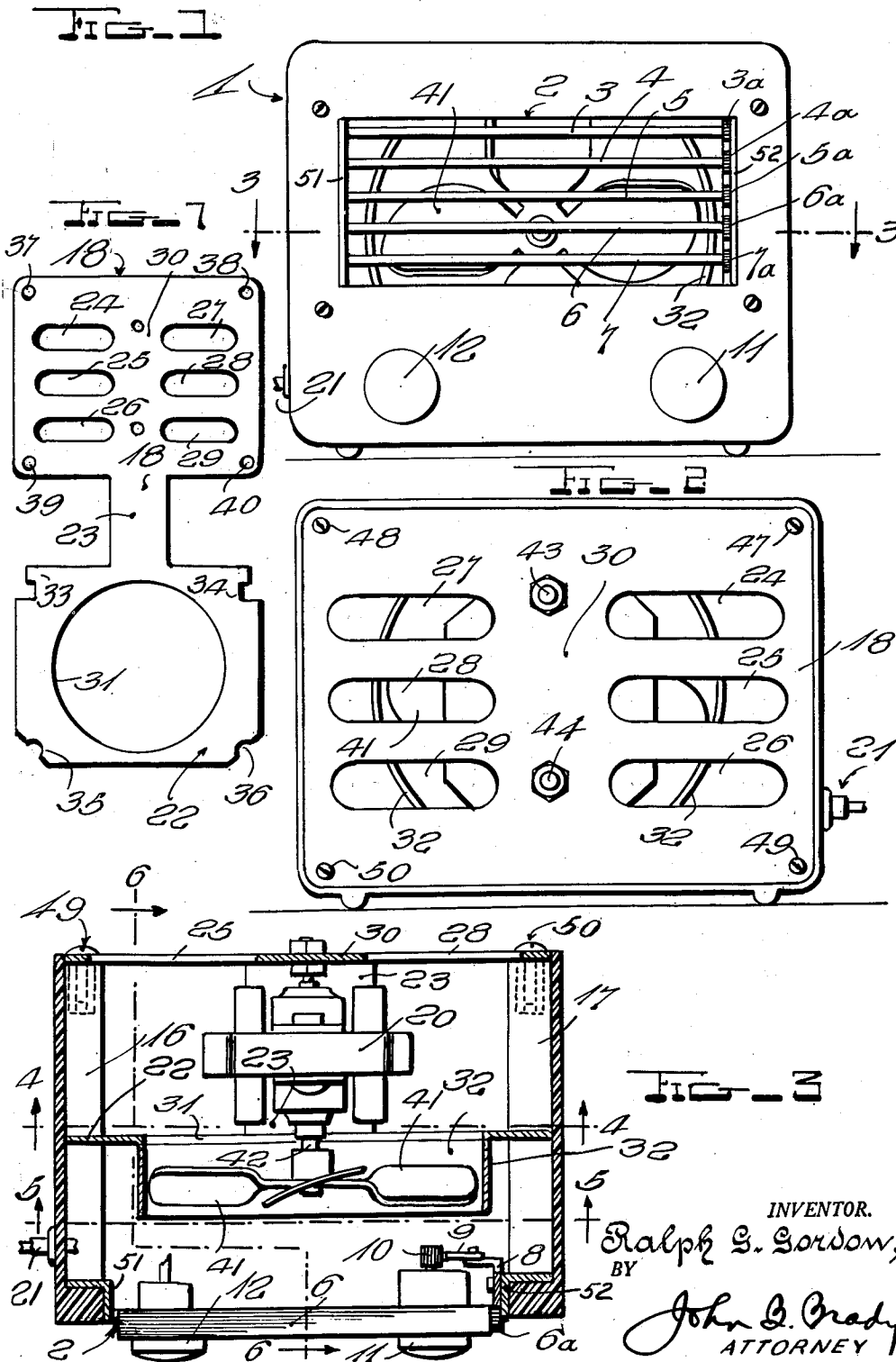
R. G. GORDON

**2,631,775**

PACKAGED ELECTRICALLY OPERATED VENTILATING FAN

Filed Aug. 23, 1949

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

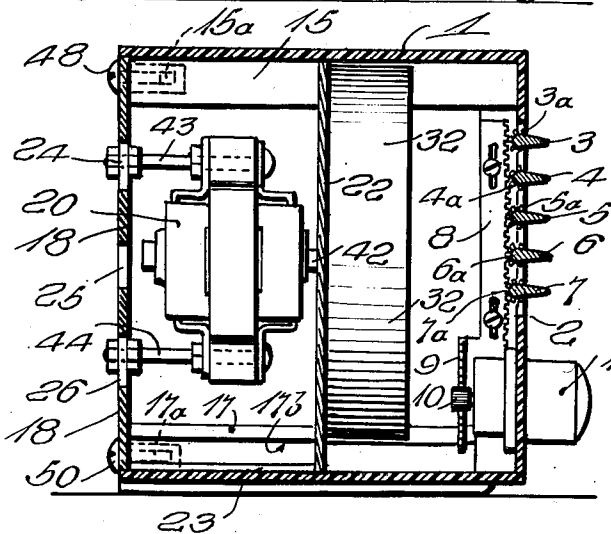
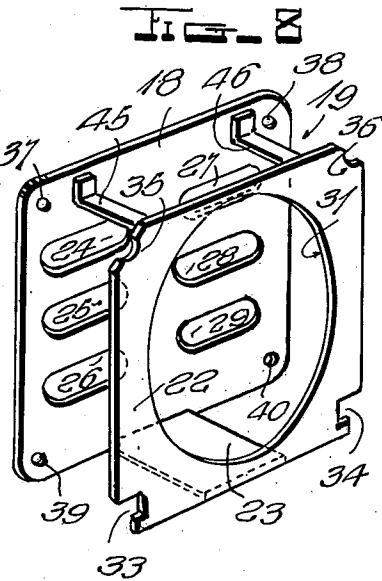
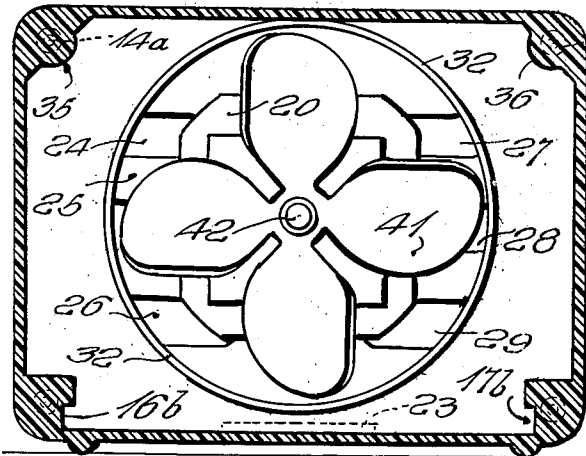
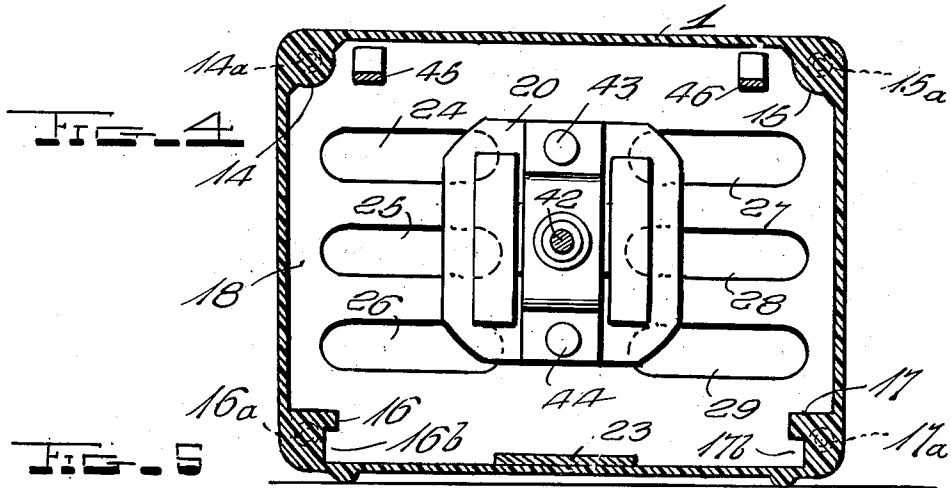


FIG. 8

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## UNITED STATES PATENT OFFICE

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PACKAGED ELECTRICALLY OPERATED  
VENTILATING FAN

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My invention relates broadly to fans, and more particularly to an improved construction of electrically operated fan having means for controlling the delivery of air therefrom.

One of the objects of my invention is to provide a construction of electrically operated fan having means for controlling the air flow through the fan and the delivery of air from the fan.

Another object of my invention is to provide a compact assembly for an electric fan and casing, for providing a readily merchandisable packaged unit which is efficient in operation and readily controllable by the user for regulating the discharge of air from the fan.

Another object of my invention is to provide a unique arrangement of frame structure for mounting an electric motor and fan within a confined casing which is designed to admit air to a restricted zone about the driving motor for maintaining the motor cool over extended periods of operation and insuring discharge of air at relatively high velocity.

Still another object of my invention is to provide practical means for mounting an electric motor operated fan within a polygonally shaped cabinet structure having means for restricting the air flow around the fan and insuring discharge of the air flow at relatively high velocity.

Still another object of my invention is to provide a packaged construction of portable electric fan which is conveniently merchandisable and efficient in operation, and in which the air discharge therefrom is readily adjustable by the user.

Other and further objects of my invention reside in the mounting means for an electric motor operated fan and the manner of supporting such mounting means in a polygonally shaped cabinet structure, as set forth more fully in the specification hereinafter following, by reference to the accompanying drawings, in which:

Figure 1 is a front view of the portable fan assembly of my invention; Fig. 2 is a rear view of the fan assembly illustrated in Fig. 1; Fig. 3 is a horizontal sectional view taken through the fan assembly substantially on line 3—3 of Fig. 1; Fig. 4 is a vertical sectional view taken through the fan assembly substantially on line 4—4 of Fig. 3; Fig. 5 is a vertical sectional view taken through the fan assembly substantially on line 5—5 of Fig. 3; Fig. 6 is a transverse sectional view through the fan assembly taken substantially on line 6—6 of Fig. 3; Fig. 7 is a plan view of the frame structure for mounting the motor and fan and illustrating the single flat blank

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which I have found practical for mounting the motor and fan within the cabinet; and Fig. 8 is a perspective view of the assembled blank of Fig. 7 preparatory to installation of the motor, fan and cylindrical fan housing.

My invention is directed to a practical construction of electric motor operated fan which is conveniently merchandisable as a package, and which is controllable by the user for directly regulating the discharge of air from the fan. I provide a polygonally shaped molded casing for the electric fan of my invention, with the front wall of the casing divided into a lower solid section and upper apertured section. The lower solid section constitutes a panel for mounting a control switch and an adjustable means for controlling the angular movements of a multiplicity of coacting streamlined louvers or vanes, disposed horizontally with respect to the front wall of the casing. I provide a system of pinions and a rack for operating the coacting louvers or vanes, for simultaneously shifting the vanes to desired angular positions for directing the air flow from the interior of the casing. Where the fan is used on a desk, the directivity afforded by adjustment of the horizontally disposed louvers may control the air flow so that papers on the desk remain undisturbed, although the user is provided with a comfortable flow of air.

The electric motor operated fan of my invention is mounted in a very special manner in the cabinet structure. A pressed metal frame is provided, formed by a pair of flat sheet members bent to spaced parallel positions with respect to each other, and in which one of the flat sheet members is provided with a forwardly extending cylindrical casing which terminates short of the interior of the front wall of the cabinet. The first-mentioned flat sheet member provides a support for the electric motor unit which is mounted in axial alignment within the forwardly extending cylindrical fan housing carried by the second-mentioned flat sheet member. The cylindrical housing forms a confined area through which the air is drawn in a manner in which the air flows directly over the motor unit, maintaining the motor unit cool, and whereby air may be discharged at high velocity through the louver regulated rectangular aperture in the polygonally shaped cabinet structure for the fan. The cylindrical housing terminates short of the interior of the front wall of the cabinet, leaving an air-circulating gap therearound. This gap serves as a diffusing area in a position where the forced flow of air is abruptly changed in cross section from a circular section to a rec-

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tangular section. The first-mentioned flat sheet member is provided with a multiplicity of spaced slots therein which extend across the gap between the motor unit and the interior wall of the cabinet structure, thereby permitting the intake of air through the motor unit, for maintaining the unit cool under conditions of long period of operation. Special provision is made for coordinating the frame structure which mounts the motor unit with the interior walls of the polygonally shaped housing by keying the flat sheet member which supports the cylindrical housing extending around the motor unit, with the interior walls of the polygonally shaped housing, to facilitate assembly, and to insure rigid structural support of the motor unit interiorly of the structure.

Referring to the drawings in more detail, reference character 1 designates a molded, ornamental fan housing through the front of which there is a substantially rectangular opening 2, which is closed by a multiplicity of horizontally extending streamlined louvres 3, 4, 5, 6, and 7 pivotally mounted at their opposite ends in frame members 51 and 52, and being provided with pinions 3a, 4a, 5a, 6a and 7a at one end, engaged by a vertical adjustable rack member 8 shown more particularly in Fig. 6, which may be vertically adjusted. The vertical adjustment is accomplished by means of an extension rack 9 attached to the vertical adjustable rack member 8, and which is engaged by pinion 10 controlled by a rotary shaft operated by adjustment knob 11 projecting from the front of the housing 1. Thus, the aperture or opening 2 in the fan housing 1 may be variably closed and opened, and the louvres therein directed at the proper angle for directing air over a surface at such an angle that minimum disturbance of articles in front of the fan will occur. Where the unit is housed on a desk top, the angular disposition of louvres 3-7 is extremely important, as, by properly selecting the angle at which the air is discharged, loose papers lying on the desk will not be unduly disturbed.

The opposite side of the front of the housing 1 provides a mounting means for the motor start-stop switch control designated at 12, for providing an accessible position for the switch and at the same time symmetrically balancing the front appearance of the unit. The inside of the housing 1 is provided with corner reinforcement and guide rails, which I have indicated at 14, 15, 16 and 17. The guide rails 14 and 15 are recessed at the ends thereof, as represented in Fig. 4, and include screw-threaded bushings 14a and 15a therein for receiving screws for mounting the rear panel 18 of the fan mounting unit assembly 19, as shown in Fig. 8. The guide rails 16 and 17 are similarly provided with screw-threaded bushings 16a and 17a at the ends thereof for receiving securing screws which pass through the rear panel 18 of the fan mounting unit assembly 19. The rails 16 and 17 are provided with channel cut-outs as represented at 16b and 17b, to provide passages for the electrical conductors extending from electrical motor 20 to the contacts of the control switch 12 and to the power supply lead 21 by which connection of the unit is established with the power circuit. To avoid confusion, the actual wiring interiorly of the cabinet has been omitted from the illustration in the drawings.

The fan mounting unit assembly 19 is formed from a single blank shown more clearly in Fig. 7,

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constituted by a rear panel 18 and a front panel 22 interconnected by a central tongue 23. The blank, which is punch-pressed as shown in Fig. 7, includes a multiplicity of ventilating apertures 24, 25, 26, 27, 28 and 29, symmetrically arranged on opposite sides of a solid central portion 30 of the rear panel 18. The front panel 22 is provided with a circular aperture 31, to which there is attached the cylindrical fan housing 32, which is directed forwardly within the housing 1 to a position in the rear of the louvres 3-7, as shown more particularly in Figs. 3 and 6. The front panel 22 has the corners thereof which coact with guide rails 16 and 17 notched to conform with the shape of guide rails 16 and 17, as represented at 33 and 34, while the opposite corners of panel 22 are recessed to conform with the shape of guide rails 14 and 15, as represented at 35 and 36. The corners of the rear panel 18 are apertured as represented at 37, 38, 39 and 40, for passage of securing screws which engage the screw-threaded sleeves 14a, 15a, 16a and 17a respectively. The circular housing 32 for the fan surrounds the fan 41 which is mounted on shaft 42 driven by motor 20. Motor 20 is supported wholly from the solid central portion 30 of rear panel 18 by means of bolt members 43 and 44 which extend forwardly from the rear panel 18.

The front and rear panels 18 and 22 form a cradle around the motor 20. The cradle is reinforced and strengthened by angle members 45 and 46, which are welded between the upper portions of rear panel 18 and front panel 22, as shown more clearly in Fig. 8. The circular housing 32 around fan 41 confines the volume of air which is forced at high velocity through the louvres 3-7. The air rushing through apertures 24-29 in rear panel 18 serves to air-cool motor 20. Inasmuch as the motor supports are directly in line with the solid central section 30 of rear panel 18, there is no undue restriction offered to the flow of air through the housing. The air which passes through apertures 24-29 flows around motor 20, serving to maintain the motor cool and at the same time develop the pressure head necessary to force the air through circular housing 32, under action of fan 41. The spacing of circular housing 32 from the rear and adjustable louvres 3, 4, 5, 6 and 7, has been selected so that sufficient diffusion of the air is secured to sufficiently utilize the rectangular aperture 2 in the front of housing 1, and flow air therethrough which is delivered from the cylindrical fan housing 32. I have found this change in cross-section of the air flow from the circular section of the cylindrical fan housing 32 to the rectangular section of the front aperture 2, to be advantageous in the control of the air flow over a predetermined zone regulated by the streamlined louvres 3-7.

The assembly of the unit is extremely simple and may be carried out inexpensively on a mass production scale. The front panel 22 has no connection whatever with the interior of rectangular housing 1, but merely slides on the guide rails at each of the interior corners thereof. The cradle unit is secured within the rectangular housing 1 by screws 47, 48, 49 and 50 which pass through apertures 37, 38, 39 and 40 respectively in rear panel 18 and engage screw-threaded sleeves 14a, 15a, 16a and 17a respectively in the guide rails illustrated in Fig. 4.

I have found the above construction of my invention highly practical and efficient in manufacture, production and operation, and while I

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have described my invention in certain preferred embodiments, I realize that modifications may be made and I desire that it be understood that no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. In a portable packaged fan unit a pair of substantially rectangular metallic plate members, a tongue integrally interconnecting adjacent edges of said plate members for maintaining said plate members in parallel spaced relation, an electric motor supported by one of said plate members, said last mentioned plate members being apertured adjacent said motor for providing air inlet means, a fan driven by said electric motor and a fan housing carried by the other of said plate members and enclosing said fan, a cabinet structure apertured at the front thereof adjacent said fan and forming air outlet means, and means for securing said plate members within said cabinet structure.

2. A portable fan packaged unit comprising a pair of sheetlike plate members, a tongue integrally interconnecting said plate members at adjacent edges thereof for maintaining said plate members in spaced, substantially parallel relation, one of said plate members being centrally apertured and the other of said plate members forming a support for an electric motor, said last mentioned plate members being apertured adjacent said motor for providing air inlet means, a shaft for said electric motor extending axially through the centrally apertured plate, a fan carried by said shaft, a fan housing carried by said last mentioned plate and surrounding said fan, and a cabinet housing for receiving and maintaining said plates in position, said cabinet housing being apertured at the front thereof substantially in alignment with said fan and forming an air outlet means.

3. A portable fan packaged unit comprising a cabinet structure apertured at the front thereof and forming air outlet means, a pair of spaced plate members integrally connected with each other along spaced linear edges thereof and folded to form a substantially parallelepiped frame movable to a position interiorly of said cabinet structure behind the apertured front thereof, an electric motor carried by one of said plate members, said last mentioned plate member being apertured adjacent said motor for providing air inlet means, a fan driven by said electric motor, and a fan housing carried by the other of said plates and surrounding the fan driven by said electric motor for establishing a forced flow of air through said apertured front of said cabinet structure.

4. A portable packaged fan unit comprising a substantially polygonally shaped cabinet structure apertured at the front thereof and forming air outlet means and having interiorly disposed transversely extending guide members therein, a pair of flat plate members disposed in spaced, parallel relation and integrally connected one with another, one of said plate members providing a support for an electric motor extending transversely into the interior of said cabinet structure, said last mentioned plate member being apertured adjacent said motor for providing air inlet means and the other of said plate members supporting a fan housing thereon, a fan driven by said electric motor and operating within said fan housing, said last mentioned plate

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member having corner sections thereof shaped to coact with the transversely extending guide members within said cabinet structure for facilitating the entry and removal of said plate members from said cabinet structure.

5. A packaged portable fan unit comprising a substantially polygonally shaped cabinet structure having a substantially rectangular discharge aperture in the front thereof, streamlined louvers disposed longitudinally of the substantially rectangular discharge aperture and adjustable therein for controlling the direction of air flow therethrough, a pair of spaced plate members integrally connected in substantially parallel relation forming a substantially parallelepiped and movable into and out of the rear of said cabinet structure, one of said plate members supporting a driving motor having a fan thereon, said last mentioned plate members being apertured adjacent said motor for providing air inlet means and the other of said plate members having a cylindrical fan housing thereon surrounding the fan driven by said electric motor, said fan housing terminating short of the rear of the apertured front of said cabinet structure whereby a forced stream of air driven by said fan may be abruptly changed in cross-sectional contour from said cylindrical fan housing through the substantially rectangular discharge aperture in the front of said cabinet structure.

6. A packaged portable fan unit as set forth in claim 5 in which the apertures which provide the air inlet means in the plate member which supports said electric motor comprise a multiplicity of spaced slots formed on opposite sides of the electric motor for establishing air intake paths on opposite sides of the electric motor and into said fan housing for forced flow through the apertured front of the cabinet structure.

7. A packaged portable fan unit as set forth in claim 5 in which said cabinet structure is provided with transversely extending guide members and wherein the plate member which supports said fan housing has the corners thereof shaped to coact with the said guide members for guiding the assembled fan unit into and out of said cabinet structure, and means for attaching the plate member which supports the motor unit to the ends of said guide members.

8. A packaged portable fan unit as set forth in claim 5 in which said cabinet structure is provided with transversely extending guide members in the interior corners thereof, said guide members being cut away for the passage of electric conductors which extend from said electric motor and control means therefor and to the power source for operating the electric motor, the plate member which supports said fan housing being recessed at the corners thereof for engagement with said guide means, and the plate member which supports said electric motor being attached to the ends of said guide means whereby said motor unit is readily insertable into or removable from said cabinet structure without interference from the electric conductors extending from the power source to the electric motor unit and the control means therefor.

9. A packaged portable fan unit comprising a cradle for mounting an electric motor and fan consisting of a pair of substantially rectangular flat plates disposed in spaced, parallel relation and having an integrally connected relatively narrow tongue extending therebetween and forming a substantially parallelepiped supporting structure, a cylindrical fan housing carried by

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one of said flat plates and apertured to provide air outlet means and an electric motor mounted on the other of said flat plates, said electric motor having a fan thereon operating within the fan housing carried by the other of said flat plates, said last mentioned plate being apertured at each side of said motor for providing air inlet means.

10. A packaged portable fan unit comprising a substantially polygonally shaped cabinet structure having a substantially rectangular shaped aperture forming an air discharge outlet in the front thereof, means for regulating the opening and closing of said substantially rectangular shaped aperture in the front of said cabinet structure, a fan unit of substantially parallelopiped contour conforming with the interior shape of said cabinet structure and slidable into and out of the rear of said substantially polygonally shaped cabinet structure, air inlet means formed in the rear of said fan unit, said fan unit terminating at the air discharge outlet in a sub-

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stantially cylindrical fan housing spaced rearwardly from the interior of the rectangular aperture in the front of said cabinet structure, whereby the column of air which is force-flowed through said polygonally shaped cabinet structure is modified in cross-sectional contour as it leaves said cylindrical fan housing and is discharged through said substantially rectangular shaped aperture in the front of said cabinet structure.

RALPH G. GORDON.

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