

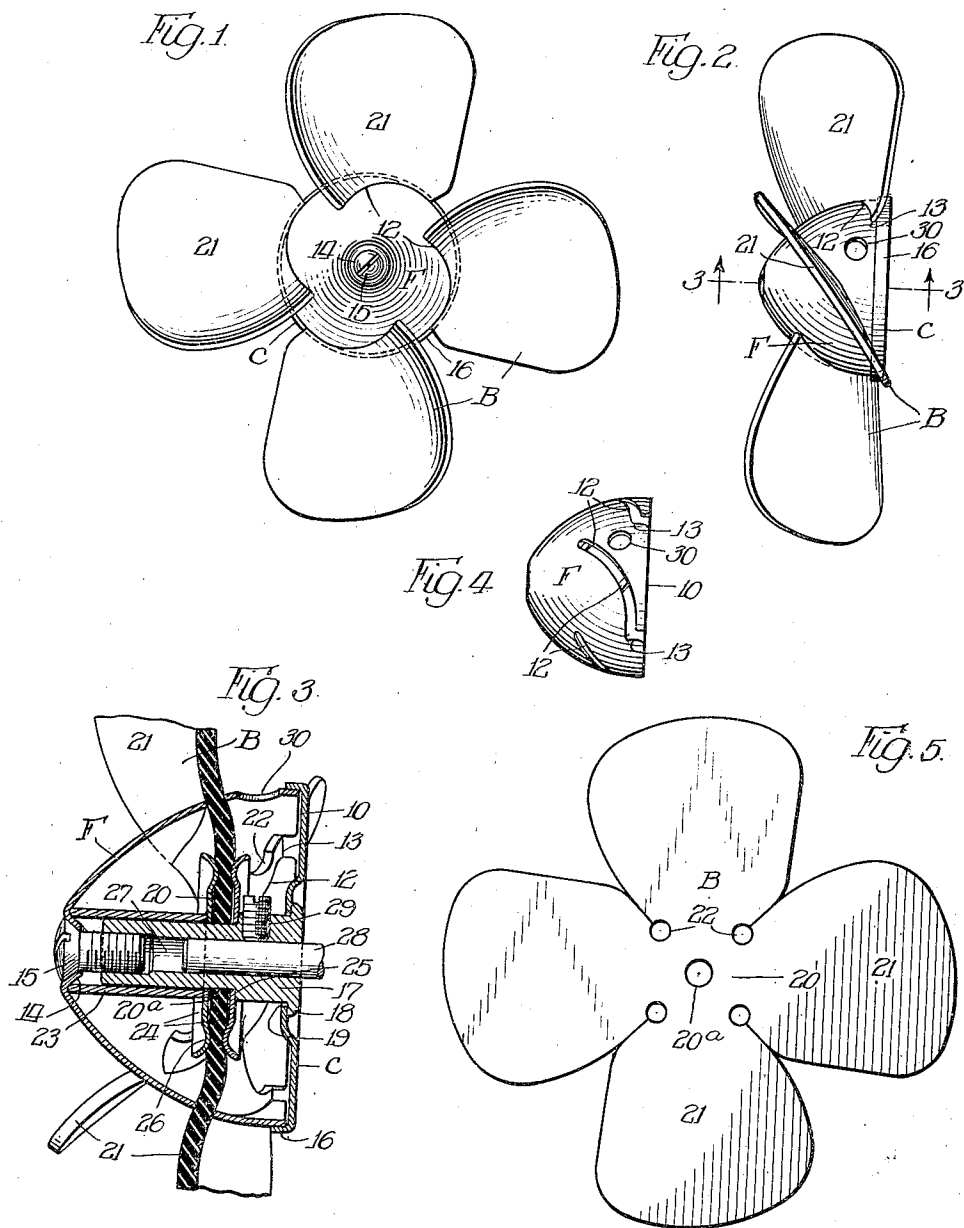
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FAN STRUCTURE

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FAN STRUCTURE

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An object of my invention is to provide a fan structure which is comparatively simple and inexpensive to manufacture, the parts of the hub assembly thereof being formed mainly of sheet metal and adapted to coact with a fan blade member formed of a sheet of rubber or other flexible material, cut to provide a plurality of fan blades.

A further object is to provide a fan structure in which a faring member is formed of sheet metal, the shape thereof being substantially ellipsoidal in contour and the faring member having slots from the base edge thereof extending toward the nose of the faring member and adapted to receive the fan blades. The slots are arranged at the desired pitch angles for the blades and are provided with shoulders which tend to retain the blades in position.

A further object is to provide cover means for the open ends of the fan blade slots consisting of a sheet metal disk, the disk, faring member and fan blade being held together relative to each other by tie means extending through the nose of the faring member and through the disk.

Still another object is to provide the tie means in the form of a headed sleeve and a screw threaded therein, an additional sleeve and a pair of disks being so mounted and associated with the headed sleeve and the screw that these disks engage the central portion of the fan blade member for retaining and clamping it.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing, in which:

Figure 1 is a front elevational view of a fan structure embodying my invention.

Figure 2 is a side elevational view thereof.

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 2, showing internal details of the hub assembly of the fan structure.

Figure 4 is a side elevation of the faring member of the fan structure; and

Figure 5 is a front elevational view of a fan blade member showing it in flat position before being associated with the hub assembly.

On the accompanying drawing I have used the reference character F to indicate a faring member and B a fan blade member. The faring member F is formed of sheet metal and is substantially ellipsoidal in contour to facilitate the flow of air thereover during the operation of the fan structure. The base edge of the faring member F is

indicated at 10. Slots 12 extend inwardly from the base edge 10 and have substantially right angular portions 13. The slots 12 as perhaps best shown in Figure 4 are arranged in the proper direction and are of the proper curvature to secure the desired pitch angle and curvature of the fan blades when they project therethrough, as will hereinafter appear.

The faring member F has at its point or nose a truncated cone-shaped flange 14 forming a countersunk opening for a screw 15. The open ends 13 of the slots 12 are covered by a cover member C comprising a disk of sheet metal. At the periphery of the disk C a flange 16 is provided for overlapping the edge 10 of the faring member F. For retaining the members F and C assembled relative to each other, I provide a headed sleeve 17 with which the screw 15 is threadedly associated. The head of the sleeve 17 is indicated at 18 and this head engages the disk C adjacent a central perforation 19 therein. The sleeve 17 itself extends through the perforation 19. The sleeve and the screw 15 serve as a tie means for holding the parts F and C rigidly assembled when the screw is tightened.

The blade member B may be cut from a flat sheet of rubber to a suitable shape, such as that shown in Figure 5. The blade member B has a central portion 20 and a plurality of blades 21. At the root of each blade an opening 22 is formed which facilitates twisting of the blade to readily conform to the pitch of the slot 12 when the fan structure is assembled.

Within the housing formed by the faring member F and the cover member C, a sleeve 23 and a pair of disks 24 are located. The disks are perforated and are received on the sleeve 17 against a shoulder 25 thereof. The sleeve 23 is interposed between one of the disks 24 and the faring member F surrounding the flange 14 thereof. The disks 24 have annular beads 26 adjacent their peripheries to engage the central portion 20 of the fan blade member B. The length of the sleeve 23 is such that when the screw 15 is tightened in the sleeve 17, the beads 26 will grip the central portion 20 of the blade member B as shown in Figure 3 for retaining the blade member in position and particularly against the tendency of centrifugal force to pull the blades out of the faring member F when the fan structure is subjected to rapid rotation.

In the bore 27 of the sleeve 17 a motor shaft 28 is illustrated. The motor shaft may be retained therein by a set screw 29. Access to the set screw

may be had through a perforation 30 in the faring member F adjacent the base edge 10 thereof.

My fan structure includes a hub assembly which can be inexpensively formed for the most part from sheet metal. The fan blades are readily assembled in the slots 12 through their open ends 13. After the blades are in position, their rear edges engage against the shoulder at 13 and the blades are further held in position by the flange 16 of the cover member C when it is assembled on the faring member F. The parts within the hub assembly may be readily arranged in their proper relation during assembly and will be rigidly clamped and thereby retained in assembled position by the single operation of driving the screw 15 into the sleeve 17. Thereafter the sleeve 17 may be mounted on the motor shaft 18 and retained thereon by the set screw 29. After the fan structure is finished, it is neat in appearance as well as being practical and inexpensive to manufacture and assemble.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. In a fan structure, a faring member having slots therein extending from the base of the faring member toward the nose thereof, said slots being shaped to the desired pitch angle for the fan blades, a fan blade member having a plurality of flexible blades received in said slots, a cover member for said base of said faring member, said cover member closing the open ends of said slots, tie members through said faring member and cover member for holding them assembled relative to each other, one of said tie members being shouldered, a sleeve and a pair of disks on said one tie member means, the center of said blade member being confined and clamped between said disks through thrust by said sleeve by drawing said tie members toward each other.

2. In a fan structure, a sheet metal faring member having slots therein extending from the base toward the nose thereof, said slots being shaped to the desired pitch angle for the fan blades, a fan blade member having a plurality of flexible blades received in said slots, the open ends of said slots having substantially right angular shoulder portions to engage the rear edges of the blades, a sheet metal cover member for said base of said faring member, said cover member being disk-like and having a peripheral flange overlapping the edges of said faring member base for closing the open ends of said slots and covering the right angular portions thereof, a headed element and a screw threaded thereinto, said headed element and said screw extending through said faring member and cover member and constituting tie means for holding them assembled relative to each other, said headed member having a shoulder within said faring and cover members, a sleeve and a pair of disks also within said faring and cover members, the central portion of said blade member being confined and clamped between said disks, sleeve and shoulder by tightening said screw in said headed element.

3. A fan structure comprising a faring member having slots therein extending from the base of the faring member toward the nose thereof, a

fan blade member having a plurality of flexible blades received in said slots, the open ends of said slots having substantially right angular shoulder portions to engage the rear edges of the blades, and a sheet metal cover member for said base of said faring member.

4. In a fan structure, a sheet metal faring member of substantially ellipsoidal contour having slots therein extending from the base of the faring member toward the nose thereof, said slots being shaped to the desired pitch angle for the fan blades and a fan blade member having a plurality of flexible blades received in said slots, the open ends of said slots having substantially right angular shoulder portions to engage the rear edges of the blades, a sheet metal cover member for said base of said faring member, said cover member being disk-like and having a peripheral flange overlapping the edges of said faring member base for closing the open ends of said slots and covering the right angular portions thereof, tie members through said faring member and cover member for holding them assembled relative to each other, a sleeve and a pair of disks on said tie means, said disks having annular beads spaced from their centers the center of said blade member being confined and clamped between said beads of said disks by tightening said tie means and said sleeve serving as a thrust element between said faring member and one of said disks.

5. In a fan structure, a sheet metal faring member of substantially ellipsoidal contour having slots therein extending from the base of the faring member toward the nose thereof, slots being shaped to the desired pitch angle for the fan blades, a fan blade member having a plurality of flexible blades received in said slots, a sheet metal cover member for said base of said faring member, said cover member being disk-like and having a peripheral flange overlapping the edges of said faring member base and closing the open ends of said slots, a headed element and a screw threaded thereinto, said headed element and said screw extending into said faring member and cover member and constituting tie means for holding them assembled relative to each other, said headed member having a shoulder within said faring and cover members, a sleeve and a pair of disks also within said faring and cover members, the central portion of said blade member being confined and clamped between said disks, sleeve and shoulder by tightening said screw in said headed element.

6. In a hub assembly for flexible blade fans, a hollow, open base sheet metal faring member having slots therein from the base edge thereof toward the point thereof to receive the fan blades edgewise, said slots being directed at the desired pitch angle, the open ends of said slots having substantially right angular shoulder portions to engage the rear edges of the blades, and means for covering the open ends of said slots comprising a cover plate for the base of said faring member having a positioning flange surrounding the perimeter of said base and tie means for said faring member and cover plate and including a bore to receive a motor shaft for rotating the hub assembly.

7. In a hub assembly for flexible blade fans, a sheet metal faring member having open end slots therein to receive the fan blades edgewise, said slots being directed at the desired pitch angle and means for covering the open ends of said slots comprising a cover plate for the base

of said faring member having a reinforcing flange surrounding the marginal edge of said base adjacent its perimeter and in contact therewith to confine the marginal edge of the base between said slots against undesirable bending outwardly beyond the periphery of said cover

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plate and to centrally position said faring member with respect to said cover plate, and means for connecting said faring member and cover plate together.

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