The present invention provides an improved fan frame with a diversion structure. A cooling fan includes a rotor, and fan blades spaced around the rotor at intervals. The fan frame positions the rotor and defines a diversion loop, which corresponds to the air outlet direction when fan blades are turning and has an expanding diversion surface. The fan frame has a diversion surface with diversion ribs spaced at intervals, the placement of the diversion ribs being in a vortex pattern without passing through the hypothetical point of the rotor center. The airflow generated by turning fan blades is guided by the diversion ribs and converted to outlet airflow in axial direction corresponding to the rotor, effectively reducing impact and friction of the gyrate airflow generated by fan blades against the frame diversion surface, lowering the noise level, making air exhaustion smoother, and improving the cooling efficiency of fan.
FAN FRAME WITH DIVERSION STRUCTURE

CROSS-REFERENCE TO RELATED U.S. APPLICATIONS

[0001] Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable.

NAMES OF PARTIES TO A JOINT RESEARCH AGREEMENT

[0003] Not applicable.

REFERENCE TO AN APPENDIX SUBMITTED ON COMPACT DISC

[0004] Not applicable.

BACKGROUND OF THE INVENTION

[0005] 1. Field of the Invention
[0006] The present invention relates generally to a fan, and more particularly to a fan which has an improved frame with a diversion structure.

[0008] Among the structures of a cooling fan, besides fan blades, rotor, and stator, the fan frame is important. The fan frame can position said fan blades, rotor, and stator, and can perform a diversion function.

[0009] The conventional fan frame structure of a cooling fan comprises an inner wall which surrounds the outer circumference of the fan blades, so that the vortex airflow generated by the fan blades during rotation is guided so that the airflow is axial to the outlet (or inflow) air from the corresponding rotor. During the operating process, the airflow in contact with the inner wall of the frame generates high noise because the flow direction changes rapidly, when the vortex airflow generated by fan blades impact the inner wall of the frame. The number of heat sinks installed in the computer case is increasing to place greater demands on cooling. Thus, if a single heat sink generates loud noise, the operation of multiple heat sinks would make even more noise. It has a negative impact on the quality of computer equipment. Also, “low noise” is an important condition considered by consumers when purchasing computer equipment.

[0010] Furthermore, with the prior art frame of the cooling fan, when the vortex airflow generated by turning fan blades impacts the inner wall of the frame, recirculation of air may occur, leading to uneven air discharge and cooling inefficiency.

[0011] Thus, to overcome the aforementioned problems of the prior art, it would be an advancement if the art to provide an improved structure that can significantly improve the efficacy.

[0012] To this end, the inventor has provided the present invention of practicability after deliberate design and evaluation based on years of experience in the production, development and design of related products.

BRIEF SUMMARY OF THE INVENTION

[0013] There are improvements in efficiency by the present invention. The fan frame with a diversion structure disclosed in the present invention provides innovation with diversion ribs spaced on the diversion surface at intervals, so that the airflow generated by turning fan blades is guided by the diversion ribs on the diversion surface and converted to outlet airflow in an axial direction corresponding to the rotor. Thus, the impact and friction of the gyrating airflow generated by fan blades against the frame diversion surface is effectively reduced, lowering the noise level, making air exhaustion smoother, and improving cooling efficiency of the fan.

[0014] Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0015] FIG. 1 shows a perspective view of the cooling fan structure of the present invention.
[0016] FIG. 2 shows a partial isolated enlarged fan structure of the present invention.
[0017] FIG. 3 shows an elevation view of the cooling fan structure of the present invention.
[0018] FIG. 4 shows a partial sectional view of the present invention.
[0019] FIG. 5 shows another partial isolated elevation view of the embodiment of the diversion ribs.

DETAILED DESCRIPTION OF THE INVENTION

[0020] The features and the advantages of the present invention will be more readily understood upon a thoughtful deliberation of the following detailed description of a preferred embodiment of the present invention with reference to the accompanying drawings.

[0021] Referring to FIGS. 1, 2, 3, and 4, the preferred embodiment of the fan frame with a diversion structure are shown. Such embodiments are for descriptive purposes only, while the patent application is not restricted to such structures. The cooling fan is comprised of a rotor 10, fan blades 11 spaced around the rotor 10 at intervals, and a frame 20 to position the rotor 10. The frame 20 defines a diversion loop 21, which corresponds to the air outlet direction when fan blades 11 are turning. The frame 20 also has an expanding diversion surface 22.

[0022] The diversion surface 22 has diversion ribs spaced at intervals. The diversion surface 22 can be an inclined plane. When the diversion ribs are placed on the diversion surface 22, the side views of the ribs appear to be triangular.

[0023] The placement of diversion ribs, as shown in FIG. 3, is a vortex design with the hypothetical extension line L at the center of the rib not passing through the hypothetical point C of the rotor center.

[0024] The diversion ribs can be straight and flat (as shown in FIGS. 1-3), or arched and curved, as diversion ribs shown in FIG. 5.

[0025] Based on the above structure, the present invention applies to a disclosed fan A, as shown in FIG. 4. The rotor 10 rotates and drives the fan blades 11 to generate airflow W1, which comes in contact with the diversion loop 21 of the frame 20. The diversion ribs on the diversion surface guide the gyrating airflow toward an axial direction corre-
responding to the rotor 10 (the line direction pointed by L2 in FIG. 4), and conversion to outlet airflow W2.

We claim:

1. An improved diversion structure of fan frame, said cooling fan comprises, a rotor, fan blades spaced around the rotor at intervals, and a frame to position the rotor; of which, the frame defines a diversion loop, which corresponds to the air outlet direction when fan blades are turning and has an expanding diversion surface; the feature of this invention is: the diversion surface has diversion ribs spaced at intervals.

2. The improved structure defined in claim 1, wherein said diversion surface can be an inclined plane.

3. The improved structure defined in claim 1, wherein the placement of said diversion ribs is a vortex design with the hypothetical extension line at the center of the rib not passing through the hypothetical point of the rotor center.

4. The improved structure defined in claim 1, wherein said diversion ribs can be straight and flat or arched and curved.

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