

July 12, 1938.

L. ZAIGER

2,123,763

FAN

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Fig.1.

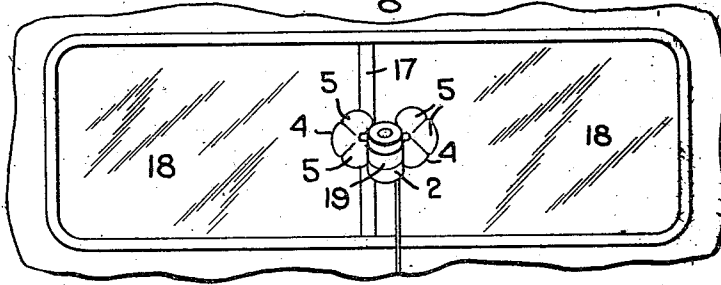


Fig.3.



Fig.2.

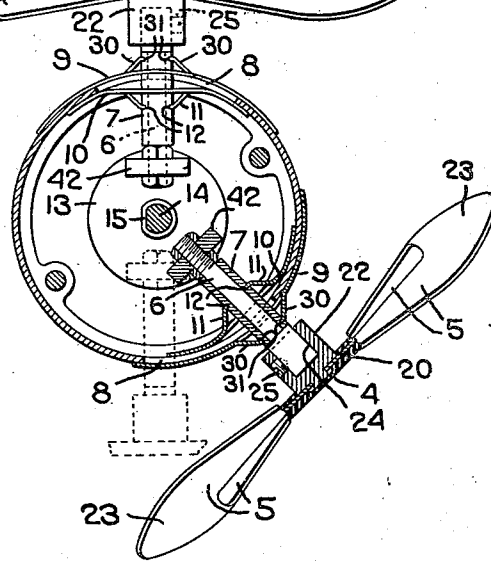
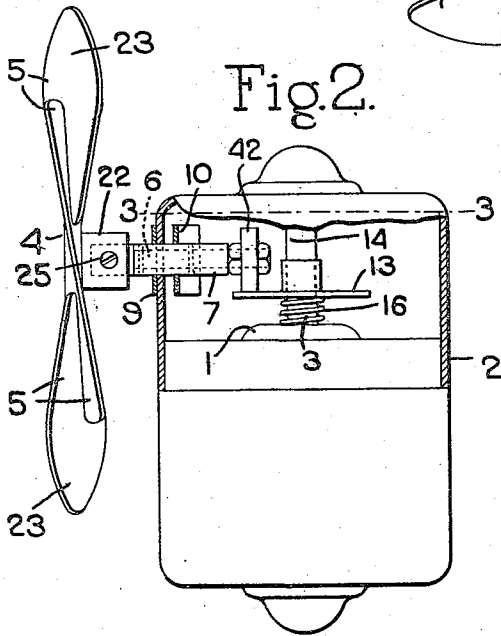


Fig.4.

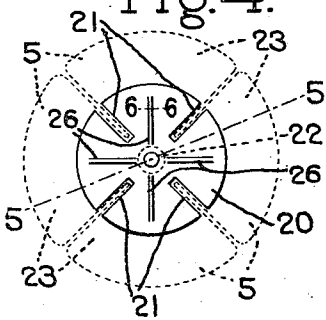


Fig.5.

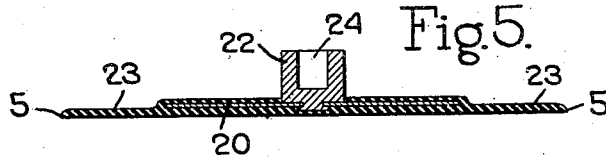
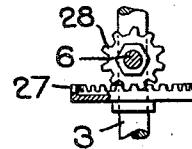


Fig.6.



Fig.7.



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## UNITED STATES PATENT OFFICE

2,123,763

FAN

Louis Zaiger, Lynn, Mass.

Application April 17, 1937, Serial No. 137,502

7 Claims. (Cl. 230—253)

This invention relates to fans and it has for one of its objects to provide a fan having a novel construction wherein the extremities or tips of the blades are made of flexible non-metallic material, thereby obviating the necessity of enclosing the blades of a fan in a guard member to prevent a person from becoming injured by contact with the rotating blades.

A further object of the invention is to provide a fan of novel construction having two or more fan shafts extending in different directions so that when the fan is in operation it will deliver a plurality of air currents in different directions.

Other objects of the invention are to improve generally fans for ventilating and other purposes in the particulars hereinafter set forth.

While a fan embodying my invention may be used wherever it is desired to create an air current or to cause circulation of air, yet the fan as herein shown has special advantages when used in an automobile for directing an air current against a windshield for the purpose of keeping it free from fog, frost, etc., and accordingly I have shown the invention as it might be embodied in a fan for this purpose.

In the drawing;

Fig. 1 shows the windshield portion of an automobile with my improved fan associated therewith;

Fig. 2 is a side view of the fan with a portion of the housing broken out;

Fig. 3 is a section on the line 3—3, Fig. 2;

Fig. 4 is a view showing in full lines the core for the fan element and in dotted lines the complete fan element;

Fig. 5 is an enlarged section on the line 5—5, Fig. 4;

Fig. 6 is an enlarged section on the line 6—6, Fig. 4;

Fig. 7 shows a modification of the device;

My improved fan is shown as a motor-driven fan and it is herein illustrated as comprising a suitable motor 1, preferably an electric motor, which is situated within a suitable housing 2 and which is provided with a motor shaft 3 from which the fan element is operated.

In the preferred embodiment of my invention the fan device is provided with a plurality of fan elements each of which are indicated at 4. Each fan element is formed with a plurality of blades 5 which are mounted on a fan shaft 6 and the fan shafts are geared to the motor shaft 3 to be rotated thereby.

One feature of my invention relates to a con-

struction wherein the fan shafts are situated at right angles to or radial to the motor shaft 3 and are mounted so that they can be adjusted angularly relative to each other. Each fan shaft 6 is rotatably mounted in a sleeve 7 which extends through a slot 8 in the wall of the housing 2. Each sleeve 7 is supported by shoes or slides 9, 10, one of which, the slide 9, is situated on the outside of the housing 2 and the other of which, the slide 10, is situated on the inside of the housing. The slide 10 has the supporting portions 11 struck up therefrom and projecting from the inner face thereof, said supporting portions engaging in notches 12 with which the sleeve 7 is provided. The outer shoe 9 also has supporting portions 30 struck up therefrom which engage in notches 31 formed in the sleeve. The sleeve 7 is thus carried by the two shoes 9, 10.

The inner end of each fan shaft 6 is provided with a friction roll 42 which frictionally engages a friction disk 13 carried by the extension 14 of the motor shaft 3. The friction disk 13 is connected to the motor shaft to rotate therewith but is capable of movement in the direction of the length of said shaft. As herein shown the extension 14 of the motor shaft has the flat face 15 and the friction disk 13 has an aperture to fit the cross-sectional shape of the motor shaft extension 14. A spring 16 situated between a collar on the motor shaft and the friction disk 13 serves to hold the friction disk yieldingly against the friction rolls 12. There is thus provided a friction driving connection between the motor shaft and the fan shafts.

It has been stated above that the fan shafts are capable of angular adjustment so that the direction of the air current generated by each fan can be varied. The engagement of the shoes or slides 9, 10 with the outer and inner faces of the housing serves to hold the sleeves 7 in their proper radial position, and the slots 8 with which the housing wall is provided permits each sleeve and the shaft supported thereby to be adjusted angularly as shown by dotted lines in Fig. 3.

I have stated above that the embodiment of the invention herein shown has special advantages when used as a fan for directing an air current against the windshield. When used in this way I propose to support the fan device with the motor shaft in an upright position at a point substantially centrally of the windshield, in which case the two fan elements will direct air currents against both halves of the windshield so that not only the portion of the windshield in front of the driver will be kept free

from fog and frost but also the portion of the windshield in front of the other occupant of the front seat.

The angular adjustment of the fan shafts provides for directing the air current delivered by each fan against the windshield in a direction to have a maximum effect.

The fan device may be secured in position in any suitable or appropriate way. Many automobiles are now made with a divided windshield, that is, with a windshield having a vertical partition member 17 at the center of the windshield thereby providing the two window portions 18 as shown in Fig. 1. Where this construction is employed it may be convenient to attach the fan device to this partition member 17, and this may be done by means of a suitable bracket 19 which is secured in some suitable way to the partition member 17 and to which the motor housing 2 is attached.

Another feature of my invention relates to the construction of the fan elements 4, and according to this feature of the invention the extremities or tips of the blades 5 of the fan are made of flexible non-metallic material. The advantage of this construction is that the blades do not present any hard cutting edge which is likely to cause injury if a person accidentally comes in contact with the rotating blades. In making the fan element I first provide a core member 20 of sheet material which has a diameter less than that of the completed fan element, said core element being provided with the radial slots 21 and with the hub portion 22. This core member and hub is then placed in a suitable mold in which the fan element is molded and I prefer to use rubber material for this purpose. When the molding operation is completed a fan element such as shown in Fig. 5 is provided in which the core 20 is embedded in rubber and in which the blades 5 of the fan element extend considerably beyond the periphery of the core as shown at 23. Said portion 23 of the blades is composed entirely of rubber but the portions of the blades adjacent the hub are reinforced by the core. This fan will be molded in a flat form and after it is made the blades may be twisted slightly to give them the required pitch. This twisting will deform the material of the core and the deformed material will maintain the blades at the required angle. The hub portion 22 is provided with a recess 24 which fits over the end of the fan shaft 6 and said hub may be secured to the fan shaft by a set screw 25.

If desired the core portion 20 may be strengthened by deforming it to provide the radially extending ribs 26, there being one rib for each blade 5. Instead of employing a friction drive between the motor shaft and the fan shaft I may employ the gear drive shown in Fig. 7 which comprises a crown gear 27 secured to the motor shaft 3 and a pinion 28 secured to the fan shaft 6, which pinion meshes with the crown gear.

With this construction a fan is provided which is extremely effective in operation but in which the blades have flexible rubber tips so that a person will not be injured by accidentally coming in contact with the rotating blades. With this type of blade it is not necessary to enclose the fan in a guard member for safety purposes as is usually done with a fan having metal blades.

I claim:

1. A fan comprising a motor having a motor

shaft, a housing for the motor provided with a plurality of slots, a plurality of fan shafts extending radially from the motor shaft and each projecting through a slot, a friction disk carried by the motor shaft, and a friction roll on each fan shaft engaging the friction disk and driven thereby, each fan shaft being independently adjustable in its slot into different angular positions about the axis of the motor shaft.

2. A fan comprising a housing, a driving shaft within the housing, a sleeve extending through and supported by the wall of the housing extending radially to the driving shaft, a fan shaft rotatably mounted in said sleeve, a fan element carried by said fan shaft exterior of the housing, and a driving connection between said fan shaft and driving shaft said sleeve and fan shaft being adjustable relative to the housing into different radial positions.

3. A fan comprising a housing, a driving shaft within the housing, a sleeve extending through and supported by the wall of the housing extending radially to the driving shaft, a fan shaft rotatably mounted in said sleeve, a fan element carried by said fan shaft exterior of the housing, a friction disk on the driving shaft, and a friction roll on the fan shaft engaging and driven by the friction disk.

4. A fan comprising a housing provided with a plurality of slots, a driving shaft mounted in the housing, a sleeve extending through each slot in a direction radial to the driving shaft, supporting means for each sleeve having frictional engagement with the wall of the housing, a fan shaft rotatably mounted in each sleeve, a fan element carried by the outer end of each fan shaft, a friction disk on the driving shaft, a friction roll on each fan shaft engaging and driven by said friction disk, and a spring maintaining said friction disk in engagement with the friction rolls, each sleeve being independently adjustable in its slot whereby the fan shafts may be adjusted into different angular positions relative to the motor shaft axis.

5. A fan having a motor provided with a motor shaft, a housing for the motor provided with a slot extending at right angles to the motor shaft, a fan shaft extending radially to the motor shaft and projecting through the slot, a bearing for the fan shaft also extending through the slot and supported by the housing, and a driving connection between the motor shaft and the fan shaft, said bearing being adjustable in said slot into different angular positions relative to the motor shaft.

6. A fan having a motor provided with a motor shaft, a housing for the motor provided with a slot extending at right angles to the motor shaft, a fan shaft extending radially to the motor shaft and projecting through the slot, a bearing for the fan shaft frictionally supported by the housing and adjustable longitudinally of the slot into different angular positions relative to the motor shaft axis, and a driving connection between the motor shaft and fan shaft.

7. A fan having a motor provided with a motor shaft, a plurality of fan shafts extending radially to the motor shaft and each independently adjustable into different angular positions relative to the motor shaft axis in a plane at right angles to the motor shaft, and a driving connection between the motor shaft and each fan shaft.

LOUIS ZAIGER.

## CERTIFICATE OF CORRECTION.

Patent No. 2,123,763.

July 12, 1938.

LOUIS ZAIGER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 12, claim 2, after "housing" insert the words and also; line 22, claim 3, after "housing" insert and; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of August, A. D. 1938.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.