

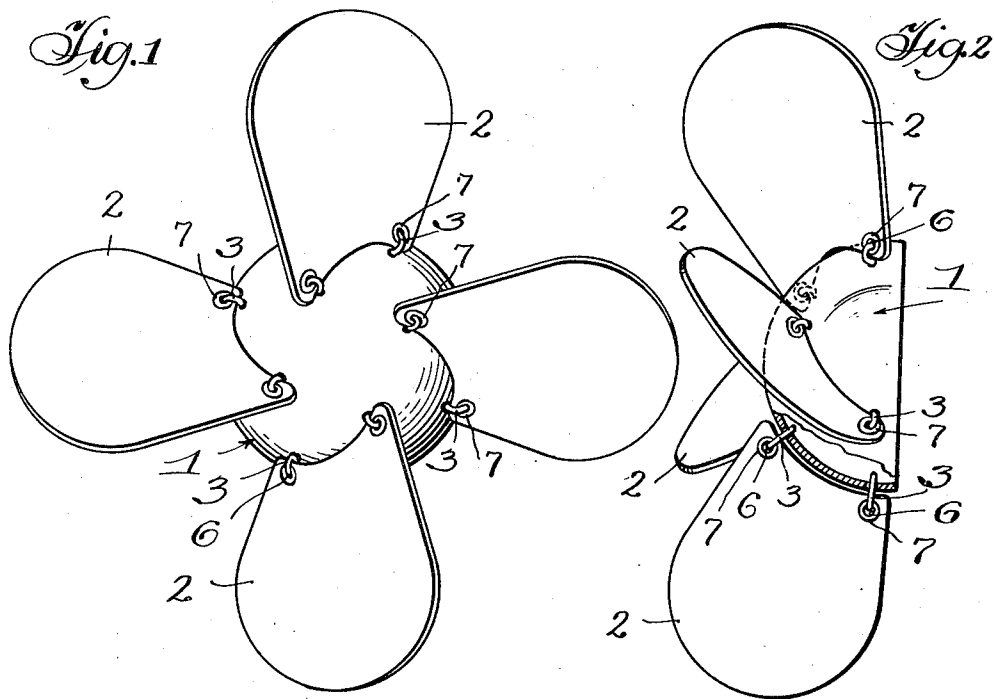
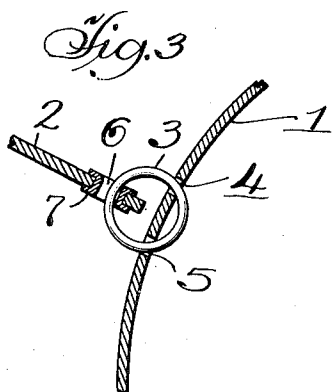
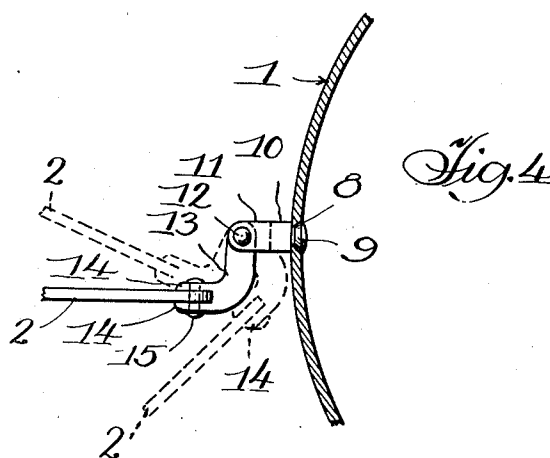
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8 Claims. (Cl. 170-173)

The present invention relates to fans of the motor or power driven type and particularly to a fan construction wherein the blades are hinged to or freely pivoted upon the hub.

5 The invention is particularly adapted to fans having blades which are used for circulating air in the interior of an automobile and primarily to defrost the windshields thereof. However, the invention may be used in fans for other uses as desired.

10 In the preferred embodiment, my fan is preferably made with a relatively wide or large hub and with the blades of about the same length as the width or diameter of the hub. While I have found that I get very good results from a hinge which permits the blade to swing directly out from the hub, I have also gotten excellent results from placing the hinge a little in front of the plane of the blade. By this construction the blade is thrown forward to balance the air thrust against it. In both constructions, the blade is thrown out by centrifugal force which counteracts the air thrust against it.

20 With my invention the blades being hinged, the fan may be packed in a much smaller box than can be used with the usual fans sold today, by bending the blades against the hub. When not in use the blades will bend on their hinges due to gravity. This construction is especially advantageous in a windshield defrosting fan as the blades will fall down and be more out of the line of vision of the driver.

25 The usual rubber bladed fans now on the market are all constructed so that the blades are anchored in the hub and project substantially rigidly from the hub. I have found that in operation these blades will make a slight hum which is caused by the fan rippling near its connection in the hub. This rippling often results in the blade breaking or tearing off at this point. It is therefore an object of my invention to provide a construction which will avoid rippling and in fact all the usual strains of the present constructions wherein the blades are substantially rigidly mounted in the hub, by eliminating this rigid connection and providing a construction wherein the strain is relieved.

30 Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

35 The invention further resides in the construction, combination and arrangements of parts

illustrated in the accompanying drawing, and while I have shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawing:

Fig. 1 is a front view of my fan;

Fig. 2 is a side view thereof with a part in cross-section to show the hinge connection.

Fig. 3 is a fragmentary cross-sectional view showing the hinge connection between the hub and blade.

Fig. 4 is a fragmentary view partly in cross-section of an alternate form of hinge connection.

Referring more in detail to the drawing of my disclosed embodiments, 1 represents the hub of my fan which is preferably of metal, hollow and spherical in shape, and which may be provided with any means (not shown) for connecting it with a suitable driving means or source of power, such as a motor. The hub might be the rotating housing or casing of a motor. This hub is provided with a plurality of blades 2 hingedly connected to the exterior of the hub by rings 3 extending through openings 4 and 5 in the hub and opening 6 in the blade. Preferably the opening 6 is provided with reinforcing metal eyelet or grommet 7.

30 The blades 2 are preferably of rubber or heavy textile or similar flexible resilient or yieldable material so that they will not cause damage to the ordinary object accidentally striking them and thus eliminating the necessity of an enclosing guard or other protecting means. However, the blades may be of metal, if desired. I have shown a four-bladed fan by way of example only and do not limit my invention to any particular number of blades. These blades are shown as extending directly out from the hub for the sake of showing their relationship to the hub when in motion and thrown out to this position by centrifugal force. When at rest the upper blades will drop by gravity and fold or turn on their hinges or pivotal mounting, the rings 3, and lie against the hub. This is especially desirable in an automobile windshield fan as the upper blades will be more out of the driver's line of vision. When packed for shipment all the blades may be folded against the hub and will consequently occupy a much smaller space than would the ordinary fan, hence resulting in a saving of packing and shipping cost.

In Fig. 4 I have shown an alternate construc-

tion in which the hub 2 is provided with openings 8 for mounting the pivotal connection for the blades. Each mounting comprises a bolt screw 9 passing through the opening 8 to secure the hinge member 10. This member has bifurcated outer ends 11 through which extend a pivot pin 12 providing a pivotal mounting for a swinging arm 13, the outer end of which is bifurcated at 14 to provide a support for the blade 2 and to which it is connected by means of pin 15. Two of these hinge connections are preferably provided for each blade. By placing the hinge a little forward of the axis of the blade, the centrifugal force set up by the rotation of the hub will throw each blade outwardly and a little forwardly to assist in balancing the air thrust.

It will be seen that I have provided a fan comprising a rather wide hub and blades freely pivoted or swingable on hinges or pivotal mountings connecting the hub and blades whereby the blades will drop by gravity and fold against the hub when the latter is at rest but will swing outwardly by centrifugal force when the hub is rotated by a suitable source of power. While I have shown two hinge constructions it is apparent that the invention comprehends and other forms of hinges may be used without departing from the spirit of my invention, and while I have shown a rubber bladed fan for use primarily for defrosting an automobile windshield it is apparent that the construction may be used with blades of other material and for other purposes.

Having disclosed my invention, I claim:

1. A fan comprising a hollow semi-spherical hub, sets of openings in said hub, rings extending through each set of openings, and flexible, resilient, flat blades having openings therein to receive said rings to hingedly attach the blades to the hub each set being in a line at an angle to the axis of the fan.

2. A fan comprising a hollow semi-spherical hub, flexible resilient blades and means for hingedly attaching the blades to the hub whereby the blades may lie against the hub while at rest but will be thrown out into operative position upon rotation of the hub, comprising sets of openings in the hub, openings in the blades, and rings extending through each set of openings in the hub and through one opening in each blade each set being in a line at an angle to the axis of the fan.

3. A fan comprising a relatively wide, curved hub, sets of hinges attached thereto in a line at an angle to the path of rotation of the hub, and flexible and resilient blades each having an end attached to a set of the hinges, the other end being free and adapted to lie against the hub when

at rest but upon rotation of the hub to be swung out to operative position by action of centrifugal force.

4. A fan comprising a substantially semi-spherical hub, pairs of attaching means on said hub, each pair being in a line at an angle to the path of rotation of the hub, a pair of hinges connected to each pair of attaching means and relatively wide, flexible and resilient blades connected near each of their lower corners to each of the pairs of hinges.

5. A fan of the type used for circulating air in automobiles and for defrosting the windshields thereof and comprising a substantially semi-spherical hub, pairs of attaching means on said hub, each pair being in a line at an angle to the path of rotation of the hub, a pair of hinges connected to each pair of attaching means and relatively wide, flexible and resilient blades connected near each of their lower corners to each of the pairs of hinges, the axis of said hinges being offset from the longitudinal center of said blades so that the centrifugal force set up by the rotation of the hub will throw each blade outwardly and forwardly to assist in balancing the air thrust.

6. A fan comprising a hub having a blunt face, hinges attached thereto, relatively wide blades having an edge attached to the hinges, the pivots of said hinges being radially offset from the longitudinal center of said blades so that the centrifugal force set up by the rotation of the hub will throw each blade outwardly and forwardly to assist in balancing the air thrust.

7. A fan for defrosting an automobile windshield comprising a hub, a plurality of sets of rings attached to the hub, each set being in a line at an angle to the axis of the fan, and flexible and resilient blades each having one end hingedly attached to the rings and with the other end free, whereby rotation of the hub will cause the blades to move forwardly and outwardly from the hub to propel the air forwardly from the hub.

8. A fan for defrosting an automobile windshield comprising a hub, a plurality of sets of attaching means mounted on said hub, each set being in a line at an angle to the axis of the fan, and flexible and resilient blades each having one end hingedly attached to one set of attaching means and with the other end free, whereby rotation of the hub will cause the blades to move forwardly and outwardly from the hub to propel the air forwardly from the hub.

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