March 24, 1959 I. BERMAN 2,878,991

AUXILIARY FAN ATTACHMENT

Filed July 15. 1957 2 Sheets-Sheet 1

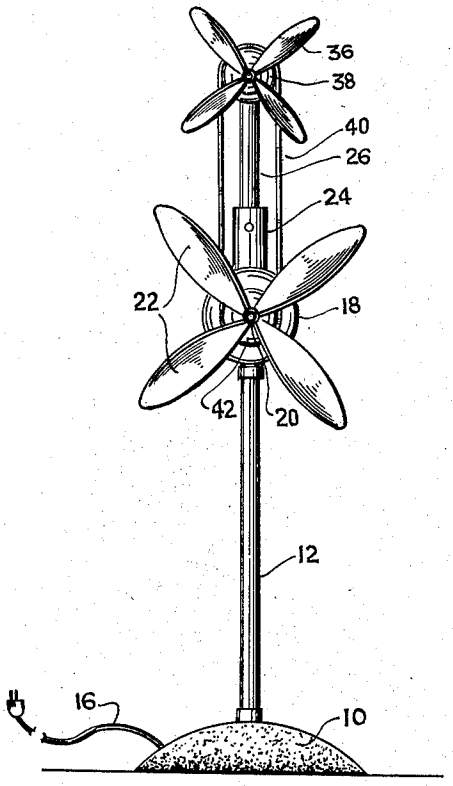


FIG. 1.

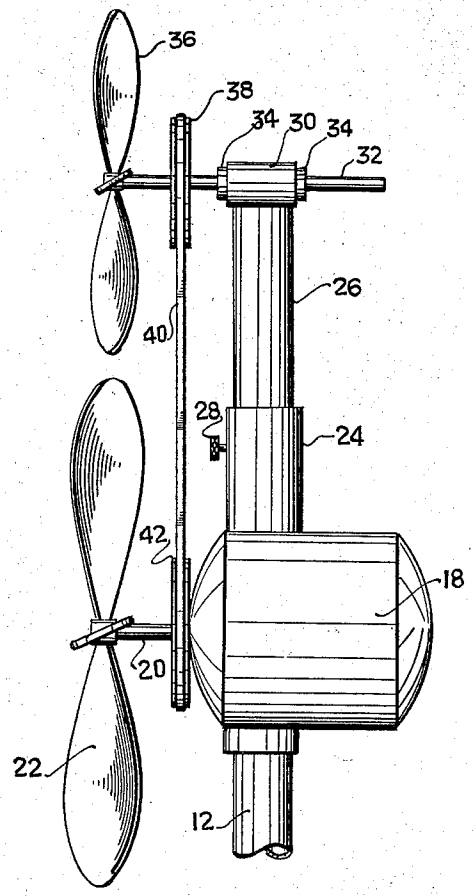


FIG. 2.

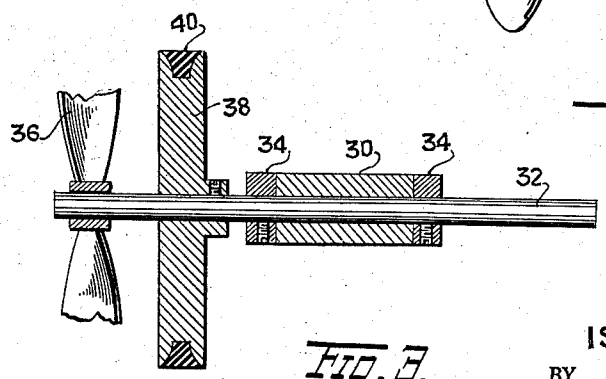


FIG. 3.

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AUXILIARY FAN ATTACHMENT

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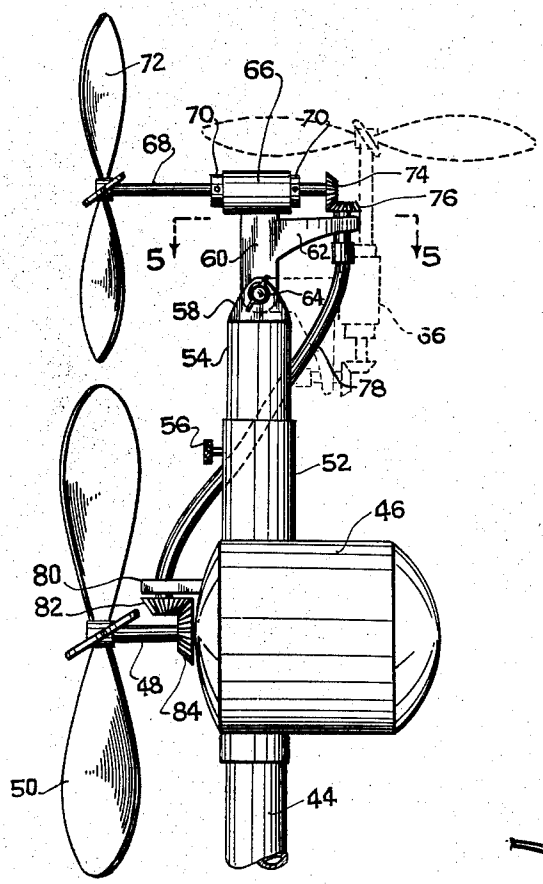


Fig. 4.

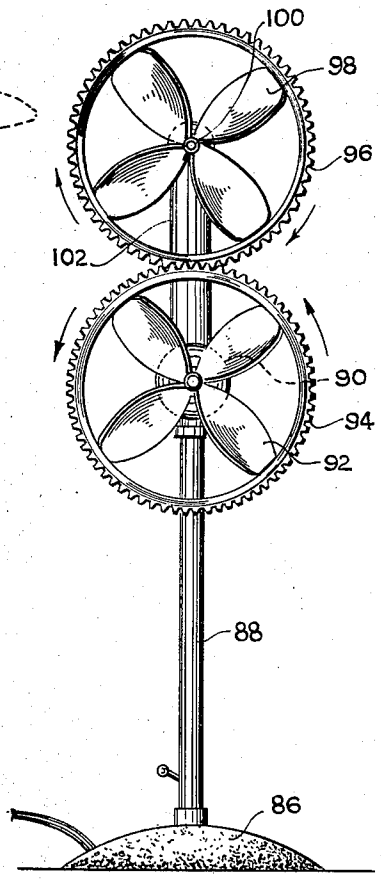


Fig. 6.

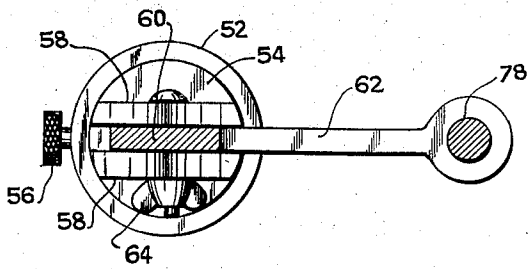


Fig. 5.

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AUXILIARY FAN ATTACHMENT

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Application July 15, 1957, Serial No. 671,749

2 Claims. (Cl. 230—259)

This invention relates generally to electric fans and, more particularly, has reference to an attachment to a fan adapted to provide a second rotor or series of fan blades, powered from the same motor as that used for rotating the conventional or main rotor.

Obviously, it is desirable to produce the maximum amount of air circulation, when an electric fan is in operation, in relation to the amount of power produced. Further, wherever possible, it is desirable to distribute the circulating air over as wide an area as possible, to provide maximum comfort in all portions of the room in which the fan is disposed.

Normally, this is not achieved by reason of the fact that a conventional fan ordinarily has a single fan rotor or series of blades. These distribute air only in a relatively small area.

The main object of the present invention is to provide an attachment for an otherwise conventional electric fan, which will be so designed as to be powered by the fan motor and provide a second rotor, which will blow air in a completely different path than that in which the air is blown by the main or conventional rotor.

Another object is to provide an attachment as described which will cooperate with the main rotor in producing maximum air circulation, at a substantial velocity, in relation to a source of power no greater than that used for fans not having the desirable characteristics of the present invention.

Another object is to provide an auxiliary fan attachment which will include, in at least one form of the invention, means for adjusting the rotor attachment to any of a large number of positions in respect to the main rotor, while still insuring a driving connection between the main shaft of the fan and the shaft of the auxiliary device.

Another object is to provide an auxiliary fan attachment which will be so designed as to be capable of manufacture at a comparatively low cost, considering the benefits to be obtained from the use thereof.

Another object, in one form of the invention, is to permit the auxiliary device to be disengaged from the drive shaft, so as not to be driven, whenever desired.

A further object is to include, in another form of the invention, means forming a peripheral guard for each rotor, which means will provide a driving connection between the main and auxiliary rotors.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a front elevational view of an electric fan equipped with an attachment according to the present invention.

Fig. 2 is an enlarged side elevational view of the upper portion of the fan and of the attachment.

Fig. 3 is a still further enlarged horizontal section through the auxiliary fan assembly taken through the auxiliary shaft.

Fig. 4 is a view like Fig. 2 showing a modified construction, the rotor of the auxiliary device being shown in full and dotted lines in different positions to which it is adjustable.

Fig. 5 is an enlarged horizontal sectional view on line 5—5 of Fig. 4 through the auxiliary device.

Fig. 6 is a front elevational view of a modified form including ring gear means on the rotors for connecting the same in driving relationship.

Referring to the drawings in detail, in Figs. 1–3 a belt type driving connection is being provided between a main fan and an auxiliary fan. The main fan can be of any desired type, that shown being of the pedestal type having a non-oscillating motor. The motor could, however, be of the oscillating type without interfering with successful practicing of the invention.

In any event, in the illustrated example the main fan includes a weighted base **10** from which extends upwardly a straight, vertical, tubular standard **12** in the lower end portion of which there is mounted a switch (not shown) controlling power to be supplied through an electric cord **16** to the motor **18** of the fan, said motor being mounted upon the upper end of the standard **12** and including a horizontally, forwardly projecting shaft **20** to which is secured the usual bladed rotor **22**.

This is conventional construction and does not per se constitute part of the present invention.

In accordance with the invention, fixedly attached to the casing of motor **18** and projecting upwardly from the casing is a cylindrical, upwardly opening, vertical socket **24** in which is rotatably and longitudinally adjustable an extension post **26** adapted to be held in any selected position of adjustment by means of a setscrew **28** threadable in the side wall of the socket **24** into engagement with extension **26**.

On the extension post **26**, at the upper end thereof, there is provided a horizontally extending bearing sleeve **30**, and extending therethrough is a shaft **32** of the auxiliary fan device. Set collars **34** are secured to shaft **32** at opposite ends of the bearing sleeve, to hold the shaft against endwise movement within the bearing sleeve. To the forward end of the shaft **32** there is secured for rotation therewith a bladed auxiliary rotor **36**.

A driven pulley **38** is secured to the auxiliary shaft **32** adjacent rotor **36**. Trained about pulley **38** is a belt **40** trained also about a drive pulley **42** secured to the main shaft **20**.

Thus, it will be seen that whenever motor **18** is in operation, not only will the main rotor operate in the usual manner, but also, the auxiliary rotor will be rotated therewith, with the motor supplying power for both rotors.

If desired, the auxiliary rotor can be disengaged, so that it will not rotate, permitting normal operation of the fan. One need merely loosen setscrew **28**, and drop extension post **26** a slight distance within socket **24**, enough to place sufficient slack in belt **40** to prevent driving of the belt by the drive pulley **42**. In effect, thus, the belt and pulley means **38**, **40**, **42** constitutes not only a driving connection between the shafts, but also a slip type clutch. It follows that the tension of the belt can be set, also, by adjusting the extension post **26** axially in respect to socket **24**, to whatever extent is desired for the purpose of placing the belt **40** under selected tension.

In the modified form shown in Figs. 4 and 5, the main fan assembly includes the standard **44** on which is mounted the motor **46** having a drive shaft **48** to which is secured a bladed main rotor **50**. Fixedly secured to and projecting upwardly from the motor casing is an

upwardly opening, cylindrical socket **52**, in which is rotatably and axially adjustable an extension post **54**, locked in selected positions of adjustment by means of a setscrew **56** threaded in socket **52** against extension **54**.

Rigidly secured to the upper end of the extension post **54** are upwardly projecting, transversely spaced ears **58**, in embracing relation to the lower end of a support arm **60** integral or otherwise rigidly formed adjacent its upper end with a laterally projecting, elongated bearing arm **62**. A pivot pin extends through aligned openings of the ears **58** and arm **60**, and threaded on the pin is a wing nut **64**, so that arm **60** can be swingably adjusted to selected angular relationships in respect to the extension post, as for example to the full and dotted line positions shown in Fig. 4. In each position to which the arm **60** is adjusted, it can be locked by tightening of the wing nut.

On the upper end of the arm **60** there is provided a bearing sleeve **66** having its axis perpendicular to the lentgh of the arm **60** and providing a journal for the auxiliary shaft **68**, which is held against endwise displacement by set collars **70** secured to the auxiliary shaft and abutting the opposite ends of the bearing sleeve. An auxiliary rotor **72** is secured to and rotates with the auxiliary shaft, and obviously, the direction of which the auxiliary rotor directs its air current is capable of selection within a wide range. For example, the extension post may be rotatably adjusted within the socket **52**, so that the main rotor can direct its current of air in one direction while the auxiliary rotor can project in any of a number of other directions. Further, in any position to which the extension post is rotatably adjusted, the arm **60** can be swingably adjusted about its pivot axis, so that the main rotor can direct its air current upwardly or downwardly, and can even direct the same completely vertically as shown in dotted lines in Fig. 4.

To provide a driving connection for the auxiliary shaft in all positions thereof, there is provided a beveled gear **74** on the auxiliary shaft meshing with a bevel gear **76** secured to one end of a flexible shaft **78**, journalled in bearing arm **62**, the other arm being journalled in a bearing **80** that projects forwardly from the motor casing. On the other end of shaft **78**, adjacent bearing **80**, there is provided a bevel gear **82**, meshing with a bevel gear **84** provided upon the drive or motor shaft **48**. Thus, the auxiliary shaft is driven no matter what position it is adjusted to.

In Fig. 6 there is shown another modification wherein the main fan assembly includes a weighted base **86** from which extends upwardly a vertical standard or post **88** on the upper end of which is mounted a motor **90** to the shaft of which is secured a bladed rotor **92**. Fixedly secured to the tips of the blades is a ring gear **94** having external teeth meshing with the teeth of an auxiliary ring gear **96** extending peripherally of and secured to the tips of the blades of an auxiliary rotor **98** mounted upon and turning with an auxiliary shaft **100** journalled in a bearing provided at the upper end of an extension post **102** mounted upon and extending upwardly from the casing of motor **90**. The extension post **102** would be of the telescoping type, the same as in the previous forms of the invention, and thus it will be seen that by adjusting in an upward direction the upper or extension portion of the standard **102**, that is, the portion carrying the shaft **100**, one can move the ring gears out of mesh, so that the auxiliary rotor can in this way be selectively disengaged or engaged, as desired, with maximum ease.

If desired, one can utilize friction belts upon the peripheries of the rotors, which are adapted to provide a driving of the rotors in the same manner as that achieved by ring gears.

It will also be understood that the blades of the auxiliary rotor would be pitched oppositely to the blades of the main rotor, if it is desired that both rotors direct air in the same direction. In these circumstances, of course, the pitching of the blades of the rotors oppositely is required because the rotors turn in opposite directions. If, however, it is desired that the auxiliary rotor direct its air backwardly while the main rotor directs its air forwardly, or vice versa, the blades of both rotors would be pitched in the same direction, as will be readily apparent.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. The combination, with an electric fan including a support, a motor thereon including a motor shaft, and a main bladed rotor, of an auxiliary fan attachment comprising support means mounted on the motor, an auxiliary shaft carried by said support means, an auxiliary, bladed rotor on the auxiliary shaft, and means providing a driving connection between the fan and attachment adapted for driving of both rotors by said motor, said means for providing a driving connection including a flexible shaft drivingly connected at its opposite ends to the motor shaft and auxiliary shaft respectively, the driving connection of the flexible shaft to the motor and auxiliary shafts comprising first beveled gears secured to the ends of the flexible shaft and second bevel gears meshing with the first bevel gears and secured to the motor shaft and auxiliary shaft respectively, the support means including a socket rigid with and projecting upwardly from the motor, and an extension post adjustably telescoping in said socket, said extension post being rotatably and axially adjustable in the socket for selective adjustment of the auxiliary rotor to selected positions in respect to the main rotor.

2. The combination, with an electric fan including a support, a motor thereon including a motor shaft, and a main bladed rotor, of an auxiliary fan attachment comprising support means mounted on the motor, an auxiliary shaft carried by said support means, an auxiliary, bladed rotor on the auxiliary shaft, and means providing a driving connection between the fan and attachment adapted for driving of both rotors by said motor, said means for providing a driving connection including a flexible shaft drivingly connected at its opposite ends to the motor shaft and auxiliary shaft respectively, the driving connection of the flexible shaft to the motor and auxiliary shafts comprising first beveled gears secured to the ends of the flexible shaft and second bevel gears meshing with the first bevel gears and secured to the motor shaft and auxiliary shaft respectively, the support means including a socket rigid with and projecting upwardly from the motor, and an extension post adjustably telescoping in said socket, said extension post being rotatably and axially adjustable in the socket for selective adjustment of the auxiliary rotor to selected positions in respect to the main rotor, the support means further including a support arm pivotally mounted upon the extension post for swingable adjustment about an axis extending normally to the length of the extension post, said pivoted arm carrying the auxiliary shaft, thus to dispose the auxiliary shaft at selected positions of inclination in respect to the length of the extension post, in each position to which the extension post is rotatably adjusted within the socket.

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