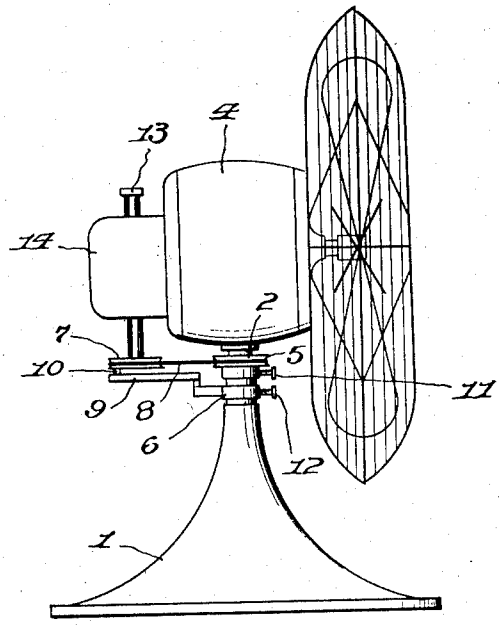
April 8, 1958 MASAHIKO OBA 2,829,525

MOTOR FAN

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Fig-1-



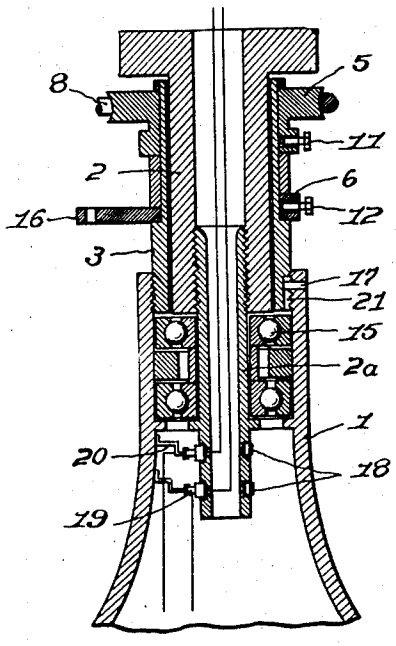


Fig-2-

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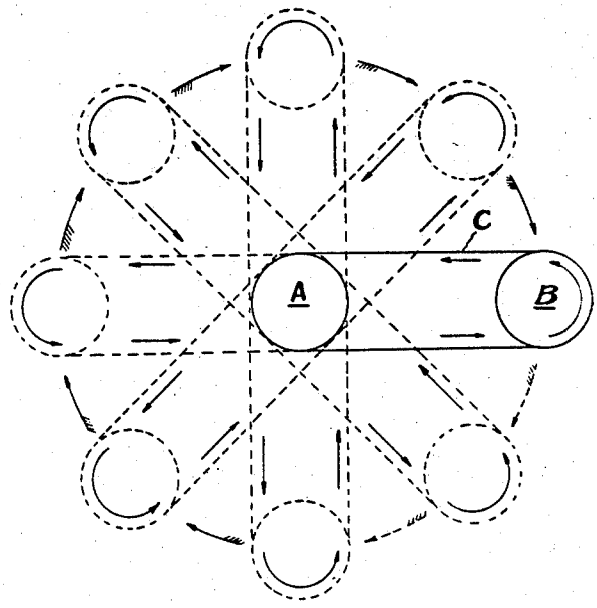
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Fig-3-



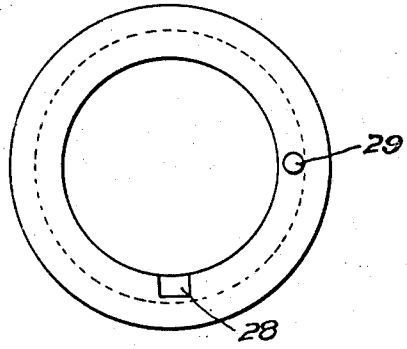
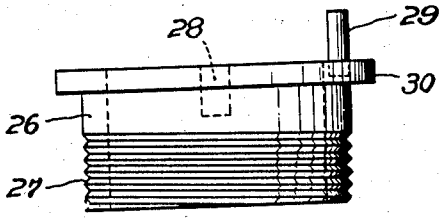


Fig-5-



INVENTOR.

BY

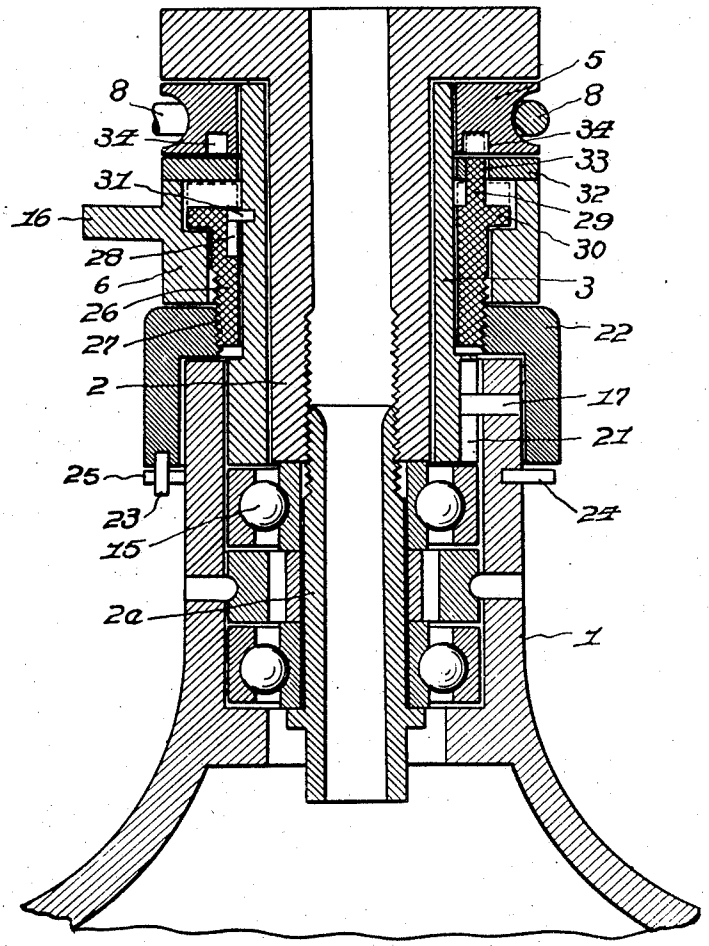
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Fig-4-



INVENTOR.

BY

ATTORNEY.

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2,829,525

MOTOR FAN

Masahiko Oba, Hofu-shi, Yamaguchi-ken, Japan

Application March 6, 1956, Serial No. 569,796
Claims priority, application Japan March 11, 1955
1 Claim. (Cl. 74—25)

This invention relates to a motor fan which is so made as to perform both oscillating fan-draft blowing and all-round revolving fan-draft blowing, by utilizing the oscillation mechanism of an ordinary motor fan.

Motor fans heretofore in use can not perform all-round revolving fan-draft blowing.

Therefore, an important feature and object of the present invention is to provide motor fans of new type which can perform both oscillating fan-draft blowing and continuous all-round revolving fan-draft blowing, with relatively simple construction and by utilizing the oscillation mechanism of an ordinary motor fan.

Another object of the present invention is to provide motor fans of new type of which blowing manner can readily be exchanged, with very simple hand adjustment of a part of the mechanism, into oscillating fan-draft blowing from all-round revolving fan-draft blowing or vice versa.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claim. My invention itself, however, both as to its construction and function together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a diagrammatic side view of an example of the present invention.

Figure 2 is an enlarged side view of the main part of oscillating and revolving mechanism of the example in Figure 1, sectioned vertically.

Figure 3 is a diagrammatic view for describing the function of the example in Figures 1 and 2.

Figure 4 is a vertically sectioned side view of the main mechanism of another example of the present invention.

Figure 5 is plan and side views of the exchange wheel used for the example in Figure 4.

Referring to Figures 1 and 2, a fan motor **4** equipped with an oscillation device **14** of an ordinary type is fixedly mounted atop the vertical shaft **2** which is so installed in the fan stand **1** as to rotate itself smoothly. For said installation, said shaft **2** is provided with a downwardly extending shaft **2***a* which is screwed in the shaft **2**, said shaft **2***a* being supported by the fan stand **1** through a bearing **15** and said shaft **2** being rotatively fitted in a sleeve **3** which in turn is steadfastly fixed to the fan stand **1** by a suitable manner, for example by a knock pin **17** which reaches a vertical slot **21** of the sleeve **3**.

An upper moving wheel **5** provided with a circular groove and a lower moving wheel **6** provided with a projected arm **16** are installed on outer side of the sleeve **3**. The upper moving wheel **5** is connected to the crank wheel **7** of the oscillation device **14** at their circular grooves by means of an elastic belt **8** and the arm **16** of the lower moving wheel **6** is pivoted to the eccentric pin **10** of the crank wheel **7** by means of a connecting rod **9**. Screw bolts **11** and **12** are screwed in to reach the sleeve **3** from the outside of the moving wheels **5** and **6**, respectively. Electric current to the fan motor **4** is circuited by way of slip rings **18** which are attached on outer side of the shaft **2***a* so that current feeding may be possible even when the vertical shaft **2** is in rotation, each of said slip rings being in contact with respective carbon brush **19** which in turn is supported by a brush holder **20**.

In the above example, when the oscillating fan-draft blowing is required, the screw bolt **11** of the upper moving wheel **5** is loosened to leave the wheel **5** in a state of a loose wheel and to make it run idle around the sleeve **3**, and the screw bolt **12** of the lower moving wheel **6** is tightened to fix the wheel **6** firmly to the sleeve **3**.

Now, if the push button **13** of the oscillation device is pushed down to let the crank wheel **7** rotate, the crank wheel **7** will, by combined work with the eccentric crank pin **10** and connecting rod **9**, drive the fan motor **4** to perform oscillation by taking the vertical shaft **2** as its axis of oscillation. When all-round revolving fan-draft blowing is desired, the screw bolt **12** of the lower moving wheel **6** is loosened to leave the wheel **6** in a state of a loose wheel, and the screw bolt **11** of the upper moving wheel **5** is tightened to fix the wheel **5** firmly to the sleeve **3**. Now, if the push button **13** is pushed down to let the crank wheel **7** rotate, the fan motor **4** will start, by inter-relative work of the crank wheel **7**, elastic belt **8** and the stationalized upper moving wheel **5**, to perform a continuous revolution by taking the vertical shaft **2** as its axis of revolution, function of said performance of the mechanism being explained as follows, in connection with Figure 3.

Referring to Figure 3, the character A indicates the upper moving wheel **5** in an immovable state being tightly fixed to the sleeve **3** by the screw bolt **11**. The character B indicates a state of the crank wheel **7** performing self-rotation in the direction indicated by the curved full-line arrow. The character C indicates the elastic belt **8** spanning between the crank wheel **7** and the upper moving wheel **5** and moving in the direction indicated by rectilinear arrows. When the wheels **5** and **7** and the belt **8** are in the state shown in Figure 3, the crank wheel **7** is rotating in the direction of the curved full-line arrow and is trying to rotate the upper moving wheel **5** by driving the elastic belt **8** towards the direction indicated by the rectilinear arrows.

However, since the upper moving wheel **5** is tightly fixed to the sleeve **3**, it does not move. Consequently, the motive power transmitted from the crank wheel **7** to the elastic belt **8** will automatically work to revolve the crank wheel **7** itself towards the direction contrary to the crank wheel's own rotation, that is, towards the dotted arrow. This movement of changing position of the crank wheel **7** continues as long as said wheel continues to rotate itself, so that position of the crank wheel **7** moves around the upper moving wheel **5** in the direction indicated by the dotted arrow, orbit of said movement being a circle having a radius which is equal to the distance between the centers of both wheels **5** and **7**. In other words, the crank wheel **7** revolves around the upper moving wheel **5** by taking the distance between the centers of both wheels **5** and **7** as its radius of circular revolution while it rotates itself in the direction indicated by the curved full-line arrow.

Since the crank wheel **7** is so made as to work jointly with the fan motor **4** in unison, the revolution of said wheel **7** drives the fan to turn round by taking the vertical shaft **2** as its axis of rotation, and thus, this invented mechanism works to let the fan perform a continuous all-round revolution.

According to the present invention, the following advantages will be obtained, as will clearly be presumed from the above description.

(*a*) Since the fan can perform a continuous revolution while it is operating draft blowing, it can send out wind to all the directions around.

(*b*) Since the fan continuously works to let the atmosphere flow in the same direction of the revolution of the

fan, it provided constant breeze in the room where it is installed.

(c) Of course, if desired, it can so easily be set as to perform usual oscillating fan-draft blowing.

In embodying the present invention, for the purpose of fixing one of the upper and lower moving wheels and loosening another, any suitable mechanism other than the screw bolts 11 and 12 illustrated in Figures 1–3 may be used, for example, the mechanism shown in Figures 4 and 5 may be used.

In Figures 4 and 5, the same parts as those in the example in Figures 1–3 are denoted by same numerals.

Referring to Figures 4 and 5, the vertical shaft 2 supporting fan motor on its top is so installed in the fan stand 1 as to rotate itself smoothly. For said installation, said shaft 2 is provided with a downwardly extending shaft 2a which is screwed in the shaft 2, said shaft 2a being supported by the stand 1 through a bearing 15 and said shaft 2 being rotatively fitted in the sleeve 3 which is provided with a vertical slot 21 and fixed to the fan stand 1 by means of a knock pin 17 which reaches said slot 21. An exchange wheel 22 is mounted atop the fan stand 1, and the lower moving wheel 6 provided with a projected arm 16, a guide ring 32 and the upper moving wheel 5 are mounted above the exchange wheel 22. Between the sleeve 3 and lower moving wheel 6 is inserted a lifter 26 slidably in the vertical direction, said lifter being provided with a circular flange 30, a vertical slot 28 and an outer screw thread 27 which is so made as to fit the screw thread of the exchange wheel 22. A knock pin 29 projecting upwards from the lifter 26 is so made as to be thrusted into the guide hole 33 perforated in the guide ring 32. The vertical slot 28 of the lifter 26 is so slotted as to fit the knock pin 31 installed in the outer side of the sleeve 3 and prevents rotation of the lifter 26.

Several hollows 34 are hollowed out on the under facet of the upper moving wheel 5 to match with the guide hole 33. Said wheel 5 is connected to the crank wheel such as shown by the wheel 7 in Figure 1, by an elastic belt 8 spanning between them. The crank pin of said crank wheel is connected to the lower moving wheel 6 by means of a connecting rod such as shown by the rod 9 in Figure 1. Electric current to the fan motor is circuited by way of such slip rings and contact brushes as described and shown in connection with the example in Figures 1–3, said members being omitted in Figure 4.

In the fan motor provided with the mechanism illustrated in Figures 4 and 5, for changing the fan-draft blowing from oscillation to revolution (or vice versa), firstly it is necessary to turn the exchange wheel 22 until the pin 23 attached downwardly to said wheel 22 engages with a pin 24 set in the fan stand 1. Then, the lifter 26 will be screwed down with said turning of the exchange wheel 22 and will press the lower moving wheel 6 downwards with its flange 30, and at the same time, the knock pin 29 of the lifter 26 will slip down out of the hollow 34. thereby the upper moving wheel 5 is left in a free state. If the electric circuit is switched on under the above state, the fan motor mounted on the vertical shaft 2 revolves. In this case, the lower moving wheel 6, which is so connected to the crank wheel of the oscillation device by a connecting rod, as shown in Figure 1, is fixed immovable, so that said connecting rod will be operated as in the case of an ordinary oscillating motor fan and the fan will perform oscillatory draft blowing.

Although the revolving motion is transmitted to the upper moving wheel 5 by the elastic belt 8 in this case, said wheel 5 will merely run idle around the sleeve 3 because of free state thereof. Now, if the exchange wheel 22 is turned in reverse way until the pin 23 of said wheel 22 engages with other pin 25 which is set in the fan stand 1, the lifter 26 will be driven upward by the screw thread 27 releasing the pressure executed on the lower moving wheel 6, thereby said wheel 6 is set in a free state. On the other hand, at the same time with said upward motion of the lifter 26 the knock pin 29 will insert into the hollow 34 of the upper moving wheel 5 and will stop the rotating motion of said wheel 5. At this condition, the crank wheel of the oscillation device such as shown by numeral 14 in Figure 1 will revolve around the vertical shaft 2 by taking the shaft 2 as its axis of revolution, in the same manner as described minutely in connection will Figure 3.

Since said crank wheel and the fan motor are made to work in unison, the fan rotates itself round horizontally at the same time with its wind blowing operation as in the case of the illustration in Figures 1–3. Thus, either the oscillating fan-draft blowing or the revolving fan-draft blowing is rapidly available as desired by turning the exchange wheel 22 only clockwise or counterclockwise.

According to the mechanism in Figures 4 and 5, another advantage besides above operations will be obtained.

That is, when a change of oscillating direction is desired, said operation can readily be attained by loosening the exchange wheel 22, turning the lower moving wheel 6 and then tightening said wheel 22, successively.

While I have described in connection with particular embodiments of the present invention, it will, of course, be understood that I do not wish to be limited thereto, since many modifications may be made and I therefore, contemplate by the appended claim to cover all such modifications as fall within the true spirit and scope of my invention.

I claim as my invention:

A motor fan with a specific character to be able to perform both the oscillation and the all-round revolution, which comprises a fan motor mounted atop a vertical shaft which is so installed in the fan stand as to rotate itself smoothly, an oscillating device mounted on said motor and having a vertical shaft driven by the motor and a circumferentially grooved crank wheel fixed on said shaft, a sleeve surrounding said first-mentioned vertical shaft, an exchange wheel, a lower moving wheel and an upper moving wheel which are so mounted around said sleeve as to be rotated around said sleeve, said upper moving wheel being circumferentially grooved and being connected to the crank wheel of said oscillation device by an elastic belt and said lower moving wheel being connected to an eccentric crank pin of said crank wheel by a connecting rod, a lifter installed between said second moving wheel and said sleeve and fitted with said exchange wheel by means of screw thread so as to be moved up or down by turning said exchange wheel either clockwise or counterclockwise, a knock pin on said lifter, and several hollows which are hollowed out on the under facet of said upper moving wheel so as to let said knock pin fit therein when said lifter is lifted, said members being so formed and combined that when said lifter is screwed down by turning the exchange wheel by hand, the lifted itself may work as a stop-brake for holding the lower moving wheel in selected position and at the same time may leave the upper moving wheel in a free rotative state and thereby allow the fan to perform the oscillating operation, and when the lifter is screwed upward, the lower moving wheel may be released from the braking pressure and may become a loose wheel, and at the same time, the knock pin of the lifter may be inserted into a hollow of the upper moving wheel and work as a stop-brake for the upper moving wheel, and thereby allow the fan to perform the revolving operation.

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