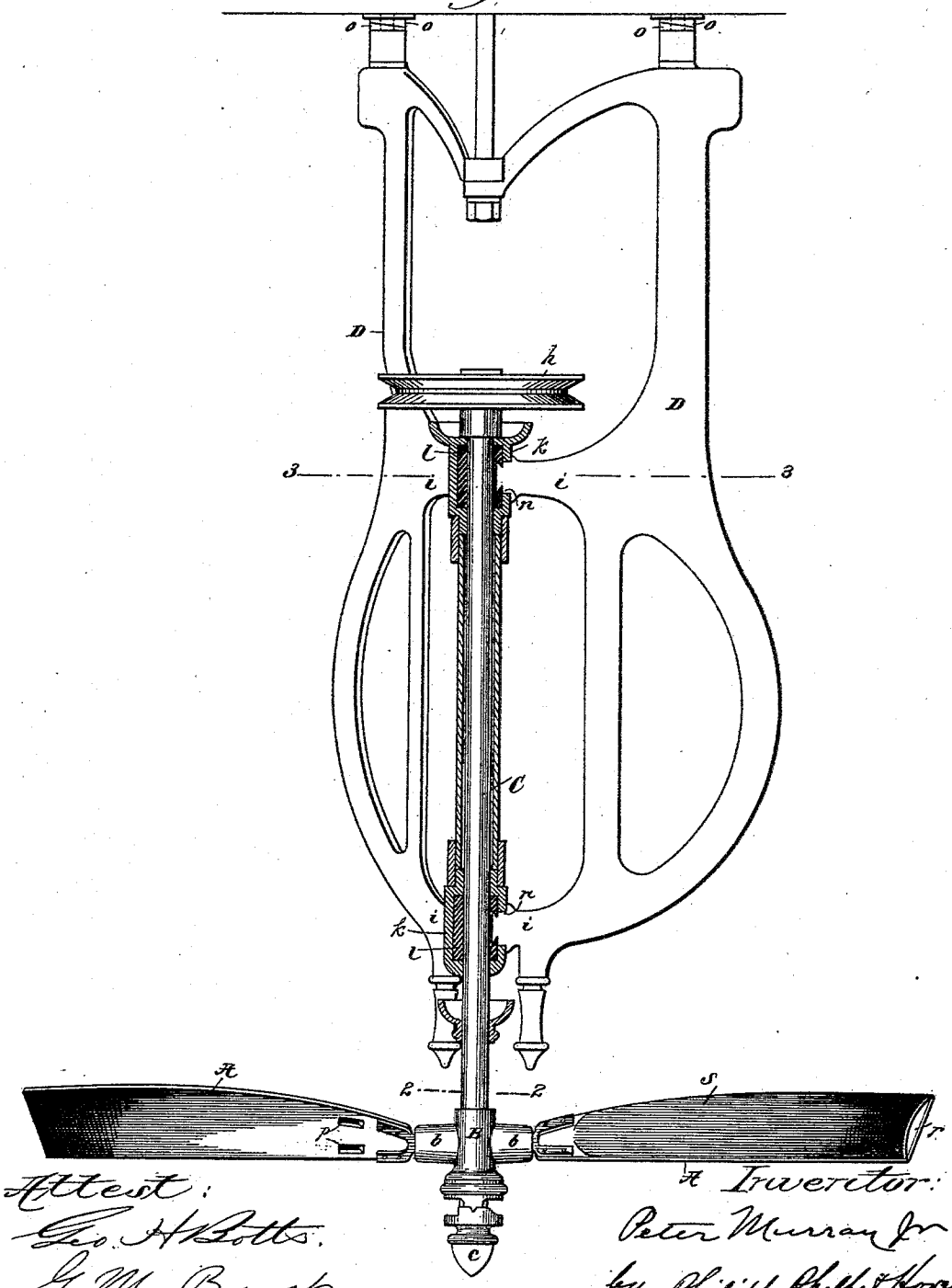
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POWER FAN.

No. 411,826. Patented Oct. 1, 1889.

Fig. 1.



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Fig. 3.

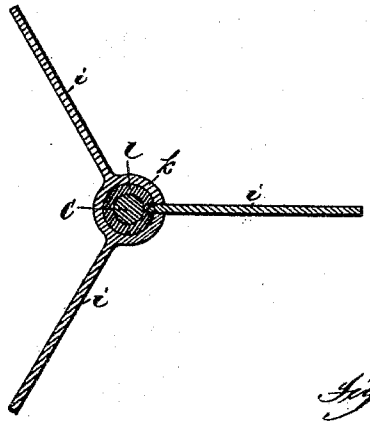


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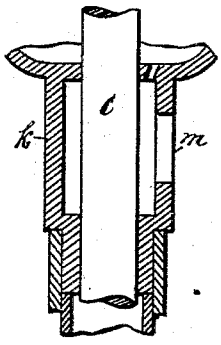


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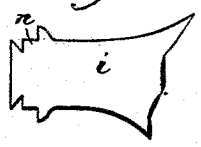


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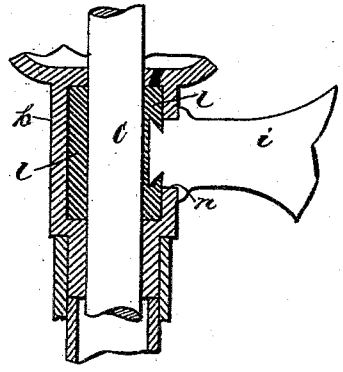


Fig. 2.

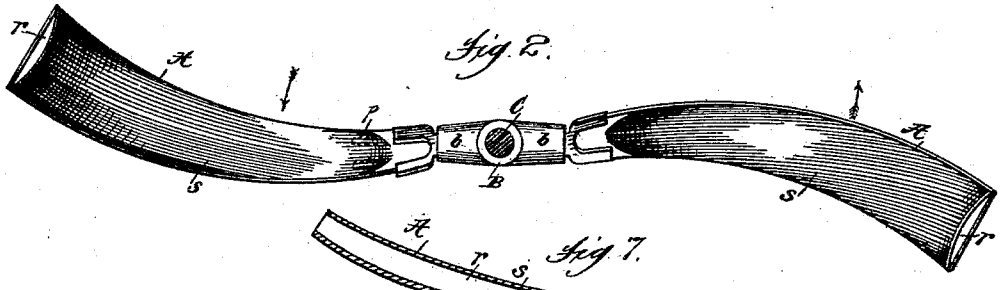


Fig 7.

Fig 8.



Fig 9.



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POWER FAN.

No. 411,826. Patented Oct. 1, 1889.

Fig. 10.

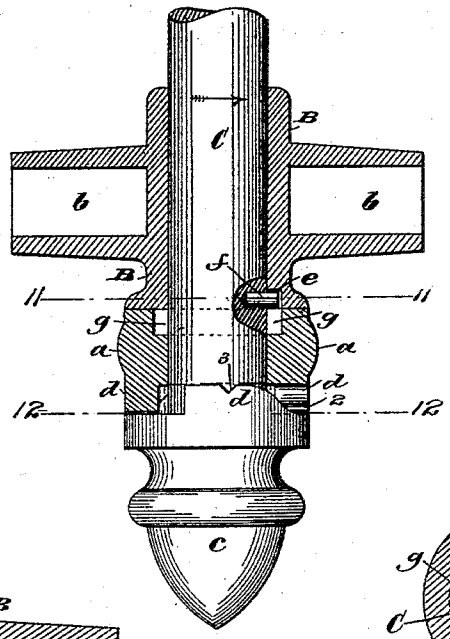


Fig. 13.

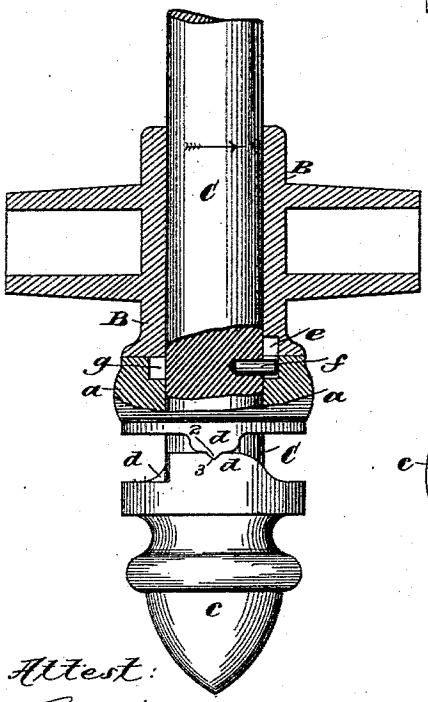


Fig. 11.

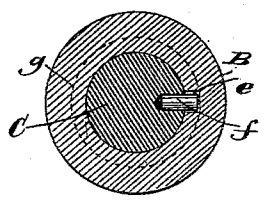
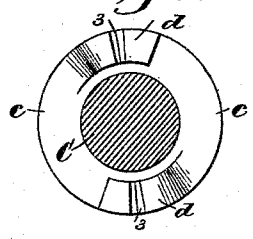


Fig. 12.



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UNITED STATES PATENT OFFICE.

PETER MURRAY, JR., OF NEWARK, NEW JERSEY.

POWER-FAN.

SPECIFICATION forming part of Letters Patent No. 411,826, dated October 1, 1889.

Application filed November 30, 1887. Serial No. 256,493. (No model.)

To all whom it may concern:

Be it known that I, PETER MURRAY, Jr., a citizen of the United States, residing at Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Power-Fans, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates, generally, to that class of power-fans which are used for cooling and ventilating purposes.

The invention relates, particularly, to improvements in the means for supporting the fan and for putting it into and out of operation. Where these fans are employed, and particularly where a number of the fans are required, it is frequently desirable to stop or start one or more of the fans without stopping or starting the others. It is therefore desirable that each fan should be provided with means by which its movements can be controlled independently of the others.

One feature of the invention relates particularly to a means for effecting this result.

Other features relate to means for supporting the fan and to the construction of the fan-blades, by which a better circulation of air is produced.

In the accompanying drawings, Figure 1 is a sectional elevation of a fan and its hanger embodying the improvements constituting the present invention. Fig. 2 is a horizontal section taken on the line 2 of Fig. 1. Fig. 3 is a similar view taken on the line 3 of the same figure. Figs. 4, 5, and 6 illustrate details which will be hereinafter explained. Figs. 7, 8, and 9 illustrate the construction of the fan-blades. Fig. 10 is an enlarged section of the means for putting the fan into and out of operation. Figs. 11 and 12 are cross-sections taken, respectively, on the lines 11 and 12 of Fig. 10; and Fig. 13 is a view similar to Fig. 10, showing the parts in a different position.

Referring to said figures, it is to be understood that the fan consists of two or more horizontally-arranged blades A, which project radially from a hub B, having sockets *b*, in which the blades are secured obliquely to the hub and its shaft and in such manner that they can readily be adjusted to different angles of inclination. The hub B is mounted to turn freely upon the lower end of a vertical shaft C, which is supported in a suitable frame or hanger D, depending from the ceiling of the room. The shaft C is provided at its upper end with a grooved or other pulley *h*, around which the belt for driving the fan passes. The hanger D is composed of three or more arms *i*, which are arranged with relation to each other as best shown in Fig. 3. The arms composing the hanger are cast in two pieces, two of the arms being cast in one piece and the third separately. The two arms which are cast together are connected by ring portions *k*, which form bearings for the shaft C, and are formed to receive Babbitt or other metal *l* to form boxes for the shaft. The ring portions *k* are provided at the proper point with recesses *m*, into which fit projections *n*, formed upon the third arm, the projections *n* being of recessed or dovetailed form, as shown in Figs. 5 and 6, so that when the metal *l* is poured into the ring portions *k* it will serve to lock the third arm to the other two, and thus make the three a rigid structure.

In placing the hangers thus constructed in position it is of course necessary that they should be so secured to the ceiling that the shaft C will be vertical, as otherwise the fan would not run easily and evenly. This is in many cases a work of considerable difficulty, as it frequently happens that the ceiling upon which the hanger is to be secured is not perfectly smooth and level, and as a consequence the hanger, if secured directly against the ceiling, would not hang in such position as to make the shaft plumb. To obviate this difficulty I provide the upper ends of the arms *i* with projecting studs, upon which are fitted washers *o*, which are made of greater thickness at one edge than at the other, as shown in Fig. 1. When the ceiling to which the hanger is to be secured is perfectly level, the washers of all the arms will be adjusted, so that the thickest portion of one washer will overlie the thinnest portion of the other, and when in this position the several arms will be of the same length. By adjusting the two washers to different positions with relation to each other the length of one or more

of the arms *i* can be increased, as will readily be seen, so as to compensate for inequalities or any slight inclination in the ceiling, and thus cause the hanger and its shaft C to hang plumb or vertical.

The hub B, as before stated, is arranged to turn freely upon the shaft C, so that the shaft can be continuously turned without necessarily imparting motion to the hub and the fan-blades. The lower end of the shaft C is provided with an enlargement or head *c*, between which and the lower end of the hub there is interposed a loose collar *a*. The upper end of the collar *a* is made flat, so as to afford a smooth bearing for the lower end of the hub, and the lower edge of the collar and the upper edge of the head *c* are provided with coacting inclines *d*, which are so arranged that by turning the collar about the shaft the hub will be raised and lowered upon the shaft. The lower end of the hub is provided with a recess *e*, which is arranged to receive a pin *f*, projecting from the shaft C, and the upper edge of collar *a* is provided with an annular recess *g*, also arranged to receive the pin *f* when the collar is raised.

The operation of the device thus organized is as follows: The belt being upon the pulley upon the shaft C, so as to set the shaft in motion in the direction indicated by the arrow, it is only necessary in order to stop the fan to grasp and hold the collar *a*. As soon as this is done the movement of the shaft will cause the inclines *d* upon the collar to ride up the corresponding inclines upon the head *c*, and thus raise the hub above the pin *f*. The resistance of the air offered to the blades of the fan will then stop the fan and the hub, while the shaft C will continue to revolve, carrying the pin *f* idly around in the annular recess *g*. The bottoms of the inclines *d* upon the collar *a* will preferably be provided with small projections 2, which, when the hub is raised, will enter corresponding recesses 3, formed in the tops of the inclines *d* upon the head *c*, and thus catch the collar and prevent it from being held so long as to carry the inclines *d* of the collar entirely over the inclines of the head. To start the fan, the collar *a* is grasped and held with sufficient force to carry the projections 2 out of the recesses 3 and the inclines *d* of the collar *a* past the inclines of the head *c*. As soon as this takes place the collar *a* will drop, leaving the hub supported upon the pin *f*, so that as soon as the pin is brought beneath the recess *e* by the revolution of the shaft C the hub will drop, so as to allow the pin to enter the recess, and thus clutch the hub to the shaft and start the fan.

Another feature of the present invention relates to a peculiar construction of the fan-blades by which the area in which the air will be agitated will be increased. For this purpose the blades, in addition to being set so as to throw the air downward, as shown in Fig. 1, are also curved or bent at their ends, as indicated in Fig. 2, so that upon being rotated in the direction indicated by the arrows the air will be thrown outward laterally as well as downward, thus securing the agitation of the air throughout an enlarged area. The curvature thus given to the blades may be varied according to circumstances, but will usually be about equal to the width of the blade. In addition to giving the blades this curvature, it is also desirable, in order to secure still more lateral agitation of the air, to provide the blades with air-passages *r*, which open outward at the ends of the blades and communicate with openings *p*, which open through the sides of the blades which act upon the air when the fan is in motion at a point near the hub. As the blades are revolved the air will be caused to pass through the openings *p* and into the passages *r*, and will by centrifugal force be projected outward from the ends of the blades, thus creating lateral currents which will effect the agitation of the air to a considerable distance. This feature is also equally applicable in those cases where the blades are of the straight or ordinary form instead of being curved or deflected at their ends.

The air-passages *r* may be readily produced by providing the ordinary flat blades with backing portions *s*, which are suitably curved and united to the blades to form these passages, as indicated in Figs. 2, 7, 8, and 9.

What I claim is—

1. In a power-fan, the combination, with the main shaft C, of the radial blades A, set obliquely to the shaft and provided with air-passages *r*, opening at the ends of the blades, and with openings *p*, communicating with said passages and opening through the sides of the blades which act upon the air when the fan is in motion, substantially as described.

2. In a power-fan, the combination, with the main shaft C, of the radial blades A, set obliquely to the shaft, so as to throw the air in the direction of the length of the shaft, and also bent in the direction of their length to throw the air laterally, and provided with air-passages *r*, opening outward at the ends of the blades, and with openings *p*, communicating with said passages and opening through the sides of the blades which act upon the air when the fan is in motion, substantially as described.

3. In a fan-hanger, the combination, with the arms *i*, having studs at their ends, of the washers *o*, fitting loosely on said studs and made thicker at one side than at the other, substantially as described.

4. The combination, with the rotating shaft C and the hub B, turning freely on the shaft, said shaft and hub having the locking-pin *f* and recess *e*, of the head *c*, secured to the shaft and having the incline *d*, the loose col-

lar *a*, interposed between the head *c* and hub B, and having the incline *d*, said inclines being provided with the projection 2 and recess 3, for engaging with each other to arrest the collar temporarily in its raised position, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PETER MURRAY, JR.

Witnesses:
J. J. KENNEDY,
G. M. BORST.