

(No Model.)

T. A. RICHARDS.
BLOWER.

No. 557,705.

Patented Apr. 7, 1896.

Fig. 1.

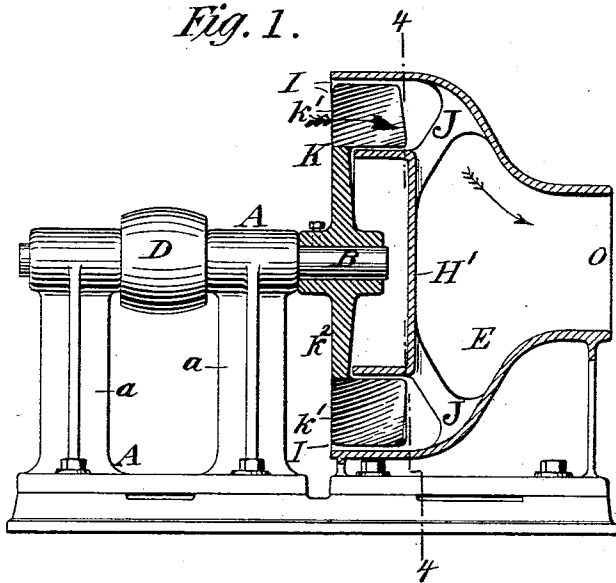


Fig. 2.

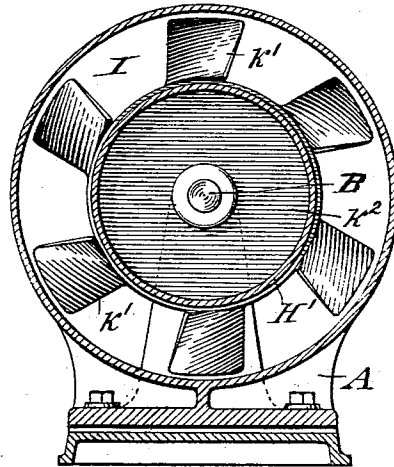
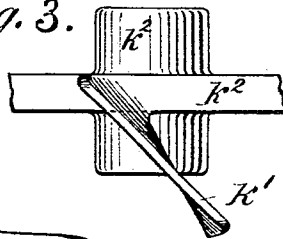


Fig. 3.



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BLOWER.

SPECIFICATION forming part of Letters Patent No. 557,705, dated April 7, 1896.

Application filed June 24, 1894. Serial No. 515,185. (No model.)

To all whom it may concern:

Be it known that I, THERON A. RICHARDS, a citizen of the United States, and a resident of Bayonne, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Blowers, of which the following is a specification.

My invention relates to exhaust-fans and blowers, and it has for its object the devising of an apparatus for exhausting air from apartments or for forcing air into apartments for ventilating or industrial purposes. In my apparatus there is obtained an unobstructed discharge for the entire body of air which is delivered uniformly from all the blades of the fan during the revolution of the fan-wheel, the air being continuously discharged toward the outlet of the casing from all the blades simultaneously during the revolution of the fan, so that the blades are entirely relieved from the injurious effects of back pressure now present in the operation of blowers as ordinarily constructed. By my apparatus I am enabled to obtain a certain amount of work with the expenditure of much less power than is usually required for operating exhausters and blowers as heretofore constructed. Besides by my improvements I produce an apparatus which is practically noiseless in its operation and will not become obstructed by solid substances that may be drawn into it.

In the accompanying drawings, which illustrate my invention, Figure 1 is a longitudinal vertical section of an apparatus embodying my improvements. Fig. 2 is a vertical section on line 4-4 of Fig. 1; and Fig. 3 shows, on an enlarged scale, the ground plan of the hub of a fan-wheel with a blade arranged in connection therewith as used in my apparatus.

Like letters refer to like parts in the several views.

Referring to the drawings, A indicates the main frame, to which the axle B is journaled. To the end of axle B the fan-wheel K is secured. This wheel comprises a large solid hub k^2 and blades $k' k'$ having regular diametrical pitch, the same as given to the blades of propeller-wheels. Such pitch is best illustrated in Fig. 3. The blades $k' k'$ may be either riveted to or cast integral with the hub k^2 .

Secured to the axle B is the driving-pulley D, which is arranged between the two standards $a a$ forming part of the main supporting-frame A and each carrying at its upper end a bearing for the axle B.

E is the fan-casing, and H' is a partition or center plate arranged between the inlet I and the outlet O of the fan-casing. The partition H' is cup-shaped and of the same diameter as the hub of the fan, and the wheel-blades k' are made to extend forward so as to have their inner edges revolve in close proximity to the annular wall of said partition.

The inlet I of the blower-casing is directly in the rear of the wheel-blades, and the flow of the air takes place in a direction substantially parallel with the inner walls of the blower-casing toward the outlet O. Owing to the conformation of the wheel-blades the air is drawn or forced through at the same rapidity at the inner edges of the blades as at their outer edges. For all practical purposes for the hub k^2 there might be substituted a series of spokes to which the blades k' could be attached. By arranging all the bearings of the shaft or axle B outside of the fan-casing they can be protected from dirt and dust, and I avoid any interference with or cutting of such bearings by solid substances which might be drawn into the fan-casing, and by making the edges of the fan-blades straight and adjusting the same close to the annular walls of the fan-casing and the partition H', I avoid the singing noise commonly produced by fans of ordinary construction.

The partition H' is supported in its position within the fan-casing by the arms J J, connected with the interior of the casing, as shown.

It will be noticed that the fan-casing E and the fan-wheel and the partition H' are symmetrically constructed, inlet I, outlet O, the fan-wheel and the partition H' being arranged concentric with the axis of the main driving-shaft B and the interior of the front portion of the fan-casing being made funnel-shaped and curving gradually toward the outlet O of the casing.

In the operation of the apparatus the air is drawn into the casing at the front at I and is thrown off toward the outlet O by all the blades simultaneously throughout the wheel,

without any impediment to its movement, and is discharged at the outlet O. The solid disk or partition H' at the rear of the wheel within the casing prevents the air thrown off from the blades of the wheel from flowing or being drawn backward against the wheel, thus enabling the wheel to continuously draw in a fresh supply of air and insuring the movement of the entire body of air so drawn in toward the outlet O and its free discharge therefrom. A serious difficulty with the fans and blowers heretofore constructed, having either the inlet or the outlet eccentric with reference to the fan-wheel, has been that the air during the revolutions of such wheel would have to be carried around by and in front of the wheel-blades for a considerable distance, thereby retarding the movement of the wheel, causing back pressure on its blades, and consuming an excess of power. In my construction, it will be seen, the movement of the air is largely parallel with the wheel-blades and symmetrical at all times with reference to all parts of the fan for blower, and besides the disk or center plate H' prevents the backward motion of the air from the outlet of the blower-case toward its inlet. This is an important advantage incident to my construction. Owing to the ready and gradual passage of the air through the apparatus and the symmetrical construction and operation

of the latter the operation of my apparatus is practically noiseless.

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

1. In a blower or exhauster, the combination with the casing and a fan-wheel mounted within said casing, of a cup-shaped partition interposed between the outlet of the casing and the central part of the fan-wheel, the blades of said fan-wheel being adjusted to revolve along the outer surface of said cup-shaped partition, substantially as set forth.

2. In a blower or exhauster, the combination with the casing and a fan-wheel mounted within said casing, of a cup-shaped partition interposed between the outlet of the casing and the central part of the fan-wheel, the blades of said fan-wheel being adjusted to revolve along the outer periphery and close to the outer surface of said cup-shaped partition and close to and along the surrounding surface of said casing, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 11th day of June, A. D. 1894.

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