

(Model.)

A. M. DOANE.
EXHAUST FAN.

No. 435.602.

Patented Sept. 2, 1890.

Fig. 2.

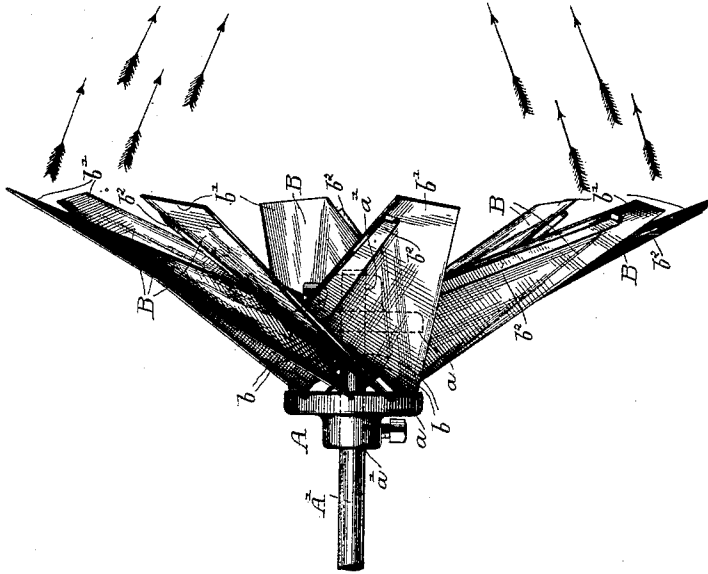
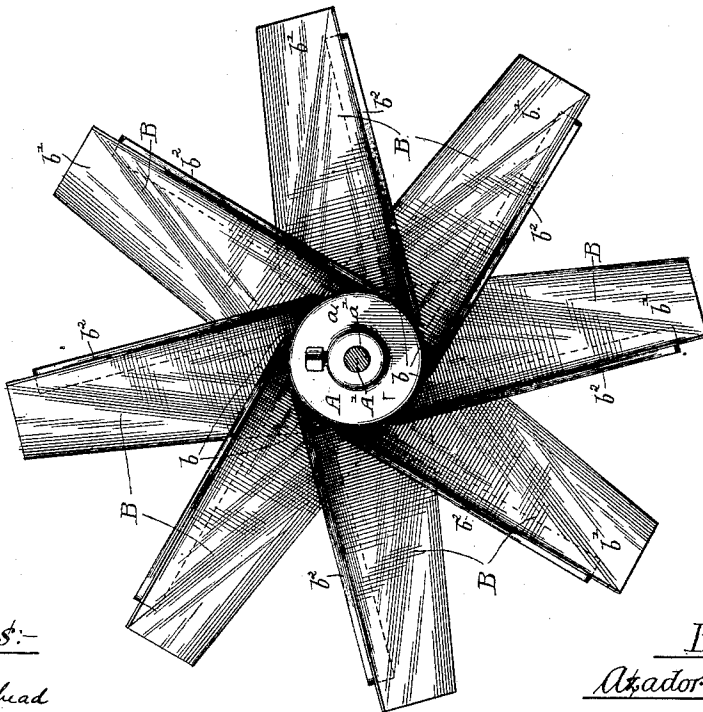


Fig. 1.



Witnesses:-
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UNITED STATES PATENT OFFICE.

AZADORE M. DOANE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO
EDWIN P. HIGGINS, OF SAME PLACE.

EXHAUST-FAN.

SPECIFICATION forming part of Letters Patent No. 435,602, dated September 2, 1890.

Application filed July 30, 1889. Serial No. 319,175. (Model.)

To all whom it may concern:

Be it known that I, AZADORE M. DOANE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Exhaust-Fans; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon,
10 which form a part of this specification.

This invention relates to a novel construction in exhaust-fans for inducing currents of air of that kind having obliquely-arranged blades or wings; and it consists in the features
15 of construction and combination of parts hereinafter fully described, and pointed out in the appended claims.

In the drawings, Figure 1 is a view in front elevation of a fan constructed in accordance
20 with my invention. Fig. 2 is a side elevation of the same.

This apparatus is designed more particularly to be employed for forcing a current of air through a suitable pipe—for example, the
25 pipes used in house-ventilating, in which case the said fan would be located transversely within and fill the ventilating-pipe.

In said drawings, A indicates a hub, which may be of any familiar construction, and
30 which is mounted upon a suitable shaft A', by which it is driven. Said hub is herein shown as formed by two disks *a a*, each of which is provided with a shaft-aperture *a'*.

B B B indicate a plurality of radial blades
35 or wings, said blades or wings being attached at their bases or inner ends to the hub A, and in the present instance secured to each of the disks *a a* comprising said hub. Each of said blades B is constructed wider at the base *b*
40 than at the outer end *b'*, and the blades are spirally bent or twisted and arranged with a greater pitch at their inner than at their outer ends. Said blades, furthermore, are bodily inclined to the axis of the shaft, so that they
45 stand obliquely to the latter, the inclination of the blades being outward and forward or in the direction in which the air-current moves. The said widened inner ends of the blades, therefore, are secured to the hub at a consid-
50 erable angle to the axial line thereof, conven-

iently about forty-five degrees of arc, and said blades are gradually bent or deflected in their body portion, so that their outer narrowed ends will stand more nearly at right angles to such axial line, while the outer ends of the
55 blades extend forward of or overhang the hub.

The blades may in practice be made either of cast or wrought metal or any other convenient material. In the particular construction
60 illustrated they are made of sheet metal and provided with strengthening-ribs *b² b²* along their rear edges; but such ribs are not necessary, provided the blades are otherwise stiff-
65 ened or made sufficiently strong. It is obvious that the bodily incline of the blades, and also the angles at which their ends are located relative to the hub and to each other, can be
70 changed or modified, as will be found most convenient, although the construction illustrated is found effective in practice.

It has heretofore been usual to so construct the blades of exhaust-fans that their outer
75 ends, which revolve with greatest velocity, have the greatest width, and consequently do the greater part of the work.

An obvious advantage gained by the construction herein set forth is the equalization
80 of the quantity of air set in motion at the inner and outer parts of the fan, due to the fact that the outer ends of the blades, which revolve with a greater velocity than the inner
85 ends, are narrower than said inner ends and have a less pitch. Another advantage gained by this construction is the direction given to the air set in motion thereby.

Heretofore the exhaust-fans commonly used
90 have been so constructed that the current of air induced thereby is thrown outwardly against the sides of the pipes in which said fan is located—that is to say, spreads out or
95 diverges—thus causing a considerable friction between it and the walls of the pipes, thereby retarding the force of the current. The same is true when the fan is working without any surrounding pipe, the air moved
by the fan being thrown outward, so as to impinge against the surrounding air instead of moving in a solid column through it.

The construction herein described is provided for the purpose of directing the current 100

of air either in parallel lines or inwardly toward the center of the pipe, and thereby attaining a strong and concentrated current of air with the same amount of power, this result being produced by the bodily inclination of the blades hereinbefore described.

I claim as my invention—

1. An exhaust-fan comprising a supporting-shaft and a plurality of radial blades or wings which are bodily inclined in a direction from their point of attachment to the shaft forwardly or toward the delivery side of the fan, the said blades being separate or disconnected from each other at their side edges, whereby the air moved by the blades passes laterally between the blades and is concentrated or directed obliquely inward toward the axis of the fan, substantially as described.

2. An exhaust-fan comprising a supporting-shaft and a plurality of radial blades or wings which have a greater pitch at their inner than at their outer ends and are bodily inclined with reference to the shaft-axis in a direction from their point of attachment to the shaft forwardly or toward the delivery side of the fan, substantially as described.

3. An exhaust-fan comprising a supporting-shaft and a plurality of radial blades or wings having a greater width at their inner than at their outer ends, said blades or wings being bodily inclined with reference to the shaft-axis in a direction from their point of attachment to the shaft forwardly, or toward the delivery side of the fan, substantially as described.

4. An exhaust-fan comprising a supporting-shaft and a plurality of radial blades or wings having a greater width and pitch at their inner than at their outer ends, said blades or wings being bodily inclined with reference to the shaft-axis in a direction from their point of attachment to the shaft forwardly, or toward the delivery side of the fan, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

AZADORE M. DOANE.

Witnesses:

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