

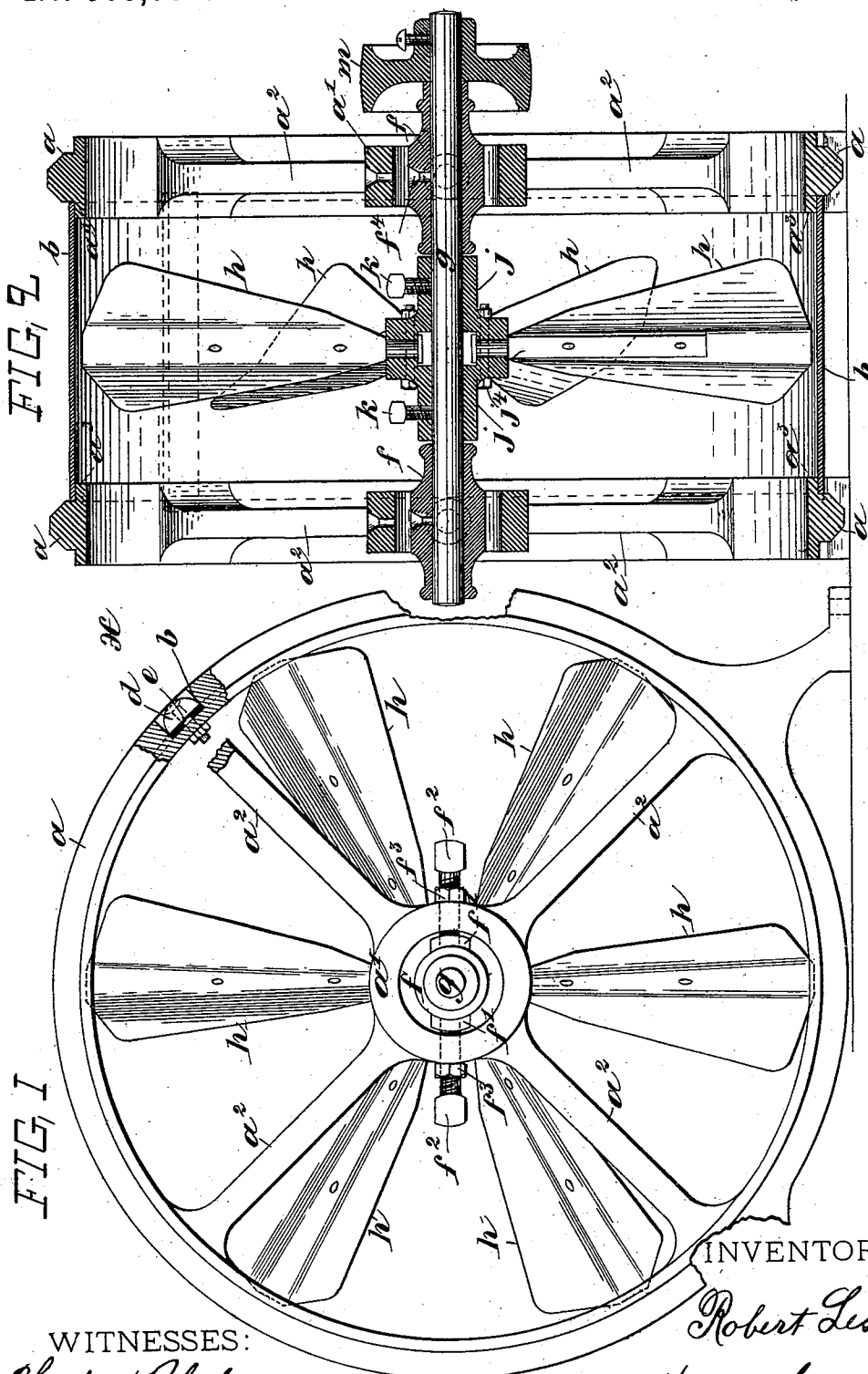
(No Model.)

2 Sheets—Sheet 1.

R. LESLIE.
EXHAUST FAN.

No. 505,902.

Patented Oct. 3, 1893.



WITNESSES:
Herbert Blossom.
Peter A. Ross.

By

INVENTOR:
Robert Leslie
Henry Connelley.
Attorney.

(No. Model.)

2 Sheets—Sheet 2.

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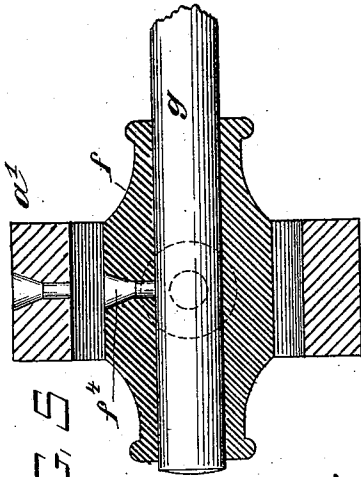


FIG. 5

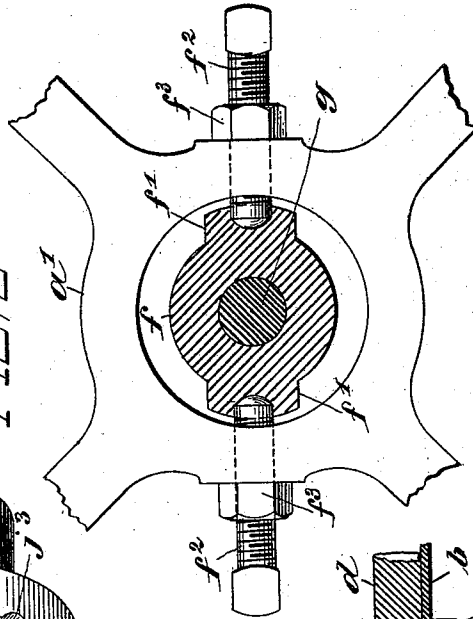


FIG. 6

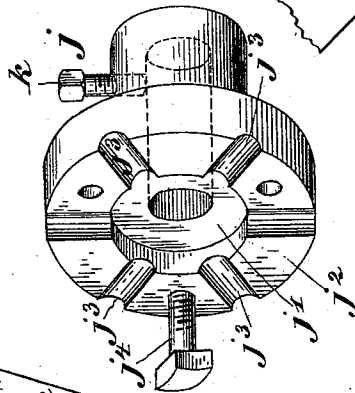


FIG. 4

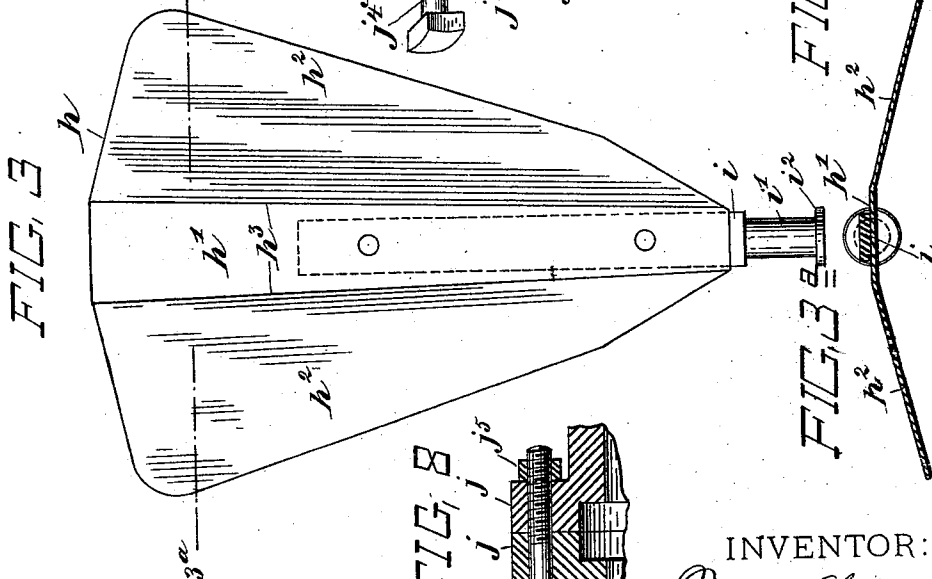


FIG. 3

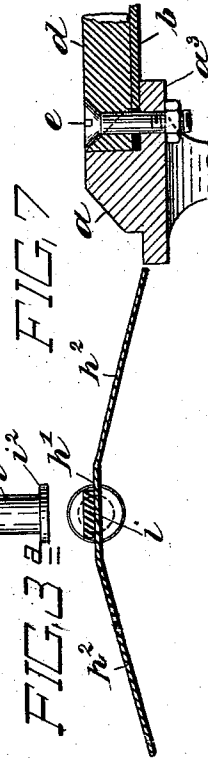


FIG. 7

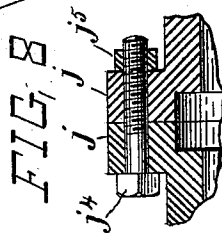


FIG. 8

WITNESSES:

Herbert Blopp
Peter A. Ross

By

Henry Conner
Attorney.

INVENTOR:

Robert Leslie

UNITED STATES PATENT OFFICE.

ROBERT LESLIE, OF NEW YORK, N. Y.

EXHAUST-FAN.

SPECIFICATION forming part of Letters Patent No. 505,902, dated October 3, 1893.

Application filed January 16, 1892. Serial No. 418,224. (No model.)

To all whom it may concern:

Be it known that I, ROBERT LESLIE, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain Improvements in Exhaust-Fans, of which the following is a specification.

My invention relates to the class of fans having obliquely arranged blades, and which rotate in an interiorly cylindrical casing open at its ends, the air-current moving parallel with the fan axis; and my improvements relate in part to the construction and manner of mounting the fan-blade, in part to the construction of the inclosing casing and in part to the manner of mounting the fan-shaft, all as will be hereinafter fully set forth.

In the accompanying drawings which serve to illustrate my invention, Figure 1 is a face view of the fan as seen from the left in Fig. 2, and Fig. 2 is a vertical mid-section of the fan in the plane of the axis of the fan-shaft. The remaining figures are on a larger scale and illustrate details of the fan. Fig. 3 is a face view of one of the blades, detached, and Fig. 3^a is a section of the blade on line 3^a, 3^a in Fig. 3. Fig. 4 is a perspective view of one of the two hubs which clamp and hold the blades of the fan and permit of adjusting the angle of obliquity of the same. Figs. 5 and 6 are sectional views of one of the two shaft-bearings. Fig. 7 is a detail view illustrating the construction of the exterior casing of the fan. Fig. 8 is a sectional detail of the hub clamping means.

I will first briefly describe the casing, which consists of two circular end-frames, a rim or hoop, and stiffening ties. These will usually be made of metal.

a is the outer ring of the end-frame, *a'*, its ring-like center or boss, and *a''*, the arms connecting said outer ring and boss. The cross section of the outer ring *a* is seen in Figs. 2 and 7.

b is the rim or hoop, which may be of sheet metal and bent to the proper form. This rim *b* rests on flanges *a''*, on the rings of the end-frames, and is secured in place by stiffening ties *d*, which extend transversely across the rim parallel with the fan-shaft, and engage at their ends recesses in the respective rings *a* of the end-frames. The ties *d*, and rim *b*

are secured to the rings *a* by bolts or screws *e*, which pass through all of the parts. The tie *d* is seen in end view in Fig. 1, where a part of the casing is broken away at *x*. I prefer to give to the tie *d* a half-round or half-oval cross section.

Mounted pivotally in the bosses *a'* of the end-frames are the shaft bearings, *f*; which are or may be alike. The bearing *f*, is bored to receive the fan-shaft *g*, and has recessed lugs or trunnions *f'*, on its opposite sides, and at about the middle of its length, to receive trunnion pivots, *f''*, provided with lock-nuts, *f'''*. The bearings are pivoted on horizontally arranged trunnions and the oil-hole *f''''*, for lubrication is arranged on the upper side so as to be convenient of access.

The fan proper comprises a pair of clamping hubs on the shaft *g*, arranged to occupy the space between the bearings *f*, and the blades are secured between said hubs.

The form of the blade *h*, of the fan is seen in Figs. 3 and 3^a. It will be made by preference of sheet metal, and has three flat or plane surfaces or portions namely, the central, flat portion *h'*, which tapers in width from the outer end of the blade inward toward the shaft, and two like wings, *h''*, *h'''*, which are bent to stand at an angle to the central portion along the lines *h''''*, seen in Fig. 3. The fan blade *h* is secured to a stem *i*, by rivets or other suitable fastenings, and is arranged in the center or axis of the blade. At its inner end, where it is clamped by the hubs *j*, this stem has a reduced neck, *i'*, and a terminal button or flange *i''*. The hubs *j* are, or may be, alike. One of them is seen in perspective in Fig. 4. The hub has a central recess *j'*, and in the face of the rim *j''*, which surrounds this recess are formed radial recesses *j'''*, which receive the necks *i'*, on the blade stems. The neck *i'* will be made rounded or cylindrical by preference, and when the two hubs *j* are made to embrace the stems of the several blades, they clamp on said stems and hold the blades firmly in place, preventing rotation also. The hubs are drawn together by screws *j''''*, which pass through their rims *j''* parallel with the shaft axis and between the stem recesses *j'''*. Set-screws *k* are also employed to secure the hubs firmly to the shaft *g*. This construction enables the workman, in assem-

bling the parts, to give to the blades the proper obliquity or "pitch" required to adapt them to the speed at which the fan is to be run, and it also enables him to adjust or vary the pitch at any time.

The fan may be provided with a pulley *m*, fixed on the shaft *g*, for driving it from any source of power.

Fig. 8 is a sectional view of a part of the hubs *j* in the plane of one of the screws *j*⁴, which secures them together. The screw passes through a smooth hole in one of the hubs, and screws into the other hub, thus drawing them tightly together; the screw is provided with a lock-nut *j*⁵, to prevent it from being loosened by the jar and vibration in running.

Having thus described my invention, I claim—

20 1. An exhaust fan having its blade *h* composed of three unwarped, plane surfaced portions, namely, the central portion *h'*, widest at its outer end and tapering toward its inner

extremity, and the two like flat surfaced wings *h*², the surfaces of which are oblique to the surface of the portion *h'*, substantially as herein shown and described. 25

2. An exhaust fan having each of its blades provided with a stem, *i*, which has a reduced cylindrical neck *i'*, and an enlargement *i*², clamping hubs, each provided with a ring *j*², having a radial thickness equal to the length of the neck *i'*, on the stem of the blade and provided with radial recesses *j*³ to receive the necks on the blades, and means for securing the hubs together when clamped on the said stems, whereby the pitch of the blades may be conveniently varied, as set forth. 30 35

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses. 40

ROBERT LESLIE.

Witnesses:

HENRY CONNETT,
HERBERT BLOSSOM.