B. F. STURTEVANT.

EXHAUST FANS OR BLOWERS.

No. 195,182. Patented Sept. 11, 1877.

Fig. 1.

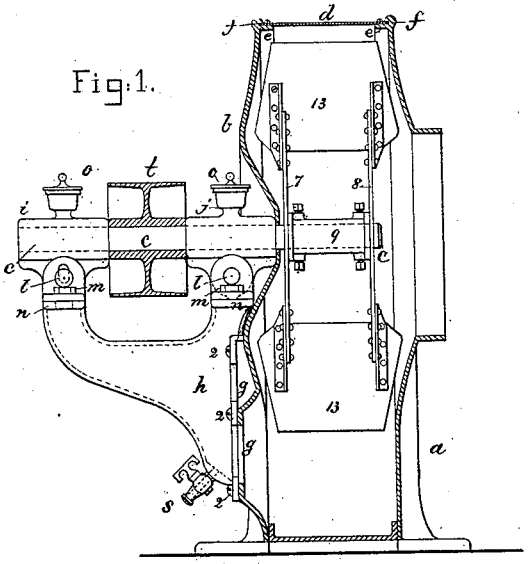


Fig. 3.

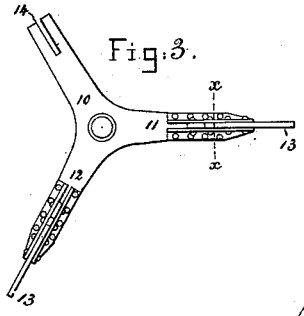


Fig. 4.

Fig. 5.

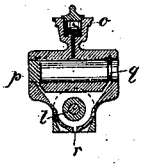


Fig. 2.

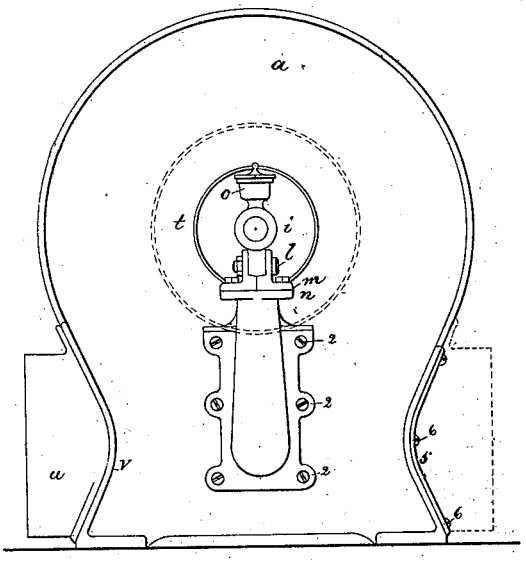
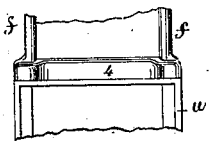


Fig. 6.



Witnesses.

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BENJAMIN F. STURTEVANT, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN EXHAUST FANS OR BLOWERS.

Specification forming part of Letters Patent No. 195,182, dated September 11, 1877; application filed July 30, 1877.

To all whom it may concern:

Be it known that I, BENJAMIN F. STURTEVANT, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Exhaust Fans or Blowers, of which the following is a specification:

This invention relates to improvements in exhaust fans or blowers.

It consists in a case provided with a reversible mouth-piece, which may be changed in position so as to discharge air or heavier particles from the case in either direction, according to the direction in which the fan is run; also, in the combination, with the fan-shaft and its two pivoted and adjustable boxes, of a hollow bracket to support the boxes and contain waste oil; also, in a fan-wheel composed of sheet-metal spiders provided with two or more arms secured to opposite ends of a connecting-hub; also, in a fan-wheel having slotted sheet-metal arms and blades inserted in the slots in the arms, substantially as described.

Figure 1 represents an end view of an exhaust-fan constructed in accordance with this invention, the case being in section; Fig. 2, a side view thereof, looking at the fan from the left of Fig. 1; Fig. 3, a side view of the blast-wheel; Fig. 4, a cross-section of one of its arms on the line *x x* of Fig. 3. Fig. 5 represents one of the pivoted and vertically-adjustable hollow boxes in section; and Fig. 6 a detail of the upper end of the reversible mouth-piece, showing the manner of connecting it with the case.

Exhaust fans or blowers, as heretofore constructed, have been made as rights and lefts, and an exhaust-fan made to run in one could not be set up to run in the other direction. This fact has made it necessary for manufacturers, and others keeping blowers in stock, to keep an increased number, so as to supply the demand for both right and left hand blowers. When ordering blowers, the sellers are not always advised in which direction they are to run, and trouble and expensive delay are frequently caused thereby. The shaft of an exhaust-fan is attached at one side, and cannot be changed to the other.

The exhaust-fan herein described may be used in any position, either as right or left hand.

The case is composed of two side pieces, one, *a*, having the central opening for the reception of air, shavings, dust, grain, &c., according to the use to which the exhaust-fan is to be put, and the other, *b*, receiving through its center the fan-shaft *c*. The two sides of the case are connected by means of a sheet-metal segment, *d*, bolted to flanges *e* at the base of ribs *f*, grooved to receive the edges of the sheet-metal segment, so as to hold the sides of the case and segment firmly together. The side *b* of the case has an abutment, *g*, with a flat vertical outer face, such abutment being cast thereon, or suitably affixed thereunto, in order to serve for the attachment, by bolts or screws 2, and the vertical adjustment of the hollow bracket *h*, (see dotted lines, Fig. 1,) adapted to receive waste oil from the hollow boxes *i j*, supported by means of bolts *l* in stands *m*, having feet bolted to the horizontal upper surfaces *n* of the bracket *h*.

The boxes are made as in Fig 5. An oil-cup, *o*, provided with a suitable cover, has an oil-passage leading to the bearing-surface of the box. A wick serves to permit the oil to descend at the necessary speed. At each end of the box *j*, within it and at the inner end of the box *i*, are annular grooves *q*, connected by means of oil-passages with the hollow base of the box, from which leads an educt, *r*, through which the oil in the hollow base of the box descends into the hollow bracket *h*, from which it is withdrawn at suitable times by a cock, *s*. The bolt-holes in the stands *m* are elongated so as to permit the boxes *i* or *j* to be raised or lowered. The bolt-holes in the feet of the stands also permit lateral motion of the boxes and stands, and the boxes can be swung or turned on their bolts *l*.

This construction and provision for adjustment insures the correct and quick placing and adjusting of the boxes in perfect line with the shaft without filing and fitting.

The fan-wheel driving-pulley *t* is connected with the shaft *c* between the boxes. The lower portions of the sides of the case are concaved, as shown in the side view, Fig. 2.

At the left hand of Fig. 2 is placed a mouth-piece, *u*, it being made, as herein shown, convex at one side, and provided with a rib to meet a rib, *v*, on the side of the case, where-

by the mouth-piece may be attached to the case by means of screws or bolts. The upper portion of the mouth-piece is preferably provided with a rib, 4, projected backward to fit between the ribs *f* of the side pieces, (as in Fig. 6,) to prevent lateral displacement of the mouth-piece. At the right of the case is a covering-plate, 5, attached by screws 6.

This mouth-piece is made reversible—that is, if it becomes necessary to use a blower with the mouth at the left, as in Fig. 2, so as to discharge air, &c., from the right-hand portion of Fig. 2, rather than from the left, then the cover-plate and mouth-piece will be detached and changed, the one to the position of the other, and thereafter the exhaust-fan may be run in the opposite direction.

The concaved formation of the base of the case is of advantage over a case made vertical or straight, for the air, &c., is less liable to clog, and the case is made more symmetrical.

By reversing the mouth-piece such exhaust-fan may be quickly converted into a right or left hand fan.

The blast-fan, when used as an exhaust to handle shavings, wood, &c., needs to be very strong, and at the same time it is very desirable to make the fan as light as possible consistent with strength. The blast or fan wheel herein shown, in Figs. 1 and 3, is composed of two spiders, 7 8, attached to a central connecting-hub, 9. These spiders will be cut from strong but thin sheet metal, such as steel, or homogeneous steel, the arms, two or more, being essentially in one piece. Three arms, 10 11 12, are shown, in this instance, of the invention, but the number may be more or less.

The arms being made of very stiff thin sheet metal, as described, may be made very light, and yet be very strong, to enable the fan to be run at high speed.

To enable the blades 13 to be supported with equal firmness, notwithstanding the direction of rotation of the fan, the arms are slotted at their outer ends, as at 14, (see arm 10, Fig. 3,) and into such slots the blades are set, and secured by means of angle-iron pieces 15, fitted each side the blade, into the angle between the arms and blades, the angle-irons being riveted to the arms, and the blades to the angle-irons. In this way the blades are equally well supported at each side, which is a matter of special importance when the fan is to be reversed, as hereinbefore described.

The dotted lines at the right of Fig. 2 show the reversible mouth applied to the right hand of the exhaust-fan.

The outer end of the box *i* is stopped by a plug, *p*, having a flange at its inner end, which enters an annular groove in the interior of the box. To insert this plug the box is made in halves in the direction of its length.

In connection with blowers it is sometimes desirable to have two mouths. Such an apparatus will form the subject-matter of another application.

I claim—

1. A blower-case, in combination with a reversible mouth or outlet, to discharge air from the case according to the direction in which the fan is run.

2. The combination, with the fan-shaft and its two pivoted and adjustable boxes, as described, of a hollow bracket to support the boxes and contain waste-oil.

3. In a fan-wheel, the combination, with the sheet-metal spiders having two or more arms, of a connecting-hub, substantially as described.

4. A fan-wheel having slotted sheet-metal arms, in combination with blades inserted in the slots in the ends of such arms, substantially as and for the purpose described.

5. A fan-wheel having slotted sheet-metal arms, in combination with blades inserted in the slots, and with angle-iron strips to unite the blades and arms, substantially as described.

6. A blower-case provided about its periphery with a grooved flange to receive the edges of the sheet-metal segment of the case, and with flanges to which such segment is bolted or secured, substantially as described.

7. A blower-case curved at its lower portion, at front and back, to receive the reversible mouth and the covering-plate, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENJ. F. STURTEVANT.

Witnesses:

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