No. 646,002

Patented Mar. 27, 1900.

H. KLEIN.

VENTILATING FAN.

(Application filed July 18, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

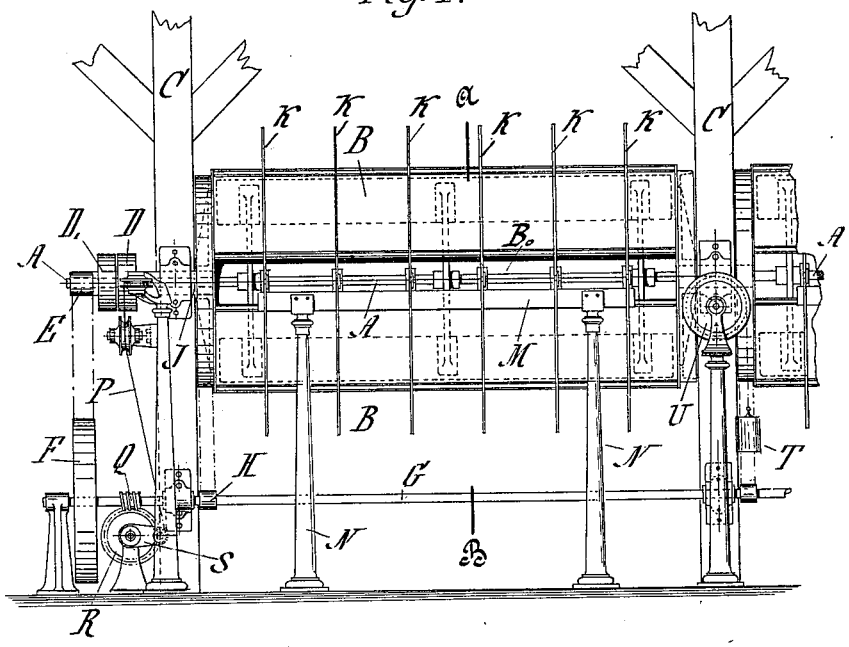
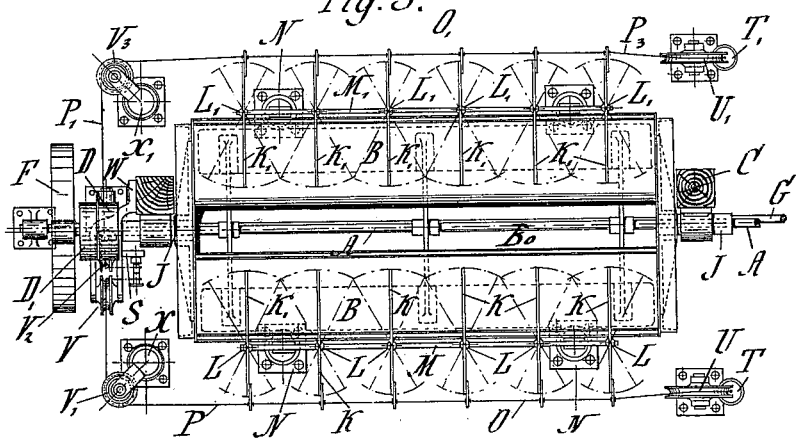


Fig. 3.



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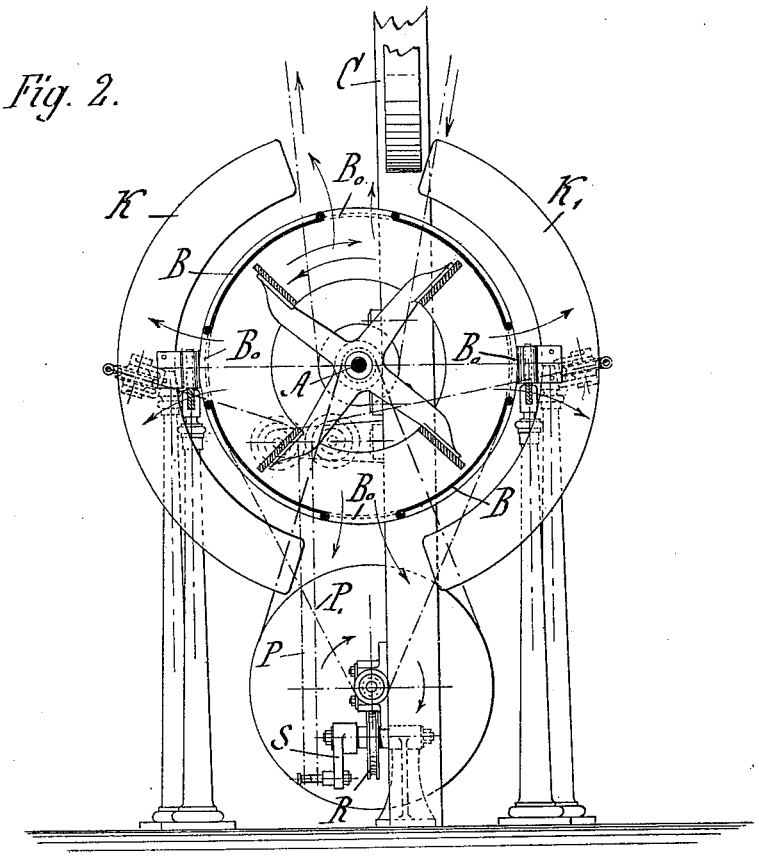
(No Model.) 2 Sheets—Sheet 2.

Fig. 2.



A - B

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UNITED STATES PATENT OFFICE.

HEINRICH KLEIN, OF PIRMASENS, GERMANY.

VENTILATING-FAN.

SPECIFICATION forming part of Letters Patent No. 646,002, dated March 27, 1900.

Application filed July 18, 1899. Serial No. 724,308. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH KLEIN, manufacturer of machines, residing at Pirmasens, Kingdom of Bavaria, Germany, have invented a new and useful Ventilating Apparatus, of which I give the following description.

My invention relates to a ventilating apparatus for the continuous ventilation of one or several rooms which may be situated in any way with regard to the apparatus.

The objects of my invention are, first, a ventilator having four vanes secured to its shaft by ribs which rotate in a ventilator-drum; second, a ventilator-drum which on its circumference has a number of equally-distributed apertures for the escape of the air and which during the time the ventilator is rotating also rotates, which rotations within certain intervals can be changed from right to left, and vice versa, by means of one of the usual reversing-gears, and, third, a number of fans resembling Venetian blinds and movable on vertical pivots, which placed along the two longer sides of the ventilator-drum rectangularly to the ventilator-shaft by a special mechanism are put in slow oscillatory motion, whereby they gradually change their rectangular position into an acute-angular position to the left (or to the right, as the case may be) with regard to the ventilator-shaft, and having on their way back passed again through the rectangular position with regard to the ventilator-shaft they gradually take an acute-angular position to the right (or to the left, as the case may be) with regard to the ventilator-shaft, and so on. By the oscillatory motion of these fans the air which is forced out of the apertures of the ventilator-drum by the fast-rotating ventilator escapes not only out of these apertures in a straight line—*i. e.*, in a direction rectangular to the ventilator-shaft—but also to the left or right of this direction, according to the position the fans just happen to have.

Figure 1 represents a front view of the ventilating apparatus. Fig. 2 represents a section in the direction A B of Fig. 1. Fig. 3 represents the ground plan of the ventilating apparatus.

The same letters denote the same parts.

The bearings of shaft A are secured to the wooden posts C C of a work or drying room at a suitable distance from the floor. If the room be very large, two or more ventilating apparatus may be put in the same. D and D′ are fixed and loose pulleys for the impulsion of shaft A. The former can alternately be put in rotation to the right or left by one of those gears commonly used for this purpose. Secured to shaft A, by the side of the loose pulley, is the little pulley E, which by means of pulley F drives shaft G, which is near the floor and parallel to shaft A. Secured to shaft G is another little pulley H, which, by means of a belt or the like, makes rotate the drum in the closed boxes I I, the rim of the drum serving as pulley.

Drum B has been cut open four times in its entire length, so as to obtain several apertures, through which the air in the drum is forced out of the same by the fast-rotating fan, the air which has been expelled being replaced by air from without, which enters in the direction of the drum-shaft.

If we now suppose the ventilating apparatus to be at work, the ventilator and the drum rotating at the same time, but with different velocities—the former very fast the latter very slowly—we will easily understand that the air which is expelled through the apertures B^0 B^0 stirs up and makes violently vibrate and undulate the surrounding air; but only the stratum of air opposite to the longer side of the ventilating apparatus—*i. e.*, a stratum of air as wide as the drum is wide—would be stirred up and the space beyond the width of the drum would entirely be excluded from any current of air if there were not the above-mentioned Venetian-blind-like fans, the motion and effect of which have been described, sub. 3. A number of these metallic crescent-shaped fans *k k* and *k′ k′* are arranged on the two longer sides of the drum, as shown in the figures subjoined to this, each of these fans being movable on a vertical pivot L or L′, which is fastened to rail M or M′, supported by posts N N′. The fans on one side of the drum are on their back connected with one another by rods O and O′ in the same manner as the slats of Venetian blinds are connected with one another. By a special arrangement all the fans on both sides of the drum are put in slow oscillatory motion, the mechanism of this arrangement being as fol-

lows: Secured to one end of the rods O and O′ are the cords P and P′, which by means of crank S, driven by worm Q and worm-wheel R, are alternately pulled to one side, the other end of the rods O and O′ being secured to the cords P^2 and P^3, respectively, which are led over pulleys U U′ and provided with counterpoises T T′. By the weight of the latter the fans are slowly pulled to the other side during the upstroke of the crank, and so on. The cords P and P′, which always are taut, because of the counterpoises T and T′, are led to the rods O and O′ over pulleys V V′ and V^2 V^3, which are secured to the supports W, X, and X′. If we now suppose shaft A to make five hundred and twelve revolutions per minute and the ratio of gearing of the pulleys E and F to be one to eight, shaft G would make sixty-four revolutions per minute, and if we suppose the ratio of pulley H to the diameter of the drum to be one to ten the drum would only make 6.4 revolutions per minute. The ratio of gearing, as well as the velocity with which the Venetian-blind-like fans move to and fro, may of course without any difficulty be changed in such a manner as to yield the best results possible in every case in question.

I know very well that before my invention ventilating apparatus for the purpose above mentioned have been constructed in which the drum, which was provided with an aperture for the ingress and egress of the air, was put in oscillatory motion in order to sweep a certain surface; but

What I claim as new, and desire to secure by Letters Patent, is—

1. A ventilator rotating with great velocity in a slowly-rotating drum which on its circumference has a number of equally-distributed, slit-shaped apertures for the escape of the air, the air which has been expelled being replaced by air from without which enters in the direction of the drum-shaft, substantially as described.

2. A number of crescent-shaped fan-blades, resembling Venetian blinds, movable on vertical pivots and placed along the two longer sides of the drum and means to put them in oscillatory motion by transmission-gear driven by the ventilator-shaft, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HEINRICH KLEIN.

Witnesses:
J. ADRIAN,
R. PISOLL.