No. 837,627. PATENTED DEC. 4, 1906.

# A. KÜNDIG-HONEGGER.

## VENTILATING FAN.

APPLICATION FILED MAR. 1, 1904.

2 SHEETS—SHEET 1.

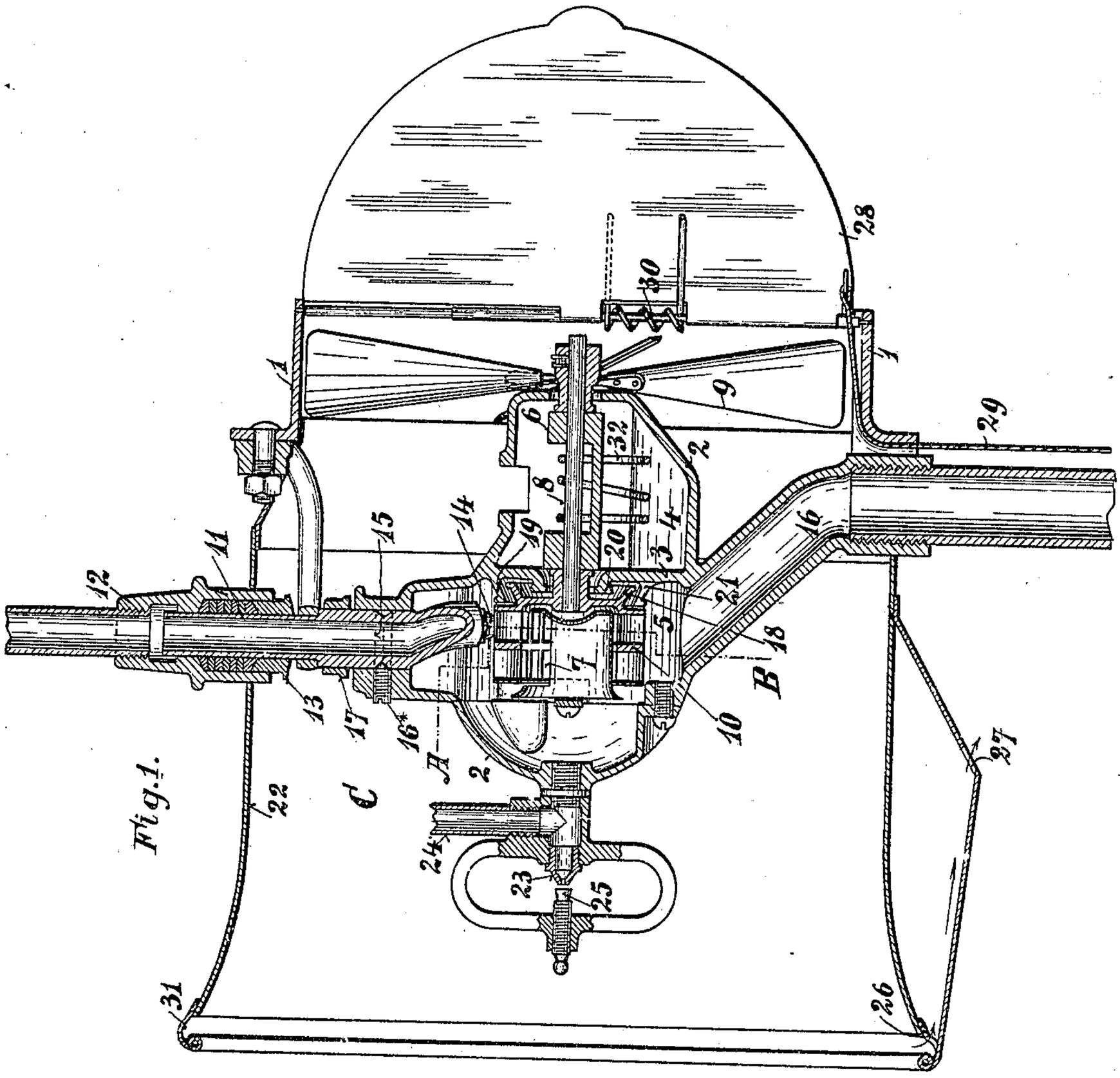


Fig. 1.

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## VENTILATING FAN.

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2 SHEETS—SHEET 2.

*Fig. 2.*

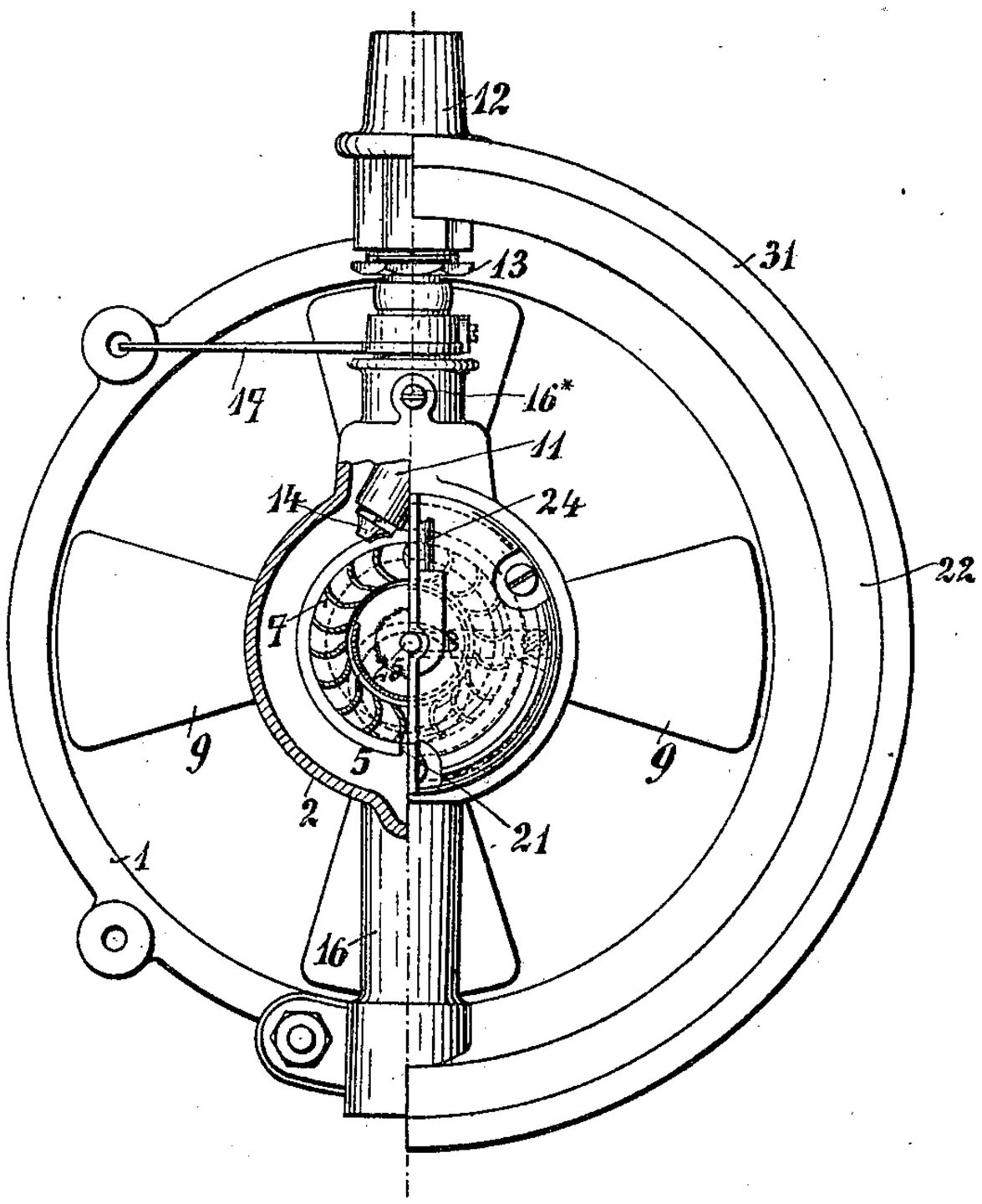
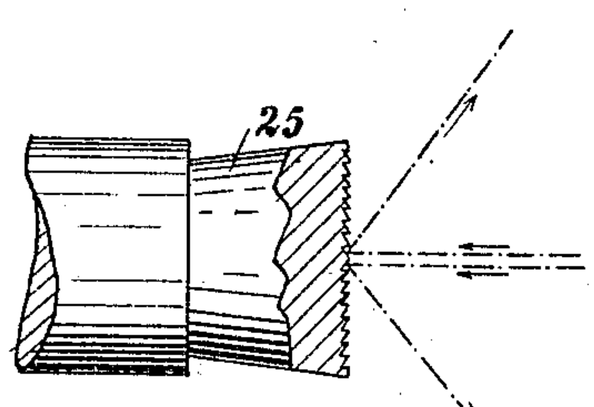



*Fig. 3.*

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# UNITED STATES PATENT OFFICE.

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## VENTILATING-FAN.

No. 837,627. Specification of Letters Patent. Patented Dec. 4, 1906.

Application filed March 1, 1904. Serial No. 196,081

*To all whom it may concern:*

Be it known that I, ARNOLD KÜNDIG-HONEGGER, a citizen of the Republic of Switzerland, residing at Zurich, Switzerland, have invented new and useful Improvements in Ventilating-Fans, of which the following is a specification.

My invention relates to a ventilating-fan driven by a turbine having two rings of scoop-shaped buckets, the one bucket-ring being designed for right-hand, the other ring for left-hand rotation of the turbine. The two bucket-rings are fed by a common supply-pipe provided with a reversing device whereby the water or other driving agent can be fed to either bucket-ring for effecting rotation of the ventilator in the desired direction for suction or for blowing action, respectively.

The accompanying drawings illustrate one form of construction of my improved ventilator.

Figure 1 is a longitudinal vertical section; and Fig. 2 a section on the line A B of Fig. 1, one-half being shown in elevation. Fig. 3 is a detail view, drawn to a larger scale, of parts to be hereinafter referred to.

1 is an outer casing, to which is secured an inner casing 2, divided into two chambers 4 5 by a partition 3. In the chamber 4 is located the ring-lubricator bearing 6, while the chamber 5 contains the turbine 7. The casing 2 receives the shaft 8, running in the bearing 6, and on one end of the shaft is mounted the fan 9 and at the other end the turbine 7, designed as partial double turbine for working by impulse from without and having a disk 10, on either side of which is a ring of scoop-buckets arranged to correspond with the direction of rotation. In the casing 2 above the turbine 7 there is located a rotary vertical reversing-pipe 11, the axis of rotation of which lies in a plane passing through the center of the shaft 8, while its top end is furnished with a union stuffing-box 12, having a gland 13. The bottom end of the pipe 11 is provided with a nozzle 14, running eccentrically to the axis of rotation of the pipe.

15 is a groove running half round the pipe 11, and in this groove there engages a screw 16*, projecting through the wall of the casing 2, whereby the maximum angle of rotation of the pipe is limited to one hundred and eighty degrees.

17 is a lever whereby the pipe can be rotated.

The ventilator is driven by pressure-water fed to the turbine in a fine jet through the pipe 11 and nozzle 14, whereby turbine 7 and fan 9 are set in rapid rotation. The water flowing off runs through the pipe 16. In order to prevent water from being thrown out of the chamber 5 into the chamber 4, which contains the bearing 6 and its lubricating-oil, the turbine 7 is provided with a dished rim 18, inclosed by rims 19 20, which together form a groove of dovetail section, within which the rim 18 can rotate without obstruction. Should water be thrown between the turbine and the rim 19, it will impinge against the rim 18, and then in consequence of the high speed of rotation of the turbine will, owing to the centrifugal action, be thrown toward the points of highest circumferential velocity. From there it will be thrown off and caught by the annular rim 19, down the inner walls of which the water will run, finally flowing back into the chamber 5 through the aperture 21, located at the lowest part of the annular rim 19. If, however, any water should be thrown round the rim 18, it will impinge against the annular rim 20 and will collect at the lowest point of the latter, from there dropping onto the inclined inner surface of the rim 18. From here the water will be thrown to the points of highest circumferential velocity, and flying from there will be caught up by the rim 19. It will then run down the walls of the latter and will finally flow off through the aperture 21 into the chamber 5, as before. Thus the water is absolutely prevented from getting access to the oil-chamber 4. The purpose here in view is to provide a thorough joint between the chambers 4 and 5 without there being any friction or consumption of power.

To reverse the turbine, the lever 17 must be turned through an angle of one hundred and eighty degrees, whereby the pipe 11 is likewise caused to turn through the same angle. Owing to the eccentric position of the nozzle 14, the above rotation will cause it to be transferred from one bucket-ring to the other ring with reversed buckets. In this manner the turbine can be rotated in the opposite direction by the jet from the nozzle 14 and the fan 9 caused to suck over air from, for instance, the side C instead of forcing it over to such side.

Air sucked into a confined space from without is usually dry and dusty. For the purpose of rendering such air humid and for

removing the dust the following method is adopted: Concentric with the shaft 8 and surrounding the casing 2 a cylindrical mantle 22 is provided, projecting beyond the casing 2. The mantle 22 is secured at one end to the casing 1 and at the other end is provided inwardly with a gutter 31. On the left-hand side of the casing 2 a nozzle 23 is provided, lying concentrically to the mantle 22 and directed toward the gutter end of the same. Pressure-water is supplied to the nozzle 23 by means of a pipe 24. In front of the nozzle 23 is an atomizer 25, which by means of a deflector-surface diffuses the spray of water issuing from the nozzle. The deflector-surface is provided with grooves, as shown in Fig. 3. These grooves run concentrically round the prolonged axis of the nozzle and present deflecting-surfaces lying inclined to and turned laterally from the prolonged nozzle-axis, so that the water-jet impinging against them rebounds in finely-divided condition. The current of air passing through the mantle 22 takes up a portion of the diffused spray of water, and thus enters the room or the like in suitably humid condition. Those particles of water which pass the air-current but are not taken up by it extract the particles of dust contained in the air and are caught up by the mantle-walls, along which they run into the gutter 31. 26 is the exit from the gutter, through which the said water runs into a collector, escaping finally through the outlet 27 of the same. Owing to the water being thrown backward by the deflector-surfaces, the air is enabled to mingle quickly and intimately with it, and the particles which are not taken up by the air-current are more readily caught by the mantle 22, the length of which can thus be relatively short. During this moistening and purifying process the air can also be cooled, as the quantity of heat necessary for vaporization of the spray of water is taken from the air blown through, which is therefore cooled.

In order to prevent the free access of air to the room being ventilated, when the ventilator is not working, flaps 28 are provided. These flaps are hinged to the casing 1 and can be closed by drawing the cord 29, while on release of the latter they open automatically under the influence of a spring 30.

The bearing 6 is lubricated by means of a spiral spring 32, coiled on the shaft 8. The lower portion of the spring dips into the oil, and owing to the friction between rotating shaft and spring the latter is slowly rotated and lifts oil onto the shaft.

The employment of a spiral lubricating-spring enables the lubricating member to be applied to the shaft at any moment, whereas with a closed ring bearing as ordinary this can only be done with split rings.

By the provision of scooped buckets the water-power can be better utilized than is the case with straight radial blades or corrugated sheet surfaces.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is—

1. In a ventilating apparatus the combination with a fan and a turbine having a lateral projecting ring; of a shaft common to both of them, an inner casing, an oil-reservoir and bearings for the shaft on the inner casing a partition separating the turbine and reservoir also having a lateral projection surrounding one of the bearings projecting toward the turbine and within the laterally-projecting ring thereon.

2. In a ventilating apparatus the combination with a fan and a turbine having a laterally-projecting ring; of a shaft common to both of them, an inner casing, an oil-reservoir and bearings on the inner casing, a partition separating the turbine and reservoir and having a pair of projecting flanges concentric with the shaft thereby forming a substantially dovetailed groove between them and into which the ring on the turbine projects, substantially as described.

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

ARNOLD KÜNDIG-HONEGGER.

Witnesses:

GUSTAV ANTON WIEDERKEHR,

A. LIEBERKNECHT.