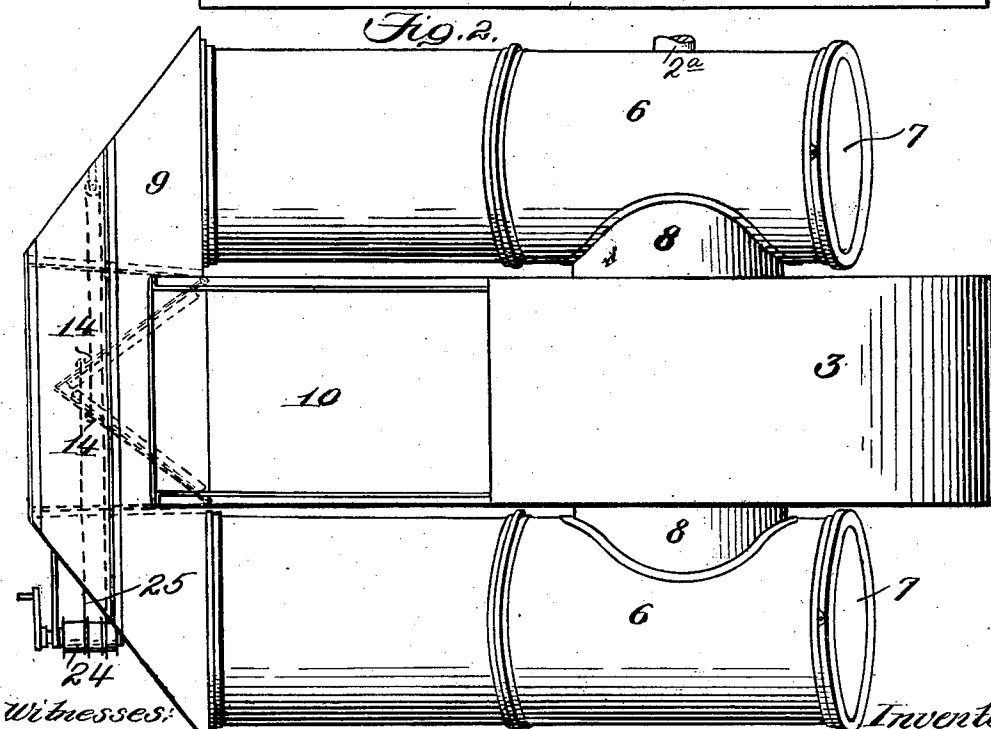
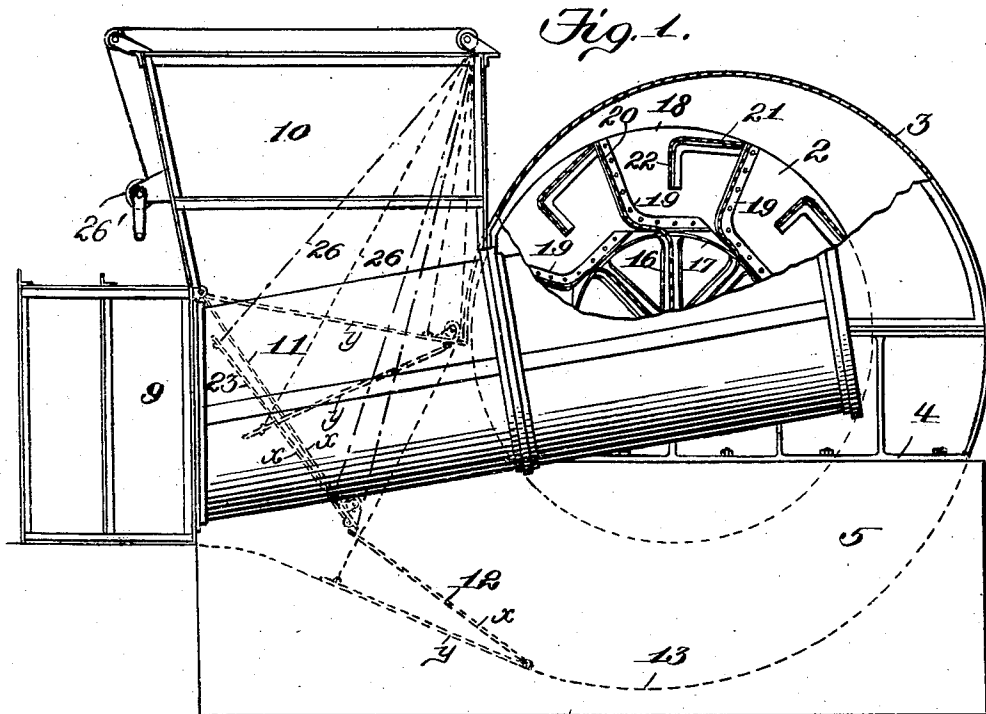


No. 854,582.

PATENTED MAY 21, 1907.

C. KUDERER.  
VENTILATING APPARATUS.  
APPLICATION FILED JAN. 9, 1906.

2 SHEETS—SHEET 1.



Witnesses:  
C. D. Hesler  
Ernest E. Weaver.

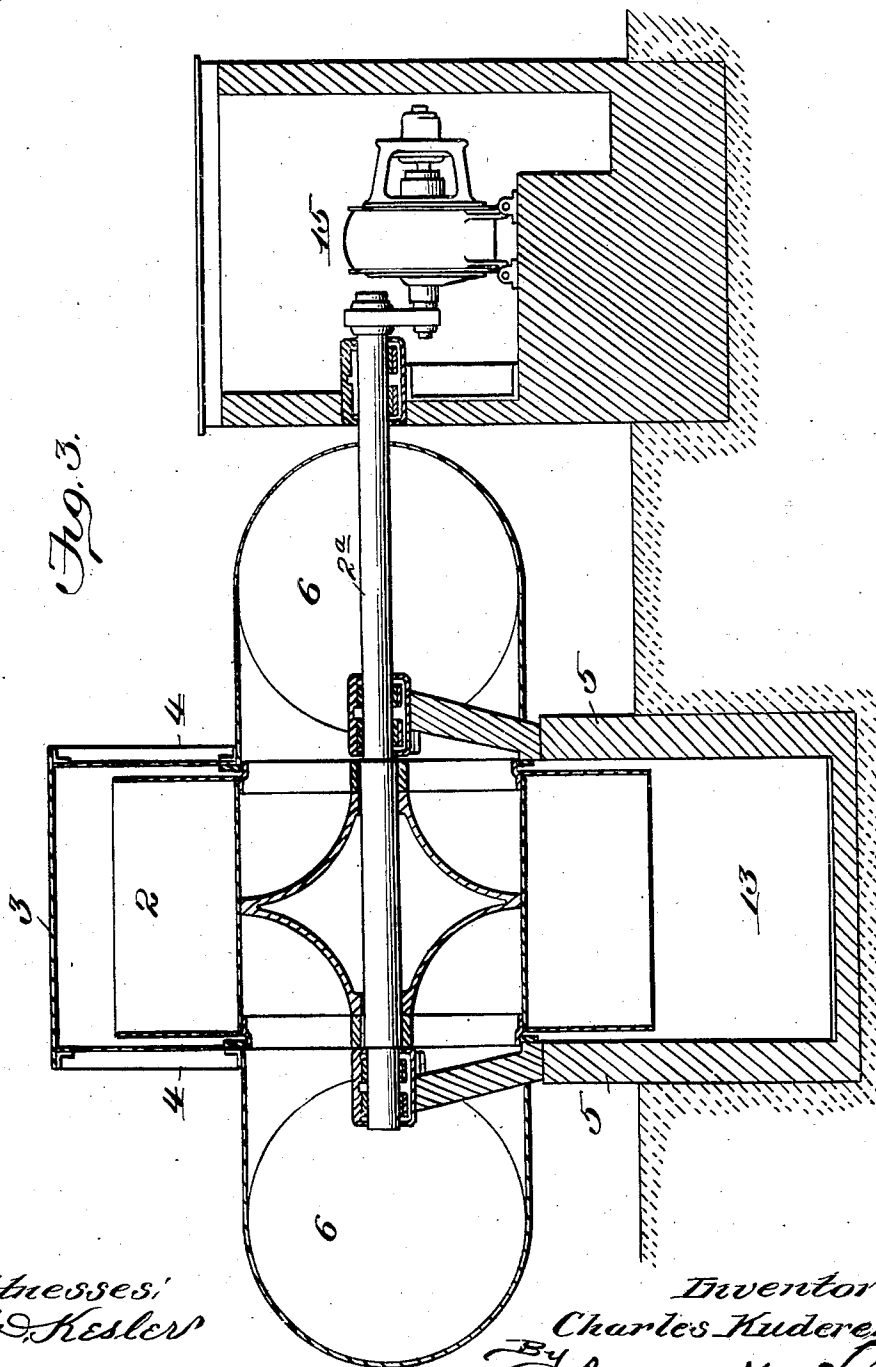
Inventor  
Charles Kuderer  
By James L. Norris  
Att'y.

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*E. D. Hesler*  
*Ernest E. Weaver*

Inventor  
*Charles Kuderer*  
By *James L. Norris*  
*Att'y*

# UNITED STATES PATENT OFFICE.

CHARLES KUDERER, OF ALLEGHENY, PENNSYLVANIA.

## VENTILATING APPARATUS.

No. 854,582.

Specification of Letters Patent.

Patented May 21, 1907.

Application filed January 9, 1906. Serial No. 295,284.

*To all whom it may concern:*

Be it known that I, CHARLES KUDERER, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Ventilating Apparatus, of which the following is a specification.

This invention relates to ventilating apparatus.

An apparatus involving the invention may be employed with advantage in many different connections; it may be employed in conjunction with a mine.

The apparatus includes in its make-up a fan of suitable type and the parts are so related that fresh air may be supplied to a mine from the atmosphere or stale or foul air can be exhausted from the mine to the atmosphere without changing the direction of rotation of the fan. This result I obtain in an effective manner.

In the drawings accompanying and forming a part of this specification I illustrate a simple form of embodiment of the invention which to enable those skilled in the art to practice said invention, I will set forth in detail in the following description while the novelty of the invention will be included in the claims succeeding said description.

In said drawings, Figure 1 is a side elevation of an apparatus including my invention with a portion removed; Fig. 2 is a top plan view of said apparatus; and Fig. 3 is a cross sectional elevation of the same.

Like reference characters refer to like parts throughout the several views.

The apparatus includes in its construction a fan which may be of any suitable type. I show a fan of peculiar construction in the drawings, the same being denoted in a general way by 2. I will set forth in detail the construction of said fan. The casing of the fan is denoted by 3 and it has upon its opposite sides flanges, as 4, which are bolted or otherwise suitably fastened to side walls 5 of a foundation of brickwork or masonry.

Extending in parallelism at opposite sides of the fan are conduits, as 6, which are of substantially duplicate formation, the outer ends of which are provided with doors, as 7, of damper-like construction which when foul air is being drawn from a mine are closed so as to cut the conduits off from the atmosphere. When, however, the mine is being supplied with fresh air these doors 7 are

opened so as to put the two conduits into communication with the atmosphere. The conduits 6 may be of any desirable form, although they are represented as being cylindrical by reason of which their interiors present no angles to retard the flow of air or to catch particles of material. From them extend lateral tubes, as 8, also of cylindrical form, the tubes being connected with the casing 3 of the fan 2, whereby the fan is put into communication with the conduits.

The inner ends of the two conduits open into a boxing, as 9, the inner end of which is open whereby fresh air may be supplied to the mine by way of such opening, or foul air exhausted from said mine through said opening. The boxing 9 has, of course, a top and bottom and its sides converge toward the opening.

The apparatus is provided with a suitable chimney through which foul air is forced to the atmosphere, as will hereinafter appear. The chimney may be of any suitable character. The one represented is denoted by 10. Its side walls may be integral with the sides of the casing 3 and may extend down and be fastened to the brick walls 5. The front wall of the chimney extends down to the top of the boxing 9, while the rear wall of the chimney extends down and merges into the circular portion or rim of the fan casing 3. A door is shown at 11 and is hinged in position substantially at the junction of the top or roof of the boxing 9 and the front wall of the chimney 10. This door coöperates with a door, as 12, hinged to the bottom of the pit 13 between the brick walls 5. The free edge of the door 12 is adapted to engage against the free edge of the door 11 as shown in Fig. 1, which is the position said doors occupy when foul or stale air is to be drawn from the mine or other chamber such position being marked *x*. In this relation the chimney 10 is put into uninterrupted communication with the mine. When it is desired to supply fresh air thereto, the chimney should be cut off from the atmosphere. This can be accomplished by swinging the door 11 upward until its free edge abuts against the fan casing 3 as shown by the position *y* in Fig. 1. When the door 11 is in said position *y* it will be evident that the chimney is cut off from the interior of the apparatus. When the door 11 is swung up I prefer also to swing the door 12 downward and against the bottom

of the pit 13, as also shown by position  $\gamma$  in said Fig. 1. I will hereinafter describe a means for operating the doors 11 and 12. In addition to these two doors there are two  
 5 doors each designated by 14 mounted within the boxing or housing 9, the free edges of which when foul air is being drawn from the mine are in abutment so that the two doors present together a V form. When, however,  
 10 fresh air is being supplied to the mine, the doors will be swung out of contact and will diverge slightly inwardly in which position they act to close the inner ends of the conduits or cylinders 6. In Fig. 2 the doors 14  
 15 are shown as occupying a V relation so that the exhaustion of stale air from the mine can be accomplished. During this operation the doors 11 and 12 will occupy the positions shown by position  $\alpha$  in Fig. 1. Foul air is,  
 20 therefore, drawn by the fan 2 from the mine it entering first the boxing 9 and from the latter being diverted by the two doors 14, acting as a wedge, into the opposite conduits 6. The foul air is drawn from the conduits  
 25 through the casing of the fan and is delivered from the fan casing upwardly into the chimney 10, the said doors 11 and 12 being at this time in such position as to prevent foul air from entering the boxing or housing 9.  
 30 During the drawing of the bad air from the mine the doors 7 will be closed. To supply fresh air to the mine the doors 7 are opened so as to put the two conduits 6 into communication with the atmosphere. The door 11 is  
 35 elevated into contact with the fan casing or until it occupies the position  $\gamma$  in Fig. 1 and the door 12 is dropped against the bottom of the pit 13, as shown by position  $\gamma$  in said Fig. 1. On the operation, therefore, of the fan,  
 40 fresh air is drawn from the atmosphere into the conduits 6 through the fan into the pit and past the doors 14, into the air way of the mine, the blast being sufficient to open said doors 14 or to separate them.

45 Any suitable motor may be provided for operating the fan 2. I have for this purpose shown a motor conventionally in Fig. 3 of the drawings, the same being denoted by 15 and being operatively belted up to the shaft 2<sup>a</sup> of the fan.  
 50

The spokes 16 of the fan driving spiders are V-shaped in cross section, the beveled edges of which point outwardly so as to present the least possible resistance to the passage of the air between the spokes.  
 55

Angle irons 19 are riveted or otherwise attached to the rim 17 of the driving spiders or centers. The angle irons are also riveted to the circular side plates 18. To these angle  
 60 irons are fastened the air impelling blades 20. The blades are substantially the same in construction as those shown in my pending application, Serial Number 225,489, filed September 22, 1904. The blades 20 extend out-  
 65 wardly from the shaft of the fan driving shaft

to the outer edges of the circular side plates 18 and each blade has a radial portion coincident with opposite spokes 16. It is then backwardly curved and then extended outward upon an angle 19. Fastened to the  
 70 outer ends of blades 20 are plates as 21 which extend rearward and have depending lips as 22. The plates 21 and their lips are fastened by riveting to the circular side plates 18 and they with coöperating blades 20 form  
 75 pockets to compress air and also to cushion the incoming air.

The door 11 is provided with a regulating plate 23 which is hinged thereto near the free edge thereof whereby said regulating  
 80 plate can be operated relatively to its carrying door. The door 11 is shown in the position  $\gamma$  as occupying its chimney closing position in Fig. 1. When in this position the regulating plate can be raised or lowered to  
 85 regulate the area of the discharge opening for the fresh air into the mine and in accordance with the velocity of the fan 2.

The boxing or housing 9 is represented as carrying exteriorly thereof a windlass as 24  
 90 from which cables or ropes 25 extend, the cables being connected to the doors 14 and extending over suitable guides. The construction is such that when the cables are wound upon the windlass the doors will be  
 95 swung together. From the doors 11 and 12 and from the regulating plate 23 cables each denoted by 26 may extend upward and to suitable windlasses as 26', by which the said doors 11 and 12 and regulating plate can be  
 100 operated. In practice the several windlasses will be provided with pawl and ratchet means to hold them in fixed position.

What I claim is:

1. An apparatus of the class described involving a fan having a casing, conduits at  
 105 opposite sides of the fan casing in communication with said casing and having doors at one end thereof, a boxing into which the opposite ends of said conduits open, doors hinged in  
 110 proximity to the inner ends of the conduits and to abut against each other to present a V form and to also separate to close the inner ends of the conduits, a chimney, doors located below the chimney adapted to engage  
 115 each other to cut off the boxing from the fan, one of the doors being shiftable to close the chimney against communication with the fan, and a regulating plate supported by the chimney closing door and shiftable to regu-  
 120 late the area of the discharge opening through which fresh air is supplied by the fan.

2. An apparatus of the class described involving a fan having a casing, cylindrical  
 125 conduits at opposite sides of the fan casing in communication with said casing and having doors at one end thereof, a boxing into which the opposite ends of said conduits open, doors hinged in proximity to the inner ends  
 130 of the conduits and to abut against each

other to present a V form and to also separate to close the inner ends of the conduits, a chimney, and doors located below the chimney adapted to engage each other to cut off  
5 the boxing from the fan, one of the doors being shifted to close the chimney against communication with the fan.

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

CHARLES KUDERER.

Witnesses:

A. R. ROBISON,  
THOS. A. WATKINS.