Aug. 28, 1951 C. B. SCHNEIBLE 2,565,933

VENTILATING EXHAUST STRUCTURE

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Fig. 1

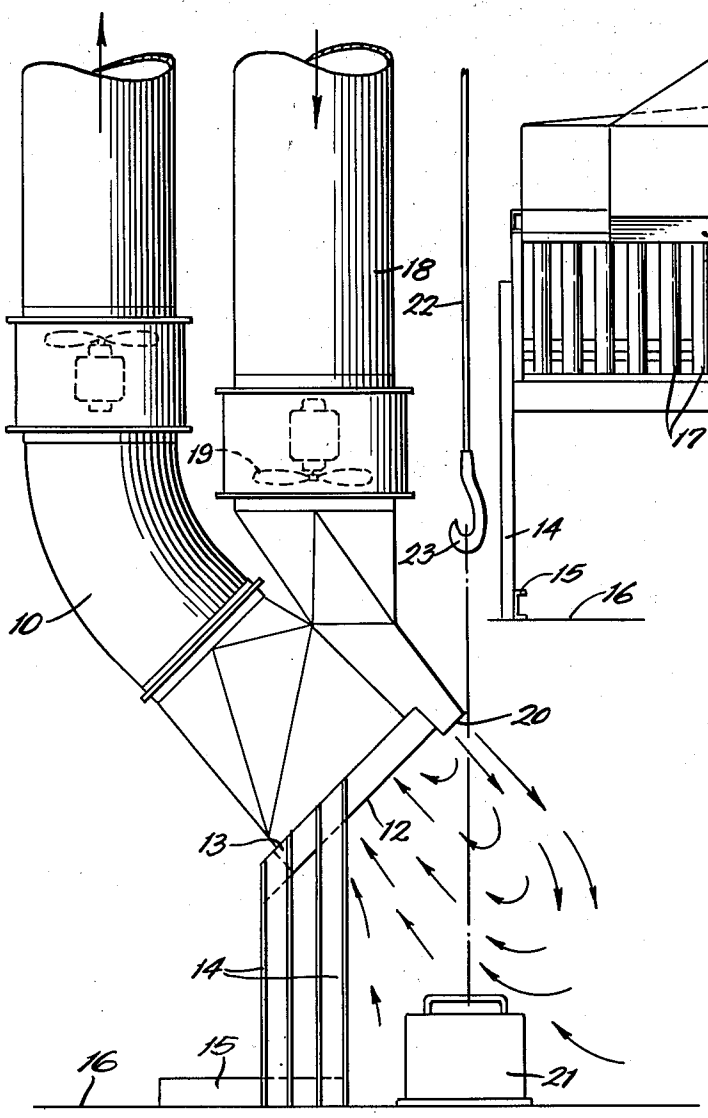

Fig. 2

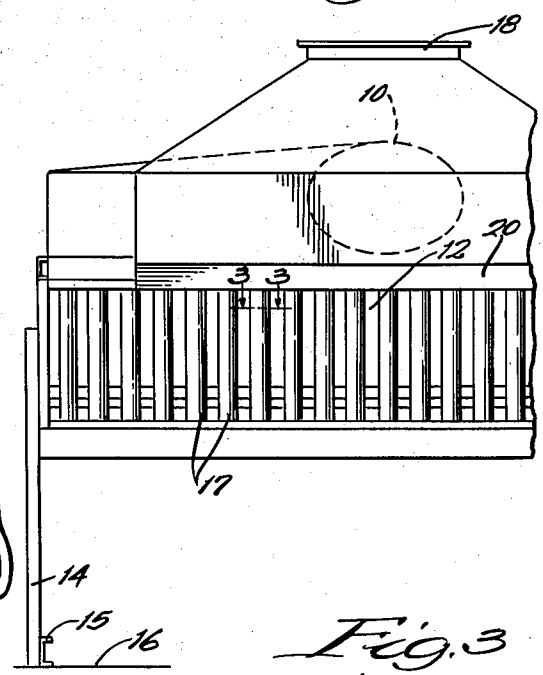

Fig. 3

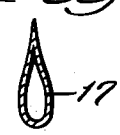

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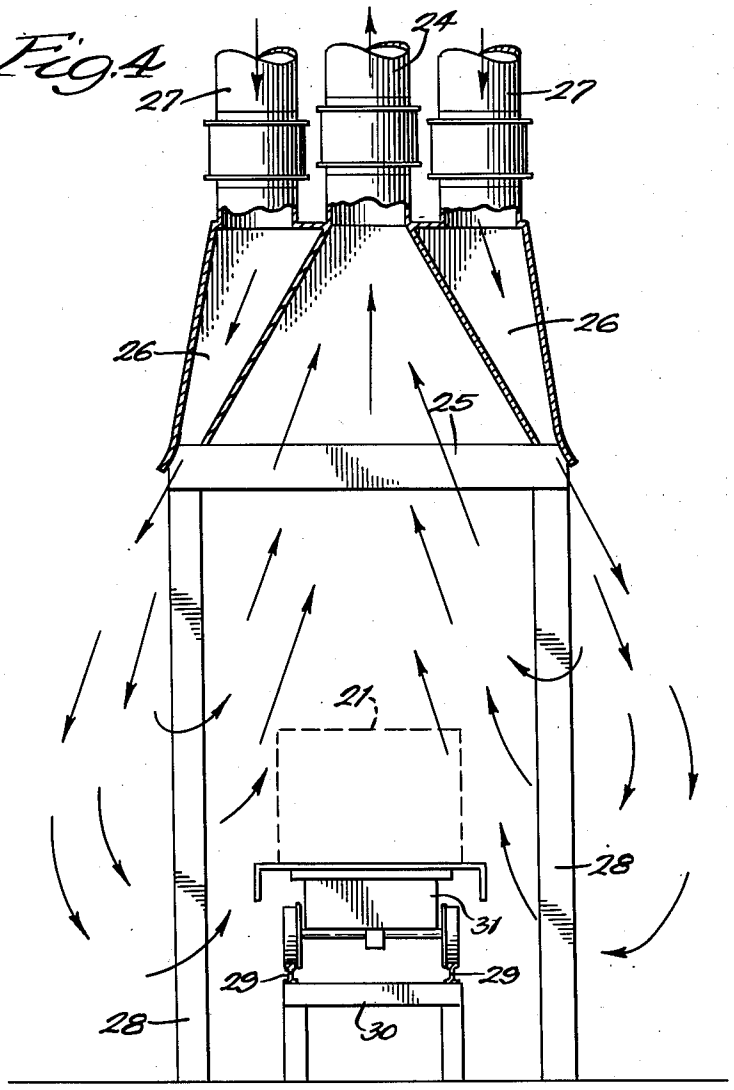
Fig. 4



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UNITED STATES PATENT OFFICE

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VENTILATING EXHAUST STRUCTURE

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Application March 22, 1948, Serial No. 16,307

5 Claims. (Cl. 98—115)

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This invention relates to a ventilating exhaust structure, and is particularly useful in the treatment of fumes, smoke, particle-laden gas, chemical vapors, etc. By the term "gas," as employed herein, I mean not only incondensable gaseous materials but condensable vapors, etc.

An object of the present invention is to provide ventilating exhaust equipment, in which a curtain of air is employed in conjunction with the exhaust intake for guiding and directing gaseous materials, such as fumes, smoke, chemical vapors, and including fine particulate matter, etc., into the intake, while at the same time leaving an open space through which operators have access to castings and other sources of such gaseous materials, particulate matter, etc. Yet another object is to provide, in conjunction with an exhaust intake, means for forming a blanket or curtain of air about an area in which there is present a source of gaseous material, etc., and thus enabling the intake of the exhaust to be positioned at a lower point in the room above the source of the gaseous material. A still further object is to provide means for forming a gaseous curtain partially around or completely around an exhaust intake, whereby there is access to the source of the gaseous material from various sides thereof and while insuring that none of the gaseous material may escape into the room or building. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated, in preferred embodiments, by the accompanying drawings, in which—

Figure 1 is a broken side view in elevation of apparatus embodying my invention; Fig. 2, a broken front view in elevation; Fig. 3, a sectional detail view, the section being taken as indicated at line 3—3 of Fig. 2; and Fig. 4, a vertical sectional view of a modified form of the invention.

In the illustration given in Figs. 1 to 3, inclusive, I provide an exhaust conduit 10, provided with an exhaust fan 11, and having an intake 12. The intake 12 is enclosed by a perimetric frame 13 supported by standards 14, which are secured together by a rail 15 resting upon the floor 16.

The intake 12 is preferably provided with a plurality of spaced louvers 17, which may be of any suitable shape, but preferably are of the cross-sectional shape illustrated in Fig. 3. Louvers, such as are shown in Schneible Patent No. 2,277,271, are useful in connection with this apparatus.

Immediately above the intake 12 is an inlet conduit 18 equipped with a discharge fan 19, and having a wide and relatively narrow outlet 20 for

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discharging a thin blanket or curtain of air, as indicated by the arrows in Fig. 1.

In the specific illustration given in Fig. 1, a mold 21 is shown in a position adjacent the intake 12, and the curtain of air from the discharge slot 20 forms a blanket about one side of the mold. Hence, fumes, smoke, dust, etc., rising from the mold is prevented from going upward in a vertical direction and is required to enter the intake 12. At the same time, access to the mold may be had through the curtain of air. For example, the hoist line 22 may be lowered to bring the hook 23 into engagement with the loop of the mold 21, and in doing so, may pass directly through the curtain of air. Similarly, the operator can pass instruments through the curtain of air and can, in other ways, have direct access to the mold 21.

If desired, the discharge slot or opening 20 may be provided with parallel louvers or ribs to produce a longer stream or blanket of air. Such detail structure is shown in co-pending application of Schneible and Lundy, Serial No. 788,496, for Treatment of Gas, and the Like.

Instead of discharging an air curtain along one side only of the mold 21, or other source of gaseous material, the curtains of air may be formed on both sides of the mold, as shown more clearly in Fig. 4, and, if desired, may be caused to completely enclose the source of gaseous material from all sides.

In the specific illustration given in Fig. 4, I provide an outlet conduit 24 communicating with a central inlet or intake 25. On each side of the intake 25, there is provided a discharge chamber 26, narrowed at its lower end for the discharge of a curtain of air along a side of the mold 21 below. Inlet conduits 27 communicate with the chambers 26. The structure described is supported upon standards 28. A track 29 is supported upon a platform 30, and a vehicle 31 is provided for carrying the mold, or other source of gaseous material, into and out of the space controlled by the air curtains.

In the structure described in Fig. 4, the air curtains diverge laterally and provide an enclosure which prevents the escape of gaseous material, which might ordinarily spread laterally as it rises. By confining the gaseous material, as illustrated, the intake 25 is effective for withdrawing all of the material. At the same time, the operator has access to the mold 21, or casting or other object carried by the vehicle 31, even while the same is positioned below the intake 25.

With the structure described, it will be noted

that the discharge slots forming the air curtains, actually form a part of the ventilating exhaust apparatus and, in effect, discharge fluid forming side walls extending laterally and about the area holding the source of the contamination or other fluids, the walls being fluid and penetrable by the operator. With the structure shown, the air curtain is strongest at the upper point, where it emerges from the area about the intake and at the point where it is most important that the gaseous material does not break through. As the curtain of air descends, it turns inwardly to supply the carrier fluid used to withdraw the contaminant, etc. The turning of the air curtain near its bottom provides the bulk of the carrier fluid which is necessary to act as the conveying means for removal of the contaminant, etc.

While in the foregoing specification, I have set forth specific structures in considerable detail for the purpose of illustrating embodiments of my invention, it will be understood that such details of structure may be modified widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In ventilating exhaust apparatus for treating a rising column of gas, an exhaust conduit equipped with an intake extending at an inclination upwardly and inwardly toward said column, and a second conduit having a discharge opening adjacent an upper edge of said intake and directed outwardly and downwardly at an inclination and forming with said intake an inverted V canopy for directing the rising column of gas toward said intake.

2. In ventilating exhaust apparatus for treating a column of gas rising from a grate, a support extending upwardly at one side of said grate, an exhaust conduit equipped with means for maintaining a suction therein and provided with an inclined intake carried by said support, said intake extending upwardly and inwardly towards said column, louvers extending across said intake in spaced relation, a second conduit having a discharge outlet adjacent the upper edge of said intake, and means for discharging gas through said discharge opening, said discharge opening being directed across said column of gas.

3. In ventilating exhaust apparatus for treating a column of gas rising from a grate, a support extending upwardly at one side of said grate, an exhaust conduit equipped with means for maintaining a suction therein and provided with an inclined intake carried by said support, said intake extending upwardly and inwardly towards said column, louvers extending across said intake in spaced relation, a second conduit having a discharge outlet adjacent the upper edge of said intake, and means for discharging gas through said discharge opening, said discharge opening being directed across said column of gas and downwardly along the outer side thereof.

4. In ventilating exhaust apparatus for treating a rising column of gas, a casing providing an exhaust conduit equipped with an intake extending at an inclination upwardly and inwardly towards said column and providing also a second conduit having a discharge opening adjacent an upper edge of said intake and directed outwardly and downwardly at an inclination and forming with said intake an inverted V canopy for directing the rising column of gas towards said intake.

5. In ventilating exhaust apparatus for treating a rising column of gas, a casing providing an exhaust conduit equipped with means for maintaining a suction therein and provided with an inclined intake, said intake extending upwardly and inwardly towards said column, a baffle structure about the lower portion of said intake, said casing providing also a second conduit having a discharge opening adjacent an upper edge of said intake and directed outwardly and downwardly at an inclination, and means for discharging gas through said discharge opening, said discharge opening being directed across said column of gas.

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