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VENTILATING EXHAUST APPARATUS

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VENTILATING EXHAUST APPARATUS

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This invention relates to ventilating exhaust apparatus. The structure 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 indescribable gaseous materials but condensible vapors, etc.

An object of the invention is to provide compact apparatus providing chambers for exhaust gases and for the discharge of gases in forming curtains about the inlet to the exhaust chamber. Yet another object is to provide a compact housing structure occupying relatively small space and providing chambers therein for effectively receiving the exhaust gases while at the same time providing an elongated discharge port through which gases may be discharged for the forming of a curtain or blanket around the source of the gaseous material passing into the exhaust chamber. A still further object is to provide unit housing structures which may be combined to form ventilating exhaust structures of an adequate capacity for the room or area to be treated. A still further object is to provide an exhaust and ventilating unit of substantially rectangular shape together with a partition wall within the rectangular housing dividing the area therein into chambers for the effective handling of exhaust gaseous material and for the discharge of air or other gas to form a blanket about a source of contaminating gaseous material. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated, in a single embodiment, by the accompanying drawings, in which—

Fig. 1 is a broken top plan view of apparatus embodying my invention; Fig. 2, a broken front view in elevation of the structure shown in Fig. 1; Fig. 3, an end view; Fig. 4, a broken sectional detail view on an enlarged scale, the section being taken as indicated at line 4 of Fig. 2; and Fig. 5, a sectional view similar to Fig. 4, the section being taken as indicated at line 5 of Fig. 2.

In the illustration given, 10 designates standards which may be secured to the floor by rails 11 and which support a louver casing 12.

Extending above the rectangular louver casing 12 is the chamber casing 13 which is substantially rectangular in shape and which communicates at its lower end with the louver casing 12. A partition wall 14 extends obliquely across the interior of casing 13 and has an end portion 15 dividing the area within the louver casing 12 into two parallel outlet portions. One outlet portion 16 is relatively narrow in width but extends the length of the louver casing. In the narrow outlet opening 16 are mounted louverers 17 which are preferably of the tear-drop cross-sectional design illustrated so as to facilitate the air flow through the area 16 through Venturi-like passages. By means of the louvers, the stream of air discharged downwardly through the passage 16 is divided into three streams so that the central stream is shielded against friction and is projected a greater distance than the other streams in forming a blanket or air curtain.

The louver casing 12 is divided by the partition wall 14 also into a relatively larger inlet portion 18 in which are mounted louverers 19 extending substantially at right angles to the louvers 17. The louvers may be of any desired cross-sectional shape but it is preferred to employ the rounded or elliptical structures which provide Venturi-like passages.

The partition 14 is inclined obliquely, as shown more clearly in Figs. 1, 4 and 5, the upper ends of the partition wall extending generally toward opposite corners of the top of the casing 13. By this means, there is provided an enlargement at each end of the casing. For example, the chamber 20 which communicates with the exhaust louverers 19 has an enlarged portion at the left-hand side of the casing 13 and provided with an exhaust opening 21. Similarly, the passage 16 communicates with an enlarged chamber 22 which becomes relatively wide at the right-hand side of the casing and is there provided with an enlarged inlet opening 23, as shown more clearly in Figs. 1 and 5. By the division of the interior of casing 13 in this manner, there are formed at opposite ends of the casing enlargements of receiving the inlet and outlet openings designated while at the same time the partition wall serves as an effective means for directing the fluid in the desired direction toward the exhaust opening and inwardly from the inlet opening toward the narrow discharging port 16.

Communicating with the exhaust port 21 is a conduit 24. The conduit 24 communicates with a fan casing 25 in which is mounted a fan 26. Also communicating with the fan casing 25 is a laterally extending conduit 27 which is adapted to communicate with a similar casing 13a positioned along side the unit shown. If no additional unit is employed, the conduit 27 will be closed by a damper or closure cap or, if desired, may be removed.

The inlet port 23 at the opposite end of the casing communicates with a conduit 28 leading to a
fan casing 29 in which is mounted a fan 30. A conduit 31 leads from the fan to a source of air or other gas. In the specific illustration given, the fan casing 29 communicates with another conduit 32 adapted to lead into another unit casing 13b arranged alongside of the casing illustrated. If no additional casing 13b is employed, the conduit 32 may be closed by a damper or closure cap, etc. Instead of employing the structures illustrated for connecting units, a single conduit 24 may be employed which communicates with a single fan casing 29 while similarly a single conduit 28 may be employed which will communicate with the fan casing 29.

The fan casing 29 communicates on its outlet side with a conduit 31 which may lead to the exterior of the building or room or to another treating device such as a separator, or the conduit may communicate through a connection with the pipe 31 to permit reuse or partial reuse of the exhaust gases.

Operation

In the operation of the apparatus, a casing or other source of gaseous fumes, smoke, particulate matter, etc. may be conveyed or placed between the standards 10 below casing 12. Air or other gas is forced by blower 30 downwardly through the conduit 28 into the chamber 22 and thence is discharged through the elongated port 16 to provide a curtain extending downwardly along one side of the source of the gaseous material. The curtain prevents the escape of fumes, smoke, etc. in the room and tends to confine the fumes, about the exhaust intake 18. The rising column of gas from the casing or other source passes upwardly through the louvers 19 and into the chamber 20 under the influence of the suction maintained in this chamber by the fan 26. The partition wall 14 is so positioned as to provide an exhaust chamber 29 of about 25% greater area than the inlet chamber 22 but it will be understood that the respective volumes of the chambers may be varied for different uses to which the apparatus may be put.

If the unit 31 is connected with adjacent units 12a and 12b, as shown more clearly in Fig. 2, the units 12a and 13b are reversed in position so that the exhaust end of casing 13a is adjacent the exhaust end of casing 13 while the inlet end of casing 13a is adjacent the inlet end of casing 13 whereby the exhaust fan 26 is able to withdraw gaseous material through the conduits 27 and 24 and the blower 30 is able to discharge air or other gas through both conduits 28 and 32.

The air which is introduced by blower 30 into casing 13 is discharged downwardly through the narrow port 16 and there broken into separate streams by the louvers 17. The curtain of air or other gas thus formed by the parallel streams extends downwardly about the source of contaminant so as to shield the room against the contaminant while the turning of the curtain near its bottom provides the bulk of the carrier fluid which is necessary to act as the conveying means for the removal of the contaminant, etc. The shape of the curtain may be varied, if desired, by changing the shape or contour of the discharge port 16.

In the illustration given, 1 provide a housing structure in which the entire interior of the housing is effectively employed for providing the chambers desired while at the same time a compact housing of elongated or rectangular shape is employed. Each end of the housing provides a wide area for providing the inlet or outlet while at the same time each communicates with a uniform area in the bottom of the casing through which air is exhausted or air is introduced. In the case where hot gases are being exhausted, as in a foundry, etc., the partition wall may be employed as a means for warming the introduced air for forming the air curtain so that the operator is not subjected to cold air drawn in from the exterior of the building.

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

I claim:

1. In ventilating exhaust apparatus, an elongated casing providing a chamber open at its bottom, a partition wall dividing the bottom portion of the chamber into a longitudinally extending narrow discharge passage and a longitudinally extending wide inlet passage, said partition wall extending upwardly from the bottom to the top of the casing in an oblique plane and at an angle varying throughout the length of the partition wall to provide chambers having enlarged portions at opposite ends of the casing, and an exhaust conduit communicating with the enlarged end of one chamber and an inlet conduit communicating with the enlarged end of the other chamber.

2. In ventilating exhaust apparatus, an elongated casing providing a chamber open at its bottom, a partition wall dividing the bottom portion of the chamber into a longitudinally extending narrow discharge passage and a longitudinally extending wide inlet passage, said partition wall extending upwardly in an oblique plane and at an angle varying throughout its length toward the top and opposite side of the casing, providing an enlarged upper portion in said discharge passage at one end of the casing and an enlarged upper portion in said exhaust passage at the other end of the casing, an exhaust conduit communicating with said enlarged portion of the exhaust passage, and a fluid discharge conduit communicating with the enlarged upper portion of the discharge passage.

3. In ventilating exhaust apparatus, a generally rectangular casing open at its lower end, a partition wall dividing the lower end of the chamber into a relatively narrow discharge passage extending longitudinally of the casing and a relatively wide exhaust passage extending longitudinally of the casing, said partition wall extending obliquely in an upward direction and at an angle varying throughout the length of the partition wall toward the opposite corner in the casing, said exhaust passage at the inlet of the casing into an exhaust chamber and a discharge chamber, means for discharging air under pressure into said discharge chamber and means for exhausting air from said exhaust chamber, said exhaust chamber being in open communication with said exhaust passage and said discharge chamber being in open communication with said discharge passage.

4. In ventilating exhaust apparatus, an elongated casing providing a chamber open at its bot-
In ventilating exhaust apparatus, a generally rectangular casing open at its bottom, a partition wall dividing the bottom portion of the casing into a longitudinally extending narrow discharge passage and a longitudinally extending wide exhaust passage, said partition wall extending upwardly in an oblique plane and at an angle varying throughout its length toward the top of the casing, louvers extending longitudinally of said discharge passage, louvers extending transversely of said exhaust passage, an exhaust conduit communicating with said portion of the chamber leading to said exhaust passage, and a discharge conduit communicating with the portion of the chamber leading to said discharge passage.

5. In ventilating exhaust apparatus, a generally rectangular casing open at its bottom, a partition wall extending longitudinally of the bottom and adjacent one side thereof to divide the bottom into a relatively narrow discharge passage extending longitudinally of the bottom and a relatively wide exhaust passage extending longitudinally of the bottom, said wall extending upwardly from one corner portion of the bottom in an oblique plane to the opposite corner portion of the casing top and at an angle varying throughout its length toward the top of the casing providing at each end of the casing a narrow chamber and an enlarged chamber, and conduits communicating with the enlarged chamber at each end of the casing.

6. In ventilating exhaust apparatus, a generally rectangular casing providing a chamber open at its bottom, a partition wall dividing the bottom into a relatively narrow discharge passage extending longitudinally of the bottom, and a relatively wide exhaust passage extending longitudinally of the bottom, said partition wall extending upwardly in an oblique plane and at an angle varying throughout its length to divide the casing into an exhaust chamber communicating with said exhaust passage and a discharge chamber communicating with said discharge passage, louvers extending longitudinally of said discharge passage, louvers extending in spaced relation across said exhaust passage, conduits communicating with each of said chambers, and fans carried by said conduits.

7. In ventilating exhaust apparatus, a generally rectangular casing, a flat partition wall dividing the bottom portion of the casing into a relatively narrow discharge passage and a relatively wide exhaust passage extending longitudinally of the bottom, said partition wall being inclined obliquely upwardly from one corner portion of the bottom and at an angle varying throughout its length toward an opposite corner portion of the casing top the top of the casing to form an exhaust chamber communicating with said exhaust passage and a discharge chamber communicating with said discharge passage, louvers extending longitudinally of said discharge passage, spaced members extending transversely of said exhaust passage and providing Venturi-like passages in said exhaust passage, an exhaust conduit communicating with said exhaust chamber, and a blower conduit communicating with said discharge chamber.

Claude B. Schneible.

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