ABSTRACT: A smoke and vapor collecting hood provided with means to produce a flow of air in the vicinity of and directed towards said hood, to assist in the entrainment into the hood of smoke and vapors which might have otherwise escaped the hood, the air flow being supplied by outside and inside air in adjustable proportion to be able to maintain a comfortable temperature in the room in which the hood is located and prevent waste of expensive heated air.
SMOKE AND VAPOR COLLECTING HOOD

The present invention relates to hoods for collecting smoke and vapors and, more particularly, to hoods used in commercial or home kitchens and to hoods used in industry for collecting vapors and smoke, for instance, produced during welding and other smoke and/or vapor producing operations.

It is known to provide hoods of the character described with means to provide an additional air flow directed towards the inside of the hood, which greatly enhances the smoke and vapor collecting capacity of a hood relative to its size; if the air required for such a system is admitted from the outside, the room in which the hood is located will be unduly cooled in cold weather; if inside air only is supplied to the system, expensive heated air will be wasted because exhausted to the exterior along with the fumes.

The general object of the invention resides in the provision of a hood of the character described, in which additional air is supplied to the hood by an air mixer and recirculator having an air table intake so arranged as to supply sufficient fresh air combined with inside air, so as not unduly cool the room in which the hood is located in cold weather while conserving heated inside air.

Another object of the invention resides in the provision of a hood of the character described, especially designed for use in association with welding tables and the like, and provided with means to suck in the smoke and vapors as much as possible at the level of the table itself.

Another object of the invention resides in the provision of a hood of the character described, provided with deflector means for the orifices supplying the additional air, which can be adjusted at any angle so as to direct the additional air flow in the desired direction.

The foregoing and other objects of the present invention will become more apparent during the following disclosure and by referring to the drawings, in which:

FIG. 1 is a cross section through the hood at the level of one of the exhaust ducts, this hood being used in combination with a welding table;

FIG. 2 is a cross section of the embodiment of FIG. 1, but at the level of the air supply for the hood;

FIG. 3 is a cross section of the embodiment of FIG. 1 showing portions cut away and in section;

FIG. 4 is a front elevation, on a smaller scale, of a wall mounted hood in association with a welding table;

FIG. 5 is a cross section of the embodiment of FIG. 4, the section being taken through the exhaust duct for the hood;

FIG. 6, shown on the first sheet of drawings, is a partial longitudinal section of a duct for supplying additional air;

FIG. 7 is a partial schematic view of a central hood provided with filter means;

FIG. 8 is a schematic view of a wall-type commercial kitchen hood provided with filter means;

FIG. 9 is a cross section on line 9-9 of FIG. 10 of the arrangement of a commercial kitchen provided with additional air supply means in accordance with the invention associated with a wall-type conventional exhaust hood; and

FIG. 10 is a partial elevation of the arrangement of FIG. 9.

In the drawings, like reference characters indicate like elements throughout.

Referring to the first embodiment shown in FIGS. 1, 2, 3, and 4, hood 1 is of generally rectangular shape and forms a top 2 and depending sides 3 on all edges of the top.

It is supported by means not shown over a work table 4, for instance used by welders. The top and sides of the hood are of double wall formation to provide air passages 5 and 6 respectively. The sides 3 are formed as assembled units and secured to the edges of the top 2 and the passage 5 of the top 2 is in communication with the passages 6 of the sides 3 by means of holes 7, shown in FIGS. 4, made in the inner wall of the side 3 at the level of the air passage 5.

The inner wall of each side 3 is provided near its lower closed end with slit 8 defined by inturmed lips 9 forming an air discharge along substantially the entire inner periphery of the hood and directed towards the center of the hood.

In front of each slit 8, is pivotally mounted on end brackets 10 secured to the inner wall of the sides 3, an air deflector, of baffle 11, so arranged that it can be adjusted to any angle and can make a complete turn about its axis.

The air deflectors 11 preferably have oppositely inclined longitudinal marginal portions 12.

An exhaust duct 13 is in communication with the inside of the hood near each end thereof. Exhaust ducts 13 extend through the double wall top 2 of the hood and pass through a hole made in the exterior wall 14 of the building in which the hood is located, being in communication with an exhaust chamber 15 in which is located motor-operated exhaust fan 16.

The outlet of chamber 15 is preferably provided with a conventional louver system 17 arranged to close when the exhaust fan is not in operation.

Referring to FIGS. 2 and 4, an air supply duct 18 is in communication with the inside of the double wall top 2 at the center of the hood to supply air to the slits 8 through air passages 5 and 6.

The duct 18 is in communication with a chamber 19 mounted in the wall 14 and extending partially outside and inside thereof. Chamber 19 contains an air blower unit 20 having its discharge connected to duct 18 and operated by an electric motor 21, itself mounted on a pivoted bracket 22 adjustable by screw 23, so as to adjustably tighten the driving belt 24 connecting the motor to the air blower 20.

Chamber 19 has a fresh air intake opening 25 which can be completely closed by a louver system 26 when there is no suction in chamber 19, the louvers 26 closing under the action of gravity and opening when suction is produced by the air blower 20 within chamber 19.

Said chamber 19 has an additional air intake 27, which opens within the room in which the hood is located. Within intake 27 are arranged louvers 28 pivotally connected at their center to chamber 19 and at their ends to a common actuating bar 30.

Louvers 28 alternate with stationary baffles 31. Common bar 30 is urged upwardly by a tension spring 32, attached thereto and to the chamber 19 into an upper position in which the louvers 28 are at an angle completely closing the intake 27. Bar 30 can be pulled downwardly by means of a rope or chain 33, which is attached by suitable means so as to adjust the angular position of the louvers 28.

Intake 27 may be connected to a duct, not shown, which may open near the ceiling of the room in which the hood is located, if so desired.

Sheet of drawings, in a partial drawing of a lower wall of top 2, but at a higher level than the lower end of the hood sides 3.

On each side of the partition 35 are located slightly upwardly diverging perforated panels 36, for instance made of asbestos cement. Partition 35 and the two panels 36 are supported on the work table by a bracket 37. Perforated panels 36 are lined at their upper edges by edgings 38. Louvers 39 are pivoted at their center on a shaft 40 carried by the sides of the hood, extend along the entire length of the hood and are adjustably pivotable so as to close or open to the desired extent of openings 41 defined by the edgings 38 and angle irons 42 secured to the bottom of the hood top 2 and extending longitudinally of the same.

The hood arrangement in accordance with this first embodiment operates as follows: the hood operates in a conventional manner with the louvers 39 being open, the exhaust fan 16 operating and the air blower 20 being stopped. However, when the latter is operating, air will be fed through supply duct 18 and will exit through slits 8 all around the inside of the lateral walls of the hood. This additional air can be directed downwardly or upwardly in any direction by suitably adjusting the air deflectors 11.

This additional air, when directed substantially towards the center of the hood, produces a partial vacuum in the area immediately surrounding the lower ends of the sides 3 and causes entrainment towards exhaust duct 13, of any smoke or vapor which might have otherwise escaped the hood entirely.

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Use of the deflectors 11 in vertical position would deflect a portion of the air towards the workmen at the work table for freshening the same in hot weather.

Rotation of louver 39 will more or less close the openings 41, thereby creating partial vacuum in the spaces between partition 35 and the perforated panels 36, whereby smoke, dust or the like produced on the table surface will immediately enter the holes of the panels 36 and be exhausted through duct 13.

When louveres 28 of chamber 19 are completely open, the additional air will be all taken from the room through intake 27, the louveres 26 then completely closing the fresh air intake 25. This would be the normal operation of the air intake and recirculator system 19 in cold weather, in order not to cool the heated room in which the hood 1 and table 4 are located.

Depending on the outside weather, the louveres 28 can be adjusted to any degree of closure, whereby a mixture of air from the room and outside air will be fed through slits 8, again without unduly cooling the room air. In hot weather, louveres 26 can be completely closed and the additional air entirely supplied from fresh air intake 25.

Thus, the system of the invention greatly enhances the efficiency of the hood while maintaining the room in which the hood is located at a comfortable temperature all year round.

FIGS. 3 and 5 show a similar system but as applied against a wall. In this case, the hood 1 has a double wall top 2 and only three double wall sides 3, the hood resting, for instance, against an external wall 14 of the room.

The work table 4 is set against said external wall 14. The double wall sides 3 are each provided on the inside thereof and near their lower closed end with slits 8, each associated with a pivoted air deflector 11.

Two exhaust ducts 13 communicate with the inside of the hood near the wall 14' and are each associated with an exhaust chamber 15 on the inside of the external wall, each having an exhaust fan 16.

The hood is further provided with a central air supply duct 18 connected to the discharge of an air blower located in chamber 19, having a fresh air intake together with a room air intake 27 provided with adjustable louveres 28, as in the first embodiment.

The work table has a perforated panel 36' upwardly extending therefrom and diverging from wall 14' and edging 38 of said panel 36' forms an opening 41' with an angle iron 42 secured to the inside of the top 2 and extending longitudinally of the hood.

A louver 39', pivoted at 40', is adjustable by manual means for closing more or less the opening 41'. Here again, additional air is supplied through slits 8 and can be deflected in the required direction by air deflector 11, so as to entrain any smoke or vapor which might have escaped the hood. Also, smoke and vapor can be sucked through the holes of perforated panel 36' by partially closing louver 39'.

The additional air supplied through slits 8 or 8' in both embodiments may be adjusted as to volume by providing a motor 21 for the air blower 20 having different speeds of operation.

FIG. 7 shows a hood for a commercial kitchen and for central location similar to the embodiment of FIG. 1. The hood 50 is of double wall formation and exhaust duct 51 opens within a chamber 52 defined by two converging filter elements 53 extending longitudinally of the hood throughout the length thereof and removably supported by brackets 54 at the top and 55 at the bottom, said bracket 55 being secured to the hood top at suitable interval by upright posts, not shown, extending within the chamber 53.

The filters 52 are preferably washed at intervals with water issuing from perforated pipes 56. This water is collected in a drain trough 57 having a drain pipe 58.

The hood is otherwise similar to the first embodiment, being provided downwardly with opening slits 59 and pivotable deflectors 60 for supplying additional air furnished by a unit, such as unit 9 of the first embodiment, and connected to the plenum chamber 61 in communication with the hollow walls of the hood 50. Deflectors 60 have preferably edges bent in the same direction.

FIG. 8 shows a hood for commercial kitchens which is applied against a wall and which would correspond to the embodiment of FIG. 5. Hood 62 shown applied against an external wall 63, is of double wall formation. A plenum 64 is connected with the inside of the top and sides of the hood 62 and connected with the inside of the top and sides of the hood 62 and connected in turn with a unit, such as unit 9, to supply fresh air or a mixture of room air and fresh air, or air blown through the bottom edges of the hood, said additional air being deflected in a suitable direction by air deflector 66. The hood is connected by duct 68 to an exhaust fan system 67 at the exterior of the wall 63 and similar to fan system 15, 16, 17, of the first embodiment. The exhaust duct 68 is closed by a filter 69, which can be washed by a perforated water pipe 70 and the water collected by a drain trough 71.

Here again, the additional air supplied through slits 65 will entrain towards the exhaust of the hood any vapors or smoke which might have otherwise escaped the hood. Moreover, the additional air is supplied at an adjustable temperature in accordance with the adjustment of the air supply units 19.

FIG. 9, together with FIG. 8 and the present invention can be applied to a conventional kitchen hood. The conventional hood 110, provided with filter elements 111 and exhaust fan 112, is located above the usual kitchen stove 113.

The system of the invention comprises the usual air intake and air mixer unit 19 supplying additional air through duct 114, also shown in FIG. 6, and extending downwardly and provided with a slit or opening 115. The lower end of the duct extends along the length of the hood 110 and carries brackets 116 on which is pivoted a deflector plate 117 having bent edges 118 and fully rotatable so as to be adjusted to whatever angle is desired.

The exhaust duct lower end may be spaced from or adjacent the front end of the hood 110. Obviously, unit 19 and 114 could be arranged to overlie hood 110, as in other embodiments. Thus, additional air will be deflected towards the inside of hood 110 entraining any additional vapor or smoke which might have escaped the hood. Also, the additional air can be used to freshen up the surroundings of the kitchen stove. Here again, the additional air is adjusted as to its temperature due to the adjustable features of unit 19.

1 claim:
1. In a smoke and/or vapor collecting hood, in combination, supply air duct means having an orifice located in the vicinity of said hood, a chamber communicating with said duct means, an air blower means within said chamber to discharge air through said orifice, means to direct air discharged from said orifice into said hood, to assist in the entrainment of smoke and/or vapor into said hood, said chamber having a first air intake which opens within the room where the hood is located, and a second air intake which opens at the exterior of the room, normally closed louveres in said second air intake for closing the latter and opening only upon suction produced in said chamber by said air blower means and adjustable louveres mounted in said first air intake.
2. In a hood as claimed in claim 1, further including exhaust duct means in communication with said hood and exhaust air blower means located in said hood, and
3. In a hood as claimed in claim 1, wherein said means to direct air discharged from said orifice into said hood, includes brackets secured to and protruding from said supply air duct means, and a deflector plate pivotally mounted on said brackets and disposed opposite said orifice and rotatable through a complete revolution, so as to direct air discharged from said orifice in any direction.
4. In a hood as claimed in claim 1, wherein said hood is of double wall formation and has a top and sides, said supply air duct means formed at least in part by the space between the double walls of said hood, said discharge orifice located along the lower margins of the sides of said hood, said hood having further an air exhaust duct extending through the top of said hood and opening within the same, and exhaust air blower located in said last-named duct.
5. In a hood as claimed in claim 4, wherein the means to direct air discharged from said orifice into said hood includes deflector plates located opposite said orifices and rotatable through a complete revolution.

6. In a hood as claimed in claim 4, further including the combination of a work table disposed below said hood, wall means upstanding from said work table and terminating close to the air exhaust opening of said hood, a perforated panel also upstanding from said work table, defining a space with said wall means and terminating short of said air exhaust opening to define a passage between said hood and panel, and an adjustable closure means in said passage to partially close the latter.