

VENTILATION GROUP

FIELD OF THE INVENTION

The present invention relates to the technical sector of livestock plants (for example barns) or industrial plants (for example factories).

5DESCRIPTION OF THE PRIOR ART

A need is strongly perceived to increase the ventilation internally of this type of plant, especially in the summer months since, in fact, the high temperatures reached in the hottest months endanger the well-being of the animals and/or operators internally thereof.

10A livestock plant of known type comprises a roof, for example a pitched roof, which includes an open central longitudinal opening above which an upper cupola is arranged.

The air therefore flows through the central opening from inside the plant towards the outside.

15This type of plant is, generally open at the relative lateral walls, and comprises a support structure for the roof.

However, this system is not sufficient to guarantee good ventilation internally of plants. In particular, the temperature inside these plants reaches higher levels with respect to the external environment and, in particular during the summer months,
20creates situations of significant difficulty. Clearly this impacts on the animals and/or operators who might be present in the plant.

In some cases ventilators and/or conditioners are used, but their use naturally has an effect on the costs connected to the functioning thereof.

Further, the presence of the covering cupola poses a resistance to wind and creates
25situations of instability.

SUMMARY OF THE INVENTION

The aim of the present invention is to obviate the above-mentioned drawbacks.

The aim is attained with a ventilation group according to claim 1.

The group of the present invention advantageously enables significantly increasing

30the ventilation internally of a livestock or industrial plant. This result has been reached without the use of ventilators and/or conditioners that in the prior art led to high costs.

Further, the drawbacks due to the presence of wind, which in the prior art created problems of instability, are eliminated.

35BRIEF DESCRIPTION OF THE DRAWINGS

Specific embodiments of the invention will be detailed in the present invention, with particular reference to the tables of drawings, in which:

- figure 1 is a perspective view of a ventilation group according to a first embodiment of the invention, in use;
- 40- figure 2 is a lateral view of the ventilation group of figure 1;
- figures 3A and 3B illustrate two cross-sections of a ventilation group according to the first embodiment of the invention, in different variants;
- figure 4 is a perspective view of a ventilation group according to a second embodiment of the invention;
- 45- figures 4A and 4B illustrate two cross-sections of a ventilation group according to the second embodiment of the invention, in different variants;
- figure 5 is a perspective view of a ventilation group according to the second embodiment of the invention, in use.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

50With reference to the accompanying figures of the drawings, the invention relates to a ventilation group (1) for a livestock or industrial plant (for example a barn or a factory not illustrated). The plant has a roof (C) provided with at least an upper opening (A) communicating with an external environment (see in particular figure 1, in which a roof (C) is partly illustrated). The plant further comprises at least a lateral
55opening (not illustrated), provided in at least a lateral wall of the plant and communicating with the external environment. This type of plant is, in fact, generally open at the relative lateral walls.

In particular, the group (1) comprises at least a collecting and conveying channel

(2), comprising a bottom (20) and lateral walls (21).

60The group (1) further comprises fixing means, for fixing the channel (2) to the roof (C), so that the channel (2) is arranged below the upper opening (A). The channel (2) is conformed and predisposed for collecting atmospheric precipitation which arrives therein from the external environment through the upper opening (A), and for conveying it towards a ground surface.

65The group (1) further comprises at least a passage (3) for the air, predisposed to place in communication an inside of the plant with the upper opening (A) of the roof (C), so as to generate an air flow which enters the plant through the lateral opening and which reaches towards the external environment through the passage (3) and the upper opening (A).

70The group (1) of the invention advantageously increases the “flue effect” (sometimes termed “passive cooling”), i.e. the natural ventilation phenomenon which draws hot air from inside the plant, which is clearly borne upwards, to exit to the outside by crossing the passage (3) and therefore the upper opening (A) of the roof (C), while air at a lower temperature enters the plant from the lateral opening. This is due to
75the fact that when the air with higher temperature exits from the plant through the upper opening (A), a sort of depression is created which determines the aspirating of air at a lower temperature into the plant through the lateral opening thereof. This vertical displacement of masses produces a contemporaneous horizontal movement of the air from the external zone with a higher density (cooler) towards the internal
80zone at a lower temperature and therefore the entry, through the lateral opening, of cooler air internally of the plant.

This air flow advantageously significantly improves the conditions internally of the plant, and therefore positively influences the well-being of the animals and/or the operators present internally of the plant.

85Consequently, an air flow is created that is able to significantly reduce the temperature internally of the plant with respect to the known systems.

Differently to the prior-art solutions, in which the presence of wind creates problems

of instability, with the invention the presence of wind increases the “natural ventilation” phenomenon.

90 Clearly the upper opening (A) of the roof (C) can be predisposed during the design step of the plant or can be realised following this.

For example, as regards the latter case, the group (1) can advantageously be exploited for example for reactivating industrial factories that are at present not being used.

95 Clearly a greater advantage is obtained with a plurality of upper openings (A) and a plurality of ventilation groups (1). In this way it is in fact possible to include openings that involve up to about 50% of the surface of the plant. In the prior art, this was not possible as only the central opening in the roof was present.

Note that the channel (2) can have a variable length according to needs. For
100 example, a plurality of channels (2) can be predisposed, one following another, fixed longitudinally or transversally to one another with respect to the roof (C).

The channel (2) has a width (i.e. a transversal extension) that is at least equal to a width of the overlying upper opening (A) (preferably greater than the width of the upper opening (A)).

105 The channel (2) is preferably fixable to the roof (C) so as to be inclined towards the ground surface, to facilitate conveying of the atmospheric precipitation. The group (1) of the invention can be predisposed in a plant having a roof (C) of any type, i.e. pitched (single or multiple), flat or curved. Clearly, in accordance with the type of roof (C), the group (1) is consequently arranged in such a way that the channel (2)
110 can convey the atmospheric precipitation towards the ground surface (see figure 1).

The group (1) of the invention advantageously does not constitute an overload with respect to the known systems, and offers no resistance to wind.

In a first embodiment of the invention, illustrated in figures, 1, 2, 3A, 3B, the fixing means comprise a frame (4), fixed to the channel (2) and fixable to the roof (C), so
115 that the passage (3) is defined between at least a lateral wall (21) of the channel (2) and the roof (C) (see figures 1 and 2).

In other words, the passage (3) is defined between the upper edge (22) of at least a lateral wall (21) of the channel (2) and the roof (C). Two passages (3) are preferably defined, each between the upper edge (22) of at least a lateral wall (21) of the channel (2) and the roof (C).

For example, the frame (4) comprises at least a support element having a C-shaped section, opposite ends of which are fixable to the roof (C). The channel (2) is fixed for example internally of the recess of the C (see figures 1, 3A-3B).

In accordance with a different embodiment of the invention, illustrated in figures 4, 1254A, 4B, 5, the channel (2) can be defined as "self-supporting", as the group (1) lacks the frame described in the preceding embodiment.

In this variant, the lateral walls (21) of the channel (2) comprise at least an upper edge (22) (preferably two upper edges) fixable to the roof (C) (see in particular figures 5, 4A, 4B). In this case, the passage (3) is arranged at least at a lateral wall (21) of the channel (2).

More than one passage (3) can advantageously be included.

For example, the edges of the lateral walls (21) can be projecting so as to be positionable resting on the roof (C) and fixed thereto by the fixing means (comprising for example holes, screws and/or fixing pins, not illustrated).

135Alternatively, the upper edges (22) of the lateral walls (21) can be fixed below the roof (C), also by means of the fixing means.

The channel (2) can have different sections according to needs, as illustrated in figures 3A, 3B, 4A, 4B. It is clear that it is possible to include any other section useful for achieving the aim of the invention.

140For example, at least a lateral wall of the channel (2) comprises a grid (210) (and/or a net), the meshes of which define a plurality of passages (3) for the air (see figure 4).

Clearly both the lateral walls (21) can each comprise a grid (210) (and/or a net).

In this way, entry into the plant of insects or other undesired foreign bodies is 145prevented, without blocking the passage of air. Further, the presence of the grid

(210) (and/or the net) also precludes the formation of air vortices internally of the plant. Alternatively tilting or sliding windows can be provided for the partial closure of the passage (3), according to need (situation not illustrated).

The group (1) can further comprise a grid and/or a net, positionable at the upper
150 opening (A) of the roof (C). The grid (and/or net) not only prevents entry of insects and/or foreign bodies into the plant, it also receives snow thereon, preventing an overloading of the channel (2) (situation not illustrated). In this way, the structure of the group (1) is consequently lightened.

The invention further relates to a system (S) comprising a roof (C) provided with a
155 plurality of upper openings (A) and a plurality of ventilation groups (1) as described in the foregoing (see figure 1 or figure 5, in which the system (S) is only partially illustrated). The system (S) can be thus realised during the design step thereof or can be obtained starting from a roof (C) of known type, in which the upper openings (A) can be predisposed. The system (S) is therefore versatile and adaptable
160 according to needs.

For example the roof (C) is of a pitched (see figure 1), or flat, or curved type.

Further, the group (1) can be predisposed in a commercial plant.

CLAIMS

165). A ventilation group (1) for a livestock or industrial plant,
the plant having a roof (C) provided with at least an upper opening (A)
communicating with an external environment; and at least a lateral opening,
provided in at least a lateral wall of the plant and communicating with the external
environment;

170the group comprising:

at least a collecting and conveying channel (2), comprising a bottom (20) and lateral
walls (21);

fixing means, for fixing the channel (2) to the roof (C), so that the channel (2) is
arranged below the upper opening (A);

175the channel (2) being conformed and predisposed for collecting atmospheric
precipitation which arrives from the external environment through the upper opening
(A), and for conveying the atmospheric precipitation towards a ground surface;

at least a passage (3) for the air, predisposed to place in communication an inside of
the plant with the upper opening (A) of the roof (C), so as to generate an air flow
180which enters the plant through the lateral opening and which reaches towards the
external environment through the passage (3) and the upper opening (A);

the channel (2) being fixable to the roof (C) so as to be inclined towards the ground
surface, to facilitate conveying of the atmospheric precipitation;

the channel (2) having a width that is at least equal to a width of the upper opening
185(A), preferably greater than the width of the upper opening (A);

the ventilation group being characterised in that it comprises, alternatively or in
combination:

a grid (210) or a net, provided in at least a lateral wall (21) of the channel (2), for
preventing entry into the plant of insects and/or foreign bodies without precluding
190passage of the air; and/or

a grid or a net, positionable at the upper opening (A) of the roof (C), for preventing
entry into the plant of insects and/or foreign bodies and for receiving thereon snow

- precipitation which otherwise would overload the channel (2).
- 2). The group (1) of claim 1, wherein the upper opening (A) of the roof (C) and the
195channel (2) are arranged transversally or longitudinally with respect to the
longitudinal extension of the plant.
 - 3). The group (1) of claim 1 or 2, wherein the lateral walls (21) of the channel (2)
comprise at least an upper edge (22) fixable to the roof (C); wherein the passage (3)
is arranged at least at a lateral wall (21) of the channel (2).
 - 204). The group (1) of claim 1 or 2, wherein the fixing means comprise a frame (4), fixed
to the channel (2) and fixable to the roof (C), so that the passage (3) is defined
between at least a lateral wall (21) of the channel (2) and the roof (C).
 - 5). The group (1) of the preceding claim, wherein the frame (4) comprises at least a
support element having a C-shaped section, opposite ends of which (40, 41) are
205fixable to the roof (C).
 - 6). A system (S) comprising a roof (C) provided with a plurality of upper openings (A)
and a plurality of ventilation groups (1) according to one of the preceding claims, the
upper openings (A) being arranged transversally or longitudinally with respect to the
longitudinal extension of the plant.
 - 217). The system (S) of the preceding claim, wherein the roof (C) is of a pitched, or flat,
or curved type.

ABSTRACT

A ventilation group (1) for a livestock or industrial plant, the plant having a roof (C) 215 provided with at least an upper opening (A) communicating with an external environment; and at least a lateral opening, provided in at least a lateral wall of the plant and communicating with the external environment;

the group comprises (1): at least a collecting and conveying channel (2), comprising a bottom (20) and lateral walls (21);

220 fixing means, for fixing the channel (2) to the roof (C), so that the channel (2) is arranged below the upper opening (A); the channel being conformed and predisposed for collecting atmospheric precipitation which arrives from the external environment through the upper opening (A), and for conveying it towards a ground surface;

225 at least a passage (3) for the air, predisposed to place in communication an inside of the plant with the upper opening (A) of the roof (C), so as to generate an air flow which enters the plant through the lateral opening and which passes towards the external environment through the passage (3) and the upper opening (A).