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(54) **Air duct**

(57) An air duct for transport or distribution or suction of air, the duct having walls (2) made of a woven or non woven fabric or foil, wherein the duct comprises
- wall (2) of the duct, which has a cross section of a triangular or rectangular shape,
- at least one upper longitudinal bearing profile (1), in which an upper corner (4) of the duct is embedded, and
- at least one lower longitudinal delimiting profile (3) for setting a position of a lower corner (5) of the duct, and

at least one further profile (1, 3), in which a further corner (4, 5) of the duct is embedded, and which is adjustable in a fixed position in respect of the upper bearing profile (1) and / or the lower delimiting profile (3).

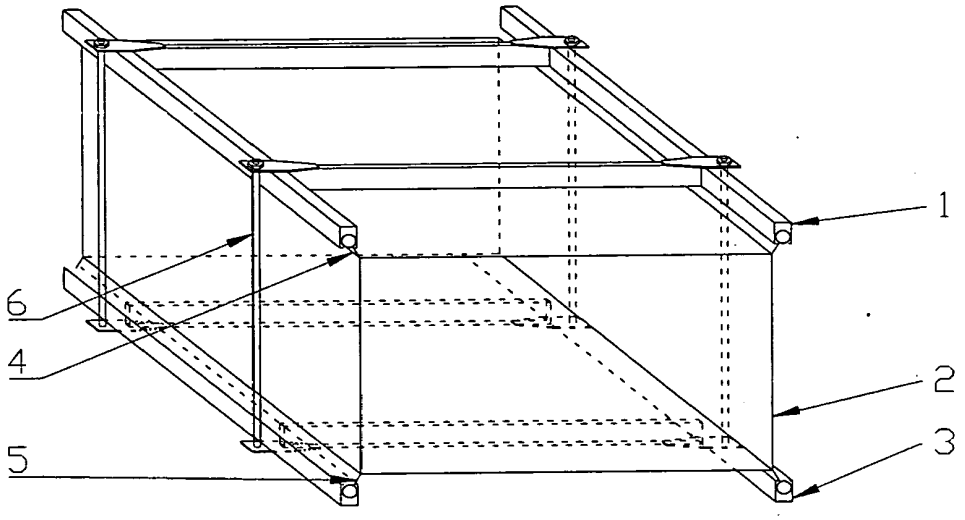

Fig. 1

EP 2 439 456 A2

Description

Field of the art

[0001] The technical solution relates to an air duct for transport, distribution, and suction of air, the duct being of a woven or non-woven fabric or foil.

Prior art

[0002] Currently known air-conditioning ducts for transport or distribution of air made of a woven or non-woven fabric or foil, also called textile diffusers, are made of a material sewn so as to form enclosed shape having various cross-section forms. Often, it is circular but, generally, it includes a part of a circle or a combination of several such parts. The ducting is perforated in a specific way and filled with air flow during operation, such that air is distributed through the perforation or passing through the fabric. In some cases, the ducting includes reinforcement means in order to maintain the required shape even without inflating it by the air flow, e.g. circular rings sewn inside the diffusers. Their disadvantage is higher price and complicated assembly and disassembly. An other option includes the use of multiple suspension means holding the upper part of the duct in the correct position. Such method is more expensive due to higher amount of installation material. Another known solution has been described in the utility model No. CZ 17562, wherein the centre of ducting cross section or region below or above the centre comprises a strut supporting the fabric and attached to the ducting in at least one place.

[0003] A disadvantage of the above air-conditioning ducting or textile diffusers is that they may be used solely for an air distribution or supply, not for any air suction or air exhaust. When required, any suction must be provided by means of a traditional ducting made from solid materials, usually metal. Several problems are associated with the use of ducting made of a solid material, because solid ducting is difficult to clean, expensive, and heavy. Known designs of fabric ducting cannot be used for a negative air pressure due, because it becomes deformed, so that its function is lost. The duct may be pulled on a structure made of solid materials such as perforated sheet metal but then it looses the advantages of a fabric ducting, namely simple cleaning, light weight and cheap price. Another disadvantage of fabric diffusers is the impossibility to use ducts having rectangular cross-section and thus providing higher air flow at the same construction height.

Summary of the invention

[0004] Said disadvantages are eliminated significantly by an air duct for a transport and distribution of air, the duct being made of a woven or non-woven fabric or foil. According to the invention walls of the duct form a rectangular or triangular cross section, and the walls are at least with one upper corner fastened in a longitudinal upper bearing profile, and at the opposite side at least one lower corner of the duct is fixed in a longitudinal lower delimitation profile. The substance of the invention is also that the upper and/or lower corner of the duct is made thicker to enable its external fixture in the longitudinal upper or lower profile. According to an alternative embodiment the lower longitudinal delimitation profile is placed inside a lower corner of the duct. According to the invention the longitudinal lower delimitation profile, to which the lower corner of the duct walls is fastened, is connected to the longitudinal upper bearing profile via fixed vertical spacing and connecting elements. At least two longitudinal upper bearing profiles form the upper bearing structure and two longitudinal profiles form the lower structure of air-conditioning ducting.

[0005] The air duct is adjusted in such way that its deformation resulting from any negative pressure or overpressure is prevented. The duct maintains its rectangular or triangular cross section. The upper part of the duct is adapted to be fixed to the solid structure which is either suspended in the area or attached directly to the ceiling. The lower part of the textile duct is adapted to allow fixing or inserting a weight structure which holds the duct walls stretched even at negative pressure levels used in practise. Such a ducting solution provides a very simple and well applicable way for maintaining the shape of the ducting. Air flow enters the ducting in a common way through the holes or through the fabric. The main advantage of the invention is the possibility to extend the use of air-conditioning ducting and diffusers made of woven or non-woven fabric or foil to most of exhaust systems of low pressure air-conditioning or for producing rectangular inlet fabric ducting, which was possible so far for ducts made of stiff materials only.

Brief description of the drawings

[0006] Technical solution is detailed by means of figures. Fig. 1 shows an air duct having a rectangular cross section, Fig. 2 represents a cross section of the duct when out of operation, Fig. 2a shows the duct during operation in the suction mode, and figure 2b shows the duct during operation in the supply mode.

[0007] Fig. 3 displays fabric suction diffuser having a triangular cross section, Fig. 4 represents a cross section through the duct when out of operation, Fig. 4a shows the duct during operation in the suction mode, and figure 2b during operation in the supply mode.

Exemplifying embodiments

[0008] The air duct for air transport or distribution is made from woven fabric and has a hose shape having walls 2 forming a rectangular cross section (Fig. 1). Two upper wall corners 4 of are fastened in two upper longitudinal bearing profiles 1, which interconnected with each other by crosspieces and which form an upper bearing

structure. At the opposite side, lower wall corners 5 of the duct are arranged in lower longitudinal delimitation profiles 3, which are connected with crosspieces and which form a lower delimitation structure. The lower longitudinal delimitation profiles 3 are interconnected with the upper longitudinal bearing profiles 1 by means of fixed vertical delimitation connecting elements 6 in the areas of upper and lower cross-sections. The height of the vertical delimitation connecting elements 6 is adjusted as per the dimensions of the duct. The upper corners 4 and the lower corners 5 are reinforced by means of a cavity, which is inserted in the upper bearing profiles 1 and the lower delimitation profiles 3. The cavity may be further reinforced e.g. by means of bars. The bearing structure made of upper bearing profiles 1 may be suspended in the area or attached to a ceiling like common ducts of this type.

[0009] In case of air ducts having walls 2 forming a triangular cross-section (Fig. 3), the arrangement of the upper wall corners 4 is similar to the duct having rectangular cross section. The remaining - the third - lower corner 5 is arranged in a lower longitudinal delimitation profile 3, which in this case forms a weight load for the duct and which is not fixed to the upper bearing profiles 1.

[0010] The new solution of air ducts provides another possible way of fixing the lower corners 5 to the lower delimitation profiles 3, namely that the lower longitudinal delimitation profile 3 is placed inside the lower corner 5 of the duct.

[0011] If the duct is out of operation, its walls 2 are more or less planar based on their stretching by means of the profiles (Fig. 2, 4) and the setting of the vertical delimitation connecting elements 6. In case of a suction mode, the walls 2 are concave during operation (Fig. 2a, 4a). The duct may be used also for air distribution; in such case the walls 2 bulge outwards (Fig. 2b, 4b).

Industrial applicability

[0012] Air ducts according to the invention may be used in industry for air-conditioning systems installations, particularly in plants requiring higher quality of hygiene and air purity.

Claims

1. An air duct for a transport or distribution or suction of air, the duct having walls (2) made of a woven or non woven fabric or foil, **characterised in that** the duct comprises

   - walls (2) of the duct, which has a cross section of a triangular or rectangular shape,
   - at least one upper longitudinal bearing profile (1), in which an upper corner (4) of the duct is embedded, and
   - at least one lower longitudinal delimiting profile (3) for setting a position of a lower corner (5) of the duct, and
   - at least one further profile (1, 3), in which a further corner (4, 5) of the duct is embedded, and which is adjustable in a fixed position in respect of the upper bearing profile (1) and / or the lower delimiting profile (3).

2. The air duct according to claim 1, **characterised in that** the upper and/or the lower corners (4, 5) of the duct are reinforced to adapt them for their external fixing in the upper and / or lower longitudinal profiles (1, 3).

3. The air duct according to claim 1, **characterised in that** the lower longitudinal delimiting profile (3) is arranged inside the lower corner (5) of the duct.

4. The air duct according to claims 1 or 2, **characterised in that** the lower longitudinal delimiting profile (3) in which the lower corner (5) of duct walls (2) is embedded, is interconnected with the upper longitudinal bearing profile (1) via fixed vertical delimiting connecting elements (6).

5. The air duct according to any of the preceding claims, **characterised in that** the upper longitudinal bearing profiles (1) are interconnected with each other by means of crosspieces for delimiting their relative position.

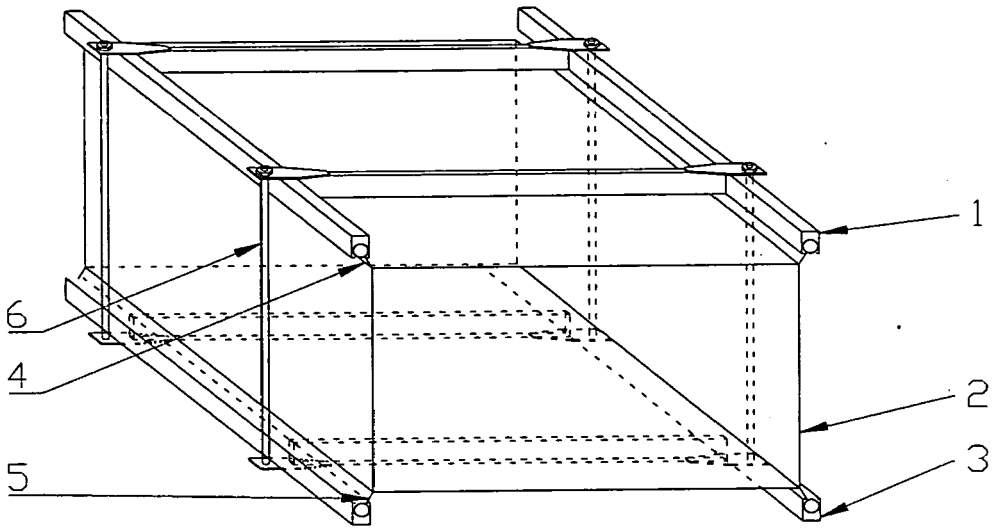

Fig. 1

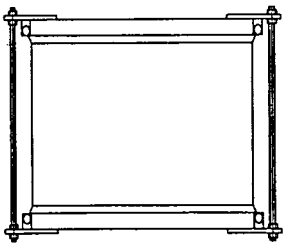

Fig. 2

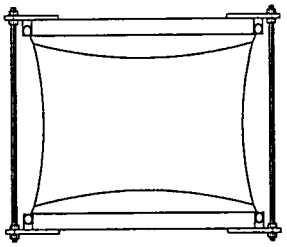

Fig. 2a

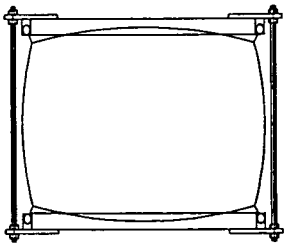

Fig. 2b

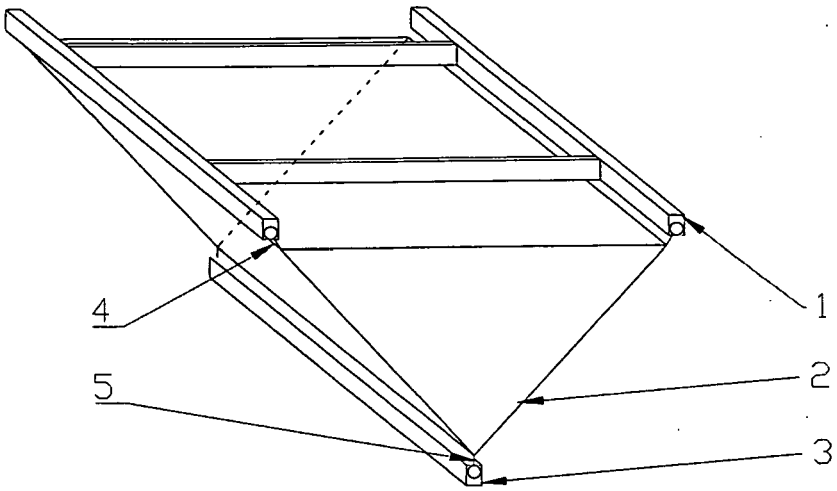

Fig. 3

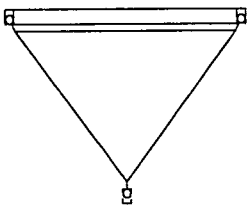

Fig. 4

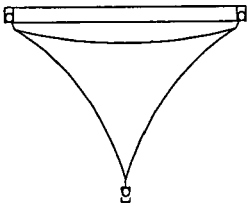

Fig. 4a

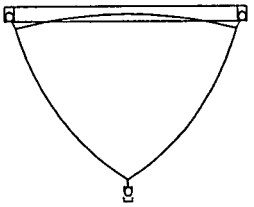

Fig. 4b

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CZ 17562 **[0002]**