CLAIMS

[Claim 1] A photocatalytic air cleaning structure for use in an air cleaner comprising:

a photocatalytic filter that includes a plurality of plate-shaped members each having a front and a back surface carrying a photocatalyst and being arranged such that the front surface of one plate-shaped member faces the back surface of another plate-shaped member adjacent thereto with a gap being interposed therebetween, the gap defining an air flow path for air flowing along the front surface and the back surface of the plate-shaped members adjacent to each other; and

a UV irradiation unit that emits ultraviolet light toward the gap, and faces one of end surfaces of each of the plate-shaped members of the photocatalytic filter with a predetermined distance array from the one of the end surfaces, the end surfaces including an end surface on an air entrance side to the gap and an end surface on an air exit side from the gap, wherein

the UV irradiation unit and one of the end surfaces of the plate-shaped member are arranged so as to define therebetween: an air supply path for taking in air from a lateral direction substantially parallel to the one of the end surfaces, and supplying the air to the air flow path defined by the gap between the plate-shaped members,the lateral direction being an outside of a space between the photocatalyic filter and the UV irradiation unit; or an air discharge path for discharging the air exiting from the flow path to a lateral direction substantially parallel to the one of the end surfaces, the lateral direction being the outside of the space between the photocatalytic filter and the UV irradiation unit, and

the gap continuously extends in a direction along the end surfaces of the plate-shaped members.

[Claim 2] The photocatalytic air cleaning structure according to claim 1, wherein

each of the plate-shaped members of the photocatalytic filter has a pair of short sides facing each other and a pair of long sides facing each other,

the end surface on the air entrance side and the end surface on the air exit side are the end surfaces corresponding to the pair of long sides of each of the plate-shaped members, thereby allowing air to pass through the air flow path in a direction in which the short sides of the plate-shaped members extend, and

the UV irradiation unit is positioned to face the end surfaces corresponding to at least one of the pair of long sides of the plate-shaped member.

[Claim 3] The photocatalytic air cleaning structure according to claim 1 or 2, wherein

the air supply path or the air discharge path is a flow path defined between the UV irradiation unit and the end surfaces on the at least one of the air entrance and exit sides of the plate-shaped members, the flow path allowing air to be taken from or discharged to a lateral direction which is substantially parallel to the end surfaces on the at least one of the air entrance and exit sides, and correspondes to a direction in which the end surfaces on the at least one of the air entrance and exit sides extend.

[Claim 4] The photocatalytic air cleaning structure according to any one of claims 1 to 3, wherein

each of the plate-shaped members of the photocatalytic filter is an undulating plate that alternately bends toward front and back of the plate, in a direction along which the end surfaces on the air entrance side or the end surfaces on the air exit side extend.

[Claim 5] The photocatalytic air cleaning structure according to any one of claims 1 to 4, wherein

the UV irradiation unit is positioned to face the end surface on the air exit side of the plate-shaped member of the photocatalytic filter, and

a dust collection filter having a white or whitish color is provided on the air entrance side of the photocatalytic filter so as to occlude an entrance of the air.

[Claim 6] The photocatalytic air cleaning structure according to claim 5, wherein

a photocatalyst is carried by the dust collection filter.

[Claim 7] The photocatalytic air cleaning structure according to any one of claims 1 to 6, wherein

the UV irradiation unit includes:

a substrate facing an entire of an air exit of the photocatalytic filter with a space being interposed therebetween, the space being the air discharge path;

a UV light source provided on and attached to a surface of the substrate, which faces the photocatalytic filter, and for irradiating the gap between the plate-shaped members with ultraviolet light; and

a light transmissive cover plate provided between the substrate and the photocatalytic filter, and

the air exiting from the gap between the plate-shaped members is discharged through the space between the cover plate and the end surface on the air exit side of each of the

plate-shaped members, along a surface of the cover plate, toward a lateral edge.

[Claim 8] The photocatalytic air cleaning structure according to any one of claims 1 to 7, wherein

the photocatalytic filter includes a linking member for linking the plate-shaped members together, and all the plate-shaped members are integrated together into a unit

arrangement by the linking member.

[Claim 9] The photocatalytic air cleaning structure according to any one of claims 1 to 8, wherein

each of the plate-shaped members is a metal plate.

[Claim 10] An air cleaner comprising:

the photocatalytic air cleaning structure according to any one of claims 1 to 9, wherein

in a housing, the photocatalytic filter and the UV irradiation unit facing the photocatalytic filter are positioned and aligned with each other in a fore-and-aft direction of the housing,

an air intake opening and an air discharge opening are each provided in an upper, a lower, a left, and a right peripheral wall for linking a front and a rear wall of the housing at a predetermined position,

in the housing, the air supply path extending from the air intake opening to the air entrance of the photocatalytic filter, and an air discharge path extending from the air exit of the photocatalytic filter to the air discharge opening, are provided, and

a fan for forcing air to flow is provided in a middle of the air supply path or the air discharge path.

[Claim 11] A photocatalytic filter for use in the air cleaning structure according to one of claims 1 to 9, comprising

a metal filter base body that includes a metal plate body having a plurality of row-shaped crest portions and a plurality of row-shaped trough portions alternately formed, with a through groove extending in a row direction for allowint a fluid to pass through being provided in each of the crest portions and each of the trough portions; and a middle wall portion facing the through groove being the plate-shaped member, and

a tube-shaped frame formed of synthetic resin into which the metal filter base body is fitted, wherein

the metal filter base body and the tube-shaped frame form a unit arrangement.