SUSPENDER

Technical Field

[0001] The present invention relates to a suspender.

Background Art

[0002] A ceiling suspended from a building is known (for example, see Patent Literature 1). In such a ceiling, for example, a plurality of rectangular-shaped frame members are arranged in a matrix and a grid-shaped groove is formed between the plurality of frame members. A suspender is attached via this groove and an object to be suspended is held via this suspender.

Citation List

Patent Literature

[0003] Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2007-126924

Summary of the Invention

Technical Problem

[0004] In the ceiling, a plurality of frames are coupled by a coupling member at an intersection point of grooves and this coupling member is suspended from a building, thus any grooves may not be formed at this intersection point area. Further, equipment such as a sprinkler may have already been suspended from a part of the grooves of the frames. In such a case, a suspender cannot be attached to an area around an intersection point of grooves and around the equipment and therefore there exists a problem that an object to be suspended cannot be easily suspended, for example, a special suspender is required.

[0005] The present invention provides a suspender capable of increasing degrees of freedom of a suspending position of an object to be suspended which is suspended from a ceiling.

Solution to Problem

[0006] According to a first aspect of the present invention, there is provided a suspender configured to suspend an object to be suspended via a grid-shaped groove provided at a ceiling included in a building and includes a fixed portion fixed to multiple places in the grid-shaped groove and a body portion connected

to the fixed portion and configured to suspend the object to be suspended. A first guide portion configured to connect the fixed portion and the body portion to each other and extending in a first direction is provided at the fixed portion or the body portion. A connecting position of the body portion with respect to the fixed portion can be changed within a range of a length of the first guide portion. A second guide portion configured to suspend the object to be suspended and extending in a second direction different from the first direction is provided at the body portion. A suspending position of the object to be suspended with respect to the body portion can be changed within a range of a length of the second guide portion. the fixed portion includes a plurality of suspending portions fixed to the groove and a plate-shaped body attached to lower ends of the plurality of suspending portions and expanding horizontally. The plurality of suspending portions includes: a first suspending portion fixed to a first position in the groove; a second suspending portion fixed to a second position in the groove, the second position different from the first position; and a third suspending portion fixed to a third position in the groove, the third position different from the first position and the second position. The plate-shaped body includes: a first portion fixed to a lower portion of the first suspending portion and extending in the first direction; a second portion fixed to a lower portion of the second suspending portion and extending in the first direction; and a third portion fixed to a lower portion of the third suspending portion, extending in the second direction, and connected to each of the first portion and the second portion. The first guide portion is provided at each of the first portion and the second portion.

[0006a] According to a second aspect of the present invention, there is provided a suspender configured to suspend an object to be suspended via a grid-shaped groove provided at a ceiling included in a building and includes a fixed portion fixed to multiple places in the grid-shaped groove and a body portion connected to the fixed portion and configured to suspend the object to be suspended. A first guide portion configured to connect the fixed portion and the body portion to each other and extending in a first direction is provided at the fixed portion or the body portion. A connecting position of the body portion with respect to the fixed portion can be changed within a range of a length of the first guide portion. A second guide portion configured to suspend the object to be suspended and extending in a second direction different from the first direction is provided at the body portion. A suspending position of the object to be suspended with respect to the body portion can be changed within a range of a length of the second guide portion. The fixed portion includes a plurality of suspending portions fixed to the groove and a plate-shaped body attached to lower ends of the plurality of suspending portions and expanding horizontally. The plurality of suspending portions include: a fourth suspending portion fixed to a fourth position in the groove; and a fifth suspending portion fixed to a fifth position in the groove, the fifth position different from the fourth position. The plate-shaped body includes: a fourth portion fixed to a lower end of the fourth suspending portion and extending in the first direction; and a fifth portion fixed to a lower end of the fifth suspending portion, extending in the second direction, and connected to the fourth portion. The first guide portion is provided at the fourth portion, the body portion includes a third raceway connected to the first guide portion of the

fourth portion and extending in the second direction, and the third raceway includes the second guide portion.

[0006b] According to a third aspect of the present invention, there is provided a suspender configured to suspend an object to be suspended via a grid-shaped groove provided at a ceiling included in a building and includes a fixed portion fixed to multiple places in the grid-shaped groove and a body portion connected to the fixed portion and configured to suspend the object to be suspended. A first guide portion configured to connect the fixed portion and the body portion to each other and extending in a first direction is provided at the fixed portion or the body portion. A connecting position of the body portion with respect to the fixed portion can be changed within a range of a length of the first guide portion. A second guide portion configured to suspend the object to be suspended and extending in a second direction different from the first direction is provided at the body portion. A suspending position of the object to be suspended with respect to the body portion can be changed within a range of a length of the second guide portion. The fixed portion includes: a sixth suspending portion fixed to a sixth position in the groove; and a seventh suspending portion fixed to a seventh position in the groove, the seventh position different from the sixth position. The body portion is a plate-shaped member attached to lower portions of the sixth suspending portion and the seventh suspending portion and expanding horizontally, and includes: a first arc-shaped guide portion that is the first guide portion corresponding to the sixth suspending portion; a second arc-shaped guide portion that is the first guide portion corresponding to the seventh suspending portion; and the second guide portion extending straight. The first arc-shaped guide portion and the second arc-shaped guide portion have an arc shape centering on a common point and face each other with the common point interposed therebetween, and the second guide portion extends between the first arc-shaped guide portion and the second arc-shaped guide portion in a plan view.

Advantageous Effects of Invention

[0007] The suspender of the aspect can change a position of the object to be suspended in the first direction and the second direction within a range of a length of the first guide portion and within a range of a length of the second guide portion and can increase degree of freedom of position to suspend the object to be suspended.

[0008] The first direction may be parallel to a groove of said grid-shaped groove, which extends in a predetermined direction and the second direction may be parallel to a groove of the grid-shaped groove, which extends in a direction intersecting with the predetermined direction. The suspender of this aspect can change a position of the object to be suspended with respect to the fixed portion in a direction in which the grid-shaped groove extends.

[0009] The fixed portion may include a plurality of suspending portions fixed to the groove and a plate-shaped body attached to lower ends of the plurality of suspending portions and expanding horizontally. In the suspender of this aspect, the suspending

portion and plate-shaped body can have an appropriate shape according to the intended use such as suspending load. Therefore the suspender can suspend stably an object to be suspended.

[0010] The plurality of suspending portions may include a first suspending portion fixed to a first position in the groove, a second suspending portion fixed to a second position in the groove, the second position different from the first position, and a third suspending portion fixed to a third position in the groove, the third position different from the first position and the second position. The plate-shaped body may include a first portion fixed to a lower portion of the first suspending portion and extending in the first direction, a second portion fixed to a lower portion of the second suspending portion and extending in the first direction, and a third portion fixed to a lower portion of the third suspending portion, extending in the second direction, and connected to each of the first portion and the second portion. Each first guide portion may be provided at the first portion and the second portion. The plate-shaped body is held by the plurality of suspending portions, therefore, the suspender of this aspect can surely hold the plate-shaped body. Further, when equipment has been installed in the groove, interference with the equipment can be avoided by a space between the first portion and second portion.

[0011] The body portion may include a first raceway connected to the first guide portion

CLAIMS

1. A suspender configured to suspend an object to be suspended via a grid-shaped groove provided at a ceiling included in a building, and including;

a fixed portion fixed to multiple places in the grid-shaped groove; and

a body portion connected to the fixed portion and configured to suspend the object to be suspended, wherein

a first guide portion configured to connect the fixed portion and the body portion to each other and extending in a first direction is provided at the fixed portion or the body portion,

a connecting position of the body portion with respect to the fixed portion is changeable within a range of a length of the first guide portion,

a second guide portion configured to suspend the object to be suspended and extending in a second direction different from the first direction is provided at the body portion, and

a suspending position of the object to be suspended with respect to the body portion is changeable within a range of a length of the second guide portion,

wherein

the fixed portion includes a plurality of suspending portions fixed to the groove and a plate-shaped body attached to lower ends of the plurality of suspending portions and expanding horizontally,

the plurality of suspending portions includes:

a first suspending portion fixed to a first position in the groove;

a second suspending portion fixed to a second position in the groove, the second position different from the first position; and

a third suspending portion fixed to a third position in the groove, the third position different from the first position and the second position, and

the plate-shaped body includes:

a first portion fixed to a lower portion of the first suspending portion and extending in the first direction;

a second portion fixed to a lower portion of the second suspending portion and extending in the first direction; and

a third portion fixed to a lower portion of the third suspending portion, extending in the second direction, and connected to each of the first portion and the second portion, and

the first guide portion is provided at each of the first portion and the second portion.

2. A suspender configured to suspend an object to be suspended via a grid-shaped groove provided at a ceiling included in a building, and including;

a fixed portion fixed to multiple places in the grid-shaped groove; and

a body portion connected to the fixed portion and configured to suspend the object to be suspended, wherein

a first guide portion configured to connect the fixed portion and the body portion to each other and extending in a first direction is provided at the fixed portion or the body portion,

a connecting position of the body portion with respect to the fixed portion is changeable within a range of a length of the first guide portion,

a second guide portion configured to suspend the object to be suspended and extending in a second direction different from the first direction is provided at the body portion, and

a suspending position of the object to be suspended with respect to the body portion is changeable within a range of a length of the second guide portion,

wherein

the fixed portion includes a plurality of suspending portions fixed to the groove and a plate-shaped body attached to lower ends of the plurality of suspending portions and expanding horizontally,

the plurality of suspending portions include:

a fourth suspending portion fixed to a fourth position in the groove; and

a fifth suspending portion fixed to a fifth position in the groove, the fifth position different from the fourth position, and

the plate-shaped body includes:

a fourth portion fixed to a lower end of the fourth suspending

portion and extending in the first direction; and

a fifth portion fixed to a lower end of the fifth suspending portion, extending in the second direction, and connected to the fourth portion,

the first guide portion is provided at the fourth portion,

the body portion includes a third raceway connected to the first guide portion of the fourth portion and extending in the second direction, and

the third raceway includes the second guide portion.

3. A suspender configured to suspend an object to be suspended via a grid-shaped groove provided at a ceiling included in a building, and including;

a fixed portion fixed to multiple places in the grid-shaped groove; and

a body portion connected to the fixed portion and configured to suspend the object to be suspended, wherein

a first guide portion configured to connect the fixed portion and the body portion to each other and extending in a first direction is provided at the fixed portion or the body portion,

a connecting position of the body portion with respect to the fixed portion is changeable within a range of a length of the first guide portion,

a second guide portion configured to suspend the object to be suspended and extending in a second direction different from the first direction is provided at the body portion, and

a suspending position of the object to be suspended with respect to the body portion is changeable within a range of a length of the second guide portion,

wherein

the fixed portion includes:

a sixth suspending portion fixed to a sixth position in the groove; and

a seventh suspending portion fixed to a seventh position in the groove, the seventh position different from the sixth position,

the body portion is a plate-shaped member attached to lower portions of the sixth suspending portion and the seventh suspending portion and expanding horizontally, and includes:

a first arc-shaped guide portion that is the first guide portion

corresponding to the sixth suspending portion;

a second arc-shaped guide portion that is the first guide portion corresponding to the seventh suspending portion; and

the second guide portion extending straight,

the first arc-shaped guide portion and the second arc-shaped guide portion have an arc shape centering on a common point and face each other with the common point interposed therebetween, and

the second guide portion extends between the first arc-shaped guide portion and the second arc-shaped guide portion in a plan view.

4. The suspender according to claim 1 or 2, wherein

the first direction is parallel to a groove of the grid-shaped groove, which extends in a predetermined direction, and

the second direction is parallel to a groove of the grid-shaped groove, which extends in a direction intersecting with the predetermined direction.

5. The suspender according to claim 1, wherein

the body portion includes:

a first raceway connected to the first guide portion of the first portion and extending in the second direction; and

a second raceway separately from the first raceway, connected to the first guide portion of the second portion, and extending in the second direction, and

the first raceway and the second raceway each include the second guide portion.

6. The suspender according to claim 5, wherein

the body portion includes a straight member connected to each of a lower end of the first raceway and a lower end of the second raceway, and extending in the second direction, and

the straight member includes the second guide portion.

7. The suspender according to claim 1, wherein

the body portion is connected to each of the first guide portion of the first portion and the first guide portion of the second portion and extends in the second direction, and

the second guide portion is provided at the body portion.