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(54) **MOUNTING APPARATUS FOR MOUNTING AN ELECTRONIC DEVICE TO A CEILING WALL**

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(57) **ABSTRACT**

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A mounting apparatus includes a supporting member and a plurality of mounting arms, each having a secured segment disposed to be fixed to an upper wall of an electronic apparatus, and a cantilever segment with a key slot. The supporting member has a base disposed to be attached to a ceiling wall, and a post extending from the base to connect with a hanging member. The hanging member has a suspended major wall which is formed with a plurality of elongated slots that are angularly displaced from one another about a centerline and that are configured to define a plurality of fastening positions displaced from one another in radial directions. A plurality of tightening members are insertable through the key slots and the corresponding elongated slots to thereby enable the tightening members to force the cantilever segments of the mounting arms to abut against the suspended major wall.

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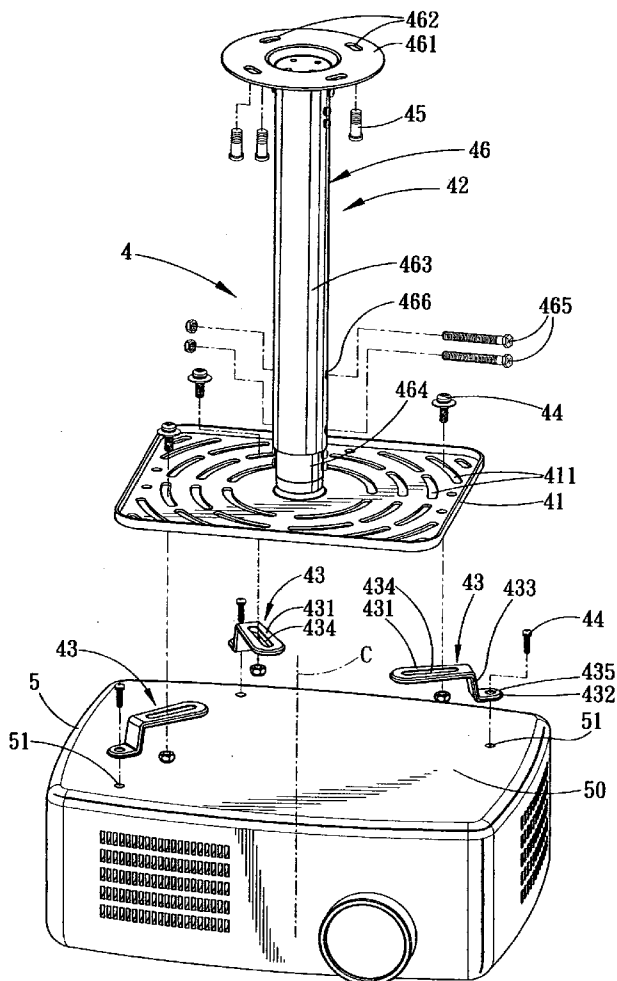
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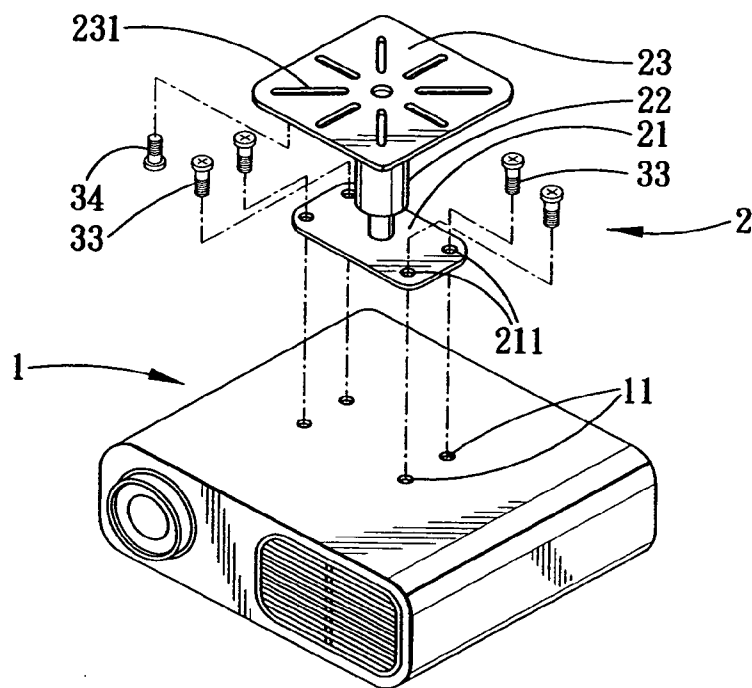


FIG. 1 PRIOR ART

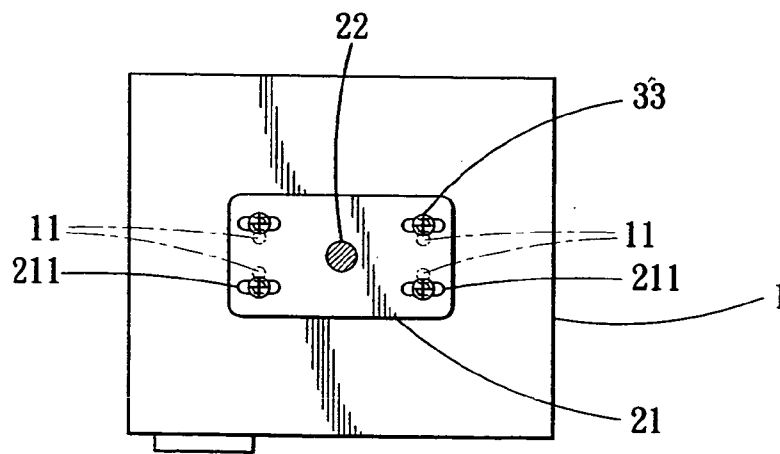


FIG. 2 PRIOR ART

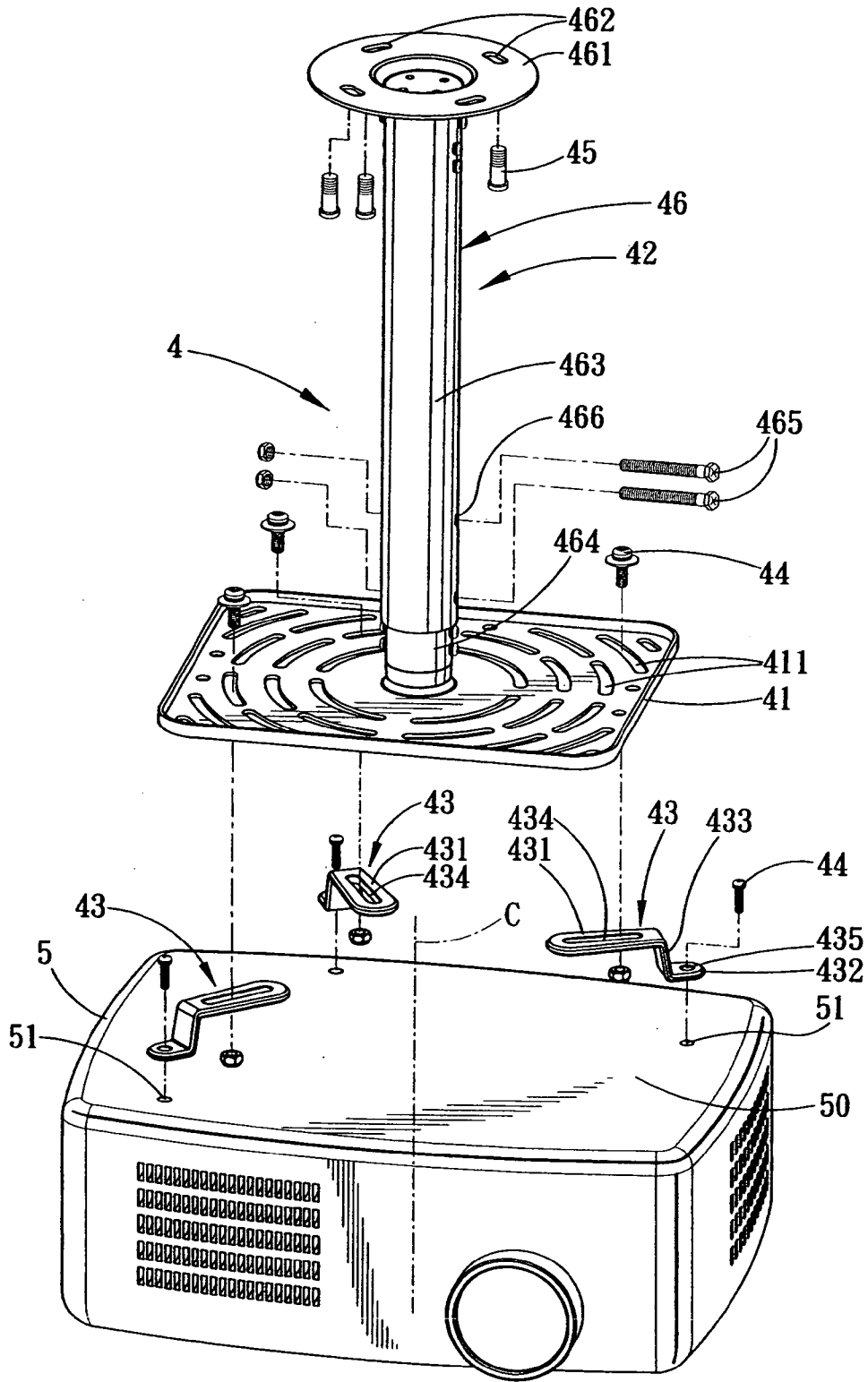


FIG. 3

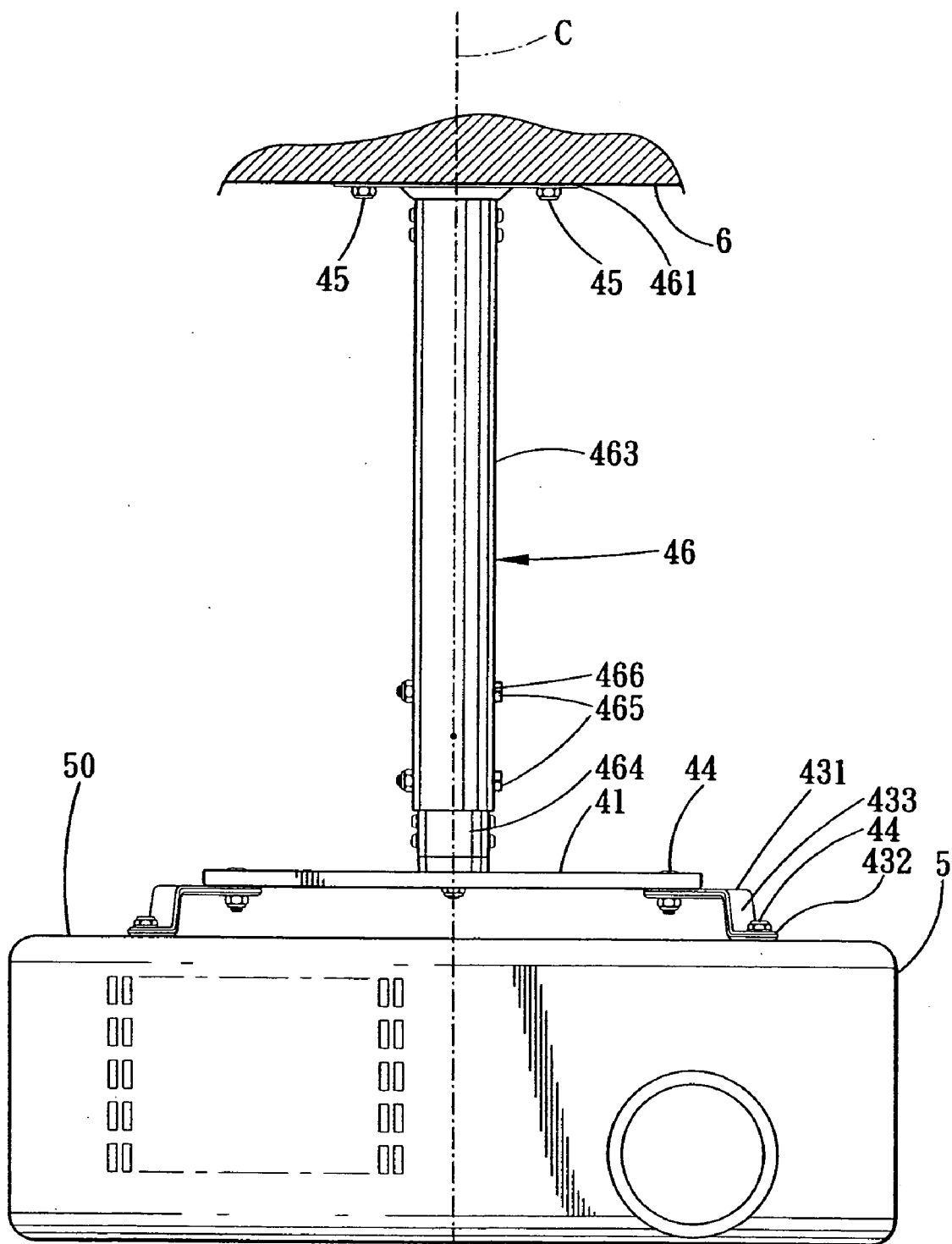


FIG. 4

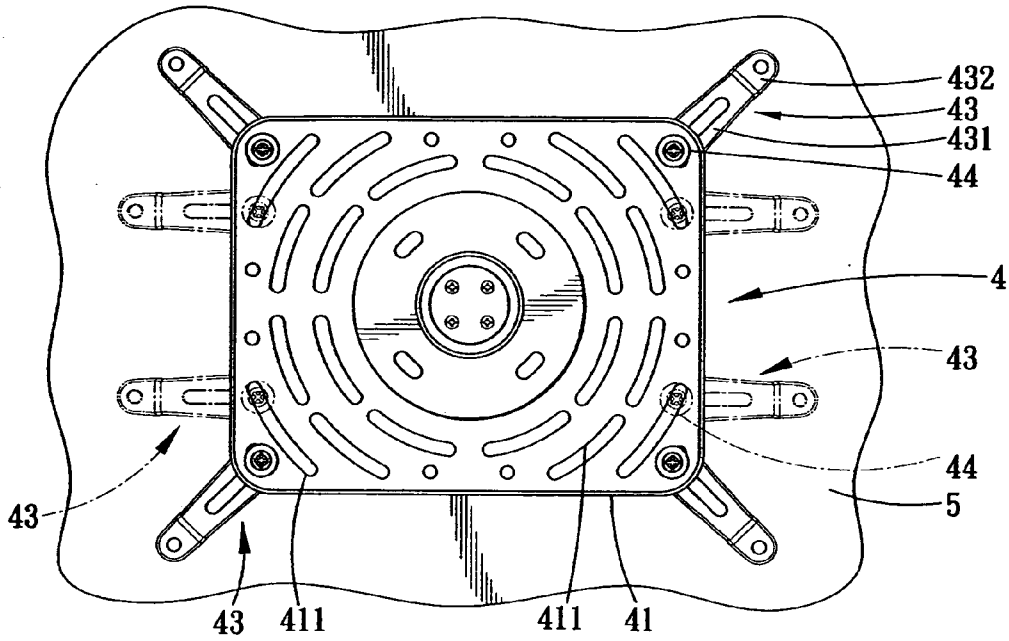


FIG. 5

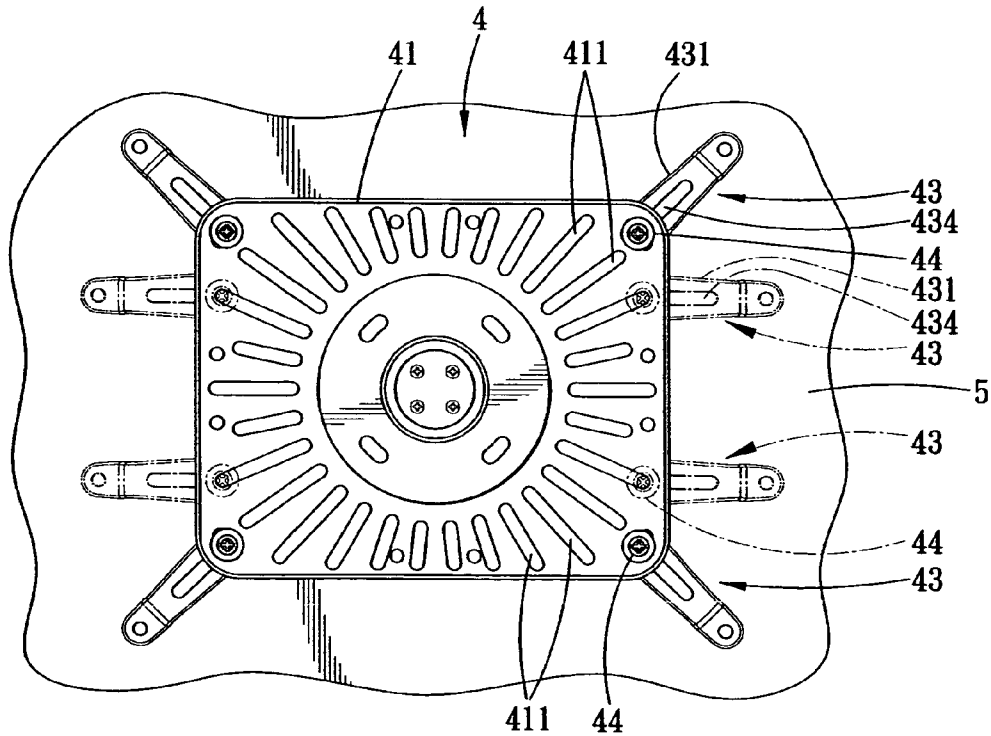


FIG. 6

**MOUNTING APPARATUS FOR MOUNTING AN ELECTRONIC DEVICE TO A CEILING WALL**

**CROSS-REFERENCE TO RELATED APPLICATION**

[0001] This application claims priority of Taiwanese Application No. 094222733, filed on Dec. 27, 2005.

**BACKGROUND OF THE INVENTION**

[0002] 1. Field of the Invention

[0003] This invention relates to a mounting apparatus for an electronic device, more particularly to a mounting apparatus for mounting an electronic device, such as a projector, to a ceiling wall.

[0004] 2. Description of the Related Art

[0005] Referring to FIG. 1, a conventional suspending device 2 for suspending an electronic device, such as a projector 1, from a ceiling wall is shown to include a hanging plate 21 which has a plurality of holes 211 for passage of a plurality of screw fasteners 33 therethrough to be screwed into screw holes 11 in an upper wall of the projector 1, a telescopic post 22 which extends uprightly from the hanging plate 21, and a supporting wall 23 which is connected to an end of the telescopic post 22 opposite to the hanging plate 21 and which has a plurality of elongated holes 231 for a plurality of screw fasteners 34 to pass therethrough to be fixed to the ceiling wall. In the conventional suspending device 2, as the holes 211 in the hanging plate 21 has to be registered with the screw holes 11 in the projector 1 to permit the screw fasteners 33 to pass therethrough, the suspending device 2 can be used with specific types of electronic devices only. Therefore, as shown in FIG. 2, the holes 211 in the hanging plate 21 of the suspending device 2 are formed as elongated slots so as to increase an area of overlapping with the screw holes 11 in the projector 1. However, registration of the elongated slots 211 with the screw holes 11 may not be possible when the distance between two adjacent screw holes 11 is shortened.

**SUMMARY OF THE INVENTION**

[0006] The object of the present invention is to provide a mounting apparatus which can be used for mounting different types of electronic devices to a ceiling wall with ease.

[0007] According to this invention, the mounting apparatus includes a plurality of mounting arms, a supporting member, a plurality of tightening members, and a hanging member. Each of the mounting arms includes a secured segment which can be fixed to an upper wall of an electronic device, and a cantilever segment which extends away from the secured segment and towards a centerline and which can be spaced apart from the upper wall in an upright direction. The cantilever segment has a key slot extending lengthwise therethrough to define a plurality of mounting positions. The supporting member includes a base which can be attached to the ceiling wall, and a post which extends from the base along the centerline and which terminates at amounting head. Each of the tightening members includes a key stem configured to be insertable through the respective key slot so as to permit the tightening member to be located at a selected mounting position. The hanging member extends in radial directions relative to the centerline to form a suspended

major wall which has a central area that is engaged with the mounting head along the centerline, and a circumferential area that surrounds the central area. The circumferential area has a plurality of elongated slots which are angularly displaced from one another about the centerline, and which are configured to define a plurality of fastening positions that are displaced from one another in the radial directions. Each of the fastening positions is registered with the corresponding mounting position of the tightening member so as to permit the key stem of the tightening member to pass through the selected elongated slot to thereby enable the respective tightening member to force the cantilever segment to abut against the suspended major wall.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0008] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments of the invention, with reference to the accompanying drawings, in which:

[0009] FIG. 1 is a perspective view of a conventional suspending device for mounting a projector;

[0010] FIG. 2 is a schematic view of a hanging plate of the conventional suspending device;

[0011] FIG. 3 is an exploded perspective view of the preferred embodiment of a mounting apparatus according to this invention;

[0012] FIG. 4 is a schematic side view of the preferred embodiment when used for mounting a projector to a ceiling wall;

[0013] FIG. 5 is a schematic top view of the preferred embodiment when used for mounting a projector; and

[0014] FIG. 6 is a schematic top view of another preferred embodiment of a mounting apparatus according to this invention when used for mounting a projector.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

[0015] Referring to FIGS. 3 to 5, the preferred embodiment of a mounting apparatus 4 according to the present invention is shown to be adapted for mounting an electronic device, such as a projector 5, to a ceiling wall 6. The projector 5 includes an upper wall 50 which defines a centerline (C) in an upright direction and which has a plurality of screw holes 51 formed therein. The mounting apparatus 4 comprises a plurality of mounting arms 43 and a suspending device 42.

[0016] Each of the mounting arms 43 includes a secured segment 432 which is in the form of a flat plate, and which has a through hole 435 to be registered with a respective one of the screw holes 51 such that a screw fastener 44 can pass through the through hole 435 to be screwed into the corresponding screw hole 51 so as to fix the secured segment 432 on the upper wall 50 of the projector 5, a cantilever segment 431 which is in the form of a flat plate, which extends away from the secured segment 432 and towards the centerline (C), and which is spaced apart from the upper wall 50 in the upright direction, and an interconnecting segment 433 which extends in the upright direction and which interconnects the secured and cantilever segments 432,431. The cantilever

segment **431** has a key slot **434** extending lengthwise therethrough to define a plurality of mounting positions.

[0017] The suspending device **42** includes a supporting member **46**, a plurality of tightening members **44**, and a hanging member **41**. The supporting member **46** has a base **461** which has a plurality of through holes **462** formed therethrough such that a plurality of screw fasteners **45** can pass through the through holes **462** to be secured to the ceiling wall **6**, and a post **463** which extends from the base **461** along the centerline (C) and which terminates at a mounting head **464**. The post **463** includes outer and inner tubular portions which have a series of adjusting holes **466** such that a plurality of screw fasteners **465** can pass through selected ones of the adjusting holes **466** to secure the outer and inner tubular portions so as to adjust the post **463** to a desired length. Each of the tightening members **44**, e.g., screw fasteners, includes a key stem configured to be insertable through the respective key slot **434** in the cantilever segment **431** so as to permit the tightening member **44** to be located at the selected mounting position. The hanging member **41** extends in radial directions relative to the centerline (C) to form a suspended major wall which has a central area that is engaged with the mounting head **464** along the centerline (C), and a circumferential area that surrounds the central area. The circumferential area has a plurality of elongated slots **411** which are angularly displaced from one another about the centerline (C), and which are configured to define a plurality of fastening positions that are displaced from one another in a respective one of the radial directions. In this embodiment, the elongated slots **411** are displaced from one another in the radial directions, and each of the elongated slots **411** is elongated circumferentially about the centerline (C) so as to correspond to a respective one of the fastening positions. Thus, a selected one of the fastening positions is registered with a corresponding one of the mounting positions of the tightening members **44** so as to permit the key stem of the respective tightening member **44** to pass through the selected elongated slot **411** to thereby enable the respective tightening member **44** to force the cantilever segment **431** of the respective mounting arm **43** to abut against the suspended major wall of the hanging member **41**.

[0018] Alternatively, in another preferred embodiment as shown in FIG. 6, each of the elongated slots **411** is elongated in the radial direction so as to define a plurality of the fastening positions.

[0019] As illustrated, by means of the arrangement and configuration of the elongated slots **411**, and by virtue of the mounting arms **43** which can be secured to the upper wall **50** to permit the cantilever segments **431** to be oriented in any direction (as indicated by dotted lines in FIGS. 5 and 6), the fastening positions defined by the elongated slots **411** can be easily adjusted to correspond to the mounting positions of the tightening members **44**, thereby facilitating mounting of the projector **5** to the ceiling wall **6**. Thus, the mounting apparatus **4** of this invention is suitable for mounting various types of electronic devices.

[0020] It is noted that the hanging member **41** may be directly attached and fixed to the upper wall **50** of the projector **5** by the tightening members **44** that pass through the elongated slots **411** and that are screwed into the screw holes **51** without the mounting arms **43**.

[0021] While the present invention has been described in connection with what are considered the most practical and preferred embodiments, it is understood that this invention is not limited to the disclosed embodiments but is intended to cover various arrangements included within the spirit and scope of the broadest interpretations and equivalent arrangements.

I claim:

1. A mounting apparatus for mounting an electronic device to a ceiling wall, the electronic device including an upper wall which defines a centerline in an upright direction, said mounting apparatus comprising:

a plurality of mounting arms, each including a secured segment which is adapted to be fixed to the upper wall of the electronic device, and a cantilever segment which extends away from said secured segment and towards the centerline and which is adapted to be spaced apart from the upper wall in the upright direction, said cantilever segment having a key slot extending lengthwise therethrough to define a plurality of mounting positions;

a supporting member including a base which is adapted to be attached to the ceiling wall, and a post which extends from said base along the centerline and which terminates at a mounting head;

a plurality of tightening members, each of which includes a key stem configured to be insertable through a respective one of said key slots so as to permit a respective one of said tightening members to be located at a selected one of the mounting positions; and

a hanging member extending in radial directions relative to the centerline to form a suspended major wall which has a central area that is engaged with said mounting head along the centerline, and a circumferential area that surrounds said central area, said circumferential area having a plurality of elongated slots which are angularly displaced from one another about the centerline, and which are configured to define a plurality of fastening positions that are displaced from one another in a respective one of the radial directions such that a selected one of said fastening positions is registered with a corresponding one of the mounting positions of said tightening members so as to permit said key stem of the respective one of said tightening members to pass through a selected one of said elongated slots to thereby enable the respective one of said tightening members to force said cantilever segment of the respective one of said mounting arms to abut against said suspended major wall.

2. The mounting apparatus of claim 1, wherein said elongated slots are displaced from one another in the radial directions, and each of said elongated slots is elongated circumferentially about the centerline so as to correspond to a respective one of the fastening positions.

3. The mounting apparatus of claim 1, wherein each of said elongated slots is elongated in the respective one of the radial directions so as to define a plurality of said fastening positions.

4. The mounting apparatus of claim 1, wherein each of said mounting arms has an interconnecting segment which extends in the upright direction and which interconnects said secured and cantilever segments.

5. A suspending device adapted for use with a plurality of mounting arms for mounting an electronic device to a ceiling wall, the electronic device including an upper wall which defines a centerline in an upright direction, each of the mounting arms including a secured segment which is fixed to the upper wall of the electronic device, and a cantilever segment which extends away from said secured segment and towards the centerline and which is spaced apart from the upper wall in the upright direction, said cantilever segment having a key slot extending lengthwise therethrough to define a plurality of mounting positions, said suspending device comprising:

a supporting member including a base which is adapted to be attached to the ceiling wall, and a post which extends from said base along the centerline and which terminates at a mounting head;

a plurality of tightening members, each of which includes a key stem configured to be insertable through a respective one of the key slots so as to permit a respective one of said tightening members to be located at a selected one of the mounting positions; and

a hanging member extending in radial directions relative to the centerline to form a suspended major wall which has a central area that is engaged with said mounting head along the centerline, and a circumferential area

that surrounds said central area, said circumferential area having a plurality of elongated slots which are angularly displaced from one another about the centerline, and which are configured to define a plurality of fastening positions that are displaced from one another in the radial directions such that a selected one of said fastening positions is registered with a corresponding one of mounting positions of said tightening members so as to permit said key stem of the respective one of said tightening members to pass through one of said elongated slots to thereby enable the respective one of said tightening members to force said cantilever segment of the respective one of said mounting arms to abut against said suspended major wall.

6. The suspending device of claim 5, wherein said elongated slots are displaced from one another in the radial directions, and each of said elongated slots is elongated circumferentially about the centerline so as to correspond to a respective one of the fastening positions.

7. The suspending device of claim 5, wherein each of said elongated slots is elongated in the respective one of the radial directions so as to define a plurality of said fastening positions.

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