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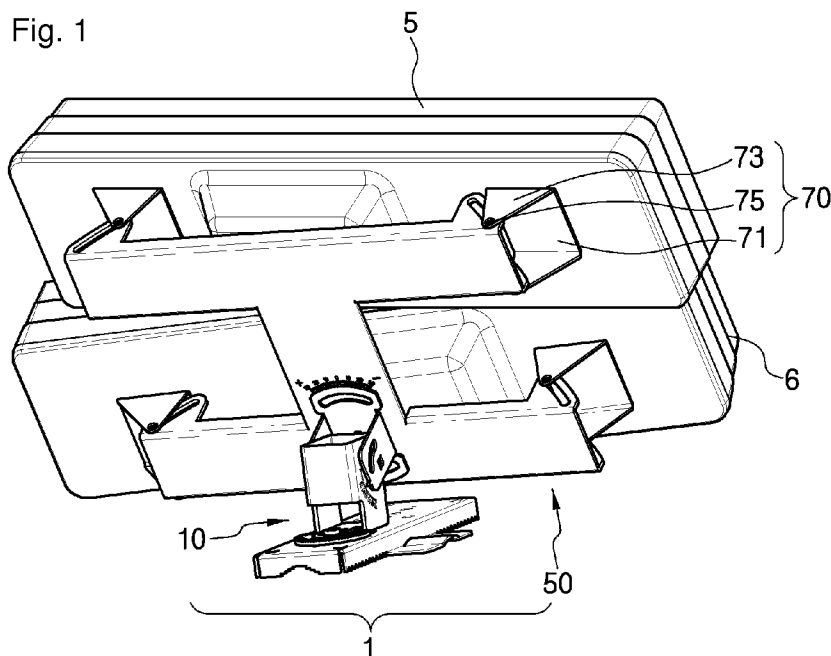
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(54) Title: SUPPORT BRACKET FOR SATELLITE ANTENNA



(57) Abstract: The present invention relates to a support bracket for satellite antennas, including a first support unit which fixes at least one pair of antennas to an installation position and is operated to adjust at least one of an azimuth angle and an elevation angle of each of the antennas, and a second support unit which is disposed between the first support unit and the antennas and is operated to separately adjust the azimuth angles of the antennas. Accordingly, since a plurality of antennas for receiving satellite broadcast signals from a plurality of satellites can be installed simply using a single bracket, the antennas is more easily installed and also a cost for installing the antennas is reduced as the number of support brackets decreases.

Description

SUPPORT BRACKET FOR SATELLITE ANTENNA

Technical Field

- [1] The present invention relates to a support bracket for satellite antennas, and more particularly, to a support bracket for satellite antennas, which is capable of separately adjusting azimuth angles of a plurality of antennas which are provided to receive satellite broadcast signals from different satellites at the same time.

Background Art

- [2] Satellite communications, which refer to communications that are made between base stations on earth using artificial satellites (space stations) stationed in space, use C-band frequency of 4~8GHz or Ku-band frequency of 12.5~18GHz to provide various communication service or broadcasting services.
- [3] The satellite communications enable communication signals for the communication service or broadcasting service to be broadcasted directly to persons in a specific area on earth, and a repeater is mounted on a satellite to transmit signals to a terminal of a person.
- [4] The satellite broadcasting based on such satellite communications uses a frequency of 14GHz in sending signals from a terrestrial station to a satellite and a frequency of 12GHz (8 channel) in sending signals from a satellite to a terrestrial station. Since the satellite broadcasting uses a very high frequency and radio waves received on earth are very weak, a receiving side uses a parabola antenna having a strong directivity or a planar antenna having a plurality of small antenna elements collected therein.
- [5] Satellite broadcasting of each nation around the world adopts an individual reception scheme and the number of satellites and the type of satellites are different for each nation. Since each nation has several satellites to perform the communication service or broadcasting service and the satellites are positioned away from one another, a single antenna cannot cover the bands and thus a plurality of antennas are required.
- [6] For example, "JCSAT" and "Super Bird" used in Japan as a private communication satellite use a frequency different from the broadcasting satellite of 12GHz to broadcast a TV broadcast and a music broadcast. Since these communication satellites are positioned away from each other and also are positioned away from the broadcasting satellite, an extra receiving antenna is required.
- [7] However, if separate antennas are provided to receive signals from the broadcasting satellite and the communication satellite respectively, a relatively large space for installing the antennas is needed and also a cost is increased due to the additional antenna.

- [8] Therefore, there has been a demand for a method for addressing a space and cost problem caused due to the installation of two antennas.

Disclosure of Invention

Technical Problem

- [9] An object of the present invention is to provide a support bracket for antennas, which is capable of separately adjusting azimuth angles of a plurality of antennas, thereby allowing the plurality of antennas to be installed simply using a single bracket.

Technical Solution

- [10] The above object is achieved by providing a support bracket for satellite antennas, characterized of including a first support unit which fixes at least one pair of antennas to an installation position and is operated to adjust at least one of an azimuth angle and an elevation angle of each of the antennas, and a second support unit which is disposed between the first support unit and the antennas and is operated to separately adjust the azimuth angles of the antennas.
- [11] The second support unit may include a support plate which is shaped in a plate and is assembled with the first support unit; and a plurality of adjusting members which are connected to opposite ends of the support plate along a lengthwise direction of the support plate and connect the support plate and the antennas such that the antennas approach to and retreat from the support plate.
- [12] The support plate may include a plurality of support portions which are formed in an elongated plate shape along a lengthwise direction of the antennas and are arranged parallel to each other, and a connection portion which connects middle portions of the support portions.
- [13] Support pieces may bend and extend from opposite ends of each of the support portions along a lengthwise direction of the support portions and are connected with the adjusting members, and an adjusting opening may be formed on each of the support pieces and is elongated along an extending direction of the support pieces.
- [14] The support pieces may be formed in a substantially triangular shape such that the support pieces each have a right-angled side forming a right angle with respect to the support portion and an inclined side gently inclined by a predetermined inclination angle with respect to the right-angled side, and the adjusting hole may be elongated along the inclination side and has a gentle curvature along a lengthwise direction.
- [15] The adjusting members each may include an assembly surface assembled with the antenna and fixing pieces bending and extending from opposite ends of the assembly surface.
- [16] An end of each of the fixing pieces may be provided with a pin to be inserted into the adjusting hole of the support piece.

Advantageous Effects

- [17] According to the present invention, since a plurality of antennas for receiving satellite broadcast signals from a plurality of satellites can be installed using a single bracket, the antennas can be more easily installed and also a plurality of support brackets are not required. Accordingly, a space for installing the antennas is reduced and also a cost for installing the antennas is decreased.

Brief Description of the Drawings

- [18] FIG. 1 is a perspective view illustrating a support bracket for antennas assembled with antennas according to an exemplary embodiment of the present invention;
- [19] FIGS. 2 and 3 are perspective views illustrating a first support unit viewed from different angles;
- [20] FIG. 4 is a perspective view illustrating a support plate of a second support unit of FIG. 1;
- [21] FIG. 5 is a side view illustrating the support plate of FIG. 4;
- [22] FIG. 6 is a bottom view illustrating the support plate of FIG. 4; and
- [23] FIG. 7 is a side perspective view illustrating the support bracket for antennas of FIG. 1.

Best Mode for Carrying Out the Invention

- [24] Hereinafter, a support bracket for supporting a pair of antennas will be illustrated and described according to an exemplary embodiment of the present invention. However, it is understood that the support bracket can be configured to support a larger number of antennas.
- [25] FIG. 1 is a perspective view illustrating a support bracket for antennas assembled with antennas according to an exemplary embodiment of the present invention.
- [26] In this embodiment, the antennas assembled with the support bracket 1 for antennas are a pair of planar satellite antennas, and the planar satellite antennas have different azimuth angles because they receive satellite signals from different satellites.
- [27] According to this embodiment, the support bracket 1 includes a first support unit 10 for fixing antennas 5, 6 to a fixed position and adjusting elevation angles and azimuth angles of the antennas 5, 6, and a second support unit 50 assembled between the antennas 5, 6 and the support unit 10, for separately adjusting the azimuth angles of the antennas 5, 6.
- [28] FIGS. 2 and 3 are perspective views illustrating the first support unit viewed from different angles.
- [29] The first support unit 10 includes an azimuth angle adjusting member 20 for adjusting the azimuth angle and an elevation angle adjusting member 30 for adjusting the elevation angle.

- [30] The azimuth angle adjusting member 20 is fixed to a seating position for seating the antennas, such as a wall or bottom or an extra seating material, and rotates the antennas about an axis, thereby adjusting the azimuth angle.
- [31] The azimuth angle adjusting member 20 includes a seating plate 21 being in contact with the seating position and an assembly body 25 for supporting the elevation angle adjusting member 30.
- [32] The seating plate 21 has one end having a semicircular shape, and an azimuth angle adjusting opening 22 of a semicircular shape having a predetermined curvature is formed on the one end of the seating plate 21. The azimuth angle adjusting opening 22 is graduated for measuring an angle, and the seating position where the first support unit 10 is seated is provided with a protrusion (not shown) which is inserted into the azimuth angle adjusting opening 22 so that the azimuth angle can be measured by detecting the location of the protrusion within the azimuth angle adjusting opening 22. A fixing hole 23 is formed on a central point of a radius of curvature of the azimuth angle adjusting opening 22 such that a screw is inserted into the fixing hole 23 to fix the azimuth angle adjusting member 20 to the seating position.
- [33] The assembly body 25 is formed in an empty hexahedron shape and has lateral walls which are marked in degrees to measure the elevation angle adjusted by the elevation angle adjusting member 30. Also, the lateral wall has an elevation angle protrusion 26 to be inserted into an elevation angle adjusting opening 34 of the elevation angle adjusting member 30.
- [34] The elevation angle adjusting member 30 includes a first assembly plate 31 assembled with the second support unit 50, for adjusting a vertical angle of the antenna, and second assembly plates 33 bending from opposite sides of the first assembly plate 31 in a lengthwise direction of the first assembly plate 31 and then extending to be brought into contact with the lateral walls of the assembly body 25.
- [35] The first assembly plate 31 has one end having a semicircular shape and an angle adjusting opening 32 of a predetermined curvature is formed on the one end. A portion around the angle adjusting opening 32 is marked in degrees to measure an angle. A screw is inserted into the angle adjusting opening 32 such that the first assembly plate 31 is movably assembled with the second support unit 50. A screw hole (not shown) is formed under the angle adjusting opening 32 to assemble the first assembly plate 31 and the second support unit 50 such that the screw inserted into the angle adjusting opening 32 is movable along the angle adjusting opening 32.
- [36] The second assembly plate 33 is provided with a screw hole 35 for fixing the elevation angle adjusting member 30 to the assembly body 25 and the elevation angle adjusting opening 34 of a predetermined curvature for allowing the elevation angle adjusting member 30 to vertically pivot. Also, an indicating piece 36 protrudes from

one side of the second assembly plate 33 to indicate the degrees marked on the assembly body 25.

[37] As the first support unit 10 described above pivots along the azimuth angle adjusting opening 22 of the azimuth angle adjusting member 20, the antenna 5 horizontally pivots and accordingly the azimuth angle is adjustable. Also, the antenna 5 vertically pivots along the elevation angle adjusting opening 34 of the elevation angle adjusting member 30 and accordingly the elevation angle is adjustable.

[38] Also, the antenna 5 pivots along the angle adjusting opening 32 of the elevation angle adjusting member 30 and accordingly the inclination of the antenna 5 is adjustable in a plane direction (in case of the planar antenna).

[39] FIG. 4 is a perspective view of a support plate of the second support unit of FIG. 1, FIG. 5 is a side view of the support plate of FIG. 4, and FIG. 6 is a bottom view of the support plate of FIG. 4. The second support unit 50 will be described with reference to FIGS. 4 to 6 and FIG. 1.

[40] The second support unit 50 includes a support plate 60 being shape in a plate and assembled with the first support unit 10 and a plurality of adjusting members 70 assembled with opposite ends of ? along a lengthwise direction of the support plate 60.

[41] The support plate 60 includes first and second support portions 61, 62 which are shaped in an elongated plate along a lengthwise direction of the antennas 5,6, for supporting the different antennas 5, 6 respectively, and the first and the second support portions 61, 62 are arranged parallel to each other. A connection portion 63 is formed between the first and the second support portions 61, 62 to connect the first and the second support portions 61, 62. Accordingly, the support plate 60 is formed in a substantially "H" shape. In this embodiment, a pair of support portions 61, 62 are provided to support a pair of antennas 5. However, a plurality of support portions may be provided according to the number of antennas.

[42] The connection portion 63 has a screw hole 67 through which a screw penetrates to fix the elevation angle adjusting member 30 of the first support unit 10, and is marked in degree to measure an angle adjusted by the angle adjusting opening 32.

[43] The first and the second support portions 61, 62 each has a pair of support pieces 65 bending and extending from opposite side of each of the first and the second support portions 61, 62 along a lengthwise direction. That is, a pair of support pieces 65 is formed on the opposite ends of the lengthwise direction of the first support portion 61, and another pair of support pieces 65 is formed on the opposite ends of the lengthwise direction the second support portion 62.

[44] Each support piece 65 is assembled with the adjusting member 70 and is formed in a substantially right triangle such that it has a right-angled side with respect to the first and the second support portion 61, 62 and an inclination side gently inclined by an in-

clination angle with respect to the right-angled side. The support pieces 65 formed at opposite sides of each of the first and the second support portions 61, 62 in a lengthwise direction have the inclination sides facing each other. An adjusting opening 66 penetrates through each of the support piece 65 and is formed along an extending direction of the support piece 65, and another adjusting opening 66 is formed along the inclination side. The inclination sides of the support pieces 66 face each other and accordingly the adjusting openings 66 formed on the support pieces 65 face each other in view of their inclination directions, and have a gentle curvature along the lengthwise direction.

- [45] As shown in FIG. 1, the plurality of adjusting members 70, which are assembled with the supporting pieces 65 to connect the first and the second support portions 61, 62 to the antennas 5, each includes an assembly surface 71 assembled with the antenna and fixing pieces 73 bending and extending from opposite ends of the assembly surface 71. The assembly surface 71 is formed in a substantially square plate and is fixed to the bottom of the antenna 5. The fixing pieces 73 extend toward the support pieces 65 of the first and the second support portions 61, 62 and are formed in a substantially triangular shape. The fixing piece 73 has a pin 75 formed at an end thereof and inserted into the adjusting opening 66 of the support piece 65. The pin 75 may be a protrusion or a screw, and if the pin 75 is a protrusion, it is integrally formed with the fixing piece 73 and if the pin 75 is a screw, it is inserted into a hole formed on an end of the fixing piece 73 for the assembly.
- [46] The second support unit 50 constructed above minutely adjusts the azimuth angle of each antenna as the pin 75 of each adjusting member 70 moves along the adjusting opening 66 of each supporting piece 65.
- [47] In order to incline the antenna 5 assembled with the first support portion 61 to the right, the azimuth angle is adjusted in so a manner that the antenna 5 is pulled at a corresponding position so as to allow the pin 75 of the right side adjusting member 70 to move along the adjusting opening 66 to approach the first support portion 61 and the antenna 5 is pressed at a corresponding position so as to allow the pin 75 of the left side adjusting member 70 to move along the adjusting opening 66 to retreat from the first support portion 61. Then, the antenna 5 is inclined to the right as shown in FIGS. 1 and 7.
- [48] On the other hand, in order to incline the antenna 6 assembled with the second support portion 62 to the left, the azimuth angle is adjusted in so a manner that the antenna 6 is pressed at a corresponding position so as to allow the pin 75 of the right side adjusting member 70 to move along the adjusting opening 66 to retreat from the second support portion 62 and the antenna 6 is pulled at a corresponding position so as to allow the pin 75 of the left side adjusting member 70 to move along the adjusting opening 66 to

approach the second support portion 62. Then, the antenna 6 is inclined to the left as shown in FIG. 1.

[49] As described above, the azimuth angles of the antennas 5, 6 can be minutely adjusted using the second support unit 50, and also, the azimuth angels of the plural antennas 5, 6 can be separately adjusted. Therefore, if a plurality of satellites is used like the Japanese satellite broadcasting, all of the satellite broadcast signals can be received from the respective satellites.

[50]

[51]

[52]

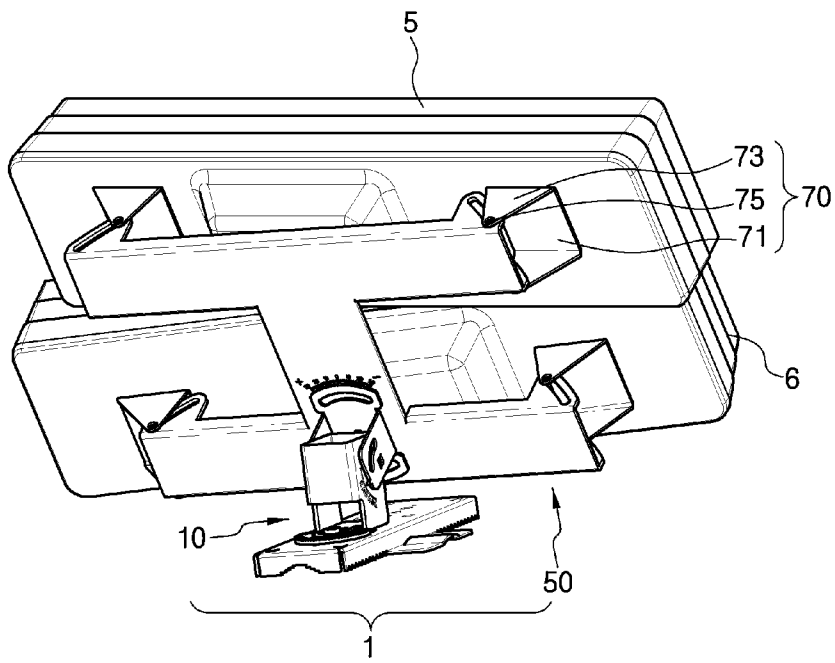
Claims

- [1] A support bracket for satellite antennas, characterized of comprising:
a first support unit which fixes at least one pair of antennas to an installation position and is operated to adjust at least one of an azimuth angle and an elevation angle of each of the antennas; and
a second support unit which is disposed between the first support unit and the antennas and is operated to separately adjust the azimuth angles of the antennas.
- [2] The support bracket for satellite antennas as claimed in claim 1, characterized in that the second support unit comprises:
a support plate which is shaped in a plate and is assembled with the first support unit; and
a plurality of adjusting members which are connected to opposite ends of the support plate along a lengthwise direction of the support plate and connect the support plate and the antennas such that the antennas approach to and retreat from the support plate.
- [3] The support bracket for satellite antennas as claimed in claim 2, characterized in that the support plate comprises:
a plurality of support portions which are formed in an elongated plate shape along a lengthwise direction of the antennas and are arranged parallel to each other; and
a connection portion which connects middle portions of the support portions.
- [4] The support bracket for satellite antennas as claimed in claim 3, characterized in that support pieces bend and extend from opposite ends of each of the support portions along a lengthwise direction of the support portions and are connected with the adjusting members, and that an adjusting opening is formed on each of the support pieces and is elongated along an extending direction of the support pieces.
- [5] The support bracket for satellite antennas as claimed in claim 4, characterized in that the support pieces are formed in a substantially triangular shape such that the support pieces each have a right-angled side forming a right angle with respect to the support portion and an inclined side gently inclined by a predetermined inclination angle with respect to the right-angled side, and that the adjusting hole is elongated along the inclination side and has a gentle curvature along a lengthwise direction.
- [6] The support bracket for satellite antennas as claimed in claim 4, characterized in that the adjusting members each includes an assembly surface assembled with the antenna and fixing pieces bending and extending from opposite ends of the

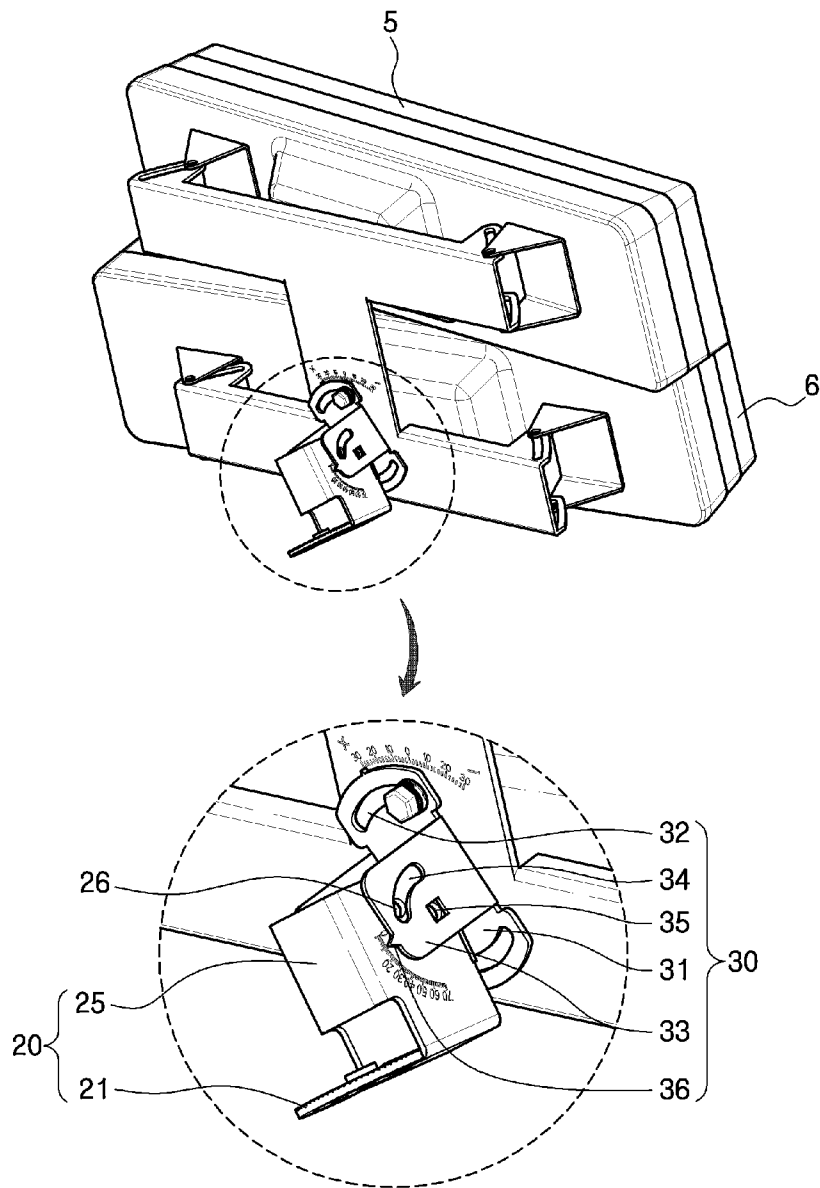
assembly surface.

- [7] The support bracket for satellite antenna as claimed in claim 6, characterized in that an end of each of the fixing pieces is provided with a pin to be inserted into the adjusting hole of the support piece.

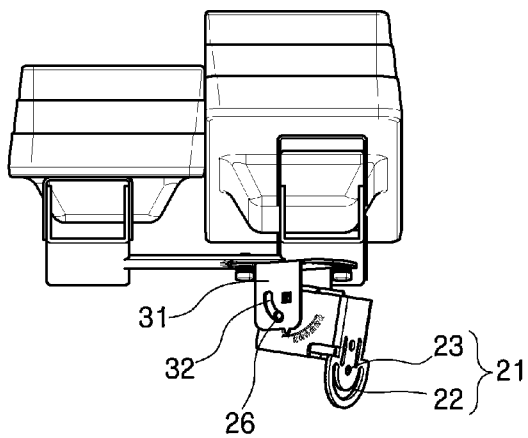
[Fig. 1]



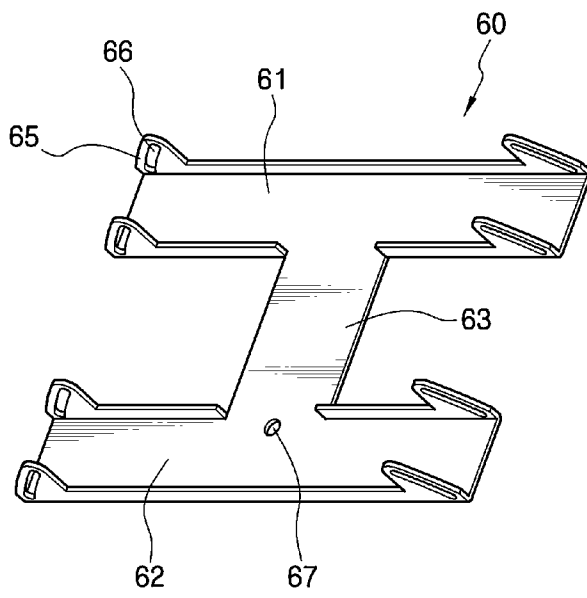
[Fig. 2]



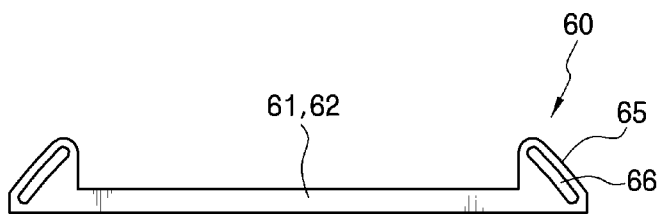
[Fig. 3]



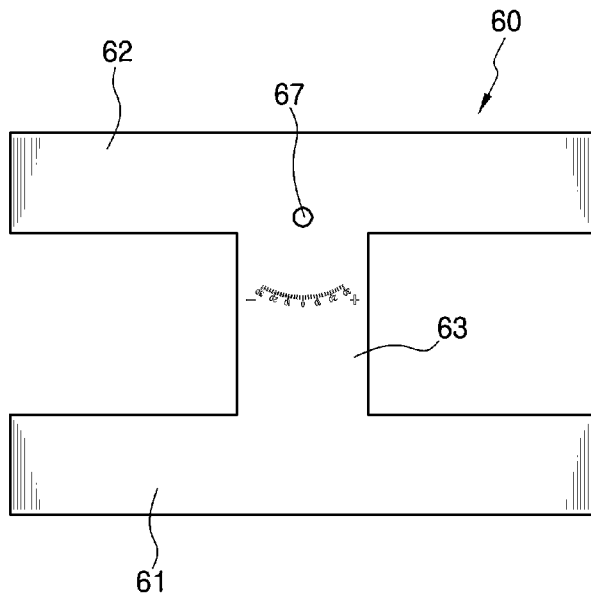
[Fig. 4]



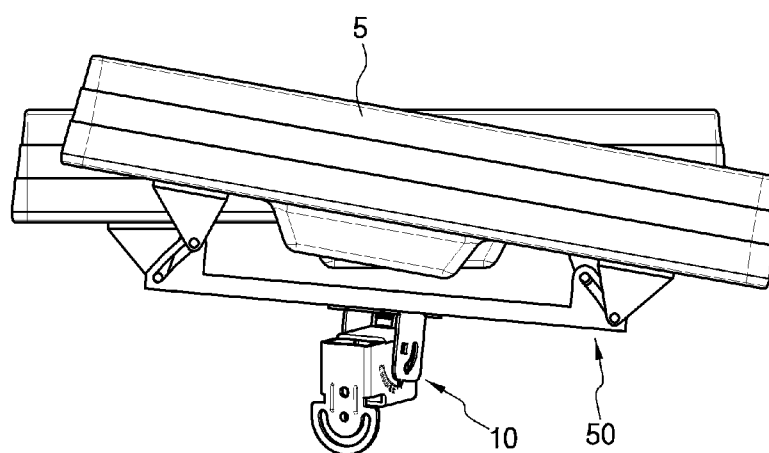
[Fig. 5]



[Fig. 6]



[Fig. 7]



A. CLASSIFICATION OF SUBJECT MATTER**H01Q 1/12(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8: H01Q 1/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO internal) "antenna", "bracket", "support", "angle"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	KR 20-0288335 Y1 (JUNG, D. Y.) 11 September 2002 See the abstract; claims 3-5; figures 1-6.	1 2-7
A	US 2005-0264467 A1 (LIN, H. Y. et al.) 01 December 2005 See the abstract; paragraphs [16]-[21]; figures 1-4.	1-7
A	JP 06-023308 U (ANH TENG INC.) 25 March 1994 See the abstract; claims 1-9; figures 1-4.	1-7
A	US 6232928 B1 (ZIMMERMAN, K. A. et al.) 15 May 2001 See the abstract; column 5, line 12 - column 6, line 43; figures 1-2.	1-7
A	US 7036734 B2 (BAKER, J. E.) 02 May 2006 See the abstract; column 9, line 17 - column 10, line 53; figures 7-10.	1-7



Further documents are listed in the continuation of Box C.



See patent family annex.

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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Date of the actual completion of the international search

20 NOVEMBER 2008 (20.11.2008)

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/003491Patent document
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datePatent family
member(s)Publication
date

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11.09.2002

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None

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25.03.1994

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02.05.2006

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04.08.2005