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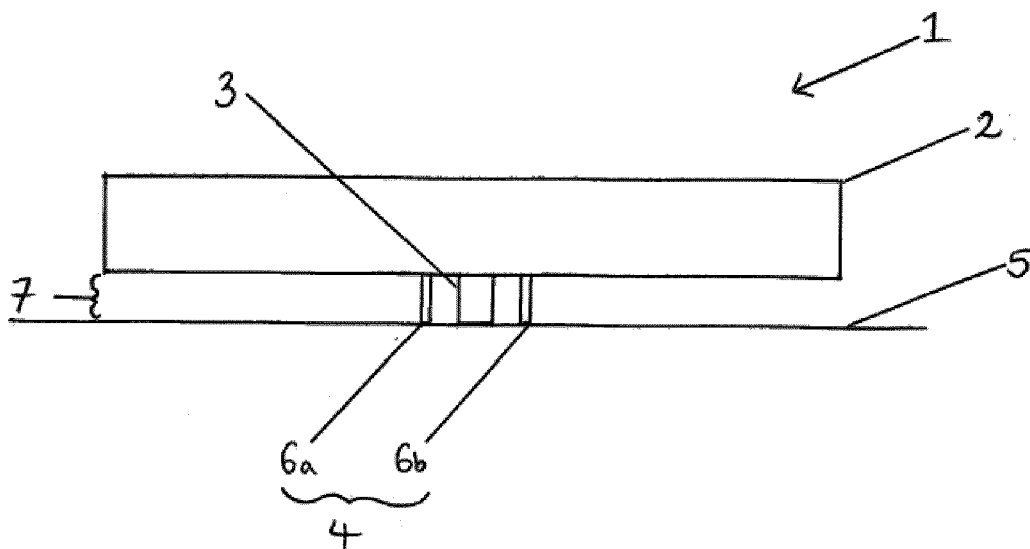
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(54) **Alarm apparatus**

(57) An alarm apparatus, where the alarm apparatus comprises a housing, an anti-tamper means and a pro-

TECTIVE MEANS. THE PROTECTIVE MEANS ARE ADAPTED TO PROJECT OUTWARDLY FROM THE HOUSING OF THE ALARM APPARATUS, AND ARE POSITIONED TO PROTECT THE ANTI-TAMPER MEANS.

Figure 1



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Description

[0001] The present invention relates to alarm systems, particularly to intruder alarm systems, where the components of the alarm system are provided with anti-tamper means. The components of the alarm system are said to form alarm apparatus.

[0002] Alarm systems generally contain a control unit that is connected to one or more sensors and one or more alarm indicators (sounders, etc). Upon activation of the alarm, a trigger signal from each activated sensor is transmitted, either through wires or wireless means, to the control unit and alarm sounders.

[0003] Such alarm systems can also incorporate expander units. These expander units provide more capacity so that more sensors, sounders, etc can be incorporated into the alarm system. Upon activation of the alarm, a trigger signal from each activated sensor that is connected to the expander unit is transmitted, through wires or wireless means, to the expander unit, and the expander unit then transmits the trigger signal, through wires or wireless means, to the control unit.

[0004] Such alarm apparatus are often fitted to walls of buildings in exposed, accessible locations and so are usually fitted with anti-tamper means. These anti-tamper means generally comprise a spring connected to a microswitch, and the spring extends between the alarm apparatus and the wall to which the alarm apparatus is mounted. The spring is usually positioned against the wall in at least a partially compressed configuration.

[0005] If an attempt is made to remove the alarm apparatus from the wall, the compressed spring is allowed to relax, triggering the microswitch, and generating a 'tamper' condition at the alarm apparatus. This causes a signal to be transmitted to the control unit and this may set off an alarm.

[0006] However, it is possible to interfere with the spring of such anti-tamper means.

[0007] In addition, such anti-tamper means are designed to be used with an alarm apparatus fitted to a flat surface. These anti-tamper means do not work so well for uneven surfaces.

[0008] The present application arose in an attempt to provide an improved alarm apparatus for alarm systems.

[0009] According to a first aspect of the present invention there is provided an alarm apparatus for an alarm system, the alarm apparatus comprising a housing, an anti-tamper means and a protective means, the protective means adapted to project outwardly from the housing of the alarm apparatus and positioned to protect the anti-tamper means.

[0010] The alarm apparatus can be a control unit, a sensor, an alarm indicator, an expander unit, or any other components of the alarm system that can be mounted to an external surface. Anti-tamper means are usually provided on expander units, so preferably, the alarm apparatus is an expander unit.

[0011] The alarm apparatus may comprise a housing,

such as a box, which houses one or more alarm components, eg a housing for one or more sounders, sensors, control devices, power supplies, expanders or otherwise.

[0012] The alarm apparatus is preferably one which is generally mounted on a surface, such as a wall or ceiling surface.

[0013] The protective means can protect through a part of the housing. Preferably, an opening is provided in the housing through which the anti-tamper means and the protective means can project.

[0014] The protective means may be arranged to be held captive by the housing yet able to float axially therewith. This allows the amount by which the protective means extend outwardly from a part of the housing to vary, and enables the protective means to extend across a range of different sized gaps formed between the housing and a surface to which the alarm apparatus is mounted. The protective means may fully extend across the gap, or partly across the gap.

[0015] The protective means preferably comprises a shroud, and the shroud is mounted to extend at least partly across the gap between part of the housing of the alarm apparatus, and a surface to which the alarm apparatus is mounted. The shroud may extend fully across the gap between the housing and the external surface.

[0016] The shroud preferably fits at least partially around the anti-tamper means and has at least one hollow end. The shroud can have many different shapes, for example, the shroud can be in the form of a tube, or a cap, or a plate, or a pair of parallel or non-parallel plates.

[0017] If the shroud is in the form of a cap, it may have one hollow and one closed end. The closed end can project outside the housing of the alarm apparatus, and the hollow end can be retained inside the housing. It is also possible to have the cap in an inverted configuration, with the closed end retained inside the housing, and the hollow end projecting outside the housing.

[0018] Preferably, the shroud has a shoulder, for example an annular shoulder, that extends at least partially around the shroud, where the shoulder is adapted to retain the shroud within the housing of the alarm apparatus. The shoulder preferably has an outer diameter that is larger than the diameter of the opening in the housing of the alarm apparatus through which the anti-tamper means can project.

[0019] The shoulder may limit the size of the gap across which the protective means may fully extend. The maximum size of the gap would be the amount by which the shroud extends outwardly from the housing when the shoulder is in contact with the housing.

[0020] The shoulder may be separable from the shroud. In some embodiments, the shoulder is attached by a weakened portion to the body of a shroud, for example, so that the shoulder may be frangibly separable from the shroud. However, other means could be used to separate the shoulder from the shroud. It may also be possible to repeatedly separate and reconnect the shoulder and the shroud, for example, using a clip or a screw

mechanism. The separability allows the same shroud to be used with or without the shoulder depending on the circumstances.

[0021] The anti-tamper means may comprise a compressible component and a switch. The compressible component may be a spring, and the switch may be a microswitch.

[0022] If the shroud is in the form of a cap having one open end and one closed end, the compressible component is preferably compressed against the closed end of the shroud, and the closed end of the shroud is preferably in contact with the external surface.

[0023] There may also be a means for fixing the protective means to the surface on which the unit is mounted. Preferably, the shroud is screwed to the external surface. However, the shroud could also be glued, nailed or otherwise attached to the surface. The shroud can be provided with projections through which screws, nails or other fixing means can be fitted, or the fixing means can be fitted through a closed end of the shroud, or through the shoulder.

[0024] Fixing the shroud to the external surface enables the protective means to be used with uneven external surfaces. If the external surface is uneven and no fixing means are provided, it is difficult to arrange the alarm apparatus so that the protective means are reliably fixed against the external surface, resulting in the protective means often functioning less effectively. Providing fixing means with the protective means overcomes this problem.

[0025] At least part of the housing of the alarm apparatus is preferably formed with a pre-formed shroud. The shroud is preferably separable from the housing, preferably by means of a weakened portion, for example a frangible portion. The shroud can be separated from the housing before or after the housing of the alarm apparatus has been fully assembled.

[0026] According to a second aspect of the invention, there is provided a panel for forming at least part of the housing of an alarm apparatus, with a portion adapted to form a shroud, the shroud being separable from the panel.

[0027] The panel can form at least part of the housing of an expander unit, a control unit, a sensor, an alarm indicator, or any other unit that can be mounted to a surface.

[0028] Preferably the shroud is separable by means of a weakened portion. This may be a frangible portion (i.e. the shroud may be frangibly attached to the panel). However, it will be obvious to a person of skill in the art that any means that are capable of temporarily fixing the shroud to a part of the housing would be suitable for use in the invention.

[0029] The shroud is supplied as part of the housing of the alarm apparatus. Preferably, the shroud is supplied as part of the rear wall of the alarm apparatus. The shroud can be separated from the housing before or after the housing of the alarm apparatus has been fully assembled.

bled.

[0030] Embodiments of the invention will now be described, by way of example only, with reference to the accompanying schematic drawings, in which;

Figure 1 is a side view of an expander unit in situ.

Figure 2 is a cross-sectional side view of an expander unit in situ.

Figure 3 is a cross-sectional side view of an alternative arrangement.

Figure 4 is a cross-sectional side view of a further arrangement.

Figure 5 is a cross-sectional side view of a yet further arrangement.

Figure 6 is a panel for forming part of the housing of an expander.

[0031] In these embodiments, the invention comprises an expander unit. However, it will be appreciated by a person of skill in the art that the alarm apparatus can also comprise a control unit, a sensor, an alarm indicator, or any other components of the alarm system that can be mounted to an external surface.

[0032] Figure 1 illustrates an expander mounted to a surface such as a wall. The expander unit 1 generally comprises housing 2, anti-tamper means 3, and protective means 4. The expander unit is mounted to an external surface 5 (the means for mounting the expander unit to the external surface are not illustrated in the figures). The protective means 4 is in the form of two parallel plates 6a, 6b which protect the anti-tamper means 3 by restricting user access to the anti-tamper means. In other embodiments only one plate need be provided, or more than two plates can be provided, and the plates may be planar or arcuate, and the more than two plates need not be parallel.

[0033] Referring to figure 2, in a second arrangement, the anti-tamper means 3 comprise a switch 8 and a spring 9, and the protective means 4 comprise a shroud 10, in the form of a cap, with shoulders 11. The shroud 10 fits through an opening 13 in the expander unit. The bottom surface 12 of the shroud 10 protects outside the expander unit 2, and the shoulders 11 are retained within the expander unit 2. The shoulders 11 have an outer diameter that is larger than the diameter of the opening 13 and so the shoulders prevent the shroud 10 from being fully removed from the expander unit 2 through the opening 13.

[0034] The shroud 10 is held captive within the housing 2, yet able to float axially (direction A) within the housing 2. By being able to float axially relative to the housing 2, the shroud 10 can fill a gap 7 between the housing 2 and the surface 5. The maximum size of the gap 7 across which the shroud 10 can extend is the amount by which the shroud 10 extends from the housing 2 when the shoulder 11 is in contact with the housing 2.

[0035] The expander unit 1 is mounted to the external surface 5 so that the bottom surface 12 of the shroud is in contact with the external surface, and the spring 9 is

compressed against the external surface of the shroud 10. The anti-tamper means 8, 9 are then fully contained within the shroud 10. A user cannot gain access to the spring 9, without taking apart the expander unit 2, and so the anti-tamper means 8, 9 are protected by the shroud 10.

[0036] Referring to figure 3, in a third arrangement, the shoulders have been removed from the shroud 10, or a shroud is used which has no shoulders, and the shroud has been inverted compared to the orientation in figure 2. The shroud is positioned in the opening 13 so that the bottom surface 12 of the shroud 10 is positioned within the expander unit 2, and the rim 14 is in contact with the external surface 5. The expander unit 2 is mounted to the external surface 5 so that the spring 9 is fully retained within the unit 2, and compressed against the bottom surface 12 of the shroud 9.

[0037] Referring to figure 4, in a fourth arrangement, the shroud 10 has the same configuration and orientation to the shroud 10 in figure 2, but in this case, the shroud 10 is fixed to the external surface 5. The fixing means are a screw 15 that is screwed through the bottom surface 12 of the shroud 10. The spring 9 is protected within the shroud 10.

[0038] Referring to figure 5, in a fifth arrangement, the shroud of figure 4 has been inverted, and the shoulders 11 are in contact with the external surface 5. The shoulders 11 are provided with openings, through which screws 16 have been fitted, to fix the shroud 10 to the external surface 5. The spring 9 is protected within the expander unit 2.

[0039] Figure 6 illustrates how, most preferably, the shroud may be pre-formed as part of the housing for an expander. The figures show a panel 17 in the form of a rear moulding 18, the rear moulding being the wall of the expander unit that faces the external surface. The panel is formed with a projecting shroud portion 19 that is fixed to the rear moulding 18 by frangible means 21 or other breakable/ removable means. The shroud 19 is in the form of a cap, and may be provided with a removable shoulder 20. Before use of the expander unit, the shroud 19 is separated from the rear moulding 18 by breaking the frangible means 21. The shroud is then fitted through the opening 22 in the rear moulding, and the shroud can be used to protect the anti-tamper means in this position.

[0040] The anti-tamper means preferably comprise a compressible component and a switch. The compressible component is generally a spring, and the switch is generally a microswitch.

[0041] A microswitch is generally a miniature electric switch that is actuated by a very small physical force, generally through the use of a tipping point mechanism. Microswitches have the advantages of being low cost and durable. However, it will be appreciated by a person of skill in the art that any type of mechanism that is capable of being activated when the expander unit is tampered with is suitable for use with the present invention.

[0042] The compressible component is generally a

coiled spring, but it is obvious to a person of skill in the art that any component that is capable of at least partially extending between the expander unit and the surface to which the expander unit is mounted, and that can be somehow affected by an attempt to tamper with the expander unit, is suitable for use with the present invention. For example, the compressible component could also be a piece of compressible material such as a soft rubber, or the component could be compressible by means of a concertina mechanism.

[0043] Preferably, the compressible means are at least partially compressed when the unit is mounted to the external surface.

Claims

1. An alarm apparatus comprising a housing, an anti-tamper means and a protective means, the protective means adapted to project outwardly from the housing of the alarm apparatus and positioned to protect the anti-tamper means.
2. An alarm apparatus as claimed in claim 1, wherein the alarm apparatus is an expander unit.
3. An alarm apparatus as claimed in claim 1 or 2, wherein the protective means project through a part of the housing.
4. An alarm apparatus as claimed in any one of claims 1, 2 or 3, wherein the protective means are arranged to be held captive by the housing yet able to float axially therewith.
5. An alarm apparatus as claimed in any one of claims 1 to 4, wherein the protective means comprises a shroud, and the shroud is mounted to extend at least partly between part of the housing of the alarm apparatus, and a surface to which the alarm apparatus is mounted.
6. An alarm apparatus as claimed in claim 5, wherein the shroud fits at least partially around the anti-tamper means and has at least one hollow end.
7. An alarm apparatus as claimed in claim 5 or 6, wherein the shroud has a shoulder that extends at least partially around the shroud.
8. An alarm apparatus as claimed in claim 7, wherein the shoulder is separable from the shroud.
9. An alarm apparatus as claimed in claim 7 or 8, wherein the shoulder is attached by a weakened portion to the body of the shroud
10. An alarm apparatus as claimed in any preceding

claim, wherein the anti-tamper means comprise a compressible component and a switch.

11. An alarm apparatus as claimed in any preceding claim, including a means for fixing the protective means to the surface on which the unit is mounted. 5
12. An alarm apparatus as claimed in any preceding claim, wherein at least part of the housing of the alarm apparatus is formed with a pre-formed shroud, and the shroud is separable from the housing. 10
13. An apparatus for forming at least part of the housing of an alarm apparatus, comprising a panel provided with a portion adapted to form a shroud, the shroud being separable from the panel. 15
14. An apparatus as claimed in claim 13, wherein the panel forms at least part of the housing of an expander unit. 20
15. An apparatus as claimed in claim 13 or 14, wherein the shroud is attached by a weakened portion to the panel. 25

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Figure 1

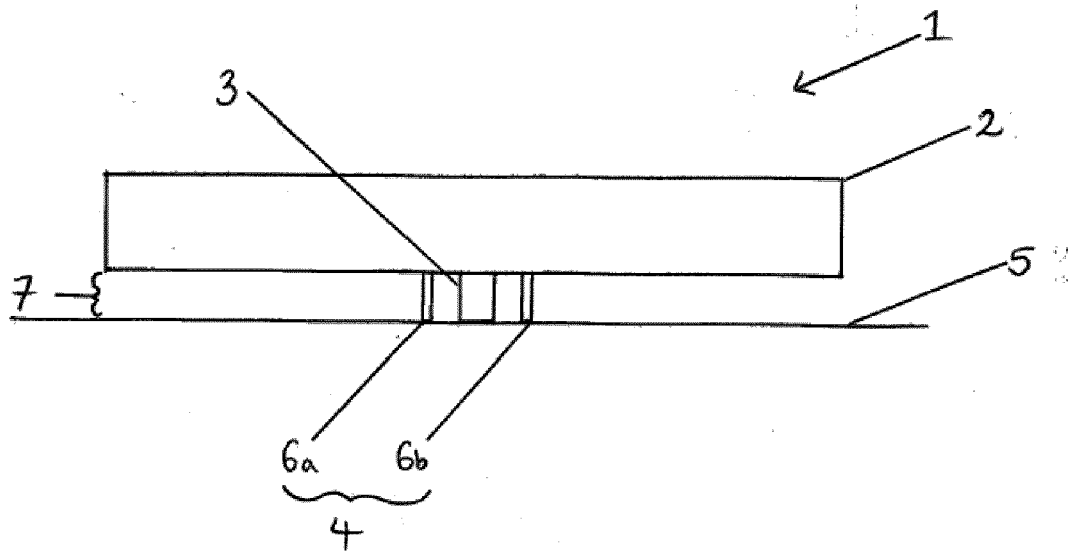


Figure 2

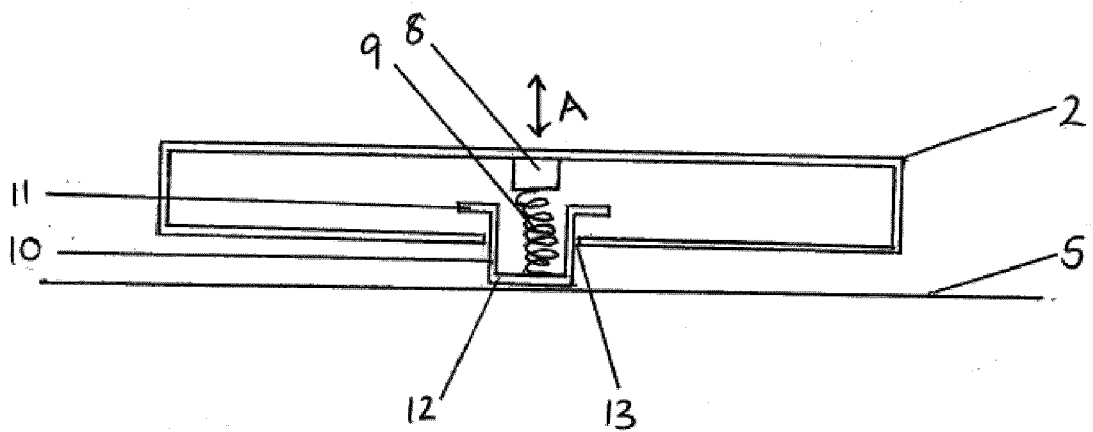


Figure 3

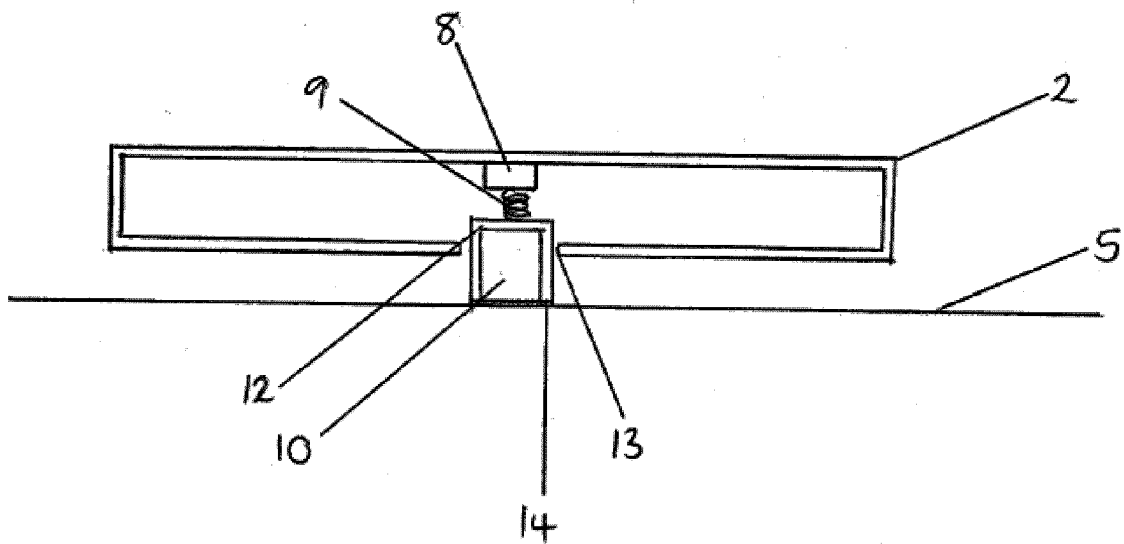


Figure 4

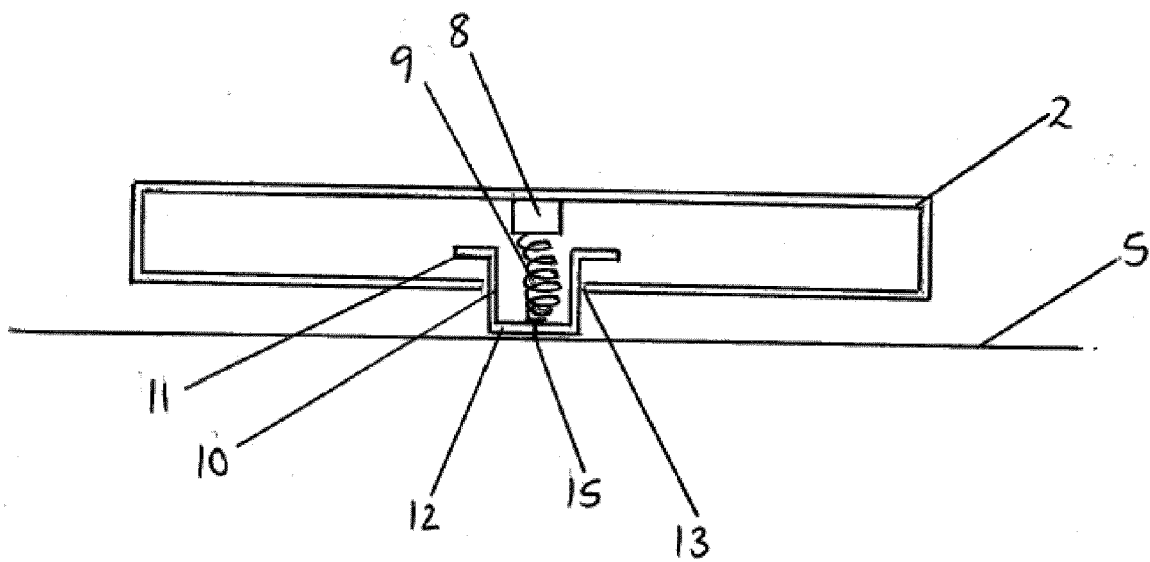


Figure 5

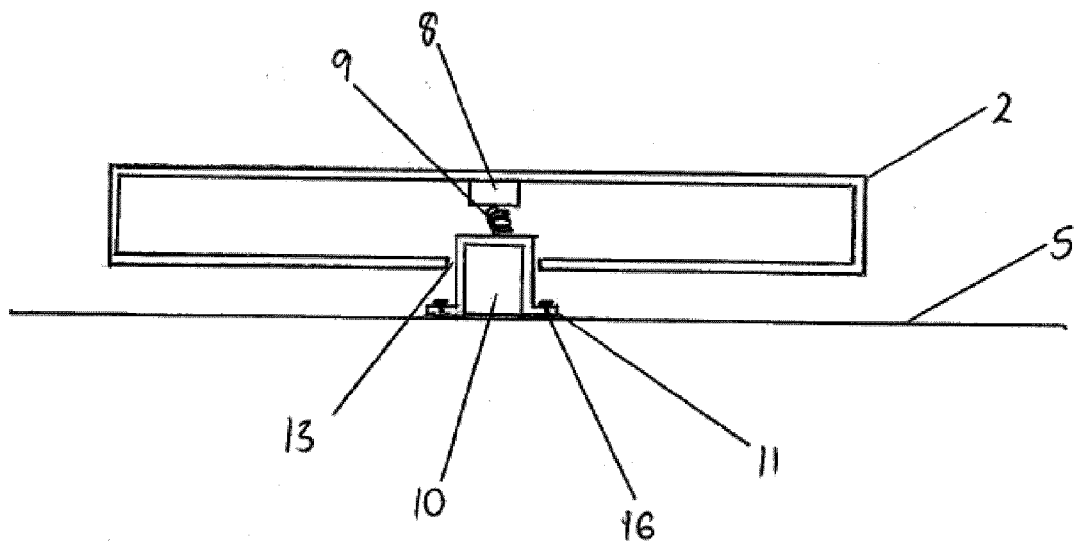


Figure 6

