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(54) A Lid Safety Mechanism

(57) A box (200) having a lid safety mechanism, comprising, a base (204) and a lid (206) which are rotatably movable relative to one another, a hydraulic ram (208) for moving the base (204) and lid (206) from a first angular position to a second angular position relative to one another, and a holding bar (218). When the base (204) and lid (206) are at, and between, the first and second angular positions relative to one another, the holding bar (218) does not impede movement of the lid (206) relative to the base (204), and on movement of the lid (206) relative to the base (204) through the second position to a third angular position the holding bar (218) holds the base (204) and lid (206) in a fixed angular position relative to one another.

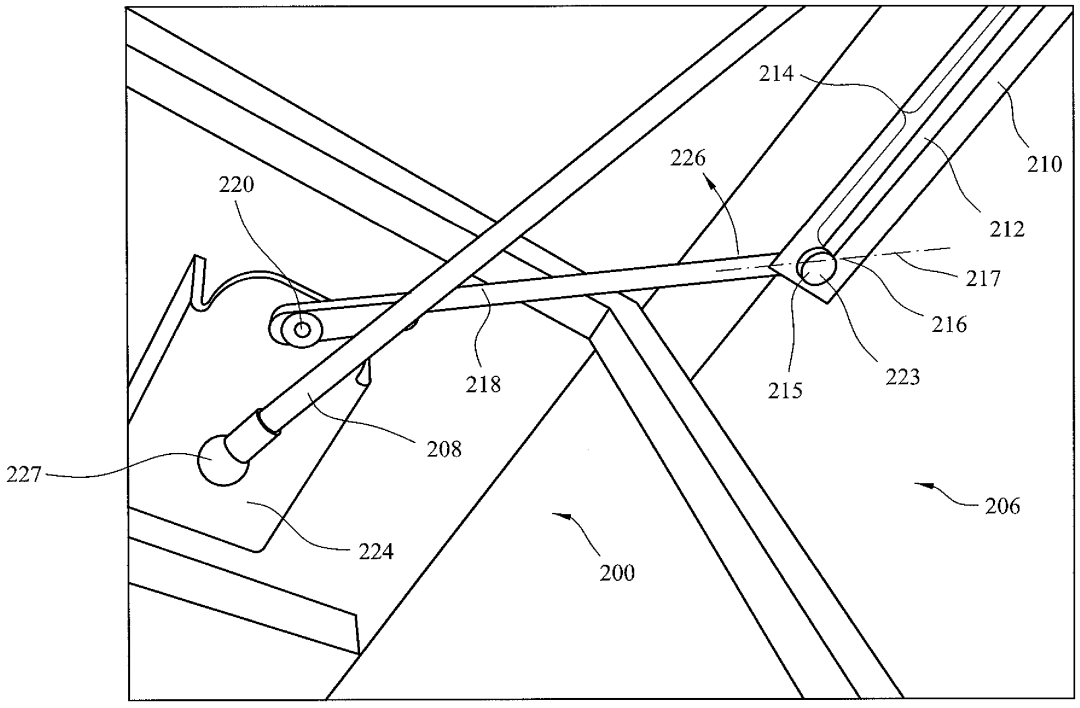


FIG. 3

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Description

[0001] The present invention relates to a lid safety mechanism, and relates particularly but not exclusively, to a lid safety mechanism for holding the lid of a box in an open position when the lid is opened by a user beyond a particular angle relative to the box.

[0002] There are many places where a volume is protected by a lid e.g. a car bonnet. Such a lid (or bonnet) may be required to be lifted for a short period of time only in order to allow a visual inspection of the enclosed volume or its constituents e.g. an engine. Alternatively the lid (or bonnet) may be required to be held open to allow a more prolonged visual examination or physical manipulation of the enclosed volume.

[0003] In order to hold open a lid, a safety mechanism is normally required to be actuated while manually holding the lid open. In the case of the car bonnet 100 in figure 1, a bar 102 is required to be fixably engaged with the bonnet 100 and to the chassis of the car (not shown). In order to fix the bar 102 to the bonnet 100, a user is required to hold open the bonnet 100 with one hand and manipulate the bar 102 with the other hand. It is more likely that a person will drop the bonnet 100 when holding it open with one hand, also a person may not be strong enough to hold it open with one hand and may only be able to open it with two hands ensuring that they would not be able to actuate the safety mechanism (bar 102).

[0004] In some situations, hydraulic rams may be used to aid a user in opening a lid. Such hydraulic rams may also be used to hold the lid in an open position while a person accesses the inside of a box, to which the lid is attached, with both of their hands. However, there remains the possibility that the hydraulic rams may fail, a strong gust of wind may force the lid to close, or a second person may close the lid, while a user has their hands within the volume of the box.

[0005] Preferred embodiments of the present invention seek to overcome the above disadvantages of the prior art.

[0006] According to an aspect of the present invention there is provided a lid safety mechanism, comprising:

a first and a second body portion, rotatably movable relative to one another, said second body portion comprising a first flange portion having a first aperture extending at least partially therethrough, said first aperture having an elongate portion extending in a first direction and at least one notch portion extending in a second direction;

at least one hydraulic ram for moving said first and second body portions from a first angular position to a second angular position relative to one another; and

a holding bar, rotatably movable relative to said first body portion and slidably movable relative to said second body portion, said holding bar having a second flange portion adapted to extend at least partially through said first aperture;

wherein:

when said first and second body portions are at, and between, said first and second angular positions relative to one another, said second flange portion of said holding bar does not extend into said notch portion of said first aperture; and

on movement of said second body portion relative to said first body portion through said second position to a third angular position said second flange portion of said holding bar extends at least partially into said notch portion of said first aperture, thereby holding said first and second body portions in a fixed angular position relative to one another.

[0007] By providing a lid safety mechanism which may be actuated by independent manipulation of the lid itself, provides the advantage of reducing the likelihood of a user dropping a lid while actuating the safety mechanism. Also because the safety mechanism is actuated while performing the operation of opening the lid, this provides the advantage of fixedly opening a lid more quickly. Furthermore, because the lid safety mechanism is not actuated until the lid is opened beyond a certain point, this provides the advantage that the lid may be opened without actuating the safety mechanism thereby allowing instantaneous inspections of the volume enclosed by a lid at the same rate as lids currently available in the art.

[0008] In a preferred embodiment said first body portion further comprises at least one third flange portion to which said hydraulic ram is connected.

[0009] This allows both the ram and holding bar to be housed internally of the box, thereby providing the advantage of reducing the likelihood of injury by lowering the chance of a user jamming their fingers in the moving parts of the box and its safety mechanism.

[0010] In another preferred embodiment said first body portion further comprises at least one third flange portion to which said holding bar is connected.

[0011] In a further preferred embodiment said holding bar comprises at least one bend portion along its length.

[0012] This allows the safety mechanism and rams of the box to be placed as close as possible to the edge of the volume within the box, thereby providing the advantage of increasing the volume of free space within the box.

[0013] In a preferred embodiment said second flange portion of said holding bar has a forth flange portion extending therefrom.

[0014] This provides the advantage of maintaining the holding bar of the safety mechanism in contact with the lid.

[0015] Preferred embodiments of the invention will now be described, by way of example only and not in any limitative sense, with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of a car bonnet safety mechanism of the prior art;

Figure 2 is a perspective view of a box having a lid safety mechanism of the present invention;

Figure 3 is a first perspective view of the lid safety mechanism in figure 2;

Figure 4 is a second perspective view of the lid safety mechanism in figure 2; and

Figure 5 is a third perspective view of the lid safety mechanism in figure 2.

[0016] The box 200 in figure 2 is fitted with a lid safety mechanism 202 of the present invention which is further illustrated in figures 3 to 5. The box 200 has a first body portion (base) 204 and second body portion (lid) 206, which are rotatably movable relative to one another using hinges (not shown) about axis 205. The lid 206 has an internally extending first flange portion 210 with a first aperture 212 extending therethrough, the first aperture 212 having an elongate portion 214 extending in a first direction 215 and a notch portion 216 extending in a second direction 217.

[0017] The box 200 has a holding bar 218, which itself has a second flange portion 222 which is adapted to extend into the first aperture 212 of the first flange portion 210 ensuring that the holding bar 218 is slidably movable relative to the lid 206. The holding bar 218 is also rotatably mounted to the base 204 about a pivot point 220 on an internally extending third flange portion 224. Furthermore, the second flange portion 222 of the holding bar 218 extending through aperture 212 has a forth flange portion 223 extending from it for maintaining the holding bar 218 in contact with the lid 206.

[0018] The box 200 is further fitted with two hydraulic rams 208, which are pivotally connected to the base 204 and lid 206. The hydraulic ram 208 adjacent the safety mechanism 202 is connected about pivot point 229 in the first flange portion 210 of the lid 206 and pivot point 227 of the third flange portion 224 within the base 204. The other hydraulic ram 208 is connected to similar flange portions on the other side of the box. The hydraulic rams 208 move the base 204 and lid 206 relative to one another, from a first angular position to a second angular position, when a user opens the lid 206 into the first angular position.

[0019] The operation of the safety mechanism 202 will now be described. When the base 204 and lid 206 are moved into a first angular position relative to one another, on application of a force by a user, the lid 206 is moved without assistance from a user from this first angular position and into a second angular position relative to the base 204, due to a force exerted by the hydraulic rams 208.

[0020] The base 204 and lid 206 may be moved between a 'closed position' and a 'maximum unlocked open position' without engaging the safety mechanism 202 of the present invention. In the closed position, the base 204 and lid 206 have no angular displacement between them about the hinges. The maximum unlocked open position corresponds to the second angular position previously mentioned, which is the position of maximum angular displacement to which the base 204 and lid 206 are pivoted relative to each other about the hinges by the rams 208. When the base 204 and lid 206 are moved between the closed position and the maximum unlocked open position the second flange portion 222 of the holding bar 218 does not extend into the notch 216 portion of the first aperture 212.

[0021] In order to engage the safety mechanism 202 of the present invention, the base 204 and lid 206 are moved into a third angular position relative to one another, having a greater angular displacement between the base 204 and lid 206 than in the maximum unlocked open position, on application of a force to the lid 206 by a user. In such a third angular position the flange portion 222 of the holding bar 218 drops into the space in the elongate portion 214 of the aperture 212 below the notch portion 216. When a user then releases the lid 206 after having moved it into the third angular position relative to the base 204, the second flange portion 222 of the holding bar 218 extends into the notch portion 216 of the aperture 212, thereby holding the base 204 and lid 206 in a fixed angular position relative to one another, as illustrated in figure 5.

[0022] In order to deactivate the safety mechanism 202 and close the box 200, a user is required to apply a force to the lid 206 in a direction away from the base 204 so as to move the second flange portion 222 of the holding bar 218 into the space in the elongate portion 214 of the aperture 212 below the notch portion 216. A user while applying the force mentioned above must also pull on the holding bar 218 in a direction substantially along that shown by the arrow 226 in figure 3. The lid of the box 200 is now able to be shut by drawing the base 204 and lid 206 together against the force of the rams 208 while maintaining the force on the holding bar 218 along the direction illustrated by arrow 226. The safety mechanism has been successfully disengaged when the base 204 and lid 206 are at such an angle relative to one another that the second flange portion 222 of the holding bar 218 extends through the space in the elongate portion 214 of the aperture 212 above the notch portion 216. The holding bar 218 may now be released and the lid 206 may be shut.

[0023] It will be appreciated by persons skilled in the art that the above embodiments have been described by way of example only and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims. For example, the holding bar 218 may have more than one bend along its length.

Claims

1. A lid safety mechanism, comprising:

   a first and a second body portion, rotatably movable relative to one another, said second body portion comprising a first flange portion having a first aperture extending at least partially therethrough, said first aperture having an elongate portion extending in a first direction and at least one notch portion extending in a second direction;
   at least one hydraulic ram for moving said first and second body portions from a first angular position to a second angular position relative to one another; and
   a holding bar, rotatably movable relative to said first body portion and slidably movable relative to said second body portion, said holding bar having a second flange portion adapted to extend at least partially through said first aperture;

   wherein:

   when said first and second body portions are at, and between, said first and second angular positions relative to one another, said second flange portion of said holding bar does not extend into said notch portion of said first aperture; and
   on movement of said second body portion relative to said first body portion through said second position to a third angular position said second flange portion of said holding bar extends at least partially into said notch portion of said first aperture, thereby holding said first and second body portions in a fixed angular position relative to one another.

2. The lid safety mechanism of claim 1, wherein said first body portion further comprises at least one third flange portion to which said hydraulic ram is connected.

3. The lid safety mechanism of any of the preceding claims, wherein said first body portion further comprises at least one third flange portion to which said holding bar is connected.

4. The lid safety mechanism of any of the preceding claims, wherein said holding bar comprises at least one bend portion along its length.

5. The lid safety mechanism of any of the preceding claims, wherein said second flange portion of said holding bar has a forth flange portion extending therefrom.

6. A lid safety mechanism as herein before described with reference to the accompanying drawings in figures 2 to 5.

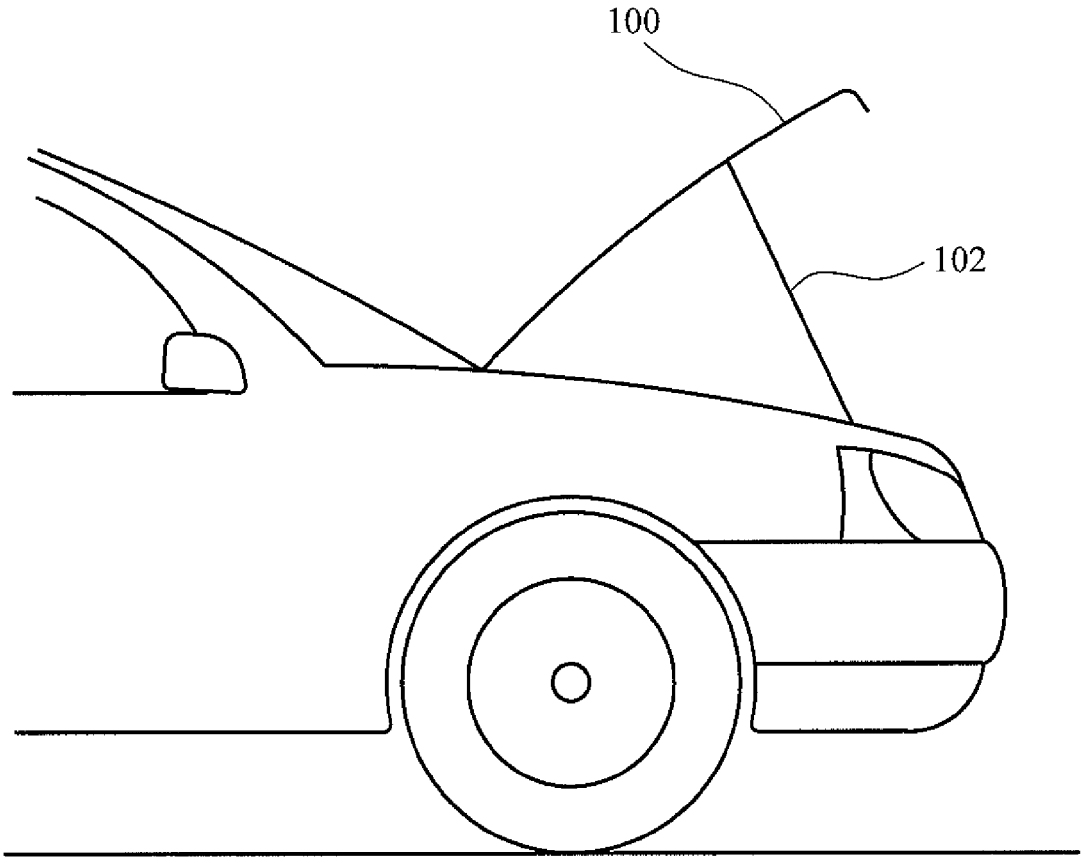


FIG. 1

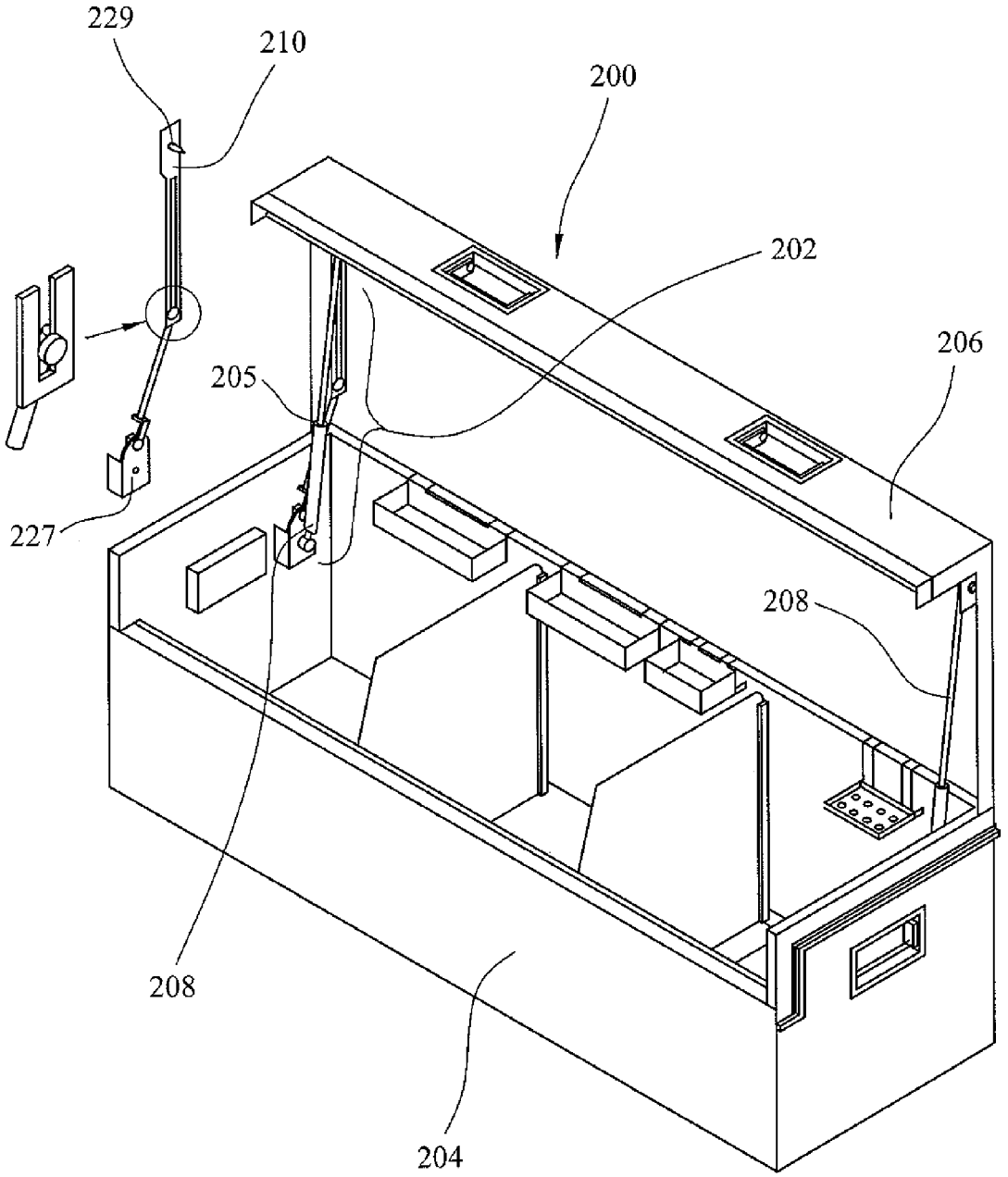


FIG. 2

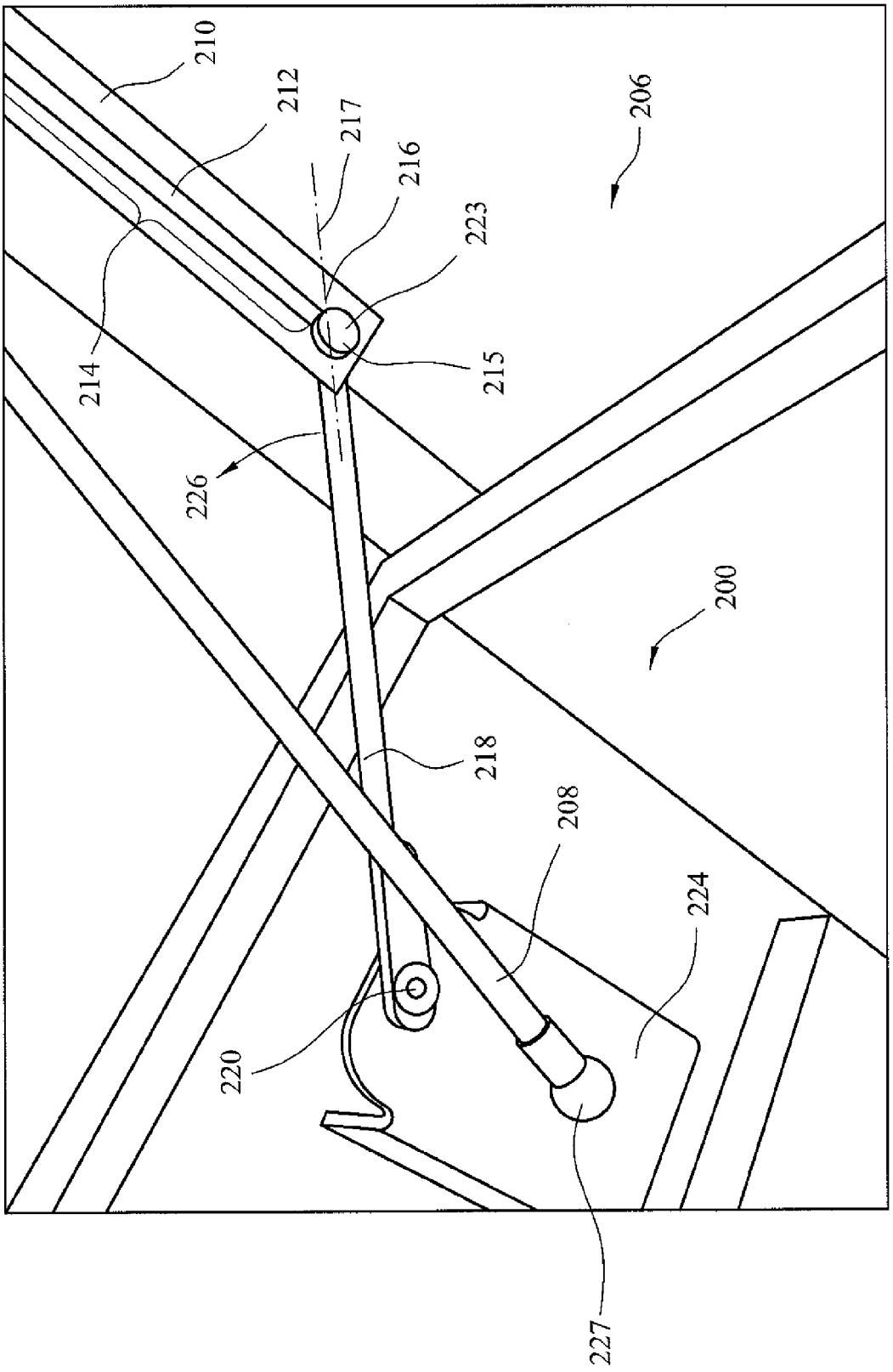


FIG. 3

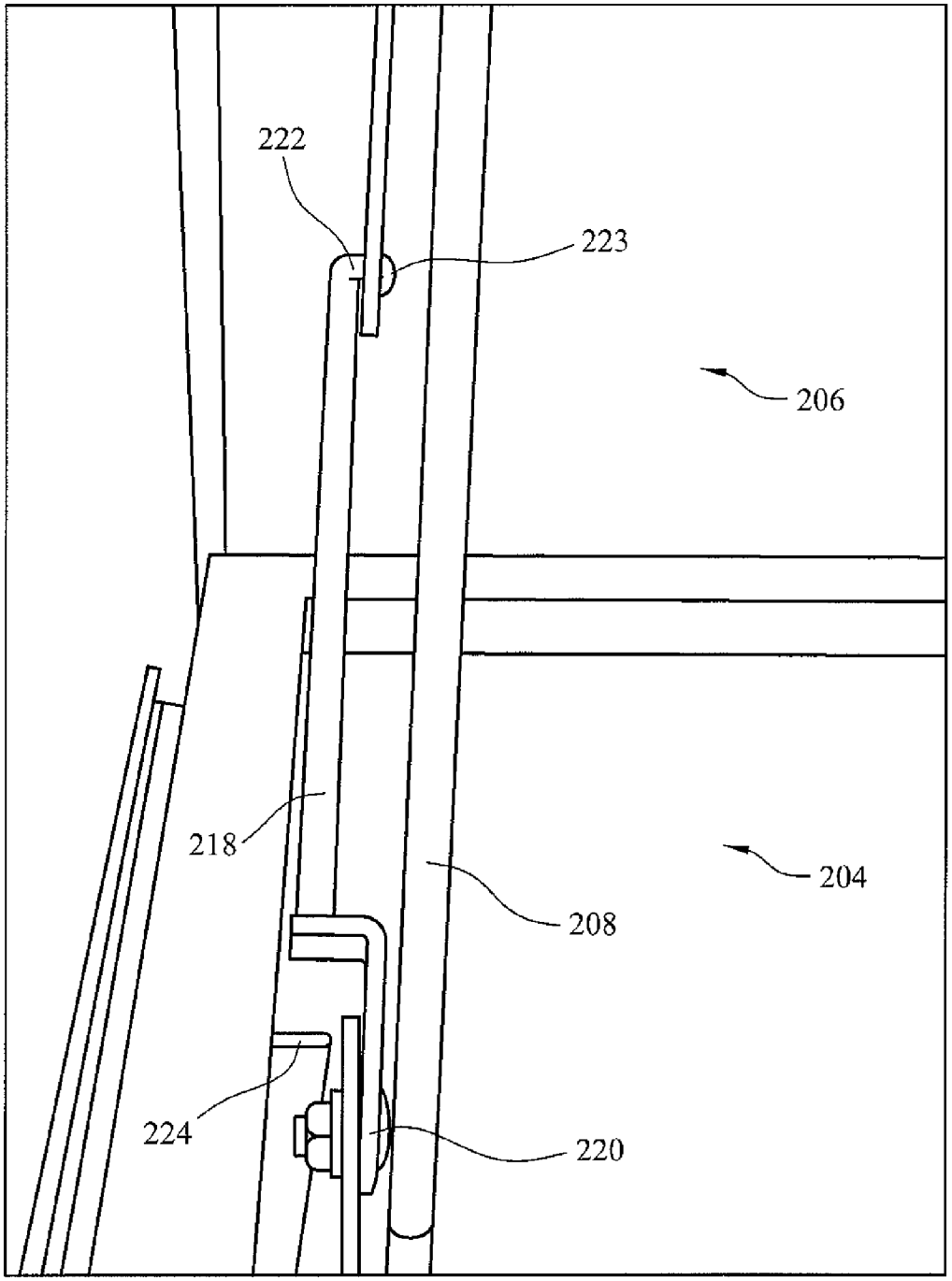


FIG. 4

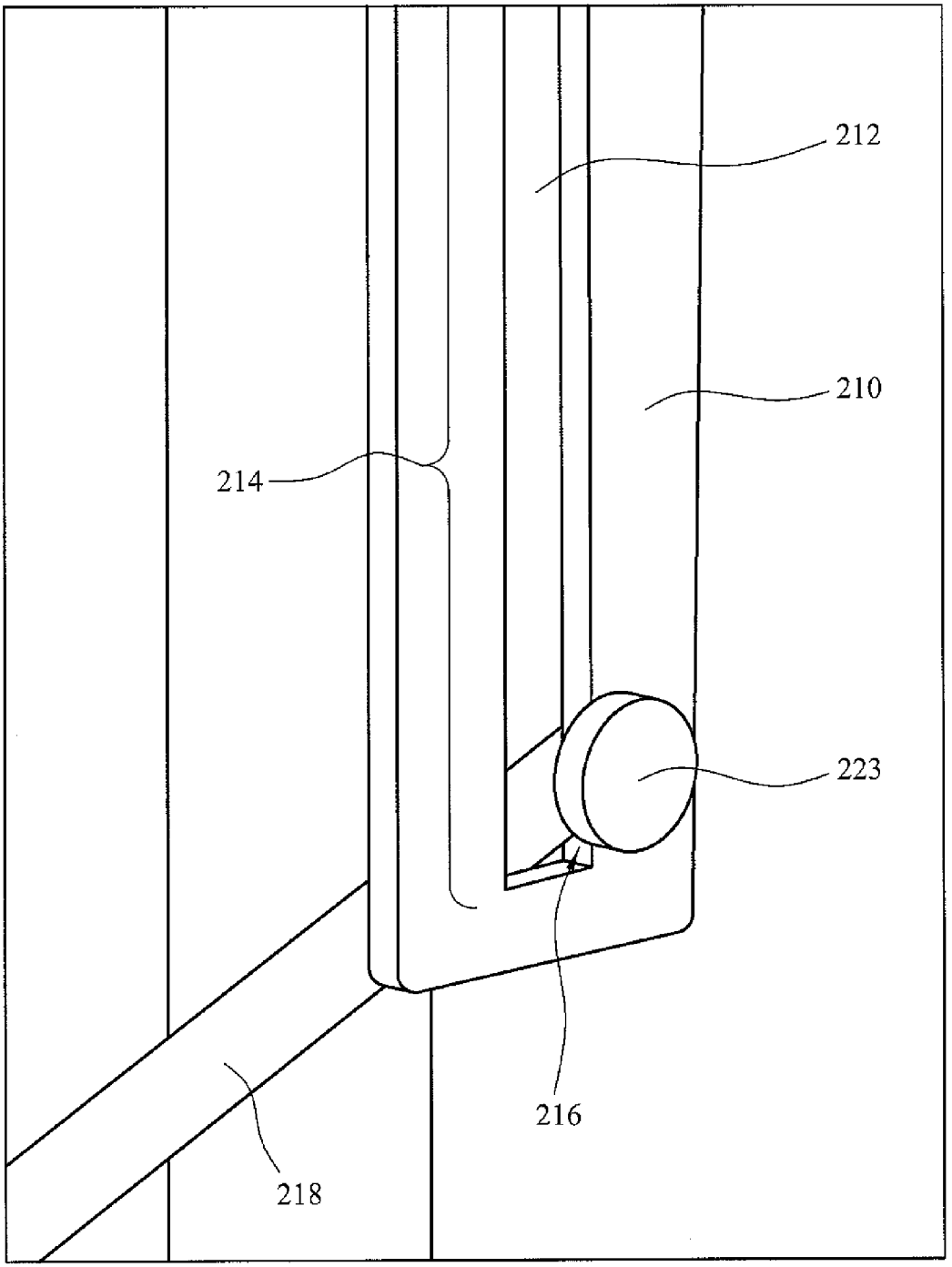


FIG. 5