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(54) Title of the Invention: **Foldable warning triangle assembly**
Abstract Title: **Foldable warning triangle assembly**

(57) A foldable warning triangle assembly 100 comprising three arms 112, 114, 116 configurable as a triangle. The three arms are pivotably connected together at pivot points 118, 120, 122 such that they collapse without disconnecting the three arms. The assembly also comprises an electrical switch within a first arm 112 adjacent a pivot point between the first and second arms 112, 114. The second arm 114 comprises a surface arranged to apply force on the switch when the three arms are configured as a triangle completing an electrical circuit of the warning triangle. Also provided is a foldable warning triangle assembly comprising three arms and a housing in which the housing comprises an interior to receive the triangle assembly when folded and comprises a support connector for the triangle providing it a base or a locking mechanism comprising a rotatable switch or an externally accessible storage compartment. Also provided is a foldable warning triangle assembly comprising three arms each arm comprising an array of lights and a control module to control the illumination of the array of lights to provide a pattern of illumination in which the pattern comprises a direction indicator by illuminating two of the three arms in sequence.

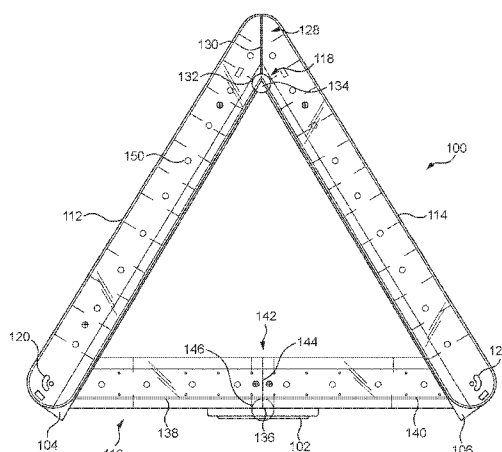


FIG. 1

GB 2554858 A

GB 2554858 A continuation

(58) Field of Search:
INT CL **B60Q, E01F, G09F**
Other: **EPODOC, WPI**

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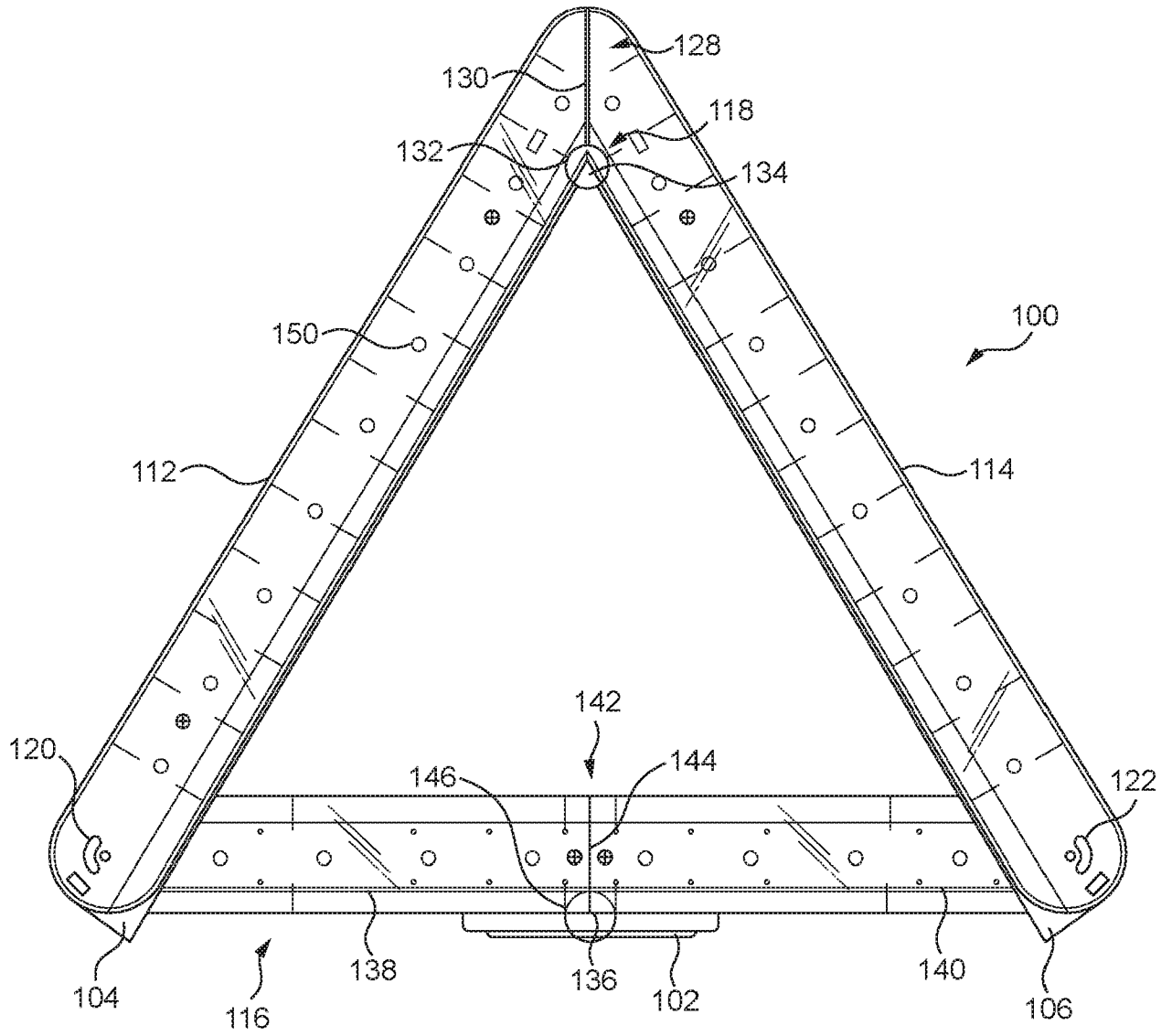


FIG. 1

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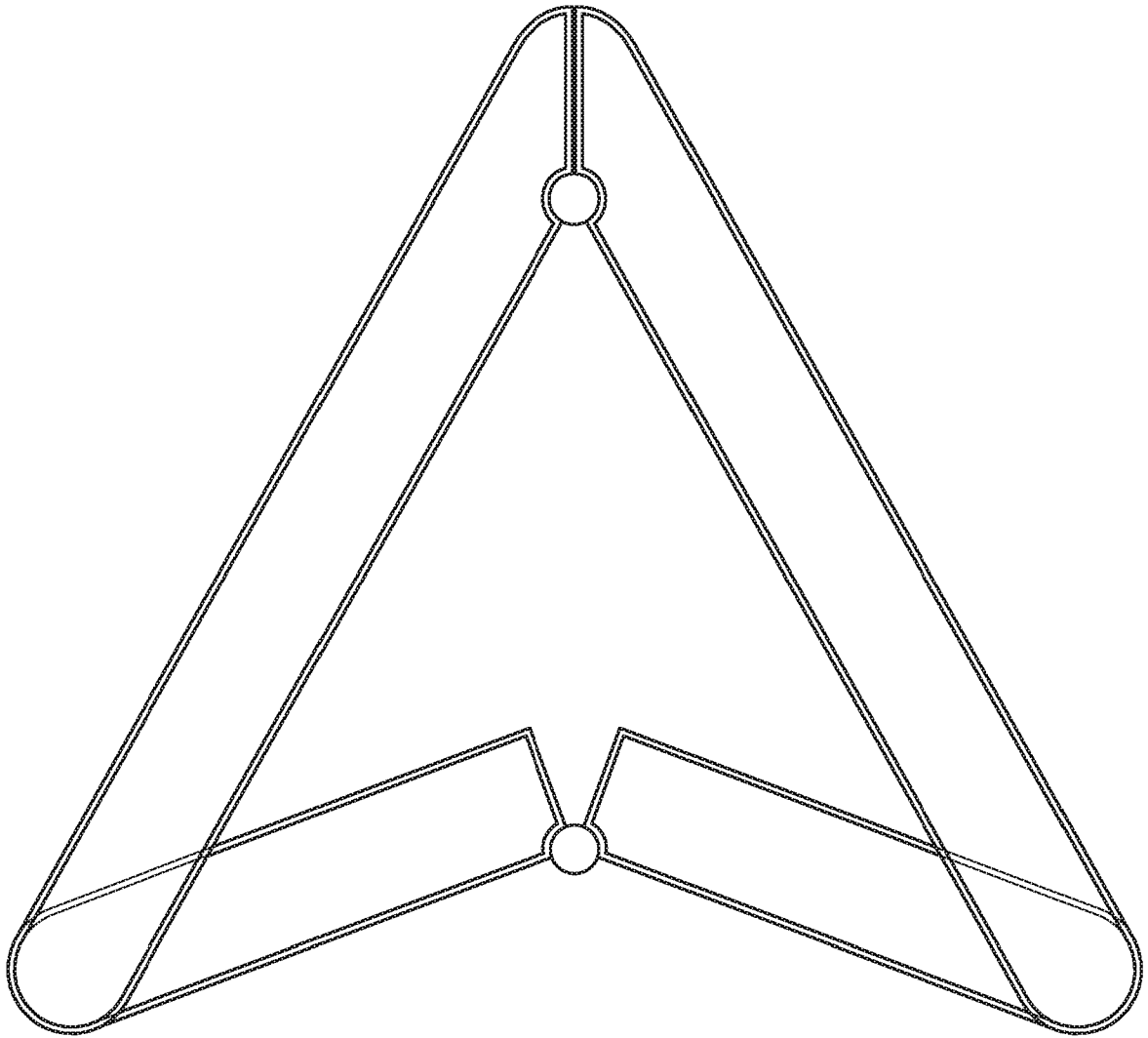


FIG. 2

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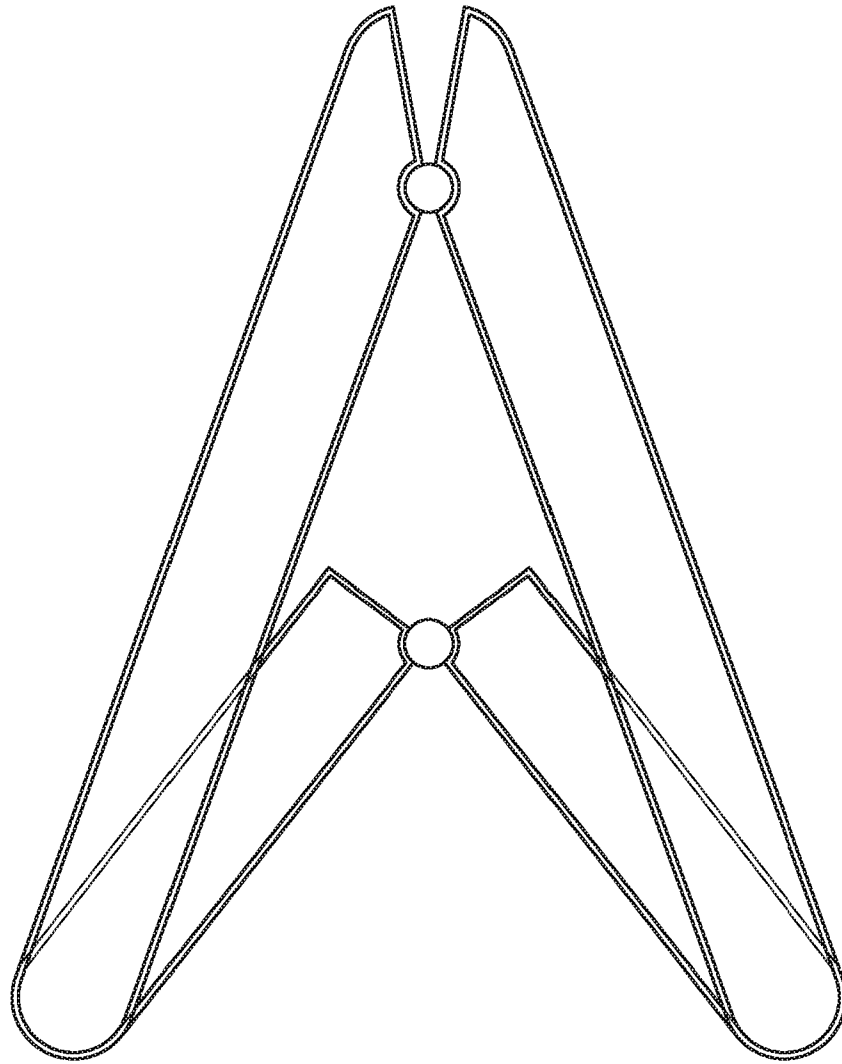


FIG. 3

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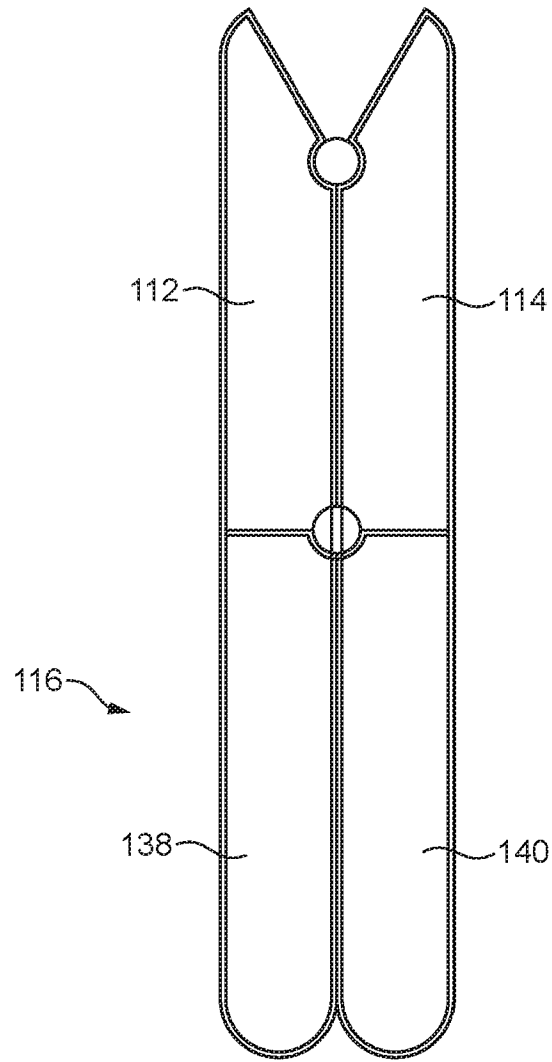


FIG. 4

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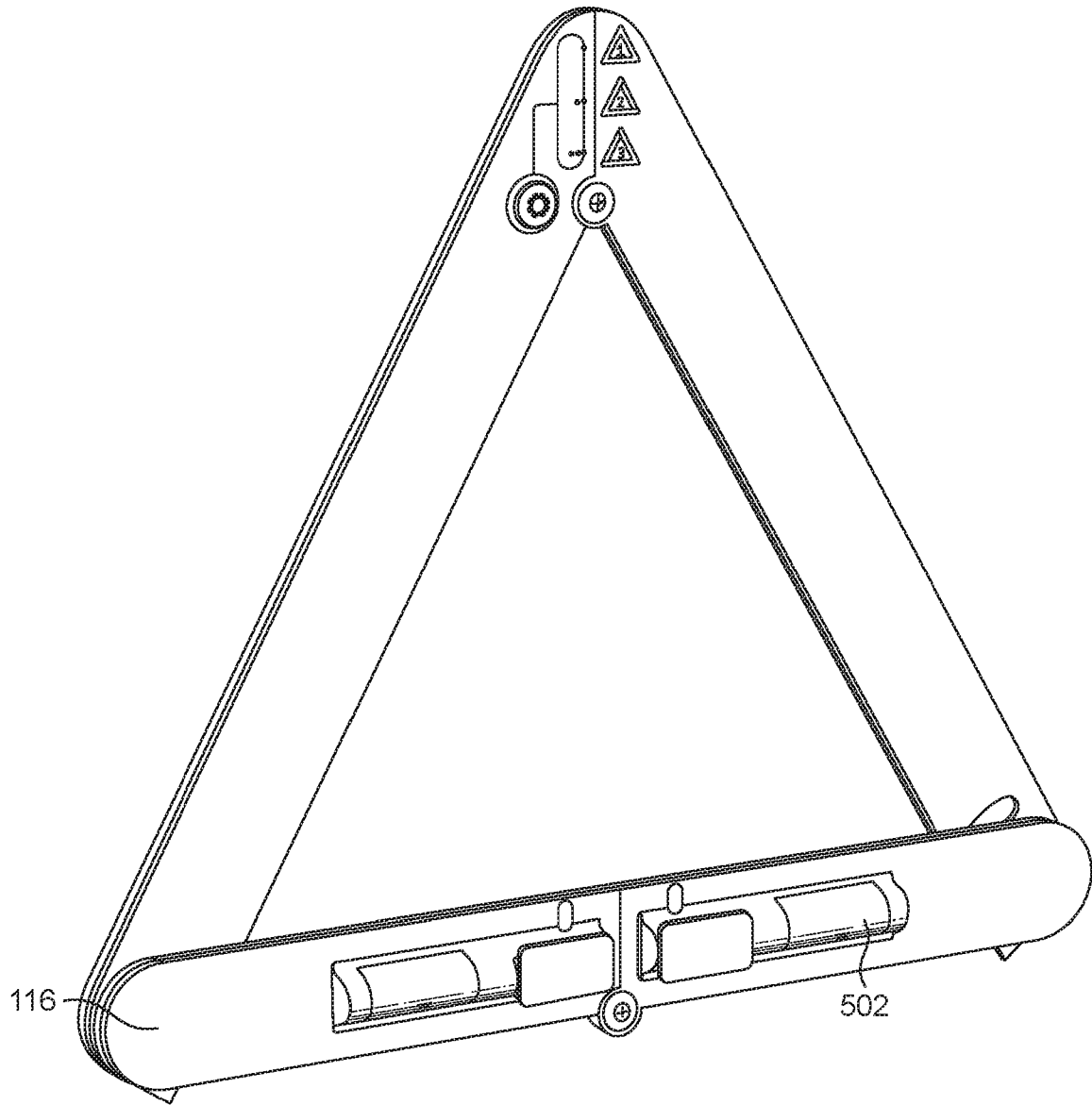


FIG. 5

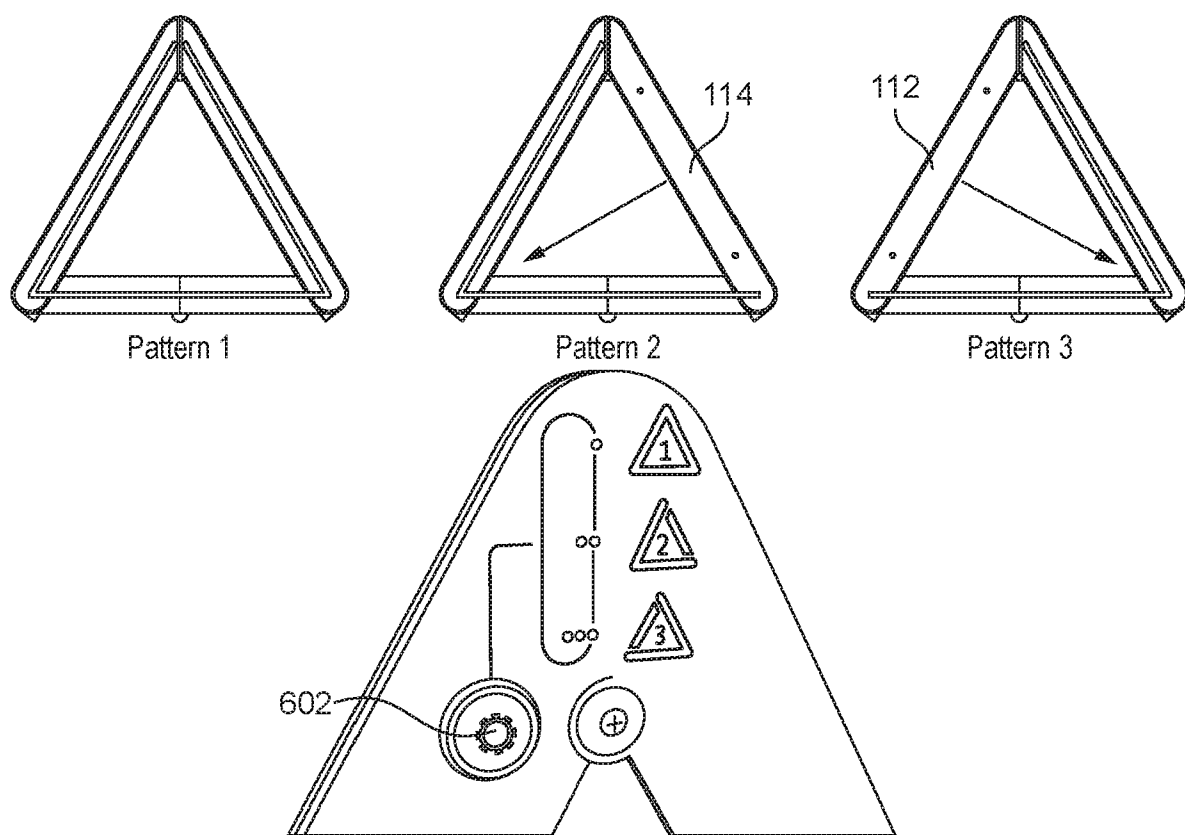


FIG. 6

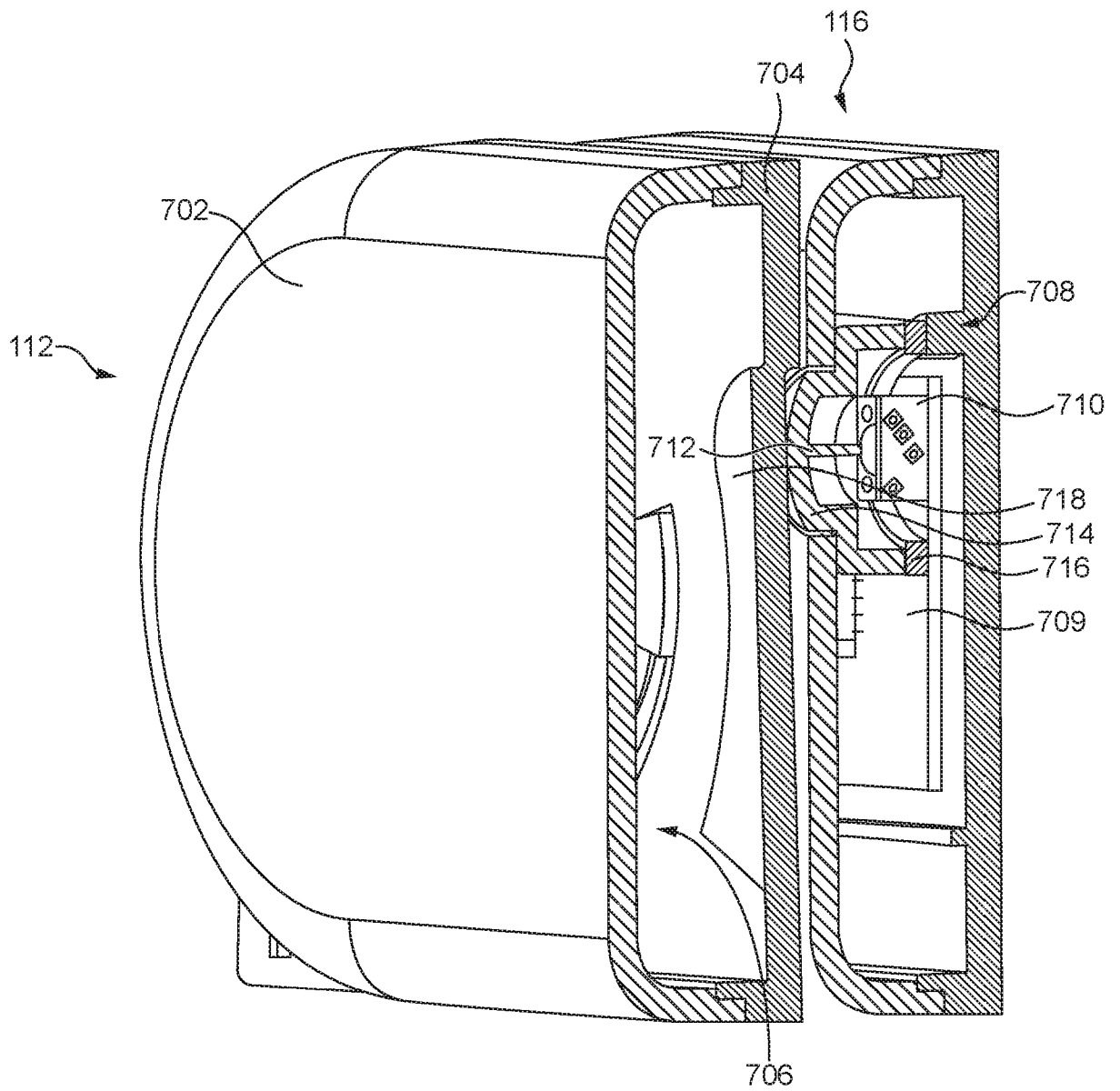


FIG. 7

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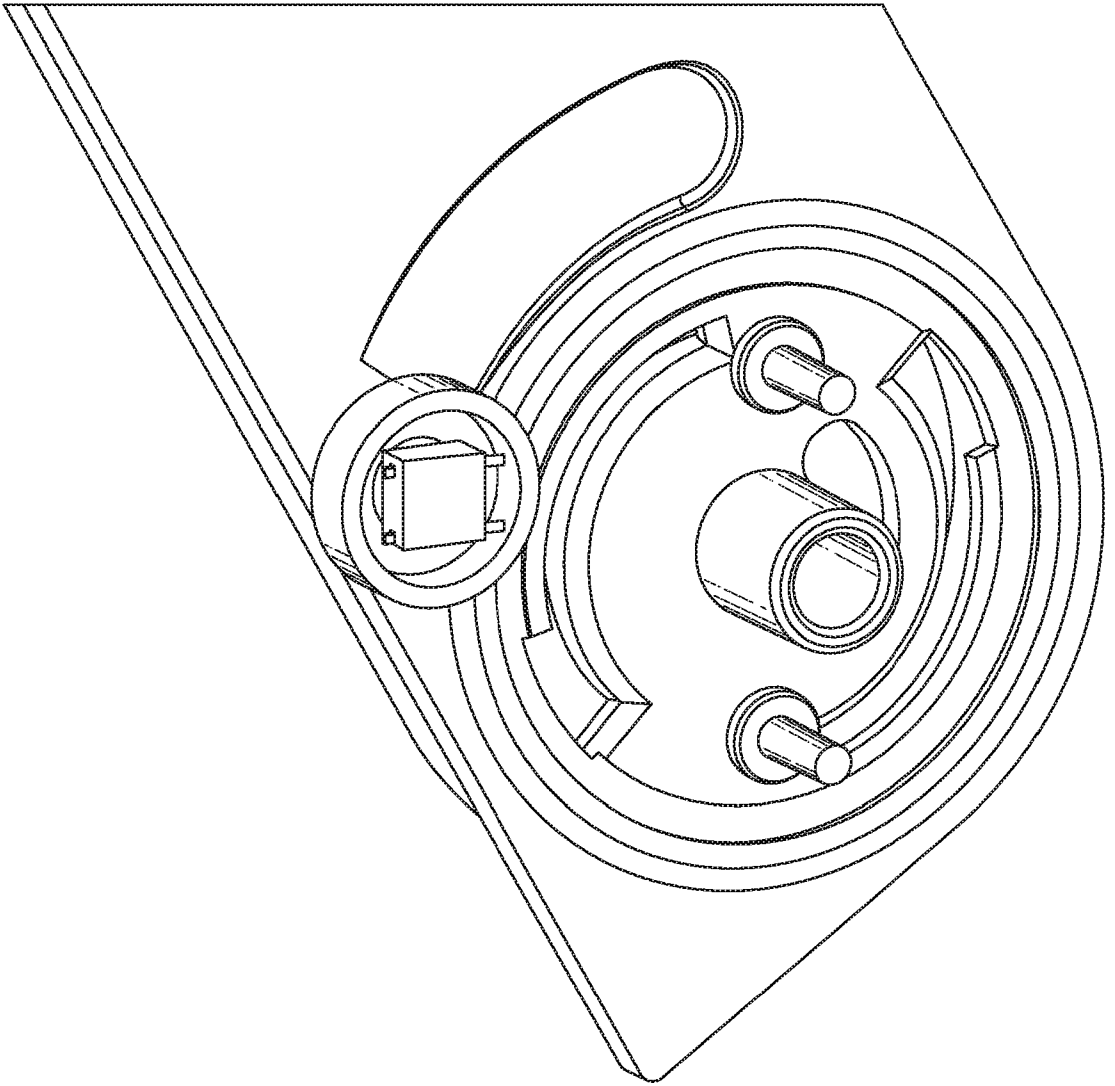


FIG. 8

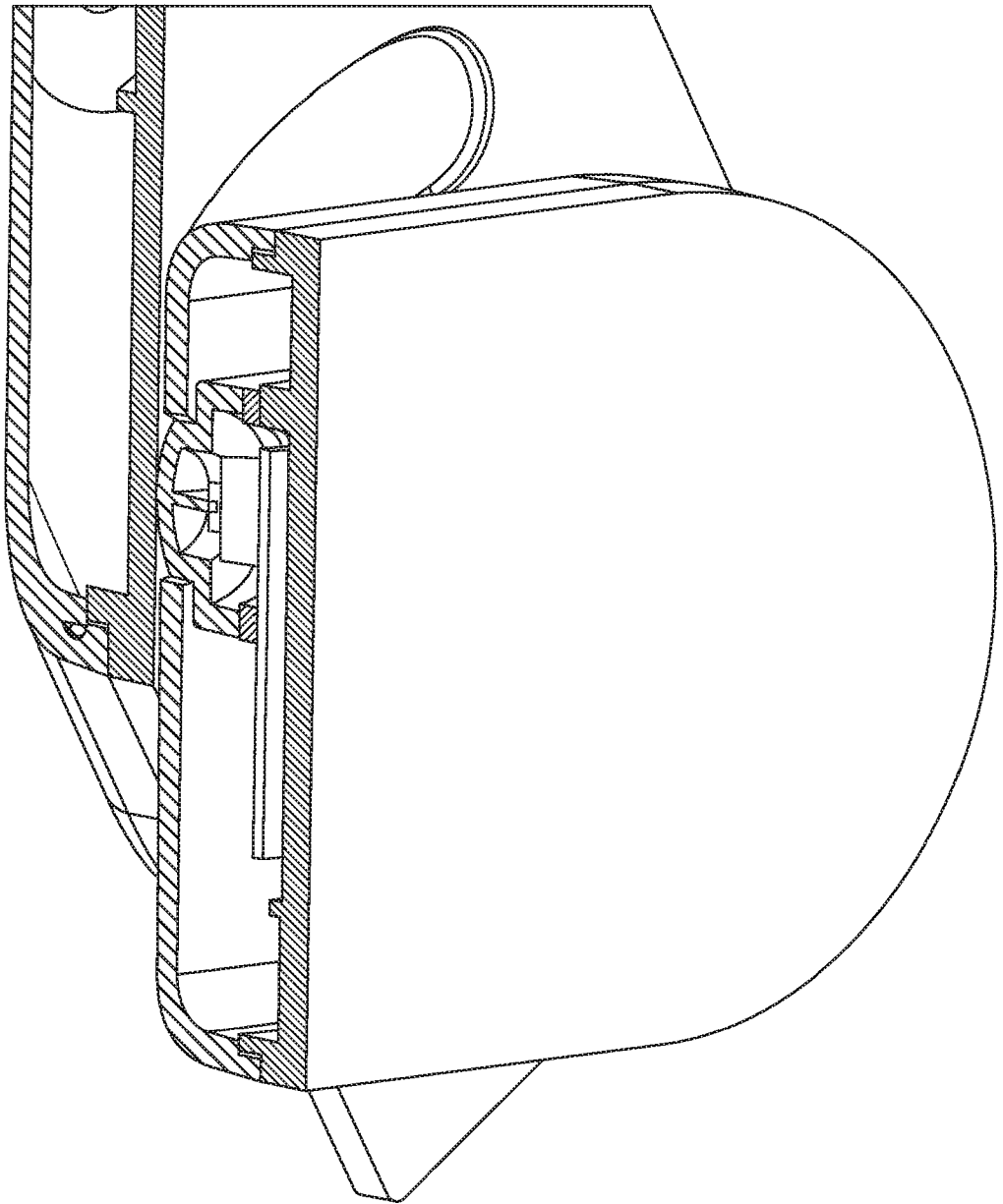


FIG. 9

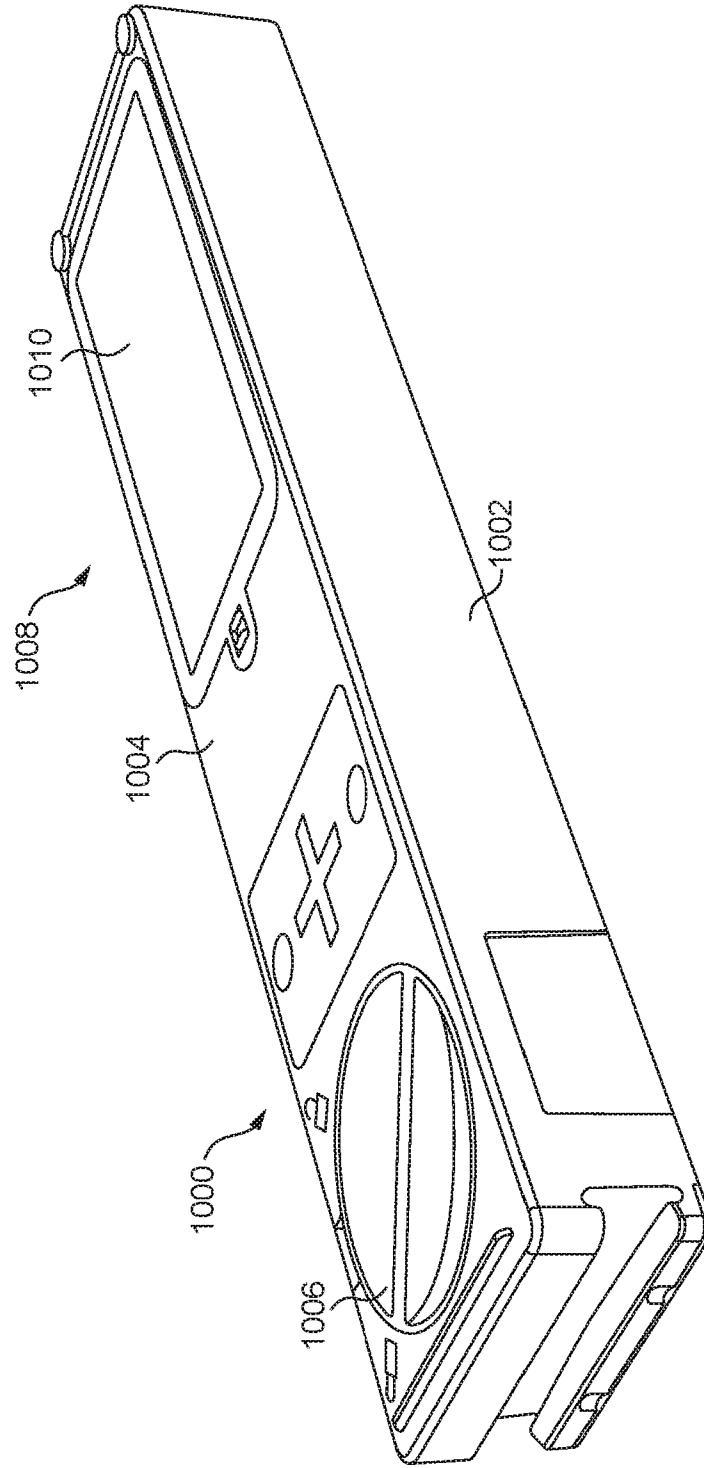


FIG. 10

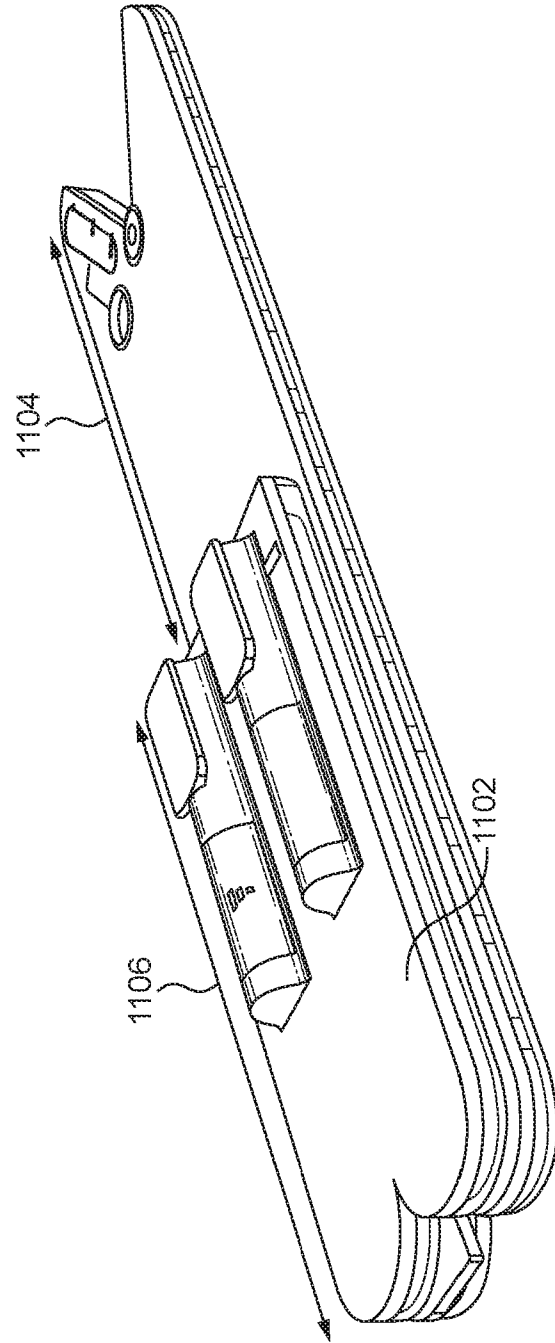


FIG. 11

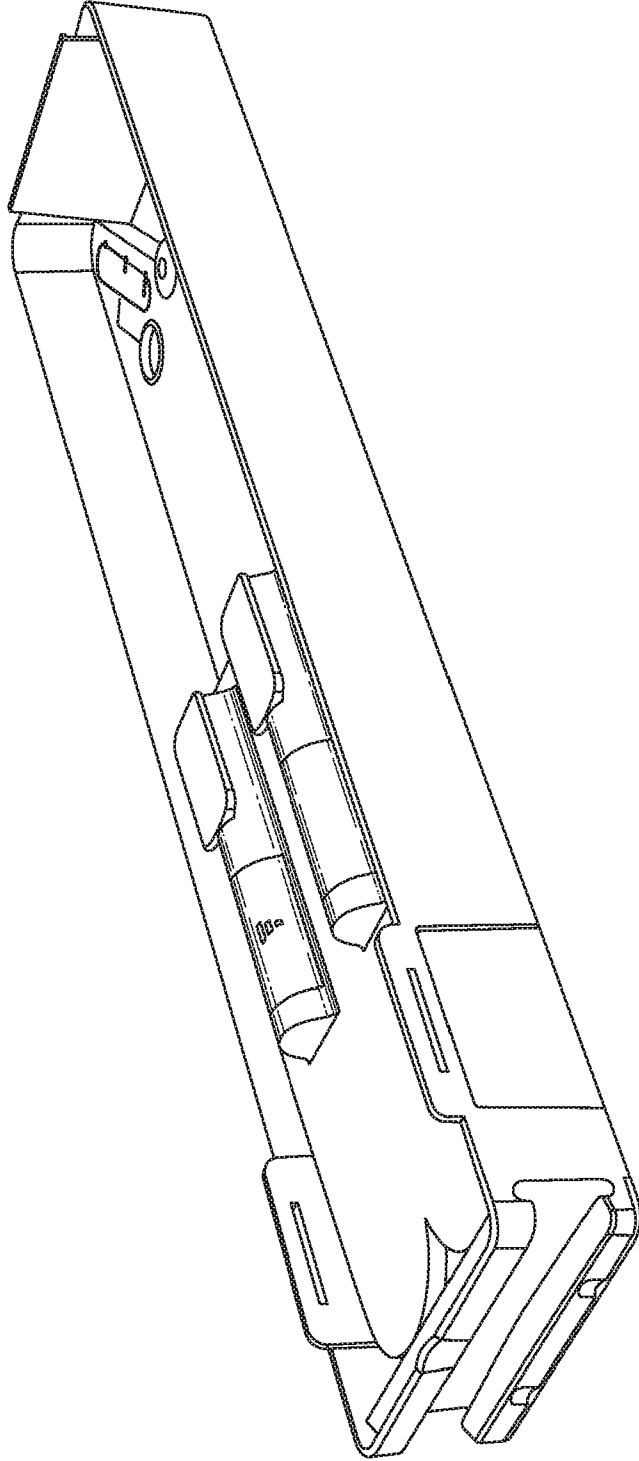


FIG. 12

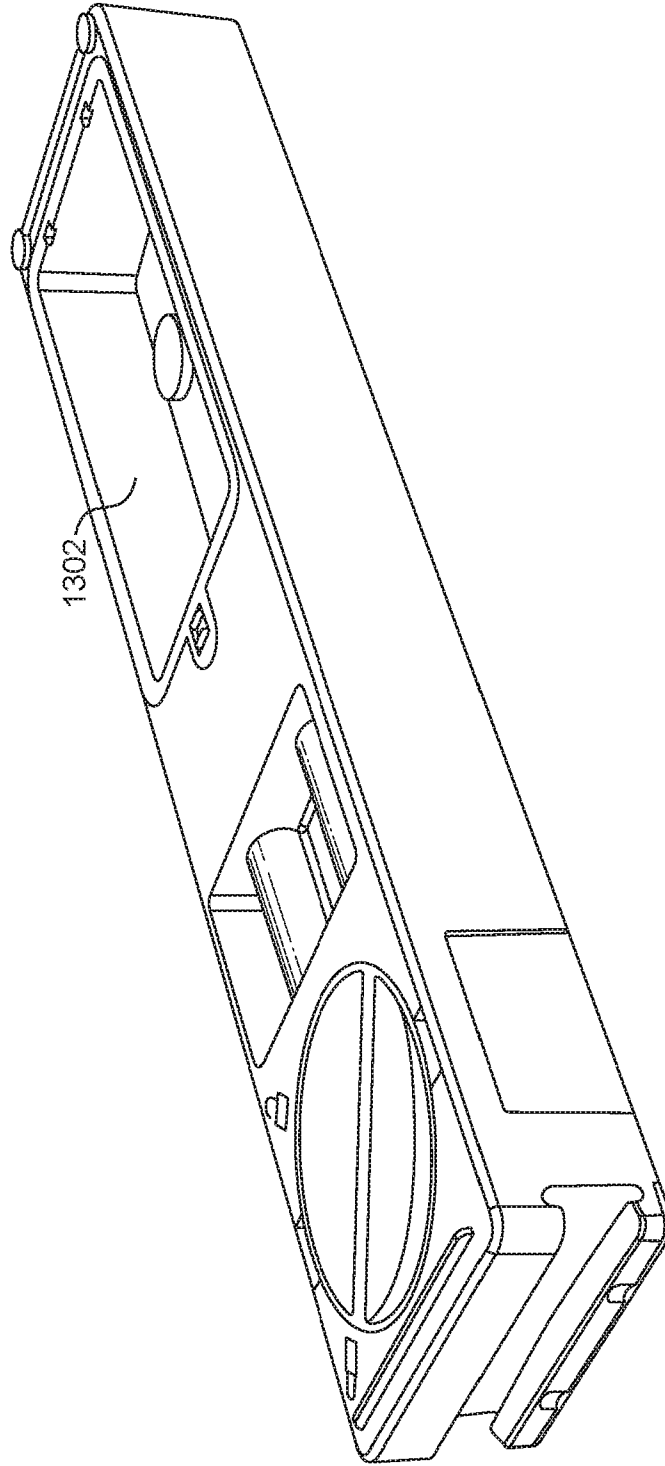


FIG. 13

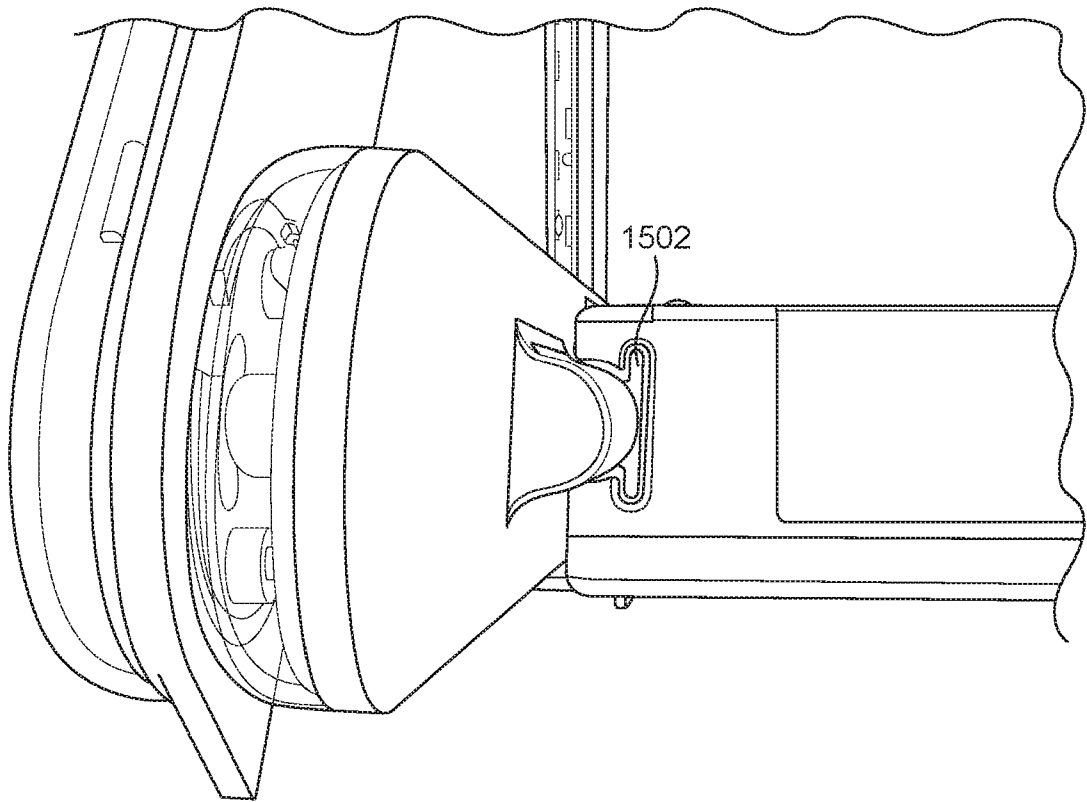


FIG. 15

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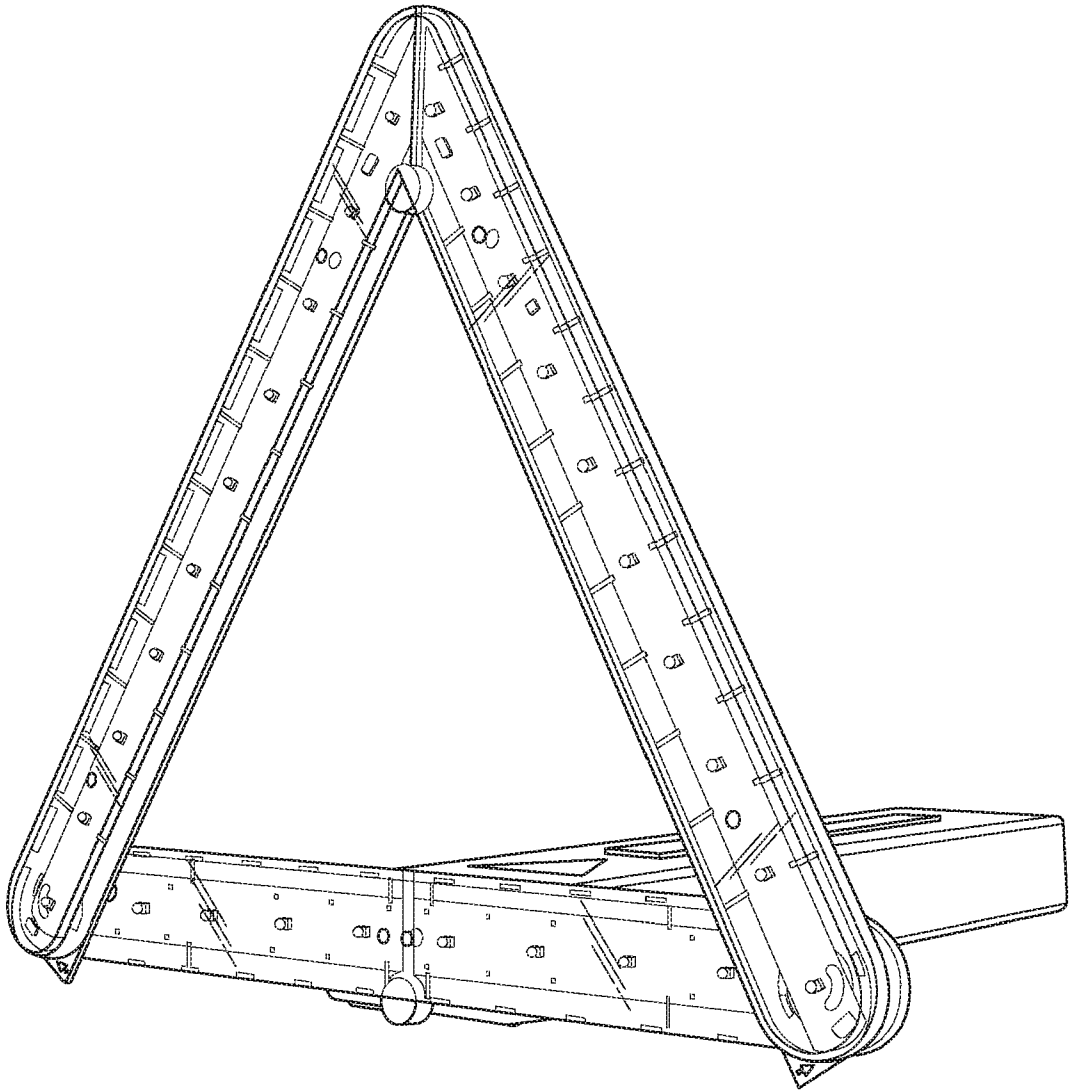


FIG. 16

Foldable Warning Triangle Assembly

BACKGROUND OF THE INVENTION

5 This invention relates to the field of road signs and signals, and particularly to the field of warning triangles.

Warning triangles are used to indicate a hazard in the road that may not be readily apparent to approaching motorists. They are used in many countries, and normally take the form of an equilateral triangle. The appearance of warning triangles varies from country to country but they are generally designed to have bright colours that are highly contrasting with the surrounding environment. This helps approaching drivers notice the warning triangle and thus avoid the hazard.

15 These warning triangles are routinely used by a variety of different organisations and governmental bodies such as police forces, highway agencies and breakdown services. It is also a legal requirement in many countries for motorists to carry these transportable warning triangles in their vehicle for use in the event that the vehicle breaks down at the side of the road.

20 Therefore, it is important for such a warning triangle to be lightweight and easy to transport, whilst remaining solid and stable when placed at the roadside. They should also be visible to approaching motorists at night and during adverse weather conditions.

25 The majority of warning triangles currently in use are made from materials that are heavy and rigid, which results in devices that are difficult to store and transport.

30 A further problem with existing warning triangles is that they generally provide no indication of the direction that an approaching motorist should take to avoid a hazard. This is an important consideration as, if motorists are travelling at night or in poor lighting, it may be difficult for them to discern the location of the hazard and therefore to determine which direction to take.

35

Triangles that are currently available also tend to be supported on thin legs that do not provide adequate stability. Accordingly, in adverse weather conditions, such as in high winds, or when large vehicles pass near to the triangle at high speeds, these warning triangles can become unstable.

5

Such warning triangles typically rely on the reflective properties of the materials they are made from to be visible at night or in poor lighting. Such warning triangles are dependent on an external light source, such as the vehicle's headlights, illuminating the triangle in order to be visible at night or in poor lighting. These reflective properties are often not sufficient to catch an approaching motorist's eye when driving in such adverse conditions. Further, the light source generally has to be directed at the warning triangle head-on for the motorist to notice the reflective properties of the material. Thus, these warning triangles can fail to adequately warn motorists of an approaching hazard.

15

SUMMARY OF THE INVENTION

We have appreciated the need to improve upon the existing warning triangles currently available.

20 The warning triangle and warning triangle assembly of the present application is defined in the claims, to which reference is now directed.

The invention comprises a number of aspects.

25 The first aspect provides a foldable warning triangle assembly comprising three arms configurable as a triangle. The three arms are pivotably connected together at pivot points such that they can pivot into a collapsed arrangement without disconnecting the three arms. An electrical switch is provide within a first arm of the three arms arranged adjacent a pivot point between the first arm of the three arms and a second arm of the three arms. A surface of the second arm is arranged to apply force on the electrical switch such that the electrical switch is configured to close when the three arms are fully configured as a triangle thereby completing an electrical circuit of the warning triangle.

The three arms are connected together to allow the warning triangle to be easily folded without separating any of the arms. This allows the warning triangle to be folded to a size that is practical and convenient for transportation, without any risk of losing or misplacing an arm. Further, the electrical switch is arranged such that it closes when the triangle is fully unfolded, preventing power from flowing between the arms when the warning triangle is in its folded arrangement and is not being used. This prevents needless power expenditure, increasing battery life and longevity of the electrical components.

Optionally, the first aspect further comprises an electrical switch that comprises a tactile switch arranged such that a force is exerted on the tactile switch when the three arms are fully configured as a triangle. Further, the second arm may be arranged such that the pivoting of the second arm in relation to the first arm causes the force to be exerted on the tactile switch. The tactile switch may have a button biased such that the electrical switch is open until the triangle is unfolded. The surface of the second arm may comprise a recessed area operable to receive the push the button to open the electrical switch when the triangle is folded, and the recessed area may be of variable depth.

This provides a robust and reliable electrical switch arrangement which has ingress protection.

A further aspect provides a foldable warning triangle assembly comprising a warning triangle having three arms configurable as a triangle. The assembly further comprises a housing having an interior configured to receive the warning triangle when folded, the housing having a support connector on the external surface thereof arranged to connect to a corresponding support connector of the warning triangle by sliding of the housing relative to the triangle such that, when connected, the housing provides a base for the warning triangle.

This provides a housing which doubles as a base for the warning triangle. This minimises the complexity of the warning triangle arrangement and reduces the number of components which may be required to provide a stable, solid warning triangle.

Optionally, the support connector of the housing comprises a slot and the support connector of the triangle comprises a protrusion arranged to slide along the slot. The support connector of the triangle may comprise a protrusion on each of two arm portions arranged so that the two protrusions slide into the slot of the housing. The protrusion may be arranged to house a battery of the triangle.

This provides a connection arrangement between the housing and the triangle that secures the foldable warning triangle in an unfolded arrangement when in use. Further, providing the batteries in the protrusions, which themselves are provided on each arm portion of an arm, provides improved weight distribution and improves stability of the triangle.

A further aspect provides a housing comprising an interior configured to receive the warning triangle when folded. The housing has a locking mechanism for securing the three arms within the housing. The locking mechanism comprises a locked state and an unlocked state, wherein, when the locking mechanism is in the locked state, the three arms cannot be inserted into or removed from the housing. The locking mechanism comprises a rotatable switch arranged on the housing, wherein the state of the locking mechanism can be changed by rotating the rotatable switch.

This provides a robust locking mechanism which provides ingress protection. The mechanism also secures the triangle within the housing thus preventing the triangle unfolding when not in use.

A further aspect provides a foldable warning triangle assembly comprising a warning triangle having three arms configurable as a triangle. The assembly further comprises a housing comprising an interior configured to receive the warning triangle when folded through a first opening. The housing further comprises an externally accessible storage compartment accessible through a second opening.

Optionally, the first opening has a lid and the second opening is arranged through the lid such that, when the lid is connected to the container, the externally

accessible storage compartment is a portion of the housing that is not occupied by the three arms when the three arms are within the housing.

5 This provides additional storage space, efficiently arranged on the housing to make the most of the available space within the housing and to be accessible externally without having to access the interior space of the housing.

10 A final aspect provides a foldable warning triangle assembly comprising a warning triangle having three arms configurable as a triangle, each of the arms having an array of lights. The assembly further comprises a control module connected to the array of lights of each arm. The control module is arranged to control the illumination of the array of lights of each arm to provide a pattern of illumination. The pattern of illumination comprises the arrays of lights illuminating in a sequence in which the arrays of two of the three arms are illuminated to produce a direction indicator.

20 This provides an arrangement which provides a clearly visible warning to oncoming motorists of an approaching hazard and provides them with an indication of which direction to travel in order to avoid the hazard.

BRIEF DESCRIPTION OF THE DRAWINGS

25 The invention will be described in more detail by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a front view of a warning triangle assembly according to an embodiment of the invention showing the three arms of the assembly forming a triangle;

30 **Fig. 2** is a schematic representation of the folding mechanism according to the embodiment of the invention showing the warning triangle substantially unfolded;

35 **Fig. 3** is a schematic representation of the folding mechanism according to the embodiment of the invention showing the warning triangle partially folded;

Fig. 4 is a schematic representation of the folding mechanism according to the embodiment of the invention showing the warning triangle fully folded;

- Fig. 5** is a rear view of a warning triangle assembly according to the embodiment of the invention showing the three arms of the assembly forming a triangle;
- 5 **Fig. 6** shows an illustration of different illumination patterns of the arms of the warning triangle according to the embodiment of the invention and a view of the switch used to select a pattern of illumination;
- 10 **Fig. 7** shows a schematic representation of an electrical switch arrangement according to the embodiment of the invention when the warning triangle is fully folded;
- 15 **Fig. 8** shows a partially deconstructed representation of an electrical switch arrangement according to the embodiment of the invention when the warning triangle is fully unfolded;
- 20 **Fig. 9** shows a schematic representation of an electrical switch arrangement according to the embodiment of the invention when the warning triangle is fully unfolded;
- 25 **Fig. 10** shows a housing for the warning triangle according to the embodiment of the invention displaying a rotational locking mechanism and a storage compartment;
- 30 **Fig. 11** shows a warning triangle according to the embodiment of the present invention in a folded arrangement:
- Fig. 12** shows the housing for the warning triangle according to the embodiment of the invention without a lid;
- Fig. 13** shows a housing for the warning triangle according to the embodiment of the invention displaying a rotational locking mechanism and a storage compartment without a lid;

Fig. 14 is a different view of the housing for the warning triangle according to the embodiment of the invention;

Fig. 15 is a view of the housing connected to the warning triangle;

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Fig. 16 shows the warning triangle assembly according to the embodiment of the invention.

10 DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

A device embodying the invention will now be described with reference to the figures. The warning triangle assembly has a number of aspects which may be used in combination or separately. For ease of understanding each aspect will be described in turn.

15

Warning Triangle Illumination

Referring initially to figure 1, a warning triangle (100) according to an embodiment of the invention comprises three arms (112), (114) and (116) configurable as a triangle. These arms (112), (114) and (116) are made from a rigid plastic material and have a substantially greater length than they have width. The arms (112), (114) and (116) of warning triangle (100) are a size that is appropriate for transportation, such that they can easily fit in the boot of a car or other vehicle.

25

The material of the front surface of arms (112), (114) and (116) may be made from a substantially transparent material that covers a surface that is designed to be visually eye-catching. The visually eye-catching surface may comprise a plurality of lights, reflectors or both. The visually eye-catching surface may be made from a material of a bright colour, or the front surface may be made from a material of a bright colour or they both may be made from a material of a bright colour.

30

The arms (112), (114) and (116) may be connected to each other at connection points, which may be described as pivot points (118), (120) and (122), positioned at each end of each arm (112), (114) and (116). At these connection points (118), (120) and (122), each arm (112), (114) and (116) has a connector

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that securely attaches the ends of each arm (112), (114) and (116) together to form a triangle. The connectors of each arm may be any connector suitable for connecting to a corresponding connector of another arm. For example, the connector of arm (112) at connection point (120) may be a peg configured to connect to a corresponding hole arranged on arm (116). Alternatively, screw fit connectors, nut and bolt combination, or any other suitable connection may be used. Arm (116) is arranged to form the bottom side of the triangle when in use. The two remaining arms (112) and (114) connect to the bottom arm (116) at connection points (120) and (122), located at either end of the bottom arm (116).

10

The ends of the arms (112) and (114) that are not connected to the bottom arm (116) are shaped such that each end comprises a coupling edge (128) that has a flat edge section (130) and a curved edge section (132). The coupling edges (128) are located at connection point (118) at the top of the warning triangle assembly when in use. The curved edge section (132) of each coupling edge (128) is located at the end of the edge (128) that is closest to the bottom arm (116). The flat edge sections (130) of each arm oppose one another at connection point (118) such that the flat edge section of arm (112) is in contact with the flat edge section of arm (114) along the entirety of its length. The arms (112) and (114) are connected together by a top connector (134). The top connector (134) is located adjacent the curved edge section (132) of the arms (112) and (114). The curved edge sections are shaped to conform with the surface of the top connector (134) such that the top connector (134) is in contact with the entirety of curved edge section of both arms. The arms (112) and (114) are connected to the top connector (134) such that they can pivot about the top connector (134), which acts as a pivot point. This allows the flat edge sections (130) of each arm to be separated and brought together.

The bottom arm (116) comprises two arm portions (138) and (140). These arm portions are preferably of equal length but may alternatively be different lengths. One end of arm portion (138) is connected to arm (112) and one end of arm portion (140) is connected to arm (114). The other end of each arm portion has a coupling edge (142). Like with the coupling edges (128) that are positioned at the top of the warning triangle assembly when in use, the coupling edges (142) each have a flat edge section (144) and a curved edge section (146). The curved

edge sections are located at the end of the coupling edges (142) that are farthest from top connector (134). The two flat edges sections may be brought together half way between connection points (122) and (120), such that the flat edge sections (144) are parallel and opposed to one another. The two arm portions are
5 connected together by a bottom connector (136), located adjacent the curved edge section (146) of arm portions (138) and (140). The curved edge sections are shaped to conform with the surface of the bottom connector (136) such that the bottom connector (136) is in contact with the entirety of the curved edge section of both arm portions. The bottom connector (136) may be substantially identical to
10 connector (134). The arm portions (138) and (140) are connected to the bottom connector (136) such that they can pivot about the bottom connector (136), which acts as a pivot point. This allows the coupling edges (142) of each arm portion to move closer to top connector (134).

15 Connectors (134) and (136) allow the warning triangle assembly (100) to be folded into a compact arrangement without having to disconnect any of the arms. This folding procedure will now be described with reference to figures 2-5.

 The bottom connector (136) and the connectors located at connection
20 points (122) and (120) act as pivot points for the two arm portions (138) and (140). These pivot points allow the ends of the arm portions not connected to arms (112) and (114) to move toward top connector (134). As the arm portions continue to pivot, arms (112) and (114) are forced to pivot about top connector (134). This brings the two arms closer together and forces the coupling edge (128) of each
25 arm to separate. Such an arrangement is shown in figures 2 and 3. Eventually, arms (112) and (114) are brought alongside each other, and arm (116) is folded such that the ends of the arm portions that are connected to arms (112) and (114) are brought alongside one another. This is shown in figure 4.

30 Warning triangle (100) has supports, here described as feet (102), (104) and (106). The foot (102) is located adjacent to pivot point (136) of the bottom arm of the triangle. Foot (104) is located on arm (112) adjacent the connection point (120) between arm (112) and the bottom arm (116), and foot (106) is located on arm (114) adjacent the connection point (122). These feet provide stable points of
35 contact between the base of the warning triangle and the ground.

Further, warning triangle (100) may comprises an array of lights (150) on each arm (112), (114) and (116). Lights (150) may comprise LED bulbs and are connected together by an appropriate electrical circuit.

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As will be described in greater detail below, an electrical switch arranged adjacent a pivot point between a first arm of the three arms and a second arm of the three arms. The electrical switch is configured to close when the warning triangle is fully unfolded thereby completing an electrical circuit between the arms.

10 Here, an electrical switch is provided at the connection point (120) between the arm (112) and the bottom arm (116). However, it will be appreciated that the electrical switch may be provided at a different location, for example at connection point (122), (118) or adjacent the pivot point (136) of the bottom arm. The electrical switch is arranged such that the switch is open (off) when the warning triangle is
15 folded and closed (on) when the warning triangle is unfolded. Therefore, current cannot flow through the electrical circuit of the warning triangle (100) unless the arms are fully unfolded. This arrangement ensures that motorists cannot unwittingly leave power flowing to lights (150) once they have folded warning triangle assembly (100) ready for transportation.

20

As shown in figure 5, the lights (150) may be powered by one or more batteries (502). Here, the batteries (502) are located in the bottom arm (116), but either of the other arms may house the batteries. Alternatively, the power source for the lights (150) may be housed externally. For example, batteries may be
25 located in the warning triangle's housing (described later), or the warning triangle may be connected directly to the mains or to a vehicle's battery. Preferably, the batteries are located in the arm that becomes the bottom of the triangle, in use, as this provides extra weight towards the bottom of the assembly for stability.

30 As will now be described with respect to figure 6, the lights (150) in arms (112), (114) and (116) may be programmed to provide various patterns of illumination. In all of the examples, the triangle may be controlled such that a pattern of illumination comprises the arrays of lights illuminating in a sequence in which the arrays of two of the three arms are illuminated to produce a direction
35 indicator.

In the present embodiment, the warning triangle has a default setting and three patterns of illumination, denoted in figure 6 by the numbers 1, 2 and 3 respectively. The default setting has all arms illuminated. The default setting may
5 be such that unfolding the triangle automatically results in the lights illuminating according to this pattern. Selection of pattern 1 may result in the lights (150) of all three arms flashing in unison, highlighting the presence of the warning triangle to approaching motorists. Pattern 2 may result in the lights (150) of arm (112) and (116) flashing but the lights of arm (114) being powered off. This flashing pattern
10 may indicate to oncoming motorists that they should travel left of the warning triangle in order to avoid the hazard. Pattern 3 may result in the lights (150) of arm (114) and (116) flashing but the lights of arm (112) being powered off. This flashing pattern may indicate to oncoming motorists that they should travel right of the warning triangle in order to avoid the hazard.

15

The flashing patterns in modes 2 and 3 may have all lights of the arrays of two arms flashing, but preferably the arrays are arranged to pulsate such that the lights appear to travel towards the bottom right or bottom left corner of the triangle. Such a pulsating pattern may be achieved by a sequence of on/off switching of the
20 arrays in a sequence. Preferably, the lights of two of the three arms are synchronised such that the light appears to travel along two of the arms together. For example, in the pattern number 2, the light of the array of arm (112) that is furthest from the base arm (i.e. the light of arm (112) nearest the top of the triangle when in use), and the light of the base arm's array that is closest to arm (114) may
25 pulsate first, followed by the lights adjacent to them in the array. This pattern may continue along the arm until the sequence of pulsating lights reach the corner of the triangle in which the arm (112) is connected to the base arm.

In the above examples in which two of the three arms have a flashing sequence, the third arm may be turned off (array not illuminated) or the array of the
30 third arm may be visibly different such as dimmed or even a different colour.

The pattern of illumination displayed by the warning triangle may be instructed by a control module. The control module may comprise a semiconductor chip or other appropriate circuitry and may be imbedded in the arms.

Here, a switch (602) is also provided, which, when pressed, cycles through the three patterns, allowing a user to select the desired illumination. For example, upon unfolding the triangle, the lights are illuminated according to the default setting in which all lights are on. Pressing the switch once cycles to pattern 1. The switch (602) can be pressed once again to change to pattern 2, pressed again to change to pattern 3 and then pressed for a third time to return to the default setting.

Such flexibility and control over the lights (e.g. the control module and the switch) may be provided by standard circuitry that is well known in the art and accordingly will not be discussed further.

The programming of lights (150) described above should also not be considered limiting. The electrical circuit may comprise a control module to control the lights such that they provide constant illumination or flash together, in sequence or at random. Further, each arm may be controlled separately such that each arm could provide an individual pattern of illumination. Further, the control module is not limited to being controlled by the switch (602). For example, the switch may be provided separately to the warning triangle to allow the illumination of the lights of the arms to be controlled remotely.

Further to lights (150) , arms (112), (114) and (116), may also comprise reflectors. Therefore, in the event that the battery is flat or there is a circuit failure, warning triangle (100) can still be used to warn motorists.

Electrical Switch Arrangement

An electrical switch arrangement according to an embodiment of the invention will now be described in further detail with respect to figures 7-9.

Figure 7 shows connection point (120) between the arm (112 or 114) and the bottom arm (116) when the warning triangle is in a folded state. As can be seen from figure 7, each arm has a front portion (702) and a rear portion (704). The front portion of each arm defines the front surface of the warning triangle when in use and the rear portion of each arm defines the rear surface of the warning triangle when in use. The front portion of an arm is connected with its corresponding rear

portion along the perimeter of the arm. Both front and rear portions of the arm are shaped such that together they define an interior volume, here described as interior region (706), that runs throughout the arm.

5 Housed within the interior region (706) of the bottom arm (116) may be an electrical switch arrangement (708). In the present embodiment, the electrical switch arrangement (708) comprises a tactile switch (710) arranged on a printed circuit board (PCB) (709) which itself is arranged on the interior surface of the rear portion (704) of the bottom arm (116). The PCB may also comprise the control
10 module described above.

A tactile switch may be any appropriate electrical switch that changes from an open state to a closed state when the switch experiences a change in force, such as pressure. In an open state, the tactile switch prevents the flow of current
15 through the PCB (709) and therefore the electrical circuit of the warning triangle is not complete. In a closed state the tactile switch allows current to flow through the PCB (709) and thus completes the electrical circuit. In the present embodiment, the tactile switch is configured to transition from an open state to a closed state when a certain force is applied to the switch. For example, the tactile switch may
20 remain in an open state up to a force of F_1 . Any force applied to the switch that is greater than F_1 will result in the switch transitioning to a closed state.

The electrical switch arrangement may further comprise a push button (712) arranged within the interior space (706) of the bottom arm (116). The push
25 button (712) may have a closed end which forms a circular surface. The opposing end of the push button may be open and comprise a bottom edge of the button. The bottom edge of the push button may be arranged on a strip of compressible material, here described as foam gasket (716). The foam gasket (716) is shaped to conform with the bottom edge of the push button (712) and as such forms a
30 circular ring. The foam gasket is arranged to encircle the tactile switch and the push button (712) is arranged such that its interior volume fits over the tactile switch (710).

The circular top surface of the push button (714) protrudes through an
35 opening in the front portion (702) of bottom arm (116) into a recessed area (716)

of the adjacent rear portion (704) of arm (112). In this folded arrangement, the push button, protruding into the recessed area (718), does not make contact with the rear portion (704) of arm (112). As such, no force is exerted by arm (112) on the push button and accordingly no force is exerted by the push button on the tactile switch.

However, as can be seen most clearly in figure 8, the recessed area has a variable depth which changes across the width of arm (112). Thus, as the arm (112) pivots with respect to arm (116) as the triangle unfolds, the electronic switch arrangement (708), being arranged on the bottom arm (116), may move across the recessed area (718). This results in the push button coming into contact with the rear portion (704) of the adjacent arm (112). When the triangle is fully unfolded, the electrical switch attached to the bottom arm (116) may be fully out of the recessed area (718). This may results an a sufficient force being exerted on the push button (712) to compress the foam gasket (716). As the foam gasket is compressed, the push button (712) comes into contact with the tactile switch (710). This may cause a force to be exerted on the switch that is sufficient (e.g. greater that F1) to cause the switch to transition from an open state to a closed state. Such an arrangement is shown in figure 9.

Thus, the electrical switch arrangement only allows current to flow through the electrical circuit of the warning triangle when the triangle is fully unfolded.

Warning Triangle Housing

With reference now to figures 10-15, a housing (1000) to house the warning triangle when in a folded state will now be described. Features of the housing include a locking mechanism, a connector to form a base for the triangle and a separately accessible compartment. These features may be used alone or in combination.

The warning triangle assembly comprises the housing (1000). Housing (1000) comprises a rectangular container (1002) and a lid (1004), which may be made of plastic. As shown in figure 11, the housing (1000) has an interior region within which arms (112), (114) and (116) can fit when they are in their folded

arrangement. Housing (1000) allows the warning triangle (100) to be compactly stored and easily transported.

The lid (1004) of the housing (1000) may comprise a locking mechanism, here described as rotational locking mechanism (1006). The rotational locking mechanism (1006) is in the form of a circular switch which can be rotated between two positions. The first position secures the lid (1004) to the container (1002), which can be described as a locked state for the housing. The second position allows the lid (1004) to be removed from the container (1002), which can be described as an unlocked state. As previously stated, the housing may be locked or unlocked by rotating the locking mechanism between position 1 and position 2. The locked state (position 1) secures the folded warning triangle within the housing and the unlocked state (position 2) allows the folded warning triangle to be inserted or removed from the housing.

An advantage of the locking mechanism is that the triangle is securely stored in a manner in which the triangle cannot be accidentally deployed which, in combination with the switch, would cause the triangle to illuminate and waste battery power.

In combination with, or as an alternative to, the locking mechanism (1006), the lid (1004) may comprise an externally accessible storage compartment (1008). This compartment may comprise a storage compartment lid (1010), as shown in figure 10, and a storage recess (1202), as shown in figure 12.

As can be seen from figure 11, the folded warning triangle (1102) has two sections, here described as a first section (1104) and a second section (1106). In the first section (1104), the bottom arm (116) does not overlap with the remaining two arms (112) and (114). In the second section (1106) the bottom arm (116) does overlap with the remaining two arms. As there is no overlap between these arms in the first section (1104), the first section of the folded warning triangle is thinner than the second section (1106). Thus, when the folded warning triangle is fitted within the container, the portion of the container above the first section (1104) is not occupied by the warning triangle. This is shown in figure 12.

The storage recess (1302) is positioned on the lid such that it aligns with the first section (1104) of the folded warning triangle and thus fits within the portion of the container (1004) that is not occupied by the warning triangle. The storage recess therefore efficiently utilises this free space within the container and provides
5 a storage compartment which can be accessed externally without needing to remove the lid (1004).

Further, housing (1000) may be connectable to the bottom arm (116) of the warning triangle (100) by a support connector and thus act as a support for the
10 warning triangle. In the present embodiment, the support connector is a push fit connector (1402) most clearly shown in figure 14, which displays the housing (1000) with the lid (1004) facing downwards. This push fit connector (1402) is configured to connect to a corresponding connector (1502) positioned on the rear portion of the bottom arm (116), as shown in figure 15. The support connector
15 (1402) may be attached to the bottom arm by laterally sliding the connector onto the corresponding connector (1502) of the bottom arm. Both connectors (1402), (1502) are shaped such that sliding the connector (1402) onto the connector of the base securely connects the housing to the warning triangle. In other words, connector (1402) comprises a slot and connector (1502) comprises a protrusion.
20 The slot of connector (1402) is shaped such that it can be slid onto the protrusion of connector (1502) to secure the base arm to the housing. In the present embodiment, connector (1502) comprises two protrusions, one on each arm portion of bottom arm (116), as can be most clearly seen in figure 5. By sliding the connector of the housing onto the protrusions of the two arm portions the two arms
25 portions are effectively locked in position, further increasing the stability of the assembly. Further, the batteries of the warning triangle may be housed within the protrusions of the connector (1502). As such, the protrusions of the bottom arm provides a compact and efficient housing for the batteries.

30 Optionally, the container may further comprise a strip of Velcro (1404) or other appropriate adhesive material. This strip may be positioned on the bottom side of the container, as shown in figure 14, and may be used to fasten the housing to a vehicle (for example, the vehicle's boot), to keep the housing in place during transportation.

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It should be appreciated that housing (1000) is not limited to connecting to arm (116) at one end. The top surface of the housing may connect to the bottom edge of the arm at the base of the triangle at a connection point that is positioned towards the centre of the housing. The housing may be made with a magnetic base or a sucker or a plurality of suckers attached to the base, or made with neither.

Thus a warning triangle assembly is provided that provides a device that is easy to store and transport, stable when fully assembled, highly visible in all lightings and weather conditions, and that provides motorists with a direction to travel in order to avoid an upcoming hazard. Such an arrangement is shown in figure 16.

As noted above, the aspects of the warning triangle assembly, in particular the illumination aspect, the electronic switch aspect and the housing aspect may be used in combination or separately. Further to this, the specific features of the housing described above may be used in combination or separately, and may be combined separately or together with each of the other aspects of the assembly. As such, a variety of combinations are possible.

For example, it should be appreciated that the warning triangle (100) described above is not limited to be used in combination with the housing (1000) described above. For example, the warning triangle (100) may be provided with other appropriate housing that may or may not double as a base, or no base may be provided at all. In such a case, means of support for providing stability when in use, may be provided on the warning triangle such as legs or an integrated base. Further, warning triangle (100) may be used in combination with a variation of housing (1000), for example a housing with the above rotational locking mechanism and sliding connector but without the externally accessible storage compartment. Alternatively, another suitable locking mechanism may be used, such as a lock and key combination, with the sliding connector and/or the externally accessible storage area. Or no locking mechanism may be used at all and the housing may comprise the sliding connector and/or the externally accessible storage compartment. In an alternative arrangement, which does not comprise the sliding connector, any appropriate connector, such as a push fit or clip connector, may be used in combination with the externally accessible storage compartment and/or the rotational locking mechanism.

Further, the housing (1000), or the variations on housing (1000) described above, are not limited to be used with the warning triangle (100). Other appropriate foldable warning triangles may be used, , for example a warning triangle that does
5 not comprise the electrical switch arrangement and/or lights for illuminating the arms. Further, variations of warning triangle (100), which can be used in combination with housing (1000) or variations thereof, are conceivable. For example, for a warning triangle comprising the illumination feature described above, any appropriate electronic switch may be used, for example a contact
10 connection or magnetic reed switch arrangement.

An example of a further variation is an embodiment having the illumination functionality but in which the sliding connector (1402) may be used or any appropriate connector may be used. For example, the connector may be in the
15 form of fitting pegs, positioned at one end of housing 1000, which fits into a corresponding support connector in the form of holes, positioned at the back of arm (116). Alternatively, in an embodiment having illumination functionality, the rotational locking mechanism (1006) may be used for the housing, or any appropriate locking mechanism may be used, such as a lock and key combination.
20 Alternatively, a locking mechanism may not be used at all.

25

CLAIMS

1. A foldable warning triangle assembly comprising:
three arms configurable as a triangle, wherein the three arms are pivotably
5 connected together at pivot points such that they can pivot into a collapsed
arrangement without disconnecting the three arms;
an electrical switch within a first arm of the three arms arranged adjacent a
pivot point between the first arm of the three arms and a second arm of the three
arms, a surface of the second arm arranged to apply force on the electrical switch
10 such that the electrical switch is configured to close when the three arms are fully
configured as a triangle thereby completing an electrical circuit of the warning
triangle.
2. An assembly according to claim 1, wherein an arm of the three arms
15 comprises two arm portions pivotably connected together about a first pivot point.
3. An assembly according to claim 2, wherein the first pivot point is arranged
midway along the arm.
4. An assembly according to claims 2 or 3, wherein the remaining two arms
are pivotably connected about a second pivot point.
- 20 5. An assembly according to claim 4, wherein the first and second pivot
points are arranged to allow the three arms to pivot into the collapsed
arrangement without disconnecting the three arms.
6. An assembly according to any preceding claim, wherein each of the arms
comprise an array of lights.
- 25 7. An assembly according to claims 6, wherein the arrays of lights are
electrically connected together by the electrical circuit.
8. An assembly according to claims 6 or 7, wherein the assembly further
30 comprises a control module connected to the array of lights of each arm, the control
module arranged to control the illumination of the array of lights of each arm to
provide a pattern of illumination

9. An assembly according to claim 8, wherein the pattern of illumination indicates a direction.
10. An assembly according to claim 9, wherein the pattern of illumination comprises the arrays of lights illuminating in a sequence in which the arrays of two of the three arms are illuminated to produce a direction indicator
11. An assembly according to any preceding claim, wherein power is provided to the electrical circuit when the electrical switch is closed.
12. An assembly according to any preceding claim, wherein the electrical switch comprises a tactile switch arranged such that a force is exerted on the tactile switch when the three arms are fully configured as a triangle.
13. An assembly according to claim 12, wherein the second arm is arranged such that the pivoting of the second arm in relation to the first arm causes the force to be exerted on the tactile switch.
14. An assembly according to claim 12 or 13, wherein the tactile switch has a button biased such that the electrical switch is open until the triangle is unfolded.
15. An assembly according to claim 14, wherein the surface of the second arm comprises a recessed area operable to receive the button to open the electrical switch when the triangle is folded.
16. An assembly according to claim 15, wherein the recessed area is of variable depth.
17. An assembly according to any preceding claim, wherein each arm further comprises a support member arranged such that when the three arms are fully configured as a triangle, each support member is in contact with the ground.
18. An assembly according to claim any preceding claim, wherein the assembly further comprises a housing having an interior, wherein the three arms, when in the collapsed arrangement, can fit within the housing.

19. An assembly according to claims 18, wherein the housing further comprises a locking mechanism for securing the three arms within the housing, the locking mechanism comprising a locked state and an unlocked state, wherein, when the locking mechanism is in the locked state, the three arms cannot be inserted into or removed from the housing, wherein the locking mechanism comprises a rotatable switch arranged on the housing, wherein the state of the locking mechanism can be changed by rotating the rotatable switch.
20. An assembly according to claim 18-19, wherein the housing further comprises a first opening through which it receives the warning triangle when folded and wherein the housing further comprises an externally accessible storage compartment accessible through a second opening.
21. An assembly according to claims 18-20, wherein the first opening has a lid and the second opening is arranged through the lid such that, when the lid is connected to the container, the externally accessible storage compartment is a portion of the housing that is not occupied by the three arms when the three arms are within the housing.
22. An assembly according to claim 18-21, wherein the housing has a support connector on the external surface thereof arranged to connect to a corresponding support connector of the warning triangle by sliding of the housing relative to the triangle such that, when connected, the housing provides a base for the warning triangle.
23. An assembly according to claim 22, wherein the support connector of the housing comprises a slot and the support connector of the triangle comprises a protrusion arranged to slide along the slot.
24. An assembly according to claim 23, wherein the support connector of the triangle comprises a protrusion on each of two arm portions arranged so that the two protrusions slide into the slot of the housing.

25. An assembly according to claim 23 or 24, wherein the protrusion is arranged to house a battery of the triangle.
26. An assembly according to claim 22-25, wherein the support connector of the arm at the base of the triangle is connectable to the support connector of the housing at one end of the housing.
27. A foldable warning triangle assembly comprising:
a warning triangle having three arms configurable as a triangle; and
a housing comprising an interior configured to receive the warning triangle when folded, the housing having a support connector on the external surface thereof arranged to connect to a corresponding support connector of the warning triangle by sliding of the housing relative to the triangle such that, when connected, the housing provides a base for the warning triangle.
28. An assembly according to claim 27, wherein the support connector of the housing comprises a slot and the support connector of the triangle comprises a protrusion arranged to slide along the slot.
29. An assembly according to claim 28, wherein the support connector of the triangle comprises a protrusion on each of two arm portions arranged so that the two protrusions slide into the slot of the housing.
30. An assembly according to claim 28 or 29, wherein the protrusion is arranged to house a battery of the triangle.
31. An assembly according to claims 27-30, wherein the three arms are pivotably connected together at pivot points such that they can pivot into a collapsed arrangement without disconnecting the three arms; and
wherein the assembly further comprises an electrical switch within a first arm of the three arms arranged adjacent a pivot point between the first arm of the three arms and a second arm of the three arms, a surface of the second arm arranged to apply force on the electrical switch such that the electrical switch is configured to close when the three arms are fully configured as a triangle thereby completing an electrical circuit of the warning triangle.

32. An assembly according to claims 27-31, wherein the housing further comprises a locking mechanism for securing the three arms within the housing, the locking mechanism comprising a locked state and an unlocked state, wherein,
5 when the locking mechanism is in the locked state, the three arms cannot be inserted into or removed from the housing, wherein the locking mechanism comprises a rotatable switch arranged on the housing, and wherein the state of the locking mechanism can be changed by rotating the rotatable switch.
- 10 33. An assembly according to claims 27-32, wherein the interior of the housing is configured to receive the warning triangle when folded through a first opening, and wherein the housing further comprises an externally accessible storage compartment accessible through a second opening.
- 15 34. An assembly according to claims 27-33, wherein each of the arms comprise an array of lights; and
wherein the assembly further comprises a control module connected to the array of lights of each arm, the control module arranged to control the illumination of the array of lights of each arm to provide a pattern of illumination, wherein the
20 pattern of illumination comprises the arrays of lights illuminating in a sequence in which the arrays of two of the three arms are illuminated to produce a direction indicator.
35. A foldable warning triangle assembly comprising:
25 a warning triangle having three arms configurable as a triangle; and
a housing comprising an interior configured to receive the warning triangle when folded, the housing having a locking mechanism for securing the three arms within the housing, the locking mechanism comprising a locked state and an unlocked state, wherein, when the locking mechanism is in the locked state, the
30 three arms cannot be inserted into or removed from the housing, wherein the locking mechanism comprises a rotatable switch arranged on the housing, and wherein the state of the locking mechanism can be changed by rotating the rotatable switch.

36. An assembly according to claims 35, wherein the three arms are pivotably connected together at pivot points such that they can pivot into a collapsed arrangement without disconnecting the three arms; and,

wherein the assembly further comprises an electrical switch within a first arm of the three arms arranged adjacent a pivot point between the first arm of the three arms and a second arm of the three arms, a surface of the second arm arranged to apply force on the electrical switch such that the electrical switch is configured to close when the three arms are fully configured as a triangle thereby completing an electrical circuit of the warning triangle.

37. An assembly according to claims 35 or 36, wherein the housing further comprises a support connector on the external surface thereof arranged to connect to a corresponding support connector of the warning triangle by sliding of the housing relative to the triangle such that, when connected, the housing provides a base for the warning triangle.

38. An assembly according to claims 35-37, wherein the interior of the housing is configured to receive the warning triangle when folded through a first opening, and wherein the housing further comprises an externally accessible storage compartment accessible through a second opening.

39. An assembly according to claims 35-38, wherein each of the arms comprise an array of lights; and

wherein the assembly further comprises a control module connected to the array of lights of each arm, the control module arranged to control the illumination of the array of lights of each arm to provide a pattern of illumination, wherein the pattern of illumination comprises the arrays of lights illuminating in a sequence in which the arrays of two of the three arms are illuminated to produce a direction indicator.

40. A foldable warning triangle assembly comprising:

a warning triangle having three arms configurable as a triangle; and

a housing comprising an interior configured to receive the warning triangle when folded through a first opening wherein the housing further comprises an externally accessible storage compartment accessible through a second opening.

41. An assembly according to claim 40, wherein the first opening has a lid and the second opening is arranged through the lid such that, when the lid is connected to the container, the externally accessible storage compartment is a portion of the housing that is not occupied by the three arms when the three arms are within the housing.

42. An assembly according to claims 40 or 41, wherein the three arms are pivotably connected together at pivot points such that they can pivot into a collapsed arrangement without disconnecting the three arms; and,

wherein the assembly further comprises an electrical switch within a first arm of the three arms arranged adjacent a pivot point between the first arm of the three arms and a second arm of the three arms, a surface of the second arm arranged to apply force on the electrical switch such that the electrical switch is configured to close when the three arms are fully configured as a triangle thereby completing an electrical circuit of the warning triangle.

43. An assembly according to claims 40-42, wherein the housing further comprises a support connector on the external surface thereof arranged to connect to a corresponding support connector of the warning triangle by sliding of the housing relative to the triangle such that, when connected, the housing provides a base for the warning triangle.

44. An assembly according to claims 40-43, wherein the housing further comprises a locking mechanism for securing the three arms within the housing, the locking mechanism comprising a locked state and an unlocked state, wherein, when the locking mechanism is in the locked state, the three arms cannot be inserted into or removed from the housing, wherein the locking mechanism comprises a rotatable switch arranged on the housing, and wherein the state of the locking mechanism can be changed by rotating the rotatable switch.

45. An assembly according to claims 40-44, wherein each of the arms comprise an array of lights; and

wherein the assembly further comprises a control module connected to the array of lights of each arm, the control module arranged to control the illumination

of the array of lights of each arm to provide a pattern of illumination, wherein the pattern of illumination comprises the arrays of lights illuminating in a sequence in which the arrays of two of the three arms are illuminated to produce a direction indicator.

5

46. A foldable warning triangle assembly comprising:

a warning triangle having three arms configurable as a triangle, each of the arms having an array of lights;

10 a control module connected to the array of lights of each arm, the control module arranged to control the illumination of the array of lights of each arm to provide a pattern of illumination, wherein the pattern of illumination comprises the arrays of lights illuminating in a sequence in which the arrays of two of the three arms are illuminated to produce a direction indicator.

15 47. An assembly according to claim 46, wherein the pattern of illumination comprises the arrays of two of the three arms illuminated and the array of one of the three arms not illuminated.

20 48. An assembly according to claim 46, wherein the pattern of illumination comprises the arrays of two of the three arms illuminated and the array of one of the three arms dimmed.

49. An assembly according to claim 46-48, wherein the pattern of illumination comprises the arrays of two of the three arms flashing.

25

50. An assembly according to claims 46-49, wherein the pattern of illumination comprises the arrays of two of the three arms pulsating in a sequence towards a corner of the triangle.

30 51. An assembly according to claims 46-50, wherein the direction indicator is arrow shaped.

52. An assembly according to claims 46-51, wherein the assembly further comprises a switch to select modes of the control module to allow a user to choose
35 the pattern of illumination of the arrays.

53. An assembly according to claims 46-52, wherein the three arms are pivotably connected together at pivot points such that they can pivot into a collapsed arrangement without disconnecting the three arms; and,
5 wherein the assembly further comprises an electrical switch within a first arm of the three arms arranged adjacent a pivot point between the first arm of the three arms and a second arm of the three arms, a surface of the second arm arranged to apply force on the electrical switch such that the electrical switch is configured to close when the three arms are fully configured as a triangle thereby
10 completing an electrical circuit of the warning triangle.

54. An assembly according to claims 46-53, wherein the assembly further comprises a housing comprising an interior configured to receive the warning triangle when folded, the housing having a locking mechanism for securing the
15 three arms within the housing, the locking mechanism comprising a locked state and an unlocked state, wherein, when the locking mechanism is in the locked state, the three arms cannot be inserted into or removed from the housing, wherein the locking mechanism comprises a rotatable switch arranged on the housing, and wherein the state of the locking mechanism can be changed by rotating the
20 rotatable switch.

55. An assembly according to claims 46-54, wherein the assembly further comprises a housing comprising an interior configured to receive the warning triangle when folded through a first opening wherein the housing further comprises
25 an externally accessible storage compartment accessible through a second opening.

56. An assembly according to claims 46-55, wherein the assembly further comprises a housing comprising an interior configured to receive the warning
30 triangle when folded, the housing having a support connector on the external surface thereof arranged to connect to a corresponding support connector of the warning triangle by sliding of the housing relative to the triangle such that, when connected, the housing provides a base for the warning triangle.



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Examiner: Mr Tony Judge

Claims searched: 1-26

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Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,E	1-8 and 11-17	WO2016/178030 A2 (ROAD SAFETY DESIGNS LTD) Please see figures; page 3, lines 13-32 and page 9, line 33 - page 10, line 34.
X	1-5, 11-14 and 17	KR1020150056011 A (KYU) Please see figures and paragraphs 12, 36, 41 and 43.
X,Y	1-9 and 17	KR1020120012586 A (IL) Please see figures and paragraphs 15, 20 and 28.
X	1, 6-12 and 17-26	AU7629981 A (RECORD R A) Please see figures and page 1, lines 19-34; page 2, lines 1-23 and 35-39; page 3, lines 26-36; page 4, lines 1-2; page 5, lines 11-37 and page 6, lines 27-33.
X	1, 6-12 and 17-26	CN201681568 U (ZHENGYAN) Please see whole document.
X	1, 6-12 and 17	CN200962292 Y (ZHIGANG) Please see whole document.
Y	1-5	GB985881 A (SCHOFIELD) Please see figures.
Y	1-5	CN204225004 U (DC INNOVATION CO LTD) Please see figures.
Y	1 and 6-12	US2008/218329 A1 (FAN et al.) Please see figures and paragraphs 3, 4, 7, 17 and 19.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

B60Q; G09F

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
G09F	0013/16	01/01/2006
B60Q	0007/00	01/01/2006
G09F	0013/22	01/01/2006



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Further Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,E	27, 28, 31 and 34	WO2016/178030 A2 (ROAD SAFETY DESIGNS LTD) Please see figures and page 4, lines 11-18; page 13, line 6-page 14, line 16; page 15, lines 21-33; page 16, line 33-page 17, line 32 and page 18, lines 18-27.
X,Y	X:27-29; Y:31-34	CN2377648 Y (ZHENAN) Please see whole document.
X,Y	X:27-30; Y:31-34	GB2312457 A (BEIJING SUCCESS ELECTRONIC CO) Please see figures and page 1, lines 13-18; page 2, lines 1-6 and page 4, lines 4-17.
X,Y	X:27-29 and 31; Y:32-34	CN200962292 Y (ZHIGANG) Please see whole document.
X,Y	X:27-29; Y:31-34	CN203631096 U (NINGBO YONGJIA AUTO PARTS CO LTD) Please see whole document.
X,Y	X:27-29; Y:31-34	US5551370 A (HWANG) Please see figures and column 2, lines 1-4 and 24-40.
X,Y	X:27 and 28; Y:31-34	US2013/016497 A1 (ANDERSON) Please see figures and paragraphs 7, 9, 19 and 21.
X,Y	X:27-29; Y:31-34	CN105185277 A (DONGGUAN BOTONG ELECTRICAL EQUIPMENT ENGINEERING CO LTD) Please see whole document.
Y	31	KR1020150056011 A (KYU) Please see figures and paragraphs 12, 36, 41 and 43.
Y	32	KR1020130048352 A (CHOI) Please see whole document.



Y	32	KR1020160003523 U (DONG et al.) Please see figures and paragraphs 82 and 88-90.
Y	33	AU7629981 A (RECORD R A) Please see figures and page 3, line 35-page 4, line 3; page 5, lines 1-40; page 6, lines 31-37 and page 9, lines 21-38.
Y	33	DE29614119 U (RAEDLER et al.) Please see whole document.
Y	34	GB2483071 A (MOORE) Please see figures and page 1, lines 13-22; page 1, line 24- page 2, line 12; page 4, lines 11-16; page 5, lines 6-10 and page 6, lines 17-22.
Y	34	CN2219526 Y (ZHONG) Please see whole document.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

Worldwide search of patent documents classified in the following areas of the IPC

B60Q; E01F; G09F

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
G09F	0013/16	01/01/2006
B60Q	0007/00	01/01/2006
G09F	0013/22	01/01/2006



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Patents Act 1977

Further Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,Y	X:35; Y:36-39	KR 1020130048352 A (CHOI) Please see whole document.
X,Y	X:35; Y:36-39	KR 1020160003523 U (DONG et al.) Please see figures and paragraphs 82 and 88-90.
X,Y	X:35; Y:36-39	KR101686816 B (LEE) Please see figures and paragraphs 37, 41 and 54.
X,Y	X:35 and 37; Y: 36, 38 and 39	GB2312457 A (BEIJING SUCCESS ELECTRONIC CO) Please see whole document.
X	35	"Online search for rotary lock" http://www.bing.com/images/search?q=rotary+lock&FORM=AWIR [Accessed on 25th May 2017]
Y	36	KR1020150056011 A (KYU) Please see figures and paragraphs 12, 36, 41 and 43.
Y	36 and 37	CN200962292 Y (ZHIGANG) Please see whole document.
Y	37	CN23776487 Y (ZHUANG) Please see whole document.
Y	38	AU7629981 A (RECORD R A) Please see figures and page 3, line 35-page 4, line 3; page 5, lines 1-40; page 6, lines 31-37 and page 9, lines 21-38.
Y	38	DE29614119 U (RAEDLER et al.) Please see whole document.
Y	39	GB2483071 A (MOORE) Please see figures and page 1, lines 13-22; page 1, line 24- page 2, line 12; page 4, lines 11-16; page 5, lines 6-10 and page 6, lines



		17-22.
Y	39	CN2219526 Y (ZHONG) Please see whole document.

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&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

B60Q; E01F; G09F

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EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
G09F	0013/16	01/01/2006
B60Q	0007/00	01/01/2006
G09F	0013/22	01/01/2006



Application No: GB1616697.7

Examiner: Mr Tony Judge

Claims searched: 40-45

Date of search: 30 May 2017

Patents Act 1977

Further Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,Y	X:40, 41 and 45; Y:42-44	AU7629981 A (RECORD R A) Please see figures and page 3, line 35-page 4, line 3; page 5, lines 1-40; page 6, lines 31-37 and page 9, lines 21-38.
X,Y	X:40; Y:42-45	DE29614119 U (RAEDLER et al.) Please see whole document.
X,Y	X:40 and 41; Y:42-45	US2015/203054 A1 (HERNANDEZ) Please see figures and paragraphs 12-15 and 19-21.
X,Y	X:40 and 41; Y:42-45	IE199400169 B2 (GUS) Please see figures and page 5, lines 1-21.
X	40 and 41	"Online search for multiple storage compartments". http://www.bing.com/images/search?q=multiple+storage+compartment&FORM=HDRSC2 [Accessed on 25th May 2017]
A	-	CN2789874 Y (HANGUANG) Please see whole document.
Y	42	KR1020150056011 A (KYU) Please see figures and paragraphs 12, 36, 41 and 43.
Y	42 and 43	CN200962292 Y (ZHIGANG) Please see whole document.
Y	43	CN23776487 Y (ZHUANG) Please see whole document.
Y	44	KR20130048352 A (CHOI) Please see whole document.
Y	44	KR20160003523 U (DONG et al.) Please see figures and paragraphs 82 and 88-90.



Y	45	GB2483071 A (MOORE) Please see figures and page 1, lines 13-22; page 1, line 24- page 2, line 12; page 4, lines 11-16; page 5, lines 6-10 and page 6, lines 17-22.
Y	45	CN2219526 Y (ZHONG) Please see whole document.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

Worldwide search of patent documents classified in the following areas of the IPC

B60Q; E01F; G09F

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
G09F	0013/16	01/01/2006
B60Q	0007/00	01/01/2006
G09F	0013/22	01/01/2006



Application No: GB1616697.7

Examiner: Mr Tony Judge

Claims searched: 46-56

Date of search: 30 May 2017

Patents Act 1977

Further Search Report under Section 17

Documents considered to be relevant:

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X,E	46-53 and 56	WO2016/178030 A2 (ROAD SAFETY DESIGNS LTD) Please see figures and page 4, lines 11-18; page 13, line 6-page 14, line 16; page 15, lines 21-33; page 16, line 33-page 17, line 32, page 18, lines 18-27 and page 19, lines 10-16.
X,Y	X:46-52; Y:53-56	CN2219526 Y (ZHONG) Please see whole document.
X,Y	X:46-52; Y:53-56	GB2483071 A (MOORE) Please see figures and page 1, lines 13-22; page 1, line 24-page 2, line 12; page 4, lines 11-16; page 5, lines 6-10 and page 6, lines 17-22.
X,Y	X:46-52; Y:53-56	US2012/056757 A1 (CAUDILL) Please see figures and paragraphs 7, 9, 10, 15, 19 and 33.
X,Y	X:46-50 and 55; Y:51-54 and 56	AU7629981 A (RECORD R A) Please see figures and page 2, lines 35-40; page 6, lines 31-37; page 7, lines 27-33 and page 9, lines 21-38.
X,Y	X: 46-50; Y:51-56	GB2254094 A (HOLMES) Please see figures and page 2, lines 6-14; page 3, line 28-page 4, line 3 and page 7, line 27-page 8, line 8.
Y	51 and 52	KR1020120108407 A (KOREA TOPTONE CO LTD) Please see figures and paragraphs 26, 27 and 35.
Y	53	KR1020150056011 A (KYU) Please see figures and paragraphs 12, 36, 41 and 43.
Y	53 and 56	CN200962292 Y (ZHIGANG) Please see whole document.
Y	54	KR1020130048352 A (CHOI) Please see whole document.



Y	54	KR20160003523 U (DONG et al.) Please see figures and paragraphs 82 and 88-90.
Y	55	DE29614119 U (RAEDLER et al.) Please see whole document.
Y	56	CN2377648 Y (ZHENAN) Please see whole document.

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