

DEPARTMENT OF TRADE AND INDUSTRY
DEPARTEMENT VAN HANDEL EN NYWERHEID

REPUBLIC OF SOUTH AFRICA



REPUBLIEK VAN SUID-AFRIKA

LETTERS PATENT

(PATENTS ACT, 1978)

PATENTBRIEF

(WET OP PATENTE, 1978)

No. 91/8034

WHEREAS **IVAN DE VILLIERS LE ROUX**
NADEMAAL

(Hereinafter called "the Patentee")
(Hieronder "die Patenthouer" genoem)

has applied to me for the grant of a patent in respect of an invention described and claimed in the complete specification
aansoek by my gedoen het om die verlening van 'n patent ten opsigte van 'n uitvinding wat beskryf is en waarop aanspraak

deposited at the Patent Office under the above-mentioned number, a copy of which is annexed, together with the relevant
gemaak word in die volledige spesifikasie wat by die Patentkantoor onder bovermelde nommer ingedien is en waarvan 'n

Form P.2;
afskrif aangeheg is tesame met die betrokke Vorm P. 2;

NOW THEREFORE these Letters Patent are to grant to the Patentee a patent, the effect of which shall be to grant to the
SO IS DIT dat hierdie Patentbrief aan die Patenthouer 'n patent verleen wat die uitwerking het dat, behoudens die

Patentee in the Republic, subject to the provisions of the Act, for the duration of the patent, the right to exclude other persons
bepalings van die Wet, aan die Patenthouer vir die duur van die patent in die Republiek die reg verleen word om ander

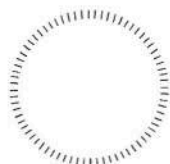
from making, using, exercising or disposing of the invention, so that he shall have and enjoy the whole profit and advantage
persone uit te sluit van die vervaardiging, aanwending, uitoefening of van die handsetting van die uitvinding, sodat hy al die

accruing by reason of the invention.
wins en voordeel wat uit die uitvinding voortspruit, verkry en geniet.

IN TESTIMONY WHEREOF the seal of the Patent Office has been affixed at Pretoria with effect from the
TER BETUIGING WAARVAN die seël van die Patentkantoor hierop te Pretoria aangebring is met ingang van die

29TH

day of

JULYnineteen hundred and
eenduisend negehoonderdNINETY TWO

[Signature]
Registrar of Patents • Registrateur van Patente

[See overleaf
Blaai om]

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FULL NAME(S) OF INVENTOR(S)

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TITLE OF INVENTION

54	"SAFETY DEVICE"
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BACKGROUND TO THE INVENTION

THIS invention relates to a safety device for assisting passengers who are trapped within a motor vehicle to escape from the vehicle.

Many vehicles such as buses, minibuses and the like are adapted to carry a large number of passengers but are provided with only a limited number of doors for use by those passengers. The number of doors provided will generally be adequate for entry and exit of passengers during normal operating conditions, but in emergency situations the number and the position of the doors is inadequate to allow all passengers to rapidly escape in safety. For example, where a vehicle of one of the aforementioned types is involved in an accident or catches fire the doors from which the passengers would exit in normal situations may be jammed or, as a result of fire, may not be approachable. It will be appreciated that in these situations there is often only a relatively short period of time within which the passengers can safely escape the vehicle before serious injury or death to those trapped in the vehicle results.

In an attempt to overcome the problem of a restricted number of exit points many such vehicles have a specially fitted rear window which is adapted to be removed from the vehicle in the event of an emergency. Often these windows include a window pane which is fitted into a surround with a special rubber bead. The arrangement is such that by pressing hard on the pane from the inside of the vehicle the pane can be forced out of the bead and thereby an emergency opening is formed through which trapped passengers can escape. A problem with this arrangement is that the pane must be sufficiently tightly held in position to ensure that it does not inadvertently fall out of the bead during normal operating conditions of the vehicle. This means that in emergency situations the pane is often not easily removable from the bead and thus, unless someone in the vehicle is able to apply considerable force to the pane, the emergency exit is not opened. In the past, death and injury have resulted as a direct consequence of the emergency exit

not being openable by those trapped in a vehicle.

SUMMARY OF THE INVENTION

A safety device according to the invention includes, mounting means for mounting the device to or adjacent a vehicle window pane, and impact means connected to the mounting means and movable relative thereto, said impact means having an impact surface thereon formed of a hard material, said device when operatively mounted to or adjacent a vehicle window pane being operable by moving said impact means such that said impact surface is brought into contact with said pane to thereby either shatter said pane or dislodge the pane from its support.

Further there is provided for the mounting means to comprise a hollow cylindrical member which is mountable to the pane with the cylinder access substantially perpendicular to the plane of the pane, said impact means comprising a plunger slidable within said cylinder and having a forward end adjacent said pane and a rearward end which projects out of said cylinder, said impact surface being formed on said forward end.

Alternatively there is provided for the impact means to comprise a lever, pivotally connected to the mounting means, the lever having a handle on one end thereof and said impact surface on the other end thereof, said device being operable by moving the lever to bring the impact surface into contact with a said pane.

The embodiments of the invention are described in detail in the following passages of the specification which refer to the accompanying drawings. The drawings, however, are merely illustrative of how the invention might be put into effect, so that the specific form and arrangement of the various features shown is not to be understood as limiting on the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

- Figure 1 shows a view of the inside of a rear door of a minibus with a safety device according to the invention fitted to the window therein;
- Figure 2 shows a perspective view of the safety device shown in Figure 1;
- Figure 3 shows a cross sectional side view along line III-III in Figure 2;
- Figure 4 shows a similar view to that of Figure 3 of a second embodiment of the invention;
- Figure 5 shows a similar view to that of Figure 1 with a third embodiment of the invention fitted to the door;
- Figure 6 shows a side view of safety device shown in Figure 5; and
- Figure 7 shows a side view of a fourth embodiment of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring initially to Figure 1, the interior of a minibus door 1 is shown having a relatively large rear window 2 having a window pane 3 which is mounted to the door by means of a rubber bead 4. The door 1 includes hinges 5 by means of which the door will be attached to the minibus body and the door also includes a lock 6 which in use will lock the door in its closed position. Generally speaking, the door 1 will not be openable from inside the vehicle.

A safety device 7 according to the invention is mounted to the window pane 3. The safety device 7 is best described with reference to Figure 2 and 3 of the drawings.

As shown, the safety device comprises a cylindrical body 10 which in use is bonded or otherwise affixed to the inner face 11 of the window pane 3. For this purpose the body 10 has a flat mounting surface 12 to which adhesive can be applied in order to permanently secure the body 10 to the surface 11. The body 10 has an internal circular bore 13 which is preferably of stepped configuration and defines a shoulder 14. A plunger 15 is slidably located within the bore 13, the plunger 15 having a forward end 16 and a rearward end 17 which projects out of the rear end 18 of the body 10. A point 19 is formed on the forward end 16 of the plunger 15 and in use that point 19 will be impacted against the pane 3 in order to shatter the pane 3 and thereby provide for easy removal of the pane 3 from its surround 4.

The plunger 15 is spring biased to a retracted position by means of a coil spring 20. The coil spring 20 will ensure that the plunger is always in its retracted and ready to strike position so that, in the event that a first strike on the pane 3 does not shatter the pane the plunger 15 will immediately retract so that the plunger can again be struck to ensure the pane will shatter on a second or subsequent striking of the plunger 15.

To prevent inadvertent shattering of the pane 3 a locking pin 21 is passed through a transverse bore 22 which extends through both the body 10 and the plunger 15. The pin 21 will, when it is located in the bore 22 ensure that the plunger and body are held together with the point 19 away from the surface 11. To activate the device the pin 21 will be removed from the bore 22 by pulling on a ring 23 and thereby activating the device by allowing the plunger 15 to be movable relative to the body 10.

Accordingly, in use, the body 10 will be permanently fixed to the pane 3. In the event of an emergency, the pin 21 will be immediately removed from the bore 22 to thereby ensure the device is operable. A passenger inside the vehicle will then strike the head 24 of the plunger 15 to drive the plunger against the pane 3. The impact of the point 19 against the surface 11 will shatter the pane 3, and once has

shattered, it will be a simple matter for those passengers inside the vehicle to break the shattered particles of glass away from the rubber bead 4 and escape through the emergency exit thus created. It will be appreciated that by shattering the glass in this manner the structural integrity of the pane will be destroyed and it will be a simple matter to break through the remainder of the glass and create an opening large enough for passengers inside the vehicle to escape through the emergency exit. The shattered glass, will be generally friable and even a relatively weak person will be able to break out the glass and thereby escape through the emergency exit. As previously mentioned, the coil spring 20 will immediately retract the plunger 15 into its retracted position after it has been struck by a user. Thus, even if the glass does not shatter on the first impact, the user will be able to again strike the glass by striking on the head 24 of the plunger 15 and, it is anticipated, a second or third impact will easily shatter the glass.

It will be noted that the plunger 15 is comprised of a front portion 26 which will preferably be formed of a hardened steel or like material, and a rear portion 27 which may conveniently be moulded from a plastic material of the like. The body 10 may also be manufactured from a plastics material.

Turning now to Figure 4, a similar embodiment to that described with reference to Figures 2 and 3 is shown in cross sectional form. In this embodiment, however, a plunger 30 is movable within a blind bore 31 of a body 32, the body 32 having a forward end 33 which is bonded to the inner surface 34 of a window pane 35. The plunger 30 has a pointed forward end 36 which is adapted to be driven against the pane 35 to shatter the pane substantially in the manner described above with reference to Figure 3.

A detonator 37 is located within the blind bore 31 between the plunger 30 and the blind end 38 of the bore. A firing pin 39 is located on the forward end of a secondary plunger 40 which is biased by means of a coil spring 41 in the direction of the detonator 37. A safety pin 42 holds the secondary plunger 40 in its retracted

position. An air release passage 43 is provided through the wall of the body 32 near the forward end 33 thereof.

In use, when in an emergency situation, the pin 42 will be withdrawn from its bore 44 to release the secondary plunger 40 which will then be driven by a spring 41 so that the firing pin 39 detonates detonator 37 and thereby drives the plunger 30 against the glass 35. It will be appreciated that this will have the effect of shattering the glass 35 much in the manner as described above with reference to Figure 3. The embodiment shown in Figure 4 has an advantage in that no manual force is required to operate the device. All that is required is to remove the pin 42 from its bore 44 and thereafter the device will operate automatically to shatter the glass. It is envisaged that the explosive force provided by the detonator 37 will not need to be substantial in order to shatter the glass.

Turning now to Figure 5 of the drawings a third embodiment of the invention is shown fitted to the rear door 50 of a motor vehicle. In this embodiment the device 51 is not actually fitted to the glass of the rear window 52 but is mounted to the door frame 53. The device 51 includes a bracket 54 which may be rivetted, screwed, or otherwise affixed to the frame 53. Fastening means 55 are depicted in the drawings. The device 51 includes a lever 56 which is pivotally connected by a pin 57 to the bracket 54. The lever 56 includes a handle portion 58 and an impact portion 59. Clearly, by lifting the handle 58 the impact portion 59 will be brought into contact with the glass 52 and the mechanical advantage of the lever will be such that by pulling hard on the handle portion 58 the impact portion 59 will cause the glass 52 either to be pressed out of its support bead 60 or to shatter. In either event, the glass 52 will be removed from the frame 53 and thereby the exit will be open for emergency evacuation of the vehicle. The device 51 includes a locking pin 61 for locking the lever against inadvertent or unauthorised use. To use the lever the locking pin 61 will first be removed.

Figure 7 depicts a yet further embodiment of the invention. In this arrangement the device includes a mounting element 70 and an impact element 71. The impact element is pivotally connected to the mounting element 70 by a pivotal connection 72. The impact element includes an impact point 73 which in use will rest against the inner surface 74 of a window pane 75.

The impact element 71 is spring biased by means of spring 76 into its rest position 77. To operate the device it will be necessary to pivot the impact element 71 into the position indicated by dotted lines 78 against the action of the spring 76. Once the device is in the position 78 it can be released and it will then move rapidly in the direction of arrow 79 under the action of the spring 76 to strike the surface 74 and thereby shatter the glass 75. Should the glass not shatter on first impact, the impact element 71 can again be lifted and re-released to again strike the glass 75 until it does shatter. The impact point 73 will preferably be formed of a hardened metal or the like to thereby more easily shatter the glass. If necessary the impact element 71 can be locked to the mounting element 70 by means of a locking pin (not shown) which will be removable much in the manner described above with reference to the other embodiments prior to operating the impact device.

It will be appreciated that no significant strength will be required to operate any of the device referred to above. In each case the removal or shattering of the emergency exit pane will be relatively easily achieved with minimal manual effort required. The use of the invention has an added advantage in that vehicle manufacturers who use the device will no longer be obliged to mount the emergency exit windows in a removable fashion. In the past, mounting windows in this fashion has occasionally resulted in the windows inadvertently falling free of the window surround during normal vehicle operation. In such event the window will generally shatter on the ground and this causes unnecessary expense to the vehicle owner. As has been mentioned previously, the safety advantages in using one or other of the devices described herein should be self evident and it is envisaged that if the devices are used as standard items on the types of vehicles referred to herein

there should, over a period of time, be a number of cases wherein lives are saved or persons are saved against serious injury as a direct result of using a safety device according to the invention.

Various alternations, modifications and/or additions may be introduced into the constructions and arrangements of parts previously described without departing from the spirit or ambit of the invention as defined by the appended claims

CLAIMS

1.

A safety device including, mounting means for mounting the device to or adjacent a vehicle window pane, and impact means connected to the mounting means and movable relative thereto, said impact means having an impact surface thereon formed of a hard material, said device when operatively mounted to or adjacent a vehicle window pane being operable by moving said impact means such that said impact surface is brought into contact with said pane to thereby either shatter said pane or dislodge the pane from its support.

2.

A safety device according to claim 1 wherein said mounting means comprises a hollow cylindrical body having an internal bore, and said impact means comprises a plunger slidable within said bore, said mounting means being mountable to a window pane with the bore axis substantially perpendicular to the plane of the pane, said plunger being operable in use to move within said bore to impact against a pane and thereby shatter the pane.

3.

A safety device according to claim 2 wherein said plunger has a rear end which projects out of said bore, said rear end being strikable to drive said plunger against said pane.

4.

A safety device according to claim 3 wherein said plunger is spring biased to a retracted position.

5.

A safety device according to claim 2 wherein said bore is open at one end thereof and closed at the other end thereof, said open end being against a said pane in use,

an explosive device being located within said bore between said closed end and said plunger, said explosive device being operable to drive said plunger against said pane in use.

6.

A safety device according to any preceding claim wherein said impact surface has a point thereon which is adapted to strike said pane.

7.

A safety device according to claim 1 wherein said impact means comprises a lever which is pivotally connected to said mounting means, said lever having a handle at one end thereof and said impact surface at the other end thereof, said impact means being operable by pulling said handle to cause said impact surface to contact a pane to thereby shatter or remove the pane.

8.

A safety device according to claim 7 wherein said mounting means is adapted to be mounted to the vehicle just adjacent the window pane.

9.

A safety device according to claim 1 wherein said impact means is pivotally connected to said mounting means and is movable between an impact position and a raised position, spring bias means biasing the impact means towards the impact position, the arrangement being such that, in use, by moving the impact means against the action of the spring bias means into the raised position and then releasing the impact means, the impact means will move rapidly to the impact position at which the impact surface will strike the pane to thereby shatter the pane.

10.

A safety device according to any preceding claims where a releasable locking device locks the impact means against relative movement with the mounting means.

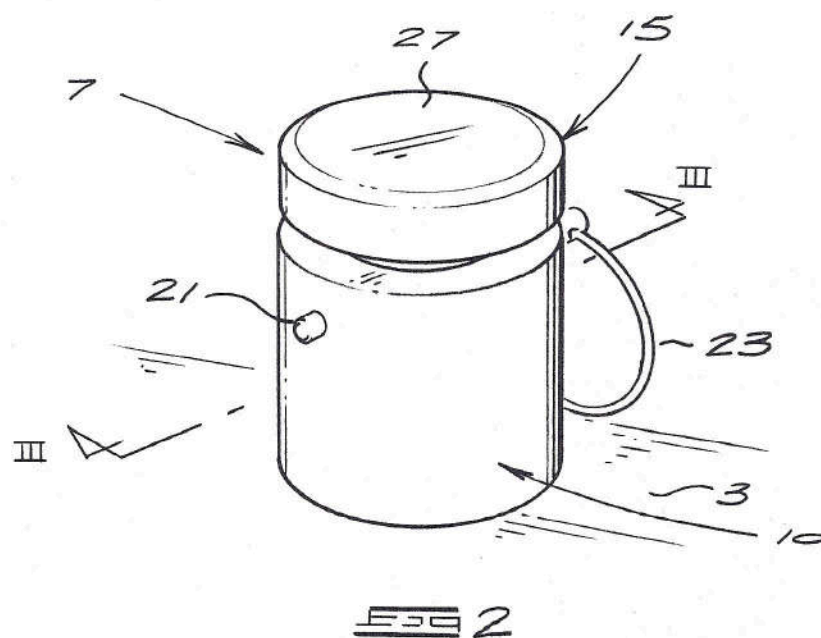
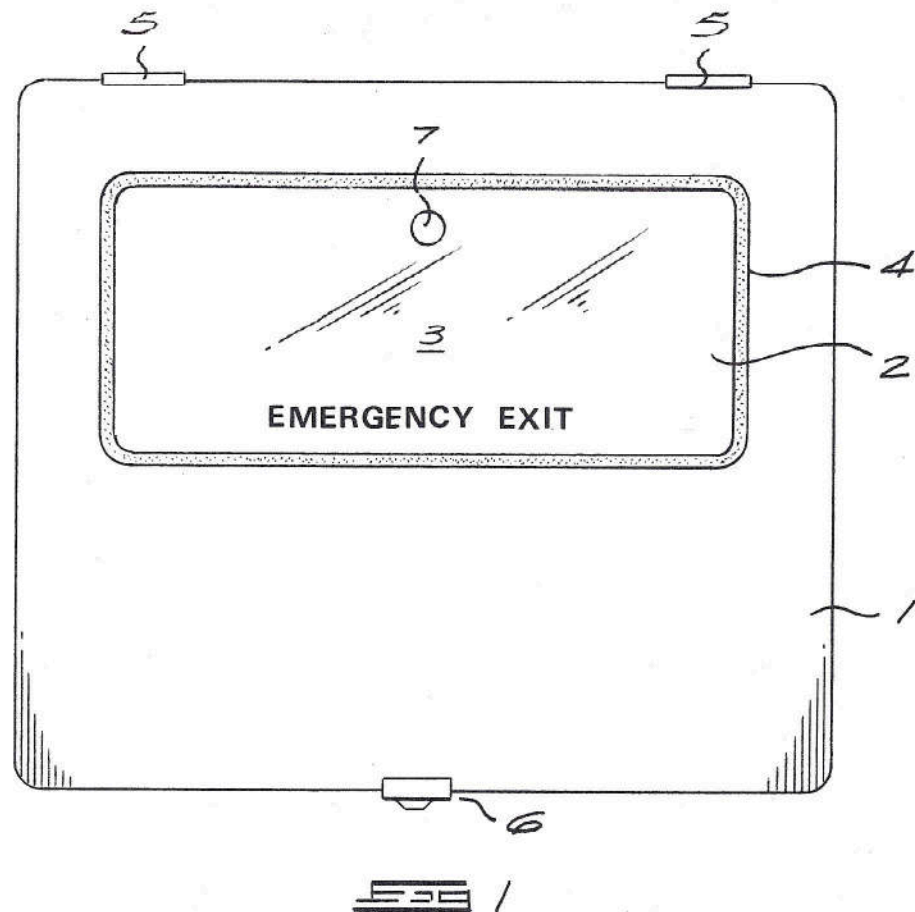
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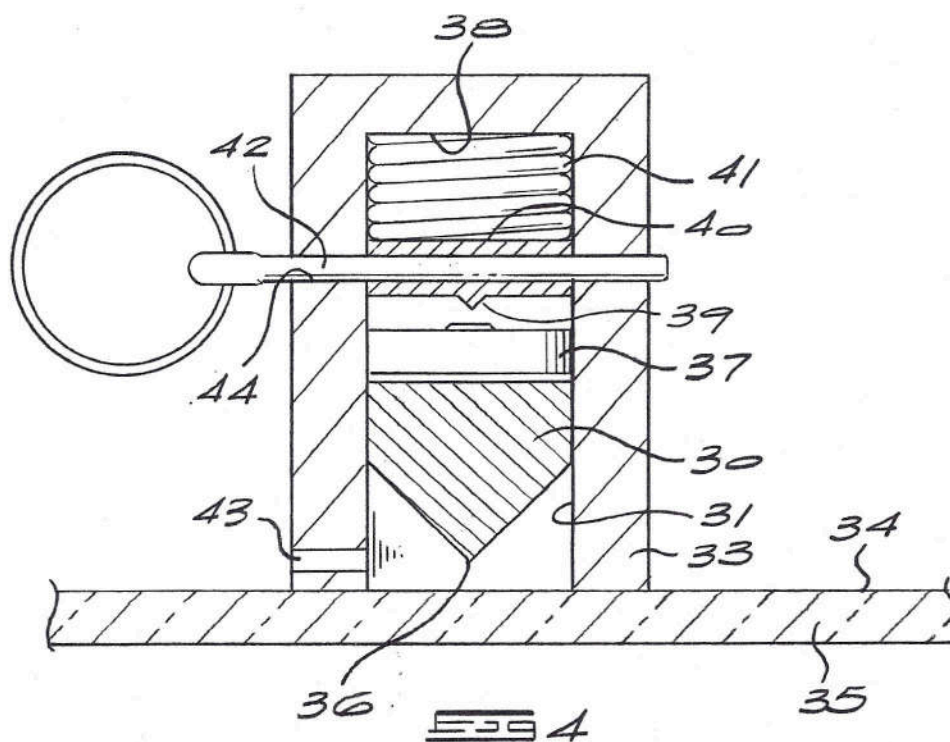
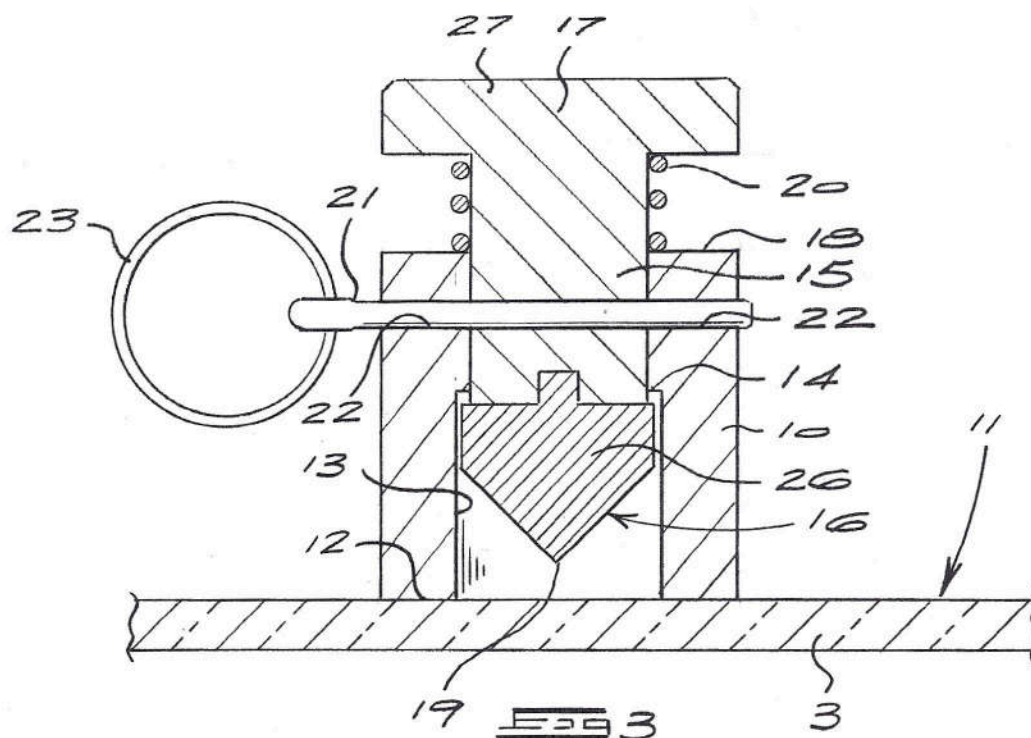
A safety device substantially as herein before described with reference to any one of the embodiments depicted in the drawings.

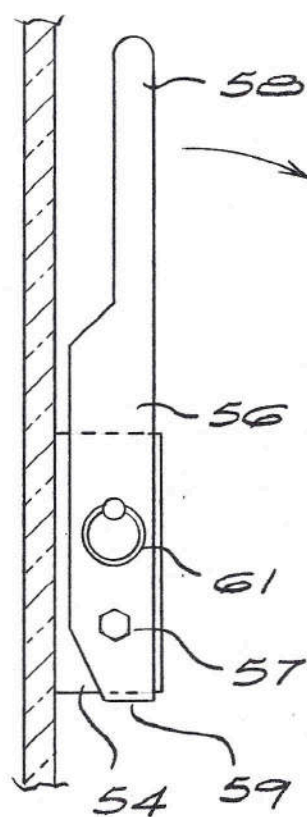
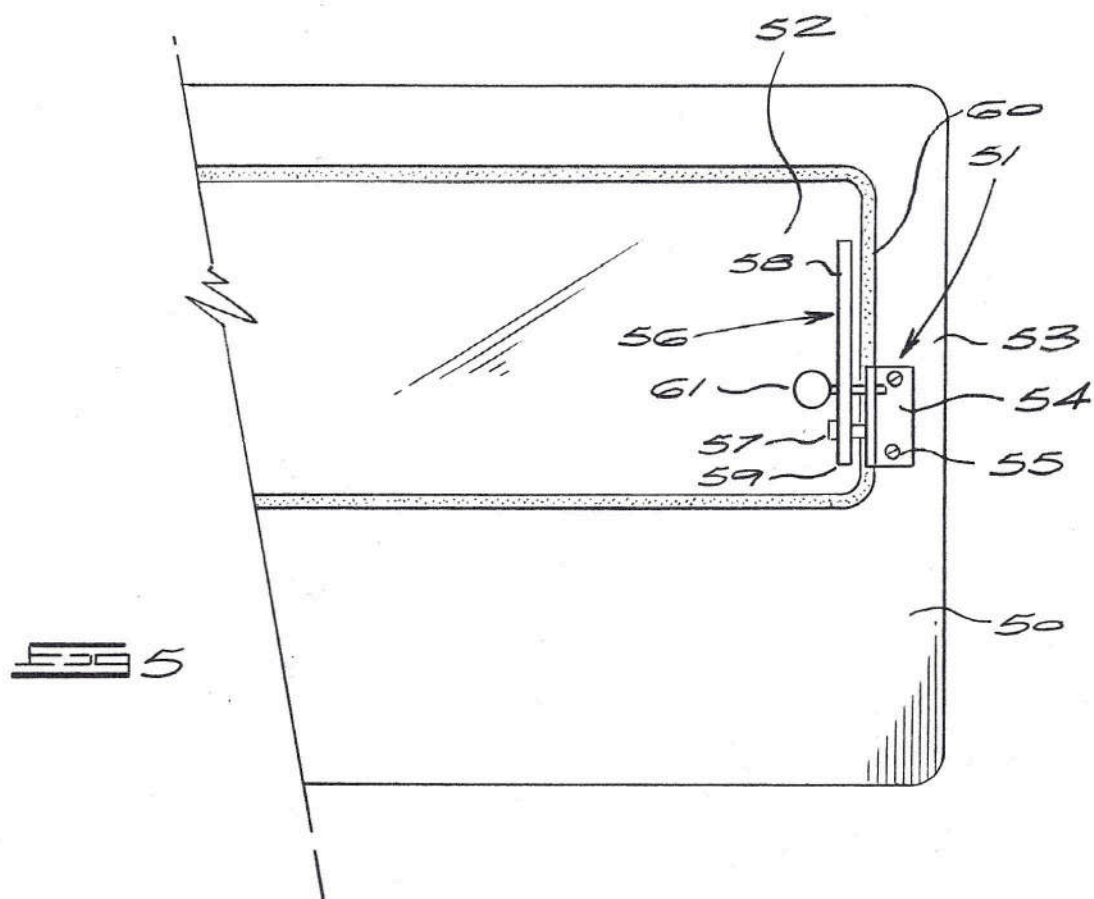
DATED this 8th day of October 1991



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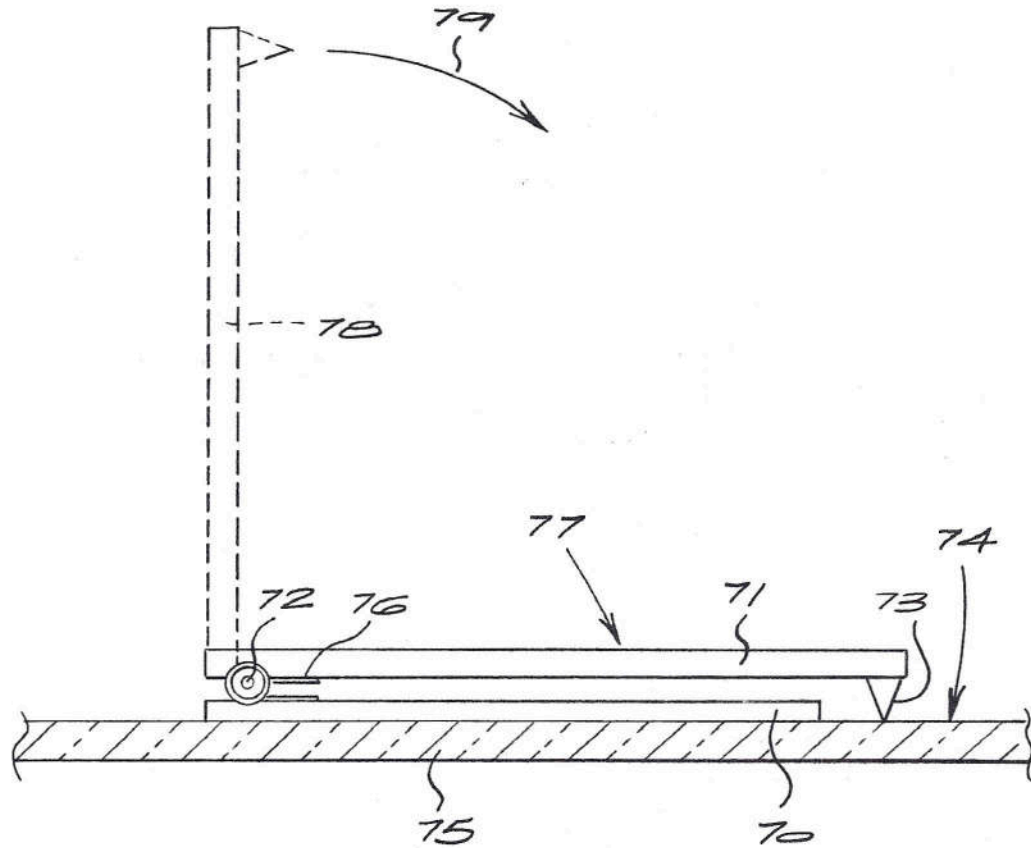


FIG 7