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(71) Applicant: **Greenwood, D.**  
**Spencer Road Metal Works Lidget Green**  
**Bradford West Yorkshire BD7 2HD(GB)**

(72) Inventor: **Greenwood, D.**  
**Spencer Road Metal Works Lidget Green**  
**Bradford West Yorkshire BD7 2HD(GB)**

(74) Representative: **Wharton, Peter Robert et al**  
**Urquhart-Dykes & Lord Alliance House 29-31**  
**Kirkgate**  
**Bradford West Yorkshire, BD1 1QB(GB)**

(54) **Hand rail safety bar.**

(57) A stairway safety bar 10 comprises a housing 14 slidable on a rail 18 which is fixed to a wall 20. The bar 12 extends across a stairway and may be pushed up or down the stairway by a person ascending or descending. The housing 14 includes a locking mechanism (22, 26) which locks on to the rail 18 thereby preventing further movement of the bar and a force which exceeds a predetermined limit is applied to the bar. The bar can be pushed by an elderly or disabled person, but should the person fall the additional force applied will lock the mechanism and prevent the person falling down the stairs.

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## HAND RAIL SAFETY BAR

This invention relates to a safety bar for a hand rail, and more particularly to a safety bar intended for elderly or disabled people which is fitted to and is able to slide up and down a stairway to help prevent a person from falling down the stairs.

At present the only device available to assist persons going up or down stairs, apart from the conventional hand rail, is a chairlift type device fitted at one side of the stairway. However, this type of device is expensive and space consuming and is intended primarily for people who are unable to walk at all or have great difficulty in walking.

It is an object of the present invention to provide a stairway safety bar for elderly or partially disabled people which is moved up and down the stairway by a person and which substantially reduces the risk of the person falling down the stairs should he lose his balance.

According to the present invention there is provided a stairway safety bar and associated housing slidable on a rail which is fixed to a wall, the bar extending across the stairway and being pushed up or down the stairway by a person ascending or descending said stairway, said housing including a locking mechanism which locks on to the rail thereby preventing further movement of the bar when a force which exceeds a predetermined limit is applied to the bar.

Preferably the housing also slides on a wire loop so that a certain amount of friction has to be overcome when moving the bar. This ensures that the housing, and therefore the safety bar, will stay in position and not merely slide down on the rail to the bottom of the stairway. The loop may extend between the top and bottom of the stairway, and the degree of friction applied may be adjustable.

The housing preferably comprises a cam mechanism fixed to the safety bar and a further section which slides on the rail. The cam mechanism may be operable to lock the further section to the rail.

Preferably a pin and associated spring extends between the bar and the housing to determine the level of force required to be applied to the safety bar in order to lock the mechanism.

A second, fixed pin preferably cooperates between the bar and the housing to prevent the mechanism from locking when the bar is pushed upwards.

The invention will now be described further, by way of example only, with reference to and as illustrated in the accompanying drawings, in which:

Figure 1 is a schematic sectional view of a device in accordance with the invention; and

Figure 2 is a view taken on line II-II of figure 1.

Referring to the drawings, a safety handrail device 10 comprises a safety bar 12 pivotally connected to a cam mechanism 22 held in a housing 14. The pivotal connection enables the bar to be secured vertically upwards out of the way when not required. The safety bar 12 preferably is long enough to extend across the full width of a stairway. The housing 14 comprises a section 16 which slides on a rail 18 which is fixed to a wall 20 of the stairway. The cam mechanism 22 extends the length of the section 16 and serves to couple the section to the bar 12. The housing 14 slides on a wire loop (not shown) which provides a certain amount of friction which must be overcome to move safety bar 12. This ensures that the device stays in position and does not merely slide down the rail 18 to the bottom of the stairway.

The section 16 houses four wheels or rollers 28 mounted on respective axles 29 which may terminate in threaded portions 31 so as to bolt in place in the housing 14. One or more of the rollers 28 is spring loaded 33 and normally maintain the housing 14 in the relationship to the 'T' shaped flange 19 of the rail 18 shown in figure 1. Inwardly extending members 30 of the section 16 terminate in pads of friction material 32 such as brake lining material or rubber.

The camming mechanism 22 comprises a generally cylindrical rod partially cut away in the region of the flange 19 of the rail 18 to provide a camming surface 26. Rotation of the rod 22 brings the surface 26 progressively into contact with the flange 19 thus pushing the housing 14 in the direction of arrow A against the spring-bias of the roller wheel springs 33. This brings the braking pads 32 into contact with the inner face of the flange 19, thus locking the housing 14, and thus the bar 22, against further movement.

In use of the device, when a person is descending a flight of stairs, the safety bar 12 is held in front of the person and is pushed down the stairway. A pin 24 and associated spring 25, (figure 2) abuts an extension 23 of the cam 22 and this sets a pre-determined force level below which the device is able to slide down the rail. The force level is dependant on the strength of the spring 25 but would typically be 5 Kgf. If the force applied to the safety bar 12 exceeds this level, as, for example, when a person falls on to the bar, the spring 25 is overridden and the cam mechanism 22 rotates with respect to the second section 16. Since the rail 18 is fixed, the camming surface 26 moves the sec-

ond, section 16 in the direction of arrow A and therefore extending members 30, contact the flange 19 of the rail 18 thereby locking the housing, and therefore the safety bar 12, in position. When the weight is removed from the bar, i.e. when the person gets up, the spring loading of the rollers 28 returns the second section 16 to its original position thereby releasing the locking effect.

The device is also useful when ascending a stairway because as it is pushed up the stairs a person can hold on to the bar 12 and prevent himself from falling backwards if he loses his balance. A second fixed pin 34 also cooperates with the extension 23 to prevent any rotation between the cam 22 and the section 16 as the device is pushed upstairs.

It is envisaged that a single safety handrail would be sufficient in private houses, but in residential homes and hospitals, for example, there would generally be two safety bars, preferably linked e.g. by a wire or cable, so that one would always be at the top and another at the bottom of a stairway. For this purpose, two rails 18 or a return run for the ascending mechanism may be provided.

In an alternative embodiment the locking mechanism could operate on the same principle as an inertia reel seat belt mechanism.

A distinct advantage of the invention is that it provides a hitherto unavailable device for increasing the safety of elderly and disabled people which will give them the confidence to walk up and down stairs.

## Claims

1. A safety bar for a handrail which comprises an associated housing slidable on a rail which is fixed to a wall, the bar being capable of extending across the stairway and being pushed up or down by a person ascending or descending the stairway, said housing including a locking mechanism which locks on to the rail thereby preventing further movement of the bar when a force which exceeds a predetermined limit is applied to the bar.

2. A bar as claimed in claim 1 in which the housing also slides on a wire loop to provide a certain degree of friction to prevent the mechanism from sliding down the rail under its own weight.

3. A bar as claimed in either of claims 1 or 2 in which the housing comprises a cam mechanism fixed to the safety bar and a further section which slides on the rail, the cam mechanism being operable to lock the further section to the rail.

4. A bar as claimed in any of claims 1 to 3 in which a pin and associated spring extend between the bar and the housing to determine the level of force required to be applied to the safety bar in order to lock the mechanism.

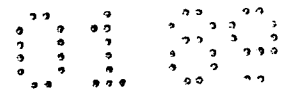
5. A bar as claimed in any of claims 1 to 4 in which a second, fixed, pin cooperates between the bar and the housing to prevent the mechanism from locking when the bar is pushed upwards.

6. A bar as claimed in any of claims 3 to 5 in which the cam mechanism comprises a generally cylindrical rod having a camming surface which moves the housing with respect to the rail so as to bring friction pads into contact with the rail and thereby effect locking.

7. A bar as claimed in either of claims 1 or 2 in which the locking mechanism operates on the inertia reel principle.

8. A safety bar as claimed in any of claims 1 to 7 in which a second bar is provided the two being linked by means of a cable or the like such that as one bar is moved down a stairway the other bar is moved up thus ensuring that one safety bar is always available for use at both the top and the bottom of the stairway.

[illegible]



*Fig.2.*

