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La Cook et al.

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[54] **SAFETY GATE**

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[52] **U.S. Cl.** **49/386,** 16/191, 49/49

[51] **Int. Cl.** **E05f 1/10**

[58] **Field of Search** 49/49, 386; 16/191, 129, 16/131, 139, 143

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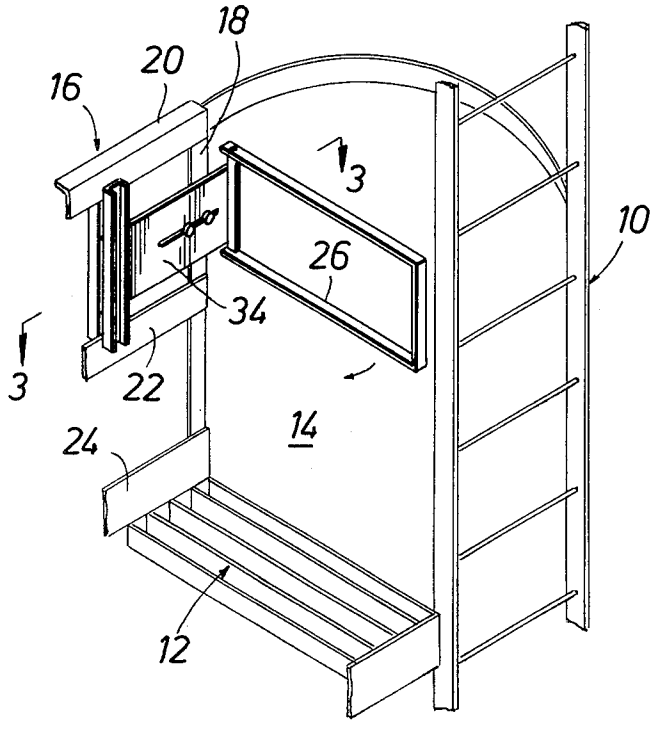
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[57] **ABSTRACT**

A gate is disclosed for closing the openings for ladders or stairwells in the guard rails of walkways. A spring urges a gate member to rotate in one direction and a stop limits the rotation in that direction to position the gate member to close the opening. The stop is adjustable so the gate member can be positioned as required by the location of the opening relative to the guard rail.

7 Claims, 5 Drawing Figures



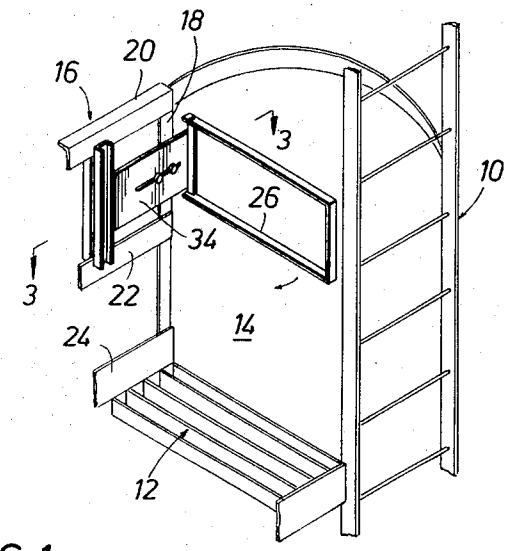


FIG. 1

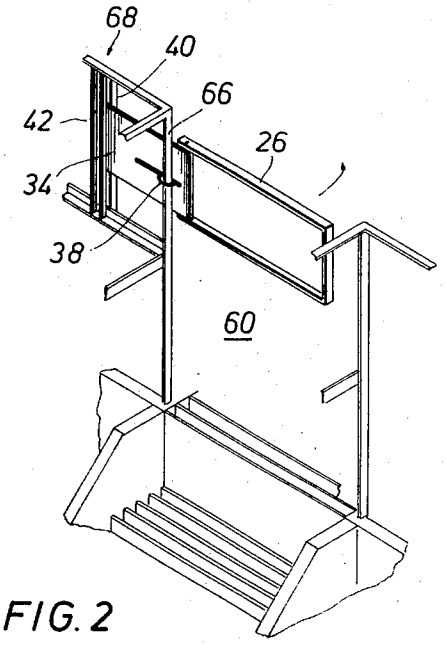


FIG. 2

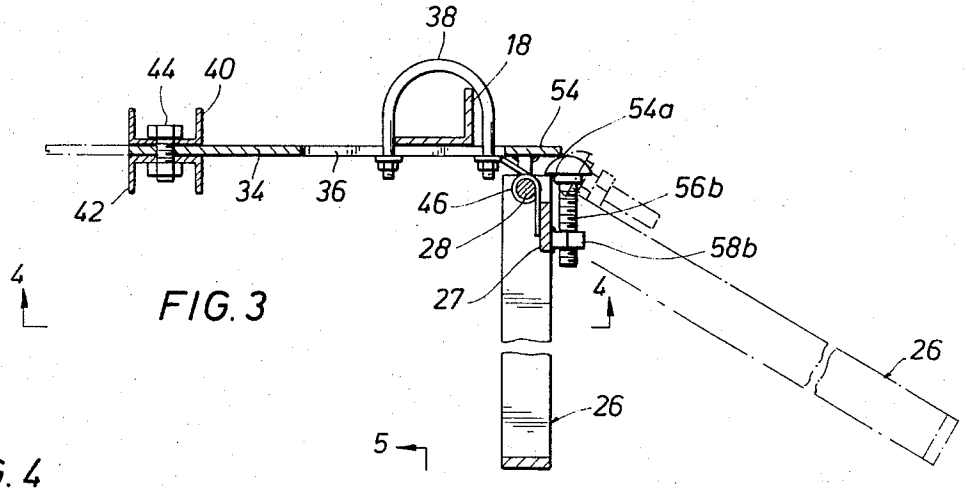
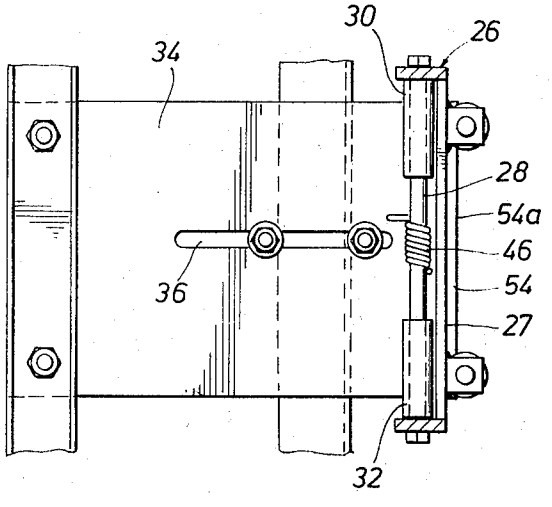


FIG. 3

FIG. 4



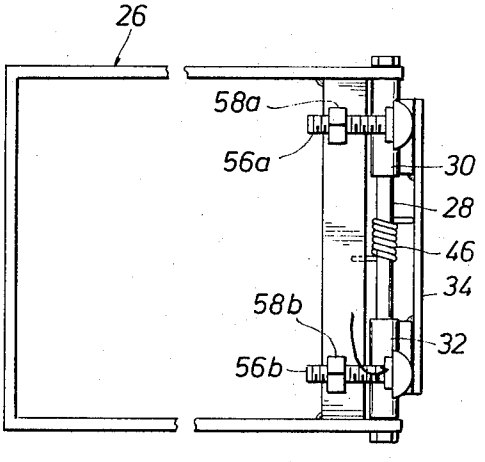


FIG. 5

SAFETY GATE

This invention relates to gates for closing the openings in the guard rails of walkways that are required for ladders and stairs leading to the walkway.

In nearly all industrial plants, there are walkways from which a worker could fall to a lower level. For safety's sake, these walkways are usually provided with guard rails to help prevent a worker from accidentally stepping off the side of the walkway and falling. For various reasons, however, it is necessary to provide openings in the guard rails. Usually, for example, one or more ladders or stairs lead from the walkway to a lower level. Openings are provided in the guard rails so that a person can move from the ladders or stairs onto the walkway and vice versa. Such openings in the guard rails are a danger to personnel using the walkway. Heretofore, to try to prevent personnel from inadvertently falling through such openings, it has been the practice to connect one end of a chain to one side of the opening and latch the other end to the other side. Usually, the latch consisted of an upright pin over which a chain link is hooked, so that the chain can be quickly and easily unhooked to allow a person to move through the opening after which it is supposed to be hooked again in position across the opening.

Unfortunately, the chain is often not rehooked across the opening, leaving the opening unobstructed where a person on the walkway could possibly accidentally step through the opening and fall. Further, even when hooked in place, there is often so much slack in the chain or it is so low that it will offer little help to a person falling against it.

It is an object of this invention to provide a gate having a gate member for closing the openings for ladders or stairwells in the guard rails of walkways that can be easily moved out of position closing the opening to allow a person to pass through the opening, after which it will automatically return to a position closing the opening.

It is another object of this invention to provide a gate for such openings having a gate member that will remain in position closing the opening unless forceably moved to allow the passage of a person through the opening, and that will return to the closed position as soon as it is released by the person forcing the gate open.

It is another object and one of the features of this invention to provide a gate for such openings in guard rails in which the gate member can be adjusted to close openings located in different positions relative to the guard rail.

It is another object of this invention to provide a safety gate for openings in guard rails having a gate member that will return automatically to a position closing the opening when not forceably held out of the closed position and that will provide solid support to anyone on the walkway who leans or falls against the gate member.

These and other objects, advantages, and features of this invention will be apparent to those skilled in the art from a consideration of this specification, including the attached drawings and appended claims.

In the drawings:

FIG. 1 is an isometric view of the preferred embodiment of this invention in position closing an opening in a guard rail for a ladder wherein the plane of the opening is perpendicular to the direction of the guard rail;

FIG. 2 is an isometric view of the gate of FIG. 1 in position closing an opening for a staircase wherein the plane of the opening is in line with the direction of the guard rail;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 3; and

FIG. 5 is a view taken along line 5—5 of FIG. 4.

Openings are required in guard rails for many reasons, one of the most common being to provide access to ladders and stairs. FIG. 1 shows a typical arrangement where ladder 10 is provided for personnel moving up to or down from walkway or catwalk 12. To move between the ladder and the walkway, a person must move through opening 14 framed by the ladder on one side and guard rail 16 on the other. The guard rails are usually built like fences with spaced posts, such as post 18, and longitudinally extending rails, such as rails 20 and 22, that extend between the posts and form a fence to help prevent personnel from falling off the side of the walkway. The guard rail usually includes toe plate 24 that extends between the guard rail posts just above the walkway to prevent a person's foot from slipping off the walkway between the lower rail 22 and the walkway.

The gate of this invention is shown closing opening 14 in FIG. 1. It includes gate member 26 and means for mounting the gate member for movement between a first position closing the opening and a second position allowing personnel to pass through the opening. In the embodiment shown, gate member 26 is U-shaped. Spacer plate 27 extends between the two legs to add rigidity to the gate member and for other purposes described below. Pivot pin or shaft 28 extends through aligned openings in the ends of the legs of the U-shaped gate member close to the ends of the legs, as shown in FIG. 5. Shaft 28 also extends through bearing sleeves 30 and 32 which are spaced apart and attached to mounting plate 34 to support the gate member for rotation around the longitudinal axis of the pin.

The entire assembly is mounted on guard rail 16, as shown in FIGS. 1 and 3. Mounting plate 34 has elongated opening 36 to receive the threaded ends of U-bolt 38 to clamp the mounting plate to post 18 of the guard rail in the desired position above walkway 12. To provide more rigidity to the support for the gate, channels 40 and 42 are pulled together on opposite sides of the vertical flanges of rails 20 and 22 by bolts 44 to clamp the plate to the rails at a point spaced from the U-bolt.

Resilient means are provided to rotate the gate member in one direction around its pivotal axis provided by shaft 28. In the embodiment shown, spring 46 is coiled around shaft 28 with its ends in engagement with mounting plate 34 and spacer plate 27 of the gate member. The spring is designed to urge the gate member to pivot in a counterclockwise direction, as viewed in FIG. 3, but to allow the gate member to be forceably moved in a clockwise direction to move out of its position obstructing opening 14 to allow personnel to move through the opening. Means are provided to stop the rotation of the gate member in the counterclockwise direction when the gate member is in position to close opening 14 to personnel on walkway 12. In other words, the gate member can be forceably moved out of the opening in a clockwise direction toward the guard

rail, and when it is released it will be returned by the spring against the stop means, which will re-position the gate member to close the opening.

It is one of the features of this invention that the stop means provided are adjustable to allow the angle the gate member makes with the mounting means to be adjusted to accommodate openings to be closed that are in different positions relative to the guard rail. In this embodiment, the adjustable stop means includes a first stop member fixed relative to the gate mounting means and a second stop member carried by the gate member. The stop members are in engagement, when the gate member is in its first or closed position, and they are resiliently held in such engagement by spring **46.**

To adjust the position of the gate member relative to the mounting means, the second stop member is movable relative to the gate member to adjust the angle the gate member makes with the mounting means when the stop members are in engagement. In the embodiment shown, the first stop member comprises portion **54** of mounting plate **34.** The second stop member comprises bolts **56***a* and **56***b* that are mounted on the gate member by nuts **58***a* and **58***b* attached to spacer plate **27.** Bolts **56***a* and **56***b* are mounted with their longitudinal axis generally parallel to and spaced from the vertical plane of the gate member and from the pivotal axis of shaft **28.** Preferably, mounting nuts **58***a* and **58***b* locate the bolts so that the longitudinal axis of the bolts are directed generally toward edge **54***a* of portion **54** of the mounting plate, when the gate extends 90 degrees from the plane of the mounting plate. Further, nuts **58***a* and **58***b* are located on the opposite side from plate **54** of a plane passing through the pivotal axis of the gate member and perpendicular to the longitudinal axis of the second stop member, bolts **56***a* and **56***b*. This causes the nuts to move to rotate to a position outside or spaced from edge **54***a* when the gate member swings ninety degrees to carry bolts **56***a* and **56***b* into position to engage the flat edge surface of portion **54** of the mounting plate. Thus, by adjusting the position of the bolts relative to the nuts, the position of the gate member, i.e., the angle between the gate member and the mounting plate and the guard rail, when in the first or closed position, can be adjusted for openings at different positions relative to the guard rail.

The most common positions for openings are those shown in FIGS. **1** and **2.** In FIG. **1,** the plane of opening **14** is perpendicular to the direction of the guard rail. In FIG. **2,** the plane of opening **60** is in line with the direction of guard rail **68.** Here mounting plate **34** is attached to post **66** of guard rail **68** by U-bolt **38** and channels **40** and **42** clamp the plate to the flanges of the rails of the guard rail in the same manner as described above. As explained above, preferably, nuts **58***a* and **58***b* are positioned to move bolts **56***a* and **56***b* into position to engage the end surface of portion **54** of the mounting plate when the gate member is substantially in alignment with the direction of the guard rail. Also, preferably, the end of the second stop members are convex or rounded, as bolt heads **70** and **72,** so the stop members will engage the mounting plate at or adjacent to edge **54***a* for most positions of the gate member between those shown in FIGS. **1** and **2.**

From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinablve set forth, together with other advantages that are obvious and that are inherent to the apparatus.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the apparatus of this invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. A safety gate for closing the opening in the guard rail of a walkway for a ladder, stairwell, or the like comprising a gate member, means for mounting the gate member for pivotal movement between a first position extending across such opening and a second position to allow passage therethrough, stop means for allowing the gate member to pivot in only one direction from the first position, said stop means including a first stop member mounted on one of the gate member and the gate member mounting means and a second stop member mounted on the other one of the gate member and the gate member mounting means to engage the stop means and hold the gate in the first position, said second stop means being movable sufficiently to allow the first position to be adjusted relative to the mounting means through an angle of about ninety degrees as required by the location of the opening, and resilient means urging the gate member toward the first position to maintain the gate member in the first position closing the opening to prevent passage therethrough in one direction when the gate member is not forceably held in the second position.

2. The gate of claim **1** in which the first stop member is mounted on and fixed relative to the gate member mounting means and the second stop member is mounted on and movable relative to the gate member.

3. A safety gate for closing the opening in the guard rail of a walkway for a ladder, stairwell, or the like comprising a gate member, means for mounting the gate member for pivotal movement between a first position extending across such opening and a second position to allow passage therethrough, stop means for allowing the gate member to pivot in only one direction from the first position, said stop means including a first stop member fixed relative to the gate member mounting means and having two perpendicular surfaces that intersect along a line that is parallel to the pivotal axis around which the gate member pivots, a second stop member, means mounting the second stop member on the gate member to engage the fixed stop member when the gate member is in its first position, said second member being movable relative to the gate member along a line spaced from and parallel to the gate member to adjust the angle the gate member makes with the mounting means, the second member mounting means being positioned for the second member to move out of engagement with one of said two surfaces and into engagement with the other as the first position of the gate member is adjusted approximately ninety degrees relative to the mounting means, and resilient means urging the gate member toward the first position to maintain the gate member in the first position closing the opening to prevent passage therethrough in one

direction when the gate member is not forceably held in the second position.

4. The gate of claim **3** in which the second stop member is a threaded rod having a convex surface on the end that engages the first stop member.

5. A gate for closing an opening in the guard rail of a walkway for ladders, stairs, or the like comprising a gate member, means for mounting the gate member for pivotal movement between a position closing such opening and a position permitting free passage.

6. The gate of claim **5** in which the end of the stop member that engages the plate is convex.

7. The gate of claim **5** in which the stop member is threaded and supported on the gate member in a tapped opening so that rotation of the member will adjust the position of the gate member relative to the mounting means in the closed position.

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