ABSTRACT

A retractable safety barricade employed to block off an aisle or entryway, comprising a barricade housing that is mounted to a first support and a safety net attached at one end to a winding tube under spring tension located within the barricade housing and at the other to a pull bar, which may be secured to a second support. When the safety barricade is in its first position, the net is fully retracted onto the winding tube within the barricade housing by means of a coil spring. When the safety barricade is in its second position, the net is extended from housing to span the area between first and second supports, substantially covering the opening between the supports and blocking passage through the area. Operation of the device is performed by a single user, who manually extends or retracts the net barrier using the pull bar.
RETRACTABLE SAFETY NET BARRICADE

This application claims the benefit of Provisional Patent Application Ser. No. 60/473,416 filed 2003 May 28.

FEDERALLY SPONSORED RESEARCH

Not applicable

SEQUENCE LISTING OR PROGRAM

Not applicable

BACKGROUND

This invention relates to devices employed as safety barriers. More particularly, the present invention relates to safety barriers that are employed to block off aisles in industrial, wholesale and retail warehouse environments.

In modern warehouse environments, particularly warehouse retail environments, safety is a critical concern. It involves time and effort to find and employ the devices, and often results in loss, breakage, and storage problems. In such environments, there are advantages in a device that can be temporarily or permanently installed at the entry to an aisle, extended for use by a lone employee and retracted out of the way when not in use.

SUMMARY OF THE INVENTION

Briefly stated, the invention in a preferred embodiment is a retractable safety net barricade adapted for attaching to opposing supports. The retractable net barricade comprises a net barrier secured at one end to a shaft centrally situated within a tubular housing and at the other end to a pull bar. A coil spring provides rotational tension against the central shaft, and is the mechanism by which the net barrier is retracted into the tubular housing through a longitudinal slot. The net barrier is extended from the housing by manually pulling the pull bar away from the housing, while maintaining a parallel aspect between the pull bar and housing.

Two clamp rings firmly affix to the exterior of the barricade housing, and in one possible embodiment, pins attached to the clamp rings slide into mounting brackets to secure the barricade device to an upright rack support. Hook brackets secured to the pull bar attach the extended net barrier to an opposing upright rack support, effectively blocking access to an aisle or other potentially unsafe area for safety purposes. It is now common practice for forklifts to operate in the same space as customers, a cost-cutting measure essential to the business model of these warehousing operations, but posing serious safety problems. The result has been an increased incidence of injuries, and a dramatic rise in costly litigation.

Various types of safety devices have been designed for use as barriers to block off aisles and entry points in warehouse environments, for the protection of both employees and customers when moving heavy stock or loading product on aisle shelving. These exist in various forms, but suffer from a number of flaws that reduce their effectiveness as safety devices. A tape strip barrier is in common use, but since it lacks the ability to vertically block an aisle entry, it is easily bypassed by ducking under—or in the case of small children, walking under—the device. Another device in use is an accordion-like extendable barricade, but because it is on wheels, it can be easily pushed out of the way. Net and banner-like devices secured to racking with straps or similar attachments have at least some vertical extension for blocking off an aisle or entryway, but possess a limited design that often results in incorrect use. There is a need for a safety device that by its design fully blocks the entry to an aisle or unsafe area, and limits the potential for incorrectly using or bypassing the barrier.

When needed for securing an area for safety purposes, the common practice with safety devices in warehouse environments is to locate, move, and set up the devices; and store them when not in use. Consequently, this practice

Accordingly, it is a general purpose and object of the present invention to provide an improved, reliable, simplified, easy-to-use barricade for the restricting of pedestrian traffic into a potentially unsafe area.

Further objects and advantages of the present invention include:

(a) To provide a new and improved safety barrier that effectively blocks access at an entry point from near floor level to a height in its various embodiments defined by the needs of the user.

(b) To provide a new and improved safety barrier that can be easily extended for use or retracted when not in use.

(c) To provide a new and improved safety barrier that is relatively easy to properly install and use, and in its various embodiments may be permanently mounted or temporarily secured to an aisle rack support or other structure as may be deemed advantageous.

(d) To provide a new and improved safety barrier that can be moved, attached to a wide variety of vertical structures, and operated by a single user.

(e) To provide a safety barrier that in its preferred embodiment utilizes a barrier made of industrial strength netting material, capable of providing protection from falling objects and impact debris.

(f) To provide a safety barrier that is self-contained within an external housing that is durable and is resistant to impact.

Other objects and advantages of the invention are derivable from close examination of the drawings and the specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a somewhat diagrammatic perspective view of the retractable safety net barricade attached to vertical members of a steel shelving unit, with the barricade net partially extended out of the barricade housing, in the operational position.

FIG. 2 shows an assembly view, with cutaway views of the internal housing parts of the barricade unit, and the barricade net partially extended.

FIG. 3 is a perspective view of the assembled bearing shaft, tension-retaining pin, and bearings 1.
FIG. 4 is a perspective view of the winding tube, with a lateral slot for the hook tail end of the coil spring.

FIG. 5 is an inverted perspective view of the top end cap, with a slot for the tension retaining pin.

FIG. 6 is an inverted side sectional view of the upper end of the barricade housing.

FIG. 7 is a perspective view of the bottom end cap.

FIG. 8 is a sectional view of the assembled position of hardware inside the barricade housing.

FIG. 9 is an elevation view of the hooked end of the coil spring, which connects the coil spring to the winding tube.

FIG. 10 is an elevation view opposite that shown in FIG. 9, and shows the alternate end of the coil spring, bent in toward the center of the coil spring’s circumference.

FIG. 11 is a perspective view of the barricade housing mounting clamp ring, with extending pin that inserts into hook bracket.

FIG. 12 is a perspective view of the barricade housing with a longitudinal slot through the housing wall to allow the safety net to be extended out from and retracted into the housing.

FIG. 13 is a perspective view of the pull bar with the attaching hook brackets.

FIG. 14 is a perspective view of the protective foam insulation tube cover for the pull bar.

FIG. 15 is a somewhat diagrammatic perspective view, in detail, of the hook bracket and ring clamp assembly, which attaches the safety net barricade to a vertical member of the steel shelving unit.

Reference Numerals in Drawings

1 bearings
2 bearing shaft
3 coil spring
3A hook tail end of coil spring
3B tail end of coil spring
4 winding tube
5 barricade net
6 barricade housing
7 top end cap
8 bottom end cap
9 dowel pin
10 foam insulation tube
11 pull bar
12 clamp rings
14 hole
15 slot
20 tightening bolt
21 hook brackets
22 rack support
23 post slots
24 self-tapping screws
25 slot in barricade housing
26 push nut
27 barricade mounting bracket
28 mounting bracket bolt
29 mounting bracket nut
30 post holes
31 hand pull opening
32 pin
33 bushing

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings, wherein numerals represent like parts throughout the figures, there is shown a retractable safety barricade assembly in accordance with the present invention, particularly in FIG. 1 (perspective view) and FIG. 2 (side cutaway view). In addition, FIG. 1 shows a representative upright steel channel rack support 22 which has a plurality of slots 23 cut into the post face. Pins 32, soldered to clamp rings 12, slide into the bushings 33 of the barricade mounting brackets 27 to hold the barricade housing 6 in a vertical position at a height determined by the user and in accordance with the position of the shelving post slots 23.

The extendable end of a barricade net 5 consists of a steel tube pull bar 11 inside a foam insulation tube 10. It is extended by holding the insulation tube 10 with one hand inserted into the hand pull opening 31 and the other hand gripping the top of pull bar 11 above the upper hook bracket 21a, then pulling the barricade net 5 out in a horizontal motion until the opposite side of the aisle is reached. Hooks 21 attached to pull bar 11 are inserted into the opposing shelving post’s slots 23 to complete the barricade’s function.

FIG. 2 shows a cutaway view of the barricade housing and the internal component parts. A round steel bearing shaft 2 runs the length of the barricade housing 6, and extends through end cap 8. The shaft is held in place by a push nut 26 to prevent spring tension from pulling the shaft out of the hole in end cap 8. There are two holes drilled on center through the side of the shaft 2. FIG. 3 shows a hole near the top end of the shaft with a steel dowel pin 9 through it. Tail end 3B of the coil spring 3, as best shown in FIG. 10, is inserted into the other hole 14 on shaft 2.

Two flanged semi-precision bearings 1 in FIG. 2 are mounted onto shaft 2. The bearings 1 are inserted into the ends of the winding tube 4 until each bearing flange seats itself against the winding tube ends. The bearings allow a smooth rotational action for the net 5 to reel into and out of the barricade housing 6. The coil spring 3 provides the recoiling tension for winding the net 5 onto the winding tube 4.

Top end cap 7 has a blind slot cut part way across the center line of the smaller diameter, which is through the
centerline of the hole and perpendicular to it (see FIG. 5). The slot on top end cap 7 in FIG. 2 holds dowel pin 9, which maintains the rotational tension between shaft 2 and winding tube 4 that is created by coil spring 3.

[0069] The level of rotational tension created against the extending of the barricade net 5 is retained at time of assembly by installing two small self-tapping screws 24, shown in FIG. 2, through the sides of the barricade housing 6 and into the lesser circumference of top end cap 7, which is shown inside the barricade housing 6. The self-tapping screws 24 are installed 180° apart and just below the top end cap 7 flange through the housing near the tube ends 6.

[0070] In FIG. 2, the barricade net 5 has a hemmed end that forms a tube-like sleeve into which the winding tube 4 snugly slides. An adhesive is applied to the tube to keep the barricade net 5 in position on the winding tube 4.

[0071] The barricade net 5 is wound on the winding tube 4 in a clockwise direction.

[0072] The opposite end of the barricade net 5, which extends through the longitudinal slot in the barricade housing 6, has a tube-like sleeve into which the assembly comprised of pull bar 11 and the surrounding insulation tube 10 slides. The barrier net can then be manually extended out of the barricade housing 6 by use of the pull bar 11 and the hooks 21 can latch into the rack support 22 slots 23 to block off an aisle, as shown in FIG. 1.

[0073] FIG. 3 shows the bearing shaft 2 with a hole 14 drilled into it for inserting and holding the tail end 3B (see FIG. 10) of the coil spring 3. FIG. 3 shows the two flanged bearings 1, shown in assembly in FIG. 8. In FIG. 3, dowel pin 9 is shown inserted through a tap fit hole for use in holding the recoiling tension.

[0074] FIG. 4 shows the winding tube, which is comprised of a piece of steel conduit with a lateral slot 15 cut into one side near the upper end of the tube. The coil spring 3 in FIG. 8 is inserted into the winding tube 4. A hook tail end 3A sticks out through the slot 15 (FIG. 4) to hook onto the wall of winding tube 4.

[0075] The top end cap 7 is shown in a perspective view in FIG. 5. It is a concentric round flanged aluminum detail with a blind hole in the center into which the bearing shaft 2 is inserted. The hole has a crosscut slot into which dowel pin 9 fits (see FIG. 8).

[0076] FIG. 6 shows a sectional view of the top end cap 7 with a center hole most of the way through and the slot part way through to capture dowel pin 9, as seen in FIG. 8.

[0077] The bottom end cap 8 is shown in perspective view in FIG. 7. It is a concentric round flanged aluminum detail with a hole through the center into which the bearing shaft 2 fits, as seen in FIG. 8.

[0078] FIG. 9 shows an end view of the coil spring 3 with hook tail end 3A for fastening the end of the coil spring to the winding tube 4, as seen in FIG. 8.

[0079] FIG. 10 shows an end view of the coil spring 3 with tail end 3B bent down to cross the center of the circumference of coil spring 3. The tail end 3B is inserted through hole 14, as seen in FIG. 3.

[0080] FIG. 11 shows a clamp ring 12, designed to tighten firmly around the barricade housing 6, as shown in FIG. 1, with the use of a tightening bolt 20. Two clamp rings 12, as shown in FIG. 1, are secured near the top and bottom of the barricade housing 6 above and below the slot 25 respectively, so as not to interfere with the barricade net 5 function.

[0081] One possible embodiment of the present invention involves a plurality of hook brackets 21, as shown in FIG. 1 and FIG. 13, employed to attach the barricade housing 6 and the pull bar 11 to an attachment location. The design involving the use of hook brackets 21 will depend on a user's need requirements.

[0082] The barricade housing 6 in FIG. 12 is an ABS plastic pipe with a lengthwise slot opening 25 of a dimension exceeding the height of the barricade net 5, which allows unimpeded movement of the barricade net 5 when extended or retracted through the slot 25, as shown in FIG. 1. The barricade housing 6 serves as a protective case and container for the internal detailed parts, as shown in FIG. 2.

[0083] The pull bar 11 in FIG. 13 is a half-inch diameter steel conduit pipe with hook brackets 21 attached to the outside diameter. The hook brackets 21 design will depend on a user's requirements.

[0084] FIG. 14 shows a neoprene foam semi-split insulation tube 10. The insulation tube 10 is used to cover the entire length of the pull bar 11 and provides a larger, cushioned cylindrical surface for the user to grip when manually extending the barricade net 5 out of the barricade housing 6, as shown in FIG. 1.

[0085] FIG. 15 shows a detailed view of how the barricade mounting bracket 27 is assembled and secured to rack support 22. The slotted ear of bracket 27 is inserted into slot 23 and pushed down to hook onto rack support 22. A bolt 28 is inserted through the side hole of bracket 27 and hole 30 on both sides of rack support 22. A nut 29 is threaded onto bolt 28 and tightened to secure bracket 27 to rack support 22. The pin 32 of clamp ring 12 is inserted into the bushing 33 on bracket 27 to hold the barricade unit in position (FIG. 1).

[0086] While a preferred embodiment of the foregoing disclosure has been set forth for purposes of illustration, the preceding description and accompanying drawings should be construed as illustrative and not be deemed a limitation on the scope of the invention herein.

What is claimed is:
1. A retractable safety barricade system, comprising:
   (a) a net barrier means for preventing passage through a given area bounded by a first and second support means, said net barrier being elongated and having a first and second end;
   (b) a rotatable shaft means to which said first end of said net barrier means is attached;
(c) mounting means for mounting said rotatable shaft means to said first support means;
(d) attaching means for attaching said second end of said net barrier means to said second support means;
(c) retraction means for retracting said net barrier means by radially winding said net barrier means upon said rotatable shaft means to permit passage through said area;
(d) extension means for extending said net barrier means to span the area between said first support means and said second support means.

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