SAFETY DEVICE WITH FALL ARREST AND DESCENDING MODES

Field of the Invention

The present invention relates to a safety device with fall arrest and descending modes.

Background

Safety devices are well known in the art of fall protection safety equipment for use by workers performing tasks during which there is a risk a fall may occur. One type of safety device commonly used is a self-retracting lifeline, which is typically connected to a support structure within the vicinity the worker is performing the task, and the end of the cable is typically connected to a safety harness worn by the worker. Self-retracting lifelines generally include a housing containing a drum around which a cable, rope, or webbing is wound. The drum is spring biased to pay out cable as tension pulling the cable is applied and to retract any of the cable that has been unwound from the drum as the tension on the cable is reduced or released. The housing also includes a brake assembly for stopping rotation of the drum when the cable suddenly unwinds from the drum at a rate greater than a predetermined maximum angular velocity. As the rotation of the drum is stopped, additional cable is prevented from being paid out of the housing to stop the fall of the worker.

Should a fall occur, or should the worker need to otherwise be rescued, the worker may require assistance to reach safety. In such situations, another type of safety device, a controlled descent device, may be used to assist the worker to safety.

For the reasons stated above and for other reasons stated below, which will become apparent to those skilled in the art upon reading and understanding the present specification, there is a need in the art for a safety device with fall arrest and descending modes.

Summary

The above-mentioned problems associated with prior devices are sought to be addressed by embodiments of the present invention and will be understood by reading and understanding the present specification. The following summary is made by way of example and not by way of limitation. It is merely provided to aid the reader in understanding some of the aspects of the invention.

According to an aspect of the present invention, there is provided a safety device with fall arrest and descending modes, comprising: a housing; a drum rotatably operatively connected to the housing; a lifeline having an intermediate portion interconnecting a first end and a second end, the first end being operatively connected to the drum; a first brake assembly operatively connected to the drum; a second brake assembly operatively connected to the drum; and a control operatively connected to the first and second brake assemblies and having a first position and a second position, the first position selectively engaging the first brake assembly and the second position selectively engaging the second brake assembly.

~~In an embodiment safety device with fall arrest and descending modes, a drum is rotatably operatively connected to a housing. A lifeline has an intermediate portion interconnecting a first end and a second end. The first end is operatively connected to the drum. A first brake assembly is operatively connected to the drum, and a second brake assembly is operatively connected to the drum. A control is operatively connected to the first and second brake assemblies and has a first position and a second position. The first position selectively engages the first brake assembly and the second position selectively engages the second brake assembly.~~

There is also disclosed a~~In an embodiment~~ safety device with fall arrest and descending modes, in which a drum is rotatably operatively connected to a housing. A lifeline has an intermediate portion interconnecting a first end and a second end. The first end is operatively connected to the drum, at least a portion of the intermediate portion is wound about the drum, and the second end is operatively connected to a hook. A first brake assembly and a second brake assembly are operatively connected to the drum. The first brake assembly includes a rotor to which at least one first pawl having a friction pad is pivotally operatively connected and a first spur gear. The rotor includes a rotor gear. The first spur gear includes inner teeth and outer teeth. The second brake assembly includes a gear assembly and at least one second pawl. The gear assembly includes a second spur gear. A shaft includes first and second teeth and operatively connects the first and second brake assemblies. The inner teeth of the first spur gear mate with the first teeth of the shaft and the outer teeth mate with the rotor gear to interconnect the shaft and the rotor. The second spur gear mates with the second teeth of the shaft. A control is operatively connected to the shaft and has a first position and a second position. The first position allows the shaft to rotate and selectively engages the first brake assembly in a descending mode in which the friction pad contacts the housing when the rotor rotates. The second position locks the shaft and selectively engages the second brake assembly

in a fall arrest mode in which the at least one second pawl is operatively connected to the drum and is configured and arranged to engage the gear assembly when the drum rotates at a predetermined speed.

There is also disclosed a~~An embodiment~~ brake assembly comprise~~s~~ing a housing, at least one pawl, a rotor, and an engaging surface. The at least one pawl includes a pivot end and a free end. The pivot end includes a first side and a second side, and the first side includes a flanged portion. The rotor includes a base and at least one receiver operatively connected to the base. The at least one receiver is configured and arranged to receive the pivot end of the at least one pawl, and the pivot end is pivotally operatively connected to the at least one receiver. The flanged portion is

positioned proximate one side of the at least one receiver between the rotor and the housing. The engaging surface is proximate the at least one pawl. The at least one pawl pivots outward relative to the rotor when the rotor is rotated to engage the engaging surface.

According to another aspect of the present invention, there is provided a~~In an embodiment~~ method of using a safety device having fall arrest and descending modes, the device comprises a housing, a drum rotatably operatively connected to the housing, a lifeline having an intermediate portion interconnecting a first end and a second end, the first end being operatively connected to the drum, a first brake assembly and a second brake assembly operatively connected to the drum, a shaft interconnecting the first and second brake assemblies, and a control operatively connected to the shaft and having a first position and a second position, the first position allowing the shaft to rotate and selectively engaging the first brake assembly in a descending mode, the second position locking the shaft and selectively engaging the second brake assembly in a fall arrest mode~~.~~, t~~T~~he method comprise~~s~~sing positioning the control in the second position thereby locking the shaft and activating the second brake assembly in the fall arrest mode.

The method further comprising positioning the control in the first position thereby allowing the shaft to rotate and activating the first brake assembly in the descending mode.

The method further comprising positioning the control in the first position thereby allowing the shaft to rotate and activating the first brake assembly in the descending mode after a fall has occurred.

Brief Description of the Drawings

The present invention can be more easily understood, and further advantages and uses thereof can be more readily apparent, when considered in view of the detailed description and the following Figures in which:

Figure 1 is a front perspective view of a safety device with fall arrest and descending modes constructed according to the principles of the present invention;

Figure 2 is a rear view of the safety device shown in Figure 1;

Figure 3 is a side view of the safety device shown in Figure 1;

Figure 4 is an exploded perspective view of the safety device shown in Figure 1;

Figure 5A is an exploded front perspective view of a control and descending assembly of the safety device shown in Figure 1;

Figure 5B is an exploded rear perspective view of the control and descending assembly shown in Figure 5A;