June 4, 1968 H. L. THOMPSON 3,386,530

SAFETY CLAMP DEVICE

Filed Dec. 7, 1966

FIG. 1

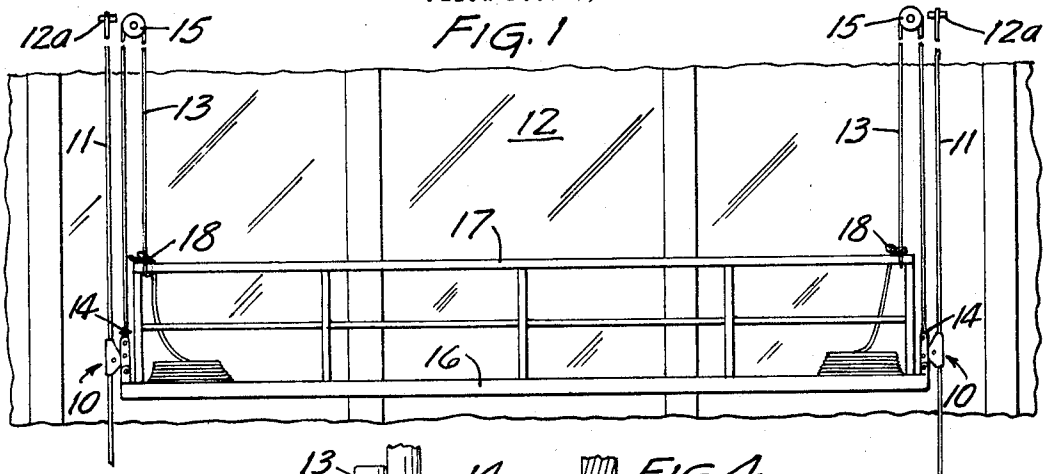


FIG. 2

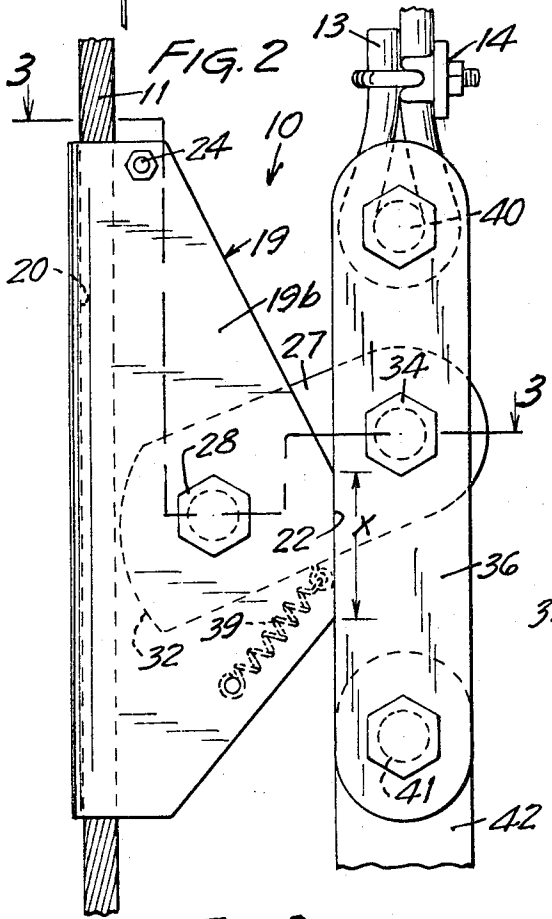


FIG. 4

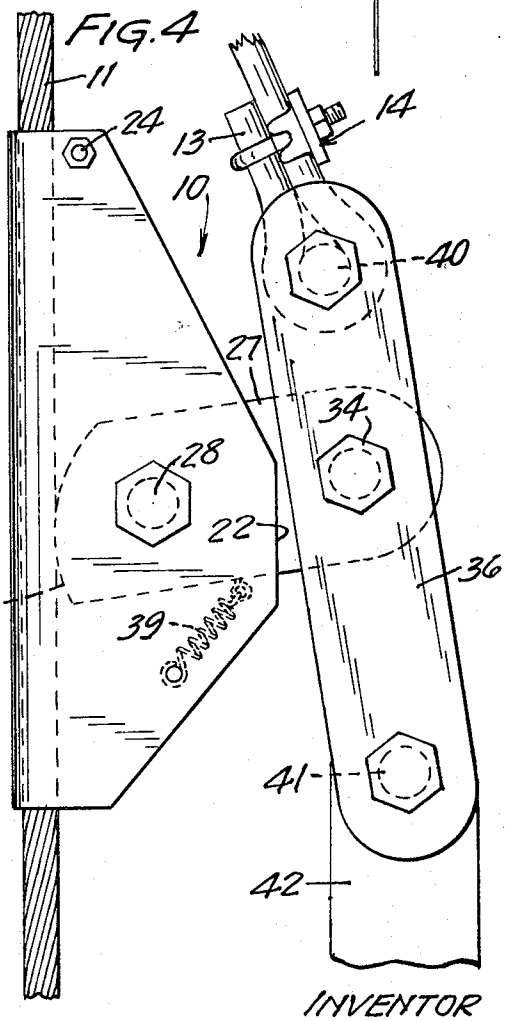
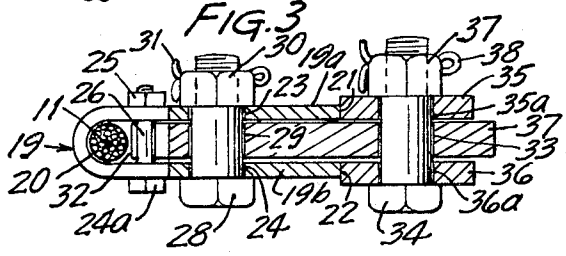


FIG. 3



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SAFETY CLAMP DEVICE

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This invention relates to a safety clamp device for movable platforms and, more particularly, relates to a safety clamp device adapted to be releasably mounted on an upright safety cable and affixed to a movable platform supported by a supporting hoist line whereby a supporting hoist line failure results in the load supported thereby being transferred to the safety cable.

Although safety devices for supporting hoist lines have been known in the past, it has been found that in many applications of known safety devices on hoist lines, failure continues to occur. Failure of a hoist line which is not protected by a safety device or which is inadequately protected by a safety device oftentimes results in loss of life, injuries to the operators as well as injuries to those who may be under the improperly protected platform. Injury may also be caused by articles falling from the platform or by the platform itself when a failure occurs. Additionally, injury may come to the operator or to a passerby from undue swinging of a movable platform as it is supported by a hoist line from forces created by wind acting on the movable platform. Safety devices which are incorporated on the hoist line or which utilize a separate safety cable are typically complex and, in their complexity oftentimes result in failure of the device. Further, the safety devices incorporated on the hoist line do not alleviate the swinging effect of the platform in the wind.

With these comments in mind it is to the elimination of these and other undesirable features to which the present invention is directed along with the inclusion therein of other novel and desirable features.

An object of my invention is the provision of a new and improved safety device for movable platforms which is of simple and inexpensive construction and operation.

Another object of my invention is the provision of a safety device for movable platforms which may be quickly and efficiently mounted on a safety cable and safely attached to the movable platform by a person of minimum skill and manual dexterity.

Still another object of my invention is the provision of a novel safety device for movable platforms which is slidably mounted on an upright safety cable in the release position and which is not affected by contamination on the cable, yet which, in the locked position, positively and immediately engages the safety cable allowing only minimum movement of the platform attached thereto at the precise time of failure of the supporting hoist line.

A further object of my invention is the provision of an improved and novel safety device for movable platforms which not only guides the platform as it is being moved by manipulation of the hoist line but also prevents swinging in the wind of the platform which is stabilized by the connection of the platform to the safety cable.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is a diagrammatic view showing a typical usage of the platform safety device of my invention;

FIG. 2 is an enlarged side elevation of the safety device of my invention in the release position;

FIG. 3 is a sectional view of the safety device of my invention taken along the lines 3—3 of FIG. 2; and

FIG. 4 is an enlarged side elevation view of the platform safety device of my invention shown in the locked position after hoist line failure.

One form of the present invention is shown in the drawings and is described herein.

The safety device is indicated, in general, by numeral **10** in FIG. 1. A pair of upright safety cables **11** is stationarily affixed at the top of building **12**, schematically indicated at **12***a*, each having a platform safety device **10** mounted thereon. Also connected to each safety device **10** is a supporting hoist support line **13** which is attached, at one end, to safety device **10**, indicated at **14** and which passes over a pulley **15**, the pulley being stationarily attached to building **12**. The pulley attachment may be made in any of several well-known ways and is not shown nor described herein. Hoist support line **13** is then attached to movable platform **16**, as by conventional tying or clamping onto guard rail **17** as indicated schematically at **18**.

The platform safety device **10** includes a body member **19** having opposed parallel upright sides **19***a* and **19***b* spaced apart a predetermined distance and having a trapezoidal-shape. Body member **19** further includes safety cable engaging cradle **20** adapted to receive safety cable **11** for slidable movement therein. The cable engaging cradle is upright and mates with the safety cable. The body member is constructed from rigid steel material bent to form safety cable engaging portion **20** providing integral construction of the body member. Cradle **20** has a substantially semi-circular transverse cross-section. Body member **19** further includes a pair of substantially upright parallel bar engaging edges **21** and **22** positioned on sides **19***a* and **19***b* respectively. Edge portions **21** and **22** have a predetermined length, indicated by the dimension X and are in registry on sides **19***a* and **19***b* relative to each edge portion. Body member **19** includes apertures **23** and **24** positioned therein in registry, substantially between upright cradle portion **20** and edge portions **21** and **22** respectively. A safety cable guide is affixed to side walls and includes bolt guide member **24** which passes through walls **19***a* and **19***b* at the uppermost portion of body member **19**, transverse to the direction of travel of the body member on the safety cable. The safety cable is thereby retained in cradle portion **20** of the body member. Bolt guide member **24** includes a threaded bolt having a nut **25** thereon and a roller **26** rotatably mounted on the bolt **24***a* whereby cable **11** freely passes over rotating roller **26**.

Lever arm member **27** is pivotally attached to body member **19** by shouldered bolt or lever arm body pivot member **28** which passes through openings **23** and **24** in side walls **19***a* and **19***b* and through aperture **29** in lever arm member **27** positioning lever arm member **27** sandwiched between walls **19***a* and **19***b* for pivotal movement about an axis transverse to the direction of travel of the body member relative to the safety cable. Castellated nut **30** is threaded onto bolt **28** and receives a cotter pin **31** which passes through suitable openings in nut **30** and bolt **28** securely locking the nut onto the bolt.

Lever arm member **27** includes safety cable engaging portion **32** which, in the release position shown in FIG. 2, confronts but does not engage cable **11**. Lever arm **27** further includes an opening therein, indicated at numeral **33**, whereby shouldered bolt or lever arm bar pivot member **34** may be received for mounting lever arm **27** between parallel, elongate bar members **35** and **36** having bolt receiving openings **35***a* and **36***a* in registry respectively. Castellated nut **37** is threaded onto bolt **34** and cotter pin **38** securely locks nut **37** on bolt **34**. Lever arm **27** may now rotate on bolt **34** providing rotation about an axis which is substantially transverse to the direction of travel of the body member on the upright safety cable

and which axis is parallel with the axis of rotation at the connection of the lever arm member to the body member.

Spring or bias member 39 is secured to lever arm 27 and to body member 19 and is sandwiched between side walls 19*a* and 19*b* of the body member. Spring 39 urges arm 27 downwardly pivoting on bolt 28. Spring 39 has a predetermined tension value such that it does not overcome the normal position of body member 19 as it slides on safety cable 11 and is urged downward by gravity. Spring 39 holds body member 19 against parallel bars 35 and 36 at edges 21 and 22 respectively, thereby providing free movement of the body member along the safety cable when the hoist line is operable. It is obvious that a spring which is strong enough to overcome the downward gravity action on body member 19 would result in pulling the body member upwardly and engaging cable engaging portion 32 on safety cable 11 thereby prematurely jamming the slidable safety clamp device.

Completing the assembly of the safety device to a movable platform, supporting hoist line 13 must be pivotally assembled to parallel bars 35 and 36. This is done by shouldered bolt member 40, about which the hoist line is looped and then joined by commercially available clamp 14. A castellated nut and cotter pin, which is not shown, completes the assembly of bolt member 40 at the upper portion of parallel bars 35 and 36. The movable platform is pivotally attached at bolt member 41 at the lower portion of parallel bars 35 and 36 by bracket 42 which is affixed to platform 16. Bracket 42 is sandwiched between parallel bars 35 and 36. Bolt 41 is shouldered and includes a castellated nut and bolt assembly which is not shown herein.

In operation, the safety clamp device of my invention may be assembled to a safety cable which has been securely attached to a building by simply removing the bolt and nut assembly 24*a* and 25 respectively. Further, bolt member 28 is removed from body member 19 by the removal of the castellated nut 30 and cotter pin 31. The body member 19 may now be placed on upright safety cable 11 by simply inserting the cable between walls 19*a* and 19*b* into the cable engaging cradle 20. The bolt and nut assembly 24*a* and 25, with the roller 26 thereon, is then reassembled to guide the body member as it moves on cable 11 during normal operation. Lever arm 27 is inserted between walls 19*a* and 19*b* and bolt member 28 is inserted through openings 23 and 24 in the walls 19*a* and 19*b* respectively, and through opening 29 in lever arm 27 thereby pivotally mounting lever arm 27 on bolt member 28 for rotation about an axis which is transverse to the direction of movement of body member 19. It should be noted that cable 11 must be securely attached to the building at the upper portion thereof and may be attached at the bottom of the building for operation under particularly windy conditions.

Hoist line 13 is pivotally attached to parallel bars 35 and 36 and sandwiched therebetween on bolt assembly 40. The movable platform is attached to the parallel bars at the bottom portion thereof through bracket 42 which pivots on bolt 41 and is sandwiched between parallel bars 35 and 36. The lever arm 27 must now be pivotally mounted on the parallel bars 35 and 36 and is sandwiched therebetween and mounted thereon utilizing bolt 34 which passes through openings 36*a* and 35*a* in the parallel bars and which passes through opening 33 in lever arm providing pivotal movement of lever arm 27 on bolt 34 in a direction which is transverse to the direction of movement of the body member on the safety cable.

Spring 39 maintains the body member in a normal slidable position on cable 11 by utilizing spring 39 which urges body member 19 upwardly but not so much as to overcome the normal downward position of body member 19 as determined by its weight. Spring 39 retains edges 21 and 22 of walls 19*a* and 19*b* respectively, in abutting contact with parallel bars 35 and 36 along the edge dimension denoted by the letter X during normal operation. Further, the spring, when the hoist line is functional, aids in maintaining the clearance between cable engaging portion 32 of lever arm 27 and the cable so that contaminants on the cable do not affect the free movement of the safety device when the hoist line is operating properly.

Failure of the hoist line results in the safety device taking a position similar to that shown in FIG. 4. Immediately upon hoist line failure spring 39, which is constantly urging the lever arm downwardly about the bolt member 28 causes the lever arm 27 to pivot immediately upon failure and supplements the downward movement of platform 16 at the point of hoist line failure. The downward movement of the lever arm pivoting on bolt member 28 causes the cable engaging portion 32 to contact and exert tremendous pressure on cable 11 thereby wedging cable 11 between cable engaging portion 32 and the cable receiving cradle 20 of body member 19 thereby preventing further downward movement of the platform 16 which is now supported by the interaction of body member 19 and the lever arm on the safety cable. Downward platform forces maintain the locking action as described above. It should be noted that parallel bars 35 and 36 no longer contact edges 21 and 22 of walls 19*a* and 19*b* of the body member 19 in that the movement of lever arm 27 about bolt member 28 to engage the cable 11 allows the parallel bars 35 and 36 to move outwardly from body member 19, the position which the parallel bars must take when a hoist line failure occurs due to instantaneous changes in the forces exerted upon the parallel bars. This action, of course, further aids in the immediate curtailing of downward movement of the platform 16 when hoist line failure occurs.

From the foregoing it will be seen that I have provided a new and novel movable safety device which is of the utmost simplciity and of the highest degree of reliability. Much of the reliability comes from the simplicity of the device in that there is minimum of moving parts resulting in not only simple assembly to the cable but simple operation at the time of failure of the hoist line. Further, the safety clamp of my invention operates to immediately stop downward movement of the platform in the event there is a hoist line failure, regardless of contaminants such as grease on the safety cable. The clamping action of the lever arm on the safety cable wedging the safety cable against the cable engaging cradle of the body member acts under such pressure that grease-type contaminants on the cable do not affect the positive and immediate clamping action of my safety cable. It should be noted that the immediate clamping action prevents abrupt and considerable downward movement of the platform before stopping occurs thereby preventing an unbalancing jar to the operator and items stored on the platform. This, of course, results in a high degree of safety not only to the operator but to those passing under the movable platform who may otherwise be harmed by falling objects in the event there is a hoist line failure and subsequent jar or jerking to the platform causing items to fall from the platform.

The safety cable may be attached not only at the top of the building but also at the bottom, thereby insuring minimum effect of wind on the platform which is supported by a hoist line and which is sildably guided on the safety cable which is secure at both ends.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

1. A safety clamp device adapted to be slidably mounted on an upright safety cable and connected to a supporting hoist line which is attached to and interchangeably raises and lowers a movable platform, said safety device comprising

a rigid body member adapted to be slidably mounted

on the upright safety cable, said body member having an upright cable receiving cradle and a pair of spaced apart side walls extending outwardly therefrom and having an upright bar engaging edge of a predetermined length opposite the cable engaging cradle whereby the safety cable may be positioned between the pair of side walls to position the safety cable in the upright cable receiving cradle,

a lever arm shiftably mounted on said body member for movement about an axis which is transverse to the slidable movement of said body member relative to the safety cable, said lever arm shiftable between a safety cable engaging position, and a safety cable release position, and said lever arm member having a safety cable engaging portion adapted to engage the safety cable in the safety cable engaging position,

lever arm body mounting means shiftably attaching said lever arm to said body member,

at least one elongate bar member pivotally attached to said lever arm at the end of said lever arm opposite the end which is shiftably mounted on said body member said bar member having the hoist line attached to the upper portion and the movable platform attached to the lower portion of said elongate bar, said elongate bar positioned substantially upright in the normal release position and adapted to confront the parallel bar engaging edges of said body member along the edges thereof whereby the cable engaging portion of said lever arm is urged in the cable release position, said elongate bar adapted to shift downward at the time of hoist line failure thereby urging said lever arm downward and engaging the cable engaging portion thereof with the safety cable whereby the safety cable is clamped between the cable receiving cradle of said body member and the cable engaging portion of said lever arm thereby preventing movement of said body member on the safety cable and arresting downward movement of the platform and

lever arm bar mounting means shiftably attaching said lever arm to said elongate bar member.

2. The safety clamp device of claim 1 wherein

the pair of spaced apart side walls of said body member include openings therein in registry positioned between the cable receiving cradle and the upright parallel bar engaging edges thereof,

said lever arm includes an opening therein positioned at the end of said lever arm adjacent the safety cable engaging portion thereof and

said lever arm bar mounting means comprises a bolt assembly projecting through the openings in the side walls of said body member and the opening in said lever arm adjacent the safety cable engaging portion

thereof and sandwiching said lever arm between the side walls of said body member whereby said lever arm is rotatable about said bolt member axis which is transverse to the direction of slidable movement of said body member relative to the safety cable.

3. The safety clamp device of claim 1 wherein

said elongate bar member includes an opening therein positioned intermediate the ends thereof,

said lever arm includes an opening therein at the end thereof opposite the safety cable engaging portion thereof and

said lever arm bar mounting means comprises a bolt assembly projecting through the opening intermediate the ends of said bar member and the opening in said lever arm opposite the safety cable engaging portion whereby said lever arm rotates on said bolt assembly about an axis which is transverse to the direction of travel of said body member of the safety cable.

4. The safety clamp device of claim 1 including a cable guide member positioned at the upper portion thereof adapted to guide and retain the safety cable in the safety cable engaging cradle of said body member in the safety cable engaging position and in the safety cable release position.

5. The safety clamp device of claim 1 including a pair of parallel spaced apart elongate bar members pivotally attached to said lever arm at the end of said lever arm opposite the end which is shiftably mounted on said body member and sandwiching said lever arm therebetween.

6. The safety clamp device of claim 1 including a bias member connected to said body member and said lever arm whereby said lever arm is urged into the safety cable release position and whereby said lever arm is urged into the safety cable engaging position at the point of hoist line failure.

7. The safety clamp device of claim 6 wherein said bias member comprises a helically wound spring affixed to said body member between the side walls thereof and to said lever arm whereby said lever arm is normally urged into the safety cable release position and urged into the safety cable engaging position at the point of hoist line and whereby the weight of said body member retains said body member in the normal downward safety cable release position relative to said lever arm.

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