April 2, 1968 G. R. CONLEY ETAL 3,375,900

WORKER SUPPORT DEVICE

Filed June 13, 1966

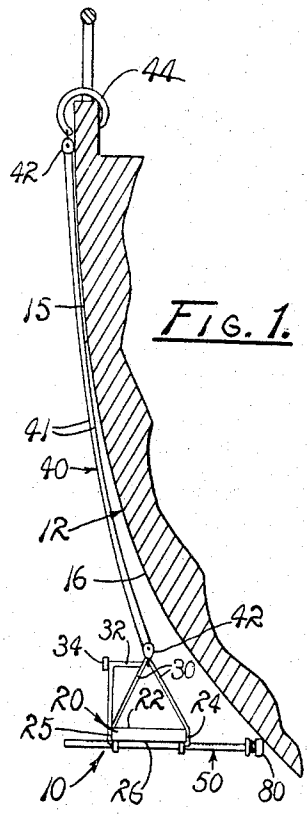


FIG. 1.

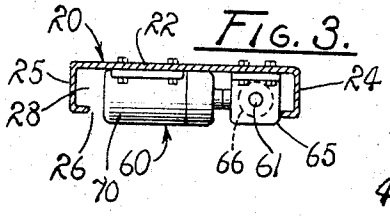


FIG. 3.

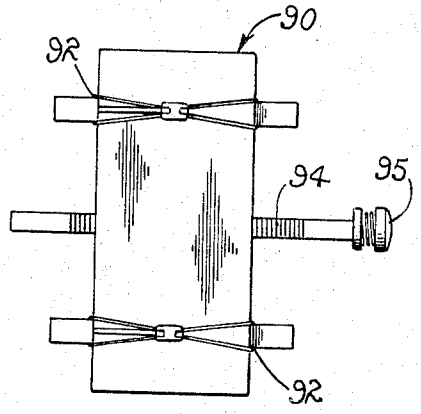


FIG. 5.

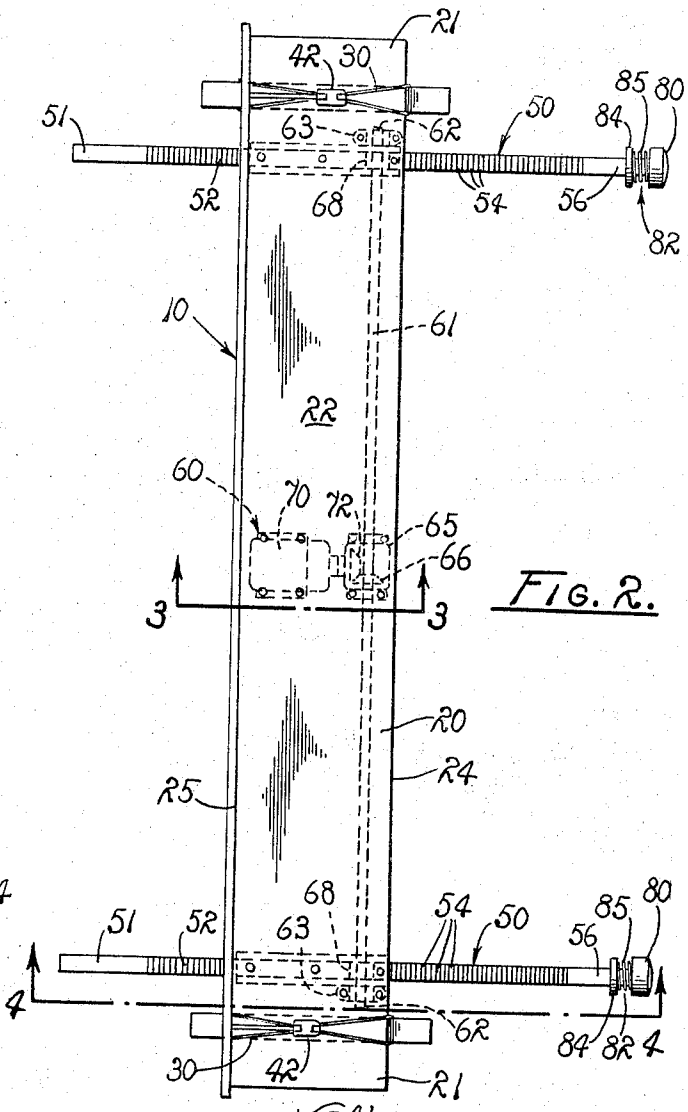


FIG. 2.

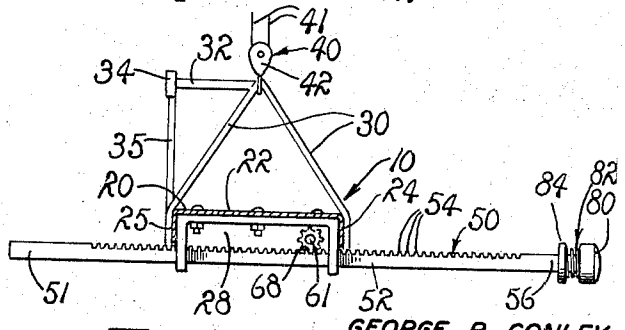


FIG. 4.

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WORKER SUPPORT DEVICE

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ABSTRACT OF THE DISCLOSURE

A worker support device adapted to be suspended in outwardly spaced relation from an upwardly extended work surface providing at least one anchor member reciprocably mounted on the support device and including a control system having driving connection to the anchor member for selective extension of the anchor member outwardly from the support device to engage said work surface in gripping relation therewith for drawing the support device toward the work surface incident to retraction of the anchor member relative to the support device.

Conventional worker support platforms such as painters' stages, planks and the like are usually pendulously suspended on cables from the tops of buildings, the rails of ships or the like. If the roof of a building has a large overhang or if the area on which the work is to be performed is recessed inwardly from the side of the building or other structure, the platform cannot be positioned sufficiently closely for a workman thereon to reach such work area. This problem is always present when suspending a worker support platform over the side of a ship which is inherently curved downwardly and inwardly so that the substantially vertical pendant support cables position the platform laterally outwardly a considerable distance from the side of the ship. It is conventional practice to connect a frapping line to the platform with the line extended around the bow of a ship to permit workmen on the deck to pull the platform inwardly against the curved side of the ship. During such operation, however, the workmen on the platform have no control over its movement. Furthermore, the workmen on the deck are usually not in a position to observe the movement of the platform so that a serious safety hazard is created particularly when emergencies occur. There is also a danger of the frapping line breaking or otherwise losing control, in which instance the platform is permitted to swing uncontrollably and to batter the workmen against the side of the ship.

Therefore, it is an object of the present invention to provide an improved worker support device for positioning workmen closely adjacent to an elevated work surface or zone.

Another object is to provide such an improved worker support device which is capable of being conveniently and accurately manipulated relative to the work surface or zone by the workmen on the device.

Another object is to provide a worker support device of the character described which is capable of being positioned laterally inwardly adjacent to the curved side of a ship and other work objects which downwardly recede from the vertical.

Another object is to provide a worker support device which is capable of being dependably rigidly attached to the relatively smooth side of a ship.

Another object is to provide a worker support device which utilizes electromagnets to constrain the support device adjacent to the side of a ship and which permits controlled lateral movement of the device from a lowering position to an inwardly displaced work position with

virtually no swaying movement or jostling of the workmen thereon.

Other objects and advantages of the present invention will subsequently become more clearly apparent upon reference to the following description and accompanying drawing.

In the drawing:

FIG. 1 is a side elevation of a worker support device embodying the principles of the present invention shown suspended in a lowering position alongside the hull of a ship fragmentarily shown in cross section.

FIG. 2 is a somewhat enlarged top plan view of the worker support device of FIG. 1.

FIG. 3 is a transverse vertical section through the support device taken on line 3—3 of FIG. 2.

FIG. 4 is a transverse vertical section through the support device taken on line 4—4 of FIG. 2.

FIG. 5 is a top plan view of an alternative form of worker support device embodying the principles of the present invention.

Referring more particularly to the drawing, a worker support device embodying the principles of the present invention is generally indicated by the reference numeral **10**. As best shown in FIG. 1, the support device is conveniently disclosed suspended alongside the hull of a ship fragmentarily indicated at **12**. The ship includes an upper rail **14**, a substantially vertical upper side surface **15**, and a downwardly inwardly curved lower side surface **16**.

The support device **10** provides an elongated worker support platform **20** of a lightweight metallic material such as aluminum or the like having opposite ends **21** and an upper support surface **22**. The platform further includes continuous front and rear sides **24** and **25**, respectively, and an open lower side **26** with the upper surface and sides circumscribing an inner chamber **28** within the platform. A pair of triangularly shaped hanger arms **30** are rigidly individually mounted in substantially upstanding relation at said opposite ends **21** of the platform. The arms are constrained in such position by a pair of substantially horizontally disposed braces **32** extended between the upper ends of the arms and an elongated back support rail **34** longitudinally extended along the rear side **25** of the platform by a plurality of upright support rods **35**.

The platform **20** is adapted to be lowered over the side of the ship **12** on a pair of block and tackle assemblies **40** having elongated cables **41** individually connected by sheave blocks **42** to the upper ends of the hanger arms **30** for elevationally lowering and raising the platform in the well known manner. As best shown in FIG. 1, the cables are suspended from the rail **14** of the ship by hooks **44** or other suitable fastener devices.

A pair of anchor bars **50** is mounted in the platform individually adjacent to the opposite ends **21** thereof. Each of the bars has an inner end **51** extended through the front and rear sides **24** and **25** of the platform closely adjacent to the lower side **26** thereof. Each of the anchor bars further includes an upper rack gear segment **52** having a plurality of gear teeth **54**. Each of the anchor bars includes an outer end **56** extended outwardly from the front side **24** of the platform.

A control unit and drive mechanism **60** for the anchor bars **50** is borne by the platform **20**. An elongated drive shaft **61** is disposed within the inner chamber **28** of the platform and provides opposite ends **62** extended slightly beyond their respectively adjacent anchor bars **50**. The ends of the drive shaft are rotatably journaled in bearing blocks **63** which are mounted in depending relation from the underside of the upper surface **22** of the platform. The drive shaft is also journaled intermediate its ends in a

drive mechanism directional change housing 65 bolted to the underside of the upper surface 22 of the platform. Within the drive housing is a beveled drive gear 66 which is mounted on the drive shaft to impart rotation to the drive shaft and to a pair of spur gears 68 individually secured to the drive shaft inwardly adjacent to the bearing block 63 in meshing engagement with the rack segments 52 of the anchor bars 50. The drive shaft 60 is adapted in the present embodiment to be driven by an electric motor 70 bolted to the underside of the upper surface 22 of the platform 20 closely adjacent to the drive housing 64 by a beveled gear 72 in meshing relation with the bevel gear 66 on the drive shaft. The electric motor is connected to a suitable source of electric power, not shown, originating from the ship 12 or from a portable power source such as a battery or the like carried on the platform. Alternatively, if no such power source is available, a hand crank or other manual actuating mechanism may be employed on the platform for rotating the drive shaft 60.

An electromagnet 80 is mounted by a shock absorber mechanism 82 on each of the outer ends 56 of the anchor bars 50. The shock absorber mechanism provides an automatic switch control for the electromagnet by including a rigid flange 84 on the outer end of each anchor bar which supports one end of a compression spring 85, the other end of which engages the electromagnet normally to maintain the flange and electromagnet in the separated position of FIG. 2. Suitable electrical lead lines, not shown, are individually connected to the electromagnet and to the flange 84 to complete the electrical circuit upon compressive movement of the magnet against the flange. It is also apparent that if no suitable power source is available, permanent type magnets may be employed to replace the electromagnets 80.

As shown in FIG. 5, the principles of the present invention may be utilized on smaller worker support devices wherein only a single anchor bar 50 is employed. This embodiment which is representative of a single worker support device, which is commonly known as a bosun's chair, has a substantially fore-shortened worker support platform 90 provided at its opposite ends with hanger arms 92 identical to the arms 30 of the platform of the preceding figures. An elongated anchor bar 94 is transversely extended through the platform and includes an electromagnet and shock absorber mechanism 95 substantially identical to the previously described mechanism.

Operation

The operation of the described embodiment of the subject invention is believed to be clearly apparent and is briefly summarized at this point. Assuming the worker support platform 20 has been lowered over the side of the ship 12 or similar work object, the cables 40 are disposed in a substantially vertical attitude with the platform disposed laterally outwardly from the lower curved surface 16 of the ship's hull. It is apparent that as the platform is lowered, it will be progressively spaced a greater distance from the curved side of the hull. Upon reaching a position horizontally aligned with the desired work surface of the side of the ship, the workers on the platform energize the drive motor 70 to cause rotation of the drive shaft 60. Such rotation causes the spur gears 68 simultaneously to walk along their respective rack segments 52 to extend the outer ends 56 of the anchor bars laterally outwardly from the platform toward the side of the ship.

Such outward travel of the anchor bars continues until the electromagnets 80 engage the side of a ship. Upon such engagement, the shock absorber mechanism 82 is operative by collapsing of the spring 85 as the magnet moves toward the flange 84 to complete the circuit and energize the magnet. Simultaneously, a switching device, not shown, may be employed to interrupt the flow of electrical current to the drive motor 70 at the instant of energizing of the magnet. Upon such energization, the magnets are firmly attached to the metallic sides of the ship so as dependably to stabilize the platform 20.

The platform 20 may then be precisely manipulated to the desired work position adjacent to the side of a ship by reverse energization of the drive motor 70. During such reverse drive, the spur gears 68 are rotated in a clockwise direction, as viewed in FIG. 4, which normally would have the effect of retracting the anchor bars through the platform in a direction from right to left. However, with the magnets 80 securely attached to the sides of the ship, such reverse drive has the effect of traveling the platform along the anchor bars in a direction from left to right, as viewed in FIGS. 1 and 4, toward the side of a ship. It will be noted that sufficient slack must be provided in the cables 40 by the operators to preclude any tipping of the platform during such inward travel.

It will be noted that forward rotation of the drive motor 70 to effect counterclockwise rotation of the spur gear 68 travels the platform outwardly along the anchor bars to the starting or lowering position of FIG. 1. When returned to the lowering position, the flow of electrical current to the electromagnets 80 is interrupted to enable their disengagement from the sides of a ship. After such de-energization of the magnets, actuation of the drive motor 70 in a reverse direction causes the outer ends 56 of the anchor bars to be simultaneously retracted inwardly toward the front side 24 of the platform to enable the platform to be elevated upwardly along the vertical portion 15 of the side of the ship 12.

In view of the foregoing, it is readily apparent that the structure of the present invention has provided an improved worker support device which is easily and conveniently manipulated by the workmen supported thereon. The anchor arms are laterally extended and retracted with respect to the platform which enables the platform readily to be attached to the side of a ship or other elevated structure having metallic work areas. Furthermore, the anchor arms permit controlled lateral traveling movement of the platform beneath overhanging obstructions and inwardly against the downwardly inwardly curving side of a ship to the desired work position. Furthermore, the worker support device is conveniently disengaged from its laterally inwardly disposed work position by controlled return movement of the platform to its lowering position spaced outwardly from the work area with a minimum of swaying or tipping as frequently occurs with conventional platform positioning practices.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.

Having described our invention what we claim as new and desire to secure by Letters Patent is:

1. A worker support device for use adjacent to upright structures having an inwardly displaced work surface comprising an elongated support platform adapted to be pendulously suspended on substantially vertically hanging lines alongside such a structure in outwardly spaced relation to its work surface; an anchor bar having an inner end transversely slidable through the platform, an opposite outer work surface gripping end, and a drive portion intermediate its ends; and powered control means borne by the platform having driving connection to said drive portion of the anchor bar for selective extension and retraction thereof relative to said platform so that upon extension of the anchor bar said outer end engages the work surface in tightly gripping relation and upon retraction of the anchor bar the platform is drawn toward the work surface from its outwardly spaced position to a position closely adjacent to the work surface.

2. A worker support device for use adjacent to elevated structures having an inwardly displaced metallic work surface comprising an elongated support platform adapted to be pendulously suspended on substantially vertically hanging lines alongside such a structure in outwardly spaced substantially parallel relation to its work surface; at least one anchor bar having an inner end transversely slidable through the platform, an opposite outer work surface gripping end, and a drive portion intermediate its ends; a magnet mounted on said outer end of the anchor bar for attachment to said metallic portion of said work surface; and a powered control member borne by the platform having driving connection to said drive portion of the anchor bar for selective extension and retraction thereof relative to the platform so that upon extension of the anchor bar said magnet on the outer end thereof engages said metallic portion of the work surface in tightly gripping relation and upon retraction of the anchor bar the platform is drawn toward the work surface from its outwardly spaced position to a position closely adjacent to the work surface.

3. A worker support device for use adjacent to elevated structures having an inwardly displaced metallic work surface comprising an elongated support platform having opposite ends adapted to be suspended on substantially vertically hanging lines alongside such a structure in outwardly spaced substantially parallel relation to its work surface; a pair of elongated anchor bars having inner ends individually transversely slidable through the platform closely adjacent to said ends thereof, opposite outer ends, and a drive portion intermediate the ends; a pair of electromagnets individually mounted on said outer ends of the anchor bars adapted to be selectively connected to a source of electric current; and a powered control member borne by the platform having driving connection to said drive portions of the anchor bars for simultaneous extension and retraction thereof relative to the platform so that upon extension of the anchor bars said magnets on the outer ends thereof engage said metallic portion of the work surface in tightly gripping relation and upon retraction of the anchor bars the platform is drawn toward the work surface from its outwardly spaced position to a position closely adjacent to the work surface.

4. A worker support device for use adjacent to elevated structures having an inwardly displaced metallic work surface comprising an elongated support platform having opposite ends adapted to be suspended on substantially vertically hanging lines alongside such a structure in outwardly spaced substantially parallel relation to its work surface; a pair of elongated anchor bars having inner ends individually transversely slidable through the platform closely adjacent to said ends thereof, opposite outer ends, and drive portions intermediate their ends providing a toothed rack; a pair of electromagnets individually mounted on said outer ends of the anchor bars adapted to be selectively connected to a source of electric current, a drive motor mounted on the platform intermediate its ends; an elongated drive shaft extended longitudinally of the platform having opposite ends; gear means on said ends of the drive shaft drivingly meshing with said toothed rack of the anchor bars; and means drivingly connecting said drive motor to said drive shaft for simultaneous extension and retratcion of the anchor bars relative to the platform so that upon extension of the anchor bars said magnets on the outer ends thereof engage said metallic portion of the work surface in tightly gripping relation and upon retraction of the anchor bars the platform is drawn toward the work surface from its outwardly spaced position to a position closely adjacent to the work surface.

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