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[54] **CANTILEVER SUPPORT**

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[52] **U.S. Cl.** **182/150**
[51] **Int. Cl.** **E04g 3/10**
[58] **Field of Search** 182/150, 63, 82, 142

[56] **References Cited**

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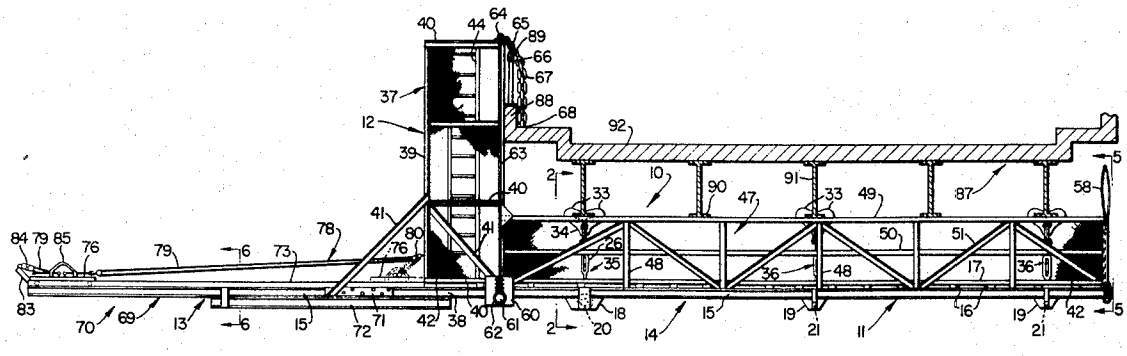
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Attorney—John N. Randolph

[57] **ABSTRACT**

A platform to safely support a plurality of workmen together with tools, equipment and supplies, for use in maintenance work beneath and in close proximity to a portion of the underside of a bridge on which work is to be performed. An upright frame structure rises from an inner end of the platform and defines a vertical passageway by which the workmen and supplies may move between the platform and the upper side of the bridge. Suspending means secured to said end of the platform extends to above said passageway for attachment to a transit crane, by means of which the platform is moved to and from a position beneath the bridge. The passageway extends upwardly along a side of the bridge and to above said bridge side to be accessible from the upper side of the bridge when the platform is disposed therebeneath. Adjustable cantilever means forms an extension of said inner end of the platform for causing the platform to swing upwardly against the underside of the bridge, while suspended by the crane, to facilitate securing hanger means, carried by the platform, to the frame structure of the bridge, after which the cantilever means is adjusted for reducing the counter balancing affect thereof, so that said hanger means will partially support the platform, and thereafter provide the sole support for the platform when the crane is disconnected from said suspending means.

9 Claims, 9 Drawing Figures



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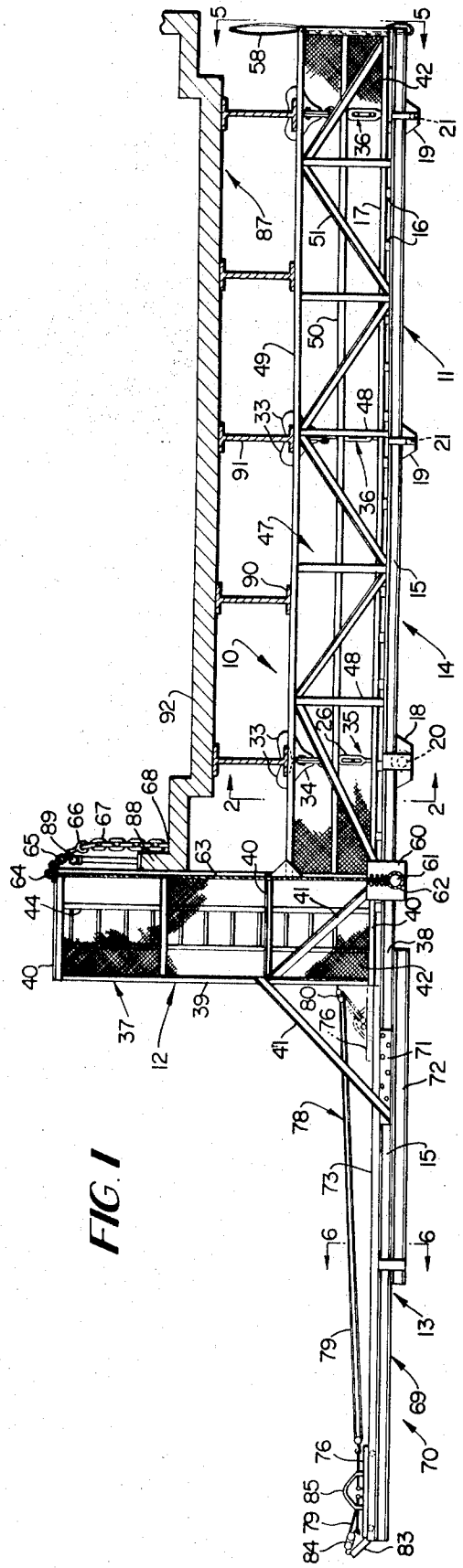


FIG. 1

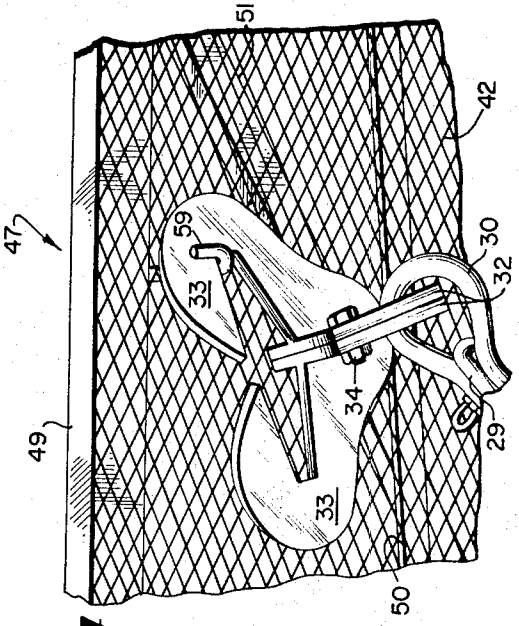


FIG. 4

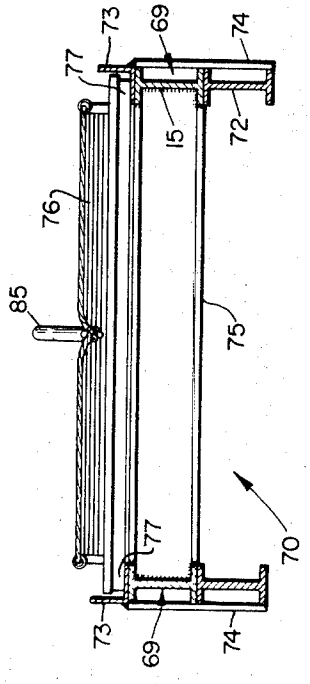


FIG. 6

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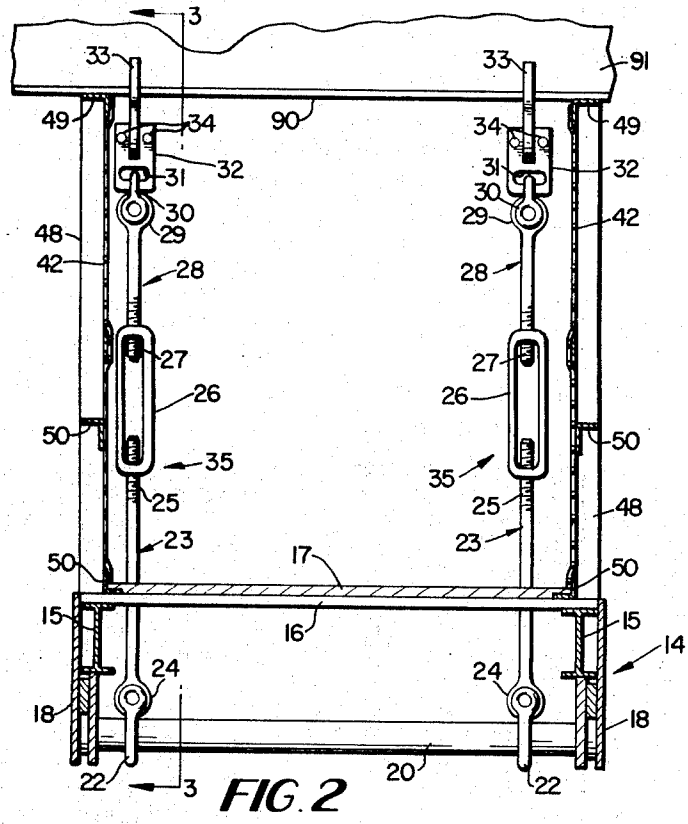


FIG. 2

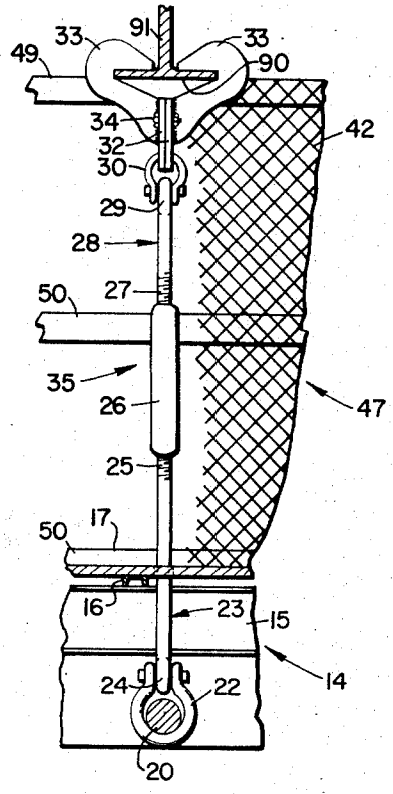


FIG. 3

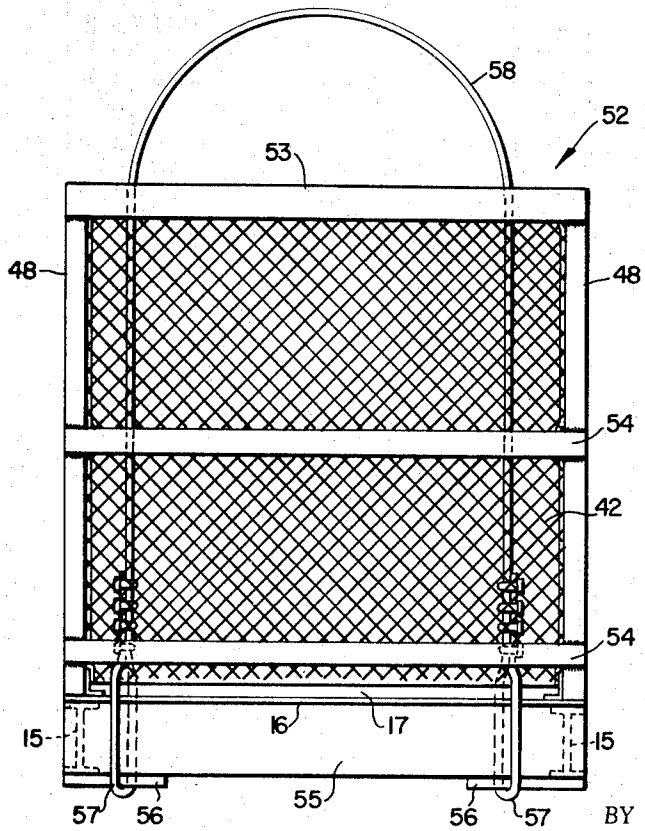


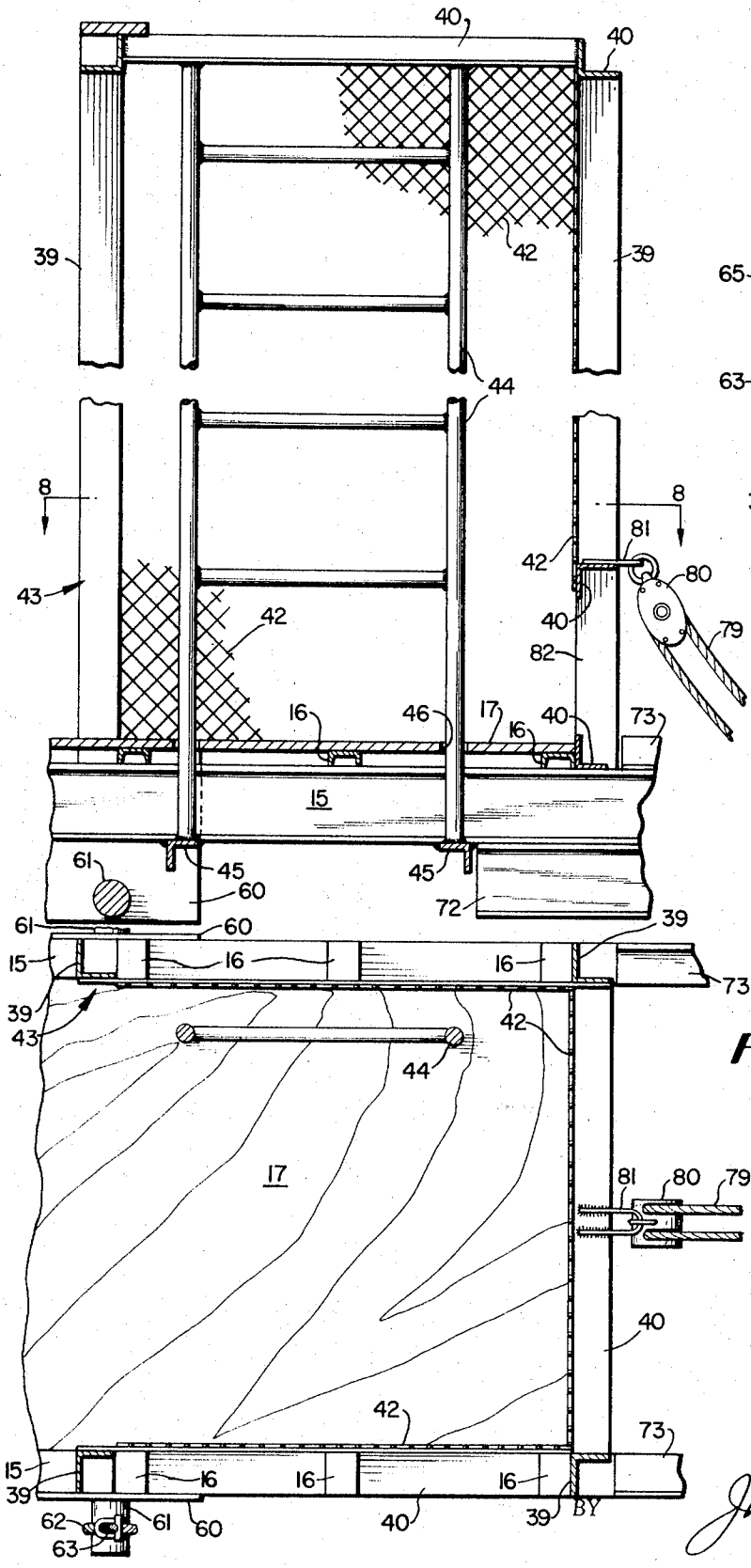
FIG. 5

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FIG. 7



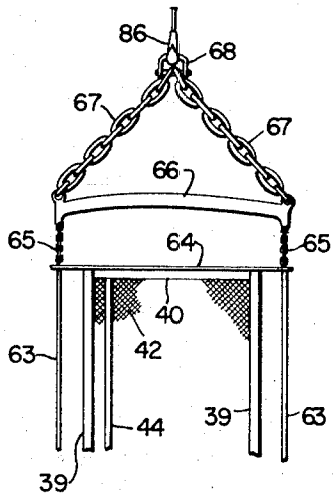


FIG. 9

FIG. 8

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CANTILEVER SUPPORT

SUMMARY

It is a primary object of the present invention to provide a work platform which may be readily manipulated by a transit crane for positioning the platform beneath and crosswise of a bridge and in sufficiently close proximity thereto so that workmen supported thereon can conveniently perform maintenance work on the underside of the bridge.

Another object of the invention is to provide a platform having confining means rising therefrom along both sides and each end, for confining the workmen thereon, to substantially eliminate the possibility of workmen falling from the platform.

A further object of the invention is to provide a frame structure rising from one end of the platform and providing a vertical passageway having an open inner side affording access at its lower end to the platform and at its upper end to the upper side of the bridge, and by means of which workmen, supplies and equipment may safely move or be moved between the platform and the upper side of the bridge.

A further object of the invention is to provide hanger means secured to and rising from the platform and adapted to be detachably secured to the frame structure of the bridge for supporting the platform therebeneath and to enable the crane to be disconnected from the platform.

Still another object of the invention is to provide a cantilever means extending from said inner end of the platform for counterbalancing the weight of the platform, for maintaining the platform in substantially a horizontal position while being conveyed and manipulated by the crane, which may be initially adjusted for elevating the platform against the underside of the bridge to facilitate attachment of said hanger means to the frame structure of the bridge, thereafter adjusted to permit the platform to swing downwardly until it is partially supported by said hanger means, and thereafter solely supported by said hanger means when the crane is detached from the suspending means.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the cantilever work support shown in an applied position;

FIG. 2 is an enlarged fragmentary cross sectional view, taken substantially along a plane as indicated by the line 2—2 of FIG. 1;

FIG. 3 is a fragmentary longitudinal sectional view, taken substantially along a plane as indicated by the line 3—3 of FIG. 2;

FIG. 4 is an enlarged fragmentary elevational view looking toward a portion of the inner side of one of the platform sides;

FIG. 5 is an enlarged end elevational view, looking in a direction as indicated by the line 5—5 of FIG. 1;

FIG. 6 is an enlarged cross sectional view, taken substantially along a plane as indicated by the line 6—6 of FIG. 1;

FIG. 7 is an enlarged fragmentary elevational view, partly in vertical section, taken vertically through the passageway, looking toward one side thereof.

FIG. 8 is a fragmentary, horizontal sectional view, through the passageway, taken substantially along a plane as indicated by the line 8—8 of FIG. 7, and

FIG. 9 is a fragmentary elevational view, on a reduced scale relative to FIGS. 7 and 8, looking toward the inner side of the upper portion of the passageway and showing the suspending means in an extended position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The cantilever support in its entirety and comprising the invention is designated generally 10 and includes an elongated platform, designated generally 11, a vertical passageway, designated generally 12, and a cantilever structure, designated generally 13.

The platform 11 includes a frame 14 having frame sides 15, each preferably including an I-beam, as seen in FIG. 2. The frame sides 15 support cross members 16, of the frame 14, which in turn support a floor or deck 17. The frame sides 15 each have a depending extension or hanger 18 and two depending extensions or hangers 19 which are spaced from one another and from the hangers 18. A rod 20, as best seen in FIGS. 2 and 3, extends between and is supported by the transversely aligned hangers 18, and rods 21 extend between and are supported by the transversely aligned hangers 19.

As seen in FIG. 2, two shackles 22 are mounted on the cross rod 20. Each shackle 22 is connected to a rod 23 by engaging the eye 24 at one end thereof. The other threaded end 25 of each rod 23 threadedly engages through the lower end of a conventional turn buckle 26. The threaded end 27 of a rod 28 threadedly engages the upper end of each turn buckle 26 and has an eye 29 at its upper end which is connected to a shackle 30, which engages through openings 31 of the base plates 32 of two hook-like pawls 33. Pawls 33 are detachably connected together in opposed relationship by two nut and bolt fastenings 34, which engage through the base plates 32. The parts 22,34 combine to form hangers, designated generally 35. Pairs of corresponding hangers 36 are secured to each of the rods 21.

The vertical passageway 12 includes an upright frame 37 which is mounted on and secured to an inner end 38 of the platform frame 14. The frame 37 includes upright corner posts 39, horizontal cross braces 40 and diagonal braces 41. The opposite sides of the frame 37, which are disposed parallel to the platform 11, and the side thereof disposed remote from the platform are covered with a metal mesh fabric material 42, leaving the inner side 43, which faces inwardly of the platform 11, open, as seen in FIGS. 7 and 8. A ladder 44 extends from top to bottom on the interior of the passageway 12, adjacent one side of the frame 37, and is supported at its lower end on angle members 45 which are welded to the underside of one of the side rails 15. The side rails of the ladder are welded at their upper ends to an upper one of the cross braces 40 and extend through openings 46 of the deck 17.

The platform 11 has sides 47 each including upright posts 48, secured to and rising from the I-beams 15, hand rails 49 supported on and secured to the upper ends of the posts 48, and horizontal braces 50 and diagonal braces 51 extending between and secured to

the posts 48. The platform sides 47 are covered with additional mesh fabric 42.

As seen in FIG. 5, the outer end 52 of the platform 11 has a top rail 53 extending between the upper ends of the posts 48, located at said end of the platform, and cross braces 54 extend between said two corner posts 48 of the two sides 47. Additional mesh fabric 42 covers the end 52 of the platform.

A cross member 55, such as a channel member, extends across the end 52 of the platform frame 14 and is secured to the ends of the I-beams 15. Short lengths of pipe 56 are welded or otherwise secured to the bottom edges of the ends of the cross member 55, to be engaged by the looped ends 57 of a cable 58, the intermediate portion of which is disposed above the cross rail 53.

Hooks 59 are secured to and extend downwardly from the handrails 49 and inwardly through the wire mesh 42 for supporting the pairs of pawls 33, when not in use, as seen in FIG. 4.

Plates 60 are secured to the I-beams 15 at the open side 43 of the passageway 12. A rod 61 extends between and is secured to the plates 60. Looped lower ends 62 of two cables 63 are secured to the rod 61 and extend upwardly to adjacent the upper end of the passage 12 and are disposed externally thereof, as seen in FIG. 9, where the upper ends of the cables 63 are secured to the ends of a bar 64. Short lengths of chain 65 connect the ends of the bar 64 to the ends of a spreader bar 66. Two short chains 67 are connected to and extend from the ends of the bar 66 in converging relation to one another and are joined at their opposite ends by a clevis 68.

The I-beams 15, forming the side rails of the platform frame 14, extend beyond the inner end 38 of said platform to provide portions of the side rails 69 of the frame structure 70 of the cantilever unit 13. As illustrated in FIG. 1, splice plates 71 are employed to connect sections of the I-beams 15, and I-beams 72 are welded to bottom edges of the joined ends of said aligned I-beams 15. Angle members 73 are welded to the top flanges of the side rails 69, as seen in FIG. 6, and have bottom flanges extending inwardly from the vertical flanges thereof. Bars 74 are welded to the outer sides of the rails 69 and to the angle members 73 to prevent outward displacement of said members 73. Cross braces 75 extend between and are secured to the rails 69, to maintain said rails parallel to one another.

A counterweight 76 has rollers 77 on its underside to ride on the bottom flanges of the angle members 73, during movement of the counterweight 76 between its full and dotted line positions of FIG. 1. A block and tackle 78 includes cables 79 connected to and leading from the counterweight 76 in opposite directions through pulley blocks 80 and 84. Pulley block 80 is anchored by a U-shaped member 81 to a cross member 40, and which defines the top of an access opening 82 in the outer side of the passageway 12, as seen in FIG. 7. As seen in FIG. 1, a member 83 is fixed to and extends outwardly and upwardly from the outer end of the cantilever frame 70 to provide an anchor for the pulley block 84. An eye 85 is secured to the counterweight 76 to enable said counter-weight to be adjusted longitudinally of the frame 70 by a crane hoist, not shown.

FIG. 9 shows the hook 86 of the hoist of a transit crane, not shown, for example, connected to the clevis 68 for supporting and conveying the work support 10. The counterweight 76 would be located somewhere between its full and dotted line positions of FIG. 1 for counterbalancing the weight of the platform 11 when the support 10 was being carried by the crane for movement to and from its position of FIG. 1 relative to a bridge 87, a portion of which is shown in FIG. 1. The support 10 is moved by the crane to position the platform 11 under the bridge 87 and crosswise thereof. A hook, not shown, may be engaged with the looped upper portion of the cable 58, so that the platform may be swung and guided to its position of FIG. 1 beneath the bridge 87, and with the passageway 12 extending upwardly along one side of the bridge and abutting against the curbing 88 of said side and extending to above the guard rail 89 thereof.

One or two workmen may then enter the passageway 12 through its open side 43, between the curbing 88 and guard rail 89 and descend to the platform 17 by means of the ladder 44, to further extend the counterweight 76, by manipulating the cable 79, adjacent the pulley block 80, utilizing the access opening 82, to cause the cantilever structure 13 to overbalance the platform 11, so that said platform will swing upwardly until its hand rails 49 contact the bottom flanges 90 of the I-beams 91, constituting parts of the frame structure of the bridge 87. The workmen may then disconnect the fastenings 34 of the pawls 33 of the two hangers 35 so that the inwardly facing hooks of said pawls can be engaged with the bottom flange 90 of the I-beam 91, disposed nearest the passageway 12, as seen in FIG. 3. The fastenings 34 are then replaced for securing said hangers to said I-beam flange. The hangers 36, located midway of the ends of the platform 11 are then secured in the same manner to the intermediate I-beam 91, after which the hangers 36, disposed near the outer end 52 of the platform, are secured in the same manner to the I-beam 91, located most remote from the passageway 12. The hangers 36 and 35 are disconnected from the I-beams 91 from right to left of FIG. 1 and with the counterweight 76 extended.

The turnbuckles 26 of the hangers 35 and 36 can be adjusted for loosening or tightening said hangers so that all the hangers will be equally taut for equally sharing the weight of the support 10 after the hook 86 is disconnected from the clevis 68. After all the hangers have been secured to the I-beams 91, the counterweight 76 is moved from its full line to its dotted line position of FIG. 1, so that the weight of the support 10 will be borne partially by the hangers 35 and 36, after which the hook 86 is disengaged from the clevis 68, so that the support 10 will be fully supported by the hangers 35 and 36.

It will be apparent that workmen may perform maintenance work on the underside of the bridge 87 with a maximum amount of safety to the workmen, and that supplies and equipment may be moved to and from the platform 11 from the upper side 92 of the bridge 87 through the passageway 12.

It will also be apparent that the hook 86 can be attached to the hoist of a rolling dolly, not shown, which could travel along the upper bridge surface 92, longitudinally of the bridge 87, for conveying the platform 11

along the underside of the bridge, while disposed crosswise thereof, with the counterweight **76** extended to counterbalance the weight of the platform **11** and with the pawls **33** loosened or detached from the bottom I-beam flanges **90**, for performing maintenance or repair work on different portions on the underside of the bridge.

Various modifications and changes are contemplated and may be resorted to, without departing from the function or scope of the invention.

I claim as my invention:

1. A support comprising an elongated platform, an upright frame structure fixed to and rising from an inner end of said platform and providing an access passageway for the movement of workmen to and from the platform, suspending means secured to said inner end of the platform and rising from said passageway and adapted to be detachably connected to a mobile hoist for moving said platform to and from a position beneath and crosswise of the underside of a bridge, hanger means secured to and extending upwardly from said platform and adapted to be detachably secured to the frame structure of the bridge for supporting the platform therebeneath and with said passageway rising from one side of the bridge and accessible from the upper side of the bridge, cantilever means extending from said inner end of the platform for counterbalancing the weight of the platform and for causing the platform to swing upwardly to facilitate securement of said hanger means to the frame structure of the bridge, and means for adjusting said cantilever means for varying the counterbalancing affect thereof for causing the platform to be partially supported by said hanger means.

2. A support as in claim **1**, said cantilever means including a pair of rails extending from said inner end of the platform and disposed substantially parallel to the axis of the platform, and a counterweight supported for travel along said rails toward and away from the platform.

3. A support as in claim **2**, and block and tackle means connected to said platform and rails and adapted to be manually actuated for moving the counterweight toward and away from the platform.

4. A support as in claim **1**, said upright frame structure having an open inner side facing toward the other end of said platform and inwardly of the side of the bridge on which said passageway is disposed, and means of open-work construction closing the other three sides of said passageway.

5. A support as in claim **4**, and a ladder disposed in said passageway to facilitate the movement of workmen therethrough to and from the platform.

6. A support as in claim **1**, said platform including a frame and a deck secured to and supported on said frame.

7. A support as in claim **6**, posts secured to and rising from the sides of said frame, and rails supported by upper ends of said posts and extending along the sides of the platform and across the other outer end thereof and disposed at a heighth to function as guardrails for protecting workmen standing on the platform.

8. A support in claim **7**, and means of open-work construction enclosing the spaces between the rails, platform frame and posts.

9. A support as in claim **1**, said hanger means comprising pairs of hook-like members, and means detachably securing said hook-like members of each pair together with the hook portions opening toward one another and engaging the bottom flange of an I-beam of the bridge frame structure.

* * * * *