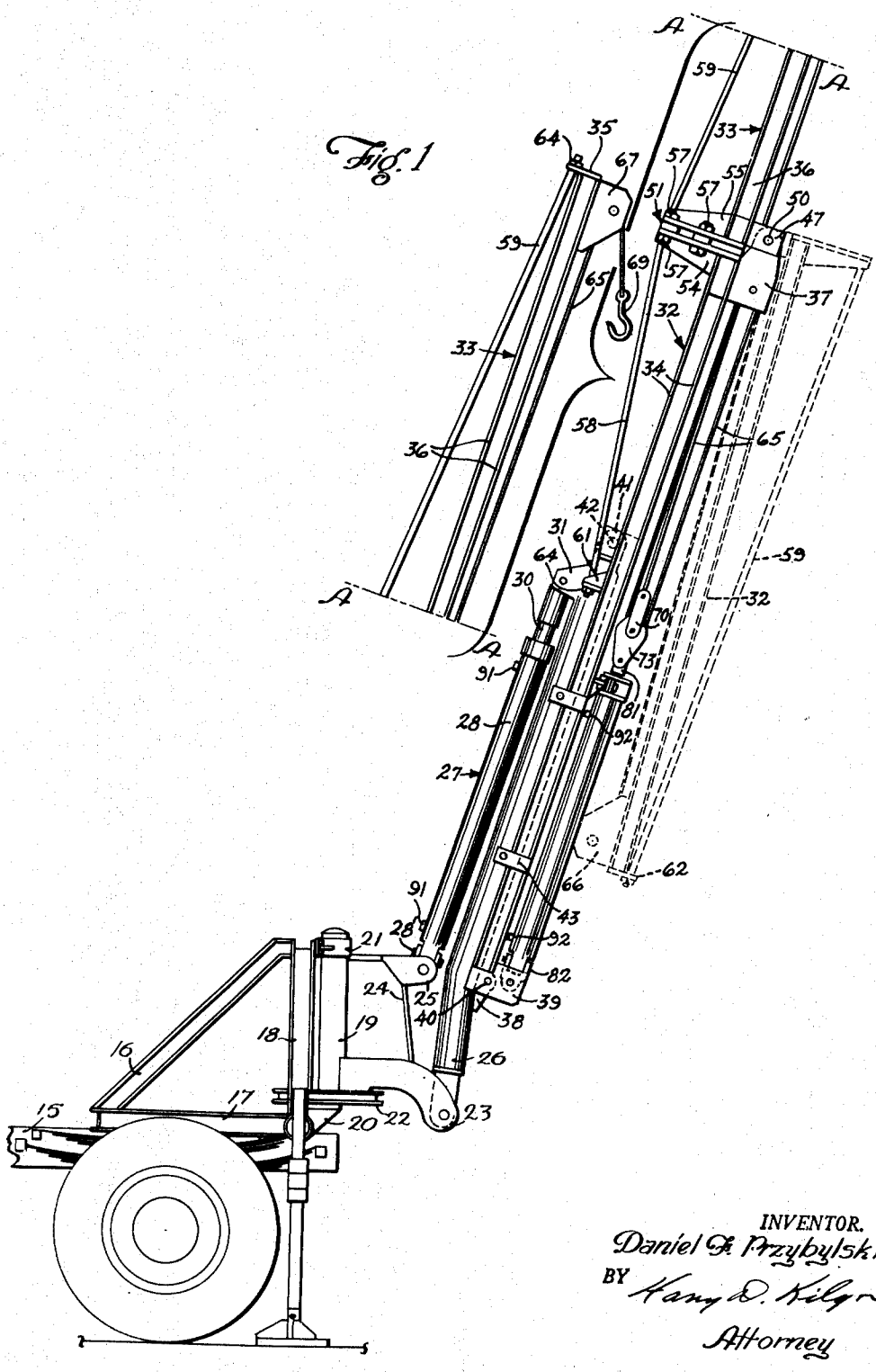
Sept. 21, 1954 D. F. PRZYBYLSKI 2,689,656

CRANE BOOM HAVING A HINGED SECTION

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Fig. 1



INVENTOR.
Daniel F. Przybylski
BY Harry D. Kilgore
Attorney

Sept. 21, 1954 D. F. PRZYBYLSKI 2,689,656

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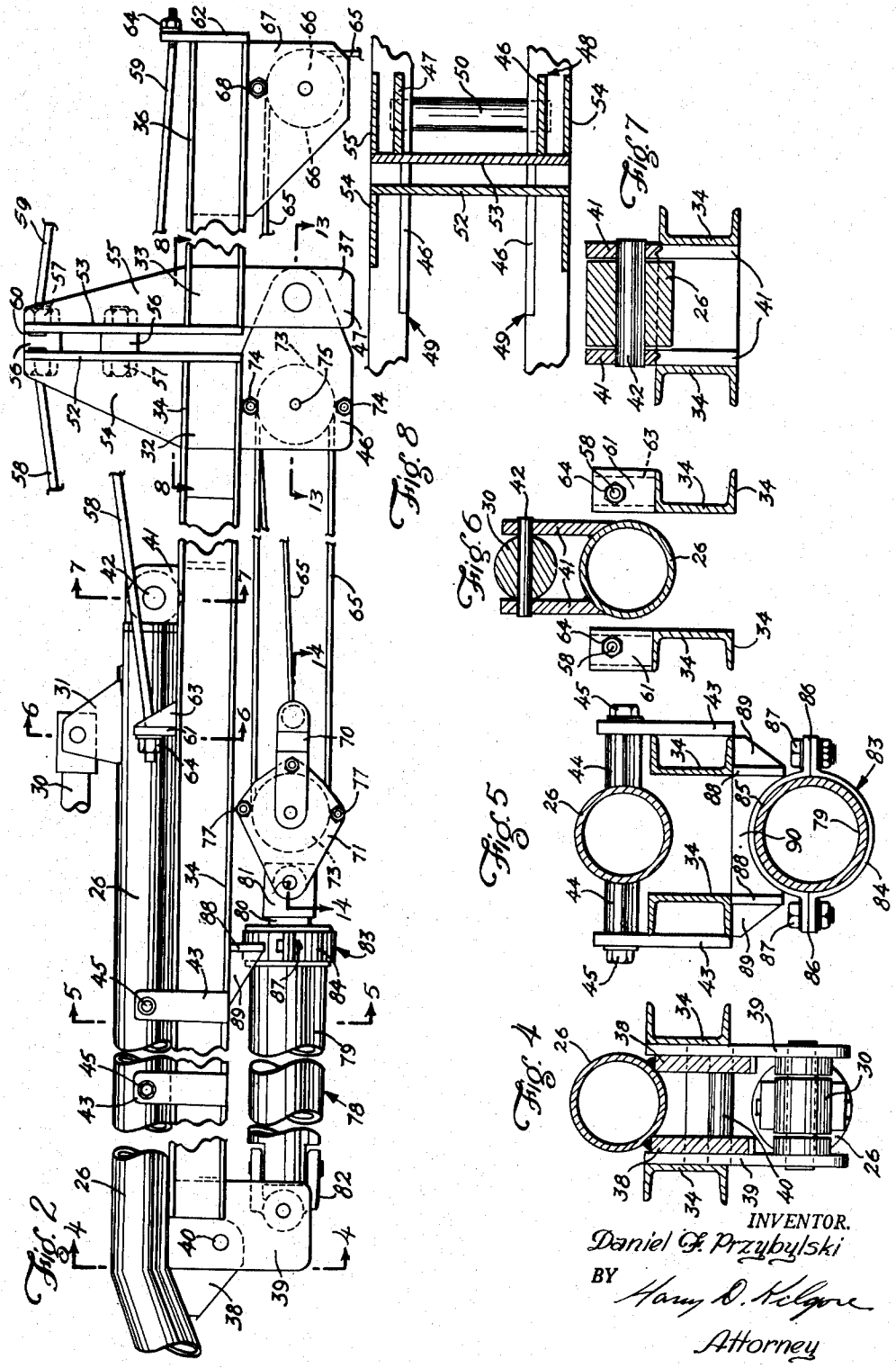


Fig. 2

Fig. 8

Fig. 7

Fig. 6

Fig. 5

Fig. 4

INVENTOR.
Daniel F. Przybylski
BY
Harry O. Kilgore
Attorney

Sept. 21, 1954 D. F. PRZYBYLSKI 2,689,656

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Filed Jan. 16, 1953 3 Sheets-Sheet 3

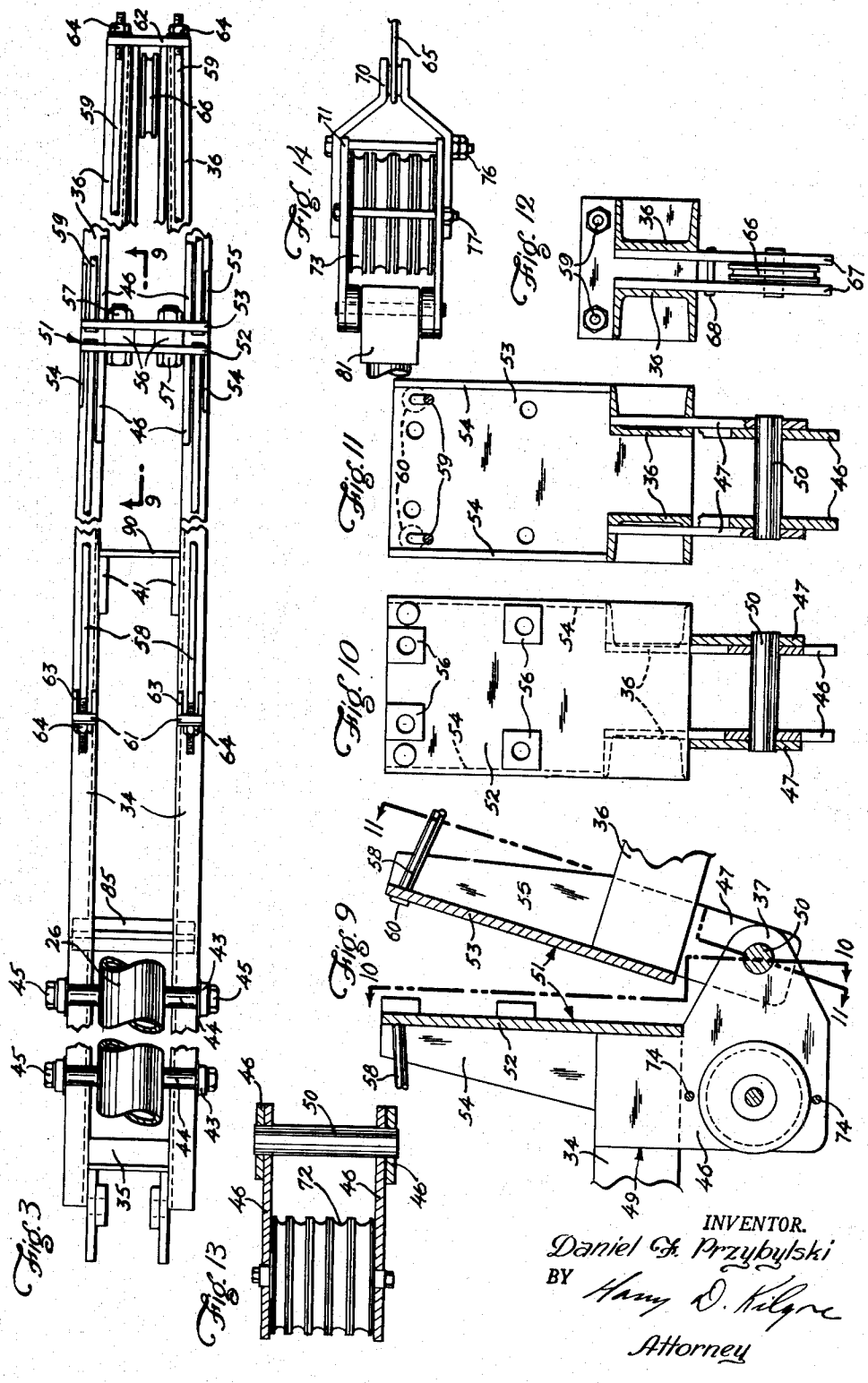


Fig. 3

Fig. 13

Fig. 14

Fig. 12

Fig. 11

Fig. 10

Fig. 9

INVENTOR.
Daniel F. Przybylski
BY Harry D. Kilgore
Attorney

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2,689,656

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CRANE BOOM HAVING A HINGED SECTION

Daniel F. Przybylski, Winona, Minn.

Application January 16, 1953, Serial No. 331,586

6 Claims. (Cl. 212—144)

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My present invention relates to improvements in cranes having a swinging boom.

An object of this invention is to provide a novel swinging boom structure for a crane.

Another object is to provide a novel swinging boom structure for a crane having a hinged section.

Still another object is to provide a novel swinging boom structure for a crane and a hydraulically-operated ram for raising or lowering the same.

A further object is to provide a novel swinging boom structure for a crane having a hoisting cable and hydraulic means for operating the same.

A still further object is to provide a strut for a swinging crane boom having a hinged section.

These and other objects of the invention will be apparent from the following description, reference being had to the drawings.

To the above end, generally stated, the invention consists of the novel devices and combination of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a side elevational view of the invention with the upper portion thereof removed on the line A—A and shown in an offset position, said view also showing a fragment of the rear end portion of a motor-propelled truck on which is mounted a novel truck mount for the crane;

Fig. 2 is a fragmentary side elevational view of the intermediate portion of the crane, on an enlarged scale;

Fig. 3 is a plan view of the parts shown in Fig. 2, except somewhat more fragmentary;

Figs. 4, 5, 6 and 7 are fragmentary detail views principally in section taken on the lines 4—4, 5—5, 6—6 and 7—7 of Fig. 2, respectively, on an enlarged scale;

Fig. 8 is a view partly in plan and partly in horizontal section taken on the line 8—8 of Fig. 2, on an enlarged scale;

Fig. 9 is a fragmentary detail view partly in side elevation and partly in vertical section taken on the line 9—9 of Fig. 3, on the same scale as Fig. 8;

Figs. 10 and 11 are views partly in elevation and partly in section taken on the lines 10—10 and 11—11 of Fig. 9, respectively;

Fig. 12 is a detail view partly in elevation and partly in section taken on the line 12—12 of Fig. 2, on the same scale as Fig. 4;

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Fig. 13 is a view partly in plan and partly in horizontal section taken on the line 13—13 of Fig. 2, on the same scale as Fig. 12; and

Fig. 14 is a plan view of the parts, at the line 14—14, of Fig. 2, on the same scale as Fig. 13.

The numeral 15 indicates a fragment of the rear end portion of a motor-propelled truck on which is mounted a novel truck mount 16 which is the subject matter of a pending application filed January 16, 1953 under Serial Number 331,584 and entitled, "Truck Mount for Booms, Cranes, and the like."

This truck mount 16 includes a sub-frame 17 and an upright main frame 18. Forming a part of the truck mount 16 is a turn post 19 mounted on a step bearing 20 and turnable in a sleeve bearing 21. These bearings 20—21 are fixed to the main frame 18. On the lower end portion of the turn post 19 is a large sheave 22 having a grooved periphery for a cable operated by hydraulic rams, not shown. A pair of laterally spaced lower ears 23, fixed to the turn post 19 and sheave 22, project radially from said turn post. Fixed to the turn post 19 and the ears 23 is a reinforced upright web 24 having on its upper end a pair of laterally spaced upper ears 25 that overlie the ears 23.

The numeral 26 indicates a novel offset tubular boom, which, in part, is the subject matter of a pending application filed January 16, 1953 under Serial Number 331,584 and entitled, "Truck Mount for Booms, Cranes, and the like." The boom 26, at its inner end portion extends between the ears 23 and is pivoted thereto for raising and lowering movements. A hydraulic ram 27 overlying the boom 26 is provided for raising and lowering said boom and includes a cylinder 28 and a piston 29 having a piston rod 30. The cylinder 28, at its rear end, is attached to the upper ears 25 by a universal coupling 28'. The piston rod 30, at its outer end portion extends between a pair of laterally spaced upstanding ears 31, fixed to the boom 26 at its outer end portion, and is pivoted thereto.

The boom 26 has a long extension comprising an inner section 32 and a hinged outer section 33. The section 32 is formed of two channel bars 34 arranged with flanges extending horizontally outwardly. These channel bars 34 are laterally spaced parallel and connected, near their rear ends, by a crosstie angle bar 35. The outer section 33 is also formed of two channel bars 36 arranged in the same manner as the channel bars 34. The channel bars 36 of the section 33 are in outwardly converging relation with their inner ends aligned with the channel bars 34.

The two sections 32–33 are connected by a pair of laterally spaced hinges 37 secured, one pair to each pair of aligned channel bars 34—36. The section 32 extends longitudinally under the boom 26 from its rear end substantially at its point of offset. At this point, the boom 36 is provided, at its under side, with a fixed pair of laterally spaced depending ears 38. A pair of laterally spaced depending side plates 39, between which the ears 38 extend, are rigidly secured, one to each channel bar 34. A pin 40 extends through aligned holes in the ears 38 and side plates 39 and connects the section 32, at its rear end to the boom 26, see Figs. 2 and 4. The section 32 is further connected to the boom 26 by a pair of upstanding ears 41 fixed to the channel bars 34, at their inner faces, and between said ears the boom 26 projects. A pin 42 extends through aligned holes in the ears 41 and the boom 26 and connects said ears to the boom 26, Figs. 2 and 7.

The section 32 is still further attached to the boom 26 by two pairs of upright ears 43 secured to the flanges of the channel bars 34 at their outer longitudinal edges, see Figs. 2 and 5. The boom 26, between the ears 43 of each pair, is provided on its sides with a pair of long bosses 44. These bosses 44 engage the ears 43 on their inner sides and are secured thereto by screws 45 that extend through holes in said ears and have threaded engagement with the bosses 44, see Fig. 5.

The hinges 37 are below the channel bars 34—36 and each comprises a pair of flat members 46 and 47 on the sections 32—33, respectively. The hinge members 47 are rectangular and elongated transversely of the channel bars 36 with their upper end portions fitted in deep notches 48 in the flanges of the bars 36 next to the webs of said bars and rigidly secured thereto. The hinge members 47 are each in the form of an L with their upper portions fitted in rabbets 49 in the channel bars 36. The lower portions of the hinge members 46 overlap the hinge members 47 on their inner sides. A hinge pin 50 extends through aligned holes in the hinge members 46 and 47 and connects said members whereby the upper section 33 may be folded under the section 32, as shown by broken lines in Fig. 1.

The sections 32—33 are releasably connected with the section 33 aligned with section 32, by a two-part upstanding strut 51 including a pair of parallel flat plates 52 and 53 that extend transversely between the adjacent end of the sections 32—33. The channel bars 34—36 at their ends abut the plates 52—53, respectively, at their lower end portions and are rigidly secured thereto, Figs. 2, 9, 10 and 11. The plates 52—53 are each reinforced by a pair of gussets 54 and 55, respectively. The gussets 54—55 rest on the upper flanges of the channel bars 34—36, respectively, at their outer longitudinal edge and extend to the tops of the plates 52—53.

Fixed to the face of the plate 52 are upper and lower pairs of bosses 56 which are engaged by the plate 53 and act as spacers to position the plate 53 parallel to the plate 52. Nut-equipped bolts 57 extend through aligned holes in the plates 52—53 and the bosses 56 and hold the plates 53 clamped onto said bosses.

Truss rods 58 and 59 extend, one longitudinally over each channel bar 34—36, respectively, with one of their end portions extending through holes in the upper portions of the plates 52—53, respectively, and are upset to provide heads 60 that

attach the truss rods 58—59 to the plates 52—53. The truss rods 58—59, at their other end portion extend, the former through holes in upright anchor plates 61 and the latter extend through holes in a single anchor plate 62. The anchor plates 61 are rigidly secured one to each of the upper flanges, the channel bars 34 and reinforced by a pair of gussets 63. The anchor plate 62 abuts the outer ends of the channel bars 36, is rigidly secured thereto and affords a crosstie for said channel bars. Nuts 64 are applied to the truss rods 58—59 and impinge the anchor plates 61—62 as bases of resistance and hold the truss rod under tension.

A hoisting cable 65 runs over a sheave 66 journaled to and between a pair of ears 67 secured to the channel bars 36, at their outer end portions, and depending therefrom. The ears 67, above the sheave 66, are cross-connected by a nut-equipped bolt 68. A hook 69 is attached to the cable 65 at its outer end, and said cable at its other end is looped around the transverse portion of a clevis 70 attached to a sheave block 71. The intermediate portion of the cable 65 is looped around and arranged to run over two multiple sheaves 72 and 73. The sheaves 72 are journaled to and between the hinge members 46 to turn about a common axis, and the sheaves 73 are journaled in the block 71 to turn about a common axis, see Figs. 1, 2, 3, 9, 12, 13 and 14.

The hinge members 46 are cross-connected, both above and below the sheaves 72, by nut-equipped bolts 74. The side members of the clevis 70 embrace the sheave block 71 and the journal 75 of the sheaves 73 extends through aligned holes in said side member and attach the clevis 70 to the sheave block 71. The clevis 70 is further attached to the sheave block 71 by a nut-equipped bolt 76 that extends through aligned holes in the side members of the sheave block 71 and the clevis 70. A pair of nut-equipped bolts 77 cross-connect the side members of the sheave block 71 above and below the sheaves 73.

The sheave block 71 is pulled by a hydraulic ram 78 to lift the end of the cable 65 provided with the hook 69 or pushed to put slack in said cable, whereby the hook-equipped end of the cable 65 may be lowered. This ram 78 underlies the boom extension 32 and comprises a cylinder 79 and a piston 80 having a piston rod 81. The cylinder 79, at its outer end, is connected to the side plates 39 by a universal coupling 82 and supported at its outer end portion by a sleeve bearing 83. This bearing 83 includes a lower section 84 and an upper section 85 having outturned end portions 86 connected by nut-equipped bolts 87 that clamp the bearing 83 into the cylinder 39. The bearing section 85 is rigidly connected by a vertically edgewise positioned bar 88 that extends transversely between the channel bars 34, is rigidly secured thereto and acts as a cross-tie for said channel bars. The cross-tie bar 88 is reinforced by gussets 89. The channel bars 34 are further connected by a cross-tie bar 90 placed flatwise against the ears 41 and between said channel bars and rigidly secured to said bars and ears, Figs. 2 and 3.

The cylinders 28—79 are provided with fittings 91 and 92, respectively, through which fluid under pressure is introduced into said cylinders for operating their pistons through hose connections, not shown, leading from a source of fluid supply, under pressure, through hand-controlled valves.

While there are herein disclosed but a limited number of embodiments of the structure, process

and product of the invention herein presented, it is possible to produce still other embodiments without departing from the inventive concept herein disclosed, and it is desired therefore that only such limitations be imposed on the appended claims as are stated herein, or required by the prior art.

What I claim is:

1. In an assembly of the class described, a turn post, a boom including an inner section and an outer section, the former being pivoted to the turn post for raising and lowering movements, a hinge joint connecting the outer section to the inner section for folding movement thereon, a strut at the hinge joint comprising two upright parts rigidly secured one to each of said sections, at least one truss rod connecting each part of the strut to the respective section, means releasably connecting said two parts for holding the outer section in a fixed operative position relative to the inner section, and a hydraulic ram connecting the inner section to the turn post and operable to raise or lower said inner section.

2. The structure defined in claim 1 in which the hinge joint includes a pair of laterally spaced hinges, each comprising a pair of depending overlapped plates rigidly secured one to each of the sections, and a hinge pin extending through aligned holes in the overlapped hinge plates, said hinge joint, when the outer section is in an operative position, holding the two sections endwise spaced apart, the parts of the strut being two flat upright plates extending transversely between the adjacent ends of the two sections and in abutting engagement one with each of said sections, the means releasably connecting the two parts of the strut being nut-equipped bolts that extend through aligned holes in the two plates.

3. The structure defined in claim 1 in which the hinge joint includes a pair of laterally spaced hinges, each comprising a pair of depending overlapped plates rigidly secured one to each of the sections, and a hinge pin extending through aligned holes in the overlapped hinge plates, said hinge joint, when the outer section is in an operative position, holding the two sections endwise spaced apart, the parts of the strut being two flat upright plates extending transversely between the adjacent ends of the two sections and in abutting engagement one with each of said sections, the means releasably connecting the two parts of the strut being nut-equipped bolts that extend through aligned holes in the two plates, said structure further including spacing bosses between the two strut plates.

4. The structure defined in claim 1 in which the hinge joint includes a pair of laterally spaced hinges, each comprising a pair of depending overlapped plates rigidly secured one to each of the sections, and a hinge pin extending through aligned holes in the overlapped hinge plates, said hinge joint, when the outer section is in an operative position, holding the two sections endwise spaced apart, the parts of the strut being two flat upright plates extending transversely between the adjacent ends of the two sections and in abutting engagement one with each of said sections, the means releasably connecting the two parts of the strut being nut-equipped bolts that extend through aligned holes in the two plates, said structure further including tubular bosses between the two plates, integral with one of said plates through which the bolts extend.

5. The structure defined in claim 1 in which the hinge joint includes a pair of laterally spaced hinges, each comprising a pair of depending overlapped plates rigidly secured one to each of the sections, and a hinge pin extending through aligned holes in the overlapped hinge plates, said hinge joint when the outer section is in an operative position, holding the two sections endwise spaced apart, the parts of the strut being two flat upright plates extending transversely between the adjacent ends of the two sections and in abutting engagement one with each of said sections, the means releasably connecting the two parts of the strut being nut-equipped bolts that extend through aligned holes in the two plates, said structure further including gussets reinforcing the strut plates.

6. In an assembly of the class described, a turn post, a boom pivoted to the turn post for raising or lowering movements, a hydraulic ram connecting the boom to the turn-post and operable to raise or lower the boom, an extension for the boom including an inner section and an outer section, each section comprising a pair of laterally spaced channel bars arranged with their webs in opposing relation and their flanges extending outwardly, means cross-connecting the channel bars of each section, the inner section underlapping the outer portion of the boom and rigidly secured thereto, a hinge joint connecting the outer section at its inner end, to the inner section at its outer end for folding movement thereunder, and releasable means connecting the outer section to the inner section at the hinge joint in a relatively fixed position, the releasable means that connects the two sections being a strut comprising two plates that extend transversely between the adjacent end of the two sections, perpendicular thereto, and in abutting engagement each with the channel bars of one of the sections and rigidly secured thereto, and nut-equipped bolts connecting the strut plates, said structure further including an anchor fixed to each channel bar of the inner section, a pair of truss rods attached at one of their ends to the strut plate of the inner section and attached at their outer ends, one to each anchor, an anchor connecting the channel bars of their outer section at their outer ends, and a second pair of truss rods attached at one of their ends to the strut plate of the outer section, and attached at their other ends to the last noted anchor.

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