Feb. 27, 1940. B. V. MILLAM 2,192,091

PORTABLE AND COLLAPSIBLE PILE DRIVER

Filed April 26, 1937 3 Sheets-Sheet 1

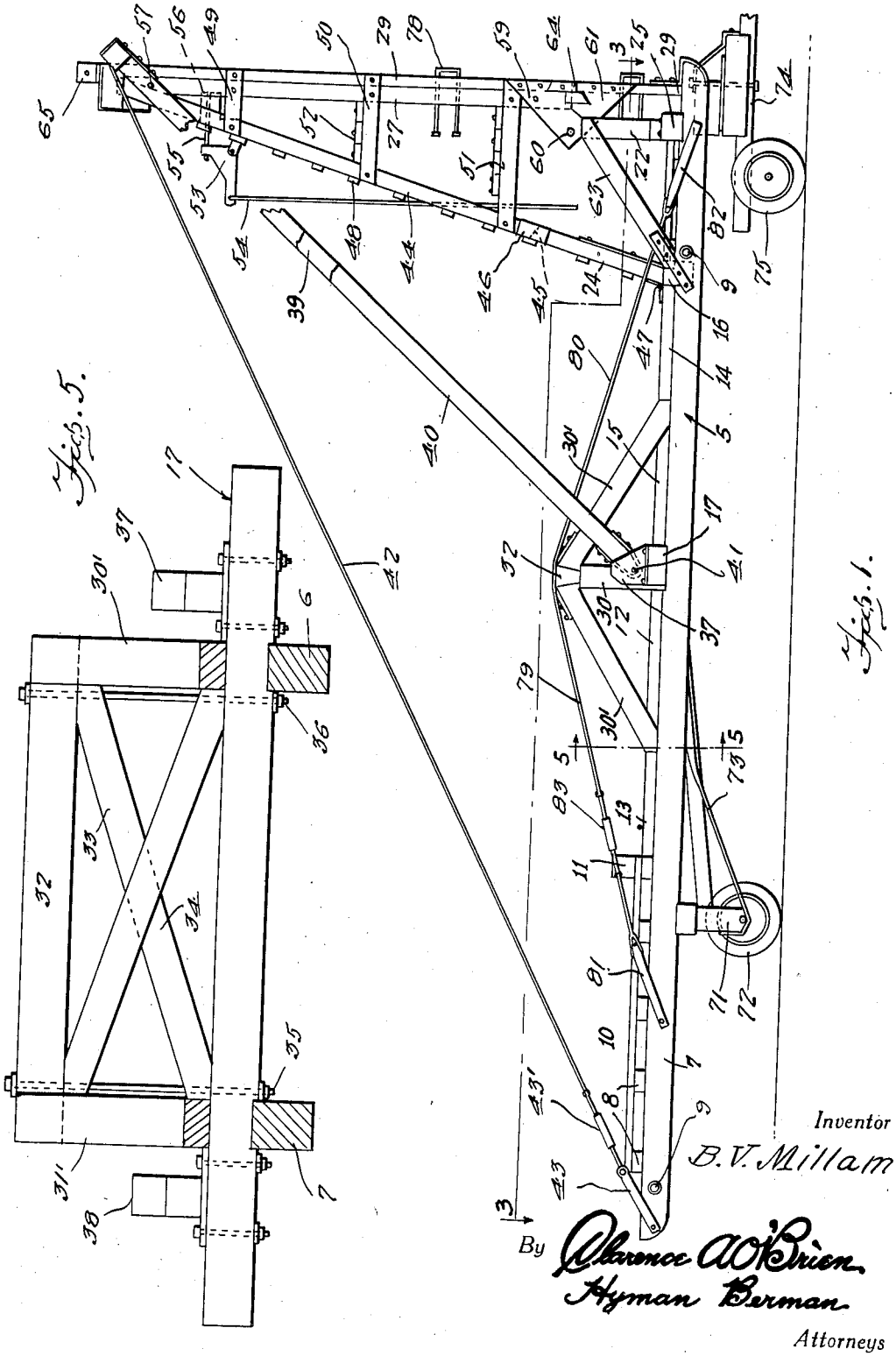


Fig. 1.

Fig. 5.

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Filed April 26, 1937 3 Sheets-Sheet 2

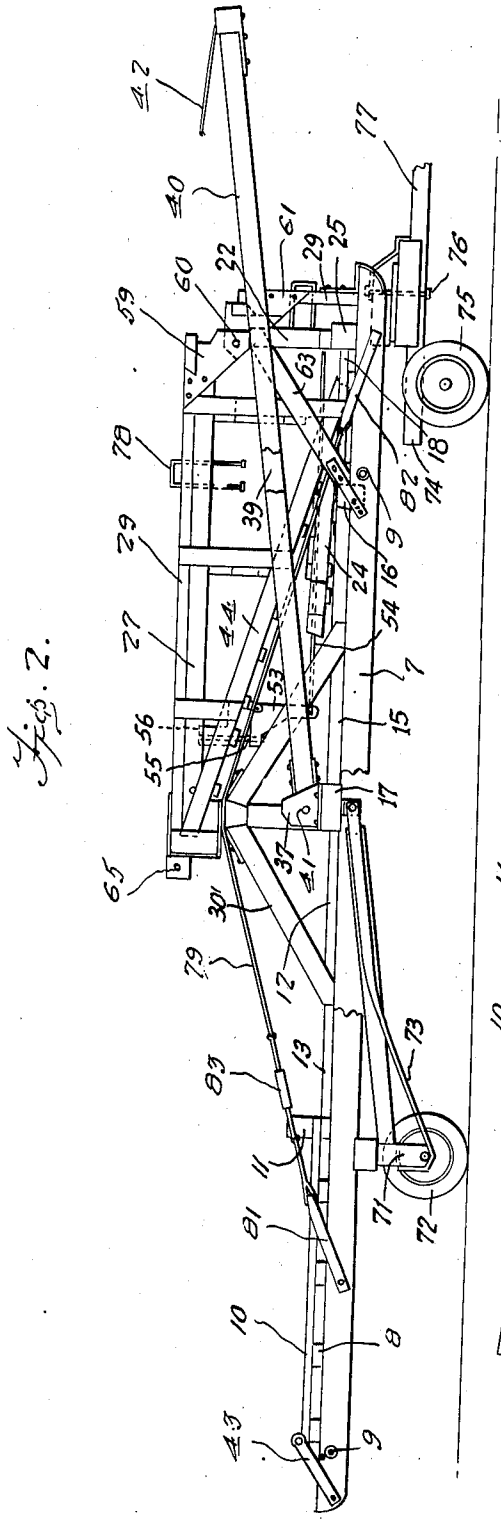


Fig. 2.

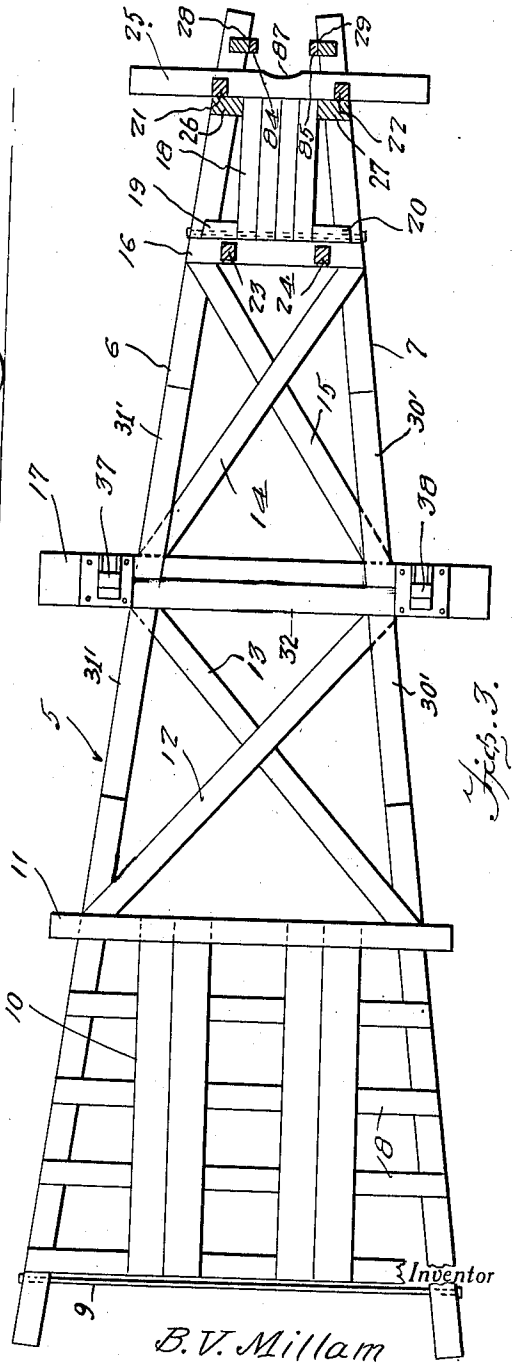


Fig. 3.

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Filed April 26, 1937 3 Sheets-Sheet 3

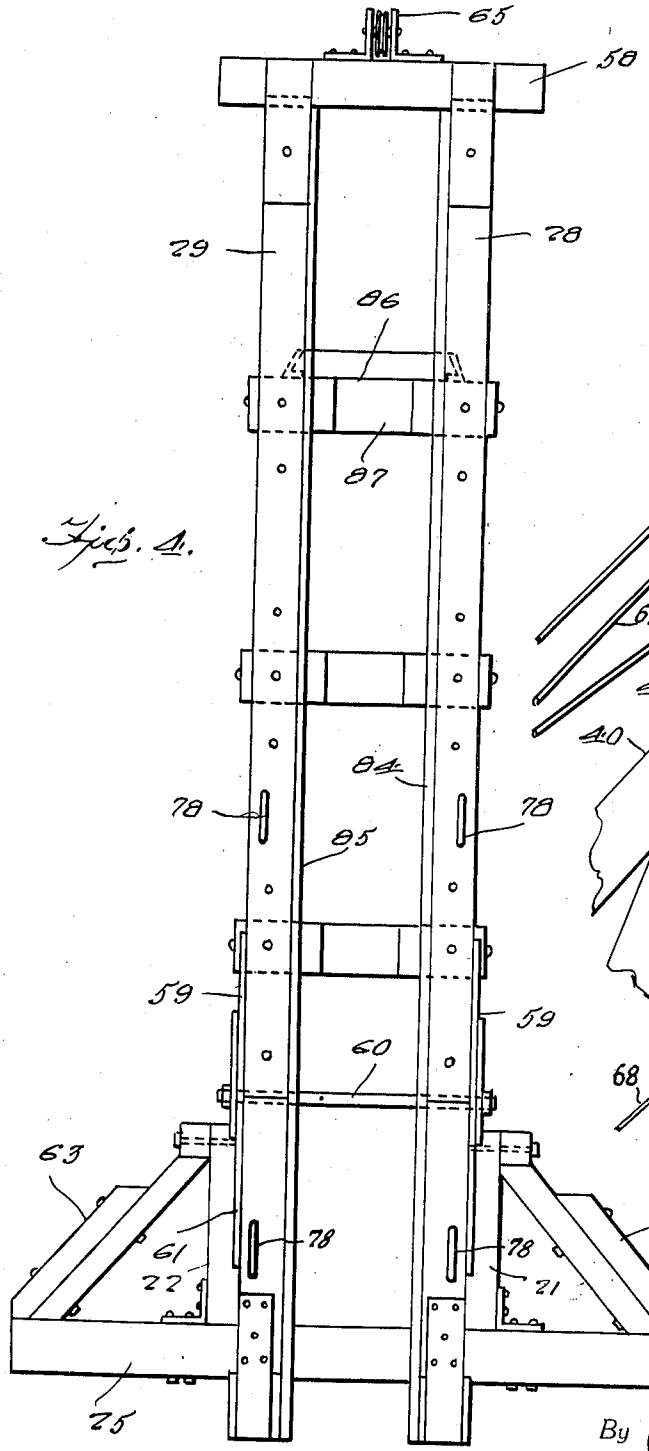


Fig. 1.

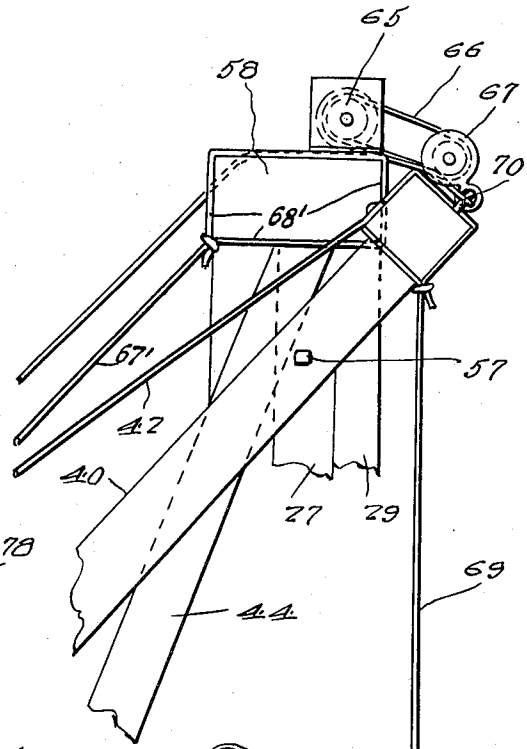


Fig. 6.

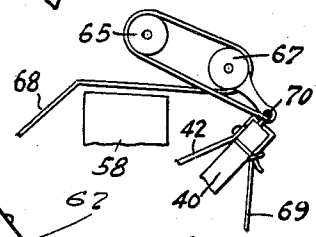


Fig. 7.

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UNITED STATES PATENT OFFICE

2,192,091

PORTABLE AND COLLAPSIBLE PILE DRIVER

Bruce V. Millam, Menlo, Wash.

Application April 26, 1937, Serial No. 139,062

6 Claims. (Cl. 61—73)

My invention relates generally to pile driving apparatus or the like, and particularly to a collapsible and easily transportable pile driver, and an important object of my invention is to provide a practical and efficient arrangement of this character.

Other important objects of my invention will be apparent from a reading of the following description taken in connection with the drawings, wherein for purposes of illustration I have shown a preferred embodiment of my invention.

In the drawings:

Figure 1 is a general side elevational view of the embodiment.

Figure 2 is a side elevational view of the embodiment showing the same in collapsed condition.

Figure 3 is a horizontal sectional view partly in top plan and taken approximately on the line 3—3 of Figure 1, looking downwardly in the direction of the arrows.

Figure 4 is an enlarged elevational view taken from right to left in Figure 1.

Figure 5 is an enlarged transverse vertical sectional view taken through Figure 1 approximately on the line 5—5 and looking toward the right in the direction of the arrow.

Figure 6 is an enlarged fragmentary side elevational view of the structure at the upper ends of the gins.

Figure 7 is a diagrammatic view showing the manner in which the cable 68 is trained over the pulleys 65 and 67 shown in Figure 3 of the drawings.

Referring in detail to the drawings, the numeral 5 generally designates the frame or chassis of the pile driver which is of tapered form and comprises the converging longitudinal side members 6 and 7 which have fastened to the tops thereof and extending therebetween at the wide end of the frame several cross members 8 and a contracting bolt 9. Platform constituting members 10 are fastened longitudinally across the cross members 8 and terminate at their front ends under a transverse block 11 which is fastened to the side members and also to the rear ends of diagonal braces 12 and 13 which cross each other and are fastened to the top of the chassis 5. Additional cross braces 14 and 15 occupy positions forwardly of the braces 12 and 13 and these have their front ends fastened under a cross member 16 and with the front ends of the braces 12 and 13, the rear ends of the braces 14 and 15 abut a heavy cross member 17 which is fastened to the top of the side members 6 and 7 and extends beyond the side members 6 and 7 as clearly shown in Figure 3 of the drawings.

Forwardly of the cross member 16 is a platform 18 having its rear end located between the elements 19 and 20 and its front end located between the lower ends of the gin poles 21 and 22 which are fastened to the cross member 25 at this point. The gin braces 23 and 24 are hinged to the cross member 16 to the rear of the platform 18. Another cross member 25 having its ends extending beyond the side members 6 and 7 is located forwardly of and abutting the members 21 and 22 and from this cross member rise the lower stationary sections 26 and 27 of the gins. Additional vertical stationary sections 28 and 29 rise from the side members 6 and 7. The heavy cross member 17 has short vertical standards 30 and 31 rising therefrom as shown in Figure 5 of the drawings and across the top of these standards rests a cross member 32 which surmounts intersecting diagonal braces 33 and 34, the cross member 32 and the opposite ends of the cross braces 33 and 34 being traversed by respective assembling bolts 35 and 36 which traverse also the heavy cross member 17 at the laterally inward sides of the standards 30 and 31.

Hinge housings 37 and 38 are bolted to the outlying parts of the heavy cross member 17 as shown in Figure 5. Extending into these elements 37 and 38 are the swingable gin braces 39 and 40 whose lower ends are pivoted on pins 41 extending across the elements 37 and 38, the upper ends of the members 39 and 40 being connected to opposite sides of the pile driver structure in a manner to be described and guy cables 42 are connected by pivoted members 43 to the rear extremities of the chassis side members 6 and 7, a turn-buckle 43' being provided in the cables for the necessary tightening.

The pile driver structure comprises the inclined sectional braces 44 which are separated on the line indicated by the numeral 45, one of the sections being provided with a sleeve 46 which is slidable to expose the abutted ends of the sections and free the sections relative to each to enable collapsing the same as indicated in Figure 2 of the drawings. The lower end of the stationary section is pivoted to the side members 6 and 7 as already mentioned by hinge means 47 mounted on the cross members 16. Ladder steps 48 may be provided to be fastened to and extend between the braces 44, and longitudinal horizontal arms 49, 50 and 51 extend forwardly from the braces 44 and between them extend flooring members 52. Between upper portions of the

members 44 is mounted the weight retainer lever 53 which is in a form of a bell crank and has an operating rod 54 depending from one arm thereof and has its opposite arm engaged with a rod 55 on which is mounted a stop 56 which can, by operation of the rod 54 be placed forwardly under the weight (not shown) to retain the weight in an elevated position or be withdrawn to permit the weight to fall in the operation of the pile driver. As indicated in the drawings the members 40 are located laterally outwardly of the members 44 and a removable bolt or rod 57 extends through the members 40 and through the vertical member 27.

A heavy cross member 58 rests on the top of the members 44, 27 and 29 and is connected thereto. The members 26, 27 and 28, 29 are sectional and have the stationary portion thereof mounted to the chassis frame as already mentioned and the movable upper sections thereof fastened to the upper member 59 of a hinge arrangement whose pivot is designated by the numeral 60. The pivot 60 is a bolt traversing the stationary section 61 which is mounted and fastened to inverted V-shaped braces 62 and 63 which are mounted on the chassis members 6 and 7, respectively, between the members 44 and the members 27, the elements 21 and 22 already mentioned constituting one arm thereof. The hinge elements 59 and 61 have step-cut formations 64 which interlock when the sections of the members 26, 27 and 28, 29 come into vertical alignment.

A sheave 65 is mounted on the top cross member 58 and over this is trained the pile driving weight operating cable 66 which is also trained over a pulley 67 connected to the upper ends of the members 40 as shown in Figure 6 of the drawings. A gin tilting cable 67' is tied around the cross member 58.

To pull or raise the gins, a small hand line 69 is fastened around the tops of the members 40 and fastened to the corresponding chassis side members and drawn tight. This prevents the main gin braces 40 from rising. Then the main line 68 from the drum or power driven hoist on the rear of the chassis frame (not shown) is passed over the cross member 58 up through the pulley 67 to the eye bolt 70 and to the pulley 65 and down through the pulley 65 and back to the member 40 and fastened securely. The haul-back line 67 is then taken from the second drum on the power driven hoist (not shown) and fastened securely to the cross member 58. The coupling sleeves 46 are then unfastened and slid down so as to disconnect the sections of the members 44 and the hinged portion of the ladder braces is then folded back. The main line 68 is then tightened slightly while the guy lines 42 are loosened by turning the turn buckles 43'. The guy lines 42 are then unfastened completely by removing the pins in the clevises 43, whereupon the bolts 57 are removed. The next step is to tighten the haul-back line 68' and at the same time slack the main line 68 so as to cause the gins and the ladder brace to tilt back. Slacking of the main line is then continued until the gins and the ladder braces 44 come to rest on the cross member 32. By further slackening of the main line without changing the position of the other lines, the main gin braces will fold down to rest on the braces 62 and 63.

To raise the gins and braces into position the foregoing process is simply reversed.

A stationary truck 71 carries rear wheels 72 and suitable braces 73 to strengthen the connection of the truck.

A dirigible truck 74 has wheels 75 and this truck turns on a pin 76 and is provided with draft means 77. The usual U-bolts 78 traverse the members 29 and 27 and 26 and 28. Cables having tighteners 79 and 80, the first having a connection with a clevis 81 attached to a rearward point on the side members 6 and 7, and the latter having clevis attachment 82 to the forward portions of the side members of the chassis frame and the central portion thereof overlie the cross member 32. Turn buckles 83 provide for the desired tightening. At the laterally inward sides of the vertical members 28 and 29 are the auxiliary strips 84 and 85. The cross member 25 as well as the vertically spaced cross members 86 which extend between the members 26 and 27 are cut out as indicated by the numeral 87 to provide proper clearance for the weight (not shown).

Although I have shown and described herein a preferred embodiment of my invention, it is to be definitely understood that I do not desire to limit the application of the invention thereto and any change or changes may be made in the materials and in the structure and arrangement of the parts, within the spirit of the invention and the scope of the subjoined claims.

Having described the invention what is claimed as new is:

1. A pile driver comprising a horizontal ambulatory chassis, pile driving structure at the front end of said chassis, said structure comprising a stationary vertical section fastened to said chassis and rising above the level of said chassis, a collapsible section hinged adjacent the upper end of said stationary section and normally thereby supported in vertical pile driving position, and hinged elements secured to said chassis rearwardly of said stationary section and engageable with a lower portion of said collapsible section for supporting said collapsible section in the vertical position.

2. A pile driver comprising a horizontal ambulatory chassis, pile driving structure at the front end of said chassis, said structure comprising a stationary vertical section fastened to said chassis and rising above the level of said chassis, a collapsible section hinged to the upper part of said stationary section, hinged elements secured to said chassis rearwardly of said stationary section and engageable with a lower rear part of said collapsible section for supporting said collapsible section in the vertical pile driving position, said collapsible section being adapted to be swung to overlie said chassis upon disconnection of said hinged elements from said lower rear part of the collapsible section, a vertical brace hinged by its lower and rearward end to an intermediate part of said chassis and swingable to engage its forward upper end with an upper part of the collapsible section of said pile driving structure to hold the collapsible section in the pile driving position.

3. A pile driver comprising a horizontal ambulatory chassis, pile driving structure at the front end of said chassis, said pile driving structure comprising a stationary vertical section fastened to said chassis and rising above the level of said chassis, a collapsible section supportably hinged on the upper end of said stationary section, hinge means mounting said collapsible section on said stationary section, said hinge means permitting said collapsible section to swing only

rearwardly from the erect pile-driving position, said hinge means further comprising means positively preventing said collapsible section from being swung forwardly beyond the erect position, and hinged elements secured to said chassis rearwardly of said stationary section and engageable with a lower rear portion of said collapsible section for supporting said collapsible section in the erect position, said collapsible section being adapted to be swung rearwardly to overlie said chassis upon disconnection of said hinged elements from said collapsible section.

4. A pile driver comprising a horizontal ambulatory chassis, pile driving structure at the front end of said chassis, said pile-driving structure comprising a stationary vertical section fastened to said chassis and rising above the level of said chassis, a collapsible section supportably hinged on the upper end of said stationary section to swing only rearwardly from the erect pile-driving position, hinged elements secured to said chassis rearwardly of said stationary section and engageable with a lower rear part of said collapsible section in the erect position, said collapsible section being adapted to be swung rearwardly to overlie said chassis upon disconnection of said hinged elements from said part of the collapsible section, hinge means mounting said collapsible section on said stationary section, said hinge means comprising means positively preventing forward swinging of said collapsible section beyond the erect pile-driving position, said hinge means comprising pivotally connected plates and extensions on said plates occupying overlapping positions while the collapsible section is in erect position whereby sidewise movement of the collapsible section relative to said stationary section is substantially precluded.

5. A pile driver comprising a horizontal ambulatory chassis, pile driving structure at one end of said chassis, said structure comprising a stationary vertical section fastened to said chassis and rising above the level of said chassis, a collapsible section hinged on the upper end of said stationary section, hinged elements secured to said chassis and engageable with a lower rear portion of said collapsible section for supporting said collapsible section in the erect pile-driving position, said collapsible section being adapted to be swung to overlie said chassis upon disconnection of said hinged elements from said collapsible section, a vertical brace hinged by its lower end to an intermediate part of said chassis and swingable to engage its upper end with an upper part of the collapsible section of said pile driving structure to hold the collapsible section in the pile driving position, and means for connecting the upper end of the vertical brace with the said collapsible section of the pile driving structure, and cable means for operating the collapsible section into and out of pile driving position.

6. A pile driver comprising a horizontal ambulatory chassis, pile driving structure at one end of said chassis, said structure comprising a stationary vertical section fastened to said chassis and rising above the level of said chassis, a collapsible section hinged on the upper end of said stationary section, hinged elements secured to said chassis inwardly of said stationary section and engageable with a lower rear portion of said collapsible section for supporting said collapsible section in the erect pile driving position, said collapsible section being adapted to be swung to overlie said chassis upon disconnection of said hinged elements from said collapsible section, a vertical brace hinged by its lower end to an intermediate part of said chassis and swingable to engage its upper end with an upper part of the collapsible section of said pile driving structure to hold the collapsible section in the pile driving position, means for connecting the upper end of the vertical brace with the said collapsible section of the pile driving structure, cable means for operating the collapsible section into and out of pile driving position, and cable means for operating said vertical brace into and out of bracing position.

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