

Jan. 10, 1933.

L. WATSON

1,893,687

PILE DRIVING MACHINE

Filed June 4, 1931

5 Sheets-Sheet 1

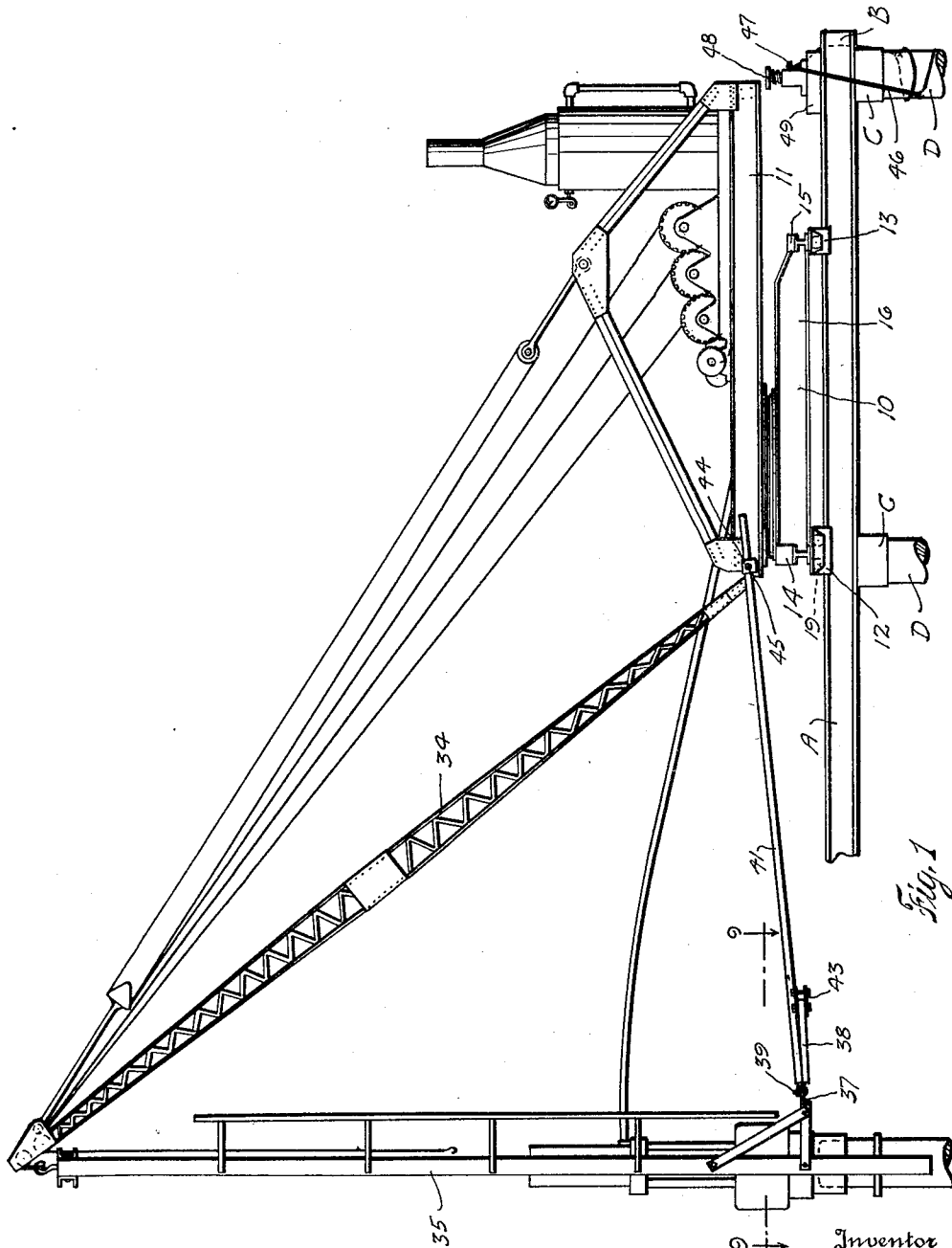


Fig. 1

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Fig.

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5 Sheets-Sheet 3

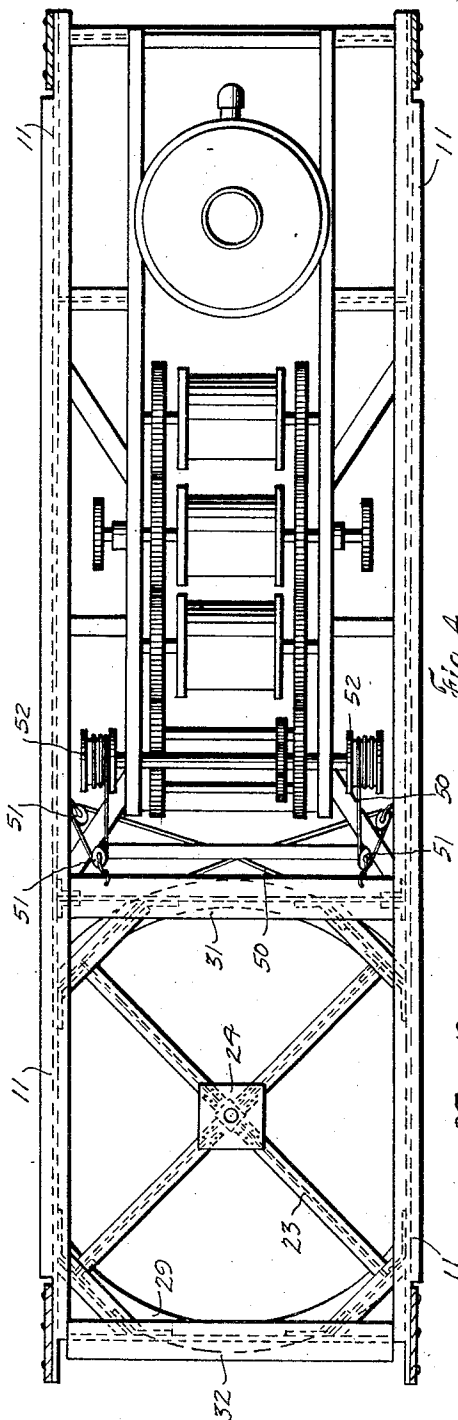


Fig. 4

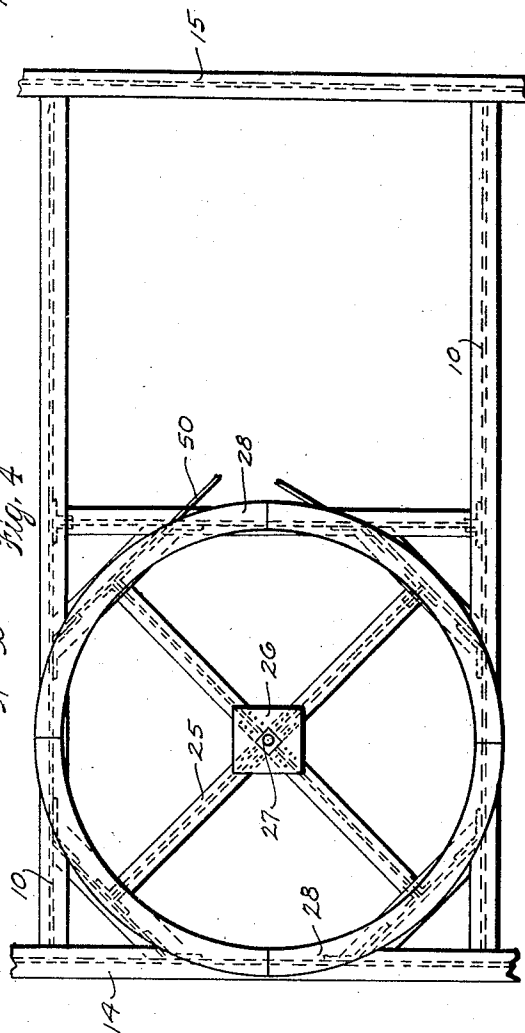


Fig. 5

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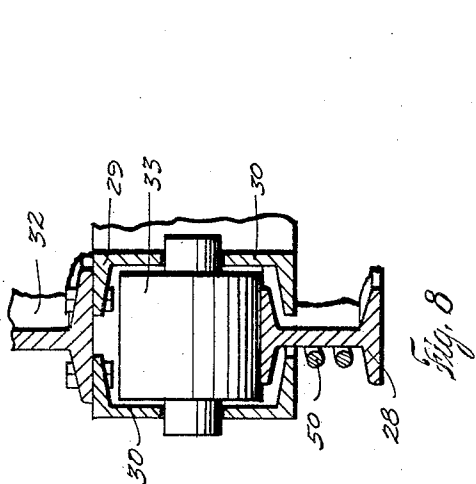
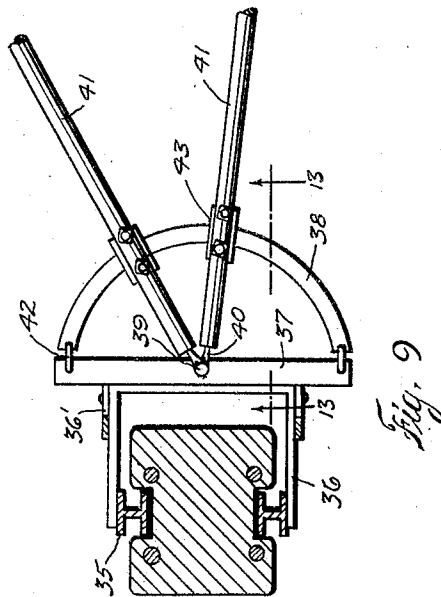
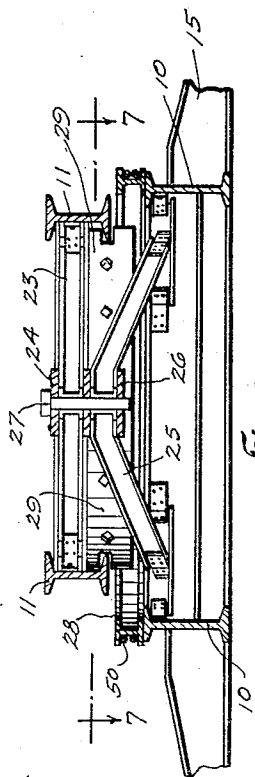
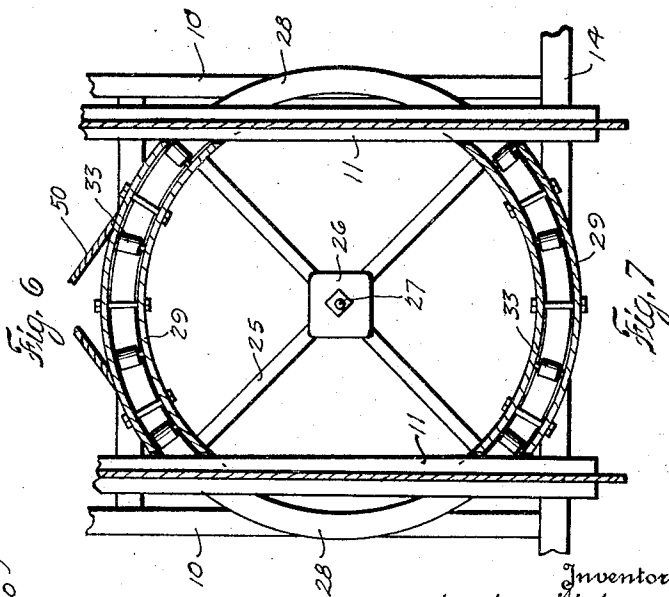
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PILE DRIVING MACHINE

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5 Sheets-Sheet 4



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PILE DRIVING MACHINE

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5 Sheets-Sheet 5

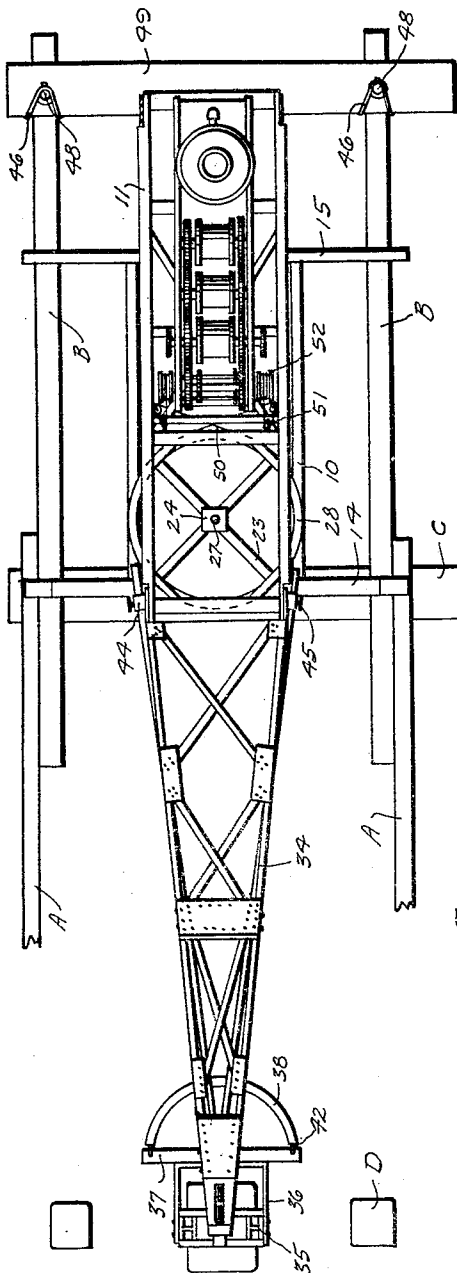


Fig. 10

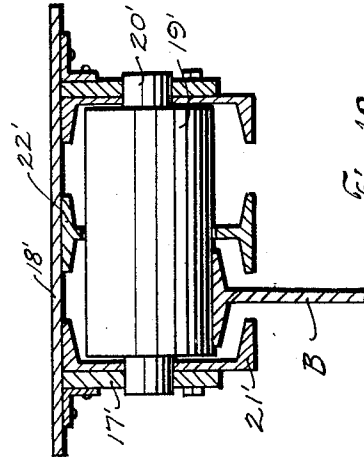


Fig. 12

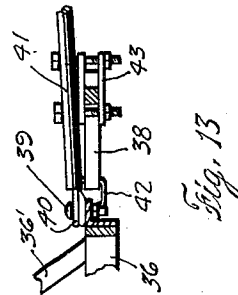


Fig. 13

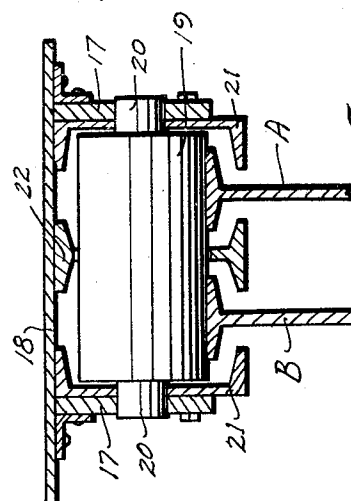


Fig. 11

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UNITED STATES PATENT OFFICE

LESTON WATSON, OF FORT WORTH, TEXAS

PILE DRIVING MACHINE

Application filed June 4, 1931. Serial No. 542,057.

This invention relates to new and useful improvements in pile driving machines.

The invention has to do with a pile driving machine particularly adapted for the driving of concrete piles for highway bridges, but is not necessarily limited to such use.

I have done considerable experimenting in pile driving on highway bridges and the like with the type of pile drivers now in general use and difficulties in the use of such machines led me to the invention of my present apparatus. While using other pile drivers I found difficulty in moving from one piling to another due to the fact that such machines are mounted on skids or rollers and when the ground is not level a great deal of cribbing and blocking is necessary before movement can be made. I found that the machines which were available were not flexible enough and could not be economically and successfully used in this character of work, and particularly in crossing a stream or body of water.

It is customary at present to use both wood and concrete piling in highway and similar construction. In the present method the individual piles are first driven to a depth to get sufficient bearing to carry the load. This may result in the top of the piling being either below or above grade, and in the first instance the piling would have to be built up to grade, and in the second instance would have to be cut off to grade. In my method the piling is first driven to grade and if it will not go to grade it is cut off to grade. A temporary wooden cap is placed across the piles which are arranged in a transverse row. If a pile has not reached sufficient bearing and it is necessary to drive it further down than to grade, this can be done with my invention after the machine passes over it, by turning the machine around and driving it from behind.

One of the objects of the invention is to provide a pile driving machine which may

be advanced on beams placed on the temporary caps and the machine so held down as to be freely swung to any position without tipping over.

A further object of the invention is to provide a machine which may not only be mounted on the beams and held down, but which may be progressed or advanced from one beam to another in a rapid and simple manner.

Still another object of the invention is to provide improved means for holding the leads rigidly in place and yet permitting ample adjustment of the machine to different positions.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings in which an example of the invention is shown, and wherein:

Figure 1 is a side elevation of a pile driving machine constructed in accordance with the invention,

Figure 2 is an enlarged view of the base portion and the supporting beams,

Figure 3 is an enlarged front elevation of the carriage and supporting beams,

Figure 4 is a plan view of the carriage, part of the super-structure being omitted.

Figure 5 is a horizontal cross-sectional view taken on the line 5—5 of Figure 2,

Figure 6 is a transverse vertical sectional view taken on the line 6—6 of Figure 2,

Figure 7 is a horizontal cross-sectional view taken on the line 7—7 of Figure 6,

Figure 8 is a detail of the turntable mounting,

Figure 9 is an enlarged longitudinal cross-sectional view taken on the line 9—9 of Figure 1,

Figure 10 is a plan view of the machine shown in Figure 1,

Figure 11 is a vertical sectional view taken on line 11—11 of Figure 2,

Figure 12 is a vertical sectional view taken on line 12—12 of Figure 2, and

5 Figure 13 is a horizontal cross-sectional view taken on line 13—13 of Figure 9.

In the drawings the numeral 10 designates a base frame and 11 a rectangular platform rotatably mounted thereon. The base frame
10 is provided with forward hold-down or retaining devices 12 at each side and similar devices 13 at the rear on each side of the frame. The frame is made up of a transverse front bolster 14, a rear transverse bolster 15 and connecting sills 16. It is preferable to make these frame parts of I-beams as is clearly shown in Figures 2, 3 and 6.

Each forward retaining device includes a pair of hangers 17 secured to the under side
20 of a mounting plate 18 which is fastened to the bottom of the forward bolster 14 at the outer end thereof. A pair of rollers 19 are journaled in the hangers as is best shown in Figure 11. The trunnions 20 at the ends of each roller 19 pass through channels 21 depending from the plate 18 and having their flat sides secured to the inner sides of the said hangers. The channels are turned so as
30 to form shoes with their lower flanges engaging under the top flanges of I-beams A and B, which are mounted in parallel and over-lapping relation on the headers or caps C of the false work. Each roller passes through a central spacer or shoe 22 cut from
35 a piece of I-beam so that its lower flanges will engage under the adjacent flanges of the beams A and B.

It will be seen that the shoes 20 and 22 will resist upward displacement of the frame
40 10 and that the rollers will provide bearings on which the base frame may be propelled. It will be noted that the rollers 19 will travel on either of the beams A or B or on both of them. The beams are placed on the caps
45 one in advance of the other with their ends over-lapping so that the machine may be propelled therealong from one beam to the other as the work progresses. The rear retaining devices 12 are similar to the forward ones and each includes a mounting plate
50 18' secured to the under side of the rear bolster 15, hangers 17', a single roller 19' journaled in the hangers, and shoes 21' and 22'. The retaining and supporting devices not only provide for easy propelling or movement
55 of the base frame, but prevent its displacement from the beams A and B when the platform 11 is swung under a load.

The platform 11 includes a spider 23 secured to the longitudinal side members (Figures 4, 5 and 6). The spider has a pivot box
60 24 in its center. An inclined spider 25 is fastened in the upper portion of the base frame 10 (Figures 2, 5, 6 and 7) and also has a central pivot box 26. A headed pivot

pin 27 is inserted in the box 24 and engages in the box 26. The purpose of this pin is to prevent movement of the frame 11 laterally in a horizontal plane and to confine its
70 horizontal movement to that of rotation about said pin.

A circular track 28 concentric to the pivot pin 27 is secured on top of the frame 10 and under the frame 11. The frame 11 includes
75 diametrically opposite segmental housings 29 as is best shown in Figures 3, 6, 7 and 8. These housings are confined between the longitudinal side members of the frame and include complementary channels 30 which are
80 suitably secured to cross-members 31 and 32 (Figures 2, 3 and 4). The channels 30 extend under the top flange of the track 28 as is shown in detail in Figure 8, and rollers 33 journaled in the channels ride upon the track 28, thus supporting the frame 11 and
85 carrying the entire load thereof. By this arrangement the frame 11 is freely rotated and the spiders, the track and the housings constitute a turntable.

A suitable boom 34 is hinged at its lower
90 end to the forward end of the platform 11 and this boom is operated and supported in the usual manner by a suitable hoisting engine the details of which form no part of the present invention. The pile driving leads 35
95 are suspended from the upper end of the boom in the usual manner. In order to brace the lower ends of the leads and hold the same in the proper position a structure has been designed for this purpose, which is clearly
100 shown in Figures 1, 9 and 10. A horizontal yoke 36 extends rearwardly from the leads and is supported by braces 36' attached to the leads. An angle bar 37 is secured to the rear
105 side of the yoke and has attached thereto a segment 38. The segment is disposed concentrically to a pivot bolt 39 passing through eyes 40 secured to the ends of brace bars 41.

The segment is secured at its ends to the ends of the bar 37 by rings 42 thus permitting a swinging movement of said segment.
110 Each bar 41 is provided with a keeper 43 which embraces the segment and prevents the segment from falling away from said bars. By this arrangement the segment, the bar 37 and the yoke 39 may be swung in a horizontal plane and rotated with relation to the
115 brace bars 41. The inner ends of the brace bars are mounted to slide in keepers 44, (Figures 1, 2, 3 and 10) fastened on each side at the forward end of the platform 10. Set
120 screws 45 mounted in the keepers are employed to fasten the brace bars in position.

It will be seen that by reason of the hold-down or retaining devices 12 and 13 the frame
125 10 can not tilt and thus the platform 11 may be freely swung to any position so as to suspend the leads 35 either forwardly or rearwardly or at any angle on each side of said frame. The turntable of course, prevents
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the platform from tipping under its load. The adjusting means shown in Figure 9 permits the leads to be swung at any desired angle either in a horizontal or vertical plane and fastened in such position by tightening the set screws 45.

5. In a pile driving machine, a base frame, a platform rotatably mounted in the frame, traction rollers supporting the frame, hold-down devices carried by the frame at each end thereof for engaging the support on which the rollers are mounted and whereby the frame is prevented from tilting, leads supported from the platform, a segment carried by the leads, and braces adjustably secured to the platform and also adjustably secured to the segment.

In testimony whereof I affix my signature.
LESTON WATSON.

It will be seen that the leads may thus be kept parallel to the caps C. As before stated the beams A and B are placed on the cap C one in advance of the other and are overlapped. The rear ends of the beams B as shown in Figure 1 must be held down to prevent tilting when the frame 10, boom 34 and leads 35 are under a load. For this purpose cables 46 are fastened around the piles D and looped over the ends of the beams so that each will engage in the hook 47 of a jack 48 supported on a heavy plank 49 (Figs. 1 and 10) extending from one beam to the other. By adjusting the jack 48 the loop of the cable 46 is tightened and the end of the beams thus held in place. For swinging the platform 11 a cable 50 is coiled about the track 28, the ends of this cable being crossed and passed through pulleys 51 and then coiled upon drums 52 connected with the engine of the machine so that by rotating either drum the cable is wound thereon and unwound from the other drum, thus rotating the turntable. Various changes in the size and shape of the different parts, as well as modifications and alterations, may be made within the scope of the appended claims.

Having illustrated and described a preferred form of the invention, what I claim, is:

1. In a pile driving machine, longitudinal flanged supports having their adjacent ends overlapping, a base frame, rollers supporting the frame and arranged to engage either or both of the overlapping supports so as to ride from one support to the other support, hold-down devices carried by the frame for engaging either or both of the overlapping supports, and a platform rotatably mounted on said frame.

2. In a pile driving machine, a base frame, hangers at the front and rear ends of the frame on each side thereof, rollers journaled in said hangers, flanged supports in which said rollers travel, shoes below the rollers extending under the flanges of the supports, and a platform rotatably mounted on the frame.

3. A pile driving machine as set forth in claim 2 and a spacer between each pair of hangers having projections on each side extending under the flanges of the supports.

4. In a pile driving machine, a base frame, a platform rotatably mounted on the frame, a support on the platform, leads suspended from the support, a yoke mounted on the leads, a segment connected to the yoke, braces pivoted to the yoke and attached to the platform, and clamps mounted on the braces and engaging the segment.

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