May 21, 1957 H. L. PHARES 2,792,689

MECHANICAL POST DRIVER

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Fig. 1.

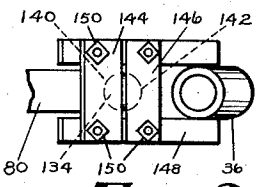


Fig. 2.

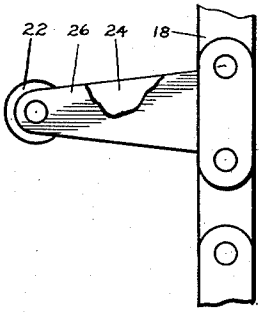
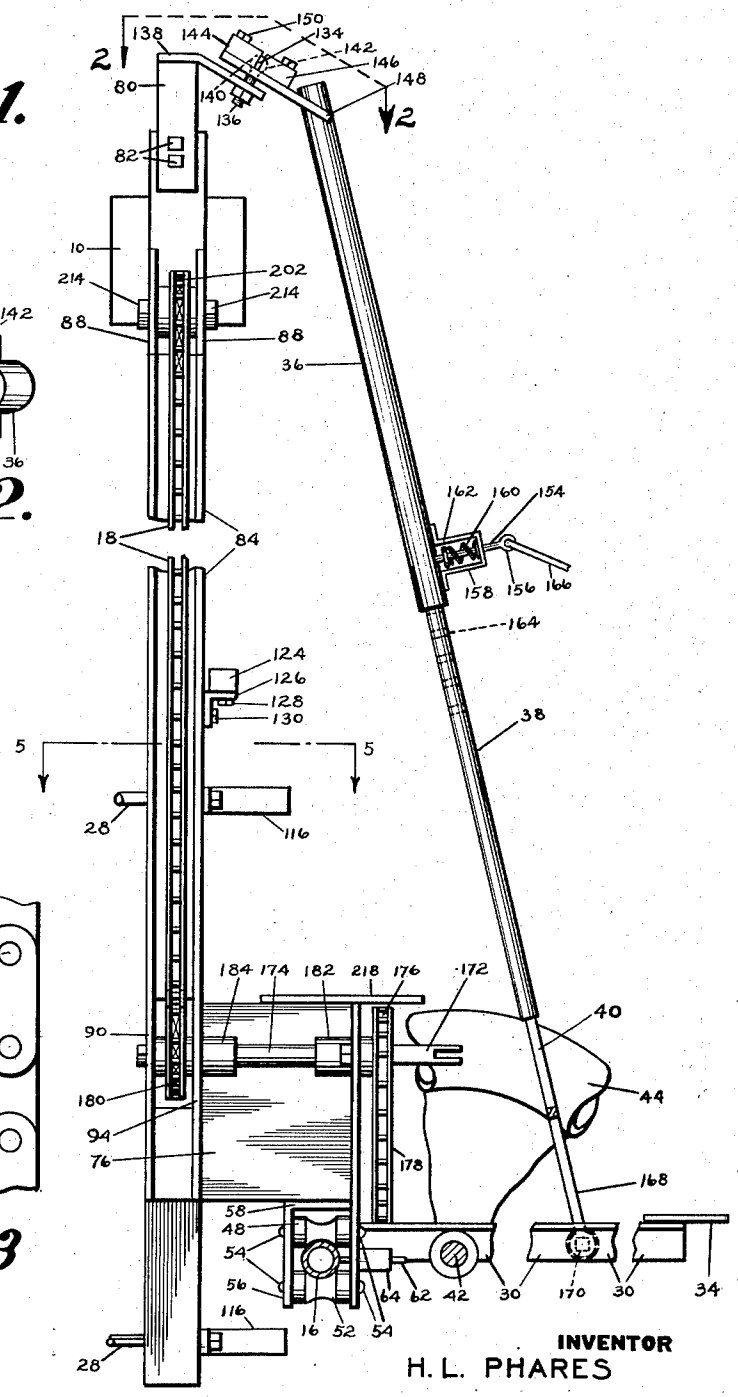


Fig. 3



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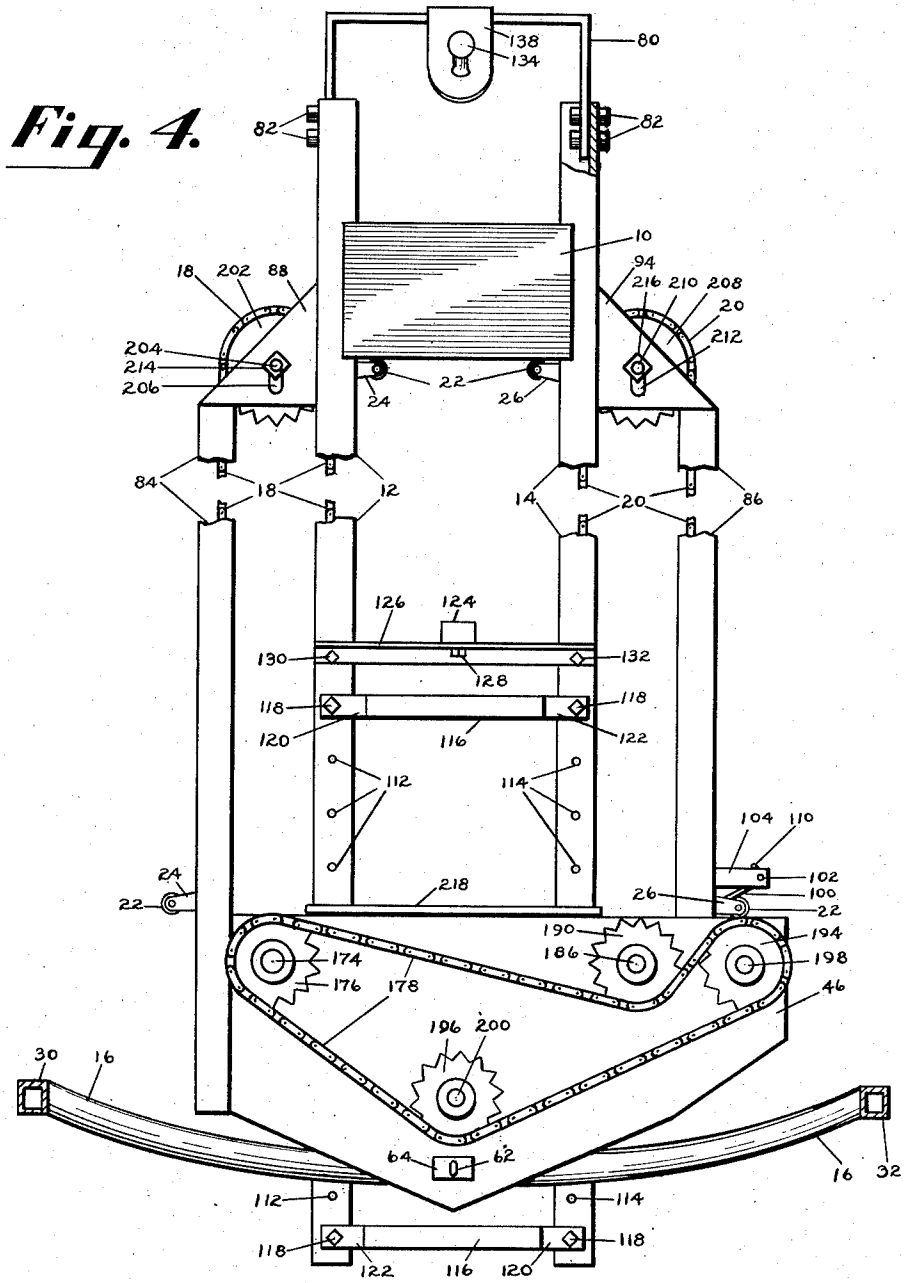
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MECHANICAL POST DRIVER

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Fig. 4.



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MECHANICAL POST DRIVER

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Fig. 5.

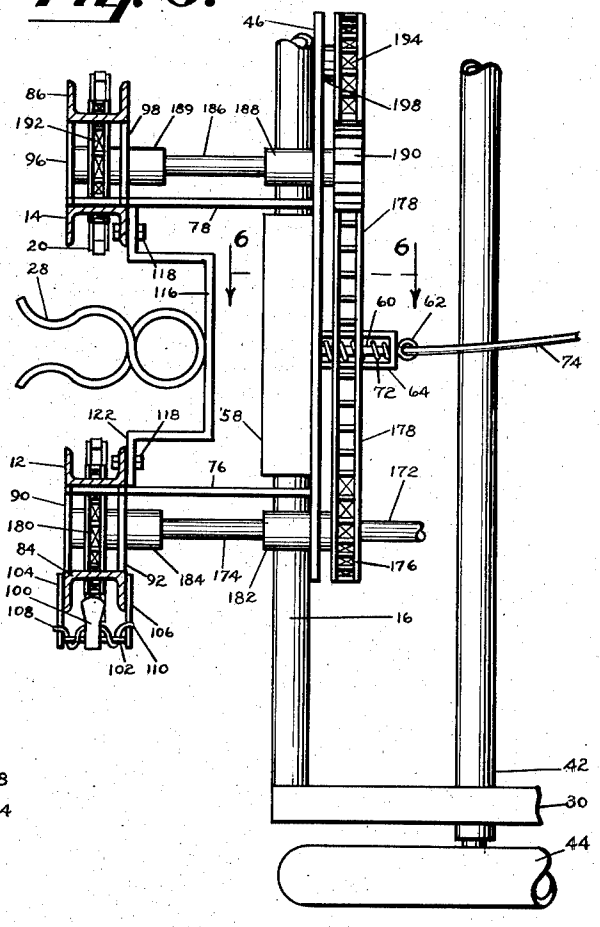


Fig. 6.

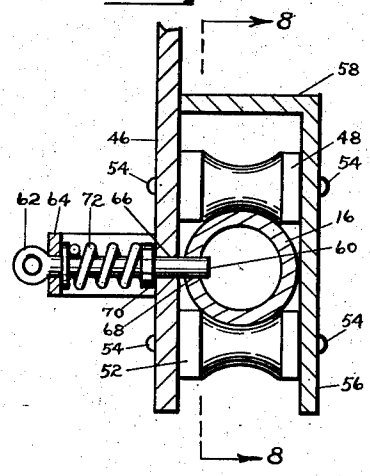


Fig. 7.

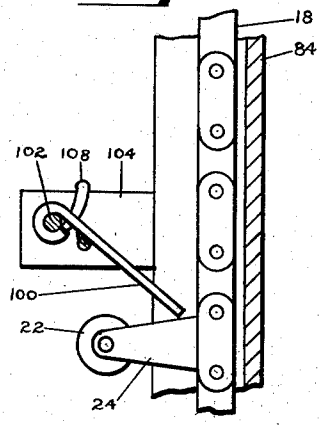
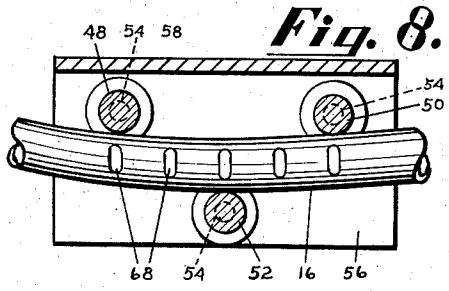


Fig. 8.



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United States Patent Office 2,792,689 Patented May 21, 1957

2,792,689

MECHANICAL POST DRIVER

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Application October 7, 1953, Serial No. 384,627

3 Claims. (Cl. 61—74)

This invention relates to portable land pile drivers and machines of the type having a weight mounted to travel vertically in a track with the weight elevated by mechanical means and drawn downwardly to a drive a post or the like into the ground by gravity, and in particular a hammer or driver slidably mounted in a pair of vertically disposed parallel rails and having endless chains with weight carrying rollers extended therefrom mounted on an arcuate rail and adapted to be mounted on and operated by a tractor, and wherein the supporting structure with the rails, chains, and weight is adapted to be adjusted to a vertical position with the device on the side of a hill or the like.

The purpose of this invention is to provide a mechanically actuated portable pile or post driver that is adapted to be set to operate automatically and that may readily be adjusted whereby the driving element and operating means therefor are vertically positioned with the device positioned on uneven ground.

Pile drivers have been provided in various designs and different means have been used to carry the weight or driver upwardly so that it may drop downwardly by gravity, however, where devices of this type are actuated by hydraulic means mechanical devices for opening and closing valves are required, and where the weights are elevated by chains or cables comparatively complicated trips are necessary, and such devices must be serviced continuously.

Where devices of this type are used in the water the trip elements and valves are not particularly objectionable, however, when they are used on the land for driving fence posts and the like it is desirable to simplify the equipment and reduce the cost of operation to a minimum.

With these thoughts in mind this invention contemplates a weight slidably mounted between spaced vertically disposed rails mounted on an arcuate horizontally disposed cross beam, with chains having rollers extended therefrom positioned on opposite sides of the rails for carrying the weight upwardly, and with means for operating the chains and adjusting the position of the rails and chains on the cross beam.

The object of this invention is, therefore, to provide a pile driver for use on the land and particularly adapted for driving posts and stakes.

Another object of the invention is to provide a post driver that is readily adjusted to a vertical position so that the device may be used for driving posts and stakes on the side of a hill.

Another important object of the invention is to provide a post and stake driver in which the only tripping instrumentalities are rollers rolling from the opposite edges of the weight or driver, whereby, once the driver is set up and started further attention by the operator is not required.

A further object of the invention is to provide a post and stake driver in which means is provided for maintaining posts or stakes being driven into the ground in

vertical positions and also in which means is provided for driving the posts or stakes to previously determined elevations above the ground.

A still further object of the invention is to provide a post and stake driver that is readily adapted to be attached to and operated by a tractor.

And a still further object of the invention is to provide a pile driver for use on the land and that is particularly adapted for driving posts and stakes in which the driver is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a supporting frame mounted on wheels with an arcuate horizontally disposed driving element carrying cross bar at one end and a draw-bar for attaching the driver to a tractor on the other, a pair of vertically disposed parallel rails extended from said cross bar, a driving weight slidably mounted in said rails, endless chains having rollers in arms extended therefrom positioned on the inner sides of the rails with the rollers adapted to extend from the rails for carrying the weight upwardly, guide clips secured to the rails for retaining posts in the path of the weight and in a vertical position, a brace extended from the upper ends of the rails to the frame for retaining the rails vertical, means for actuating the chains, and means for adjusting the position of the rails on the cross bar.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is a side elevational view showing the driver attachment with the device mounted on a trailer frame, parts of which are broken away.

Figure 2 is a plan view showing the upper end of the attachment, being taken on line 2—2 of Figure 1.

Figure 3 is a detail showing a side elevational view of one of the weight elevating chains showing a portion, only, of the chain, and illustrating the arms for mounting the weight carrying rollers on the chains.

Figure 4 is a cross section through the trailer frame showing a front elevational view of the driver attachment with parts broken away and also with parts omitted.

Figure 5 is a sectional plan through the driver attachment taken on line 5—5 of Figure 1.

Figure 6 is a cross section through the lower part of the driver taken on line 6—6 of Figure 5, with the parts shown on an enlarged scale, and illustrating the mounting of the driver elements on the arcuate cross bar.

Figure 7 is a detail through one of the chain enclosing channel bars illustrating a spring finger for preventing a reverse movement of the chain.

Figure 8 is a detail showing a section taken on line 8—8 of Figure 6, illustrating the positions of rollers in the mounting of the driver parts on the arcuate cross bar.

While one embodiment of the invention is illustrated in the above-referred to drawings, it is to be understood that they are merely for the purpose of illustration and that various changes in construction may be resorted to in the course of manufacture in order that the device may be utilized to the best advantage according to circumstances which may arise, without in any way departing from the spirit and intention of the device, which is to be limited only in accordance with the appended claims. And while there is stated the primary field of utility of the invention, it remains obvious that it may be employed in any other capacity wherein it may be found applicable.

In the accompanying drawings, and in the following specification, the same reference characters are used to designate the same parts and elements throughout and in which the numeral 8 refers to the invention in its entirety, numeral 10 a weight that is slidably mounted between rails 12 and 14 which are supported from an arcu-

ate cross bar 16, numerals 18 and 20 endless chains having weight carrying rollers 22 extended therefrom with arms 24 and 26, spring clips 28 for holding posts and the like in the path of the weight, a supporting trailer frame having side bars 30 and 32 and a draw-bar 34, and a brace including telescoping sections 36 and 38 and a yoke 40, for holding the rails in upright positions from the frame.

The side bars 30 and 32 are mounted on an axle 42 on the ends of which wheels 44 are journaled, and the ends of the side bars are secured to the ends of the cross bar 16, preferably by welding, as shown in Figure 4.

A mounting plate 46, positioned on the forward side of the cross bar, is mounted to travel on the cross bar 16 with upper rollers 48 and 50, and a lower roller 52. The ends of the rollers are provided with studs 54 with which the rollers are journaled in the mounting plate 46 at one side of the cross bar and in an L-shaped cover plate 56 on the opposite side of the cross bar. The upper edge of the plate 56 is connected to the mounting plate 46 with a cross plate 58.

A spring actuated pin 60 having an eye 62 on the extended end and which is mounted in a U-shaped bracket 64, extends through an opening 66 in the plate 46, and is adapted to extend into spaced slots 68 in the cross bar 16, as shown in Figures 6 and 8. The pin is provided with a collar 70, and a spring 72 positioned around the pin urges the extended end of the pin into the notches or slots of the cross bar when the pin is released. The pin may be withdrawn to release the device from the cross bar by a cable 74 attached to the eye 62.

The rails 12 and 14 are supported from the mounting plate 46 with side plates 76 and 78, the forward edges of which are secured to the mounting plate and the opposite edges to the backs of the rails, which are channel-shaped in cross section. The upper ends of the rails are connected with a U-shaped brace 80 the ends of which are secured to the webs forming the backs of the rails with bolts 82. The sides of the weight 10 are provided with grooves that are positioned to receive the flanges extended from the webs of the rails.

The return sections of the chains are positioned to travel in channel-shaped covers or tracks 84 and 86 which are supported from the rails. The upper end of the track 84 is connected to the rail 12 with plates 88, and the lower end with bars 90 and 92, and the upper end of the track 86 is connected to the rail 14 with plates 94 and the lower end to the lower end of the track with bars 96 and 98.

The tracks are provided with spring fingers 100 mounted on pins 102 between arms 104 and 106 and, as illustrated in Figure 7, the fingers are provided with spring clips 108 and 110 that wrap around the pins 102 and that extend over the upper edges of the arms, whereby the fingers 100 are held in the path of the rollers 22 permitting the rollers to pass downwardly and preventing upward travel thereof so that the weight will not drop should operation of the device accidentally stop, or should the operator desire to hold the weight in an upper position.

The flanges on the forward sides of the rails 12 and 14 are provided with spaced openings 112 and 144 and U-shaped brackets 116 on which the spring clips 28 are mounted are secured to the rails with bolts 118 which extend through the openings 112 and 114 and flanges 120 and 122 of the brackets. The brackets are positioned and the spring fingers formed so that the fingers of the clips hold a post or stake in the path of a weight slidably mounted on the rails.

A stop block 124, of rubber or other resilient material, is also mounted on the rails 12 and 14, and this block is also positioned in the path of the weight and above the uppermost of the brackets 116, whereby with the block set to the elevation to which it is desired to drive a post or the like all posts may be driven with the upper ends

the same distance above the ground, or as desired. The block 124 is secured to an angle bar 126 by a bolt 128 and the angle bar is secured to the flanges of the rails with bolts 130 and 132.

A swivel joint is provided between the upper ends of the rails and the brace connecting the upper ends to the supporting frame, wherein a ball 134 on the end of a stud 136 in a plate 138 extended from the brace 80, is positioned in semi-spherical recesses 140 and 142 in blocks 144 and 146 which are secured to a plate 148 on the upper end of the upper telescoping section 36 with bolts 150, as shown in Figures 1 and 2.

With the upper ends of the rails connected to the brace in this manner the lower end of the device is free to travel laterally on the arcuate cross bar 16 to facilitate adjusting the rails to a vertical position with the driver position on a hillside or the like. The bolts securing the blocks 144 and 146 to the plate 148 may be loosened in making the adjustment.

The upper telescoping member or tube 36 is provided with a spring latch or pin 154, similar to the pin 60, and the pin, which is provided with an eye 156 on the outer end is slidably mounted in a U-shaped bracket 158 and resiliently held inwardly by a spring 160 one end of which bears against the bracket and the other against a collar 162 on the pin. By this means the pin is resiliently urged into spaced openings 164 in the section 38 of the brace, and may readily be withdrawn to adjust the length of the brace by a pull-cord 166. The arms 168 of the yoke 40 in the lower end of the section 38 are secured to the side bars 30 and 32 with bolts 170.

The driver for posts, stakes, and the like, of this invention is driven by suitable transmission elements and, as shown in Figures 1 and 5, an extension shaft 172 from the end of a shaft 174 is adapted to be connected to the power take-off of a tractor on which the attachment is mounted, or to other means, such as the driving shaft of an internal combustion engine and, as illustrated in Figure 4, the shaft 174 is provided with a sprocket 176 over which an endless chain 178 is trained and also a sprocket 180 over which the endless chain 18 is trained. The chain 18 carries the spaced rollers 22 that carry the weight 10 upwardly on one side of the driver.

The shaft 174 is journaled with a bearing 182 in the mounting plate 46 and also by a bearing 184 in the bars 90 and 92 connecting the lower end of the cover 84 to the rail 12, and a similar shaft 186, journaled in the plate 46 with a bearing 188 and in the bars 96 and 98, connecting the lower end of the cover 86 to the rail 14 with a bearing 189, is provided with sprockets 190 and 192 which are aligned with the sprockets 176 and 180, respectively. The chain 178 is trained over the sprocket 190 and the chain 20 over the sprocket 192. The chain 178 is also trained under sprockets 194 and 196 which are mounted by studs 198 and 200, respectively, on the plate 46, as shown in Figure 4.

With the sprockets arranged as illustrated in Figure 4, the power take-off shaft of a tractor, which normally turns counter-clockwise, with the parts as shown, turns the shaft 174 in a counter-clockwise direction with the inside section of the chain 18 traveling upwardly, and turns the shaft 186 in a clockwise direction with the inside section of the chain 20 traveling upwardly.

The upper end of the chain 18 is trained over a sprocket 202 journaled on a shaft 204 which is mounted in slots 206 in the plates 88 connecting the upper end of the cover 84 to the rail 12 and the chain 20 is trained over a similar sprocket 208 on a shaft 210 which is mounted in slots 212 in the plates 94 connecting the upper end of the cover 86 to the rail 14. The shaft 204 is adjustably held in the slots 206 by lock nuts 214 and the shaft 210 is similarly held by lock nuts 216 whereby slack may readily be taken up in the chains.

A reinforcing plate 218 is provided on the upper edges of the mounting plate 46 and side plates 76 and 78 and,

as shown in Figure 1, this plate extends over and provides a cover for the intermediate part of the chain **178**. The plate **218** is also provided to serve as a mounting platform for an internal combustion engine at times when the machine is not driven by the power take off shaft of a tractor.

Operation

In use the post or stake driver of this invention may be attached, by the draw-bar **34**, to a tractor or the like and after being conveyed to a suitable position on level ground or on a slope or side of a hill, the superstructure, including the rails **12** and **14** is adjusted on the cross bar **16** until the rails are vertical. The bumper or stop block **124** is then set so that the upper end of the post will be the desired height after being driven into place and, with a post or stake positioned in the spring clips **28**, the driving means is started whereby the inner sections of the chains **18** and **20** travel upwardly with the rollers **22** picking up the weight **10** and carrying the weight upwardly until the rollers roll from the lower surface of the weight permitting the weight to drop and strike the upper end of the post. This action is continued until the weight reaches the bumper **124**, at which time the machine is moved to the next position and the cycle of operations repeated.

From the foregoing specification, it will become apparent that the invention disclosed will adequately accomplish the functions for which it has been designed and in an economical manner, and that its simplicity, accuracy, and ease of operation are such as to provide a relatively inexpensive device, considering what it will accomplish, and that it will find an important place in the art to which it appertains when once placed on the market.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Changes in shape, size and arrangement of details and parts, such as come within the purview of the invention claimed may be resorted to in actual practice, if desired.

Having now described the invention that which is claimed to be new and desired to be procured by Letters Patent, is:

1. In a post driver, the combination which comprises a supporting frame mounted on wheels and having an arcuate cross bar therein, spaced vertically disposed parallel rails mounted on said cross bar, means for adjusting the position of said rails on the cross bar, a telescoping brace with flexible attachment extended from the upper ends of the rails and flexibly attached thereto to a point on the frame spaced from the cross bar, endless chains having rollers mounted on arms extended therefrom, mounted with one of the sections thereof positioned to travel in said rails, a weight positioned between and slidably mounted on said rails, said weight adapted to be elevated by the rollers of the chains from each side simultaneously in a balanced position, means for positioning a post between the rails and in the path of the weight, and means for actuating the chains.

2. In a post driver, the combination which comprises a supporting frame mounted on wheels and having an arcuate cross bar at one end, spaced vertically disposed parallel rails mounted on said cross bar, means for adjusting the position of said rails longitudinally of said cross bar, a weight positioned between and slidably mounted on said rails, a stop adjustably mounted on said rails and positioned to be engaged by the weight, endless chains having rollers extended therefrom mounted on said rails and positioned whereby the rollers are adapted to carry the weight upwardly in balanced position, said rollers being adapted to drop the weight at the upper end of the frame, means for retaining a post between the rails and in the path of said weight, and means for actuating the chains.

3. In a driver for posts and the like, the combination which comprises a supporting frame mounted on wheels and having a draw-bar at one end and an arcuate transversely disposed cross bar at the other, a mounting plate having rollers thereon adapted to travel longitudinally on the cross bar, said rollers being positioned above and below the cross bar, locking means for retaining the mounting plate in adjusted positions on the cross bar, spaced vertically disposed parallel rails carried by said mounting plate, a weight providing a hammer slidably mounted on said rails and positioned to travel between the rails, endless chains having rollers extended therefrom mounted to travel upwardly on said rails with the rollers adapted to pick up the weight as they move upwardly and adapted to drop the weight at a point spaced from the upper ends of the rails, spring clips carried by the rails and adapted to retain posts in position in the path of the weight, a bumper carried by the rails and also positioned in the path of the weight, said bumper adapted to be adjusted to limit downward movement of a post, means for preventing reverse travel of the chains, means for connecting the chains to driving means, and a telescoping brace connecting the upper ends of the rails to the supporting frame at a point spaced from said mounting plate.

References Cited in the file of this patent

UNITED STATES PATENTS

2,599,995 Hobson ---------- June 10, 1952

FOREIGN PATENTS

26,427 Denmark ---------- 1920