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PILE RAISING DEVICE

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FIG. 1

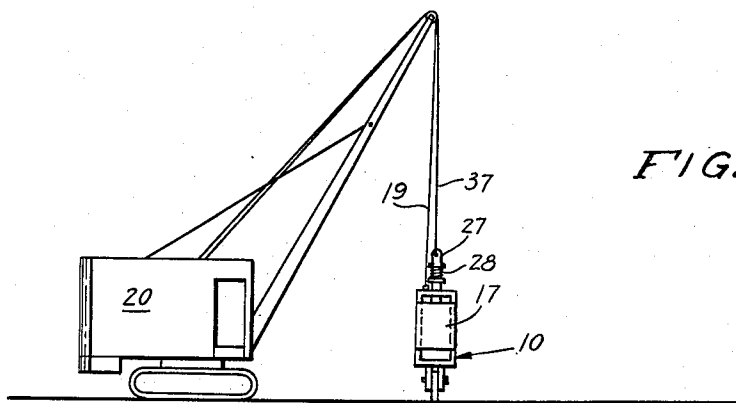
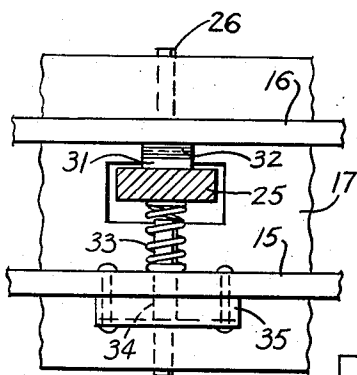


FIG. 4

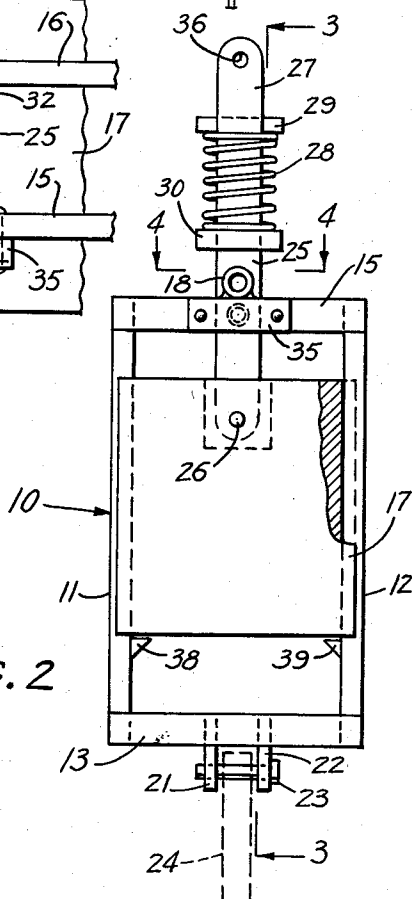


FIG. 2

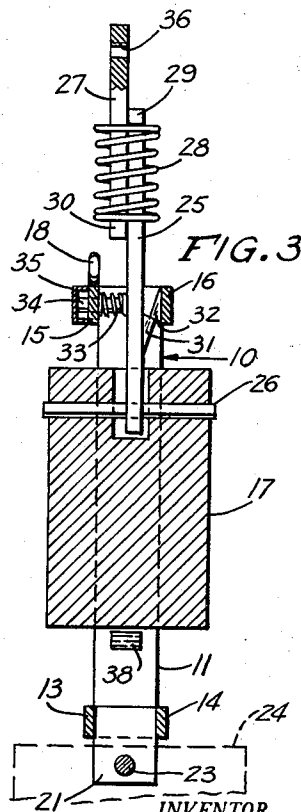


FIG. 3

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PILE RAISING DEVICE

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3 Claims. (Cl. 61—73)

The present invention relates to a device for pulling driven piles from the ground.

An object of the present invention is to provide a pile-raising device which may be used with a crane or other simple hoisting means.

Another object of the present invention is to provide a pile-raising device which is easily and quickly attached to the hoisting cable of a crane or other hoisting means and to a pile, and one which delivers an upwardly-directed blow to the pile while exerting an upwardly-directed pull on the pile.

A further object of the present invention is to provide a pile-raising device which is simple in structure, one compact and having few parts, one which may be economically manufactured and assembled, and one which is simple in structure, one compact and having few parts, one which may be economically manufactured and assembled, and one which is highly effective in action.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in connection with the annexed drawing, in which:

Figure 1 is an elevational view of a crane with the pile-raising device of the present invention attached to the hoisting cables of the crane, the dotted lines showing indicating a pile to be raised,

Figure 2 is an elevational view of the pile-raising device of the present invention, with a portion of the hammer in section,

Figure 3 is a sectional view taken on the line 3—3 of Figure 2, and

Figure 4 is a sectional view, on an enlarged scale, taken on the line 4—4 of Figure 2.

Referring in greater detail to the drawing in which like numerals indicate like parts throughout the several views, the pile-raising device of the present invention comprises an upstanding cage 10 having side members 11 and 12, bottom members 13 and 14 arranged in spaced relation and having their ends connected to the lower ends of the side members 11 and 12, and anvil bars 15 and 16 arranged in spaced relation positioned on and extending across the upper end of the cage 10 and fixedly secured thereto, the anvil bars 15 and 16 having their ends fixed to the upper ends of the side members 11 and 12.

A hammer 17 is positioned within and is connected to the cage 10 by means of grooves formed in the side edges of the hammer 17 and is movable in the cage 10 with the side members 11 and 12 in the grooves in the side edges of the hammer 17 into and out of engagement with the anvil bars 15 and 16.

Means is carried on the anvil bar 15 for attachment thereto of a hoisting cable. Specifically, this means consists in an eye-formation 18 rising from the anvil bar 15 and receiving the free end of a cable 19 for support of the cage 10 from the cable 19. A continuous upward pull on the cable 19 is provided by the crane 20, the latter being shown in Figure 1.

Means is provided on the lower end of the cage 10 for

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detachably securing the cage 10 to a pile to be raised. Specifically, this means embodies a pair of plates 21 and 22 arranged in parallel spaced relation transversely of the bottom members 13 and 14 and intermediate the ends of the latter. Portions of the plates 21 and 22 extend beneath the bottom members 13 and 14 and have aligned holes through which extends a pin 23. A pile, indicated by the numeral 24 in Figures 1, 2, and 3, and shown in dotted lines in those figures, is provided with a hole for receiving the pin 23 for attaching the cage 10 thereto.

The first vertically-disposed hoisting link 25 extends loosely between the anvil bars 15 and 16 and has its lower end connected to the hammer 17 for lateral movement with respect to the anvil bars 15 and 16. The lower end of the hoisting link 25 is fixedly secured to a rod 26 which extends transversely through the hammer 17 which has a rectangular hole in its upper end receiving the lower end portion of the hoisting link 25 with the intermediate portion of the rod 26 traversing a hole in the lower end portion of the hoisting link 25. The rod 26 is slidable within the hole provided in the upper end portion of the hammer 17.

A second vertically-disposed hoisting link 27 is arranged so that the portion adjacent the lower end thereof is contiguous to the portion adjacent the upper end of the first link 25.

Means is provided connecting the upper end portion of the hoisting link 25 to the lower end portion of the hoisting link 27 for limited vertical movement relative to each other. Specifically, this means consists in a compressible coil spring 28 surrounding the upper portion of the hoisting link 25 and the lower end portion of the hoisting link 27 and having its upper end bearing against a shoulder 29 projecting from each side of the hoisting link 25 and having its lower end bearing against a shoulder 30 projecting from each side of the hoisting link 27. The spring 28, when compressed, biases the hoisting link 25 for upward movement relative to the hoisting link 27.

Releasable cooperating means is provided on the link 25 and on the anvil bar 16 for holding the hoisting link 25 against the anvil bar 16 and preventing the upward movement of the link 25 relative to the link 27. Specifically, this means consists in a dog 31 on the face of the hoisting link 25 facing the anvil bar 16 and a cooperating dog 32 on the inner face of the anvil bar 16 and having its end engageable with the end of the dog 31. The ends of the dogs 31 and 32 are complementally sloped at approximately an angle of 25° to the horizontal and upon application of a force on the hoisting link 25 to raise it relative to the hoisting link 27, the dog 31 has a tendency to slip off of the dog 32 releasing the link 25 for upward movement.

Spring means is provided operatively connected to the link 25 and the anvil bar 15 for biasing the link 25 toward the anvil bar 16. Specifically, this means consists in a coil spring 33 surrounding a horizontally-disposed pin 34 which has one end supported on a plate 35 which is exteriorly of the anvil bar 15 and is fixedly secured to the anvil bar 15. The pin 34 extends through the anvil bar 15 and has its free end spaced a distance away from the adjacent face of the link 25 so that the link 25 may pass upwardly between the free end of the pin 34 and the dog 32. One end of the coil spring 33 bears against the inner face of the anvil bar 15 and the other end bears against the adjacent face of the link 25 and biases the link 25 against lateral movement toward the anvil bar 15 and holds the link 25 against upward movement until the dogs 31 and 32 become disengaged from each other. The coil spring 33 is compressible upon movement of the dogs 31 and 32 to the point where their ends no longer engage each other and is operable to release the link 25

for upward movement in response to the lateral movement of the link 25 relative to the anvil bars 15 and 16.

Means is provided on the upper end of the link 27 for attachment thereto of a second hoisting cable. Specifically, this means consists in an eye-formation receiving the free end of a cable 37 which is operatively connected to the crane 20. A pair of stops 38 and 39 spaced upwardly from the bottom members 13 and 14 and fixedly secured to the side members 11 and 12, respectively, prevent the downward movement of the hammer 17 beyond the point of their attachment to the side members 11 and 12.

In operation, the continuous pull by the crane 20 on the cable 19 exerts a steady pull upwardly on the piling 24 through the cage 10. An upward pull on the cable 37 results in the compression of the spring 28 to the point where the ends of the dogs 31 and 32 disengage from each other and compress the coil spring 33 to the point where the link 25 is free for upward movement. This results in the raising suddenly of the hammer 17 against the anvil bars 15 and 16 and imparting to the cage 10 an impact blow in the upward direction which is transmitted to the piling 24 and causing the latter to move upwardly out of the ground. It has been found for a hammer weighing a thousand pounds, the spring 28 should have a two thousand pound resistance to compression. The crane 20 should be able to exert a three thousand pound pull on the cable 37 to effect the upward movement of the hammer. The coil spring 33 should require a five hundred pound compressive force before it releases the hammer for upward movement. The connection of the side members 11 and 12, the bottom members 13 and 14, and the anvil bars 15 and 16 to each other should be welded and provided with such reinforcements as may be needed.

What is claimed is:

1. A pile raising device comprising an upstanding cage including spaced side members, a pair of horizontally-disposed anvil bars arranged in spaced relation positioned on and extending across the upper end of said side members and fixedly secured thereto, a hammer positioned within and connected to said side members for sliding movement into and out of engagement with said anvil bars, means carried by one of said anvil bars for attachment thereto of a hoisting cable, means on the lower end of said cage for detachably securing said cage to a piling to be raised, a first vertically-disposed hoisting link extending loosely between said anvil bars and having its lower end connected to said hammer for lateral movement with respect to said anvil bars, a second vertically-disposed hoisting link arranged so that the portion adjacent the lower end thereof is contiguous to the portion adjacent the upper end of said first link, means connecting said portions together for limited vertical movement relative to each other, means on the upper end of said second link for attachment thereto of a second hoisting cable, releasable cooperating means on one of said anvil bars and said first link for holding said first link against said one anvil bar, and spring means operatively connected to said first link and the other of said anvil bars for biasing said first link toward said one of said anvil bars.

2. A pile-raising device comprising an upstanding cage including spaced side members, a pair of horizontally-

disposed anvil bars arranged in spaced relation positioned on and extending across the upper end of said side members and fixedly secured thereto, a hammer positioned within and connected to said side members for sliding movement into and out of engagement with said anvil bars, means carried by one of said anvil bars for attachment thereto of a hoisting cable, means on the lower end of said cage for detachably securing said cage to a piling to be raised, a first vertically-disposed hoisting link extending loosely between said anvil bars and having its lower end connected to said hammer for lateral movement with respect to said anvil bars, a second vertically-disposed hoisting link arranged so that the portion adjacent the lower end thereof is contiguous to the portion adjacent the upper end of said first link, means embodying a compressible spring connecting said portions together for limited vertical movement relative to each other, means on the upper end of said second link for attachment thereto of a second hoisting cable, spring means operatively connected to said first link and the other of said anvil bars for biasing said first link toward said one of said anvil bars, and releasable cooperating means on one of said anvil bars and said first link for holding said first link against said one anvil bar.

3. A pile-raising device comprising an upstanding cage including spaced side members, a pair of horizontally-disposed anvil bars arranged in spaced relation positioned on and extending across the upper end of said side members and fixedly secured thereto, a hammer positioned within and connected to said side members for sliding movement into and out of engagement with said anvil bars, means carried by one of said anvil bars for attachment thereto of a hoisting cable, means on the lower end of said cage for detachably securing said cage to a piling to be raised, a first vertically-disposed hoisting link extending loosely between said anvil bars and having its lower end connected to said hammer for lateral movement with respect to said anvil bars, a second vertically-disposed hoisting link arranged so that the portion adjacent the lower end thereof is contiguous to the portion adjacent the upper end of said first link, a compressible coil spring surrounding said portions of said links and having its upper end connected to said first link and having its lower end connected to said second link for biasing said first link for upward movement relative to said second link, releasable cooperating means on said first link and on one of said anvil bars for holding said first link against said one anvil bar and against upward movement relative to said second link and operable to release said first link for upward movement in response to lateral movement of said first link relative to said anvil bars, spring means carried by one of said anvil bars biasing said first link against lateral movement, and means on the upper end of said second link for attachment thereto of a second hoisting cable.

References Cited in the file of this patent

UNITED STATES PATENTS

2,158,702	Kipper	May 16, 1939
2,328,120	Atwater	Aug. 31, 1943
2,492,840	Bugg	Dec. 27, 1949

FOREIGN PATENTS

201,300	Great Britain	Aug. 2, 1923
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