Oct. 20, 1970 W. DE WITT 3,534,996

PILING EXTRACTOR

Filed Feb. 6, 1969 2 Sheets-Sheet 1

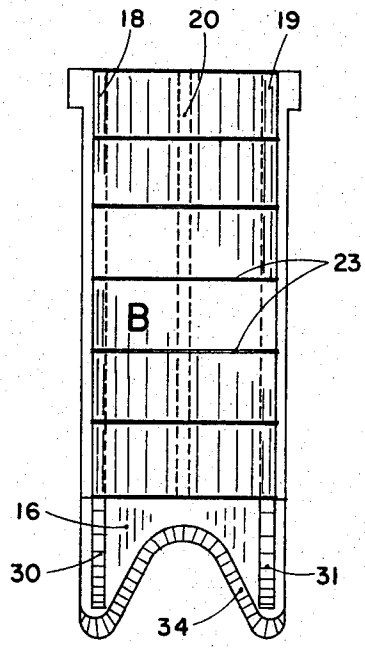


FIG. 2

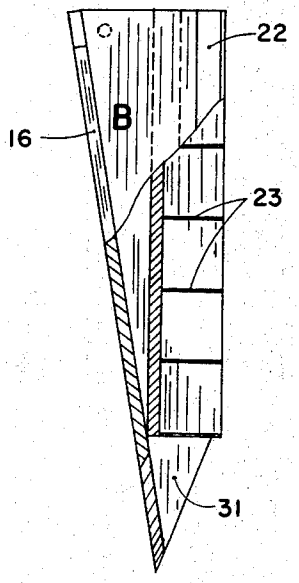


FIG. 3

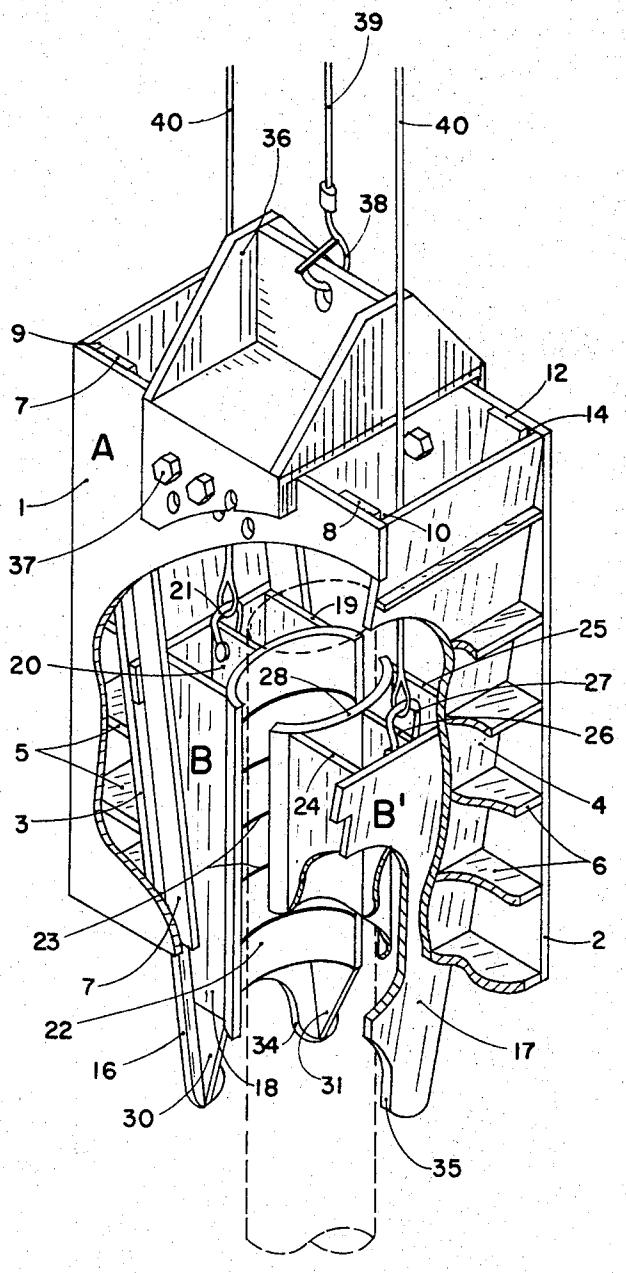


FIG. 1

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PILING EXTRACTOR

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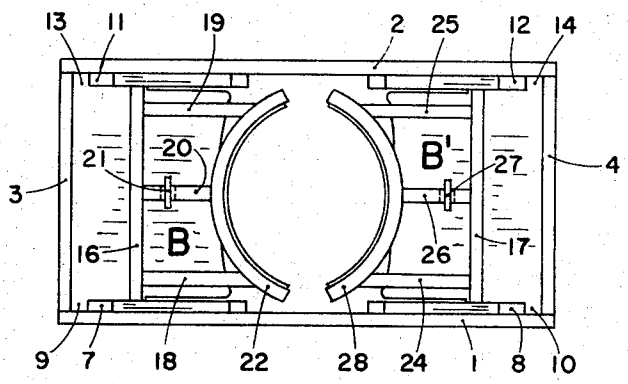


FIG. 4

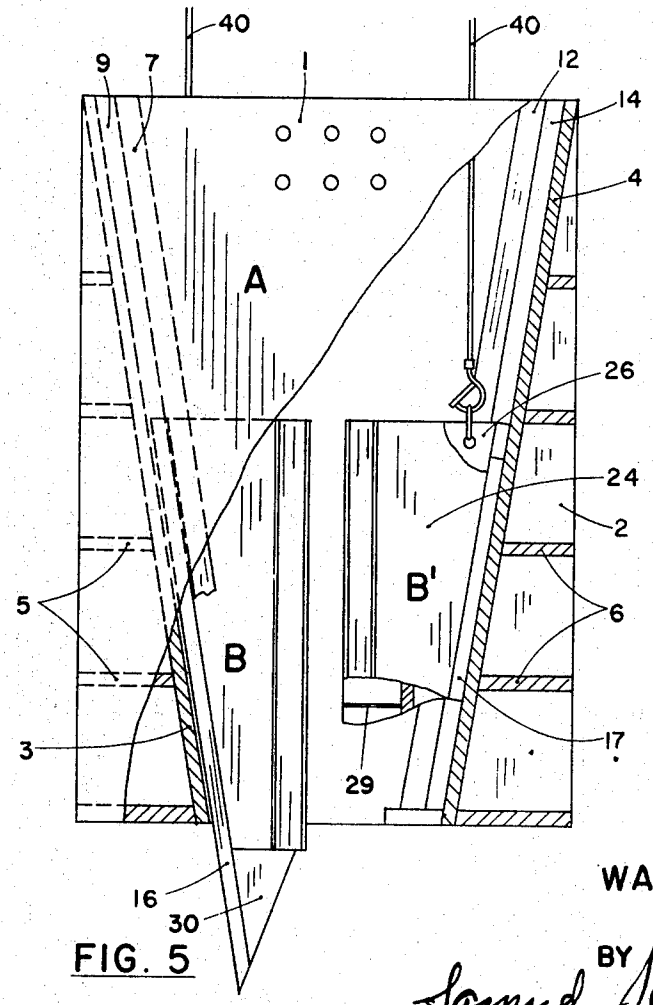


FIG. 5

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PILING EXTRACTOR

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Int. Cl. B66c 1/00
U.S. Cl. 294—102 4 Claims

ABSTRACT OF THE DISCLOSURE

A device for releasably gripping the upper end of piling, of different sizes and configurations, while in place and extracting them from their fixed position by conventional power means, as a suitable crane boom, with or without the assistance of vibro or other types of drivers, sometimes necessary to loosen the piling from its bind.

This invention relates generally to gripping and pulling devices and more particularly to devices for the removal of piling, whether of timber or other materials, in place for some time and therefore requiring the application of a substantial pulling force, often with the aid of vibrators to loosen the pile from its bind. Consequently, the extraction of such piling necessitates the use of a firm and powerful, but nevertheless an adjustable and releasable gripping assembly near the top of the piling to do the extraction almost effortlessly.

The primary object of the invention is to provide a pile extractor, easily adaptable for gripping piles of different sizes, shapes and materials, which can be readily slipped over the exposed end of a pile, and by conventional power means, exert a positive and continuous pulling force upon the pile as it is being extracted.

Still another object of the invention is to embody complementary crescent shaped jaw assemblies adapted to accommodate piles of various diameters and shapes, the gripping force of which increases proportional to the resistance offered by the pile during its attempted extraction from its fixed position.

Another object of my invention is to provide a simplified but durable pile extractor which may be easily and inexpensively manufactured and readily serviced and repaired.

Other objects and advantages and the nature and purpose of the invention will become more readily apparent from the following description when considered in connection with the accompanying drawings forming a part of this specification and revealing a preferred embodiment of the invention.

In the drawings:

FIG. 1 is an elevational view in perspective and partially broken away to show in working relationship the structural characteristics of the basic elements of the invention;

FIG. 2 is an elevational view of one of the jaw members of the invention, to graphically show the structural features of the semi-circular face thereof;

FIG. 3 is side elevational view, partially in section and partially broken away to reveal more details of construction of the jaw members;

FIG. 4 is a top plan view of the extractor embodying the invention with the housing lift bracket assembly removed to show the working relationship of the several members of the extractor; and

FIG. 5 is an elevational view, partially in section and partially broken away, with the housing lift bracket assembly removed, to show some of the details of construction of the extractor embodying the invention.

The invention consists of a housing assembly, generally designated by reference character A, consisting of a

pair of parallelly disposed walls **1** and **2** and a pair of end walls **3** and **4**. End walls **3** and **4** are positioned angularly in relation to each other so that the space confined therebetween is gradually reduced from the top toward the bottom thereof. A plurality of spaced stiffening plates **5** and **6** are provided for end walls **3** and **4** respectively, each group of plates being also secured to walls **1** and **2** for added reinforcement.

Guide bars **7** and **8** extend angularly along the entire length of wall **1** adjacent to end walls **3** and **4** respectively forming raceways **9** and **10**. Identical types of guide bars **11** and **12** are formed on wall **2** in coinciding angular relationship to guide bars **7** and **8** respectively. Consequently raceways **13** and **14** are also formed adjacent to end walls **3** and **4** and are in coinciding relation to raceways **9** and **10** respectively. Adequate lubrication is periodically provided in the raceways for reasons which will become obvious from subsequent explanations.

A pair of pile gripping assemblies, generally designated by reference characters B and B′ are independently mounted opposite each other in the space formed by the four walls of housing assembly A and are slidably positioned in the raceways as hereinafter described. Each gripping assembly possesses the same structural characteristics. Pile gripping assembly B has a plate **16** slidably moveable within raceways **9** and **13** and pile gripping assembly B′ has a plate **17** slidably moveable within raceways **10** and **14**. A pair of wedge-shaped ribs **18** and **19** extend vertically from the sides of plate **16** in spaced parallel relation to each other. Interposed equidistant between them is still another wedge-shaped rib **20**, which also extends vertically from plate **16**. An eye or bale **21** is secured to the top of rib **20**. A semi-circular shaped pile gripping face **22** is integrally secured to the ribs **18**, **19** and **20** and, because of the peripheral linear contour of the ribs in relation to the contour of the space formed by the walls of housing A, face **22** always presents a perpendicular position to a pile regardless of the position to the pile to be extracted. A plurality of beads **23** are parallely spaced and transversely welded on face **22**.

Similarly, a pair of wedge-shaped ribs **24** and **25** extend vertically from the sides of plate **17** in spaced parallel relation to each other. Also interposed equidistant between them is another wedge-shaped rib **26**, which extends vertically from plate **17**. Rib **26** also has an eye or bale **27** secured thereto.

A semi-circular shaped pile gripping face **28** is integrally secured to ribs **24**, **25** and **26** and, because of the peripheral linear contour of these ribs in relation to the contour of the spaced formed by the walls of housing A, face **28** also presents a perpendicular position to a pile regardless of the position of the pile to be extracted. Face **28** also has a plurality of beads **29** parallely spaced and transversely welded to it. While the pile gripping assemblies depend largely on pressure provided for the pulling load, the beads **23** and **29** act as teeth and dig into the pile to be extracted, thus aiding the friction developed by these gripping assemblies.

Guide flanges **30** and **31** are secured to the base of plate **16** and identical guide flanges **32** and **33** (not shown) are secured to plate **17**, all of which are intended to guide the pile gripping faces **22** and **28** over the pile without damaging them or jamming the plates **16** and **17** in their respective raceways.

Plates **16** and **17** have arcuate shaped cut-outs **34** and **35** respectively to afford better vision to the operator in guiding the pile gripping faces over the piling to be extracted.

A bracket assembly **36** of any desirable configuration is removably secured to housing A, in any well known manner, as by a nut and bolt arrangement **37**. Suffice

it to say that hook **38** is secured to bracket **36** and its cable **39** leads to a suitable crane boom, not shown, which moves the housing assembly A into position over a piling to be extracted.

In the event it becomes necessary to first agitate the piling before, or during its removal, another type of bracket assembly can be substituted for bracket **36**, for example, one which includes a vibro or a vulcan type of driver of well konwn construction without altering the basic concepts of the invention.

Cable **40**, which is secured to eyes or bales of ribs **20** and **26** respectively of gripping assemblies B and B', also leads to the same crane boom, not shown, which moves gripping assemblies B and B' independently of housing assembly A. The rigging of cable **39** permits the entire pile extractor to be raised or lowered while the rigging of cable **40** permits only the movement of the gripping assemblies within the housing assembly, although a common crane boom is employed for both types of rigging.

MODUS OPERANDI

The movement of pile gripping assemblies B and B' is confined by the inclined guide flanges and, because of the inclination of the guide flanges, as the gripping assemblies move downward to grasp a pile they also move closer together and, when they gradually move apart.

In operation, the housing assembly A is guided and centered over the pile to be extracted and then lowered by its rigging from the crane boom. Simultaneously with this operation, the pile gripping assemblies B and B' are moved upwardly in the housing assembly A to a wide open position by their separate rigging eminating from the same crane boom. The housing is then slowly lowered over the pile to be extracted so that the pile, fancifully represented in dotted line in FIG. 1, is well within the housing and between the semi-circular faces of the gripping assemblies. These are then released by their rigging and allowed to drop and surround the pile so that the rigging is in relaxed condition.

The rigging for the housing is then actuated to exert a vertical upload on housing assembly A causing the pile gripping assemblies B and B' to progressively wedge between the pile and the end walls **3** and **4** of housing assembly A and the greater the resistance of the pile against its extraction the stronger proportionately is the bite of the beaded face plates of the gripping assemblies.

The simplicity and advantages of the piling extractor heretofore described undoudbtedly will be clear to those skilled in the art without further detailed description; and while the drawing shows one embodiment of the invention and the salient features thereof, only by way of example, it is quite possible that changes may be made in the details of construction which, nevertheless, will come within the scope of this invention, and therefore

I do not wish to limit myself to the disclosure shown and described herein except as specified in the following claims in which:

I claim:

1. A pile extractor, comprising a housing including a pair of parallelly disposed side walls and a pair of end walls all integrally connected to each other, said end walls inclined inwardly toward each other thereby form an opening through said housing, the bottom periphery of which is smaller than its top periphery, pairs of inclined raceways formed between said walls, and a pair of pile gripping means slidably positioned in said raceways confined within said housing at each side of the axis of said opening and independently movable relative thereto adapted for firm engagement around a pile received in said housing when a vertical upload is exerted on the housing.

2. The pile extractor set forth in claim **1** in which a beaded semi-circular shaped pile gripping face is provided in each pile gripping means and positioned relative to the housing so as to present a perpendicular position relative to a pile to be extracted.

3. The pile extractor set forth in claim **1** in which a beaded semi-circular shaped pile gripping face is provided in each pile gripping means, and a plurality of wedge-shaped ribs secured to the back of each semi-circular pile gripping face to reinforce and so position said face relative to the housing as to present the face in a perpendicular position relative to a pile to be extracted.

4. A pile extractor, comprising a housing including a pair of parallelly disposed side walls and a pair of end walls all integrally connected to each other, said end walls inclined inwardly toward each other to thereby form an opening through said housing, the bottom periphery of which is smaller than its top periphery, pairs of inclined raceways formed between said walls, a pair of pile gripping means slidably positioned in said raceways confined within said housing at each side of the axis of said opening and independently movable relative thereto adapted for firm engagement around a pile received in said housing when a vertical upload is exerted on the housing, and a bracket assembly secured to said housing for the manipulation of said housing and of the pile gripping means independent of each other.

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ANDRES H. NIELSEN, Primary Examiner

U.S. Cl. X.R.

24—2635