July 4, 1967 R. B. SPRAGUE 3,329,460

PILE CLAMP

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Fig. 1

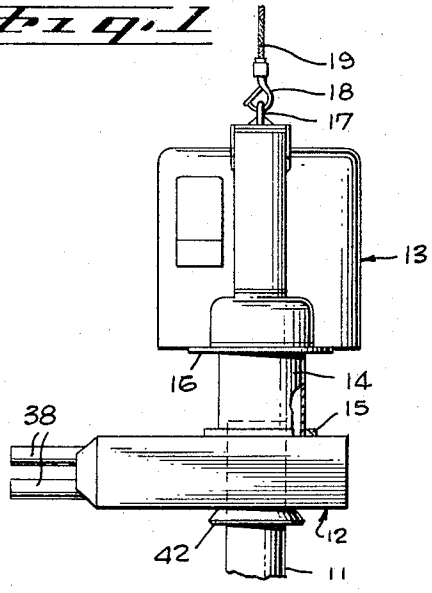


Fig. 3

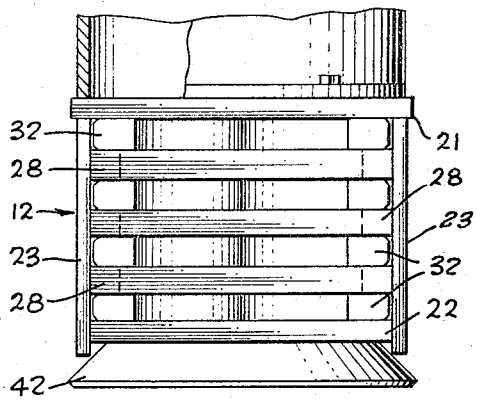
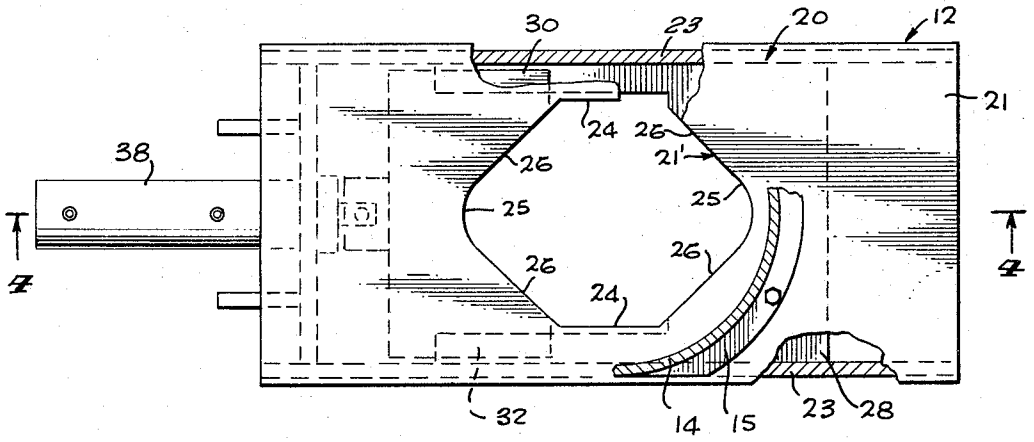


Fig. 2



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Fig. 4

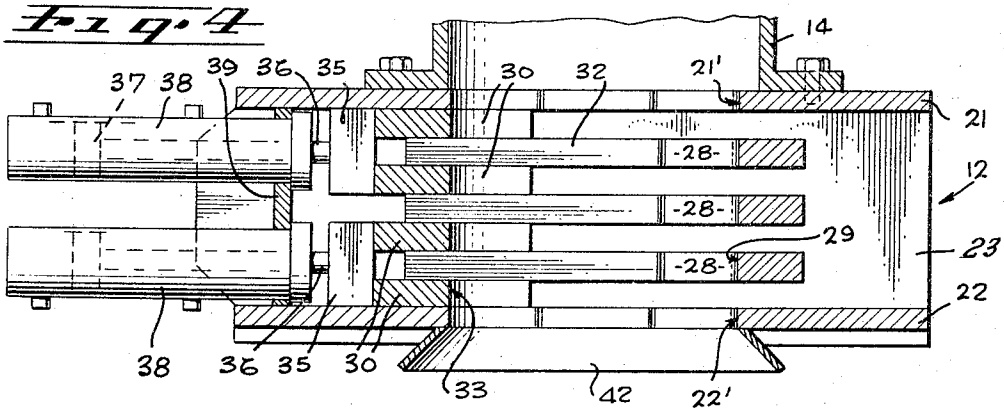


Fig. 5

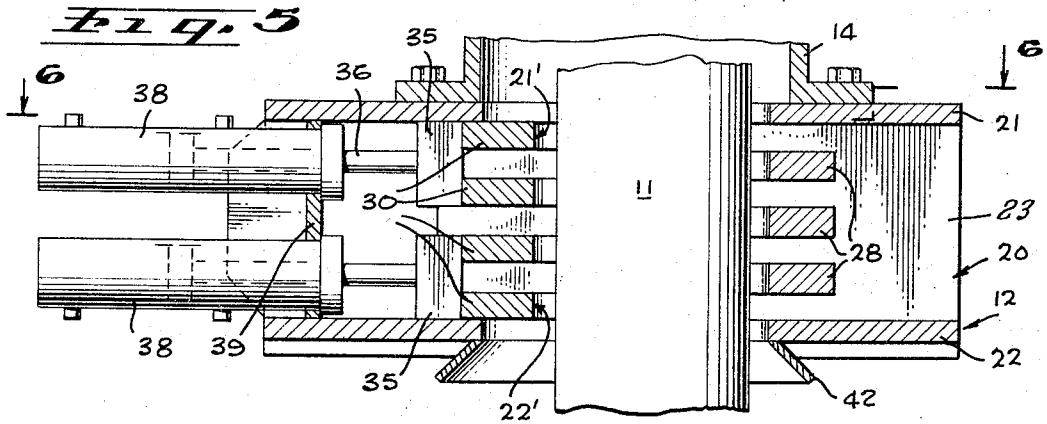
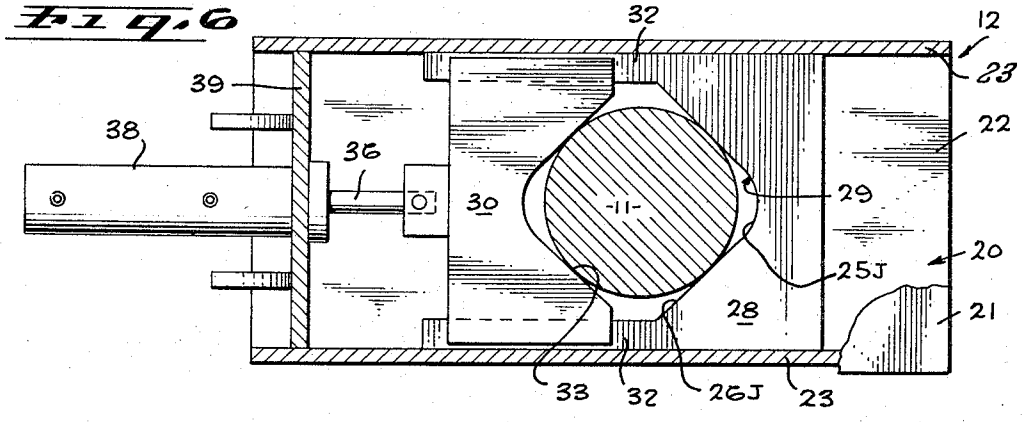


Fig. 6



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PILE CLAMP

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3 Claims. (Cl. 294—88)

This invention has to do generally with devices for pulling piling and particularly with means for releasably gripping individual piles to enable the pulling thereof by conventional means.

In pulling or removing piling which may have been in place for many years substantial force is required to be applied, necessitating the use of some means for firmly gripping the upper ends of the piles. While various means have been used, none has proved completely successful. Most means with which I am familiar are not readily adaptable for gripping piles of different sizes nor for gripping piles of different material, since such means requires special shoes or linings depending upon the material to be gripped and requiring shims or the use of adapters for various sizes.

Also, in recent years with the advent of pile driving by so-called vibro-drivers which impart high energy vibrations to the piling in both driving and pulling operations, prior pile gripping devices and those in use today tend to dampen the vibrations and lessen the efficiency of the equipment.

An object of the present invention is to provide a new and improved pile clamp which overcomes the above-noted disadvantages of prior devices and which has several advantageous features thereover.

More particularly it is an object to provide a novel pile clamp which can be readily slipped over the upper end of of a pile into place and which can be readily operated to positively grip the pile.

Another object is to provide a fluid-operated device embodying opposed movable and stationary jaws adapted to accommodate piles of various diameters and cross-sectional shapes and suited for gripping piles irrespective of the material thereof, that is, whether it is steel, wood, concrete, or made of more than one material.

Still another object is to provide a novel clamp which firmly grips the pile and serves to impart thereto the vibrations of a pile driver and puller of the vibration generating and imparting type without appreciably damping the vibrations.

Another object is to provide a simple, durable, easily manufactured device which can be readily serviced.

These and other objects will be apparent from the drawings and the following description. Referring to the drawings, which are for illustrative purposes only:

FIG. 1 is an elevational view of a pile clamp embodying the invention shown attached to a pile driving-pulling unit and in place over the upper end of a pile;

FIG. 2 is a sectional plan view through the clamping device of FIG. 1 apart from the pile, and on a larger scale;

FIG. 3 is an end elevational view of the right-hand end of the clamping device;

FIG. 4 is a sectional view on line 4—4 of FIG. 2, with the clamp in open position;

FIG. 5 is a view similar to FIG. 4 but showing the clamp closed in gripping engagement with a pile; and

FIG. 6 is a sectional plan view on line 6—6 of FIG. 5.

More particularly describing the invention, numeral 11 generally indicates a pile which may be considered as being firmly anchored in the ground. Numeral 12 designates the pile clamp of the invention and this is shown attached to a so-called vibro-driver pile driver and puller 13 by means of a pipe section 14 which is bolted or otherwise secured by its flanges 15 and 16 to the members 12 and 13, respectively. The driver 13 has an eye or bail at the top, designated 17, and the driver is normally suspended upon a hook 18 therethrough and cable 19. The latter may extend from a suitable crane boom (not shown).

The pile clamp 12 comprises a body 20 formed chiefly by top and bottom plates 21 and 22, respectively, connected by two side plates 23, the parts being welded together. The top and bottom plates are formed to provide openings 21' and 22', respectively. These openings are characterized by having oppositely disposed flat-sided lateral edges 24, rounded end edges 25, and four straight edges 26 which merge with the end sections and terminate at the side edges 24, the shape of the opening being best seen in FIG. 2.

Mounted in the body 20 between the side plates are a plurality of stationary plates 28, three being shown. The plates are spaced apart vertically and are parallel with the top and bottom plates 21 and 22. Each plate is formed at its inner edge to provide a jaw 29 which corresponds in shape to the surfaces 25 and 26 at one end of the opening through the plates of the body as previously described, the jaw surfaces being designated 25J, 26J. These stationary plates 28 are firmly secured in place, being welded or otherwise attached to the side plates 23.

The body is also provided with a plurality of movable plates 30 divided into two sets of two each, mounted for movement longitudinally of the body. The two middle plates are at elevations between that of the stationary plates, while the upper movable plate is above the upper stationary plate and the lower movable plate is below the lower stationary plate. The lower movable plate is supported upon the bottom plate 22 of the body, while the other movable plates are supported upon side extensions 32 of the stationary plates, although the extensions may be formed as separate members welded to the side walls of the body. The movable plates are recessed on their inner edges to provide jaws 33 which complement the jaws 29 of the stationary plates, being of the same shape thereof but facing in the opposite direction. Jaws 33 have the faces 25J and 26J previously described.

The upper two movable plates are connected to a head 35 and the two lower movable plates are connected to a similar head, also designated 35. The heads are mounted upon the ends of the piston rods 36 of pistons 37 which are received in cylinders 38 mounted in an end wall 39 provided at one end of the clamp between the top and bottom plates and the side walls 23. Since the two piston-cylinder units, or fluid rams as they are called, are of the same construction, corresponding parts have been designated by the same numerals. Any source of pressure fluid, either hydraulic or gaseous, and suitable control means may be provided in conjunction with conventional fluid control means for operating the fluid rams.

The body of the clamp is also provided with a flared skirt 42 which is welded or otherwise secured to the lower plate 22 and this serves as a guide in placing the device over the upper end of a pile.

In the operation of the device the entire assembly, as viewed in FIG. 1, is lowered over the upper end of a pile 11 which may then project through the clamp somewhat into the pipe section 14 after which the fluid rams or power cylinders are operated to cause the movable plates 30 to move inwardly against the pile and firmly grip it between the jaws thereof and the jaws of the stationary plates. Inasmuch as the movable and stationary jaws are vertically offset, the pile, irrespectively of material, is indented by the jaws and thus firmly gripped so that the operation of removing the same can be carried out readily.

While I have shown a preferred form of my invention, I contemplate that various changes and modifications can be made therein without departing from the inven-

tion, the scope of which is indicated by the following claims.

I claim:

1. A pile clamp, comprising a body including a top plate, a bottom plate, and side plates connecting the same, said top and bottom plates each having a substantially central opening in register with the opening in the other plate to receive a pile, a plurality of parallel, vertically spaced stationary plates mounted in the body at one side of the axis of said openings and providing inner jaw edges to engage a pile, a plurality of vertically spaced, parallel movable plates in said body opposite said stationary plates and providing inner jaw edges to engage a pile, said stationary and movable plates being alternately vertically offset, and fluid ram means carried by said body and operable to move said movable plates into firm engagement with a pile received in said body.

2. The pile clamp set forth in claim 1 in which a tubular extension is provided on said upper plate for attachment to a pile driving and pulling unit.

3. The pile clamp set forth in claim 1 in which a tubular extension is provided on said upper plate for attachment to a pile driving and pulling unit, and in which a skirt is provided on said bottom plate of the body around the opening therein.

References Cited

UNITED STATES PATENTS

1,641,921	9/1927	Crowell	251—1 X
2,026,036	12/1935	Head	251—1 X
2,188,141	1/1940	Abercrombie	251—1 X

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