April 5, 1960 L. L. FREDERICK 2,931,186

PILE DRIVE CAP

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Fig. 1.

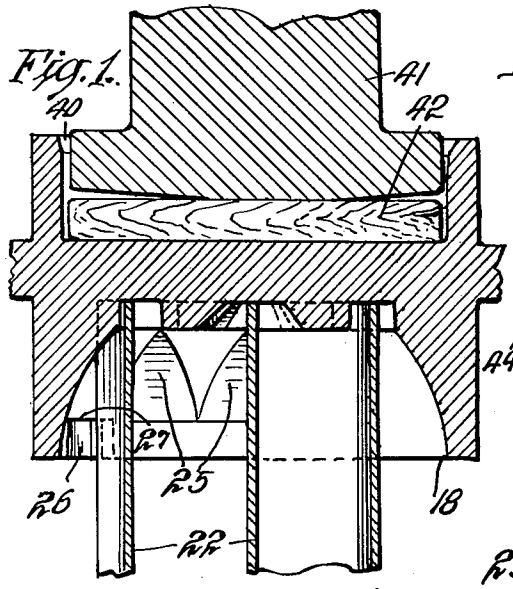


Fig. 3.

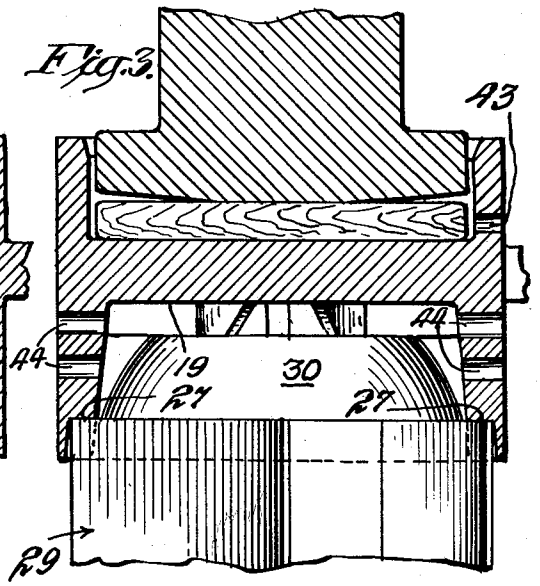


Fig. 2.

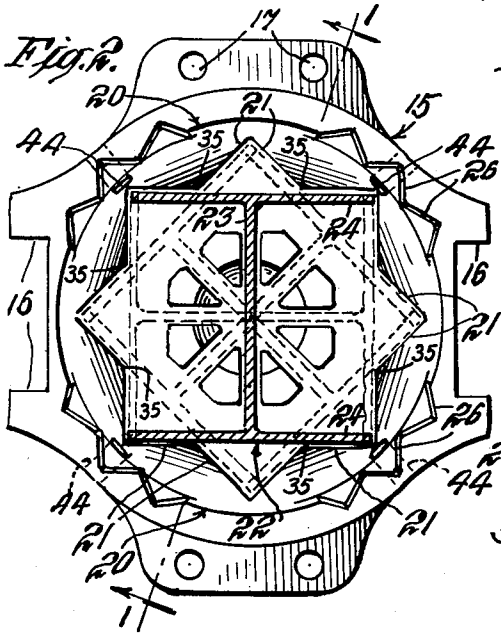
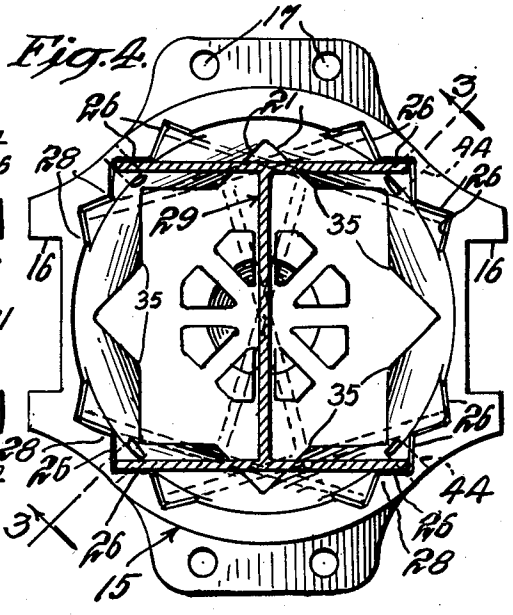


Fig. 4.



INVENTOR.
LEONARD L. FREDERICK
BY
Philip S. McLean.
ATTORNEY

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Fig. 5.

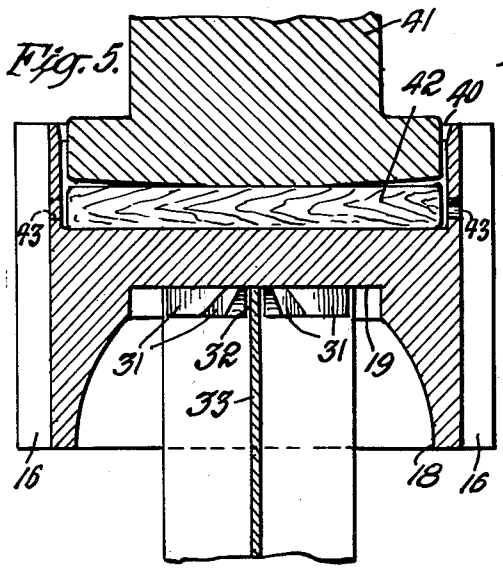


Fig. 7.

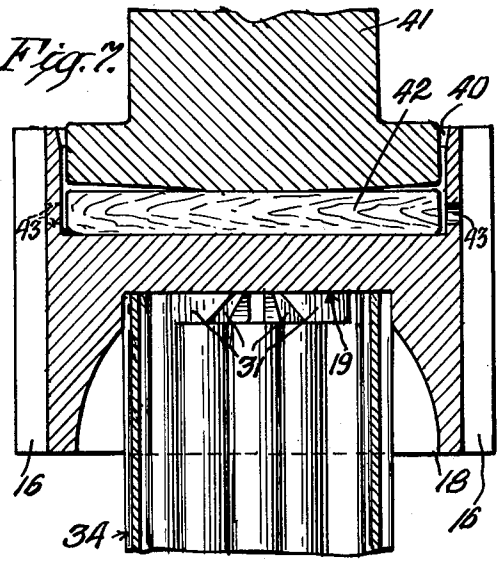


Fig. 6.

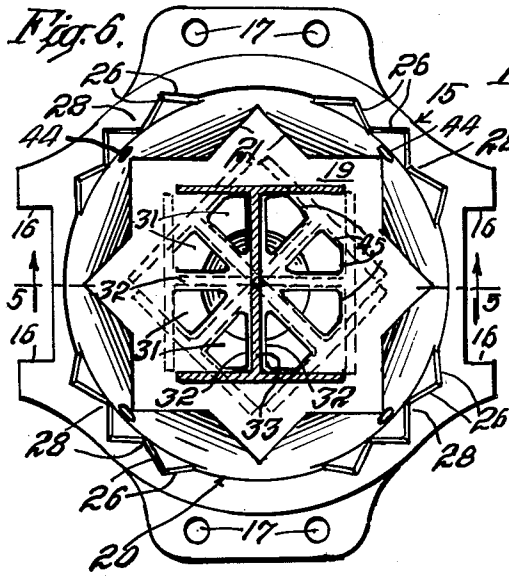
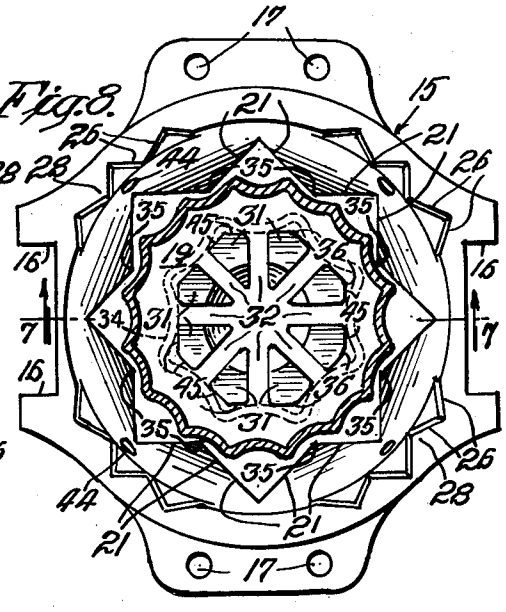


Fig. 8.



INVENTOR.
LEONARD L. FREDERICK
BY
Philip S. McLean
ATTORNEY

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Fig. 9.

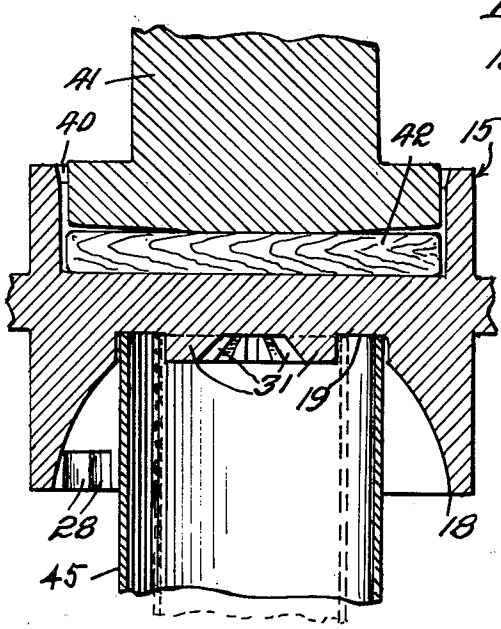


Fig. 11.

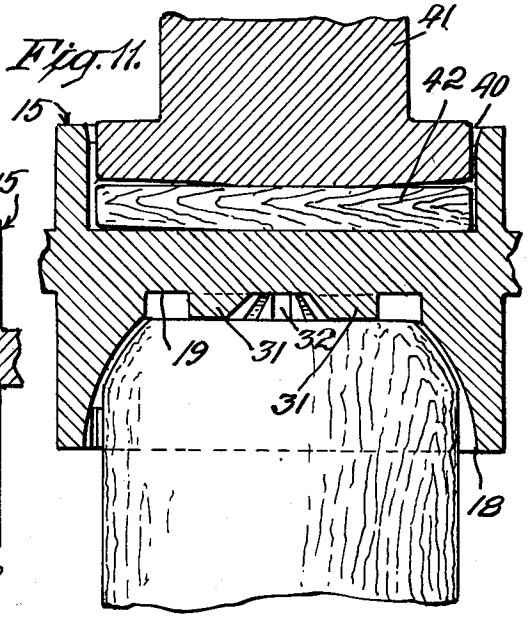


Fig. 10.

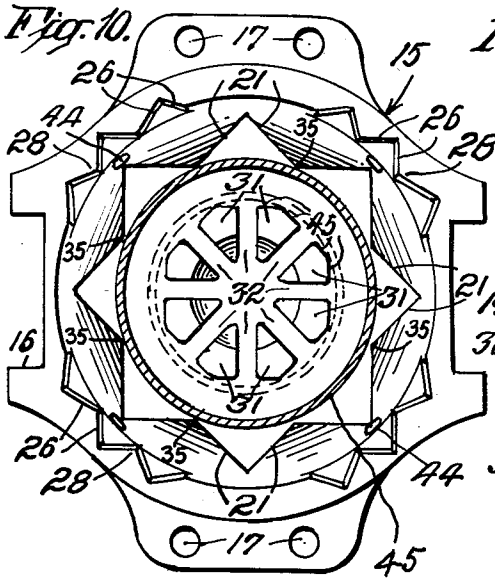
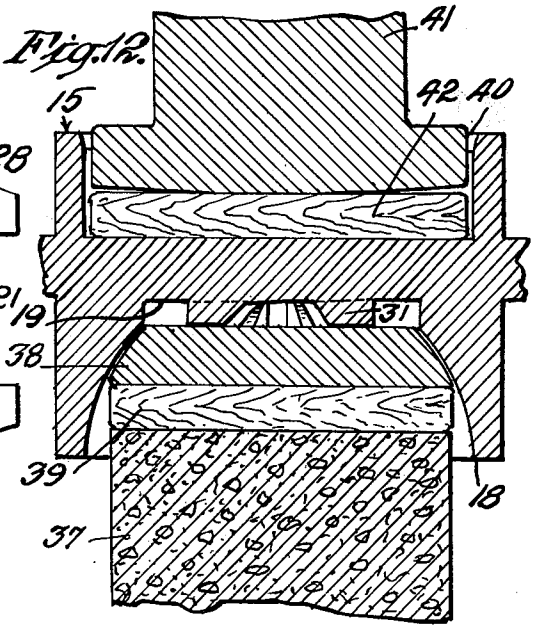


Fig. 12.



INVENTOR
LEONARD L. FREDERICK
BY
ATTORNEY

United States Patent Office

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PILE DRIVE CAP

Leonard L. Frederick, Whippany, N.J., assignor to McKiernan-Terry Corporation, Harrison, N.J., a corporation of New Jersey

Application February 5, 1958, Serial No. 713,423

2 Claims. (Cl. 61—77)

The invention herein disclosed relates to pile driving.

Special objects of the invention are to enable the same pile hammer being used, without, or practically without change, to drive the different kinds of pile, such as timber or wood pile, concrete pile, H-beams, pipe pile, fluted pile and the like, and to hold the pile in each form, properly centered on the driving axis.

Other special objects of the invention are to enable the hammer to be used to line up the pile and, in the case of H-beams, and the like, to hold the pile against rotation or "spiraling" while being driven into the ground.

Further special objects are to provide temporary connection between the hammer and pile permitting the pile to be held in different angular relations with respect to the boom supporting the hammer, thus to enable the setting of the pile in different angular relations without shifting the crane.

Other desirable objects accomplished by the invention and the novel features of construction, combination and relation of parts by which the purposes of the invention are attained, are set forth and will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present commercial embodiment of the invention but structure may be modified and changed as regards the immediate illustration, all within the true intent and scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawings is a broken vertical sectional view of one of the drive caps in use driving a large H-beam pile with parts appearing as taken on section line 1—1 of Fig. 2.

Fig. 2 is a bottom plan view of the drive cap with the H-beam appearing in section therein and with broken lines indicating two other possible angular positions of the H-beam.

Figs. 3 and 4 are views similar to Figs. 1 and 2 illustrating the driving of an extra large H-beam and showing a filler pad in the bowl of the cap over the end of the larger size beam.

Figs. 5 and 6 are similar views illustrating the driving of a smaller size H-beam and showing how this may be centered and held on the driving axis in different angular relations.

Figs. 7 and 8 are like views illustrating the driving of fluted pile, Fig. 8 showing in dotted lines how a fluted pile of smaller diameter is centered in the drive cap.

Figs. 9 and 10 are broken section and bottom plan views respectively showing the cap used for driving large and small pipe pile.

Figs. 11 and 12 are broken sectional views illustrating use of the invention for driving timber pile and concrete pile respectively.

As shown in the several views, the drive cap is made up of a solid head piece **15** having guides **16** at the sides for engagement with the leads of the hammer and cable lashing eyes **17** by which it may be connected with the anvil of the hammer.

The bottom of the cap is finished in the form of a guide bowl **18** terminating at the top in a flat impact drive face **19**.

This drive face is shown in Fig. 2 as bound by an upright octagonal wall **20** having angularly related flats **21** providing the means for confining, centering and holding H-beam pile in any one of four different angular relations.

Fig. 2 shows an I-beam **22** positioned with the web **23** of the same transverse to the guides and hence in line with or parallel to the boom of the hammer, held so by engagement of its flanges **24** with opposed parallel flats **21**. The dotted lines show in Fig. 2 how the H-beam may be centered with the web transverse to the boom or inclined left or right by engagement of the beam flanges with the other parallel faces of the octagonally disposed flats **21**.

The octagonal confining wall **20** is cut up into the domed wall of the bowl, leaving the latter in the form of curved segments **25**, tapering toward the top, as in Fig. 1, but of sufficient extent to serve for all driving purposes.

The rim of the bowl, as shown in the bottom plan views, is cut into in angular notches **26** terminating at the top in abrupt shoulders **27**, Fig. 3. This provides dentals **28** between the notches for holding an extra large H-beam **29**.

As shown in Fig. 4 the dentals **28** are placed to engage the flanges and hold this large size beam with the web in different angular relations. In the illustration three possible positions are shown but with larger diameter cap the number of such possible locations may be increased.

In driving the larger size beams a filler pad **30** may be used in the bowl over the end of the pile.

Figs. 5 and 6 illustrate the invention used for driving smaller size H-beams.

In this case the beams are held centered on the driving face **19** by lugs **31** segmental in form spaced to provide between them through passages **32** in the plane of the driving face for receiving and holding the web **33** of the beam in the four different angular relations illustrated. These lugs have relatively inclined outer edge portions **45** positioned to engage inner faces of the beam flanges to hold the beams centered, as shown in Fig. 6.

Figs. 7 and 8 show the cap used for driving fluted pile **34**.

The large size fluted pile, as shown particularly in Fig. 8, is held centered by the points **35** of the pile entering in the notches **26** between the angularly related octagonal wall forming flats **21**.

The lugs **31**, as shown in Fig. 8, have rounded outer edges **36** located to enter within and hold fluted pile of small diameter.

Figs. 9 and 10 show how the points of the octagonal wall serve to center larger pipe pile **45** and in dotted lines how the outer edges of the center lugs serve to center and hold smaller diameter pipe.

Fig. 11 shows how the cap may be used for driving timber pile, the contracting wall segments of the bowl acting to center and hold such a pile in place, a filler pad being used or not as circumstances require.

Fig. 12 shows how the invention may be used for driving concrete pile **37** with suitable cushion and filler pads **38, 39** interposed in the guide bowl.

The curved tapering bowl segments in this case act like fingers closing down over the crown of the pile to center and hold it against rotation.

The cap is shown as having a pocket **40** in the top of it for the hammer anvil **41** and cushion pad **42**. This pocket will usually have opposed weep holes **43**.

The bowl, as shown, Fig. 3, may have openings **44** for cables to lash the filler pad in place.

While usually made up as a separate unit it is contemplated that the drive cap, as herein disclosed, may be combined with or built into the anvil of the hammer.

The invention as will be seen provides a practically universal form of cap adapted for driving all usual forms of pile and one which in every instance will center and hold the work on the driving axis, on the center line of force, a particularly important factor in the driving of long pile in the lengths of 60 and 80 feet. By locking the pile to the cap in the different angular relations shown, the hammer is able to line up the pile and to drive it in accurately alined relation and in many cases without having to shift the crane into different angular positions.

I claim:

1. A pile cap comprising a cap body having a pile guide in the bottom of the same in the form of a concavely arched inverted bowl having an upwardly convergent generally spherically curved side wall terminating at the top in a centrally located generally horizontal flat drive face for impact engagement with a pile entered in the bowl, the inner surface of said upwardly convergent curved side wall being intersected by eight equally spaced substantially vertical angular notches extending upward to said drive face and joined to form the boundary of said drive face for receiving and holding H-beam pile engaged with said drive face, said notches leaving between them eight equally spaced segments of the curved side wall in the form of upwardly convergent curved segments to grasp the head of a timber pile centered in the bowl and segmental lugs on the central portion of said drive face spaced to leave diametrical passages between them across the drive face for receiving the web portions of H-beams centered by said notches in engagement with the drive face.

2. A pile cap comprising a cap body having a pile guide in the bottom of the same in the form of a concavely arched inverted bowl having an upwardly convergent generally spherically curved side wall terminating at the top in a centrally located generally horizontal flat drive face for impact engagement with a pile entered in the bowl, the inner surface of said upwardly convergent curved side wall being intersected by eight equally spaced substantially vertical angular notches extending upward to said drive face and joined to form the boundary of said drive face for receiving and holding H-beam pile engaged with said drive face, said notches leaving between them eight equally spaced segments of the curved side wall in the form of upwardly convergent curved segments to grasp the head of a timber pile centered in the bowl and segmental lugs on the central portion of said drive face spaced to leave diametrical passages between them across the drive face for receiving the web portions of H-beams centered by said notches in engagement with the drive face, the rim of the bowl formation having upwardly extending internal diametrically opposite angular indentations therein terminating at the top in abrupt drive shoulders for receiving and driving H-beam pile of larger size than those first mentioned.

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