UNITED STATES PATENT OFFICE.

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PILE-EXTRACTING, PILE-DRIVING, AND LIKE MACHINE.

1,292,429.


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To all whom it may concern:

Be it known that I, JOHN BULL, a subject of the King of Great Britain, residing at 17 Victoria street, Westminster, in the county of London, England, have invented certain new and useful Improvements in or Relating to Pile-Extracting, Pile-Driving, and like Machines, of which the following is a specification.

10 This invention relates to pile extracting, pile driving and like machines of the kind wherein a reciprocating fluid actuated piston strikes an anvil or block which receives and imparts the necessary force to the pile required to be extracted or driven. The chief object of the invention is to provide a machine of the aforesaid character which is capable of ready adaptation for either extracting or driving and in which the force exerted on the pile is applied in a more direct manner than hitherto.

According to the invention the machine comprises a cylinder made in sections one of which is adapted to be replaced or substituted by another slightly modified in form according to whether the machine is required to be employed as an extractor or a driver. As adapted for pile extracting the anvil or block for receiving the impact of the upwardly moving piston is mounted within the upper part of the cylinder and supported by a central rod which passes through the piston and carries the pile grips. When the piston is required to strike downwardly as in pile driving one portion of the cylinder will be removed and the modified part substituted, which part, then constituting the lower end of the cylinder, is designed to carry or support the anvil or block for receiving the force of impact of the piston on its downward stroke.

In order that the invention may be clearly understood and readily carried into effect the same will now be more fully described with the aid of the accompanying drawings in which:

Figure 1 is a vertical section of the machine as adapted for pile extracting.

Fig. 2 is a similar view to Fig. 1 showing the machine for use in pile driving.

Figs. 3 and 4 are sectional elevation and plan respectively of one of the parts of the cylinder.

Fig. 5 is a sectional plan on line X—X of Fig. 2.

Fig. 6 is a fragmentary view in section of a modification of the arrangement shown in Fig. 1.

Fig. 7 is a plan of Fig. 6.

a′, a″ (Fig. 1) are the two main parts constituting the cylinder of the machine and a′ (Figs. 2 and 3) is the part adapted to be substituted for the part a″ when the machine is to be employed as a pile driver. In the example shown the part a′ is formed in two parts for convenience in making. b is the anvil block arranged at the upper end of the cylinder (Figs. 1 and 6) for pile extracting and at the lower end of the cylinder (Fig. 2) for pile driving, the part a′ being reversed and an anvil block in either case receiving the impact from the reciprocating piston c actuated by fluid pressure admitted to the cylinder through the ports d′, d″ alternately, under the control of the valve e.

The parts a′, a″ or a′, a″ are secured together by rods f and nuts g, while in the arrangement shown at Fig. 1 the anvil block b is carried by a central rod b′ to the lower end of which pile grips h may be secured in any appropriate manner, and thus in the case of pile extractors enable the force of the blow on the pile to be applied in the most direct manner. At the upper end of the cylinder, a rod-like extension b″ from the anvil block passes through the part a′ and is fitted outside the cylinder with a nut i which serves to maintain the anvil block b with its rod b′ and pile grip h suspended from the cylinder. A spring j on the extension b″ arranged between the anvil block b and the part a″ serves to act as a buffer or cushioning means. During the upward impact of the piston c on the anvil block, the force is transmitted through the central rod b′ to the pile grips h and consequently to the pile h′. By adjusting the nut i the cushioning effect of the spring may be varied as required. For suspending the machine when in operation the heads f′ of the rods f are formed with openings or eyes f″ whereby ropes, chains or other suspending means may be attached thereto. In lieu, however, of said openings f″ it will be understood that other appropriate means may be provided on the heads f′ to enable the machine to be suspended. Also, instead of the extension b″ protruding through the cylinder head it may be formed as shown in Fig. 6 in which case the compression of the spring j may be regulated by...
means of a screw \( k \) provided with a flange \( k' \); a screwed collar \( k' \) serving to determine the adjustment of the screw and flange.

For pile driving the cylinder is reversed while the part \( a^2 \) is substituted by the part \( a^2 \) (Figs. 2, 3 and 4). In this connection an anvil block \( b^2 \) provided with wings \( b^2 \) (Fig. 5) is fitted within the part \( a^2 \) and guided in its movement by means of the parts \( a^2 \) which are designed to rest on the heads \( f' \) of the bolts \( f \) while allowing for the necessary movement of the anvil block when the latter is forced downward under the impact of the piston. In the position shown in Fig. 2, the anvil block \( b^2 \) is resting on the top of the pipe \( h' \) to be driven. The heads \( f' \) in Fig. 2 also engage the parts \( a^2 \) in such a manner as to enable the parts of the cylinder to be firmly bound together as in Fig. 1. With the omission of the rod \( b' \) for pile driving a cap or plug \( l \) may be secured to the cylinder end as shown, said cap having an eye \( b' \) to receive a chain, rope or other suspension means. Or, the nuts \( g \) may, if desired, be such as to permit of the rope being attached thereto.

What I claim and desire to secure by Letters Patent of the United States is:

1. A fluid actuated pile extractor and pile driver comprising in combination a cylinder made in two parts, an anvil block mounted within said cylinder, a central rod for supporting said anvil block, a piston, and pile grips also carried by said rod.

2. A fluid actuated pile extractor and pile driver comprising in combination a reversible cylinder made in two parts, an anvil block mounted adjacent one part, a piston for operating on said anvil block, and means associated with one of the parts for maintaining said anvil block in position.

3. A fluid actuated pile extractor and pile driver comprising in combination a reversible cylinder made in sections certain of which are interchangeable, a control valve, an anvil block associated with one of said interchangeable sections, means for supporting said anvil block from the pile, means for securing the sections of the cylinder together, an impact piston working within the cylinder and means for transmitting the force direct to the pile.

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