PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in Rotary Means for Facilitating the Driving or Extraction of Piles or the like

I, HEINRICH ROBERT HOCHSTRASSER, of German nationality, and residing at Am Kieselhumes 27, Saarbrucken, Germany, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described, in and by the following statement:

This invention relates to a rotary device, working in opposite directions alternately, for facilitating the driving or the withdrawal of piles, bore tubes or the like in the ground.

It is known that piles, driving tubes and the like in so far as they are not driven into the ground by supplementary loading or by impact ramming, are forced into the ground by being rotated to and fro. This alternating movement in opposite directions has hitherto be effected by hand or by means of mechanical appliances. The manual actuation requires several workmen, while with the mechanical appliances the reaction to the forces, which are often very considerable, incidental to the alternating rotation, has to be taken up by the boring crane or drilling rig, and this necessitates a correspondingly good anchorage. Since the static friction of the pile or tube in the transition from a state of rest to a state of motion is considerably greater than the dynamic friction during motion, the appliances furthermore have to be dimensioned for this most unfavourable case.

This invention provides a very simple and much better appliance, with which the rotation to and fro of the piles or the like is facilitated and which has the advantage that no fixed point outside the apparatus is required for taking up the reaction forces. According to the invention the beginning of each rotary movement is initiated by an impact, which overcomes the greater initial friction. For this purpose an inertia mass is provided, which is rotatably mounted around the pile or other body to be driven alternating rotary motion being imparted to this inertia mass by means of a device connecting the inertia mass with the pile or other such body, and the rotary motion being limited by abutments provided on the periphery of the pile or the like, with conversion of the kinetic energy imparted to the inertia mass into impacts acting tangentially to the periphery of the pile or the like.

With this rotary appliance there is preferably utilized as an inertia mass a weight-loaded disc, supported upon a check ring of the pile or the like, preferably by means of ball bearings so as to be readily rotatable, there being connected to the periphery of this disc the cylinder of a compressed-air motor, the piston rod of which is attached to the periphery of the pile or the like.

Further features and details of the invention will be gathered from the accompanying drawings, in which:—

Figure 1 shows diagrammatically in sectional elevation one constructional example of the apparatus according to the invention; and

Figure 2 is a view of the apparatus shown in Figure 1 as seen from below.

Upon a bore tube *a* is welded a ring *b*, which is provided with abutments *c* and *d*. A circular plate *e* is rotatably mounted by means of a ball bearing *f* upon the ring *b*. Upon the plate *e* is secured a compressed-air piston engine *g*, the piston rod *h* of which is pivoted to a lug *i* secured to the ring *b*. Between the abutments *c* and *d* a tappet *j* is welded to the plate.

The method of operation is as follows: When the piston rod *h* is exerting a pull on the lug *i*, since the bore tube is fixed in the ground, the plate *e* rotates about the bore tube with increasing speed until the tappet *j* strikes against the abutment *c*. By this impact the bore tube is impelled to rotate through a small angle. At the same moment the compressed-air motor *g* is reversed, so that the plate *e* is now rotated in the opposite direction, until the tappet *j* strikes against the abutment *d*, and the bore tube executes a slight rotation in the opposite direction.

The controlling of the compressed-air motor

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may be effected automatically or by hand. The apparatus could however, be operated by any other type of motor.

The kinetic energy may alternatively be produced by two pulling or thrusting devices acting in opposite directions instead of by a pulling and pushing device.

This appliance has the advantages that no fixed point independent of the bore tube is needed, that the apparatus can be employed without ~~alternation~~ alteration both for sinking and for withdrawing a pile or a bore tube, and that the initial friction is overcome by an impact.

What I claim is:—

1. A rotary appliance working alternately in opposite directions for facilitating the driving in and extraction of piles, including bore tubes and the like, comprising an inertia mass mounted rotatably about the pile, means connecting the inertia mass with the pile and adapted to impart alternating rotary movements to the pile, and abutments fitted to the periphery of the pile, and adapted to limit the amplitude of the said movements, and to convert the kinetic energy imparted to the inertia mass into impacts acting tangentially to the periphery of the pile.

2. A rotary appliance as claimed in claim 1, further comprising: a check ring on the pile, a weight-loaded disc mounted on the check ring, a ball bearing interposed between the weight-loaded disc and the check ring to facilitate rotation of the said disc, and a motor such as a compressed-air motor, including a cylinder and a piston reciprocable therein, the cylinder of the motor being attached to the periphery of the disc and its piston being attached to the periphery of the pile.

3. A rotary appliance working alternately in opposite directions for facilitating the driving in and extraction of piles, including bore tubes and the like, substantially as hereinbefore described with reference to the accompanying drawings.

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What I claim is:—

1. A rotary appliance working alternately in opposite directions for facilitating the driving in and extraction of piles, including bore tubes and the like, comprising an inertia mass mounted rotatably about the pile, means connecting the inertia mass with the pile and adapted to impart alternating rotary movements to the pile, and abutments fitted to the periphery of the pile, and adapted to limit the amplitude of the said movements, and to convert the kinetic energy imparted to the inertia mass into impacts acting tangentially to the periphery of the pile.

2. A rotary appliance as claimed in claim 1, further comprising: a check ring on the pile, a weight-loaded disc mounted on the check ring, a ball bearing interposed between the weight-loaded disc and the check ring to facilitate rotation of the said disc, and a motor such as a compressed-air motor, including a cylinder and a piston reciprocable therein, the cylinder of the motor being attached to the periphery of the disc and its piston being attached to the periphery of the pile.

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