A. B. CLARK.

PILE DRIVER.

APPLICATION FILED NOV. 23, 1911.

1,066,469.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

Fig. 1

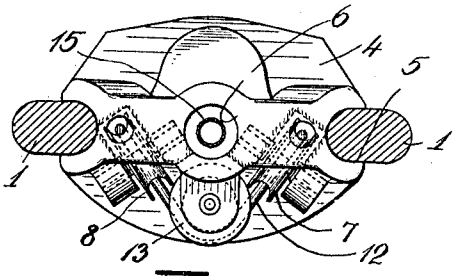


Fig. 2

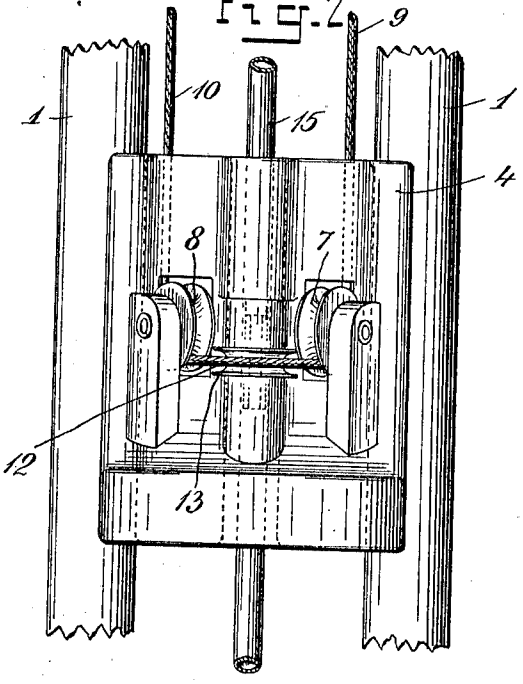


Fig. 3

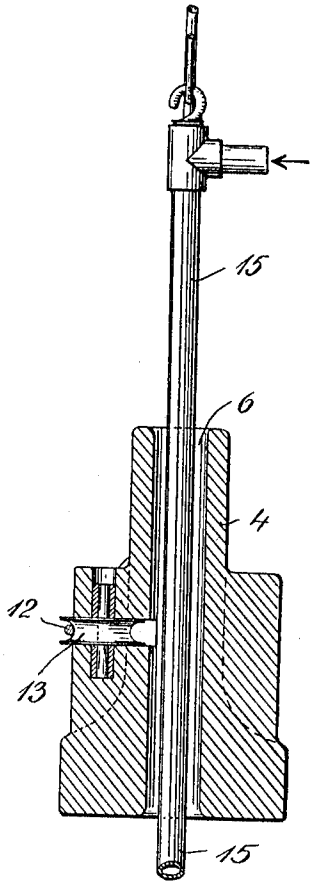
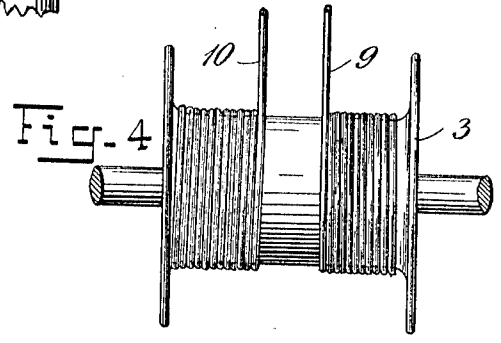


Fig. 4



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2 SHEETS—SHEET 2.

Fig. 5.

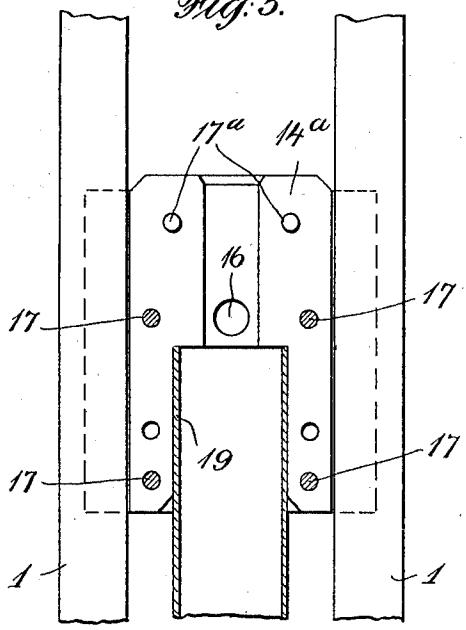


Fig. 6.

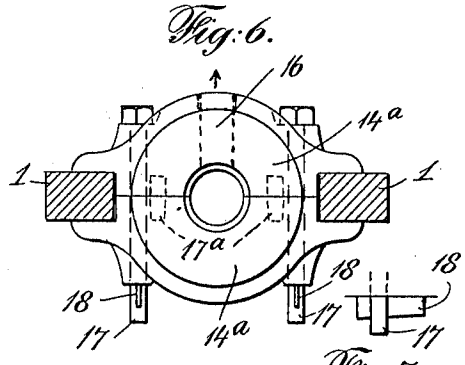
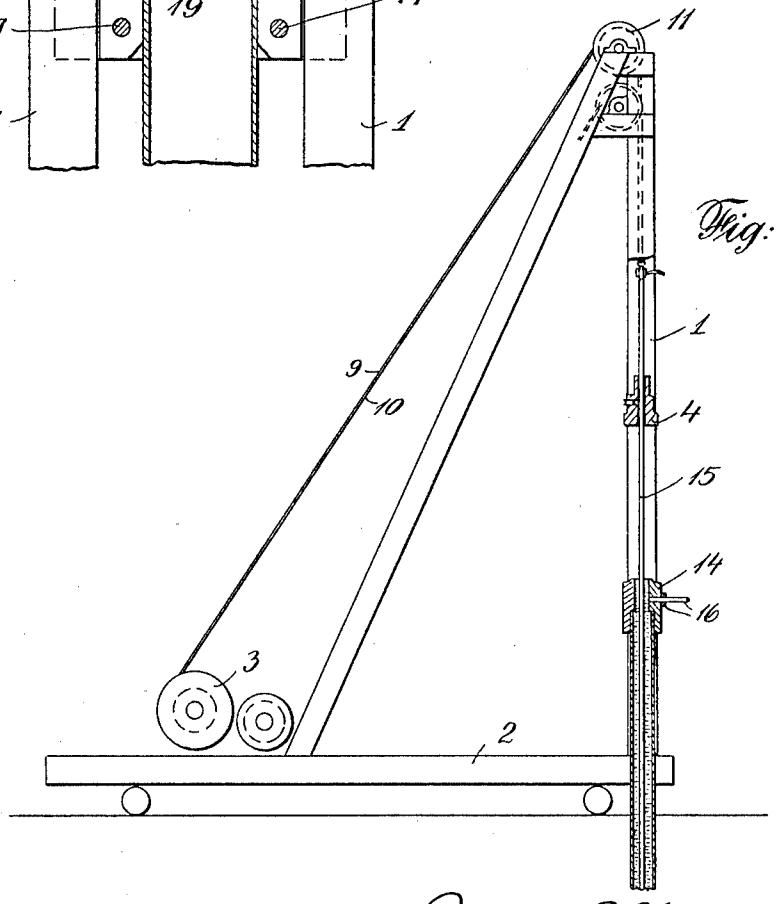


Fig. 7.

Fig. 8.



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UNITED STATES PATENT OFFICE.

AMASA B. CLARK, OF NEW YORK, N. Y.

PILE-DRIVER.

1,066,469. Specification of Letters Patent. Patented July 8, 1913.

Application filed November 23, 1911. Serial No. 661,880.

To all whom it may concern:

Be it known that I, AMASA B. CLARK, a citizen of the United States, residing in the city, county, and State of New York, have invented the following-described Improvements in Pile-Drivers.

The invention relates to monkey pile drivers and kindred apparatus wherein large masses are raised against gravity and then dropped to perform work.

The invention is specially applicable to pile drivers which are constructed to be used with a jet-pipe passed through an aperture in the monkey itself, and in which the enlargement of the lateral dimensions of the monkey that is necessary to accommodate the jet-pipe, produces a tendency to cramp in the leads and thus hamper effective operation upon the pile. The convenient disposition of the jet-pipe aperture in the center of the monkey moreover prescribes that the hoisting mechanism must be connected thereto at two separate points, both out of line with the center of gravity, which relation further promotes the tendency to cramp and stick. The present invention provides a double line hoist suitable for use in any kind of monkey pile driver wherein all these tendencies are eliminated and in which the monkey can be of any desired dimension, with or without the jet-pipe aperture, and in which certain other advantages are also present as made apparent below.

In Patent No. 1,010,723, dated December 5th, 1911, I have shown and described a double line hoist for operating wide monkeys, wherein the tendency toward cramping in the leads was obviated by equalizing the tension in the two lines. In such device, the specific means for producing the equalization consisted in a form of differential gearing incorporated in the hoisting mechanism. In the present case, such means consist in a part of the hoisting cable and suitable operating parts located on the monkey itself.

Referring to the accompanying drawings: Figure 1 is a transverse section through the leads of a pile driver, showing the monkey in top plan and the jet pipe in section. Fig. 2 is a front elevation of the parts shown in Fig. 1. Fig. 3 is a vertical section of Figs. 1 and 2, through the idler sheave. Fig. 4 is a detail of the hoisting drum connected to both lines of the hoist. Fig. 5 is a front elevation of one half of the follower-block in position on the pile, which is shown in section. Fig. 6 is a top plan of the follower-block, Fig. 7 being a detail. Fig. 8 is a diagrammatic representation of an ordinary pile driver equipped with a double line hoist, tubular hammer, tubular follower-block, and a jet pipe mechanism.

The pile driver includes a pair of leads 1, which may be of any suitable form and material, adapted to guide the monkey in its descent. The leads are usually mounted on a movable platform 2, on which the hoisting mechanism is placed. In the present instance, this mechanism is represented by the simple hoisting drum 3, which is shown in greater detail, but without the motor and driving gearing, in Fig. 4. The monkey 4, is conveniently formed with opposite recesses 5, adapted for sliding engagement with the two leads, and in cases where it is employed for tubular piles, it is also provided with a longitudinal jet pipe aperture marked 6. On opposite sides of its central point, which point may be occupied by its jet pipe aperture, and preferably at about equal distances from the leads, 1, the monkey is provided with two cable bearings represented by the two sheaves 7 and 8, each of which is journaled on a horizontal axis, as shown in Figs. 1 and 2. The rope or cable by which the monkey is lifted, is passed through both cable bearings and its two ends are wound on the hoisting drum, thereby forming two hoisting lines, to wit, the stretch of cable marked 9, and running from the cable bearing 7, to the hoisting drum 4, and the stretch marked 10, running from the cable bearing 8, to the hoisting drum. Both these stretches are suitably trained over the sheaves 11, at the top of the leads, in the usual manner. Inasmuch as the cable is capable of endwise movement and adjustment through the cable bearings, it will be evident that the tension on the two hoisting lines, 9 and 10, is equal under all circumstances. The short stretch of cable between the two bearings forms the equalizing connection and it is preferred that this stretch should be a continuous part of the cable itself, as shown at 12, in the drawings, although it obviously might be of a different material or arrangement. The idler sheave 13, is placed between the two cable bearings on a vertical axis to guide the cable around the jet pipe aperture, and of course when this aperture is not present such guiding means will not be necessary. It will be un-

derstood that when the cable bearings are formed by sheaves, as shown in the drawings, they should be massive in their construction and securely backed up in their bearings on the monkey, to resist any shock to which they may be subjected in practice.

The monkey as thus constructed is lifted and dropped without cramping tendency, as the result of the equalization of tension in the hoisting lines, and where the piles to be driven are tubular and made of steel, as is frequently the case, the hammer imparts its energy thereto through the follower-block, 14, as shown in Fig. 8. This block is preferably guided in the leads in the same manner as the monkey and is formed with a depending skirt portion which embraces the pile head and thereby tends to direct the force of the impact along lines parallel to the axis of the pile. The jet pipe 15, is accommodated in the central aperture through the block and a lateral aperture marked 16, is also found in the wall of the block to lead away the overflow of jet water, as clearly indicated in Fig. 8. The skirt portion, at least, and preferably the whole of the follower-block, is longitudinally divided into two united divisions or sections, 14^a, which are normally held together by a set of cross-bolts 17 and dowels 17^a. When so assembled and held the two portions are intended to fit the pile head 19 with a desired degree of snugness. The bolts are set by means of keys or wedges, 18, through their extremities, or by other means which can be quickly released, so as to release the divisions of the block and allow it to be expanded by the relative separation of its parts. Such expansibility is desirable inasmuch as it provides for the removal of the block from a pile head which has bulged or spread as the effect of the impact to which it has been subjected. By knocking out the wedges, the follower-block is expanded and easily taken off of the pile head, whereas otherwise the pile might have to be cut. It will be observed that the follower-block longitudinally divided for this purpose is not only useful in connection with double line hoists but also in other types of pile drivers, whether employing gravity or other force to sink the pile. This device, therefore, constitutes an important and independent feature of the present invention.

I claim:—

1. In a pile driver the combination of a monkey provided with suitable leads, two hoisting lines therefor and means on the monkey for equalizing the tension on the said two hoisting lines.

2. In a pile driver, the combination of suitable leads, a monkey provided with an aperture suitable for receiving a jet pipe, two hoisting lines connected with the monkey at opposite sides of the aperture and means on the monkey for equalizing the tension of the hoisting lines.

3. In a pile driver, a pair of leads, and a monkey thereon having separated cable-bearings for connection with the hoisting mechanism, in combination with a rope or cable passed through said bearings forming two hoisting lines.

4. In a pile driver, a hoisting mechanism, a pair of leads and a monkey having separated cable bearings thereon for connection with the hoisting mechanism, in combination with a rope or cable passed through said bearings and forming two hoisting lines extending from each to said mechanism and an equalizing line extending from one bearing to the other, whereby the tension in the hoisting lines is equalized.

5. In a pile driver, a monkey provided with an aperture and cable bearings on opposite sides thereof, in combination with a single rope or cable movable through said bearings and around the aperture, and a hoisting mechanism connected with the ends of the rope or cable.

6. In a pile driver, the combination of hammer mechanism suitable for use on tubular piles and a follower-block formed to embrace and overhang the head of the pile and comprising two longitudinally divided sections, and means for releasably holding the sections in normal relation.

7. In a pile driver, a monkey member provided with an aperture suitable to receive a jet pipe and a tubular follower block therefor formed to embrace the head of a tubular pile and provided with an overflow passage, the pile-embracing portion of such block being expansible to remove the same from a swelled pile.

In testimony whereof, I have signed this specification in the presence of two witnesses.

AMASA B. CLARK.

Witnesses:
A. F. BARNES,
PETER A. ABELES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."