N. F. LIBBY & P. HATCH.

Pile-Drivers.

No. 199,299. **Patented Jan. 15, 1878.**

Fig. 1.

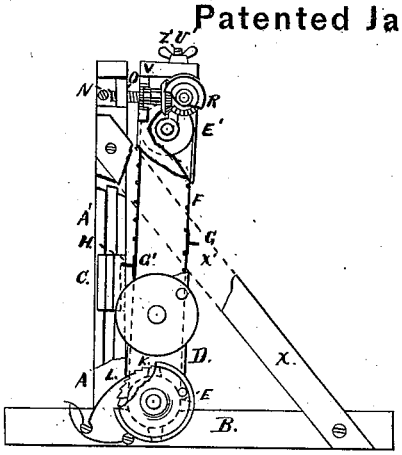


Fig. 2.

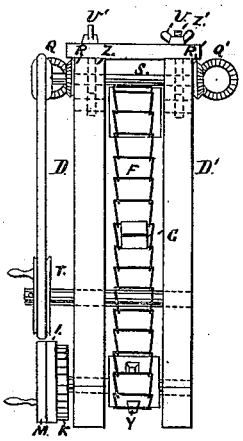
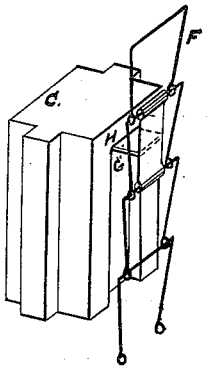


Fig. 3.



Witnesses
Irvine S. Porter.
Nathaniel Hill.

Inventors,
Nelson F. Libby &
Pascal Hatch,
By Albert M. Moore,
Their Attorney.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

NELSON F. LIBBY AND PASCAL HATCH, OF CHELMSFORD, MASSACHUSETTS.

IMPROVEMENT IN PILE-DRIVERS.

Specification forming part of Letters Patent No. **199,299**, dated January 15, 1878; application filed April 21, 1877.

To all whom it may concern:

Be it known that we, NELSON F. LIBBY and PASCAL HATCH, both of Chelmsford, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Pile-Driving Machines, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

The object of our invention is to lift the drop as quickly as possible after one stroke, preparatory to another stroke, in order to give the greatest practicable number of strokes in a given time; also, to vary the distance through which the drop falls, in order to strike a heavier or lighter blow.

Figure 1 is a side elevation of our invention, with part of the frame-work broken away to show the drop and the method of lifting the drop by means of the chain provided with studs. Fig. 2 is a rear elevation of the same without the drop. Fig. 3 is a perspective view of the drop and a part of the chain.

A A′ are the two halves of the upright stationary frame of the machine, secured to the rectangular platform B, and strengthened by braces X X′. Between the uprights A A′ moves the drop C, confined to a vertical path by tongues and grooves, all in the usual manner.

A rectangular frame, D D′, is pivoted or loosely tenoned to the platform B, and stands nearly upright between the braces X X′. Around chain-gears E E′ or drums, supported by the frame D D′, is an endless chain, F, one of said drums, E, being provided with pins Y, to prevent the chain from slipping. To the chain F are attached studs G G′, one or more. On the face of the drop, next the chain, is an ear, H, by which the studs G G′ lift the drop when the chain-gears are revolved. Now, the path of the chain is not parallel to the path of the drop, the chain being nearest to the drop when the latter is down, so that in lifting the drop the stud G or G′, as it rises, gradually draws out from under the ear H, and allows the drop to fall, the distance to which the drop is lifted being determined by the approach to parallelism of the frame D D′ with the frame A A′, the drop being lifted to its greatest height when said frames are parallel to each other. The angle between said frames is varied by the tangent-screws N N′, working in nuts O O′ on opposite sides of the frame A A′, and in bearings V V′ on opposite sides of the frame D D′, and having secured to them bevel-gears Q Q′, which take into other bevel-gears, R R′, secured to a shaft, S, supported by the frame D D′.

A pulley on the shaft S is belted to a pulley, T, provided with a winch. The pulley T, being revolved by the operator, will turn both screws N N′ equally, and alter the angle between the frames.

The chain-gears, and consequently the chain, are moved by the driving-pulley I on the shaft of the lower gear E. A ratchet, K, on the same shaft, and its pawl L, prevent the gears E E′ from moving in the wrong direction, and the partly-raised drop from falling when the machine is stopped by shifting the driving-belt from the pulley I to the loose pulley M.

The bearings of the upper chain-gear may be raised or lowered by the thumb-nuts U U′ on screws Z Z′, attached to said bearings.

In the pile-driving machines now commonly used the rope and tongs which raise the drop have not a continuous motion, but their motion must be reversed after each fall to pick up the drop, causing considerable loss of time; and, further, if less than the whole fall of the drop is required, the tongs must be opened with a bar by a man standing on an elevated platform.

Our machine may be stopped without stopping the engine, the drop may be raised without reversing the engine, and the drop may be let fall from any height, without the assistance of an extra man, by the engineer standing on the platform B.

Instead of an endless chain, an endless belt or rope may be used.

We claim as our invention—

1. In a pile-driving machine, a lifting-chain, F, moving at an angle to the path of the drop C, as and for the purpose specified.

2. In a pile-driving machine, a lifting-chain, F, moving at a variable angle to the path of the drop C, as and for the purpose specified.

3. The combination of the drop-guide frame

A A′, provided with nuts O O′, and the pivoted chain-frame D D′, provided with tangent-screws N N′, as and for the purpose specified.

4. The combination of the tangent-screws N N′, provided with bevel-gears Q Q′, and the shaft S, also provided with bevel-gears R R′, as and for the purpose specified.

5. The combination of the drop C, having the ear H, the chain F, provided with studs G G′, the chain-gears E E′, the ratchet K, and the pawl L, as and for the purpose specified.

NELSON F. LIBBY.
PASCAL HATCH.

Witnesses:
GEO. A. PARKHURST,
EDWIN K. PARKHURST.