

(No Model.)

2 Sheets—Sheet 1.

F. LE BLANC.
PILE DRIVER.

No. 506,854.

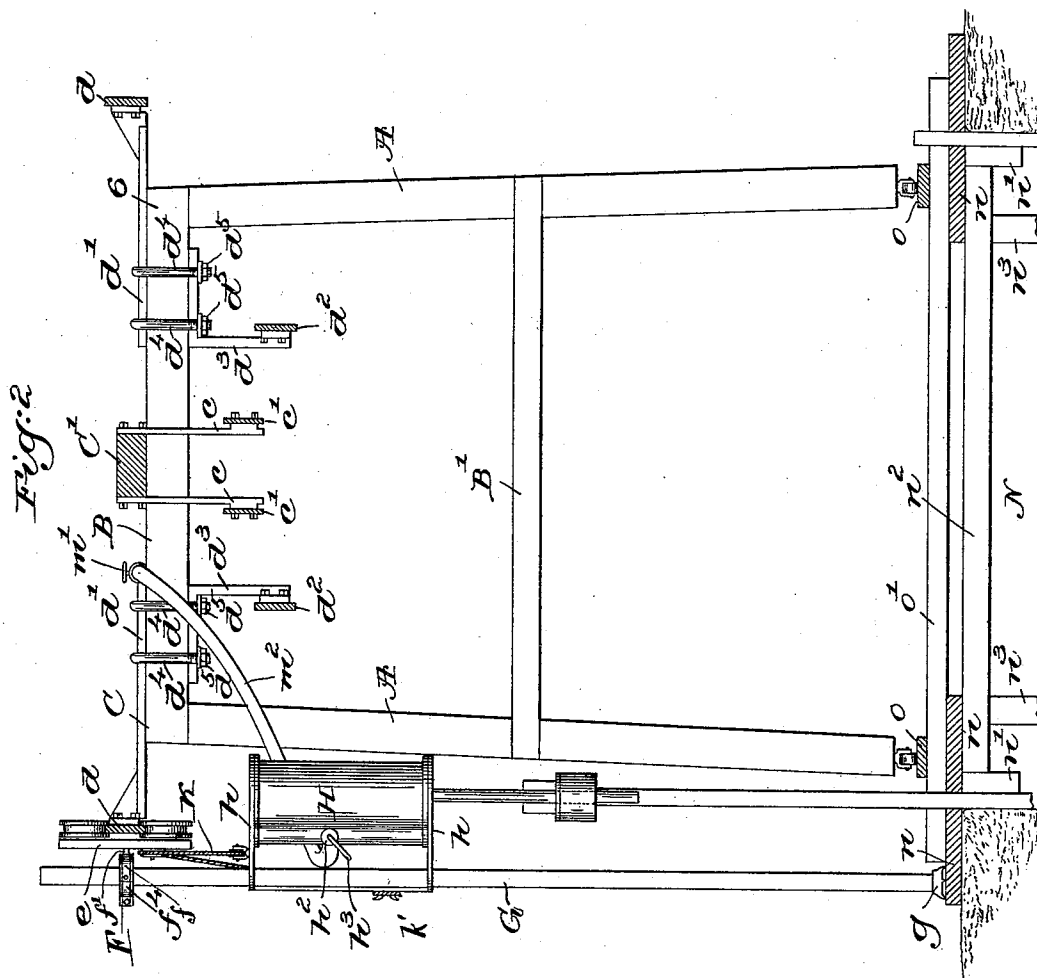
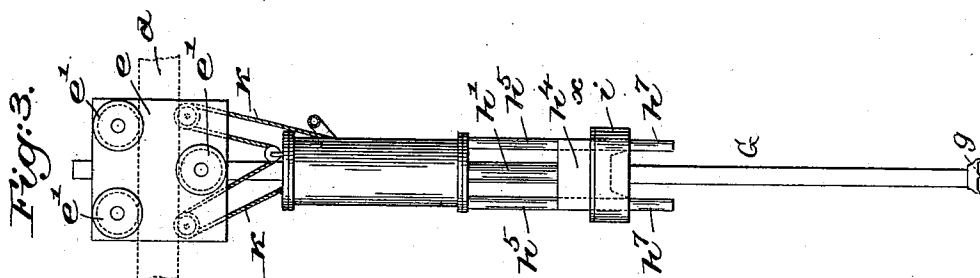
Patented Oct. 17, 1893.

By Frank Le Blanc.
Crosby & Gregory
Attys.

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Witnesses.

Louis N. Gould
Edward F. Allen

Inventor

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UNITED STATES PATENT OFFICE.

FRANK LE BLANC, OF BOSTON, MASSACHUSETTS.

PILE-DRIVER.

SPECIFICATION forming part of Letters Patent No. 506,854, dated October 17, 1893.

Application filed April 14, 1893. Serial No. 470,335. (No model.)

To all whom it may concern:

Be it known that I, FRANK LE BLANC, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Pile-Drivers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to pile drivers and particularly to pile drivers used to drive the sheet piles employed to support the sides of street trenches and the like.

I have devised my improved pile driver with especial reference to its easy and practical application for use in connection with the well-known "Carson" trench machine, which is now almost universally used by contractors in excavating trenches for sewers, water-pipes and the like, but I desire it to be understood that the invention is not necessarily restricted to use in connection with the "Carson" machine.

In carrying out this invention I provide the "Carson" frame with one or more longitudinal tracks or guide-ways on which may slide a carriage. A guide-rod or post is connected with this carriage, and is adapted to move along from point to point therewith, and to rest at its lower end preferably upon the ground, or upon a suitable plank or support provided for it upon the ground, said guide-rod furnishing a proper support and guide for the pile driving motor, preferably a steam motor which is employed to drive the piles. I provide the cylinder of the driving motor with two guide-rods, between which the cross or driving head is reciprocated, and at the lower end of this guide I provide a head block adapted to rest upon the pile to be driven and to receive the blow caused by the descent of the piston in the cylinder. The driving motor or cylinder rests upon this head and therefore upon the pile being driven and follows the pile in its descent. I provide, however, a lost motion between the head and the motor, whereby the head may be driven sharply downward with the pile by the blow of the motor, the motor itself falling thereafter as soon as it recovers.

Other features of my invention will appear in the specification and claims.

In the drawings, Figure 1 represents in

side view a section of a "Carson" trench machine of usual construction fitted with one form of my improved pile driver; Fig. 2, an end view of the section shown in Fig. 1; Fig. 3, an inside view of the pile driver looking from the back of Fig. 1, and Fig. 4, an enlarged top or plan view of the preferred form of carriage, showing the universal connection between the guide post and the carriage, to be described.

Referring to the drawings, A, A, represent the uprights of a "Carson" machine connected by the upper and lower cross members B, B', and the side and central longitudinal members C, C', the central member C' being provided with depending hangers *c* which carry the tracks or runs *c'* for the buckets, all of which are and may be of usual construction as found in the "Carson" machines at the present time, and which may be varied more or less without reference to this invention.

In the preferred embodiment of my invention I provide the "Carson" frame with two sets of tracks or guide-runs, the outside tracks *d* being supported upon suitable arms or brackets *d'* resting upon the upper cross-member B, while the inner tracks or guide-runs *d''* are supported upon the depending brackets or arms *d'''*, both the brackets *d'* and *d'''* at each side of the machine being clamped rigidly in position and to the member B by means of the clips or U-bolts *d⁴* to which are applied the clamping nuts *d⁵*. The carriage which is made to run upon either of these tracks, is herein shown at the left in Fig. 2, and in its preferred form consists of a frame-plate *e* provided with the flanged guide-wheels *e'*, preferably three in number, two of which run upon the upper side of the track, while the third runs upon the under side thereof.

To the side of the frame-plate *e* opposite that to which the guide-wheels are applied, I pivot at *f'* the yoke *f* between the arms of which are pivoted upon trunnions *f²* the clamp F consisting, as herein shown, of the two members *f³*, encircled by a strap *f⁴*, the ends of the latter being turned outwardly and drawn together by a bolt *f⁵* to thereby clamp the two members *f³* together, and contract the opening *f⁶* formed in their adjacent

sides. The guide-rod G, preferably square in cross section, is passed loosely through the hole f^6 in the clamp F, and at its lower end is provided with a foot-piece g having two or more claws or points adapted to be inserted in the ground or a plank or other support, resting upon the ground, to retain the said guide-rod in the desired rigid position.

The pile driving motor in the present instance consists of the cylinder H which is preferably provided at its ends with the guide plates h which extend to one side and surround the guide rod G, which therefore constitutes the vertical guide for the motor. The cylinder H contains a piston mounted upon the end of the piston rod h' which is of usual construction, and the movements of which within the cylinder are controlled by a rotary valve h^2 provided with a handle h^3 , all of which are of usual common construction, it being therefore deemed unnecessary to enter into a detailed description of the same, they being constructed and operated in well-known manner. The piston rod h' , at its lowest end, carries the cross-head h^4 which moves in the lateral guide-rods h^5 secured to the bottom cylinder head, said guide-rods being reduced in size to form shoulders h^6 near their lowermost ends below which project the extended ends (see Fig. 1) h^7 of said guide-rods, said extended ends being of less diameter than the guide rods proper. The head block i mounted upon the extended ends h^7 of the guide rods, is chambered at its under side, as shown in dotted lines, to fit the upper end of a pile, preferably a sheet pile, which is to be driven. The motor H is raised and lowered by hand by means of a lifting rope k passed about suitable pulleys, as shown, and secured at its lower end as at k' when necessary. Steam to reciprocate the piston within the cylinder H is furnished by a supply-pipe m , which extends longitudinally of the "Carson" frame and rests upon the upper member B thereof, it being provided at regular intervals with suitable valves m' , to any of which the flexible connection m^2 leading to the cylinder may be joined.

N represents the trench; n, n , the usual guide planks laid flat and separated to leave a space to constitute guides for the sheet piles to be driven down against the side walls of the trench to keep the latter from falling in; n' the usual longitudinal strips between which are interposed the usual cross-braces n^2 shored up by supports n^3 . The "Carson" frame is supported in usual manner in position above this trench, it being herein shown as carried upon the stringers o resting upon the cross pieces o' . Assuming that the trench has been sunk a depth, say of two feet, more or less, and it is found necessary to begin to drive the sheet piling, the several piles are inserted through the guide opening formed between the guide planks n and the carriage e moved along its track into proper position with the cylinder H in position above the first pile to be driven,

and the guide rod G firmly set in position upon the outer guide plank, as shown, to thereby constitute a rigid vertical guide for the cylinder in its movements. The cylinder, by means of the lifting rope k , is raised sufficiently to permit the head block i to be placed upon the end of the pile to be driven when the said lifting rope is released, and the cylinder permitted to drop until stopped by the shoulders h^6 of the guide-rods h^5 resting upon the head block upon the pile. The cylinder H having been connected with the steam supply pipe m by means of the flexible connection m^2 , the operator by movement of the valve handle h^3 will cause reciprocation of the piston within the cylinder, such reciprocation of the piston delivering successive, repeated blows through its cross-head upon the head-block i , such blows gradually driving the pile downward. At each blow the head-block and pile are driven sharply and quickly downward, more quickly than the cylinder H, which is supported by the pile, can usually follow, for the head-block is loosely mounted upon the guide-rod extension h^7 , so that the said head-block is permitted to follow the quick movement of the pile due to a blow, the cylinder thereafter by its own weight dropping until stopped and again supported by the shoulders h^6 upon the head-block in its new position, the cylinder being thus always supported by the pile and following the latter as it is driven into the ground.

In practice I prefer to insert a block x of babbitt, wood, or other cushioning substance between the cross-head and head-block to relieve somewhat the sharpness of the blow. One pile having been driven the cylinder H is raised by means of the lifting cord k , the carriage moved along into position above the next pile to be driven, the head-block placed in position upon said pile, the guide-rod G seated in its new position, and the machine is ready to drive another pile, this operation being continued as long as desired until all the piles are driven.

In the drawings Fig. 2, the pile driver is shown in proper position to drive sheet piling when the trench is of considerable width, but when the trench is a narrow one, narrower than the "Carson" frame, the carriage e will be transferred to one of the inner tracks d^2 to bring the cylinder H into position to drive the sheet piling for the narrow trench, the adjustability of the arms d' , d^3 , which carry the outer and inner tracks being of sufficient range to permit the said cylinder, when mounted upon one or the other of the tracks, to be brought into position directly over the piles for any size trench. The clamp F, mounted as shown in Fig. 4, in effect constitutes a universal connection between the guide rod G and the carriage, so that the said guide-rod together with the cylinder H mounted thereon, may be turned into position which may be necessary in order to transfer the pile

driver from one position to another on and with relation to the "Carson" frame. When the guide-rod has been placed in position and firmly seated upon a support at its lower end, the clamp *f* may be tightened by means of the bolt *f*⁵ to hold the said guide-rod more rigidly in position.

The entire device is sufficiently light to permit it to be readily handled by one, or at most two men when it is to be transferred from one track to another. The head-block being chambered to fit upon the end of the pile being driven and itself guided by the extensions *h*⁷ of the guide rods *h*⁵, guides the pile perfectly while being driven.

If desired a friction device of suitable construction may be employed to prevent the pile driving motor rebounding on the guide-rod *G*, in hard driving.

This invention is not restricted to the particular construction or arrangement of parts herein shown, for it is evident the same may be varied in many particulars without departing from the spirit and scope of this invention.

Having described one embodiment of this invention and without reference to details, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a frame, and a longitudinal track thereon, of a carriage movable on said track, a guide-rod connected to said carriage and movable therewith along said track, and at its lower end adapted to rest upon a fixed support at one side of the pile to be driven, and a pile driving motor adapted to be supported by the pile to be driven and movable longitudinally with said carriage, and vertically on and guided by said guide rod whereby the latter serves as a guide for the motor as the said motor follows the pile as it is driven into the ground, substantially as described.

2. The combination with a frame, and a track running longitudinally thereof, of a carriage movable on said track, a guide-rod adjustably connected thereto and its lower end adapted to rest upon the ground, and a pile driving motor movable longitudinally with said carriage and vertically on and with relation to said guide-rod, substantially as described.

3. The combination with a frame, and a track running longitudinally thereof, of a carriage movable on said track, a universally adjustable guide-rod connected thereto at its upper portion and adapted to rest upon the ground independent of the piling, a pile driv-

ing motor movable vertically on said guide-rod, and consisting of a steam cylinder containing a piston, a piston rod, guides therefor, and a cross head for the end of the piston rod, to operate, substantially as described.

4. The combination with a frame, and a track running longitudinally thereof, of a carriage movable on said track, a guide-rod connected with said carriage, a pile driving motor movable vertically on said rod, and a clamping device to clamp the upper end of said guide-rod to said carriage, substantially as described.

5. The combination with a frame, and a track running longitudinally thereof, of a carriage movable on said track, a guide-rod movable with and jointed to said carriage and adapted at its lower end to rest upon the ground or a support thereon, and a pile driving motor guided in its vertical movements by said rod, and adapted to rest upon and drive a pile, substantially as described.

6. The combination with a "Carson" frame and a pile driving motor, of inner and outer tracks for said motor carried by and adjustable on and with relation to the said frame to accommodate trenches of varying widths, substantially as described.

7. The combination with a "Carson" frame, of the arms *d*¹, *d*³, tracks sustained thereby, the pile-driving motor, and clamping devices as *d*⁴ common to both arms, substantially as described.

8. The combination with a frame, and a track running longitudinally thereof, of a carriage movable on said track, a guide-rod connected with said carriage and movable vertically with relation thereto, and a clamping device to clamp said guide-rod in adjusted vertical position, and a pile driving motor movable vertically on said guide-rod, substantially as described.

9. The combination with a frame, and a track running longitudinally thereof, of a carriage movable on said track, a guide-rod movable with said carriage and provided with a holding socket *g* at its lower end adapted to rest upon the ground or plank thereon, and a pile driving motor mounted on said guide-rod, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK LE BLANC.

Witnesses:

FREDERICK L. EMERY,
AUGUSTA E. DEAN.