(No Model.)

3 Sheets—Sheet 1.

T. TANGNEY.

PILE DRIVER.

No. 300,407. Patented June 17, 1884.

Fig: 1

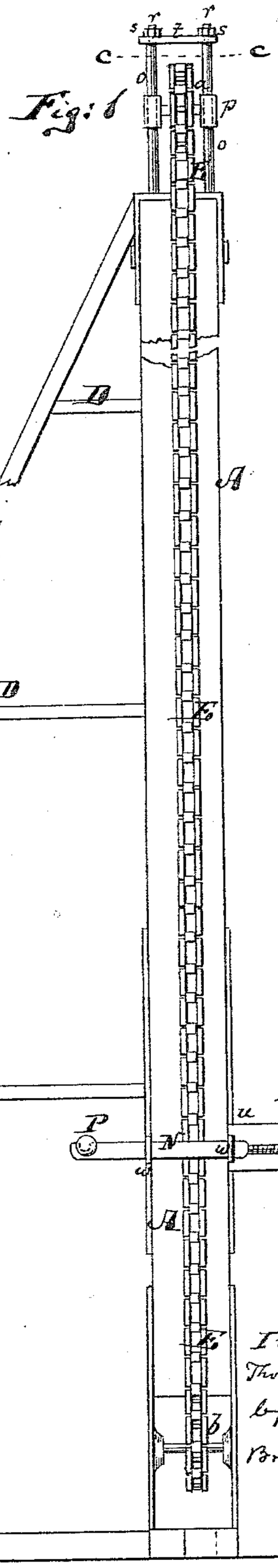


Fig: 2

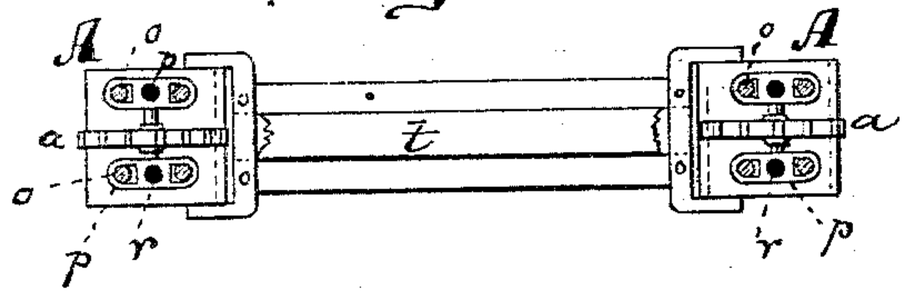


Fig: 3

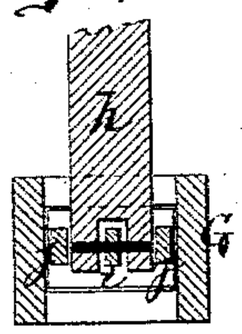


Fig: 4

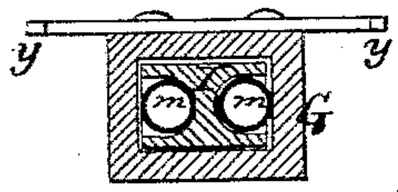


Fig: 5

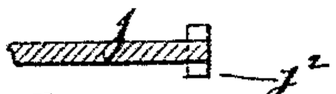
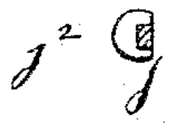


Fig: 6



Witnesses:
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John M. Speer.

Inventor
Thos. Tangney
by his attorneys
Briesen & Steele

(No Model.) 3 Sheets—Sheet 2.

T. TANGNEY.

PILE DRIVER.

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Fig: 7

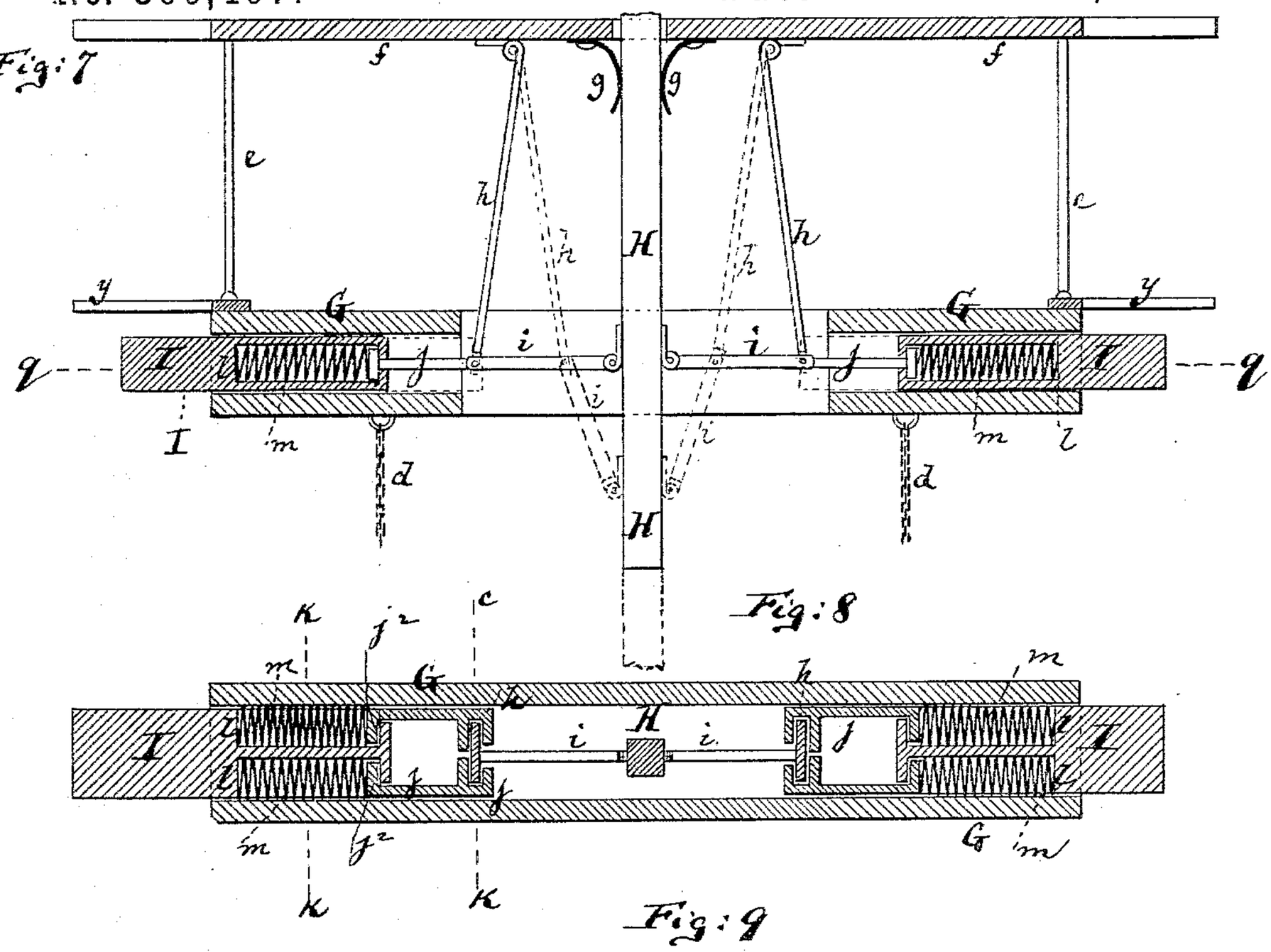
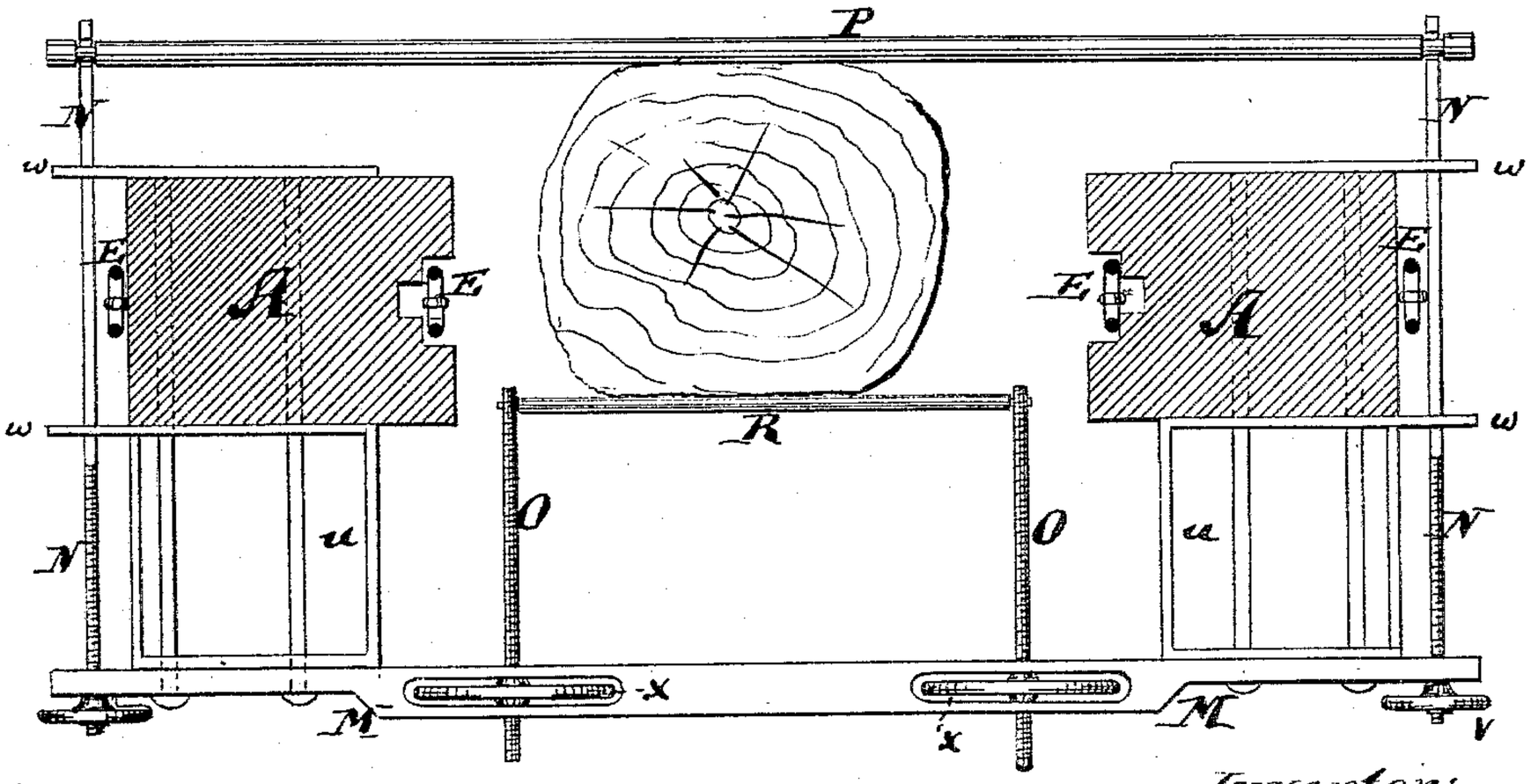


Fig: 8

Fig: 9

Fig: 10



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3 Sheets—Sheet 3.

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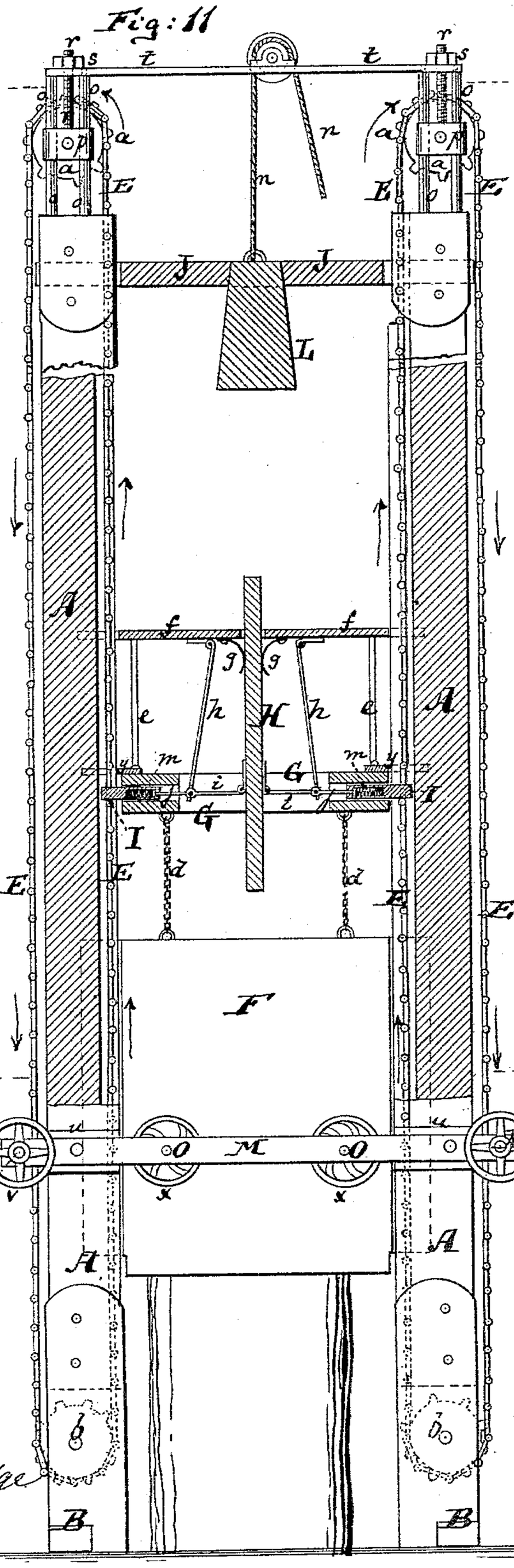
Fig: 11



Witnesses.
John C. Tunbridge
John M. Speer.

Inventor:
Thos. Tangney
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UNITED STATES PATENT OFFICE.

THOMAS TANGNEY, OF NEW YORK, N. Y.

PILE-DRIVER.

SPECIFICATION forming part of Letters Patent No. 300,407, dated June 17, 1884.

Application filed January 25, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS TANGNEY, of New York, in the county and State of New York, have invented an Improved Pile-Driver, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of my improved pile-driver. Fig. 2 is a plan view, partly in horizontal section, on the plane of the line *c c*, Fig. 1. Fig. 3 is a detail vertical section on the plane of the line *c k*, Fig. 8. Fig. 4 is a detail vertical section on the plane of the line *k k*, Fig. 8. Fig. 5 is a detail longitudinal section, and Fig. 6 a detail cross-section, of part of the pusher for the catches, hereinafter described. Fig. 7 is a vertical cross-section, on an enlarged scale, of the mechanism for engaging the hammer with the lifting-chains. Fig. 8 is a horizontal section on the plane of the line *q q*, Fig. 7. Fig. 9 is a detail side view of one of the braces for holding the pile-guides. Fig. 10 is a horizontal section of the pile-driver taken below the hammer. Fig. 11 is a vertical cross-section and partial face view of the pile-driver.

This invention relates to certain improvements in pile-drivers whereby, more particularly, the engine employed for lifting and dropping the hammer can be kept in constant motion, and whereby the position of the pile with reference to the hammer can be readily adjusted.

The invention consists of the new combinations of parts, hereinafter described and claimed.

In the accompanying drawings, the letters A A represent the leaders or upright posts of a pile-driver, the same being placed on sills B, and braced thereon by the usual ladder-brace, C, and further steadied by cross-braces D D, so as to constitute a rigid structure. Each of the leaders or poles carries an endless chain, E, which is passed around chain-wheels *a* and *b*, that are respectively hung at or near the upper and lower ends of said leaders. The chain for each leader runs along the inner face thereof, by preference, and also along the outer face, as shown in Figs. 10 and 11, the inner face of the leader being preferably grooved, as in Fig. 10, so that the chains may be kept out of the way of the traveling hammer in said grooves. By suitable machinery, the wheels *b b* or *a a* of the two chains E E are revolved in such manner that along the inner face of each leader the chain pertaining thereto travels upward, and along the outer face thereof it travels downward, as indicated by arrows in Fig. 11.

F is the hammer for driving the pile. This hammer is, by short chains *d d*, suspended from a cross-beam, G, that is adapted to travel between the two leaders A A, and which in turn connects by stiff braces or posts *e e* with an upper traveling cross-beam, *f*, all as indicated in Figs. 7 and 11. In an opening in the center or near the center of the cross-beams G and *f* is a vertical slide, H, which is a strong bar of metal of prismatic, circular, or oval cross-section, and which is adapted to slide up and down in said cross-beams, being held in the position to which it may be put for the time being by frictional springs *g*, if desired; but these frictional springs may be omitted in many cases.

To the under side of the upper cross-beam, *f*, is hinged, at each side of the slide H, a link or plate, *h*, which by a hinge-joint connects with a shorter link or plate, *i*, which in turn is hinged to the side of the slide H, so that thus the slide H is connected to the upper cross-beam, *f*, by the jointed links *h i* on each of its sides. Where these two links on each side are united by the hinge-connection, they connect, either by means of straddling-jaws, as shown in Fig. 8, or in any other manner, with a horizontally-sliding pusher, *j*, that finds proper guidance in a horizontal channel provided for it near the ends of the beam G, there being two such horizontal pushers, *j j*. These pushers, by outer heads, j^2, engage with catches I I, that are slides adapted to travel in the channels at the ends of the beam G, and to be projected beyond the ends of said beam G, as shown in Figs. 8 and 11. Between inner shoulders, *l*, of the catches I and the outer ends of the pushers *j* are interposed spiral springs *m*, or analogous cushions. Above this traveling contrivance G H and its appurtenances, thus far described, is affixed to the upper part of the leaders A A a cross brace or beam, J.

Now, as far as described, the mechanism

operates as follows: The chains traveling in the direction of the arrows, which are indicated in Fig. 11, will, when the catches I I engage them, as in Fig. 11, lift the cross-beam G and all its appurtenances, and also the hammer F. Fig. 11 shows the device when in position to lift the hammer. When the hammer has been lifted so far that the upper end of the vertical slide H is brought in contact with the under side of the beam J, the slide H is by such contact pushed downward into the position shown by dotted lines in Fig. 7, carrying with it the links *h i* on each side, so as to bring their connecting hinge-joints nearer together, and by that means the pushers *j* and the catches I are drawn inward and disengaged from the chains E E, thus releasing the hammer and allowing it to drop. In dropping, the hammer strikes the pile, the beam G follows it, and the downwardly-projecting end of the vertical slide H, which is on said beam G, will strike the upper face of the hammer and will thereby be displaced vertically—that is to say, moved upwardly through the beam G, so as to bring the links *h i* and their connections back into the position which is shown in Fig. 11, and by full lines in Fig. 7. This causes the catches I I to become re-engaged with the chains, that will at once proceed to lift the hammer again. If at the moment the catches are pushed asunder and against the chains E E their points should not happen to enter into the apertures of the chain-links, the result will be that for the time being the pushers *j* will be moved outward, while the catches I will not be capable of moving outward. Hence the springs *m* will be compressed until by the continued motion of the chains the apertures of the links arrive in line with the catches I, whereupon the springs, becoming released, will propel said catches into the chain-links and insure the proper engagement of the parts.

It will thus be seen that the engine for actuating the hammer F can at all times remain in motion to simply keep the chains E traveling in the desired direction, and that the hammer will be automatically engaged with the chains, lifted, disengaged from them, dropped, and so on until the desired result has been attained. Specific attention to control the action of the grappling devices is, therefore, not required; nor will the operation of the mechanism be varied as the pile is gradually driven into the soil, as the catches will engage the chains whenever they may arrive beside them after the hammer has struck the pile. In case shorter strokes of the hammer should be required from time to time, or on special occasions, a block, L, which is suspended by a rope or chain, *n*, from the upper cross-bar, *t*, of the apparatus, may be let down as far as desired, so as to be vertically above the slide H, to push the slide H downward and disengage the hammer from the chains whenever the hammer has been lifted to the required extent. Thus the strokes of the hammer can be made as long or as short as desired. In order to keep the chains properly taut, and also to have the openings in their links just aligned, so that they may be engaged by both catches at the same time, the shafts of the upper chain-wheels, *a*, are made adjustable. For this purpose the upper ends of the leaders A A carry each two pairs of vertical posts, *o o*, on which are sliding boxes *p*, wherein the shafts of the chain-wheels *a* have their bearings. These sliding boxes *p* are suspended adjustably by screw-rods *r*, that are held by nuts *s* on an upper fixed cross-bar, *t*, of the pile-driver. This adjusting mechanism is more fully indicated in Figs. 1, 2, and 11. The ends of the traveling beam *f* and projections *y* at the ends of the traveling beam G may straddle the leaders for the purpose of proper guidance of the movable part of the apparatus. In order to properly guide the pile in the lateral direction, or rather to guide the position of its upper part laterally, I have fastened to the faces of the leaders A A, by strong metal or wooden framings *u*, a front beam or bar, M, which beam or bar serves as a support for the screw-threaded front ends of four or more adjustable braces, N N and O O, which hold the pile-guides P and R, respectively—that is to say, the pile-guide P is a bar or rod resting in the hook-shaped or perforated rear ends of the braces N. One such brace is clearly shown in side view in Fig. 9; and this guide P can be drawn forward or backward as far as desired by turning the nut-handles *v* of the cross pieces or braces N N. The straight non-threaded portions of the braces N N are further guided in straps *w*, that project from the leaders, as shown in Fig. 10. The front pile-guide, R, rests in the rear ends of the rods O O, and may be moved backward or forward as far as desired by turning the nut-handles *x x* of said braces O O, all of which will be clearly understood by reference to Fig. 10. If the upper end of the pile is to be moved farther forward, the rods P R are forced forward to that extent, and if the upper end of the pile is to be made to lean farther backward this result will be attained by pushing the rods P R backward to that extent.

The bar P may in many cases be used in front of the leaders, in which case the bar M, with its appurtenances, will be in rear.

I claim—

1. In a pile-driver, the combination of the leaders A A with the endless chains E E, and mechanism, substantially as described, for supporting and moving said chains, and with the traveling beam G, having laterally-projecting catches I I, that are adapted to engage with said chains, and with the hammer F, that is suspended from said beam G, substantially as described.

2. The traveling beam G, combined with the vertical slide H, links *h i*, pushers *j j*, catches I I, chains E *d*, and hammer F, for operation in a pile-driver, substantially as described.

3. The combination of the traveling beam G, links *h i*, pushers *j*, catches I, and springs

m, with the chains *d*, and hammer F, and with the upper traveling cross-beam, *f*, chains E, and slide H, for operation substantially as specified.

4. The combination of the beam G, having movable catches I, that are adapted to be engaged by the chain E of a pile-driver, with the vertical slide H, upper cross-bar, J, chains E, and hammer F, and with means, substantially as described, for operating the catches I from slide H, all arranged so that the slide H will be moved at the terminus of each stroke to disengage and engage the hammer, as specified.

5. The hammer F, combined with the traveling beam G, vertical slide H, catches on said beam, lifting-chains, upper cross-bar, *t*, and vertically-adjustable disengaging-block L, substantially as specified.

6. In a pile-driver, the combination of the leaders A A, bar M, screw-threaded braces N O, and pile-guides P R, substantially as and for the purpose specified.

THOMAS TANGNEY.

Witnesses:
JOHN C. TUNBRIDGE,
JOHN M. SPEER.