J. HAMILTON & L. PIERCE.

POWER HAMMER.

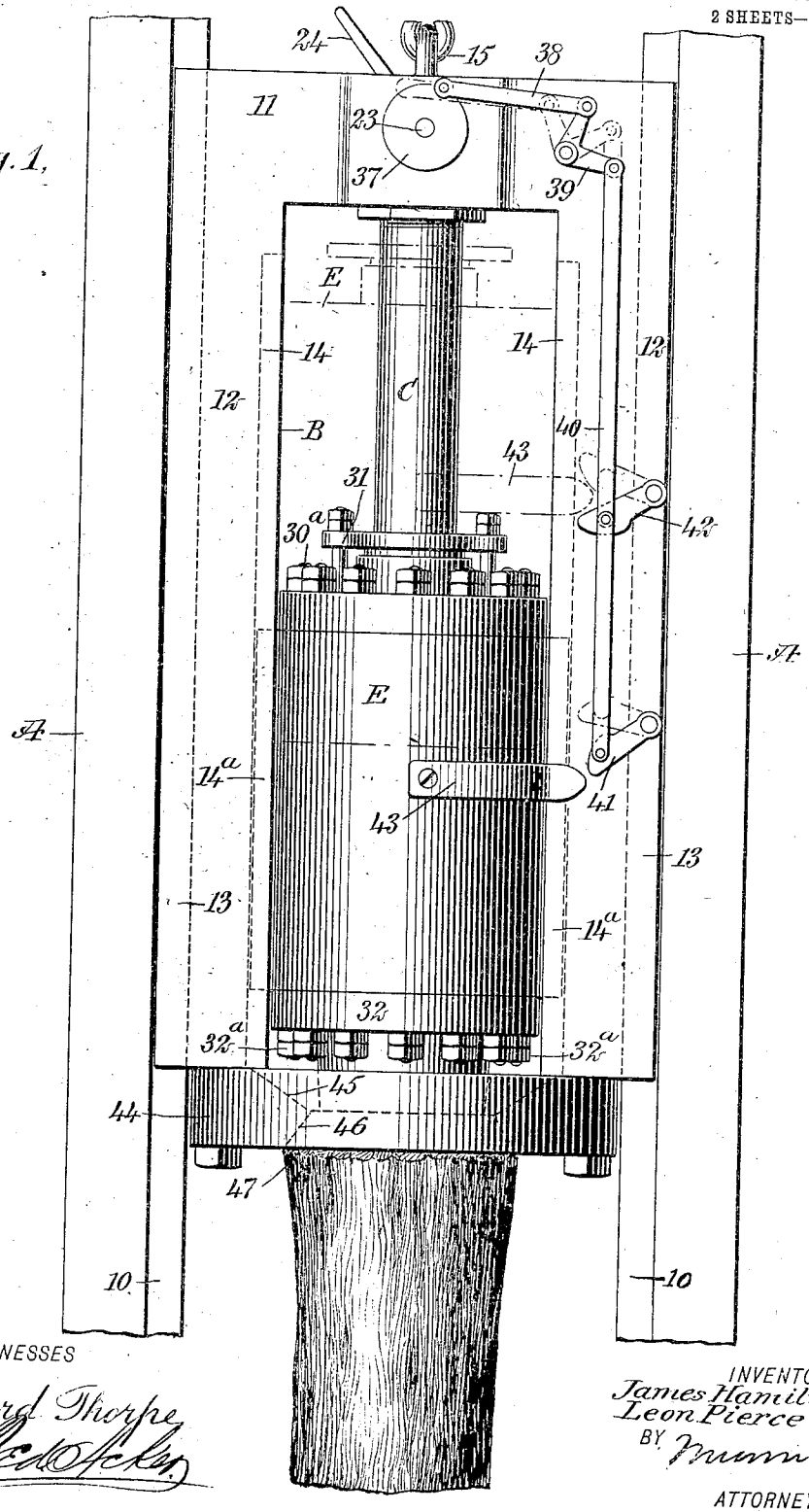
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904,528.

Patented Nov. 24, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

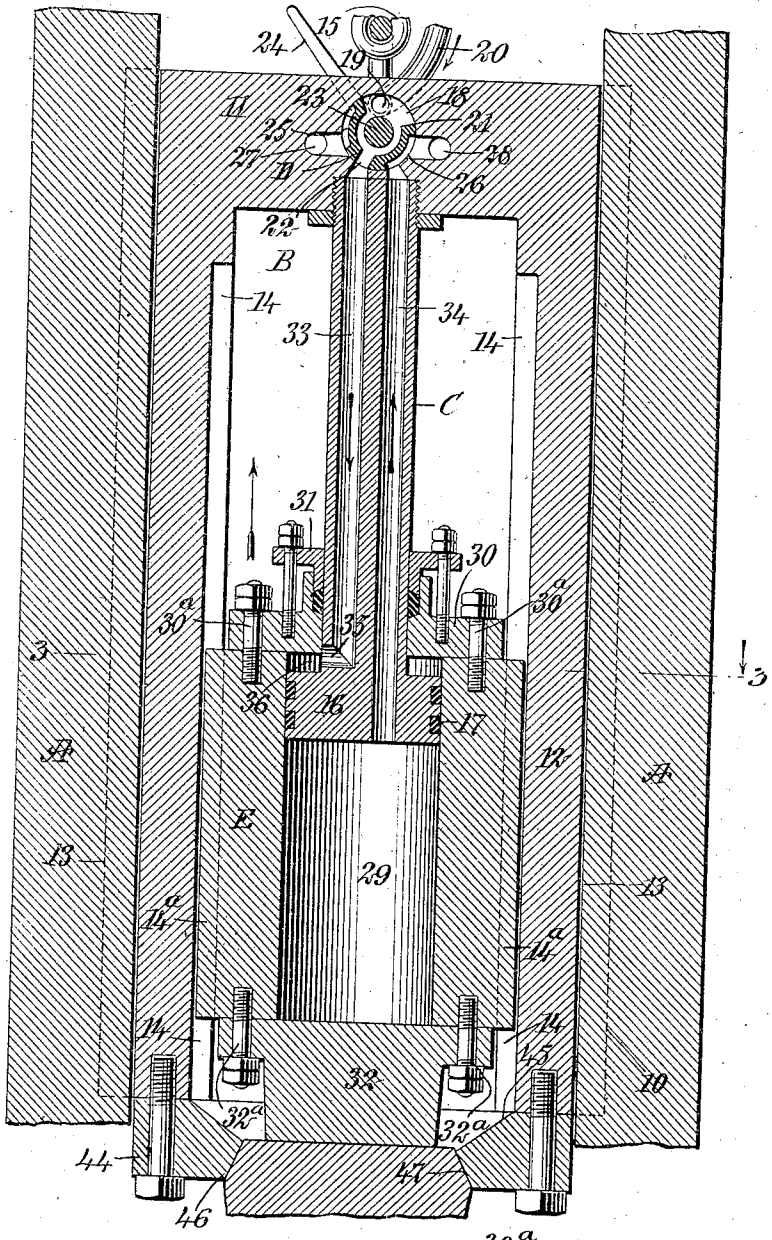
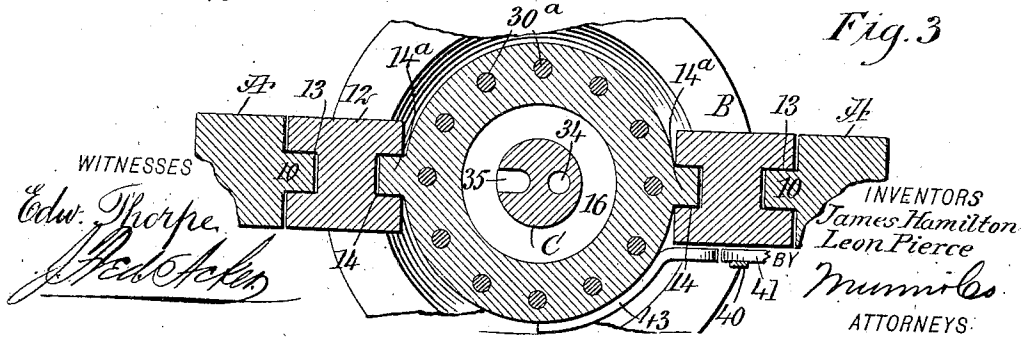


Fig. 3



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JAMES HAMILTON AND LEON PIERCE, OF NEW YORK, N. Y.

POWER-HAMMER.

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To all whom it may concern:

Be it known that we, JAMES HAMILTON and LEON PIERCE, both citizens of the United States, and residents, respectively, of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, and the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and useful Improvement in Power-Hammers, of which the following is a full, clear, and exact description.

The purpose of the invention is to provide a power hammer adapted to be operated by steam or compressed air, designed principally as a power pile driver, and adapted primarily for use in connection with sheet piling, but which is equally applicable for analogous purposes, as for example, wherever a percussive blow is used such as in rock drilling, riveting machines, and the like.

It is a further object of the invention to provide a stationary channeled piston rod and a hammer that is in the nature of a piston, sliding on said rod, together with a valve connected with a source of steam supply, or a supply of compressed air, and exhausts, which valve is controlled by mechanism operated by the movement of the hammer, whereby the valve is opened alternately to one or the other port or channel in the piston rod to cause the hammer to rise and fall.

It is a further purpose of the invention to provide a construction of the character described that will be simple, durable, economic, and positive in action.

The invention consists in the novel construction and combination of the several parts as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improved device, shown adapted for driving piles; Fig. 2 is a vertical section through the device; and Fig. 3 is a horizontal section taken practically on the line 3—3 of Fig. 2.

A represents opposing standards that are fixed in position in any suitable or approved manner, and each standard at its inner face is provided with a longitudinal tongue 10. B represents a frame adapted to slide between said standards, which frame consists of an upper cross bar 11 and side bars 12. The said side bars 12 are provided at their outer longitudinal edges with grooves 13 in which are adapted to slide the tongues 10 of the standards A, and the side members 12 of the said frame B are also provided at their inner longitudinal faces with grooves 14, that extend from the bottom to a point near the cross bar 11, as is illustrated in Figs. 2 and 3, and in which are adapted to slide tongues 14^a formed on the hammer E hereinafter described. The frame B is raised and lowered as occasion may demand, by means of a chain or cable 15, attached to the cross bar member 11, and is further connected with or controlled by any suitable tackle.

A piston rod C is secured at its upper end at the central portion of the cross bar 11 of the said frame B, and this piston rod C is provided with a circular head 16 at its lower end, having suitable packing rings 17. In the said cross bar 11 of the sliding frame B, an annular chamber 18 is formed, in which a valve D is mounted to rotate. This chamber is provided with a port 19 at its upper portion for the admission of steam or compressed air, and the said port 19 is connected by a pipe 20 with the source of supply. The valve D is provided with an admission port 21 at its upper surface, receiving steam or compressed air from the aforesaid port 19, and the valve D is also provided with an outlet port 22 opposite the inlet or receiving port 21, as is shown in Fig. 2. The valve is also provided with a member 23, adapted to turn in the aforesaid cross bar 11 of the frame B, and a hand lever 24 is attached to this pivotal member 23 of the valve, whereby the valve may be operated by hand when so desired.

The valve is provided at its peripheral surface with opposing exhaust chambers 25 and 26, as is also best shown in Fig. 2, and these exhaust chambers 25 and 26 are adapted to alternately register with exhaust ports 27 and 28 produced in the said cross bar 11 of the frame B, which exhaust ports 27 and 28 are in communication with the chamber 18 in which the valve turns, and the said ports are likewise in communication with the outside atmosphere.

The hammer E is in the nature of a piston, since it consists of a cylinder, the chamber

29 whereof snugly receives the head 16 of the piston rod C, as is illustrated in Fig. 2. This chamber 29 is closed at its upper end by a cap 30 secured to the body of the hammer by means of suitable screws 30ª, and said cap 30 is provided with a stuffing box 31 so as to prevent steam or compressed air escaping as the hammer E slides up and down on the piston rod C. The lower end of the said chamber 29 in the hammer E is closed by a striking face 32 secured to the body of the hammer by bolts 32ª, or the equivalents thereof, as is also shown in Fig. 2. The piston rod C is provided with two longitudinal channels 33 and 34. Both of these channels extend through the upper end of the piston rod and are in connection with the valve chamber 18. The channel 33 is provided at its lower end with a horizontal branch 35 that leads to a space 36 between the cap 30 of the hammer and the head 16 of the piston rod when the said hammer is in its lowest position, as is illustrated also in Fig. 2, while the channel 34 extends down uninterruptedly through the head 16 of the said piston rod C.

The valve chamber 18 is covered at the outer sides of the frame B by means of disks 37, and one of these disks has pivotally attached to it, one end of a link 38, which link at its opposite end is pivotally connected with an elbow lever 39 that is pivoted upon the outer side face of the aforesaid frame B, as is illustrated in Fig. 1, and this elbow lever 39 is pivotally attached to the upper end of a longer link 40, which link at its lower end is pivoted to a shifting finger 41, that has a rounded free end portion that extends inwardly beyond the link 40, and the said link 40 is furthermore pivotally attached to a second and upper shifting finger 42, that is also pivoted to the frame B and has also a rounded inner surface at its free end that extends inwardly beyond the said link 40, and the hammer E is provided at its outer face with an attached trip finger 43 adapted to engage with the shifting fingers 41 and 42.

In the operation of the device, the hammer E being in its lower position and steam or compressed air being supplied to the valve D, the outlet port 22 of the valve will at that time be in registry with the channel 33 in the piston rod C, and the steam or compressed air will be supplied to the space 36 and will cause the hammer to ascend. As the hammer ascends, its trip finger 43 engages with the upper shifting finger 42 and so moves the elbow lever 39 as to partially rotate the valve D, carrying its outlet port out of registry with the channel 33 in the fixed piston rod C to registry with the channel 34, whereupon the steam or compressed air acting upon the inner surface of the striking face 32 will force the hammer violently downward and cause it to strike an object in its path. This automatic shifting of the valve and the up and down movement of the hammer, is proceeded with automatically while the steam or compressed air is supplied to the said valve D, but at any time the valve may be shifted manually by means of the lever 24.

At the bottom of the sliding frame B, a ring 44 is secured, having its upper and under faces beveled in opposite directions as is illustrated at 45 and 46 in Figs. 1 and 2.

The under beveled surface 46 of the ring, receives and rests upon the upper beveled surface 47 of the pile to be driven, as is shown in Fig. 2, thus holding the pile steady for the stroke of the hammer, and the upper bead 45 provided for the ring, permits the striking face of the hammer to have free access to the pile.

Having thus described our invention, we claim as new and desire to secure by Letters Patent,—

1. In a power hammer, a support, a rotary valve in the support, exhaust ports for the valve, a guide member attached to the support terminating in a head, channels in the guide member in communication with the valve, one of said channels extending through the head and the other out at one side above the head, a hammer mounted to slide on the said guide member having a chamber receiving said head, pivoted shifting fingers, a link connecting said fingers, a lever pivoted to said link, a second link connecting the said lever with said valve, and a projection from the hammer adapted for alternate engagement with the said shifting fingers.

2. In a power hammer, a support, a rotary valve in the support, exhaust ports for the valve, a guide member attached to the support and terminating in a head, channels in the guide member in communication with the valve, one of said channels extending through the head and the other out at one side above the head, a hammer mounted to slide on said guide member and having a chamber receiving said head, a longitudinally-movable rod disposed adjacent the side of said chamber, means connecting the upper end of said rod with said valve, a projection carried by said chamber, and fingers extending outwardly from said rod into the path of said projection and adapted for alternate engagement therewith for moving said rod longitudinally and rotating said valve.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JAMES HAMILTON.
LEON PIERCE.

Witnesses:
J. FRED ACKER,
JOHN P. DAVIS.