G. BALL.

HYDRAULIC ELEVATOR.

No. 193,392. Patented July 24, 1877.

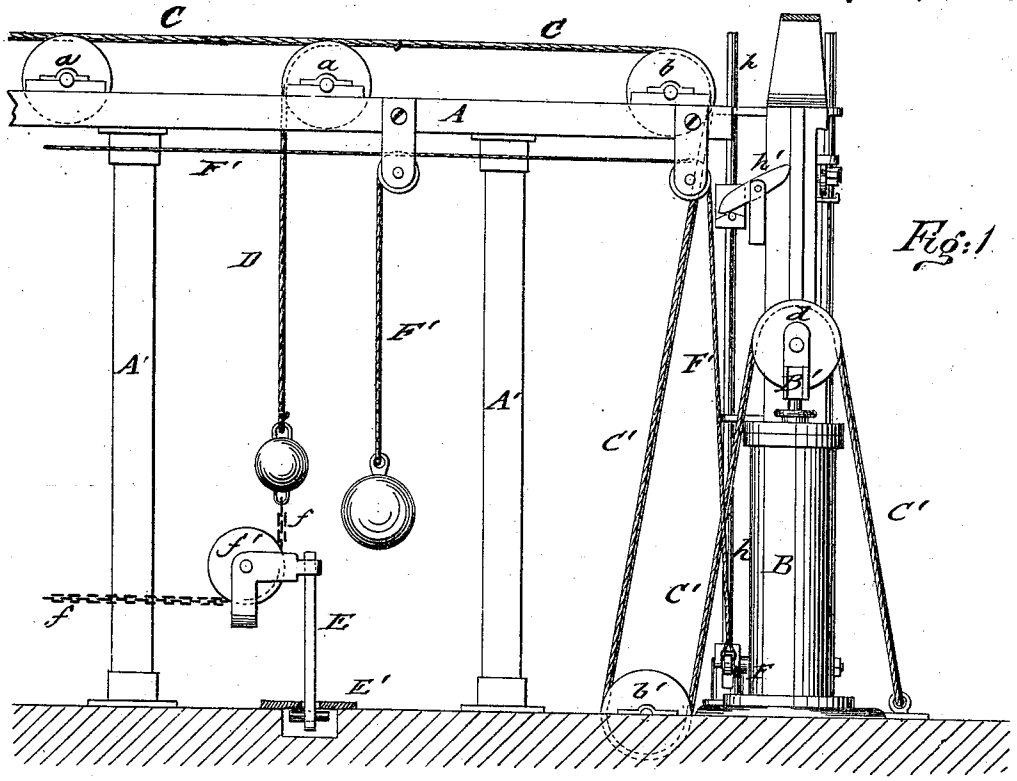


Fig: 1

Fig: 2.

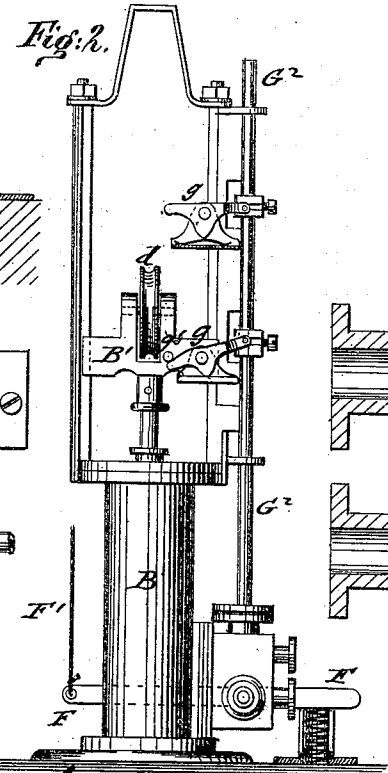


Fig: 3

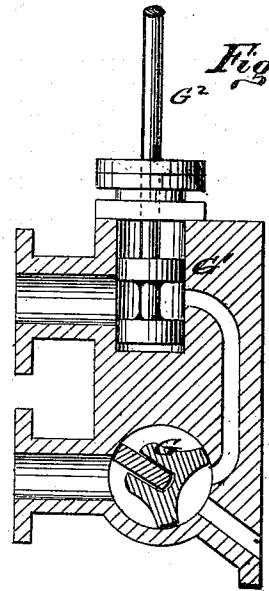


Fig: 4.

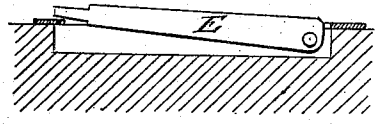


Fig: 5.

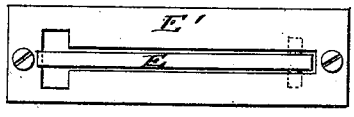


Fig: 6.



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GEORGE BALL, OF SPRINGFIELD, ILLINOIS.

IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **193,392**, dated July 24, 1877; application filed May 28, 1877.

To all whom it may concern:

Be it known that I, GEORGE BALL, of Springfield, county of Sangamon, and State of Illinois, have invented a new and useful Improvement in Apparatus for Moving Heavy Bodies, of which the following is a specification:

The invention is designed to furnish an apparatus for removing iron piles, steel ingots, and other heavy pieces of iron or steel from heating-furnaces; also for removing, in packing-houses, dead animals from scalding-vats, and for other purposes; and the invention consists of a steam or hydraulic ram, connected by suitable transmitting pulleys and ropes with standards of the different furnaces, the ram being operated by starting-cords connected to the steam-entrance valve, and provided with devices for exhausting the cylinder and cushioning the ram-piston.

In the accompanying drawings, Figure 1 represents a side elevation of my improved apparatus for moving heavy bodies; Fig. 2, an end elevation of the actuating-ram; Fig. 3, a detail vertical transverse section of the steam entrance and exhaust ports. Figs. 4 and 5 are detail side and top views of the hinged and folding standard in front of furnace; and Fig. 6 is a detail side view of the main transmitting rod and connection with cords branching off therefrom.

Similar letters of reference indicate corresponding parts.

Referring to the drawing, A A are strong timbers resting on iron girders of a building, or on post A′, and forming a support for a number of pulleys, *a*, on which the power-transmitting cable, pipe, or rod C is resting. The main cable, pipe, iron rod, or chain C passes over a top pulley, *b*, down to a pulley, *b′*, turning in fixed bearings of the ground, and over the same upward to a pulley, *d*, supported in cross-head B′ of a steam or hydraulic ram, B, and from pulley *d* to a fixed point of attachment on the ground, as shown in Fig. 1. To the main cable C are coupled wire ropes D that run over side pulleys down to some point near the furnace, being there connected by a chain, *f*, with a pulley, *f′*, of a standard, E, that is hinged to an anchor-plate, E′, of the ground, and so guided in a slot of the same that the standard may be readily thrown into upright position, or folded down to be out of the way, as shown in Figs. 4 and 5.

In place of the pulleys over which the branch ropes pass, fulcrumed bell-crank levers or any equivalent mechanism, by which the power is transmitted from the main rope, may be employed.

The end of chain *f* is attached to a wagon or tongs that carry or grasp a pile of iron or other heavy body for moving it. The opposite end of the main rod C is provided with a counter-weight, the main rod being arranged either in straight line along the heating-furnaces, or running off at an angle from the main line over guide-pulleys, so as to be conducted to any part of a building, and admit the use of one ram for a number of furnaces, vats, or other objects in which heavy bodies have to be moved.

The steam-valve of the ram B is operated by a fulcrumed lever, F, which is acted upon by a spiral spring at one end, and connected at the other end to a starting-rope, F′, that is conducted over pulleys of the supporting-timbers A, and branched down to each furnace, to be taken hold of by a handle whenever the action of the ram B for moving a body is required.

The ram B is constructed in the customary manner, provided with a steam-entrance port and main valve G, operated by the lever F and starting-rope F′, and of a small cylinder on top of the steam-chest, as shown in Fig. 3, with a choking or cushioning valve, G′, for the purpose of preventing the too rapid descent of the piston after completing the upward stroke. The valve G^1 is operated by a rod, G^2, with adjustable tappets *g*, which form contact with a pin, *g′*, of the cross-head B′ at the top or end of the stroke at the same time at which the main valve is made to exhaust, so as to raise the cushioning-valve, thereby securing a free exhaust, and admitting the piston to descend. When the pin of the cross-head comes in contact with the lower tappet the valve closes up the exhaust and the piston-cushions on the remaining steam in the cylinder, and descends gradually to the bottom, at which point it rests on a spiral spring,

inclosed in a box, attached to the lower head of steam-cylinder. The main valve is an ordinary round valve, with two bridges and concaves between them. One of the bridges stands at an angle to the live-steam port, and admits, thereby, the steam into the cylinder through a three-cornered aperture, as appears from the detail in Fig. 3.

The lever F is also connected by a rod, *h*, with a pivoted tappet, h^1, of the cross-head-guides, which tappet strikes against a pin, h^2, clamped to the rod *h*, so as to secure the shutting of the main valve in case the lever-spring should fail to act on the completion of the whole stroke, so that the exhaust would be accomplished and the piston descend, as described.

For the purpose of removing a pile or other body from the furnace the cushioning and exhaust-rod tappets on the ram are adjusted to give a stroke equal to one-half length of the distance to which the pile is to be moved. The buggy is placed under the fore plate of the furnace-door when the heater's helper takes the tongs attached to the chain *f*, introduces them into the furnace, and grasps the pile. The helper assumes a position near the starting-rope, and, when all is ready, pulls the same, at first gradually, to take up the slack of the same. Steam is thereby admitted into the cylinder of the ram, the piston propelled upward, the line of rope taken up, and the pile delivered on the buggy in good shape. The starting-rope is then released by the helper, so that the spring of the lever shuts off the steam, exhausting that in the cylinder, and causing the piston-head to return to its original place, ready for the next pull. In case the spring should fail to work, the whole stroke is made by the piston, until the cross-head strikes the exhaust-tappet, accomplishes the exhaust, and shuts off the steam, bringing the piston back to rest.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. An apparatus for moving heavy bodies, consisting, essentially, of a steam or hydraulic ram, B, a guided power-transmitting-chain, rope, or cable, C, with end rope C′ passing over the ram and over guide-pulleys to the places of work, and of devices to start the ram, substantially in the manner described, and for the purpose specified.

2. The combination of the ram B B′, having top pulley *d*, with the transmitting-cable C C′, branch ropes D, folding standards E, and guide-pulleys *f′*, substantially as specified.

3. The combination of the ram B, power-transmitting ropes and chains C′, C, D, and *f*, and standards E, with starting-cords F′, and with exhausting and cushioning devices of ram, substantially as described, and for the purpose specified.

4. A steam-ram having steam entrance and exhaust valves and devices for exhausting the cylinder and cushioning the piston, in combination with the ram-starting and power-transmitting ropes, substantially in the manner described, and for the purpose specified.

GEORGE BALL.

Witnesses:
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