T. B. BARR & F. G. HOYER.
CRUCIBLE LIFTING MECHANISM.
APPLICATION FILED NOV. 8, 1911.

1,148,138.

Patented July 27, 1915.

2 SHEETS—SHEET 1.

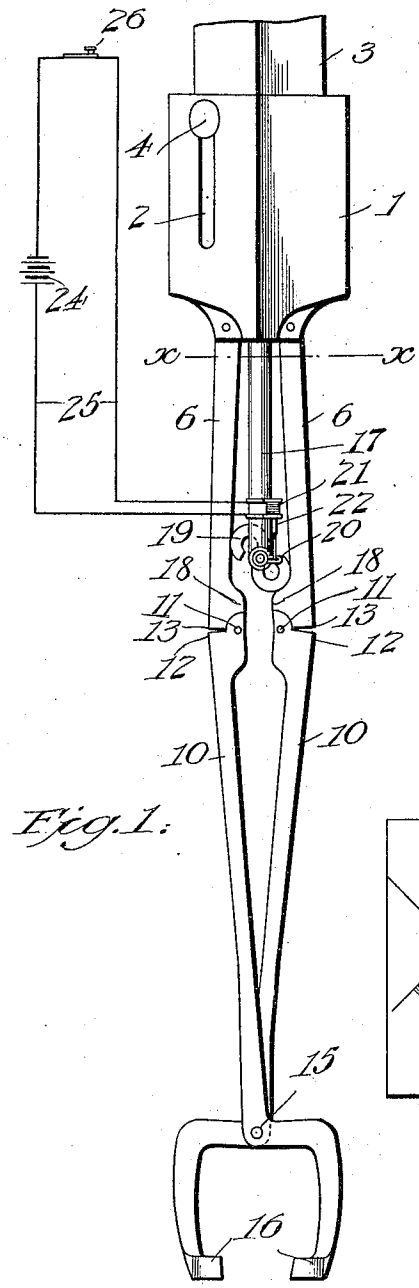


Fig. 1.

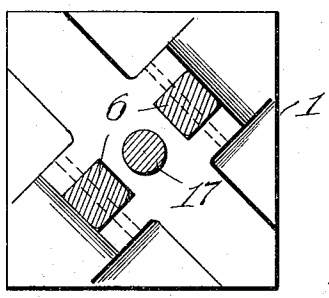


Fig. 3.

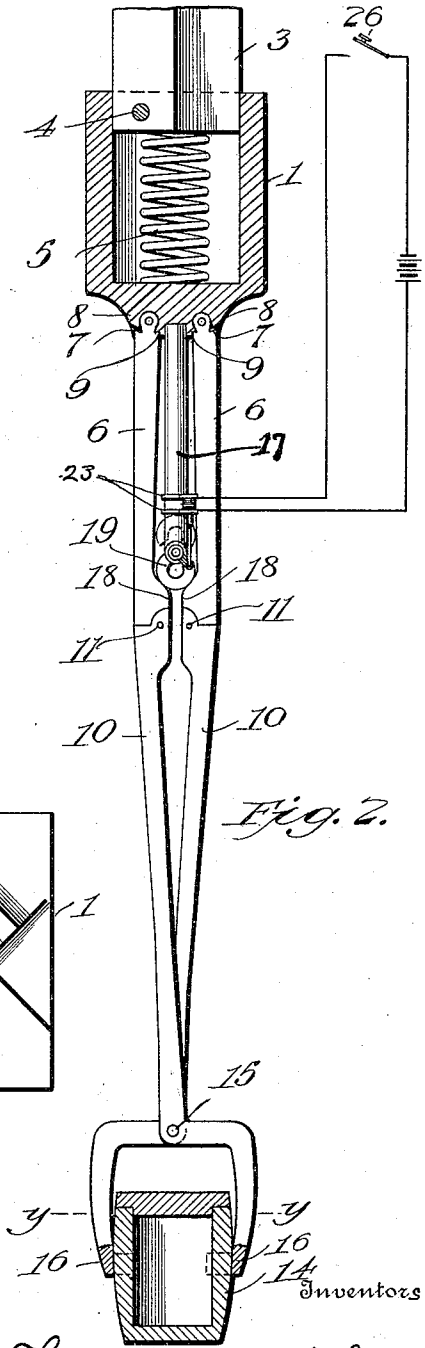


Fig. 2.

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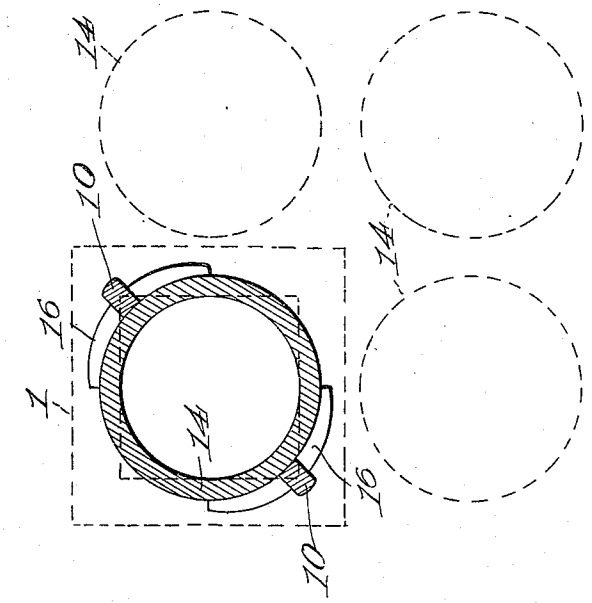
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2 SHEETS—SHEET 2.

Fig. 5.



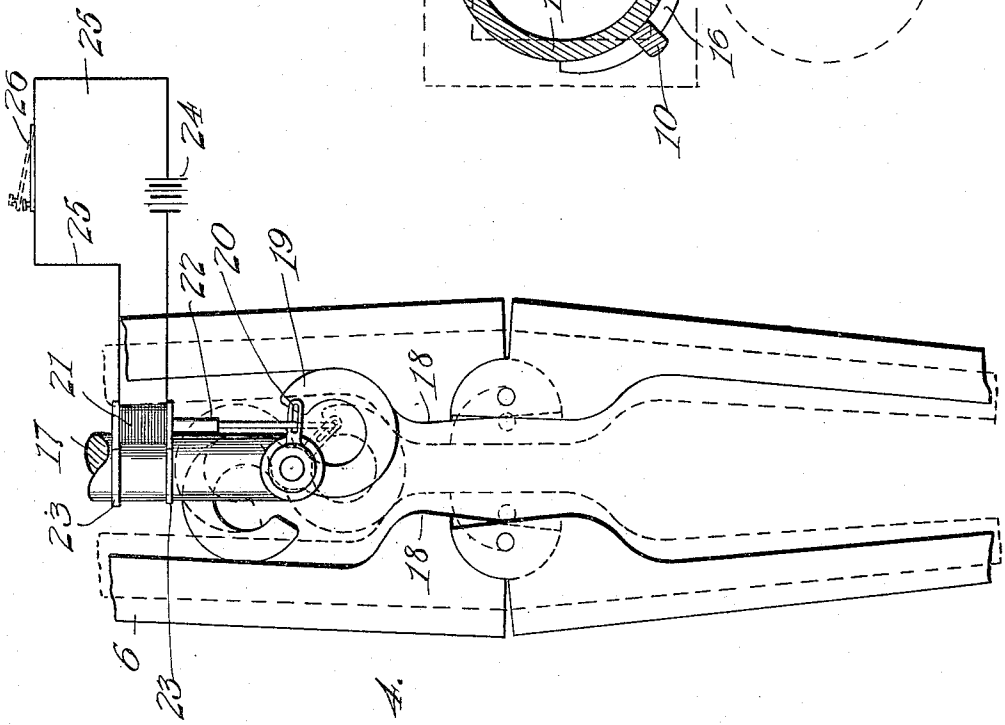


Fig. 4.

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UNITED STATES PATENT OFFICE.

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CRUCIBLE-LIFTING MECHANISM.

1,148,138. Specification of Letters Patent. **Patented July 27, 1915.**

Application filed November 8, 1911. Serial No. 659,228.

To all whom it may concern:

Be it known that we, THOMAS B. BARR and FRANKLIN G. HOYER, citizens of the United States, said BARR residing at Bethlehem, in the county of Northampton, and said HOYER in south Bethlehem, county of Lehigh, State of Pennsylvania, have invented certain new and useful Improvements in Crucible-Lifting Mechanism, of which the following is a specification.

Our invention relates to lifting mechanism, and especially to mechanism for use in mills and iron manufacturing plants.

The object of our invention is to provide means by which powerfully acting tongs can be so constructed as to be adapted to enter conveniently a crucible heating furnace without occupying much room in so doing.

Crucibles used in the manufacture of steel have heretofore been handled by lifting devices which required the service of one or more workmen to engage the tongs, and by reason of the intense heat, which prevents the near approach of the workmen to the furnace, the engaging and disengaging of the tongs from the crucible could not be rapidly performed.

Furthermore, the object of our invention is to provide a device, whereby one or more workmen heretofore required can be dispensed with, and the handling of the crucibles greatly facilitated.

Finally the object of our invention is to provide a lifting driver in which the legs of the tongs are pivoted to the head-stock whereby their outward movement is limited by shoulders formed on the end of the leg sections.

With the foregoing and other objects in view, the invention consists in the details of construction and in the arrangement and combination of parts to be hereinafter more fully set forth, and particularly pointed out in the claims.

In describing the invention in detail, reference will be had to the accompanying drawings, which will form a part of this specification, wherein like characters denote corresponding parts in the several views, and in which:—

Figure 1 is a front view in elevation, showing the tongs in open position. Fig. 2 is a front view in elevation showing the headblock in section and the tongs engaging a crucible. Fig. 3 is a sectional view on the line X—X of Fig. 1. Fig. 4 is an enlarged view showing the electric means for opening the jaws of the tongs, and Fig. 5 is a sectional view on the line Y—Y of Fig. 2.

Our device is arranged to be suspended from a crane or lifting device of any kind and operated by any suitable power. It comprises a hollow square-shaped head-block 1 having slots, 2 formed in two opposite sides thereof. A plunger 3 has one end inserted in said head-block, and is prevented from being withdrawn therefrom by a bolt or pin 4 inserted through the slots and plunger. A spiral spring 5 is mounted in the head-block, interposed between the inner bottom surface of the block and the lower end of said plunger 3. This spring cushions the jar caused by the sudden contact of the tongs against a rigid surface.

Pivotally connected to the head-block are links 6—6 arranged diagonally opposite to each other, in relation to the square of the head-block, see Fig. 3, so that when the tongs are lowered into a crucible furnace, they will descend into the widest space between the crucible and the walls of the furnace. This arrangement permits the furnace walls to be set closer together, and reduces the heating space required for such purposes. The links 6 are formed with shoulders 7 adjacent to their pivotal connection with the head-block by which the outward movement of the jaws is prevented beyond the required distance through their contact with shoulders 8 on said block. Shoulders 9 are also formed on the head-block, and extend downward a short distance below the shoulders 8, by which the inward movement of the links 6 beyond a certain distance is prevented. The links 6 are provided on their lower inner surface with shoulders 18, and are pivotally connected to the tong handles 10 by pivots 11. Said tong handles are also provided with shoulders 12, which abut against shoulders 13 in the links 6, so that no greater pressure may be exerted on the crucible 14 than is necessary to lift the same. The tongs are pivoted together at 15, and are provided at their lower ends with jaws 16 which are shown as partially semi-circular in shape, but any desired form may be used as required in lifting articles of different shapes.

The means for releasing the jaws from the

crucible comprises a rigid vertical rod 17, which is connected in any suitable manner to the head-block at one end and extends downward between the links 6, nearly to their pivotal junction with the tong handles. On the lower end of the rod 17 is mounted an S-shaped cam or lever 19, which is connected by a link 20 to a solenoid 21 by a rod 22. The solenoid is secured to the rod 17 by any suitable means, as straps 23. A battery 24, provides a current for the solenoid through the medium of the wires 25 and a switch 26 which may be placed at any convenient place for the operator to control the same.

The operation of our said invention is as follows: The upper end of the plunger 3 is connected in any suitable manner to the lifting rod or head of a crane. The crane arm is then brought into a position immediately over the furnace and the operator by means of the switch 26 energizes the solenoid. As soon as the solenoid is energized, the S-shaped cam is drawn into a horizontal position, and as it assumes such position, the cam shaped ends contact with the shoulders 18—18 and the jaws of the tongs are opened. The operator will then lower the tongs into the furnace, and by throwing the switch out, the solenoid is disengaged, and the jaws by their own weight come in contact with the crucible, and as the tongs are withdrawn from the furnace, they automatically grasp the crucible and raise it clear of the furnace, when it is carried to and deposited in any desired place.

Having thus fully described our said invention, what we claim as new, and desire to secure by Letters Patent, is:

1. A crucible lifting device comprising a head-block adapted for connection with the lifting member of a crane, a pair of tong carrying arms pivoted to said head-block, lifting tongs pivotally connected to the lower ends of said arms, and means carried by the head-block and interposed between said arms adjacent to said connection with the tongs for expanding and holding said arms expanded for opening said tongs, substantially as set forth.

2. A crucible lifting device comprising a hollow head-block, a plunger adapted to reciprocate in said head-block, a pair of arms provided with shoulders pivotally connected to the lower end of said head-block, lifting tongs having their handles pivotally connected to the lower ends of said arms, a rigid rod suitably secured to the head-block, and extending downward between said arms, and means carried by said rod for opening and releasing said tongs.

3. A crucible lifting device comprising a hollow head-block provided with shoulders on its lower end, a plunger adapted to reciprocate in said head-block, a spiral spring inserted between the lower end of said plunger and bottom of said head-block, a pair of arms provided with shoulders pivotally connected to the lower end of said head-block, said arm shoulders being adapted to co-act with the shoulders formed on the headblock, lifting tongs pivotally connected to said arms, a rigid rod secured at one end to the head-block and extending downward between the arms, a cam pivoted on the lower end of said rod, a solenoid secured on the rod, and connected with said cam, and means for energizing said solenoid.

4. A crucible lifting device comprising a hollow head-block having shoulders at its lower end, a plunger in said head-block, links pivoted to said head-block, tongs pivotally connected to said links, a rod rigidly secured to the head-block, a cam pivoted on the lower end of the rod, a solenoid for operating said cam, and means for energizing said solenoid.

5. A crucible lifting device comprising a head-block, means for attachment with a crane, a pair of tongs having jointed handles pivotally connected to said head, and electrically operated means for breaking the joint in said handles to open the tongs, substantially as set forth.

6. A crucible lifting device comprising a carrying block adapted for connection with a crane, a pair of tongs pivoted to said block and formed with joints in the handles thereof, and positively operating means for breaking said joints and opening said tongs, substantially as set forth.

In witness whereof we have hereunto set our hands and seals at Bethlehem, Pennsylvania, this 4th day of November, A. D. nineteen hundred and eleven.

THOMAS B. BARR. [L. S.]
FRANKLIN G. HOYER. [L. S.]

Witnesses:
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E. L. MARSH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."