

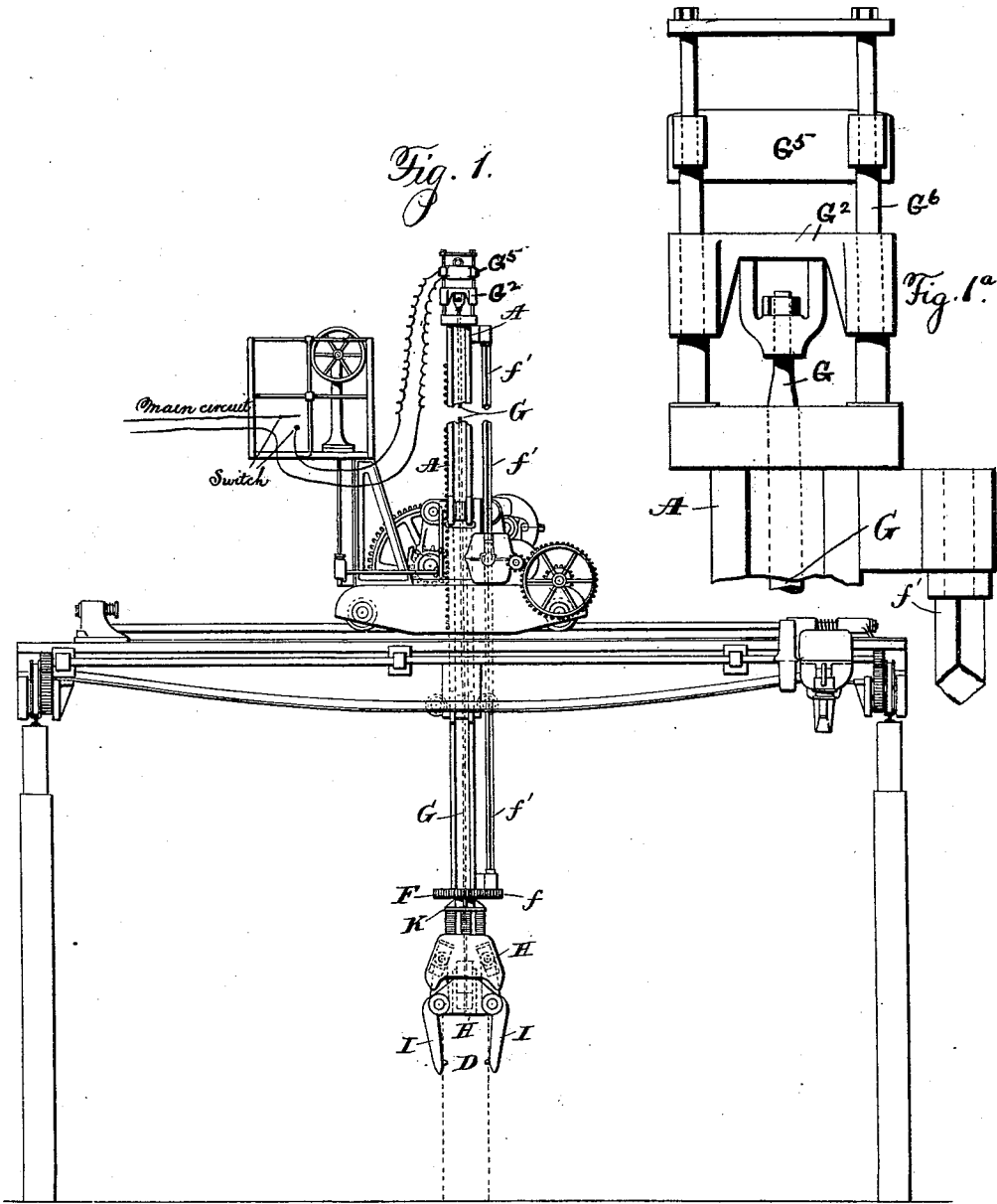
(No Model.)

3 Sheets—Sheet 1.

T. R. MORGAN, Sr. & W. H. MORGAN.  
INGOT CHARGING APPARATUS.

No. 520,798.

Patented June 5, 1894.



Witnesses  
*Jas. E. Hutchinson.*  
*S. W. Porter*

Inventors:  
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*B. H. Adamsom.*  
 Attorney

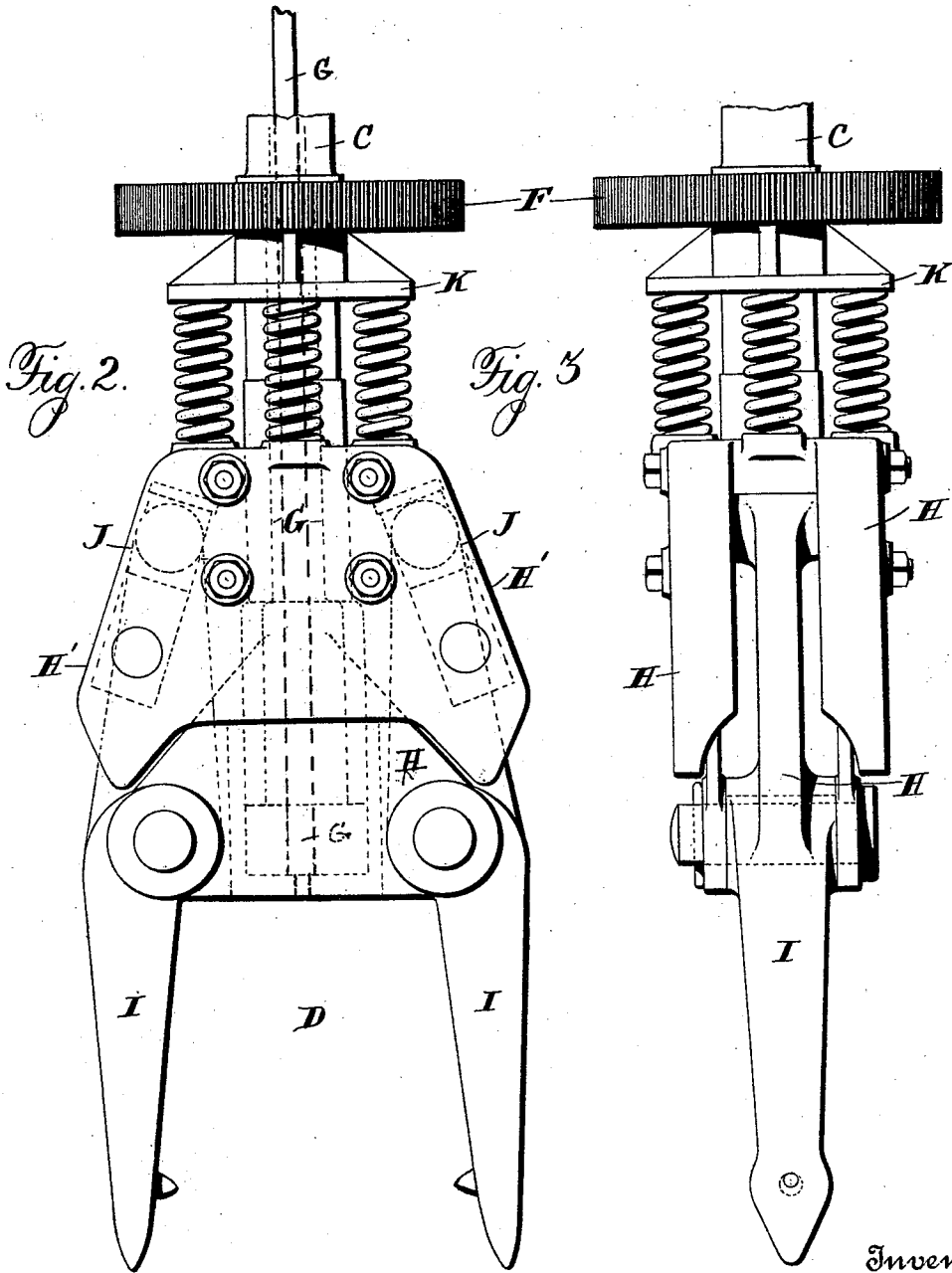
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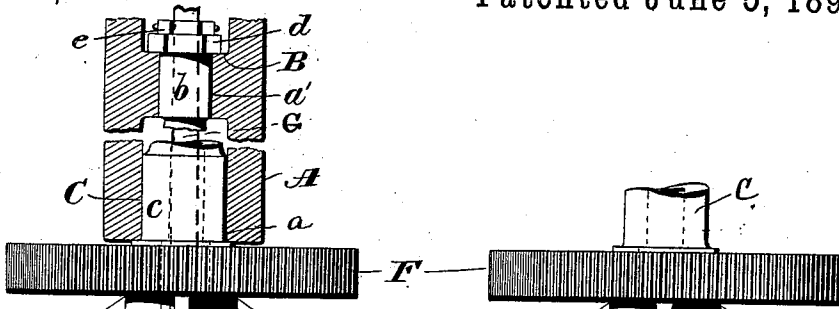
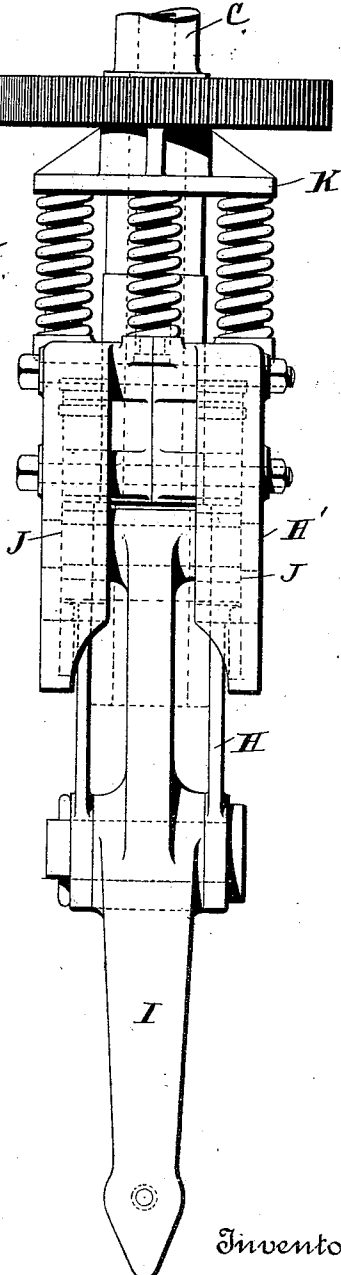
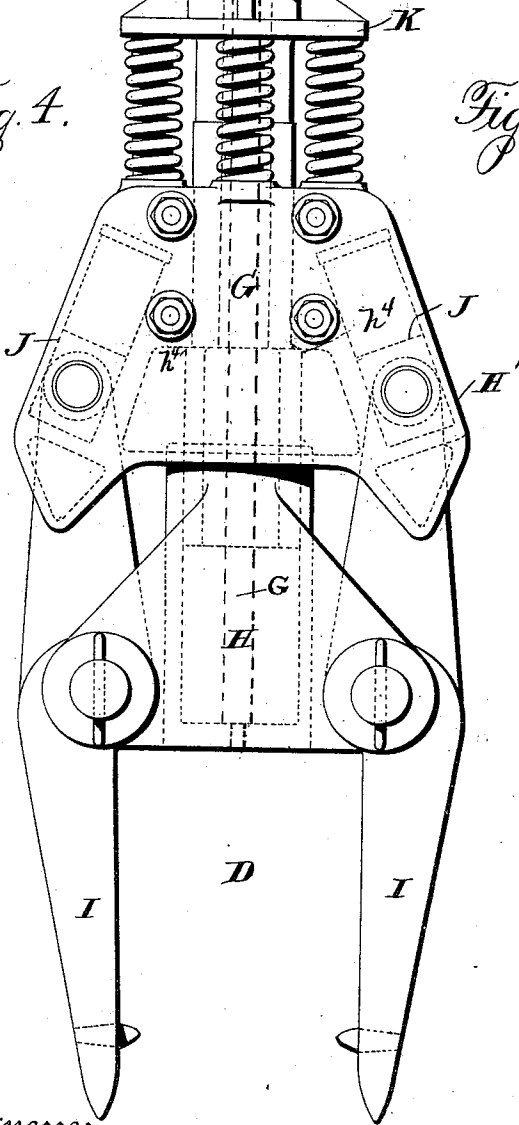


Fig. 4.

Fig. 5.



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# UNITED STATES PATENT OFFICE.

THOMAS R. MORGAN, SR., AND WILLIAM HENRY MORGAN, OF ALLIANCE, OHIO, ASSIGNORS OF ONE-HALF TO THOMAS R. MORGAN, JR., AND JOHN R. MORGAN, OF SAME PLACE.

## INGOT-CHARGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 520,798, dated June 5, 1894.

Application filed June 3, 1893. Serial No. 476,498. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS R. MORGAN, Sr., and WILLIAM HENRY MORGAN, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Ingot-Charging Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to an improvement in ingot charging apparatus, designed more particularly to be carried by overhead traveling cranes and for use in connection with open top furnaces.

Our invention consists in the parts and combinations of parts as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of our improved crane. Fig. 1<sup>a</sup> is an enlarged view of the upper end of part A. Fig. 2 is a view in side elevation of the tongs showing the jaws in their open position. Fig. 3 is an edge view of same. Fig. 4 is a side view showing the jaws closed, and Fig. 5 is an edge view of same.

A represents a depending body which may be a piston rod operated by steam, air of water, a rack bar or a bar or rod movable vertically by any suitable mechanism. The parts for vertically moving this piston rod or bar are preferably carried by a trolley mounted to travel lengthwise a traveling bridge as shown.

The lower end of part A is recessed or hollowed out as shown at *a* and is provided with a seat B having a central opening therein for the passage of the post C carrying the tongs D. This post C is provided with a cylindrical portion *b* near its upper edge adapted to snugly fit within the opening *a'* in seat B, and with a cylindrical portion *c* adapted to snugly fit opening in the lower end of rod or bar A. The upper end of post C, or that portion above seat B is reduced in size for the reception of washer *d* which latter rests on the seat B, the said washer being held in place by the nut *e*. By this arrangement it

will be seen that the post is free to turn in the lower end of the rod or bar A so as to bring the tongs, to be hereinafter referred to in position to grasp the ingot on opposite sides.

Secured to post C at a point immediately below the rod or bar A is the toothed wheel F which latter is engaged by the pinion *f* secured to the lower end of rod *f'*. By turning rod *f'* it will be seen that post C and all the parts carried thereby are also turned.

G is a rod connected at its lower end to cross head or bracket H, and passing upwardly through the hollow post C, and through the rack bar or part A, to a point above the upper end of the latter where it is connected to the armatures G<sup>2</sup> see Fig. 1<sup>a</sup> for a purpose to be hereinafter explained. The lower cross head or bracket H is provided on its upper face with a socket (shown in dotted lines in Figs. 2 and 4) for the reception of the lower end of the post, the said cross head or bracket being loose so that it can move vertically thereon.

Pivotaly mounted on the trunnions carried by the cross head or bracket H are the tongs I. The lower ends of these are each provided with a tooth or projection adapted to engage the ingot, while each carries at its upper end slidable blocks—which latter move in inclined guideways in the upper cross head H'. This upper cross head is also loosely mounted on the post, and when in its lowest position as shown in Fig. 4 rest on the shoulder *h*<sup>4</sup> on post and is held thereby against vertical displacement. The post C is provided at a point below the pinion F with a flange K, between which latter and the top of the upper cross head H' a series of spiral springs is interposed, the function of which is to hold the upper cross head H' against shoulder *h*<sup>4</sup>, but allow said cross head to yield and move upwardly, when through neglect or any other cause the lower edge of the lower cross head or bracket is lowered onto the ingot or other object, thus absorbing shock which would otherwise fall on said parts were the upper cross head stationary. The slidable blocks J move in the inclined ways and it will be seen that as the blocks J move up the

converging ways the lower ends of the tongs are opened and as they descend or diverge the lower or grasping ends of the tongs approach each other until they contact with the  
5 ingot.

From the foregoing it will be seen that the weight of the blocks J normally tends to lower the tongs I as in Fig. 4 and the tongs, being  
10 pivoted at points between their ends and connected at their upper ends to slidable blocks mounted in inclined guideways, it follows that as the tongs are lowered, their upper ends move away from each other while their lower ends move toward each other so as to  
15 grasp the ingot between them. As soon as the teeth on the ends of the tongs engage the ingot, the weight of the latter tends to still further close the tongs and causes the latter to firmly grasp the ingot and securely hold it  
20 until the ingot has been deposited either in the furnace, car, or other support, after which the tongs are released.

By providing the tongs with slidable blocks moving in inclined guides, the leverage is constant with any width of ingot.  
25

In the operation of the device the grasping ends of the tongs are separated by energizing the electro-magnet G<sup>5</sup> which operates to draw the armature thereof upwardly and elevate  
30 the lower cross head. This movement of the cross heads slides the blocks in the inclined guide ways and necessarily causes the lower ends of the tongs to separate. With the tongs in their distended or separated position they are ready to be lowered to the ingot.  
35 The tongs or charging device carried by the crane can now be moved to a position over the ingot, partly rotated if necessary and lowered and until the tongs rest on opposite sides of the ingot; then by releasing the cross head H, which is done by breaking the circuit through the magnet, the cross-head falls and causes the tongs to grasp the sides of the ingot. After the ingot has been moved to  
40 its position, by simply lowering the post A slightly so as to take the weight of the ingot off the tongs, and energizing the magnet, the armature is elevated carrying with it the cross-head H, which as before stated opens or  
45 separates the tongs at their lower ends. The rod G located between and carried by the lower cross head and the armature must necessarily move longitudinally when, as previously stated, the lower cross head comes in  
50 contact with the ingot and comprises the springs. This movement of the rod necessarily moves the armature G<sup>2</sup> carried by the upper end thereof, and if the electro magnet G<sup>5</sup> were fixed it would obstruct the free movement of the armature. To overcome this we  
55 have loosely seated the magnet on the posts G<sup>6</sup> so that an upward pressure thereon can lift same and thus provide for the free unobstructed movement of the rod carrying the  
60 armature.

It is evident that numerous slight changes might be resorted to in the relative arrange-

ment of parts without departing from the spirit and scope of our invention; hence we  
70 would have it understood that we do not confine ourselves to the exact construction herein described, but,

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—  
75

1. In an ingot charging apparatus, the combination with a rotary post a movable cross head thereon, tongs pivoted between the ends to said cross head, and means engaging said tongs at their upper ends for spreading them,  
80 of means for elevating the cross head carrying the tongs, substantially as set forth.

2. In an ingot charging apparatus the combination with a rod or bar, a post journaled in the end thereof and means for turning the  
85 post, of a slidable cross head on the end of the post, tongs pivoted to said cross head, means engaging the upper ends of said tongs for opening and closing them, and means for elevating said cross head, substantially as set  
90 forth.

3. In an ingot charging device, the combination with a post, of tongs mounted at their upper ends in guide ways, a slidable cross head connected to the tongs at points between their ends, electro-magnets and arma-  
95 tures and devices connecting said armatures with the cross head, substantially as set forth.

4. In an ingot charging device, the combination with a post or bar, grasping tongs and  
100 devices for actuating said tongs, of a spring buffer carried by said post or bar, substantially as set forth.

5. The combination with a bar or post and a magnet carried thereby, of a movable cross  
105 head having tongs pivoted thereto, slidable blocks connected to the tongs at the upper ends of the latter, guide ways for said blocks, an armature and means connecting said cross head and armature, substantially as set forth.  
110

6. The combination with a bar or post and pivoted tongs, of a slidable cross head for  
115 actuating the tongs, and electro-magnetic devices for actuating the sliding cross-head, substantially as set forth.

7. The combination with a rod or bar, a post journaled in the end thereof and means for  
120 rotating said post; of pivoted tongs, a slidable cross head for actuating the tongs, and electro-magnetic devices for actuating said slidable cross-head, substantially as set forth.

8. The combination with a movable cross head, tongs pivoted thereto, slidable blocks on the upper ends of the tongs, and inclined  
125 guide ways for said blocks, of magneto-electric devices for actuating the cross head, substantially as set forth.

9. The combination with a post, an upper movable cross head thereon provided with  
130 inclined ways, a lower movable cross head, tongs mounted on said lower head and having slide blocks resting in the inclined ways in the upper cross-head, and means for elevating the lower cross-head.

10. The combination with a post a lower  
cross head carrying tongs, an upper cross  
head having inclined guide ways, slidable  
blocks carried by the tongs and resting in  
5 the inclined ways and means for moving the  
lower cross head toward the upper cross head,  
of yielding support or backing located above  
the upper cross head, substantially as set  
forth.

In testimony whereof we have signed this 10  
specification in the presence of two subscrib-  
ing witnesses.

THOMAS R. MORGAN, SR.  
WILLIAM HENRY MORGAN.

Witnesses:

T. E. DUSSEL,  
A. C. STRONG.