

July 23, 1946.

H. F. STOFFLET

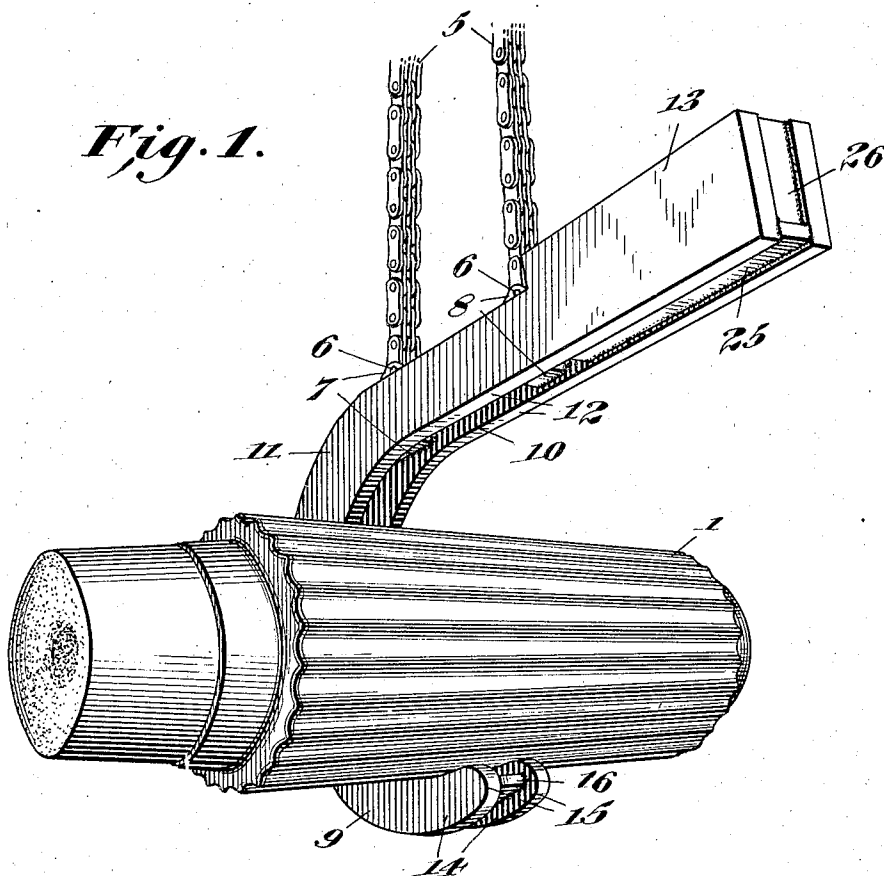
2,404,602

INGOT HOOK

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3 Sheets-Sheet 1

Fig. 1.



Inventor

Harry F. Stofflet.

By *R. S. C. Wougherty*
Attorney

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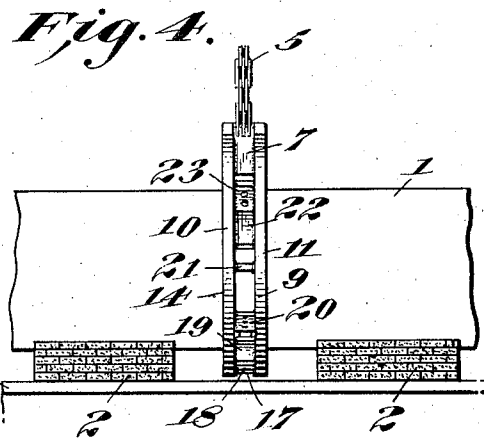
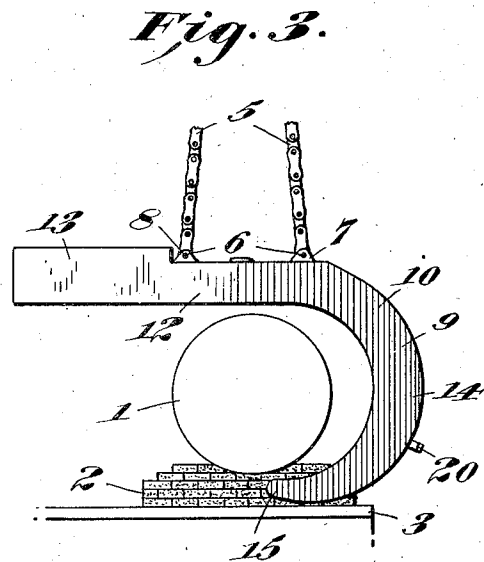
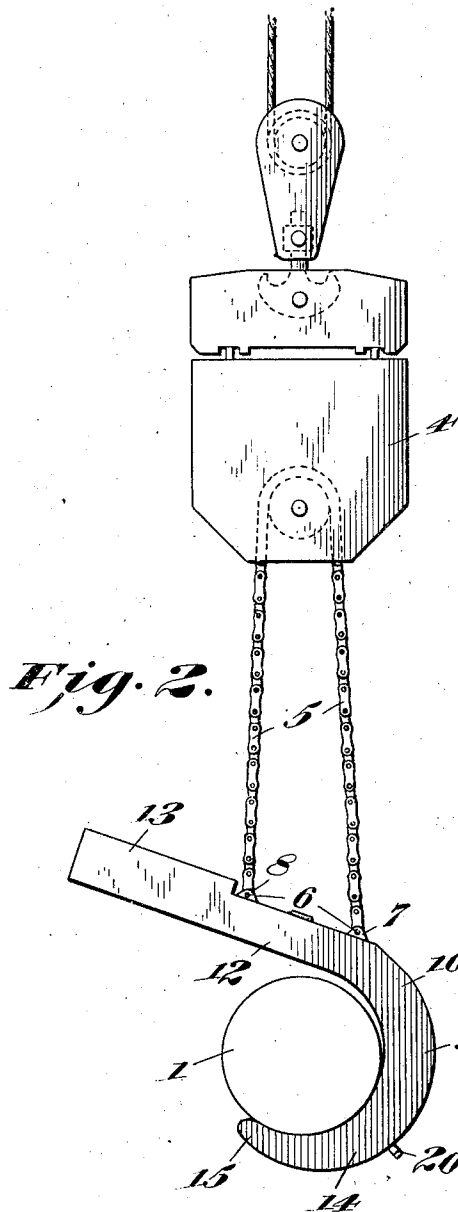
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Inventor

Harry F. Stofflet.

By *R. S. C. Kougherty.*
Attorney

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Fig. 5.

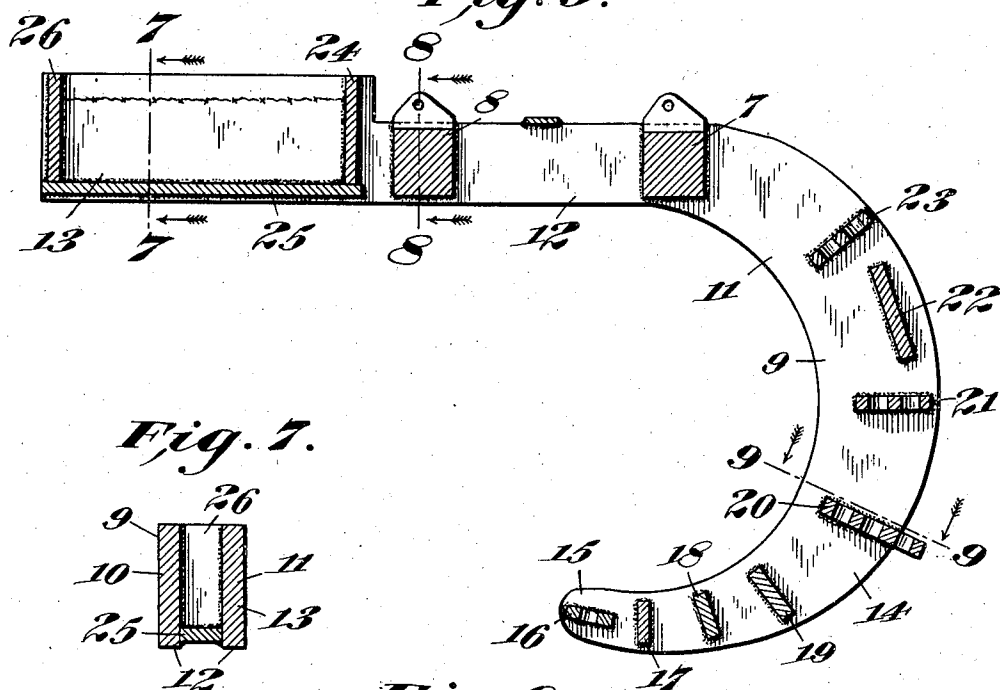


Fig. 7.

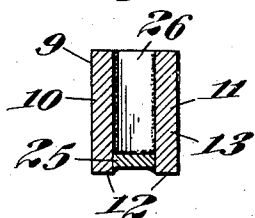


Fig. 6.

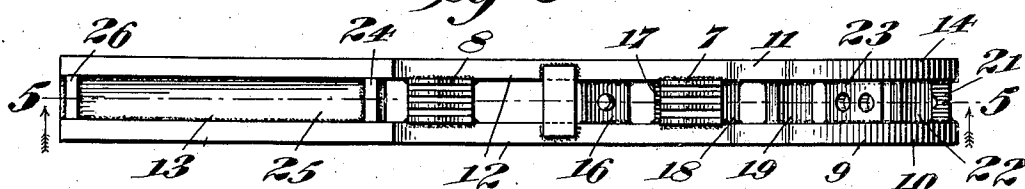


Fig. 8.

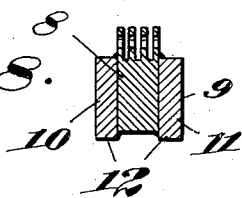
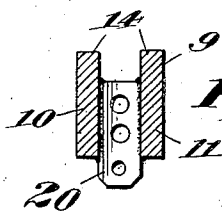


Fig. 9.



Inventor

Harry F. Stofflet.

By *R. S. C. Dougherty.*
Attorney

UNITED STATES PATENT OFFICE

2,404,602

INGOT HOOK

Harry F. Stofflet, Allentown, Pa., assignor to Bethlehem Steel Company, a corporation of Pennsylvania

Application May 29, 1944, Serial No. 537,823

2 Claims. (Cl. 294—67)

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My invention relates in general to apparatus for manipulating large cylindrical bodies, and more particularly to a device for quickly lifting and conveying tremendously heavy metal ingots which have been heated to very high temperatures.

The production of modern heavy ordnance, such as big naval guns and the like, necessitates the handling and forging of steel ingots heated to 2000° F. or more of dimensions which might be considered extraordinary in peacetime. Some of these ingots may be as large as 87 inches in diameter, and may weigh as much as 300,000 pounds.

Such ingots are customarily heated in large carbottom furnaces to proper forging temperature, then while hot chains are attached and the ingot removed by an overhead bridge crane or the like to a hydraulic press for forging.

During the heating operation, the ingot is supported at both ends by brick blocking on the car platform. To attach the crane chains the ingot must be swung around to enable the chains to pass the first block on the car, inevitably damaging the brick work and eventually the car itself, and requiring the setting up of outside supports for the swung-out end. This takes a good deal of the time of the floor gang and delays the movement of ingots from the furnace to the press, with much loss of heat resulting.

Tongs with conventional scissors action when tried in place of chains have been found to be of dangerously uncertain grip and to wear out their pins and catch devices too quickly under the strenuous conditions of ordinary operation.

One object of my invention, therefore, is a device for handling quickly and safely any very large object of generally cylindrical shape.

Another object is a device which will lessen the wear and tear on furnace cars in manipulating heavy ingots.

Still another object is a simple sturdy tong with a minimum of parts exposed to breakage or shear under severe operating conditions.

Other objects and purposes of my invention will appear hereinafter in the specification and in the appended claims.

Having thus described the purposes and advantages of my invention, I shall now in order to make the same more clear refer to the annexed three sheets of drawings forming a part of this specification and in which like characters of reference indicate like parts:

Figure 1 is a perspective view of my invention in operative position lifting a fluted round ingot;

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Fig. 2 is a side elevation of my invention in lifting position as employed with a turning rig;

Fig. 3 is a side elevation showing the approach position of my invention;

Fig. 4 is an end elevation of my invention in lifting position;

Fig. 5 is a vertical section taken along the line 5—5 of Fig. 6;

Fig. 6 is a top plan view of the invention;

Fig. 7 is a vertical section taken along the line 7—7 of Fig. 5;

Fig. 8 is a vertical section taken along the line 8—8 of Fig. 5; and

Fig. 9 is a section on the line 9—9 of Fig. 5.

Referring further to the drawings, and particularly to Figs. 1 to 4, inclusive, the numeral 1 indicates the hot ingot, which may be corrugated or fluted as in Fig. 1, or having a smooth cylindrical surface as in Figs. 2 to 4, resting on the brick work 2 on the car platform 3.

Suspended from the crane turning rig or turn-over mechanism 4 of Fig. 2 by the chain or cable 5, pivotally attached by the pins 6 to the spaced slotted lug blocks 7 and 8, is my hook tong 9.

As shown in more detail in Figs. 5 to 9, inclusive, the said hook tong 9 is fabricated of very heavy J-shaped welded steel plates, the pair of spaced parallel side plates 10 and 11 comprising a substantially straight horizontal balance arm portion 12, with a counterweight box 13 at the free end thereof and a dependent curved hook portion 14 terminating in an upturned relatively narrow tapered nose tip 15 which may be covered with Stellite or the like to increase its resistance to extremes of weight and temperature. The side plates 10 and 11 are held in properly spaced welded relation by the lug blocks 7 and 8, by the diaphragm plates 16, 17, 18, 19, 20, 21, 22 and 23, the plates 16, 20, 21 and 23 being perforated for cooling, and by the plates 24, 25 and 26 forming the counterweight box 13.

In operation, the counterweight box 13 of the unloaded hook tong 9 is first filled with steel scrap or the like to about the level of the waved line of Fig. 5, or until the balance arm portion 12 stays horizontal without load. On account of the restricted height of the brick blocking 2, the hook tong 9 has to approach the ingot 1 in this horizontal position, which it takes automatically through its dead weight. The tapered nose 15 can then easily be moved in from the side, as shown in Fig. 3. As soon as lifting with the crane starts and the live load of the ingot 1 is taken on, the hook tong 9 will turn automatically into the position shown in Fig. 2, due to the combination of the

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centers of gravity of the ingot 1 and the hook tong 9, the turning rig 4 thus acting as a simple pulley, though capable of elevating either end if desired. Throughout this movement the ingot 1 is supported safely against rolling off by the up-turned nose 15.

The hook tong 9 thus handles ingots quickly and efficiently. It is wide enough to permit the balance point to be easily and quickly established, and use on the job has shown that there is no difficulty in catching the ingot under its point of gravity and balancing it lengthwise.

By this means the time required for handling the ingot has been reduced to about one sixth the time formerly taken, the brick blocking on the car has been preserved for reuse, and the expense of frequently replacing worn and broken chains of great size has been eliminated.

Although I have hereinabove described my invention in considerable detail, I do not wish to be limited to the exact and specific details which I have shown and described, but I may use also such substitutions, modifications or equivalents as are embraced within the scope and spirit of the invention or pointed out in the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

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1. A lifting device for handling heavy cylindrical bodies such as large ingots or the like, comprising a hook fabricated of a pair of J-shaped plates held in spaced relation by diaphragm plates welded therebetween, one end of the shank of the hook carrying a counterbalance and the other end curved downward and inward for the load-supporting portion, lug blocks slotted on their upper faces and welded between the side plates in the shank of the hook, an overhead conveying and turning rig having a sheave, a flexible link chain over the sheave, and pivot-pins attaching the link chain to the lug blocks.

2. A hook for carrying heavy ingots or the like, comprising a pair of J-shaped side plate members of substantial width and thickness, a plurality of diaphragm plates welded between said side members and maintaining said side members in parallel spaced relation, the curved end of the hook being turned downwardly and inwardly to form the load-engaging portion, counterweight means on the shank end of the hook, a pair of lug blocks welded between the side members in longitudinally spaced relation intermediate the ends of the hook, and overhead conveying and turning means pivotally attached to said lug blocks.

HARRY F. STOFFLET.