(No Model.) 3 Sheets—Sheet 1.

W. R. HINSDALE.

APPARATUS FOR SEVERING INGOT BARS.

No. 384,847. Patented June 19, 1888.

Fig. 3.

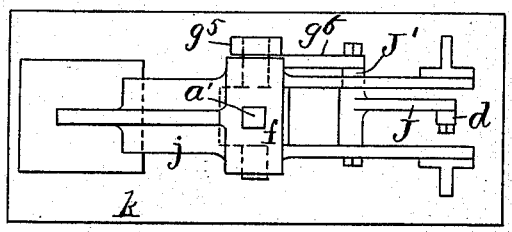

Fig. 1.

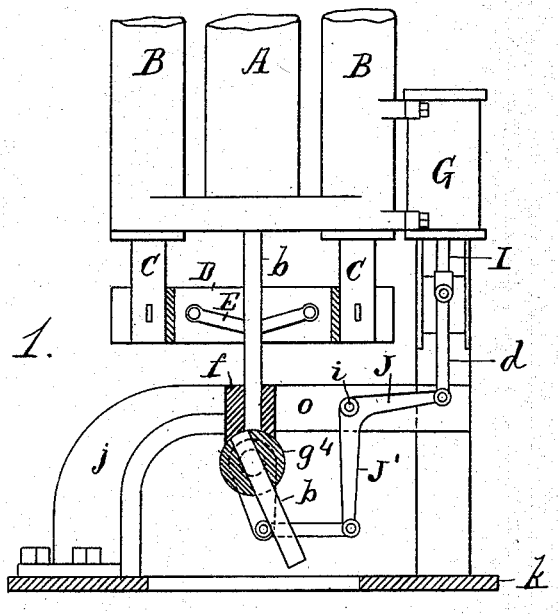

Fig. 2.

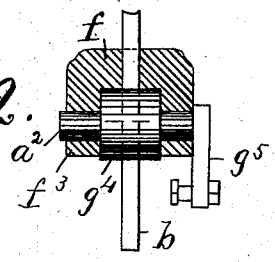

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Fig. 4.

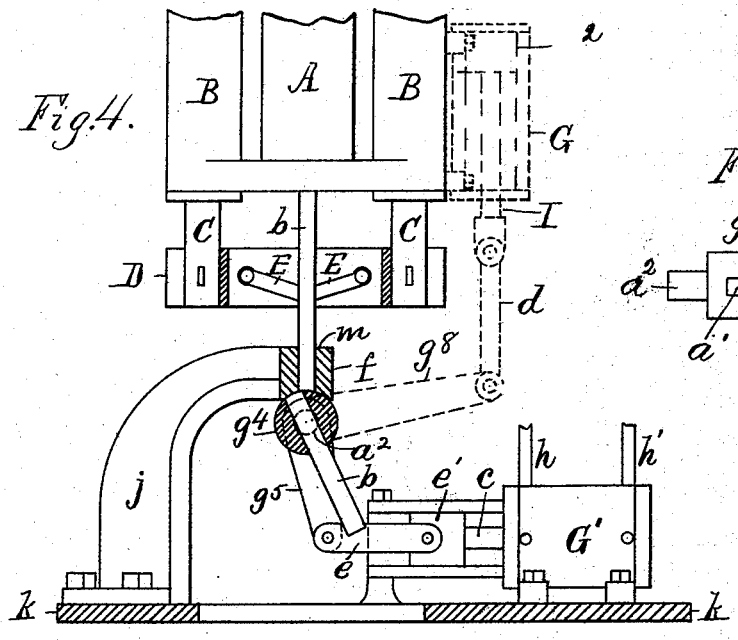


Fig. 5.

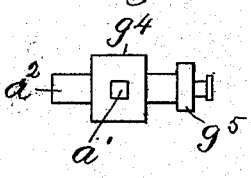
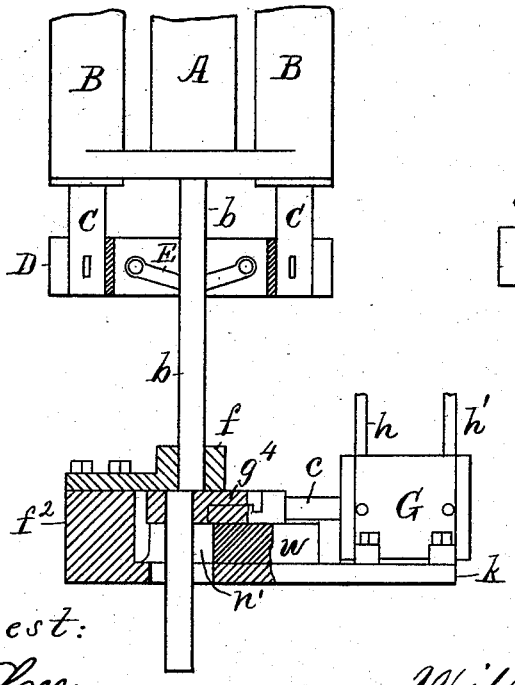


Fig. 6.



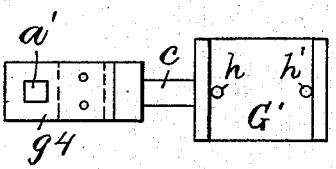


Fig. 7.

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APPARATUS FOR SEVERING INGOT BARS.

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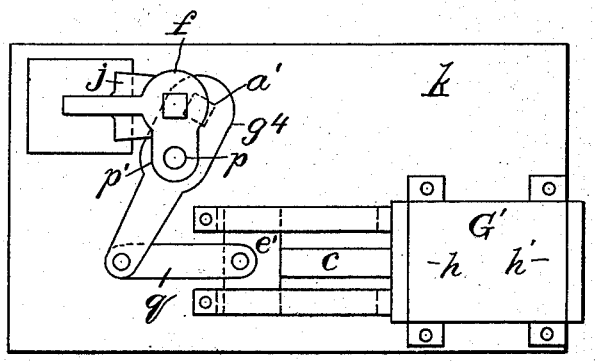
Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM R. HINSDALE, OF HOBOKEN, NEW JERSEY.

APPARATUS FOR SEVERING INGOT-BARS.

SPECIFICATION forming part of Letters Patent No. 384,847, dated June 19, 1888.

Original application filed March 29, 1888, Serial No. 266,460. Divided and this application filed April 2, 1888. Serial No. 269,219.

(No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. HINSDALE, a citizen of the United States, residing at Hoboken, Hudson county, New Jersey, have invented certain new and useful Improvements in Apparatus for Severing Ingot-Bars, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to sever an ingot-bar at a given point when delivered in a partially-cooled condition from an ingot-casting machine without exerting bending-strain upon the bar, which, when the bar is heated, would be exceedingly liable to curve the same; and the invention consists in a means for holding an ingot-bar in two adjacent holders or dies and shifting one of them laterally in relation to the other to rupture the ingot by a species of shearing-strain.

The dies do not require actual cutting-edges, as a rough ingot-bar from three to six inches in diameter would speedily destroy the cutting function of such edges, and the bar when only partially cooled is much more readily severed by permitting the material to slightly tear apart than to cut it by close shearing implements.

The invention may be carried out in various constructions, two of which are shown in the annexed drawings, in which—

Figure 1 is a side elevation, partly in section, where hatched, of the lower end of a casting apparatus and an oscillating die or holder actuated by a vertical cylinder. Fig. 2 is a view of the fixed holder at right angles to that presented in Fig. 1, with the oscillating holder and the ingot-bar in position therein. Fig. 3 is a plan of the severing devices in Fig. 1, with the casting-machine omitted from the view. Fig. 4 is a view similar to that in Fig. 1, with a horizontal cylinder for actuating the oscillating holder. Fig. 5 is a plan of the oscillating holder detached from its bearing. Fig. 6 is a view similar to that in Fig. 4, with the oscillating holder replaced by a transversely-sliding holder connected with the horizontal actuating-cylinder. Fig. 7 is a plan of the cylinder shown in Fig. 6, with the sliding holder, in plan, attached to the piston-rod; and Fig. 8 is an alternative construction for the severing devices.

Figs. 1, 4, and 6 show the lower end of an ingot-casting machine, with its movable cross-head for feeding the ingot-bar downward, such as is shown in my United States Patent application No. 222,371, dated December 23, 1886; but my invention may be applied to any other casting-machine in which the ingot is fed downward in a partially-cooled condition.

In the drawings, A represents the lower end of the ingot-mold in which the ingot-bar *b* is cast; B, the cylinders for actuating the cross-head; C, their piston-rods; D, the cross-head, and E the feeding-pawls, which clamp the ingot-bar when drawing it downward from the cylinder A and automatically release it on their upward movement.

f is a fixed socket or holder through which the ingot-bar is projected to sustain it during the severing operation, the shearing being effected by a movable holder arranged below the fixed holder or socket and operating to shift the movable holder or die laterally in relation to the fixed holder.

In Fig. 1, G is a vertical cylinder, which is arranged parallel with the mold A, and has its piston-rod I connected by a link, *d*, with the arm J of a bell-crank. In this figure the fixed holder *f* is shown mounted upon a bracket or standard, *j*, which would be affixed to any suitable foundation or bed, *k*, below the mold A, and the bell-crank is shown pivoted by a pin, *i*, upon a beam, *o*, projecting from such bracket to confine the strain wholly to the bracket.

The movable holder g^4 is shown mounted upon pivots or trunnions a^2, fitted to ears f^3, fixed upon the holder *f*, and has an aperture formed transverse to the trunnions in line with the socket in the fixed holder, so that when the oscillating holder is properly adjusted the apertures in both holders may correspond. One of the trunnions has an arm, g^5, linked by connection g^6 to the arm J′ of the bell-crank, and the holder may thus be rotated in the ears f^3 when the bell-crank is oscillated. Such oscillation is effected by the reciprocation of the rod I, the cylinder G being supplied through pipes *h* and *h′* with water, steam, compressed

air, or any other suitable agent, governed by suitable valves to produce the movement at the desired time.

The oscillating holder g^4 is shown in Figs. 1 and 2 of cylindrical form, with the aperture a', which admits the ingot-bar transverse to its axis, inclined by the retraction of the piston-rod I, and an ingot, b', ruptured from the ingot-bar b by the partial rotation of the cylindrical holder upon its trunnions.

The lower side of the fixed holder f is shown concaved to fit the cylindrical body of the movable holder g^4; but such concave form is not material to the working of the ring device.

The plan in Fig. 3 shows the arrangement of the beams o supporting the bell-crank, it being understood that the arm J′ is bent sidewise to bring the link g^6 in line with the inside of the arm g^5.

The oscillating holder g^4 is also shown in Fig. 4 with its arm g^5 attached by a link, e, to a cross-head, e'. The cross-head is reciprocated horizontally by the piston-rod I of a horizontal actuating-cylinder, G′. Such horizontal cylinder operates more directly upon the oscillating holder than the vertical cylinder G in Fig. 1, where the latter is connected with the holder by a bell-crank with arms J J′. The vertical cylinder G may, however, be connected directly with a horizontal arm, g^8, attached to a trunnion of the oscillating holder, and such construction is an alternative to that shown in Fig. 1, as indicated in the dotted lines in Fig. 1 and the reference-letters G, I, and d.

The oscillating holder is shown in plan in Fig. 5, the aperture b^2 for the ingot-bar being shown of square form; but sockets of any form may be provided in the holders to fit the shape of the bar.

In Fig. 6 the mold, the feeding cross-head, and the cylinders for actuating the same are shown as in Figs. 1 and 4; but the construction is still more simplified by forming the movable holder as a straight slide reciprocated transversely to the ingot-bar by direct connection with the piston C of the actuating-cylinder G′.

The fixed holder f is shown secured to the bed-plate upon a standard, j, and the reciprocating slide g^4, which is provided with an aperture, a', in its forward end to serve as the movable holder or die, is sustained between the under surface of the holder f and a seat, n, formed upon the bed-plate.

The seat and bed-plate are provided with apertures n' to permit the passage of the ingot through the same and its lateral movement during the severing operation. The holder f is made removable from the stand j, and the movable holder may also be made detachable from the slide a, so that both parts may be readily renewed.

The movable holder g^4 is shown in plan in Fig. 7, attached to the piston-rod and cylinder which serve to reciprocate it, such cylinder being supplied with fluid through pipes h h' to reciprocate its piston as required. The proper adjustment of the movable holder in line with the fixed holder is most conveniently effected by constructing them to line with one another when the piston is in contact with one end of its cylinder, as is indicated by the position of the piston G^2 in Fig. 4.

Fig. 8 shows an alternative construction for the severing-plate when moved upon a pivot instead of longitudinally, the pivot p being fixed vertically upon an ear, p', at one side of the socket in the fixed holder f. The fixed holder is mounted upon a bracket, j, like that shown in Figs. 1 and 3, and the plate is formed as a lever, projected at one end beneath the fixed holder and provided with aperture a' to serve as the movable holder or die, while the other end moves in a horizontal plane and is connected by a link, q, to a cross-head, e', moving in slides s.

The cylinder G is arranged horizontally upon the bed k, and its piston-rod c is connected with the cross-head e', so that the reciprocation of the piston operates to move the lever and to oscillate the movable holder in the desired manner, the holder being shown in the ingot at one extremity of its stroke as it would appear after severing an ingot-bar.

The holders may, if desired, be bushed or lined with a removable sleeve, m, as shown in solid black in the fixed holder f in Fig. 4.

My present invention is particularly applicable to the severing of ingot-bars, which are formed with a cold-shut at regular intervals to facilitate their rupture, the feeding devices being operated to bring such cold-shut in the joint between the fixed and movable holders, so that the lateral shifting of the ingot may serve to easily rupture the same from the ingot-bar.

It will be noticed that in all the constructions shown for the movable holder g^4 the lower portion of the ingot-bar is shifted bodily in a direction transverse to its length at the junction of the fixed and movable holders and is not ruptured by lateral strain applied to its free end, nor is it subjected to any bending-strain adapted to curve or distort the bar in the severing operation.

I have termed my invention "a device for severing ingot-bars;" but it is understood that the dies or holders are not provided with actual cutting-edges, but are intended to rupture the bar by pushing one portion of it transversely to the other without attempting to make a clean cut.

My present application is a division of patent application No. 266,460, filed March 7, 1888, in which the principal subject-matter is the combination, with a vertical mold and a vertical cylinder sustained adjacent to the same, of a fixed socket beneath the mold to sustain the ingot-bar during the breaking operation, and a bell-crank with a vertical arm connected to such ingot-bar below the fixed socket, and having a horizontal arm connected with the piston of the vertical cylinder. In

such prior application I have shown a variety of means for bending the ingot-bar by a connection through a bell-crank with a piston-rod of the vertical cylinder, but have limited my present invention to means by which a portion of the ingot-bar is shifted transversely to the bar to rupture the same exactly at a given point.

Having thus set forth my invention, what I claim herein is--

1. In an apparatus for severing ingot-bars, the combination, with an ingot-casting machine, of a fixed holder in line with the casting-mold, and a movable holder having an aperture fitted to the ingot-bar and arranged and operated to shift the lower portion of the ingot-bar transversely at the junction of the two holders, substantially as set forth.

2. In an apparatus for severing ingot-bars, the combination, with an ingot-casting machine, of a fixed holder in line with the casting-mold, and a movable holder having an aperture fitted to the ingot-bar and connected with the piston-rod of a horizontal cylinder arranged and operated to shift the lower portion of the ingot-bar transversely at the junction of the two holders, substantially as set forth.

3. In an apparatus for severing ingot-bars, the combination, with an ingot-casting machine, of a fixed holder in line with the casting-mold, an oscillating holder having its axis transverse to the ingot-bar and provided with an aperture fitted to the ingot-bar, trunnions upon such holder, supports for the same, and an arm connected with the piston-rod of a horizontal cylinder arranged and operated to oscillate such holder upon its trunnions, as and for the purpose set forth.

4. In an apparatus for severing ingot-bars, the combination, with an ingot-casting machine, of a bed-plate arranged beneath the same, a fixed holder attached thereto, a movable holder arranged between the fixed holder and the bed-plate in contact with the fixed holder, and a horizontal cylinder attached to the bed-plate, and the piston-rod of the cylinder connected with the movable holder, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM R. HINSDALE.

Witnesses:
THOS. S. CRANE,
L. LEE.