No. 672,198. Patented Apr. 16, 1901.

S. S. WALES.

INGOT STRIPPER.

(Application filed Dec. 27, 1900.)

(No Model.) 2 Sheets—Sheet 1.

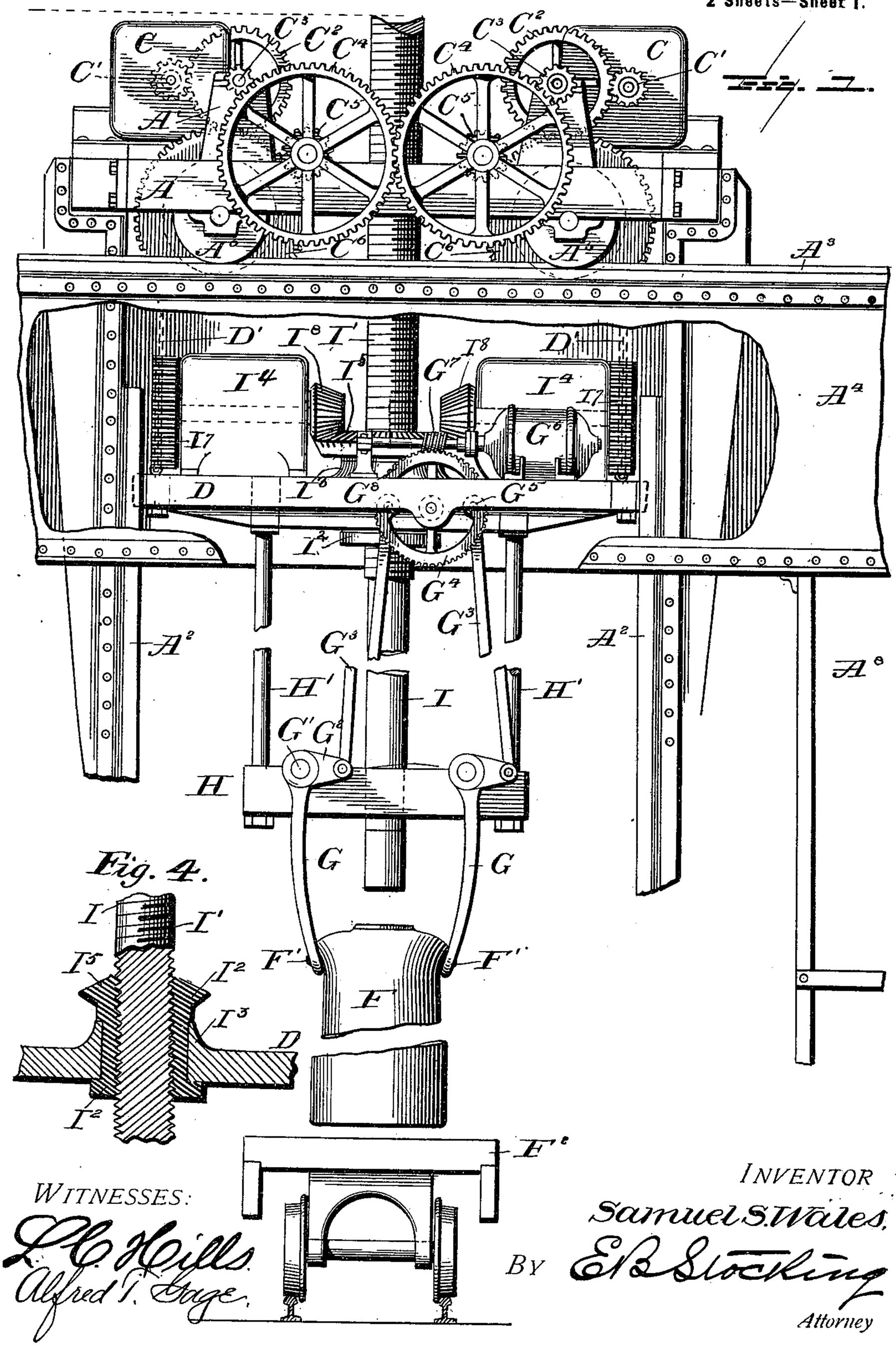

Fig. 4.

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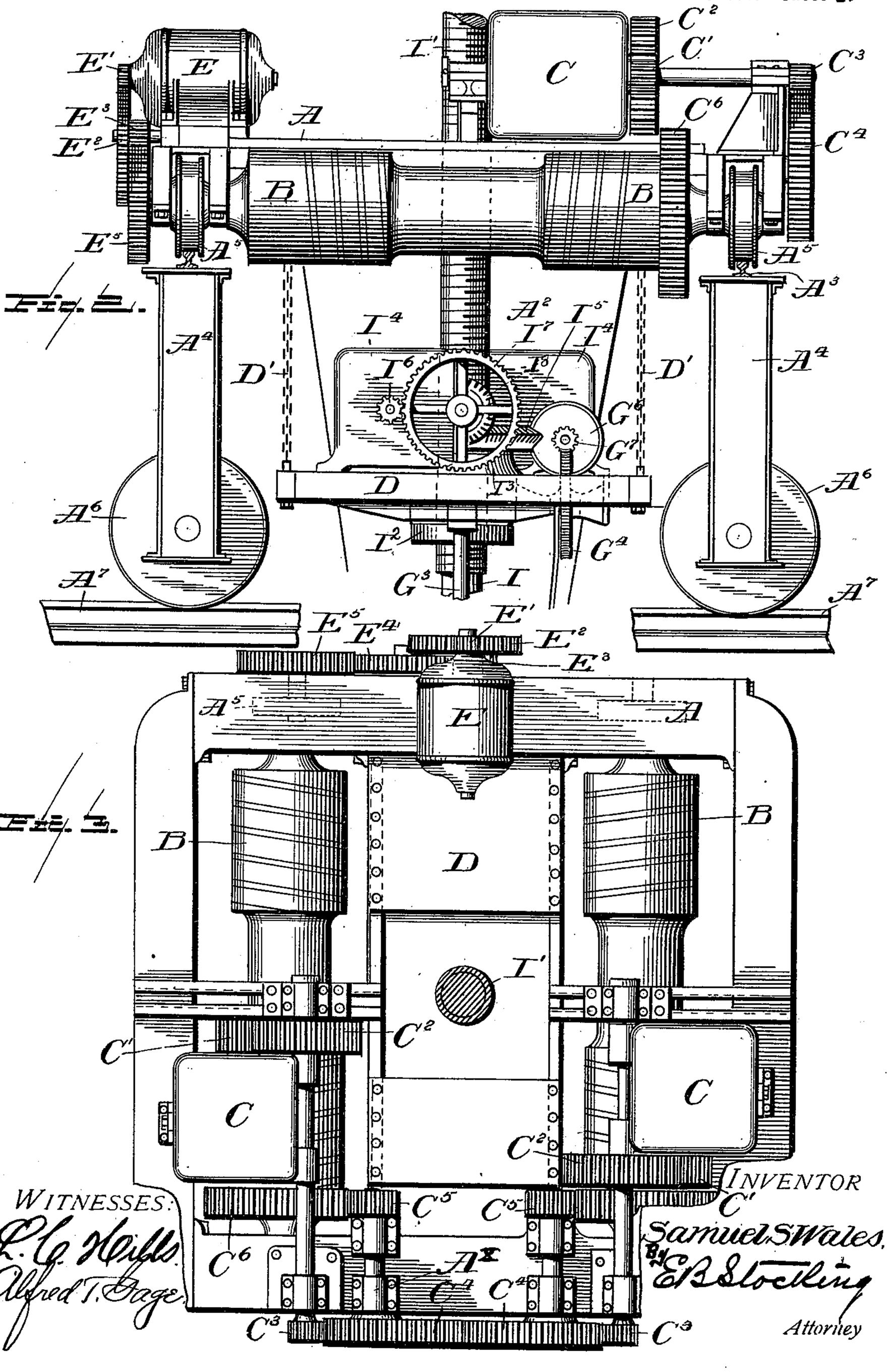
Fig. 2.



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UNITED STATES PATENT OFFICE.

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INGOT-STRIPPER.

SPECIFICATION forming part of Letters Patent No. 672,198, dated April 16, 1901.

Application filed December 27, 1900. Serial No. 41,284. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL S. WALES, a citizen of the United States, residing at Munhall, in the county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Ingot-Strippers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to ingot-strippers, and particularly to the class wherein the mold and ingot are elevated from a support and the ingot removed from the mold by a moving member or ram.

The invention has for one object to provide a structure by which the mold may be grasped and elevated and the descending ram enter the mold for the purpose of ejecting the ingot, all of said functions being performed by independent electric or similar motors.

A further object of the invention is to provide an improved construction of operating means for actuating the descending ram independently of the movement of its carrying-carriage and also of independent mechanism for actuating the stirrups for grasping the mold.

A further object of the invention is to so construct the several operating parts that they are adapted for operation by means of electric motors, which can be conveniently carried upon the moving members of a crane or hoisting device without affecting the operation of the several parts.

Other objects and advantages of the invention will hereinafter appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side view of the invention with parts broken away. Fig. 2 is an end view of the hoisting apparatus and operating mechanism for the crane. Fig. 3 is a plan of the same, and Fig. 4 is a detail vertical section through the threaded ram and sleeve.

Like letters of reference indicate like parts throughout the several figures of the drawings.

The letter A designates the framework of a crane or other suitable support, which may be either movable or stationary and is adapted to carry hoisting mechanism for the parts suspended from the same. As illustrating a desirable form of said hoisting mechanism I have shown winding-drums B, supported within the framework A and adapted to be driven by any suitable form of motor—for instance, an electric motor C. This motor is provided with a pinion C' upon its driving-shaft, meshing with a gear C^2, suitably supported upon a bearing A' on the frame A, and the shaft of the gear C^2 is provided with a pinion C^3, meshing with an enlarged gear C^4. This gear C^4 is journaled in bearings $A^\times$ upon the frame, and its shaft is provided at the opposite end with a pinion C^5, meshing with a gear C^6, carried upon one end of the hoisting-drum B. Two of these drums are usually arranged within the frame A and parallel to each other, each driven by an independent motor with a similar set of gearing to that just described; but each of the pinions C^4 may intermesh to equalize the speed and movement of the opposite winding-drums.

In the form of the invention illustrated the hoisting mechanism just described is connected with a platform or support D by means of chains or other suitable flexible connections D', extending from the platform to the winding-drum, thus adapting the several parts carried by the platform to be elevated and depressed in a vertical plane, while such movement will be guided by means of depending ways A^2, carried by the frame A of the crane or other suitable supporting device.

While it is obvious that the mechanism of my invention may be supported in any suitable manner, still I have illustrated the support A in the present case as being movably mounted upon tracks A^3, carried by beams or girders A^4. The frame A is provided with suitable traction-wheels A^5 and is adapted to be driven upon said tracks by means of any suitable motor—for instance, an electric motor E. A shaft of this motor is provided with a pinion E', meshing with a gear E^2, which in turn drives the pinion E^3 upon its shaft. From this pinion the gear E^4 is driven, which meshes with a pinion-wheel E^5 upon the axle

of one of the driving-wheels A^5, thus providing means for moving the hoisting apparatus in place upon the tracks A^3. The girders or beams A^4 upon which the parts just described are mounted constitute the supporting members of any suitable form of traveling crane which may be provided with traction-wheels, A^6, bearing upon suitable rails or supports A^7, by means of which the entire crane may be removed from point to point and the hoisting apparatus shifted transversely to the movement of the crane. The girders or beams A^4 of the crane are also provided with a suitable depending cage A^8, adapted to be occupied by the person operating the stripper and provided with proper electric or other connections for controlling the movements of the several motors comprising the operative elements of the invention.

The hoisting mechanism hereinbefore described is adapted for the purpose of elevating the mold, with the ingot therein, through the medium of the sliding platform D, which carries thereon mechanism for engaging the mold and an independent mechanism for ejecting the ingot from the mold. The mechanism for engaging the mold F, which may be of any desired configuration, consists of stirrups or arms G, adapted to engage beneath suitable projections F′ upon the mold F, and are pivoted upon a frame H, supported by depending rods H′ from the sliding platform D. At one side of the pivots G′ of each of these stirrups is a lever-arm G^2, connected by means of a link G^3 with a rotatable disk G^4 by means of pivots G^5, whereby the rotation of the disk shifts the links G^3 in opposite directions—for instance, one downward and the other upward, as in the present illustration. The disk G^4 may be rotated by any suitable means—for instance, an electric motor G^6, carrying upon its shaft a worm-gear G^7, adapted to mesh with peripheral teeth G^8, carried by the disk, whereby a rotation of the motor-shaft and worm G^7 in either direction will properly rotate the disk to bring the stirrups into contact with a mold or disengage the same therefrom. By this means the mold is engaged, and the hoisting apparatus elevates the same any suitable distance above the support upon which the mold is carried—for instance, a carrier-car F^2 of any suitable construction. While the mold is thus held in an elevated position or during its elevation the ingot is ejected therefrom by a suitable ram or plunger—for instance, as shown at I—which is provided at its upper portion with a screw-thread I′ and passes through a threaded sleeve or nut I^2, supported upon the platform D and within a collar I^3, which when rotated feeds the ram therethrough. In order to provide suitable power for ejecting the ingot, a motor, such as I^4, has been provided and transmits power to a beveled gear I^5, upon the threaded nut I^2, through the medium of a pinion I^6, upon the shaft of the motor engaging a gear I^7, carrying at its inner end a beveled pinion I^8, in engagement with the gear I^5 of the threaded nut. By this means the power is geared to the proper speed for operating the ram, and, if found desirable, two motors may be located on opposite sides of the platform D in order to equalize the weight thereof and the strain upon the threaded nut I^5 in ejecting the ingot from the mold.

The operation of the several parts of the invention will be apparent from the foregoing description of their construction and relation, but for the purpose of illustration the operation of stripping the ingot from its mold will be recited. The mold containing the ingot to be stripped is carried upon a suitable carrier and is there engaged by the stirrups which coöperate with the lugs upon the mold, which is lifted a short distance above its support when the ram is actuated by a suitable motor and forced downward upon the top of the ingot, thus ejecting it from the mold. At this time the whole stripping apparatus carried by the platform is raised, thus clearing the mold from the ingot, and the ram is also elevated to clear the mold, after which the empty mold may be transferred by means of a crane to another suitable carrier or support. When the mold reaches this support, the stirrups are opened by means of the independent motor therefor, thus releasing the mold from the stripping apparatus. It will be apparent that all of these operations may be controlled by an operator occupying the cage, and while the use of electric motors for the several different parts has been found most advantageous still it is obvious that any other form of suitable motor might be applied to transmit power to the operative parts of the invention. The structure hereinbefore set forth permits a very delicate timing of the several operations and the application of the power in the most economical and accurate manner to effect the several operations. The structure also obviates the use of the piston and cylinder commonly employed in this art for actuating the ram and other parts, which former construction rendered the apparatus unwieldy and prevented the exact timing of the parts as well as their accurate operation.

It will be obvious that changes may be made in the details of construction and configuration of the several parts of the apparatus without departing from the spirit of the invention as defined by the appended claims.

Having described my invention, what I claim is—

1. In an ingot-stripper, the combination with means for supporting a mold, of a ram adapted to enter said mold and having an exteriorly-threaded portion, a platform through which said ram reciprocates, and rotatable means carried by said platform to engage the threaded portion of said ram for reciprocating the same; substantially as specified.

2. In an ingot-stripper, the combination with means for supporting a mold, of a ram

adapted to enter said mold and having an exteriorly-threaded portion, a platform through which said ram reciprocates, a threaded sleeve carried by the platform and engaging the threaded portion of said ram, and a motor adapted to rotate said sleeve to reciprocate said ram; substantially as specified.

3. In an ingot-stripper, a vertically-movable platform, a ram carried by said platform, means for feeding said ram, pivoted stirrups supported from said platform and adapted to engage a mold, and an independent motor carried by said platform for operating said stirrups; substantially as specified.

4. In an ingot-stripper, a vertically-movable platform, a ram carried by said platform, means for feeding said ram, pivoted stirrups supported from said platform and adapted to engage a mold, a disk supported by said platform and connected by links with said stirrups, and a motor for rotating said disk; substantially as specified.

5. In an ingot-stripper, a vertically-movable platform, a ram carried by said platform, means for feeding said ram, pivoted stirrups supported from said platform and adapted to engage a mold, a disk having peripheral teeth and pivotally mounted upon said platform, links extending from opposite sides of said disk and connected to said stirrups to oscillate the same, and a positively-driven gear engaging the peripheral teeth upon said disk; substantially as specified.

6. In an ingot-stripper, the combination with a carrier and ways therefor, of a hoisting-drum mounted upon said carrier, a motor upon the carrier adapted to drive said drum, a vertically-sliding platform suspended from said drum, a ram carried by said platform, means for reciprocating said ram, stirrups supported from said platform, and means for engaging and disengaging said stirrups from a mold; substantially as specified.

7. In an ingot-stripper, the combination with a carrier and ways therefor, of a hoisting-drum mounted upon said carrier, a motor upon the carrier adapted to drive said drum, a vertically-sliding platform suspended from said drum, a ram carried by said platform, means for reciprocating said ram, stirrups supported from said platform, means for engaging and disengaging said stirrups from a mold, and a motor carried by said carrier and adapted to propel the same upon its ways; substantially as specified.

8. In an ingot-stripper, the combination with a carrier and ways therefor, of a hoisting-drum mounted upon said carrier, a rotary motor upon the carrier adapted to drive said drum, a vertically-sliding platform suspended from said drum, a ram carried by said platform, means for reciprocating said ram, stirrups supported from said platform, means for engaging and disengaging said stirrups from a mold, and a rotary motor carried by said carrier and adapted to propel the same upon its ways; substantially as specified.

9. In an ingot-stripper, the combination with means for supporting a mold, of a ram adapted to enter said mold and having an exteriorly-threaded portion, a platform through which said ram reciprocates, an interiorly-threaded sleeve rotatably mounted upon said platform and provided with a gear upon one of its peripheries, and a rotary motor having a pinion adapted to engage and drive the gear upon said sleeve; substantially as specified.

10. In an ingot-stripper, the combination with a vertically-sliding platform, means for operating the same, of an interiorly-threaded sleeve mounted in said platform and provided with a gear at one of its peripheries, a threaded ram passing through said sleeve, a rotary motor having a pinion adapted to engage and drive the gear upon said sleeve, a support depending from said platform, pivoted stirrups upon said support and having crank-arms, a disk carried by the platform and provided with peripheral teeth, links extending from opposite sides of said disk and pivoted to said crank-arms, and a gear upon the shaft of the rotary motor adapted to engage the peripheral teeth of said disk; substantially as specified.

11. In an ingot-stripper, the combination with a vertically-sliding platform, means for operating the same, of an interiorly-threaded sleeve mounted in said platform and provided with a gear at one of its peripheries, a threaded ram passing through said sleeve, a rotary motor having a pinion adapted to engage and drive the gear upon said sleeve, a support depending from said platform, pivoted stirrups upon said support and having crank-arms, a disk carried by the platform and provided with peripheral teeth, links extending from opposite sides of said disk and pivoted to said crank-arms, a gear upon the shaft of the rotary motor adapted to engage the peripheral teeth of said disk; a carrier adapted to move upon ways, a winding-drum and motor therefor supported upon said carrier, and flexible devices extending from said drum and engaging said platform to operate the same; substantially as specified.

12. In an ingot-stripper, the combination with a vertically-moving platform, of a threaded sleeve supported to rotate thereon and having a peripheral gear, a threaded ram extending through said sleeve, independent rotary motors provided with pinions adapted to engage the peripheral gear of said sleeve upon opposite sides of the center thereof, and means for supporting the mold beneath said ram; substantially as specified.

13. In an ingot-stripper, the combination with a carrier and ways therefor, of a winding-drum mounted upon said carrier and provided with a pinion, a motor supported by the carrier, a gear meshing with the pinion upon the shaft of the motor and carrying upon its shaft a pinion, a larger gear meshing with said pinion and carrying upon its shaft a pinion adapted to mesh with the driving-gear upon said winding-drum, a platform support-

ed from said drum, and a stripping mechanism carried by said platform; substantially as specified.

14. In an ingot-stripper, the combination with a movable crane adapted to travel upon ways, of a carrier supported upon the transverse beams of said crane, depending guides from said carrier, a vertically-moving platform engaging said guides, means carried by the carrier for operating said platform, a ram supported upon said platform, and means carried by the platform for engaging a mold; substantially as specified.

15. In an ingot-stripper, the combination with a movable crane adapted to travel upon ways, of a carrier supported upon the transverse beams of said crane, depending guides from said carrier, a vertically-moving platform engaging said guides, means carried by the carrier for operating said platform, a ram supported upon said platform, means carried by the platform for engaging a mold, a motor carried by the carrier for actuating the same, a motor carried by said platform for driving said ram, and an independent motor upon the platform for actuating the mold-engaging means; substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL S. WALES.

Witnesses:
FREDRICK W. METZ,
CHARLES PROUDFOOT.