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J. I. BLOUNT.

INGOT STRIPPER.

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Fig. 1.

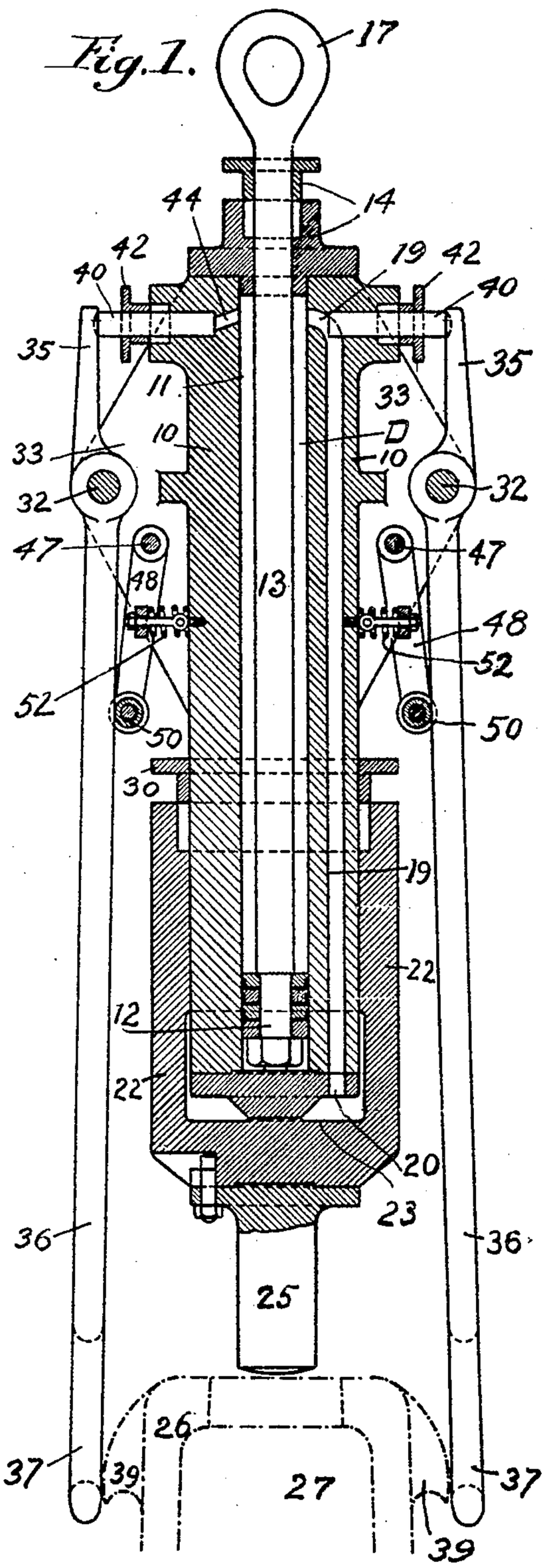
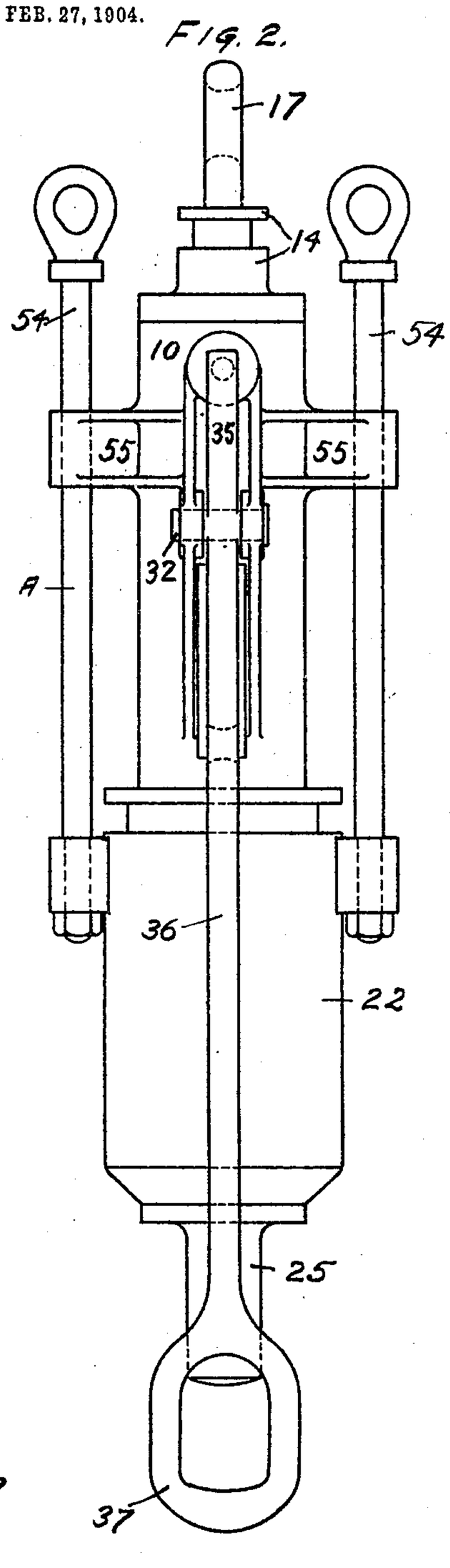


Fig. 2.



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INGOT-STRIPPER.

No. 800,712. Specification of Letters Patent. Patented Oct. 3, 1905.

Application filed February 27, 1904. Serial No. 195,571.

To all whom it may concern:

Be it known that I, JOHN I. BLOUNT, a citizen of the United States, residing at Donora, in the county of Washington, and in the State of Pennsylvania, have invented a new and useful Ingot-Stripper, of which the following is a specification.

My invention relates to ingot-strippers or devices adapted to strip a cast ingot of iron or steel out of the mold in which it is cast, and particularly to devices of this class operated by hydraulic power.

The object of my invention is to provide a mechanism which shall be neat, compact, and self-contained in form, in which the operation of stripping the ingot from the mold operates to automatically lock the mold in the device, the whole being performed by the shifting in position of a constant quantity of pressure-exerting fluid without any additions from external sources.

It consists in such a mechanism which can be easily and cheaply constructed, is efficient in operation, compact, neat in form, and not readily liable to get out of order, and particularly in the use of auxiliary plungers connected with the main stripping-cylinder adapted under the pressure of the fluid in the cylinder to lock the gripping devices upon the mold.

It further consists in details of construction, which will be hereinafter more fully described and claimed as the specification proceeds.

Figure 1 is a detail sectional front elevation of mechanism illustrating my invention in its preferred form. Fig. 2 is a side view of the same.

Again referring to the drawings, numeral 10 indicates the walls of an ordinary cylinder made of any suitable metal, having within it a cylindrical chamber 11. Slidably mounted in this cylindrical chamber 11 is a piston 12, mounted upon a piston-rod 13, adapted to move up and down through stuffing-box packing 14, which closes the end of the cylinder in the ordinary manner. On the upper end of this piston-rod 13 is a loop or hook 17, adapted to be engaged by the main lifting-hook of a traveling crane. Entering the upper end of the cylindrical chamber 11 is a port or passage 19, which extends, as shown, within the body of the cylinder 10 down to the lower end of the cylinder, where in the absence of other parts it would open at 20 into the outer air. It will readily be seen that if the source of water-pressure be attached to the opening 20 water will pass through the passage 19 into the chamber 11 and force the piston 12 downward in the cylinder, and that if an upward pull be exerted upon the loop 17 and the piston 12 moved upward in the cylinder the fluid in the chamber 11 will be forced out through the passage 19 and orifice 20. Mounted upon the lower end of this cylinder, in the particular form here shown as an inclosing cylinder 22, is an external piston-head 23, of larger diameter than the piston 12, heretofore described, and upon the lower end of this external piston 23 is a ram 25, adapted to pass through the opening in the top of the ingot-mold 26 and engage the ingot 27, thereby stripping it downward through the mold if the mold 26 is held in stationary position. The inclosing cylinder 22 has a water-tight slidable connection with the outside of the cylinder 10 and is rendered still more tight by the packing-ring 30. As the area of the piston 12 is much smaller than the external piston-head 23, it will readily be seen that under the well-known physical principles relating to the transmission of power a long movement of the small piston 12 in the cylinder 10 will cause a great pressure upon the inside of the second or exterior piston 23 and move it only a short distance with such great power, whereby a small pressure exerted upon the hook 17 will be transmitted into a large pressure at the ram 25 for the purpose of starting the ingot within its mold.

In order to grip the ingot-mold 26 in my mechanism for the purpose of stripping and also for lifting it off the ingot, I provide novel mechanism, which will now be described.

Pivoted upon opposite sides of the mold 10 at 32 upon plates 33, extending from the sides of the cylinder, are levers composed of short arms 35, extending upward, and long arms 36, extending downward. In the lower ends of these arms 36 are loops 37, adapted to fit over lugs 39 upon the side of the ingot, from which it will be seen that when these loops 37 are over the lugs 39 the ingot-mold will be held in position below the cylinder for, first, the stripping of the ingot, and, second, the lifting and carrying the mold. In order to hold these lever-arms 36 in position in contact with the ingot-mold, I insert in the up-

per end of the cylinder 10 at approximately right angles to the piston-rod 13 and directly opposite the short arms 35 of the locking-levers auxiliary pistons or plungers 40, adapted to slide backward and forward through the stuffing-boxes 42 in the sides of the cylinder 10. The inner end of the left-hand plunger is connected by a port or passage 44 with the inside of the cylinder, while the inner end of the right-hand plunger 40 enters the passage 19, heretofore described, from which it will be seen that whenever pressure is exerted in the upper end of the cylindrical chamber 10, and consequently in the passage 19, these auxiliary plungers 40 will be moved outward against the short lever-arms 35, and that consequently the long lever-arms 36 will be moved inward toward the ingot-mold, thereby locking the long arms 36 upon the mold. It will further be seen that this locking effect will continue just as long as such internal pressure exists in the upper portion of cylindrical chamber 11. In order to move the lever-arms 36 in the opposite direction, I pivot at 47 upon the plates 33, heretofore referred to, short levers 48, having at their lower ends rollers 50 engaging the insides of the lever-arms 36. These levers 48 are normally forced outward by coiled springs 52, engaging both the levers 48 and the cylinder 10, so that when there is no pressure exerted within the cylindrical chamber 11, as heretofore described, to move the levers 36 inward toward the ingot-mold the springs 52 will move them outward away from the mold and hold them there or in the position shown in Fig. 1.

The inclosing cylinder 22 is rigidly secured to rods 54, which are adapted to slide up and down in the guides 55, extending from the side of cylinder 10.

In the operation of my device the cylindrical chamber 11 is filled with oil, water, or some other suitable material and the various stuffing-box packing devices closed, as shown. The mechanism is now self-contained and has no valves or pipe connection with any source of fluid-supply. The device is now hung upon one set of hooks of a crane by means of the rods 54 and transported to the place where it is desired to be operated, the springs 52 holding the levers 36 outward in the manner heretofore described and the weight of the cylinder 10 and piston-rod 13 causing all the parts to assume the position of Fig. 1. The crane carrying the device by the rods 54 is lowered until the loops 37 are below lugs 39 of the ingot to be stripped. The operator now sets in motion the central hook of the crane, which is attached to the loop 17, releasing entirely, if desired, the strain on hooks 54. This operation moves the piston 12 upward in the chamber 11, thereby exerting internal pressure in the chamber 11 and the passages 44 and 19, thereby forces the plungers 40 outward against the short levers 35 and moving the long levers 36 inward upon the lugs 39 of the ingot-mold, where they remain during the stripping operation. A further pulling upon the hook at loop 17 moves the piston 12 farther upward in the chamber 11, thereby, in the manner heretofore described, moving the second piston 23 downward with reference to the ingot-mold 26 and stripping the ingot from the mold. The crane continues to lift on the loop 17, thereby lifting the mold off the ingot. This mold is now carried to a desired point and set down by the crane in the usual manner. As soon as this occurs the operator begins to lift upon the rods 54, thereby releasing the pressure inside the cylinder, and when this pressure is sufficiently released the springs 52 cause the long lever-arms 36 to move outward to position of Fig. 1 and the ingot-mold is released. As the mechanism is air-tight and there is only a given amount of fluid within the device, a further lifting on the loops 54 causes an upward pressure in the pipe 19, which in turn moves the piston 12 downward in cylinder 10 and the parts to all return to the position shown in Fig. 1.

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

1. In mechanism of the class described, the combination of a cylinder, a piston adapted to be moved backward and forward with reference to said cylinder, and a larger piston also adapted to be moved backward and forward with reference to said cylinder, the two pistons communicating power from one to the other through a constant-quantity body of liquid, within the cylinder.

2. In mechanism of the class described, the combination of a large piston, a small piston and a cylinder with reference to which both pistons are adapted to be moved backward and forward, there being recesses and passageways, so located within the cylinder that a constant-quantity body of liquid within the cylinder bears simultaneously on the same side of each piston with reference to one end of the cylinder.

3. In mechanism of the class described the combination of a large piston, a small piston and a cylinder with reference to which both pistons are adapted to be moved backward and forward, there being recesses and passages, so located within the cylinder that a constant-quantity body of liquid within the cylinder bears simultaneously on one side of each piston.

4. In mechanism of the class described the combination of a large piston, a small piston, a cylinder with reference to which both pistons are adapted to be moved backward and forward, there being recesses or passages so located within the cylinder that a constant-quantity body of liquid within the cylinder bears simultaneously on one side of each piston, a lever pivotally mounted adjacent to the

outside of the cylinder and a supplemental plunger or piston mounted in the cylinder adapted to be moved by said fluid within the cylinder to operate said lever.

5. In mechanism of the class described, the combination of a large piston, a small piston, a cylinder with reference to which both pistons are adapted to be moved backward and forward, there being recesses or passages so located within the cylinder that a constant-quantity body of liquid within the cylinder bears simultaneously on one side of each piston, a lever pivotally mounted adjacent to the outside of the cylinder, a supplemental plunger or piston mounted in the cylinder adapted to be moved by the fluid within the cylinder to operate said lever, and spring mechanism adapted to tend to move said lever in the opposite direction.

6. In mechanism of the class described the combination of a cylinder, a small piston mounted on a piston-rod adapted to move backward and forward within said cylinder, a larger piston having a portion inclosing the opposite end of said cylinder adapted to be moved backward and forward with reference to said cylinder, there being ports and passage-ways in said cylinder whereby a constant quantity of liquid within the cylinder and said ports and passage-ways is adapted to simultaneously bear upon the upper surface of each of said pistons.

7. In mechanism of the class described the combination of a cylinder, a piston mounted upon its piston-rod adapted to be moved backward and forward within said cylinder, a lever pivoted adjacent to said cylinder and a supplemental piston or plunger mounted in said cylinder having its outer end adapted to bear upon said lever and having its inner end in communication with the fluid within said cylinder, whereby moving said first piston in a direction to compress said liquid within the cylinder forces the supplemental plunger outward to operate said lever.

8. In mechanism of the class described the combination of a cylinder, a piston mounted upon its piston-rod adapted to be moved backward and forward within said cylinder, a lever pivoted adjacent to said cylinder and a supplemental piston or plunger mounted in said cylinder at approximately right angles to the main piston-rod adapted to bear externally upon said lever and having its inner end in communication with fluid within the cylinder whereby moving said first piston in a direction to compress said liquid within the cylinder forces the supplemental plunger outward to operate said lever.

9. In mechanism of the class described the combination of a main cylinder closed at its lower end, a piston adapted to move up and down within said cylinder, a piston-rod on said piston extending outside of said cylinder through suitable packing devices in the upper end of the cylinder adapted to be grasped by one hook of a traveling crane, a supplemental second piston mounted below the main cylinder having a portion making fluid-tight slidable connection with the outside of said cylinder, adapted to engage an ingot, a port or passage-way connecting the upper end of the inside of said cylinder above said first piston with the upper end of said second piston whereby a constant quantity of fluid in said port or passage-way bears simultaneously upon the upper side of each of said pistons, levers pivotally mounted adjacent to the outside of said cylinder having their lower ends adapted to grasp an ingot-mold and supplemental pistons or plungers bearing on the upper ends, said levers and their other ends entering said cylinder and in communication with the fluid within the cylinder, whereby pressure of said fluid within the cylinder moves the supplemental plungers outward to operate the ingot-mold-gripping levers.

10. In mechanism of the class described, the combination of a main cylinder closed at its lower end, a piston adapted to move up and down within said cylinder, a piston-rod on said piston extending outside of said cylinder through suitable packing devices in the upper end of the cylinder adapted to be grasped by one hook of a traveling crane, a supplemental second piston mounted below the main cylinder having a portion making fluid-tight slidable connection with the outside of said cylinder, adapted to engage an ingot, a port or passage-way connecting the upper end of the inside of said cylinder above said first piston with the upper end of said second piston whereby a constant quantity of fluid in said port or passage-way bears simultaneously upon the upper side of each of said pistons, levers pivotally mounted adjacent to the outside of said cylinder having their lower ends adapted to grasp an ingot-mold and supplemental pistons or plungers bearing on the upper ends, said levers and their other ends entering said cylinder and in communication with the fluid within the cylinder, whereby pressure of said fluid within the cylinder moves the supplemental plungers outward to operate the ingot-mold-gripping levers and means for moving said gripping-levers in the opposite direction.

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