(No Model.)

2 Sheets—Sheet 1.

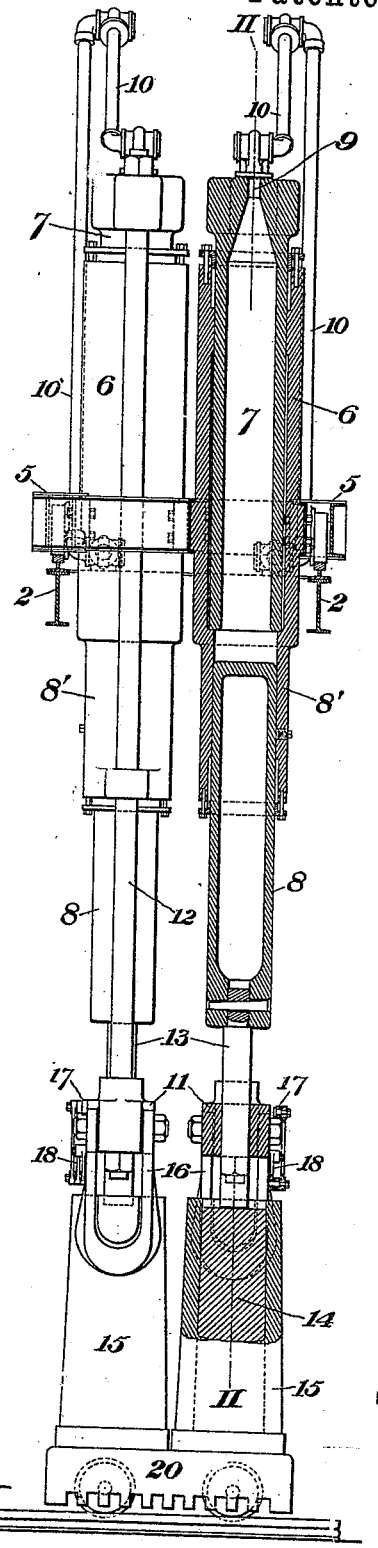
H. AIKEN.

INGOT EXTRACTOR.

No. 526,093.

Patented Sept. 18, 1894.

Fig. 1.



WITNESSES

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(No Model.)

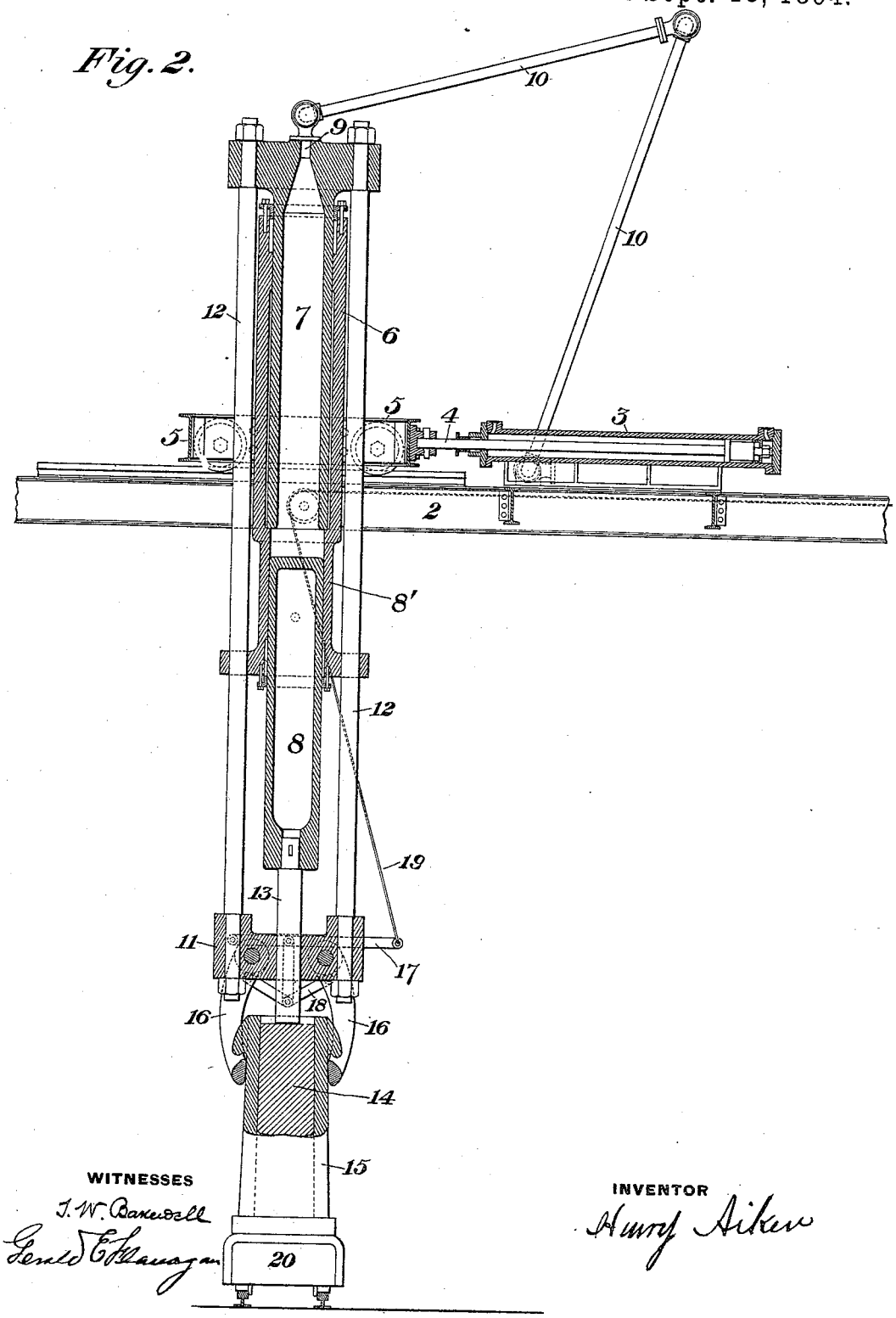
2 Sheets—Sheet 2.

H. AIKEN.

INGOT EXTRACTOR.

No. 526,093. Patented Sept. 18, 1894.

Fig. 2.



WITNESSES

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INVENTOR

Henry Aiken

UNITED STATES PATENT OFFICE.

HENRY AIKEN, OF PITTSBURG, PENNSYLVANIA.

INGOT-EXTRACTOR.

SPECIFICATION forming part of Letters Patent No. 526,093, dated September 18, 1894.

Application filed February 17, 1894. Serial No. 500,481. (No model.)

To all whom it may concern:

Be it known that I, HENRY AIKEN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Ingot-Extractors, of which the following is a full, clear, and exact description.

My invention relates to an improvement in apparatus for extracting ingots, for which I have obtained Letters Patent No. 439,828, dated November 4, 1890. It also in some respects embodies inventions which are described and claimed in an application for Letters Patent, Serial No. 507,548, filed April 14, 1894.

The object of the invention is to provide improved means for extracting ingots from the molds in which they are cast, and it is shown in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved apparatus, showing one-half thereof in vertical central section; and Fig. 2 is a vertical section on the line II—II of Fig. 1.

In the drawings, 2 represents an elevated jib or platform; 3 a horizontal racking-cylinder mounted thereon, and having a plunger 4 connected with a trolley 5, which can be moved back and forth on the jib or elevated support 2 by means of the cylinder. Said trolley carries the upright extracting cylinders of my improved apparatus, of which cylinders there are preferably two, the same being set side by side so as to be capable of extracting simultaneously the ingots from two molds, though this is not essential to my invention, and the apparatus may be single, *i. e.*, arranged to extract only one ingot at a time. Each of the main parts of the apparatus is constructed as follows: The vertical cylinder 6 is set in a box on the trolley, and has two plungers, one of which, 7, extends upwardly from the cylinder, while the other, 8, projects downwardly therefrom, and is set in a more contracted portion 8′ of the cylinder, so that the effective area of the plunger 7 is greater than that of the plunger 8, the difference in area being such that the greater area of the plunger 7 shall be sufficient to lift the mold and the moving parts of the apparatus. The water inlet to the cylinder 6 is through a passage 9 in the plunger 7, which is preferably made hollow for this purpose, the passage being connected by jointed pipes 10 with a source of water-supply, or the water inlet may be attached to any portion of the cylinder 6.

11 is a cross-head below the plunger 8 connected with the head of the plunger 7 by vertical hangers 12.

13 is a projection or post which extends down from the end of the plunger 8 through the head 11, and is adapted to engage the top of an ingot 14 within a mold 15, as shown.

16, 16, are tongs-levers or jaws, which are pivoted to the head 11 and are adapted to engage lugs on the mold for the purpose of lifting the same. These jaws may be operated by levers 17, 18, connected by a cord 19 or other device with the station of the operator.

The operation is as follows:—The molds containing the ingots to be extracted are carried upon a car 20, on which the ignot is cast, and without removing the mold from the car, the car is drawn to the ingot-extracting apparatus, so that the mold shall be directly beneath one of the posts 13, or in case two ingots are to be extracted simultaneously, so that the molds are beneath the two adjacent posts; previously to such time the post having been elevated by admitting water into the hollow plunger 7, the effect of which is to raise the plunger 7, thus lifting the cross-head 11 until it engages the lower end of the plunger 8 and thus lifts said plunger. When the molds are thus in position, the water-supply pipe is connected with the exhaust, and the plunger 8 thus suffered to descend until the end of the post 13 engages the ingot, and the plunger 7 suffered to descend and to lower the cross-head 11 until the jaws 16 come opposite to the lugs on the mold. Then by operation of the lever 17, the jaws are brought together so as to engage the lugs, as shown in Fig. 2. If now water be admitted into the hollow plunger 7, so as to act in opposite directions upon the plungers 7 and 8, the larger area of the upper plunger 7 will cause it to be forced upwardly within the cylinder 6 and to lift with it the mold 15, the ingot being held from rising by reason of the bearing of the post 13. When the plunger 7 has risen sufficiently high to bring the cross-head 11 into contact with the end of the

plunger 8, the further elevation of the plunger 7 will lift the plunger 8 with it. The lifting of the mold is thus continued until the mold has been stripped entirely from the ingot which is left standing on the car.

One of the advantages of my improvement is that as both plungers are operated by the same water inlet, the number of valves to be used is lessened, and the operation is simplified. This advantage may be secured even if the cylindrical parts 6 and 8′ be separated from each other by a diaphragm or otherwise made distinct, but each connected with the same water-supply pipe; and within the scope of my invention, unless otherwise stated in individual claims, I desire to cover such modification.

Other advantages of the invention are that the apparatus is cheap, the cylinders are relieved from all strain except those due to the lifting of the load, since the pistons mutually act against each other through the rods 12.

Another important item of the invention which I wish to claim broadly, is the use of two cylinders, one a mold-lifting cylinder, and the other a down-holding cylinder having pistons acting in opposite directions, and the down-holding cylinder being of less area and being adapted to be engaged by elevation of the mold-lifting cylinder and to be raised thereby even while the water pressure is exerted thereon.

Within the scope of my invention, it is possible to reverse the parts by making the moving parts (plungers) of the motors fit around the stationary parts (cylinders) instead of fitting within them as shown in the drawings.

I claim—

1. In ingot-extracting apparatus, a cylinder having two oppositely projecting plungers, one for lifting the mold and the other for holding down the ingot, and a common water inlet between said plungers; substantially as described.

2. In ingot-extracting apparatus, a cylinder having two oppositely projecting plungers, one for lifting the mold and the other for holding down the ingot, and a common water inlet between said plungers, the down-holding plunger being of less cross-sectional area than the lifting-plunger and being adapted to be engaged during the rise of the lifting-plunger and to be raised thereby; substantially as described.

3. In ingot-extracting apparatus, the combination of a mold-lifting plunger and a down-holding plunger, the down-holding plunger being of less area than the lifting-plunger, and having a portion situate in the path of motion of a portion of the lifting plunger whereby it is engaged during the rise of the latter and is lifted thereby; substantially as described.

4. In ingot extracting apparatus, the combination with a lifting plunger having mold-engaging devices, and a down holding plunger acting in an opposite direction thereto, of a single fluid inlet common to both and admitting fluid to actuate the plungers in opposite directions and thereby strip the ingot; substantially as described.

5. In ingot-extracting apparatus, the combination of a lifting-plunger and down-holding plunger acting in opposite directions, and a common fluid supply by which they are actuated, the down-holding plunger being of less area than the other; substantially as described.

6. In ingot-extracting apparatus, the combination of a mold-lifting plunger and a down-holding plunger, both being single acting, the down-holding plunger being of less area than the lifting-plunger, said down-holding portion having a portion situate in the path of motion of a portion of the lifting plunger, whereby it is engaged during the rise of the latter and is lifted thereby; substantially as described.

In testimony whereof I have hereunto set my hand.

HENRY AIKEN.

Witnesses:
W. B. CORWIN,
H. M. CORWIN.