No. 746,244. PATENTED DEC. 8, 1903.

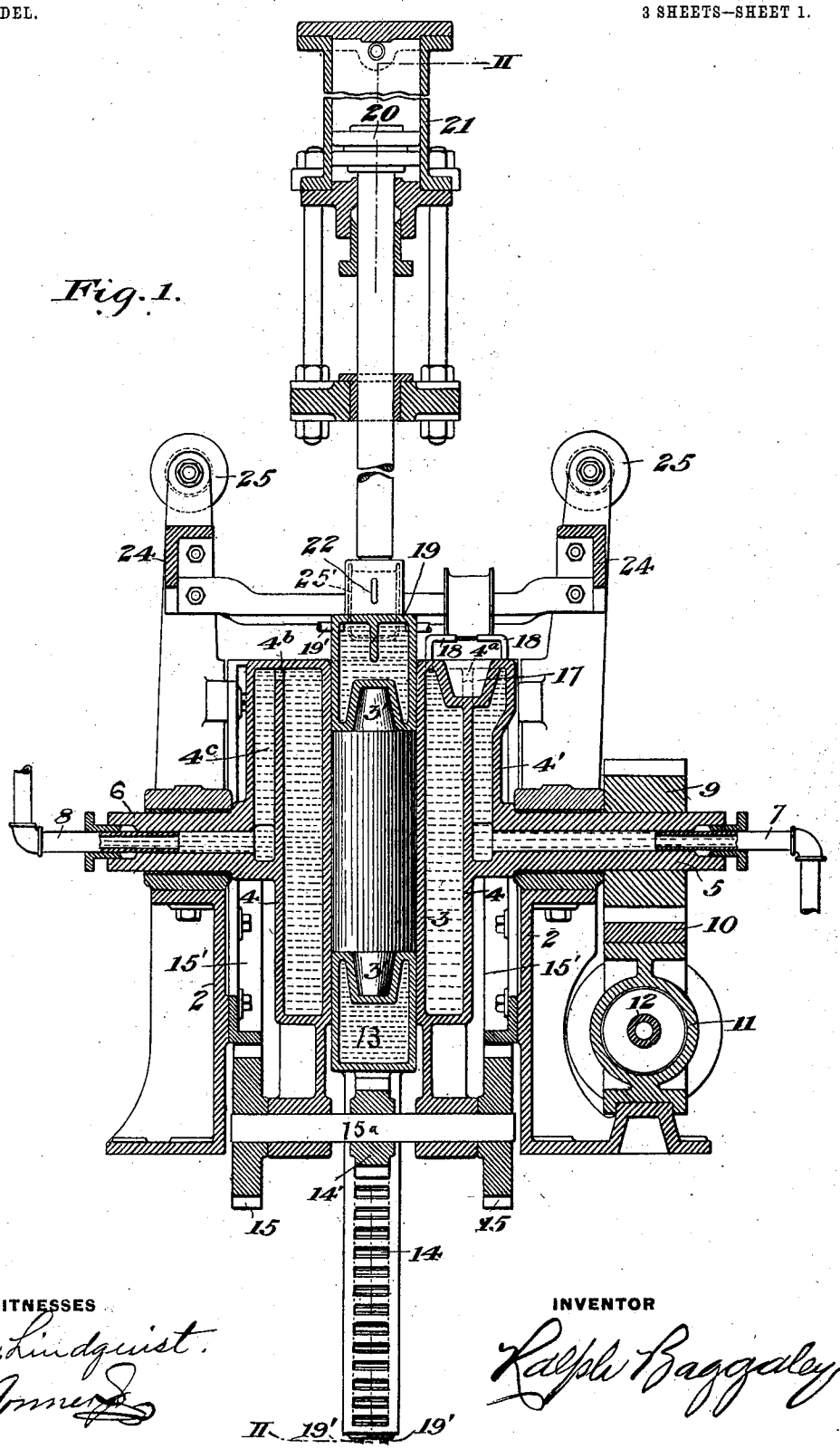
R. BAGGALEY.

CASTING MACHINE.

APPLICATION FILED MAR. 16, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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L. A. Ormes

INVENTOR

Ralph Baggaley

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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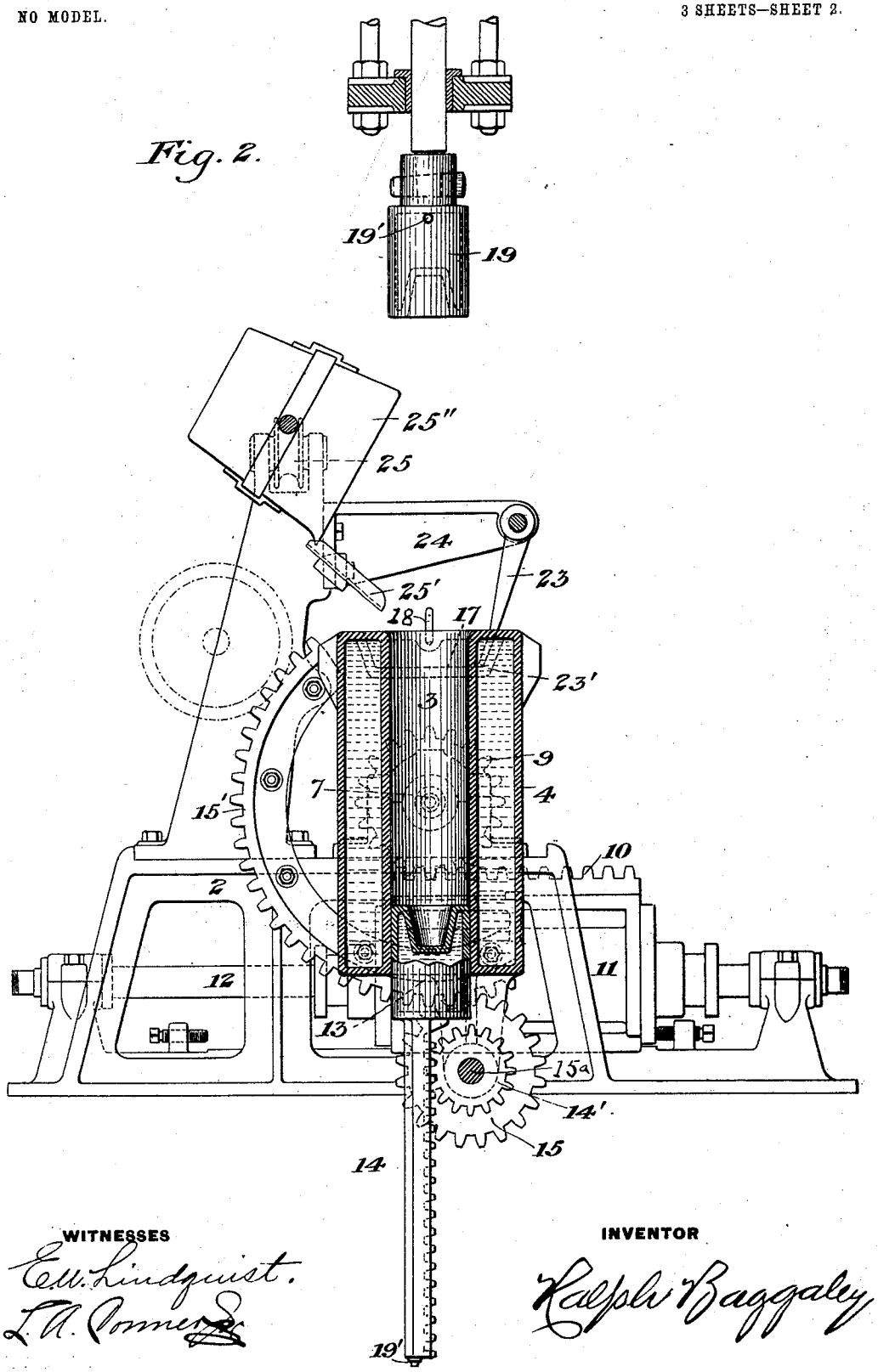
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APPLICATION FILED MAR. 16, 1903.

NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.



WITNESSES

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3.

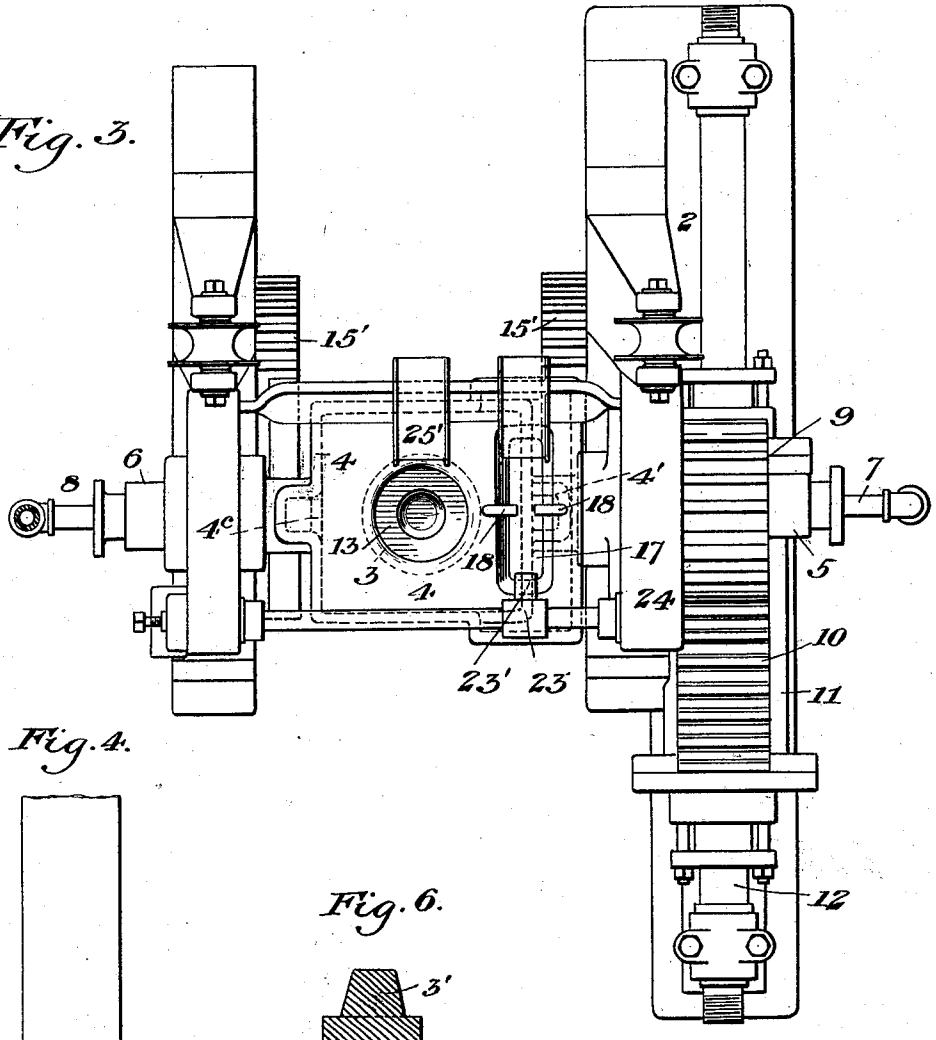


Fig. 4.

Fig. 5.

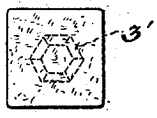


Fig. 6.

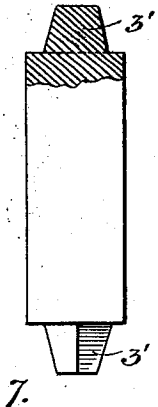
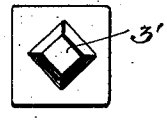


Fig. 7.



WITNESSES

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No. 746,244. Patented December 8, 1903.

UNITED STATES PATENT OFFICE.

RALPH BAGGALEY, OF PITTSBURG, PENNSYLVANIA.

CASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 746,244, dated December 8, 1903.

Application filed March 16, 1903. Serial No. 147,984. (No model.)

To all whom it may concern.

Be it known that I, RALPH BAGGALEY, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Casting-Machine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows in vertical central section a casting-machine constructed in accordance with my invention. Fig. 2 is a vertical section on the line II II of Fig. 1. Fig. 3 is a plan view of the machine. Figs. 4, 5, 6, and 7 are end views and elevations, partly in section, illustrating two of the designs of pigs which may be cast with my machine.

The operation of casting copper pigs as heretofore conducted has been very wasteful, not only because the apparatus which has been employed causes the spilling of a considerable portion of the metal in pouring it into the molds, but also because the pigs are cast with fins, which, absorbing oxygen from the air, become very brittle and break off in handling and shipping, thus occasioning a considerable loss.

The object of my invention is to provide means whereby the present losses resulting in the pouring and shipment of copper, whether the same be in pigs, slabs, or bars, may be eliminated. To accomplish this result, I use, preferably, water-jacketed molds whose molding-cavities are designed so that the fins resulting from the casting process are concentrated. Fins when so concentrated may be readily and completely removed by machinery, so that in shipping it is impossible for any portion of the pig, however small, to be broken loose, and thus lost.

In the accompanying drawings, 2 represents the frame of the machine, and 3 is the mold, which is formed with hollow walls 4 for the passage of a stream of water and with trunnions 5 6, through which the inlet and outlet pipes 7 and 8 extend for the introduction of water to cool the mold. The water enters a chamber 4′ at one side of the mold, from the top of which it overflows through a passage 4^a into the main water-passage 4 around the mold-cavity. Thence after filling the main cavity, it flows through a passage 4^b at the top into a side chamber 4^c, from which it flows through the outlet-pipe 8. As the mold is filling the air rises to the top of the chambers 4, 4′, and 4^c and is displaced through the passages 4^a and 4^b and is caused to go out through the pipe 8. To rotate the mold on its trunnions, I prefer to employ a pinion 9, which is fixed to one of the trunnions and is operated by a rack 10, fixed to and movable with a cylinder 11, which is reciprocated on a plunger 12, the latter being hollow and serving for the introduction and discharge of the water or compressed air by which the cylinder is operated.

At the base of the mold is a movable plunger 13, which is adapted to be moved inwardly to or nearly to the upper end of the mold when the mold is rotated into inverted position, so that the plunger may forcibly eject the pig from the mold. I am thus enabled to use a mold whose cavity is substantially cylindrical instead of relying upon the use of a tapered mold-cavity for effecting the discharge of the pig. The inner end of the plunger constitutes a plug, which is preferably shaped so as to form a pig with a projection 3′ at the end, the purpose being to afford means by which the pig may readily be seized or handled.

For the purpose of moving the plunger 13 automatically I provide it with a rack 14, engaging a pinion 14′, which is fixed to a shaft 15^a, having pinions 15. The shaft 15^a is journaled to portions of the mold, and the pinions 15 are in gear with segmental racks 15′, fixed to the frame 2, so that when the mold is rotated into inverted position the pinion 14′ will be driven and the rack moved lengthwise, so as to eject the pig.

The upper end of the mold has at the side of the mold-cavity a trough or basin 17 for receiving any surplus metal which may remain in the pouring-ladle after the mold has been filled, and extending above this basin there are preferably stop-arms 18, the purpose of which I describe below.

Above the mold is a vertically-movable end piece or plug 19, which is shaped like the end piece of the plunger 13 and is vertically movable by a plunger 20, operated by a cylinder 21, the motive power of which may be compressed air or water. The plug 19 is preferably removably attached to the plunger 20 by a key 22, so that it may be replaced when

desired, and the plugs 13 and 19 are water-cooled by flexible inlet and outlet pipes 19′. The pipes 19′, which conduct the water to and from lower plunger 13, extend through the rack 14 and are shown at the lower end of Figs. 1 and 2.

23 is an arm pivoted to a bracket 24 and extending down into the basin 17, having at its lower end a projection or tongue 23′.

25 25 are wheels journaled in the uprights of the machine-frame and adapted to constitute rests for the trunnions of the ladle, and 25′ is a spout which conducts the metal to the cavity of the mold 3.

The parts being in the position shown in Fig. 1, except that the upper plug 19 is retracted above the mold, and the mold being water-cooled by passage of water through its hollow walls 4, molten metal is charged into the ladle 25″ from a furnace or converter in proximity to which the casting-machine is set, and the ladle is tilted on the wheels 25, so as to discharge the molten copper into the mold. The ladle has a capacity just a little in excess of the capacity of the mold. When the copper has risen in the mold to the desired height, which may be indicated by a mark in the mold-cavity, the ladle is righted and is moved on the wheels so as to bring its pouring-spout over the basin 17, and any surplus metal which may remain in it is then poured into the basin, from which it is afterward removed, as explained below. When the mold has been filled, the plunger 20 is brought down, and the plug 19 enters the still molten copper and shapes the end of the pig, which rapidly sets, because of the cooling of the mold and plunger by water. The down pressure on the plunger 20 need be sufficient only to shape the end of the pig and is not sufficient to exert undue strain upon the machine or the setting metal of the pig. The plug 19 is then retracted and the mold rotated on its axis into inverted position, and during such rotation the rotation of the pinion 14′ moves the rack and ejects the pig from the mold. The same motion of inverting the mold causes the arm 23, which is upheld by the bracket 24, to loosen the surplus piece of copper in the basin 17. If this piece of copper should stick to the arm 23, it is disengaged therefrom when it strikes the arms 18, and when the mold is inverted the loosened piece of copper drops freely from the basin. It is then returned to the refining-furnace for retreatment, or, if desired, it may be thrown into the mold and incorporated in the next pig in order that no waste shall occur. After the discharge of the pig the mold is immediately righted, and another pig can then be cast. The operation is thus very rapid and can be carried on with the labor of only one man.

If desired, the end plug 19 may not be used, in which case the upper end of the pig will not be shaped as described above and the side supplement mold or basin will not be used.

In Figs. 4, 5, 6, and 7 of the drawings I show pigs which are cast in my mold. Their design is such that they are shapely and easily handled. By reason of being cast in a water-cooled mold, in which they chill quickly, they are smooth and uniform in appearance, and if they are discharged into water from the molds while still hot the coating of black oxid will be removed and they will present a bright appearance. All the fins are purposely concentrated by the design of the pig for ready and complete removal by suitable trimming machinery, and such fins, containing large proportions of suboxid, are then returned to the refining-furnace for retreatment, or, if desired, they may be placed in the mold and become incorporated in the next pig that is cast, thus preventing every item of the waste that now prevails.

Within the scope of my invention the apparatus may be modified in various ways, since

What I claim, and desire to secure by Letters Patent, is—

1. A pig-casting machine having a mold, and means at the ends of the mold-cavity adapted to form on the pig reduced projecting portions 3′; substantially as described.

2. A pig-casting machine having a mold adapted to be inverted, an ejector for the pig, and means whereby the inverting of the mold will automatically move the ejector; substantially as described.

3. A pig-casting machine having a mold adapted to be inverted, an ejector for the pig, said mold and ejector being water-cooled; substantially as described.

4. A pig-casting machine having a pivoted mold adapted to be rotated to discharge the pig, gearing moving with the mold, and an ejector-plunger connected with said gearing and adapted to be moved thereby; substantially as described.

5. A pig-casting machine having a pivoted mold adapted to be rotated to discharge the pig, gearing moving with the mold, and an ejector-plunger having a rack portion connected with said gearing and adapted to be moved thereby; substantially as described.

6. A pig-casting machine having a mold normally in upright position, said mold having at its end a movable plug, and means for projecting the plug by the rotation of the mold; substantially as described.

In testimony whereof I have hereunto set my hand.

RALPH BAGGALEY.

Witnesses:
GEO. B. BLEMING,
H. M. CORWIN.