

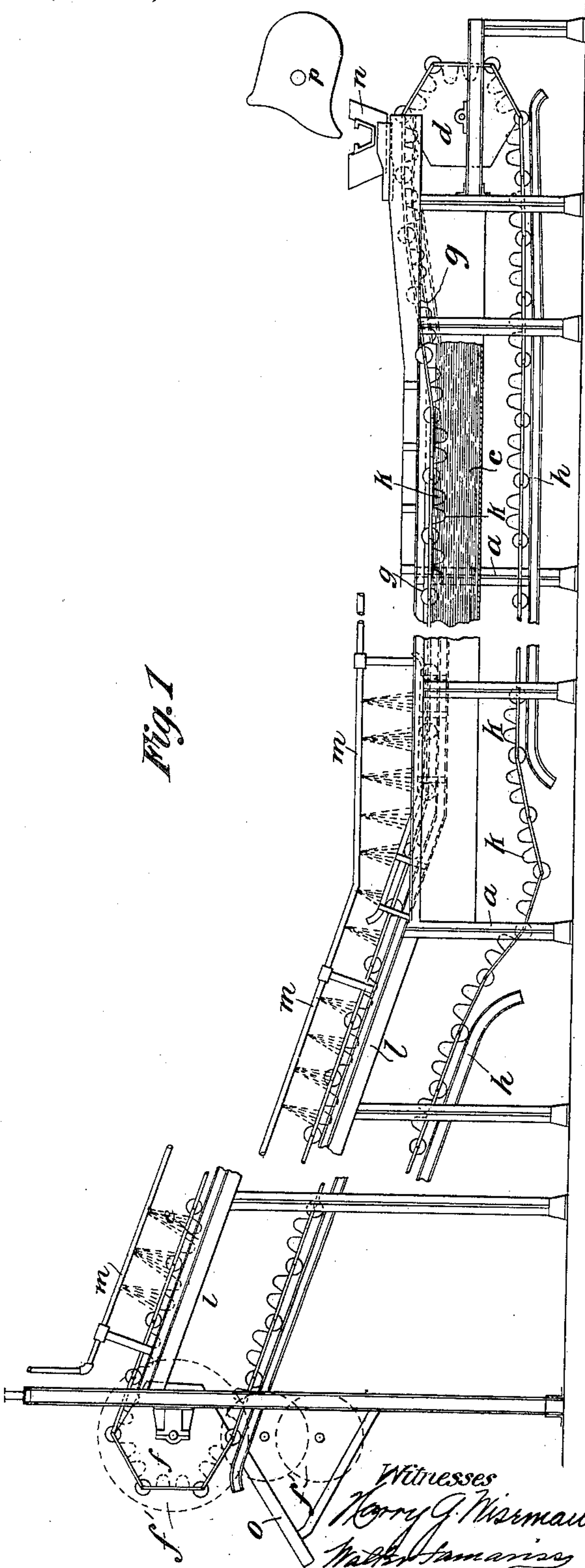
No. 657,071.

Patented Aug. 28, 1900.

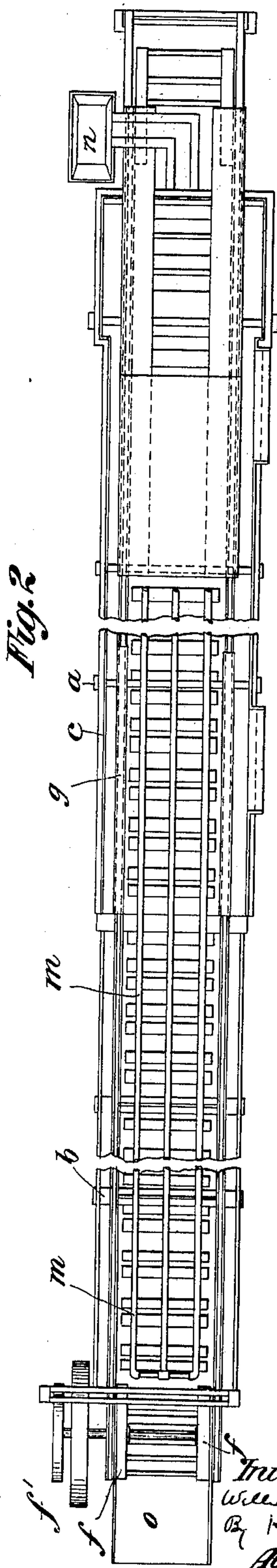
W. J. PATTERSON.  
APPARATUS FOR CASTING METAL.

(Application filed Oct. 16, 1899.)

(No Model.)



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM J. PATTERSON, OF PITTSBURG, PENNSYLVANIA.

## APPARATUS FOR CASTING METAL.

SPECIFICATION forming part of Letters Patent No. 657,071, dated August 28, 1900.

Application filed October 16, 1899. Serial No. 733,764. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. PATTERSON, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Casting Metal; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the casting of metal, and directly, though not exclusively, to the casting of pig metal, the invention relating to the same general class as Letters Patent No. 583,424, granted to A. M. Acklin May 25, 1897. That patent provided for the casting of the molten metal in an endless connected series of traveling molds, the metal being then carried in the molds for a certain distance, while the molds were partially submerged in a body of water, and the molds being then carried down into the body of water, being completely submerged therein, so that the water flowed over the metal contained in the molds to cool and set such metal.

The principal objects of the present invention are to provide apparatus for the proper and economical cooling of the metal without the necessity of entirely submerging the molds within the body of water by combining the partial submerging of the molds carrying the metal and the spraying of the metal during and subsequent to the partial submersion of the molds, as set forth in an application filed by me July 31, 1899, Serial No. 725,605, and to provide for the economical use of the water employed for spraying in maintaining the water-supply of the tank.

The points of invention desired to be covered will be hereinafter set forth and claimed.

To enable others skilled in the art to employ my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a side view, partly broken away, illustrating the same; and Fig. 2 is a top plan view thereof.

Like letters indicate like parts in each of the figures.

The apparatus may in general conform to that shown in said Acklin patent, except that it is for some purposes and in its preferable form constructed to carry the molds through the tank or body of water with the molds

only partially submerged for the entire length of the tank. The framework of the apparatus may be of any suitable construction, being illustrated as consisting of the standards *a*, connected by a series of cross-bars *b*, and having extending for a considerable portion of its length the tank *c*, while at the receiving end, beyond said tank, is the sprocket *d*, and beyond the tank toward the delivery end is the inclined trackway *e*, at the upper end of which is the sprocket *f*, which is driven by any desired source of power through gearing *f'*. The machine is provided with a suitable track *g*, which extends from the receiving end down into the tank, extending on such level within the tank that the molds are partially submerged therein—that is, submerged to such height that the water cannot flow over the tops of the molds, and thus be brought into direct contact with the molten metal, the track then extending at the incline up over the inclined trackway *e* to the sprocket-wheel *f* and below said sprocket the return tracks *h h'* extending back to the sprocket-wheel *b*, a gap being preferably left between these tracks *h h'* to provide for expansion and contraction of the series of traveling molds *k*. The series of traveling molds *k* are preferably formed of wrought plate-metal and are connected together and mounted on these tracks in any suitable way so that the molds will be partially submerged in the water in the tank, as above stated. Back of the tank *c* and in line with the inclined trackway *e*, and in fact forming part of the same, is the inclined trough *l*, which extends down from the delivery end of the machine to the tank *c*, so as to deliver any water from the spraying of the molds into said tank. Extending over this trough, and preferably over a good portion of the tank *c*, are the spray-pipes *m*, which, as shown in Fig. 2, are adapted to spray the molds in the latter part of their course through the tank *c* and in their course up the inclined trackway *e*, so providing for the cooling of the molds in large part by such water-spray. The water from the spraying of the molds will of course pass down into the trough *l* and run thence into the tank *c* and may be utilized in said tank for the cooling of the metal in the molds. At the receiving end of the apparatus is provided the metal-pouring



trough *n*, into which the metal is poured from the traveling ladle *p*, transporting the same from the furnace, the trough providing for the pouring of a continuous controllable stream into the traveling molds *k*.

In the preferred use of the invention the metal is poured in a continuous controllable stream from the ladle *p* and trough *n* into the molds *k* as they travel at regular speed under the trough. As the molds receive the molten metal they pass into the tank *c*, the molds being partially, but not altogether, submerged therein, so that the only cooling action of the water in the tank itself acts through the thin walls of the wrought-metal molds, such cooling action taking place for the entire length of the tank. When the metal first enters the molds, its heat is so high that the water coming in contact with the unset top face thereof causes the metal to boil and honeycomb said top face, and such honeycomb is liable to break off in the subsequent handling of the pig. The molds are therefore carried within the tank, while the metal is protected from contact with water until the metal is sufficiently set to be brought into contact with the water. They may be carried to the full length of the tank in this way without being sprayed or the spraying action may take place during a part of the cooling action in the tank. The water-spray falling upon the metal when at a comparatively-high heat will of course generate steam; but as a spray is used free escape is provided for the steam, and the metal in the molds is cooled quickly by the repeated fresh contacting of the water dropping from the spray-pipes into direct contact with the metal, and a rapid cooling thereof is effected, this action being continued up the inclined trackway *e*, so that by the time the molds reach the upper end thereof the pigs are set and cold and ready to be discharged from the molds into a chute *o*, which guides the pigs into a car or such other receptacle as may be employed to receive them. The water from the spray-pipes over the inclined trackway is caught in the inclined trough *l*, which directs it down into the tank, the water from the spray-pipes maintaining the supply for the tank, which has overflows at suitable points, as at *r r'*, for maintaining the proper water-level, one such overflow being placed at the receiving end of the tank, so as to carry sufficient water to that end for cooling the pig when first cast, and one or more overflows between the ends being arranged to carry off the excess of water from the spray-pipes. The water from the pipes extending over the tank is of course caught in the tank itself. In this way I am enabled to cool the metal rapidly, first by water cooling when it is protected from direct contact with water and then by water cooling both by contact of the mold-bodies with the water and by direct contact of water with the metal itself through the repeated fresh contacting of the water from the spray-pipes therewith, the necessity for en-

tirely submerging the molds within the tank being overcome. I am also enabled to get repeated contact of cold water with the metal itself and at the same time provide free escape for the steam generated by the hot metal, so obtaining the best conditions for cooling practicable. I also utilize the water to advantage by continuing the spraying after the molds pass from the tank and utilizing the water for subsequent cooling purposes.

No claim is made in this application for the method herein described, as the same is embodied in said application filed by me July 31, 1899, Serial No. 725,605.

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

1. In pig-metal-casting apparatus, the combination with a suitable water-tank, having a substantially-horizontal track extending therethrough at a substantially-uniform level, of an endless connected series of molds passing into the tank and along the track, means for maintaining the water in the tank in contact with the molds but at a lower level than the tops of the molds, and spray-pipes extending over the rear portion only of said tank.

2. In pig-metal-casting apparatus, the combination with a suitable frame, of an endless connected series of traveling molds passing around the same, a water-tank, an inclined trough extending upwardly from the rear end of said tank, tracks extending through said tank at a substantially-uniform level and over said inclined trough, along which tracks the molds travel, means for maintaining the water in the tank in contact with the molds but below their upper edges, and spray-pipes extending over such inclined trough, above the line of travel of the molds and over the rear portion only of the tank.

3. In pig-metal-casting apparatus, the combination with a suitable frame, of an endless connected series of traveling molds passing around the same, a water-tank, an inclined trough extending upwardly from the rear end of said tank, tracks extending through said tank and over said inclined trough, along which tracks the molds travel, spray-pipes extending over such inclined trough and above the line of travel of the molds, and a water-overflow at the forward or opposite end of the tank.

4. In pig-metal-casting apparatus, the combination with a suitable frame, of an endless connected series of traveling molds passing around the same, a water-tank, an inclined trough extending up from the rear end of said tank, tracks extending into said tank and above said inclined trough, along which tracks the molds travel, spray-pipes extending above such inclined trough and above the course of the molds thereon, a water-overflow at the forward or opposite end of the tank, and an overflow between the ends of the tank.

5. In pig-metal-casting apparatus, the com-



5 bination with a suitable frame, of an endless connected series of traveling molds passing around the same, a water-tank, an inclined trough extending up from the rear end of said tank, tracks extending into said tank and above said inclined trough, along which tracks the molds travel, and spray-pipes extending above such inclined trough and above the course of the molds thereon,

said spray-pipes also extending forward above the rear portion of said tank.

In testimony whereof I, the said WILLIAM J. PATTERSON, have hereunto set my hand.

WILLIAM J. PATTERSON.

Witnesses:

JAMES I. KAY,

ROBERT C. TOTTEN.