

(Model.)

2 Sheets—Sheet 1.

S. W. VAUGHEN.  
APPARATUS FOR CASTING PIG METAL.

No. 539,157.

Patented May 14, 1895.

Fig. 1.

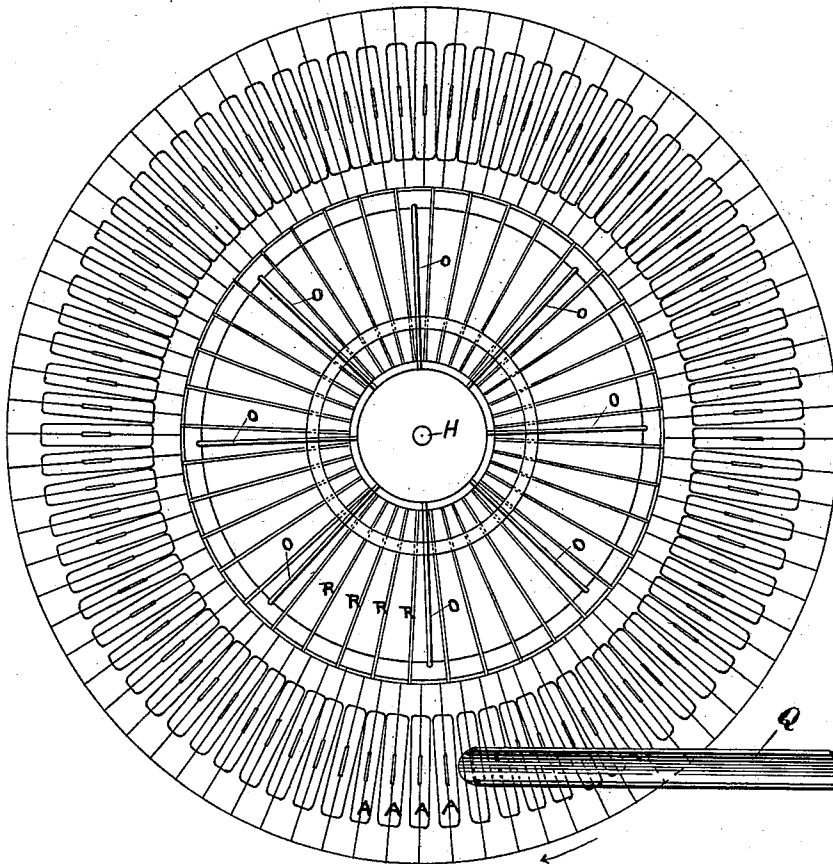
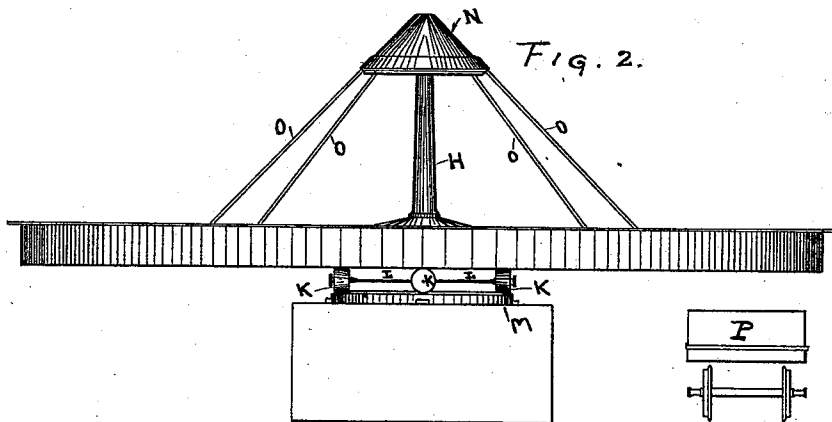


Fig. 2.



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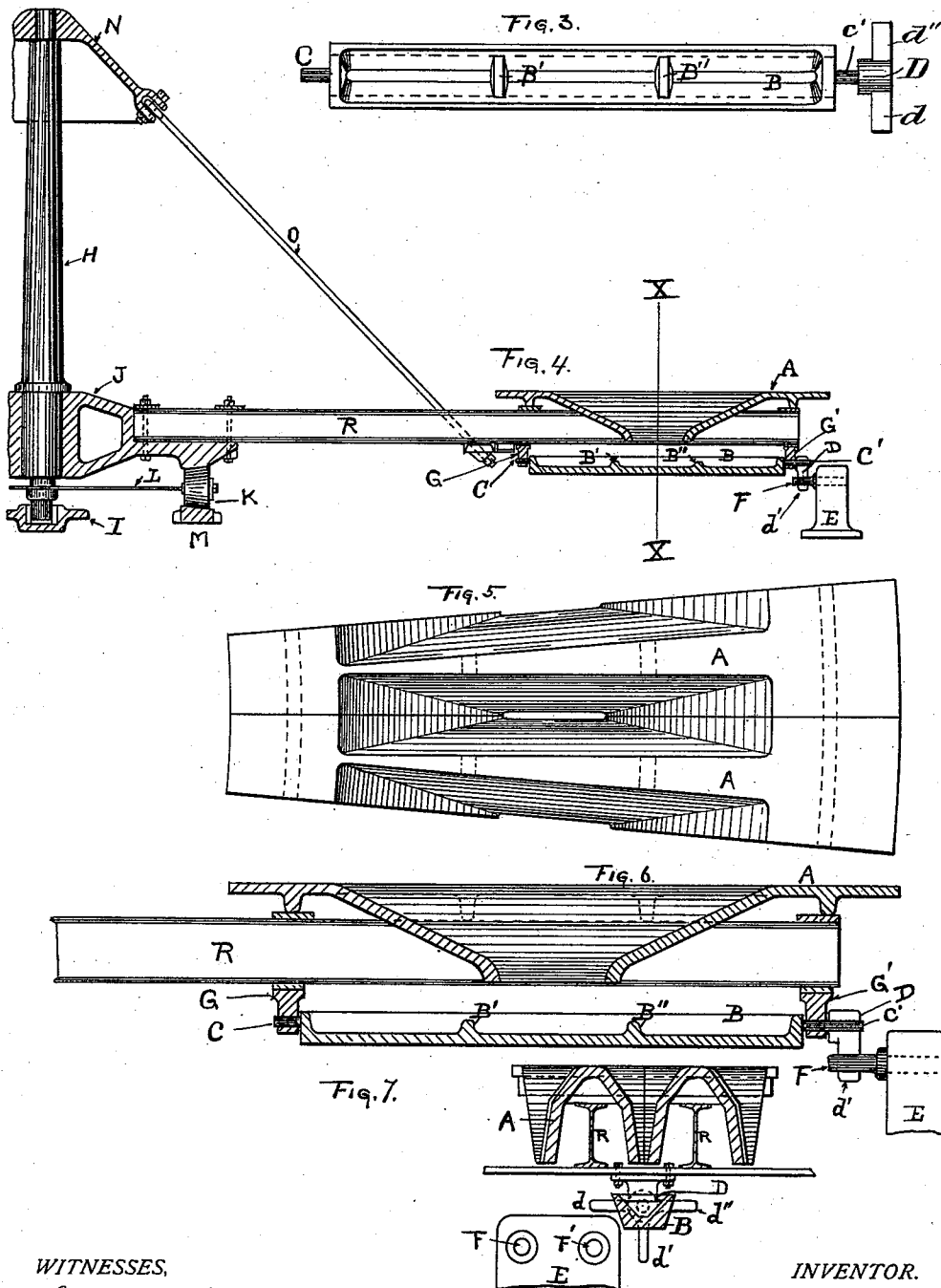
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# UNITED STATES PATENT OFFICE.

SAMUEL W. VAUGHEN, OF COOPERSDALE, PENNSYLVANIA.

## APPARATUS FOR CASTING PIG METAL.

SPECIFICATION forming part of Letters Patent No. 539,157, dated May 14, 1895.

Application filed December 26, 1894. Serial No. 533,029. (Model.)

*To all whom it may concern:*

Be it known that I, SAMUEL W. VAUGHEN, a citizen of the United States, residing at Coopersdale, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Casting Pig Metal; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the art of making pig iron, it has been the usual practice hitherto, to cast the same into molds, arranged in the bed of the casting house; said molds being formed either in sand or iron, the latter molds being technically known as "chills." These molds are usually disposed symmetrically, on either side of a longitudinal runner, which extends from the tapping hole of the furnace, throughout the length of the casting house, with side outlets arranged at proper intervals, through which outlets the metal flows into what is known as the pig bed.

In order to simplify my description, I will refer to that species of pig bed which is formed in sand, although as noted above, cast iron is also used for this purpose.

In ordinary practice, the side outlets above referred to, are connected directly to other channels, formed in the bed, said channels being known as "sows," at right angles to which, latter channels, pig molds are prepared leading therefrom at frequent intervals; these molds being so made as to form pieces of convenient size, which are known as "pigs." This arrangement of central runner, laterally disposed sows, and a series of pigs in connection with the latter, is the usual arrangement, which, however, has many disadvantages as noted hereinafter. After the metal is cast into this arrangement, it is necessary to cool it by means of a water spray, or other suitable means, after which it is necessary to break up the various pieces, by severing the sows from the metal in the central runner, and by separating each individual pig from the sow to which it is attached. This work, which from its nature, has been done by manual labor, is very severe and laborious, so much so, that with a casting house of limited

size, as is very often the case, the delays incident to this work seriously limit the output of a furnace.

Recent improvements in blast furnace practice have so increased the quantity of metal made each day, that casting houses designed some years ago, are at present found inadequate to contain the amount of metal which can be made, which taken in connection with the limitations above noted, leads to serious impairment of output.

In addition to the difficulties above enumerated, in connection with the work of removing the pigs from the ordinary casting bed, a large amount of expense and labor is of necessity incurred in preparing these beds and maintaining them and their appurtenances in proper order, as may be readily understood.

It is the object of my invention to provide an arrangement for casting pig metal, whereby the above difficulties and inconveniences may be obviated.

My invention consists in general, of an arrangement of metal molds on a turn table, so located with respect to a furnace, that the metal may run direct from the same, into said molds, as the turn table is revolved. As the molds are filled in succession, they are removed from the runner, which delivers the metal to them, by the slow revolution of the table, which is so adjusted and proportioned, that before these same molds are again presented to the runner, the metal in them has had time to become sufficiently cooled, or so set as to be properly removed.

In my invention the molds are radially arranged on the table, and mounted on pivots, one of said pivots being provided with one or more radially projecting arms, which latter are so arranged as to come in contact with one or more fixed pins or abutments, in such a way that the motion of the table causes each one of the molds to be overturned in succession, whereby its contents are discharged below, into a car or other convenient receptacle.

Although the overturning arrangement described consists of radially arranged arms, secured to one of the pivots of the molds, in connection with one or more fixed pins or abutments, I do not however, limit myself to

this exact construction, for the reason that instead of these arms, cams, gear wheels, or other equivalents may be substituted, as may be readily understood by one skilled in the art.

5 On my turn table, above each mold, I place a casting of iron, or other suitable material, which is funnel shaped in its general form, and so arranged that its lower aperture is directly above the mold, for the purpose of preventing the deposit of metal on the edges of the molds, and also for preventing the same from dropping between them. These funnels, I prefer to make in sections, in order to prevent their destruction by contraction and expansion, and to allow their easy replacement when broken or worn.

I can use any suitable form of turntable in connection with my invention, but I prefer to use one in which the carrying rollers are located at some distance from the molds, in order to prevent their being fouled by dirt or scrap.

Although my invention is shown and described in connection with a blast furnace plant, it may also be applied to any plant where molten metal or similar material is poured into molds.

Having given this general description of my invention, I will now refer to the annexed two sheets of drawings, which form part of this specification and in which like letters refer to like parts.

Figure 1 is a general plan of my casting apparatus, showing the funnels radially arranged near the rim of the turn-table and a runner so located as to deliver metal into said funnels. Fig. 2 is a general side elevation of the same, with the runner removed for the sake of clearness, showing an ordinary railroad-car placed in position for receiving the pigs. Fig. 3 is a plan view of one of my molds on an enlarged scale. Fig. 4 is a half sectional elevation, showing my turn-table with molds, funnel, and dumping arrangement. Fig. 5 is a plan view of my funnel on an enlarged scale. Fig. 6 is a vertical section, on an enlarged scale, through the center of one of the molds, showing the funnel, supporting-beams, and dumping arrangement. Fig. 7 is a sectional view taken on the line X X of Fig. 4, looking in the direction of the outer circumference of the turn-table.

In the different figures, A. A. A. represent a funnel directly located above the molds B. B., said molds being partially sub-divided as shown, by the partitions B' and B''.

C. and C' are pivots or short shafts on the ends of the mold B, while D represents that part of the dumping device which is rigidly secured to the extension of the shaft pivot C'.

d. d' d'' are radial extensions of the dumping device D, while E is a fixed abutment, or support which is carried independently of the turn table, in which supports are secured pins F and F'.

G and G' are bearings for the pivots of the

molds; said bearings being secured to the under side of the frame work of the table as shown.

H is the central shaft of the table.

I is the bottom bearing or step, J the central or hub casting, secured to the central shaft H, and to which are secured the radially arranged beams R. R. R.

N is the top spider secured to the upper part of the vertical shaft H, while O. O. O. are inclined braces, or tie rods which aid in supporting the frame work of the table, as shown.

K. K. are conoidal rollers upon which the table turns; said rollers being supported upon the track M, which in turn is held in position upon a suitable and substantial foundation.

L. L. are radial rods forming part of the spider which holds the rollers K. K. in proper position after the usual manner of such constructions.

In Fig. 2, P represents a railroad car placed in position for receiving the pigs as they are dumped from the molds.

Having thus described my invention, I will now proceed to show how it is used.

Referring to Figs. 1 and 2, a spout or runner, marked Q in Fig. 1 is arranged to deliver molten metal into, or near the center of the funnels A. A. A.; the longitudinal axis of said runner being preferably located in a direction tangent to the circle formed by the center of said funnels, as they revolve about the axis of the turn table. Although this location of the runner with respect to the turn table is preferable for obvious reasons, it may also be arranged in any other convenient position. The molds being empty and cooled ready for the reception of molten metal, the stream is then allowed to flow into them, while at the same time the table is slowly revolved by any suitable means; the speed of such revolution being adjusted from time to time in such a way, that each mold remains under the runner long enough to become filled to the required degree. By properly regulating the speed of flow of the molten metal, and the speed of revolution of the turn table, each mold will be properly filled.

In order that the flow of molten iron may be properly regulated as it issues, without the intervention of a receiving ladle or its equivalent, it is necessary to have absolute control, as near as may be, of the size of the tapping hole through which this metal first passes.

The method whereby the size of the tapping hole may be maintained without difficulty, forms the subject of another invention which I have described and claimed in an application filed by me June 8, 1894, Serial No. 513,961.

As the table continues to revolve, the metal contained in the first filled molds, in their slow passage, becomes cooled and hardened, so that before an entire revolution, the molds

may be over-turned, thus dumping the pigs, after which the molds may be further cooled before receiving another charge of molten metal.

5 The mold which I prefer to use, is shown in plan in Fig. 3; the general dimensions of which, for pig iron are such that each one of the three pieces formed in each mold is of suitable size and weight to allow it to be readily  
10 handled in the usual way by manual labor, either for unloading or for further use in the arts.

The advantages of my method and apparatus, compared with those previously in existence, lies in the fact that by their use the  
15 pigs are cast in one operation and are at once available for transportation, or further manipulation, thus obviating all the previously recited disadvantages and expenses in connection with casting pigs in the usual way  
20 hitherto customary.

I am aware that casting turn tables with radially disposed dumping molds have been proposed by others, and I therefore do not  
25 claim such broadly, but

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

1. In apparatus for casting pig metal, a turn-table carrying a plurality of molds mounted on pivots in the table, adapted to  
30 be over-turned, and funnels carried by the turn-table and arranged over said molds, substantially as set forth.

2. In apparatus for casting pig metal, a turn-table carrying a plurality of molds  
35 mounted on pivots in the table, adapted to be over-turned, and sectional funnels carried by the turn-table and arranged over said molds substantially as set forth.

3. In apparatus for casting pig-metal, a  
40 turn-table carrying a plurality of molds, mounted on pivots in the table, adapted to be over-turned, funnels carried by the turn-table and arranged above said molds and a suitable removable receptacle arranged be-  
45 neath said turn-table substantially as set forth.

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

SAMUEL W. VAUGHEN.

Witnesses:

D. J. JONES,

GEO. E. THACKRAY.