No. 788,964. PATENTED MAY 2, 1905.

E. A. UEHLING.

CASTING APPARATUS.

APPLICATION FILED MAR. 24, 1904.

3 SHEETS—SHEET 1.

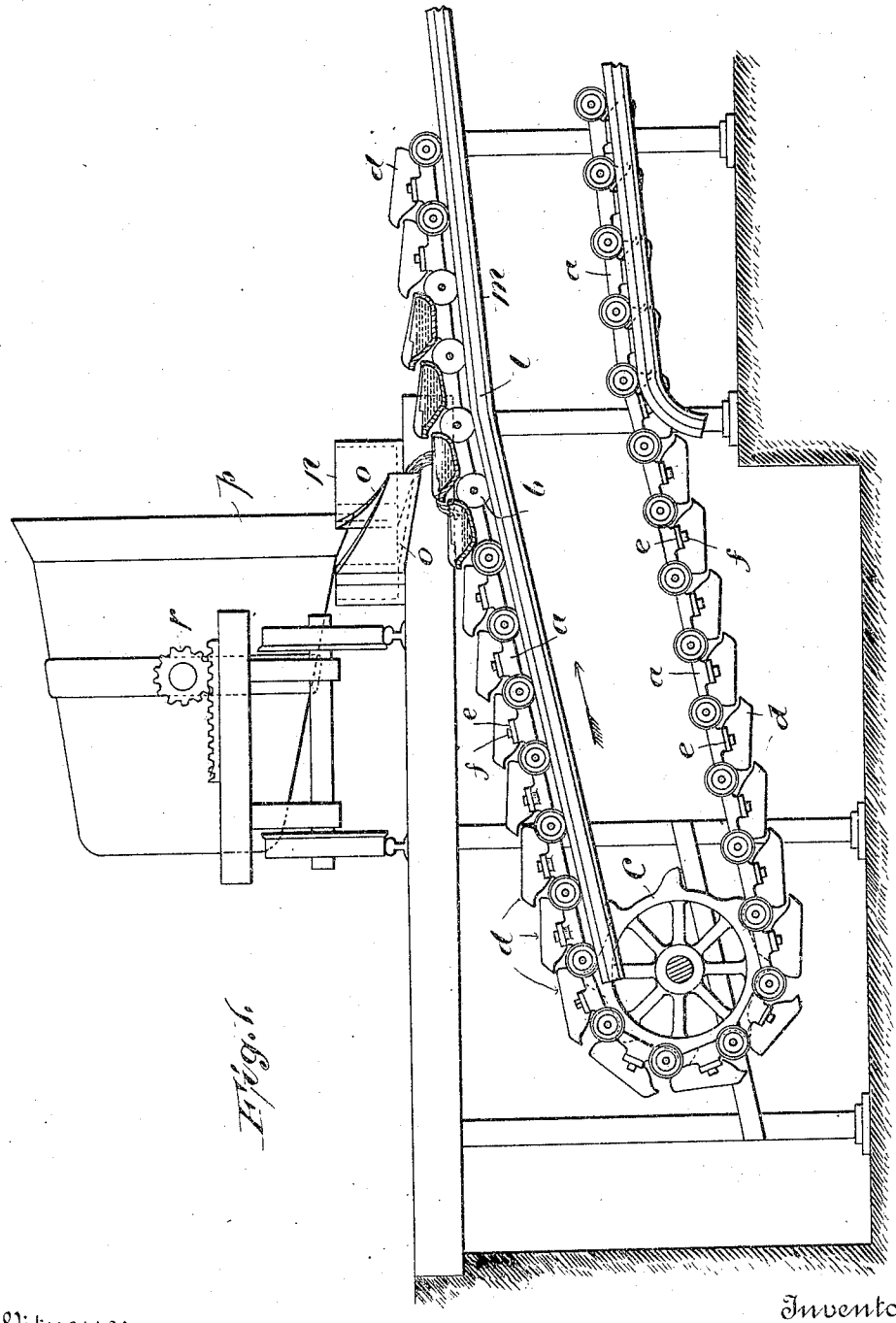


Fig. 1.

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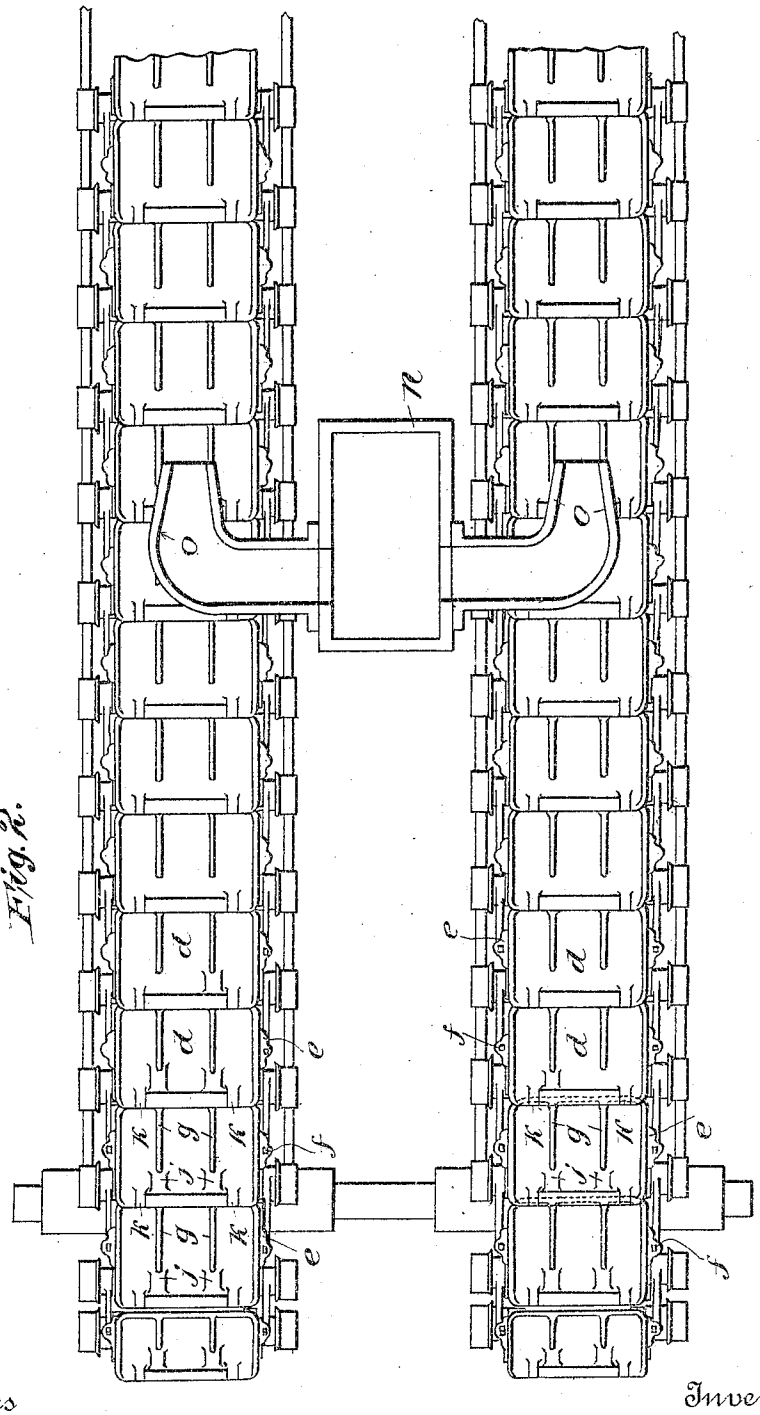


Fig. 2.

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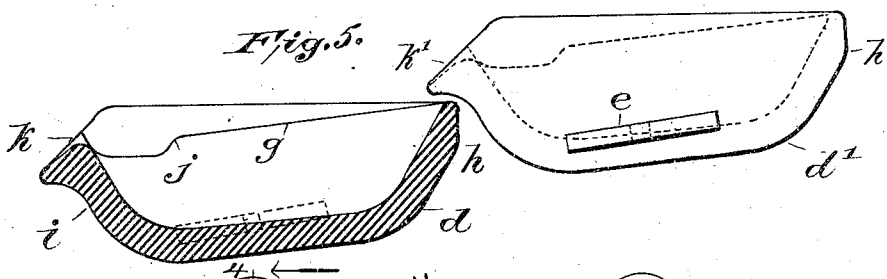
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3 SHEETS—SHEET 3.

Fig. 5.



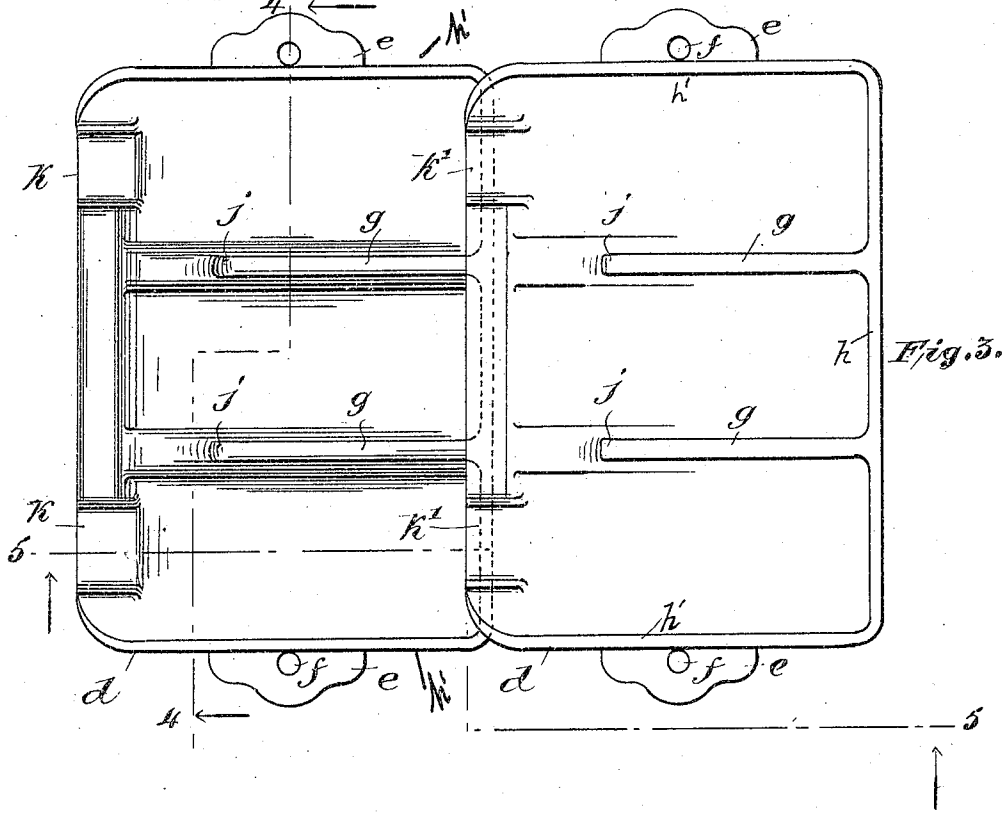
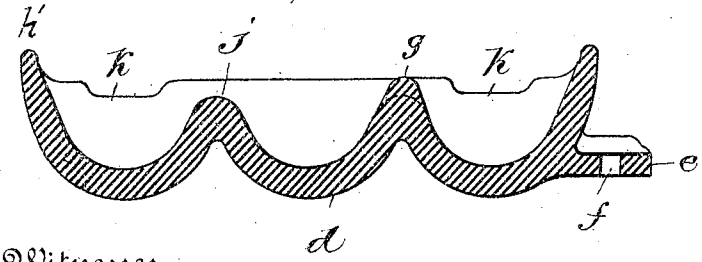


Fig. 4.



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No. 788,964. Patented May 2, 1905.

UNITED STATES PATENT OFFICE.

EDWARD A. UEHLING, OF PASSAIC, NEW JERSEY.

CASTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 788,964, dated May 2, 1905.

Application filed March 24, 1904. Serial No. 199,688.

To all whom it may concern:

Be it known that I, EDWARD A. UEHLING, mechanical engineer, a citizen of the United States, and a resident of Passaic, Passaic county, New Jersey, have invented certain new and useful Improvements in Casting Apparatus, of which the following is a description.

This invention relates in particular to apparatus adapted to cast metal billets or pigs, which obviates the use of a casting-floor, a series of molds carried on an endless chain being substituted in its stead. This apparatus can be adapted to the treatment of any kind of molten metal; but it is more especially designed and adapted for use in the casting of pig-iron from blast-furnaces.

In United States Letters Patent No. 548,146, granted to me, is contained an extended description of the benefits derived from using a casting apparatus as against the sand molds heretofore in use. The numerous disadvantages in the use of sand molds are by using a casting apparatus entirely obviated and a higher and more uniform grade of product obtained than was heretofore possible.

In carrying out the process of casting molten metal, especially pig-iron, on casting-machines many difficulties have been encountered, chief of which is that it is almost impossible to secure a constant stream of metal from the ladle to the machine, thereby causing not only irregular-sized pigs, but frequently a waste of metal by overflowing of the molds, which endangers parts of the machine into which it may flow. Furthermore, in the present construction of the casting-machine where the long axis of the mold is placed at right angles to the line of motion of the machine its width, and hence its capacity, is limited to the length of the pig, which length is fixed by market and demand and can only be increased by multiplying the number of mold strands, which is very expensive and requires much additional space not always available.

In one form of casting apparatus now in use the molds are carried on the outside of a large slowly-rotating horizontal wheel; but the form of device here shown relates more particularly to that form of machine in which the molds are carried on an endless chain, the chain moving at a constant rate of speed over two vertical sprocket-wheels. The use of the improvement herein described is not limited to this particular device, but may be adapted to the forms of apparatus above referred to or to other forms.

The object of the present invention is threefold: first, to construct the framework and ways on which the chain carrying the molds travels in such a manner that the inclination of the molds at the point of pouring and for some distance before reaching this point is such that the metal can flow only in the direction toward the empty molds; secondly, the molds are so constructed that when they each contain the proper amount of metal the metal will flow into the adjacent empty mold, the incline of the machine when the filling of the molds takes place and the disposition of the overflow-spouts overlapping the next succeeding mold being so adjusted and dimensioned that pigs of exact uniformity result, and, thirdly, to permit greater variation of capacity by placing the pigs lengthwise instead of crosswise of the machine. This greater variation is obtained by arranging the molds so that one or more pigs can be cast at once and can be varied from one to three or more, thus permitting a corresponding variation in the capacity of machines without the necessity of multiplying the number of strands of molds.

In Figure 1 is shown a side elevation of this device, some of the molds being seen in section. Fig. 2 is a plan view of the apparatus into which the ladle discharges, showing two parallel endless chains of molds. In this view the amount of the projection of one mold over the next succeeding one is only shown in the case of three of the molds, as it would only lead to confusion to show it for each mold. Fig. 3 is a detail plan view of two adjoining molds; Fig. 4, a cross-section on the plane 4 4 of Fig. 3 and viewed in the direction of the arrow in Fig. 3. Fig. 5 is a view on the plane 5 5 of Fig. 3 in the direction of the other arrow in Fig. 3, one of the molds being shown in section.

The details of construction of the link chain carrying the molds form no part of this invention, as any style of chain may be used adapted to the purpose. The form of chain shown in the drawings is more particularly described and claimed in United States Letters Patent No. 752,727, issued to me February 23, 1904.

The links *a*, supported and carried by the wheels *b*, are carried over the sprocket-wheel *c* and over another similar wheel (not shown) at the point where the molds are dumped or tripped. The molds *d*, which may be bolted to the links *a* in any convenient manner, are provided with the projections *e*, which are in turn provided with the bolt-holes *f* to admit of the molds being secured to the corresponding projections on the link.

The molds *d* are constructed of cast-iron or other suitable material cast integral, as shown. The molds heretofore in use contained but one receptacle, which extended across the mold and admitted of but one pig being cast by each mold. In the device here set forth the molds *d* contain two or more receptacles arranged so that their axes correspond with the direction of travel of the conveyer, the mold shown being provided with three receptacles, and by this means several pigs can be cast from each of the molds on the chain and the output thus greatly increased.

At distances of one-third of the width from each side of the mold *d* are the partitions or webs *g g*. These partitions are flush with the front *h* of the mold, the mold traveling in the direction of the arrow in Fig. 1. The front *h* and the sides *h'* are of sufficient height above the overflow-spouts *k* so that their contents can only escape from the mold through the spouts *k* into the empty mold following. As these partitions *g* approach the back *i* of the mold they drop at *j* to a slightly lower level to permit the flow from the middle compartment of the mold to more readily enter the side compartments.

Each of the side compartments of the mold is provided with the spouts *k*, which project over the side *h* of the next succeeding mold, as seen in Fig. 5, where the spout *k'* of the mold *d'* extends over the front *h* of the mold *d*. It will be seen that the radius of curvature of the partition at *j*, Fig. 4, is greater than at *g*, the two parts of the partition being in alinement one with the other. The plane 4 4 cuts the two partitions of the mold at different points in order to more clearly illustrate the varying contour of the partitions.

The track *m*, on which is carried the casting apparatus, is carried at such an inclination to the horizontal that the spouts *k* are sufficiently low to permit no flow into the next mold except by way of the spout. After the molds pass the point on the track marked *l*, where they are filled, the angle of inclination may be changed to a less degree with the horizontal, but, of course, may not be increased.

Situated above and between the chains of molds is the reservoir *n*, which is provided on either side with the spouts *o*. These spouts extend from the side of the reservoir and forming an angle therewith discharge at a lower level above the center of the chain of molds.

The chain of molds may be actuated by connecting an electric motor on the shaft of one of the sprocket-wheels or in any suitable and convenient manner.

The operation of this device is as follows: The ladle *p*, after being filled at the furnace with molten material, is run on a suitable carriage on tracks to the place where is located the casting device. The ladle is then gradually tilted to a position such as shown in Fig. 1, causing its contents to discharge into the reservoir *n*, and traversing the spouts *o* the metal will discharge onto the line of molds *d*, which are moving at a uniform rate of speed in the direction shown by the arrow in Fig. 1. The molten metal will first flow into the central compartment of the mold until it is filled, when it will overflow over the depressions *j* into the other parts of the mold, and if before the mold has passed from beneath the spout the three portions of the mold are more than filled the extra amount of metal will readily overflow by means of the spouts *k* into the next succeeding mold, as previously described, and the danger and loss due to spilling the metal between the molds will be entirely done away with. After the molds have passed from beneath the spout and any excess of metal overflowed they will travel to the opposite end of the conveyer, where by means of sprocket-wheel similar to the one shown their contents will be discharged, and they will again be conveyed to a point beneath the spout and the process repeated.

In the drawings two chains of molds are shown, Fig. 2; but the invention is in no way limited to the use of two chains, as one chain may be used and the other spout closed. Also, if desired, the ladle may discharge directly into the mold; but better results are obtained by using the reservoir together with the spouts, as by that means spattering is largely eliminated.

Without enumerating the many modifications of which this invention is capable, what I desire to particularly claim and specify as the features of this invention are the following:

1. In a casting apparatus, the combination of a conveyer consisting of a connected series of molds, means for filling said molds, means for discharging the overflow from one mold to the next succeeding mold during a portion of their travel, and means for preventing such discharge during another portion of their travel, substantially as described.

2. In a casting apparatus, the combination

with a conveyer consisting of a connected series of molds each having a spout projecting over the next succeeding mold, of means for filling said molds, and a track for said conveyer inclined at different angles to the horizontal, the angle of inclination being greatest at the point where said molds are filled, substantially as described.

3. In a casting apparatus, the combination with a conveyer consisting of a connected series of molds having overlapping portions, of a track for said conveyer inclined at different angles to the horizontal, and means for filling said molds, said means being located approximately at the point where the track changes from one angle to the other, substantially as described.

4. In a casting apparatus, the combination with a conveyer consisting of a connected series of molds each having a spout projecting over the next succeeding mold, of means for filling said mold, and a track inclined at different angles to the horizontal, one portion of the track being so inclined as to permit of the overflow material from one mold passing into the next succeeding mold, substantially as described.

5. In a casting apparatus, and in combination with an endless conveying apparatus, a track adapted to carry said conveying apparatus, molds mounted on said conveyer, means for filling said molds with molten material, partitions dividing said molds into a plurality of receptacles, spouts projecting from said molds over the next succeeding mold, said track being inclined at different angles to the horizontal, the angle of inclination being greatest at the point where the said molds are filled with the molten material, substantially as described.

Signed this 23d day of March, 1904, at New York city.

EDWARD A. UEHLING.

Witnesses:
A. C. KENDALL,
H. S. MORTON.