(No Model.)

S. J. ADAMS.

SAND MOLD.

No. 511,284. Patented Dec. 19, 1893.

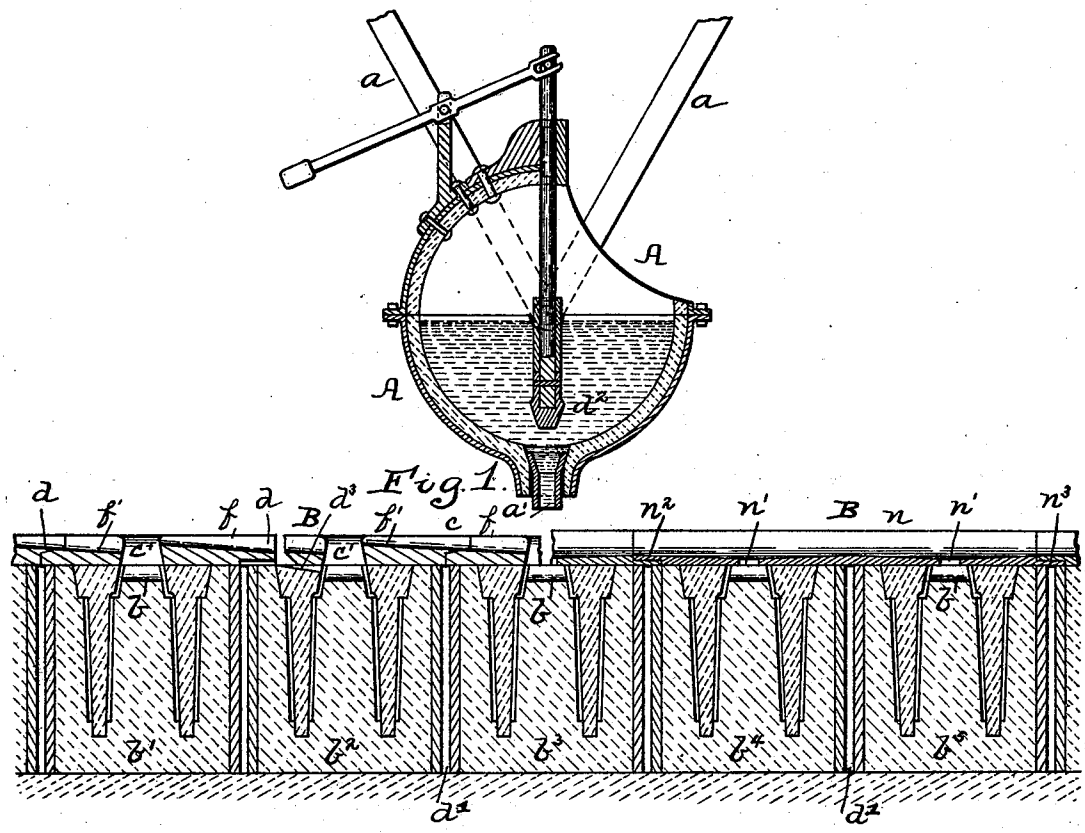

Fig. 1.

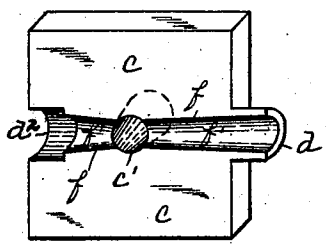

Fig. 3.

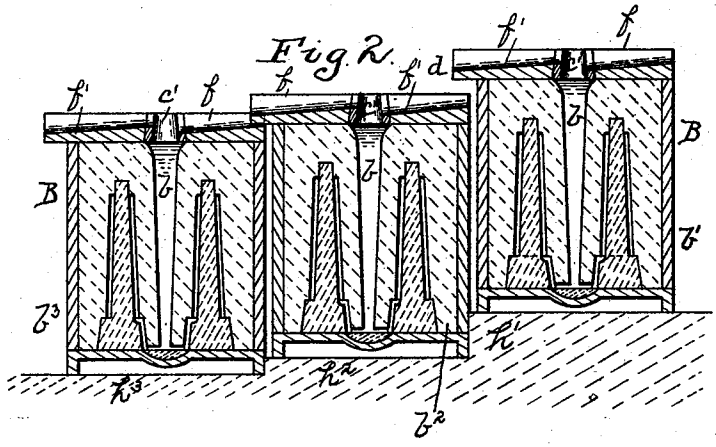

Fig. 2.

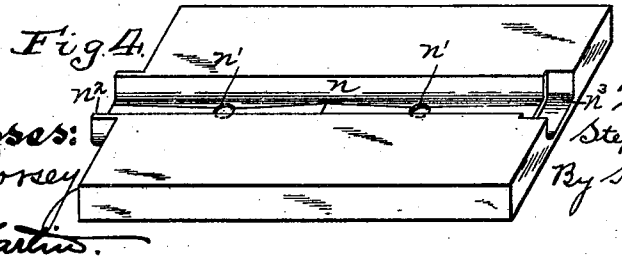

Fig. 4.

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SAND MOLD.

SPECIFICATION forming part of Letters Patent No. 511,284, dated December 19, 1893.

Application filed October 24, 1892. Serial No. 449,902. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN JARVIS ADAMS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Sand Molds; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the pouring and casting of metal into sand molds, and to the construction of runners for feeding the metal to the pouring gates of these molds. In the formation of metal sand molds it has been practically universally the custom to form the sand molds each one independent of the other, the pouring gate or gates of each mold passing down from the top thereof into the body of the mold and communicating with the mold cavities, and to cast or pour the metal by means of hand ladles, which were carried by the workmen from the cupola to the molds, each ladle containing sufficient metal to pour from one to four molds and it being necessary for the workmen not only to carry the metal to the molds, which was laborious and occupied considerable time on account of the distance from the cupola to the molds, but to direct the stream from the ladle into the pouring gate of the mold while he supported the ladle of metal, this requiring skill and strength and being practically the heaviest work in the formation of small molds. When it is appreciated that some molders can make from three to four hundred molds per day, and that it is necessary for them to carry the metal from the cupola, or main ladle receiving the metal from the same, to these molds, and to make a sufficient number of trips to pour all the molds, it will be understood that it occupies a large part of the working day and is very wearing to the workmen; while at the same time it is practically impossible to feed the metal to the molds as rapidly as desired, and as the metal is exposed to the air so long a time in the hand ladles that it chills, more or less, and the molds are not cast with the metal at as high a heat as desired, consequently many imperfect castings are made.

The present invention relates to what might be termed mold weights for holding the mold down, and at the same time providing for the proper feeding of the metal to the mold cavities; and it includes, generally stated, the combination of a series of sand molds having pouring gates extending down into and communicating with the mold cavities, and mold weights resting on one or more of said molds, each mold weight having a lip or extension at the side thereof adapted to extend over the space between the two molds, and having a pouring opening therein to communicate with the pouring gate of the mold, and a channel extending along the upper surface of the weight and its lip so that the metal may be poured continuously along the top of a series of molds and the metal will be directed by said mold weight into the mold cavities and carried over the space or point of juncture between the two molds over which the lip extends.

It also consists in certain other improvements which will be hereinafter more particularly set forth and claimed.

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

Figure 1 is a sectional view of a series of molds illustrating my invention. Fig. 2 is a like view, showing the invention as employed in connection with a series of steps for supporting the molds. Figs. 3 and 4 are perspective views of different forms of mold weights embodying the invention.

Like letters of reference indicate like parts in each.

The preferred form of my invention is illustrated in Fig. 1 of the drawings, and in connection therewith I have illustrated a ladle such as preferably employed for the pouring of molds, said ladle forming the subject matter of a separate application of even date herewith, Serial No. 449,910, the ladle A being hung from a suitable frame *a* on a track above the series of molds B, the ladle having a pouring spout a' controlled by a stopper a^2.

The several molds b', b^2, b^3, &c., are of the ordinary or any desired construction, and are formed in any desired way, the molds having the pouring gates *b* extending down into them and communicating in any desired way with the mold cavities.

In the general invention, forming the subject matter of this application, the molds are formed in the usual way with the ordinary pouring gates *b*, the runner feeding the metal to the several molds being entirely above the bodies of the molds.

To the left of Fig. 1 the combined mold weights and runners which show the simplest form of my invention are illustrated, the same being formed of metal of like blocks *c* resting upon the tops of the molds and so serving to confine the sand therein during the casting operation, as is usual with the ordinary mold weight, each weight having the pouring hole or opening *c'* in the center thereof which is placed over the pouring gate *b* so that the metal may flow through the said opening into the pouring gate. The weights have lips or extensions *d* which extend over the spaces *d'* between two adjoining molds, or connect between the molds and thus form bridges between the molds to prevent the metal from flowing down into the space *d'* between them; such space may, of course, be bridged in part by each weight or its lip, if desired. Extending across the upper surface of this metal weight *c* is the longitudinal groove, channel or runner *f* which in the series of weights forms the continuous runner extending over the series of molds, such runner in each metal weight extending along the bridge *d* so that the metal in the runner will pass across the bridge onto the next mold; and where the molds are arranged upon the same level as shown in Fig. 1, I prefer to have the extension *d* of each metal weight enter a seat d^2 formed for it in the adjoining weight, so that the metal can flow directly from one mold weight to the next and be directed thereby into the pouring gate of that mold. As illustrated between the molds *b'* and b^2 of Fig. 1, however, the bridge *d* simply extends onto the next mold without extending over the next mold weight, and any metal flowing from said bridge may be directed into the mold cavity by a slight supplemental runner or channel d^3 formed in the upper surface of the sand mold. It will be noticed that the runner *f* is arranged to extend on an incline over the two adjoining weights from the pouring gate of one mold to the pouring gate of the next mold, as shown at *f' f'*, and this is considered desirable, as described in said application of even date herewith, Serial No. 449,910, in order that the mold cavity of one mold may be entirely filled before the ladle is shifted to the pouring gate of the next mold, and the metal flowing therefrom during the shifting operation will pass down such inclined runner into the pouring gate of the next mold, all liability of the over-flow of the metal by part flowing back into the first pouring gate being prevented.

In Fig. 2 I have illustrated these same combined weights and runners as applied to a series of molds resting upon a series of steps *h*, so that the bridge or extension of the one weight may extend over above the next weight. The molds *b'*, b^2, b^3, &c., rest upon the steps *h'*, h^2, h^3, &c., and the combined weights and runners are constructed in substantially the way as above described, the bridge *d* of one weight extending entirely above the weight of the next mold as shown between the molds *b'*, b^2, or entering slightly into the next weight as shown between the molds b^2, b^3. This construction of molds would provide for the pouring of a continuous stream of metal at one end of the series, the metal flowing from mold to mold throughout the series until all are filled.

To the right of Fig. 1, as well as in perspective view Fig. 4, the mold weight is illustrated in the form of a metallic or other block or trough which rests upon several molds, two forms of the same being illustrated, and both being arranged so that the metal can be fed at one end of the gutter or runner and flow therefrom to the several molds. The long weight *n* rests directly upon the series of molds, and the openings *n'* communicate with the pouring gates, each block having a lip n^2 entering seats n^3 in the adjoining section, and the entire body of the block resting upon the molds.

In employing the invention herein described in casting molds, after the sand molds are made they are placed upon the foundry floor close to each other, a series of molds as at B being arranged in this way, and the mold weights or runners *c* are placed upon the same, the bridges or extensions *d* of these weights extending over the spaces between the molds as above described. The mold weights having the runners formed thereon, will confine the sand of the mold during the pouring operation, such weights being generally employed where the cores enter the mold cavities from above. The casting ladle A filled with metal is then brought over the series of molds, and the stopper of the ladle is raised so that the metal will flow therefrom, the ladle being brought over the pouring gate of the first mold *b'*, the metal flowing over the same in a stream controlled by the stopper until that mold is filled, when by suitable mechanism the ladle is shifted a sufficient distance to bring it over the pouring gate of the mold b^2, it not being necessary to check the flow of the metal, but the metal entering the continuous runner *f* on the mold weight which directs it over the space between the two molds and into the pouring gate of the next mold. The metal in the groove or runner passes over the bridge *d* onto the top of the nest mold and flows under the weight through the runner d^3 into the mold cavity, and this metal unites with the stream which is flowing directly into the mold cavity *c'* through the weight. When this mold is filled, by again shifting the ladle, it is brought over the pouring gate of the next mold b^3 and the metal flowing from the ladle during its passage to that pouring gate will flow in the continuous runner across the bridge

d and then onto the next weight on said mold b^3, the metal thus flowing along the inclined surface formed by the channels on the two weights into the pouring gate. By forming the runners inclined from one pouring gate to the other, each pouring gate may be filled before the ladle is shifted, and all the metal flowing from it during the shifting operation will be directed into the next pouring gate, so that liability of the metal overflowing will be prevented. Where the molds are arranged on steps, as shown in Fig. 3, the operation is the same as that above described, the bridges or extensions of the weights or runners placed upon the molds simply extending over onto the adjoining molds, so that the metal will flow from one mold to the other, as above described, all the molds being thus filled. Where a long mold weight adapted to extend over more than one mold is used, as shown to the right of Fig 1 the same movable ladle may be employed, and in each case it is shifted along the runner and over the several pouring gates, as above set forth, or the metal may be poured at one end of the runner and the metal may flow along the continuous runner to each pouring gate, passing into the same, filling that mold cavity, and then feeding to the next mold cavity in the series of molds, this being continued until the entire series is filled. By the employment of these mold weights or runners, placed on top of the series of molds, I am enabled to feed the metal along the continuous runner without the necessity of forming such runner or runners in the molds themselves, so that ordinary molds may be employed without any change whatever in forming the same, and the runners may be shifted from one series of molds to another, so as to provide for the casting of a large number by means of the same set of runners or weights.

No claim is made in this application to the particular construction of ladle illustrated, as that forms the subject matter of said application Serial No. 449,910; nor, broadly, to the series of molds having pouring gates entering the same and the exposed continuous runner extending along said molds, in combination with the ladle carried above the continuous runner and adapted to move along above the molds and feed the metal to the continuous runner, as that forms the subject matter of an application filed by me November 24, 1893, Serial No. 491,698, the same being a division of said application, Serial No. 449,910.

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

1. The combination of two or more sand molds having pouring gates extending into the same and mold weights supported on the molds and having channels therein above the bodies of the molds, and openings communicating with the pouring gates of the molds, each mold weight having a lip or extension extending over the space between the molds and adapted to feed the metal over such space into the pouring gate of the adjoining mold, substantially as and for the purposes set forth.

2. The combination with a sand mold having a pouring gate extending down into the same, of a mold weight or block having a pouring opening therein, and having a channel extending along its upper face to form a runner over the mold, substantially as and for the purposes set forth.

3. The combination with a sand mold having a pouring gate extending down into the sand, of a mold weight having a lip or extension at the side thereof, and having a pouring opening therein and a channel extending along the upper surface of the weight and its lip, substantially as and for the purposes set forth.

4. The combination of two or more sand molds, having pouring gates extending into the same, and a mold weight having a pouring opening therein above the pouring gate of the mold, and having an extension at one end thereof forming a bridge extending over the space between the two molds, substantially as and for the purposes set forth.

5. The combination of two or more sand molds, and mold weights above the same, said weights having pouring openings therein and the two weights having formed therein a runner extending over the two weights from one pouring gate to the next, substantially as and for the purposes set forth.

6. The combination of two or more sand molds and mold blocks or weights resting on or above the same, each mold block having an extension or bridge at one end thereof, and having a seat into which the bridge of the adjoining mold block enters, substantially as and for the purposes set forth.

7. The combination of two or more sand molds supported on steps in line with each other, and a block or weight resting on one sand mold, and having a lip or extension forming a bridge extending over to the block or weight on the adjoining mold, substantially as and for the purposes set forth.

In testimony whereof I, the said STEPHEN JARVIS ADAMS, have hereunto set my hand.

STEPHEN JARVIS ADAMS.

Witnesses:
JAMES I. KAY,
J. N. COOKE.