(No Model.)

S. J. ADAMS.

CASTING SAND MOLDS.

No. 521,521. Patented June 19, 1894.

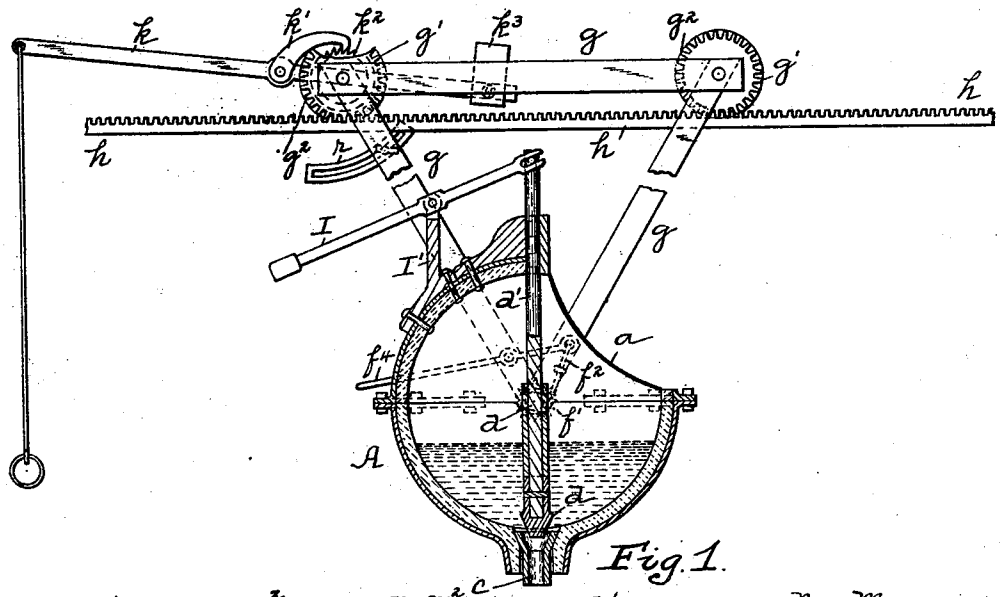

Fig. 1.

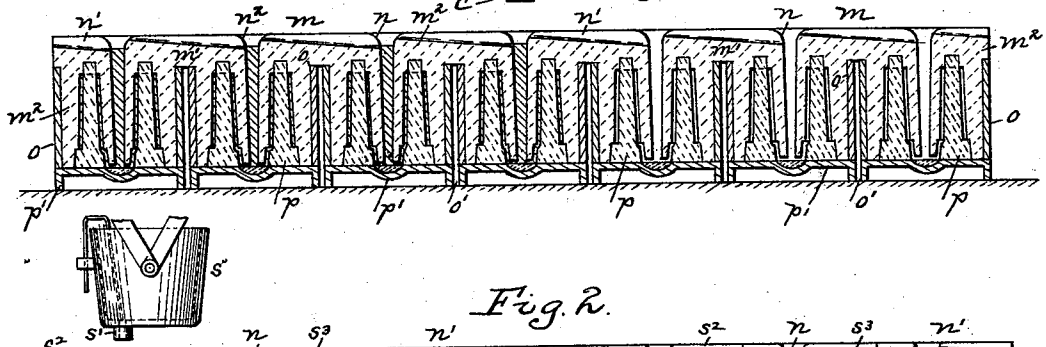

Fig. 2.

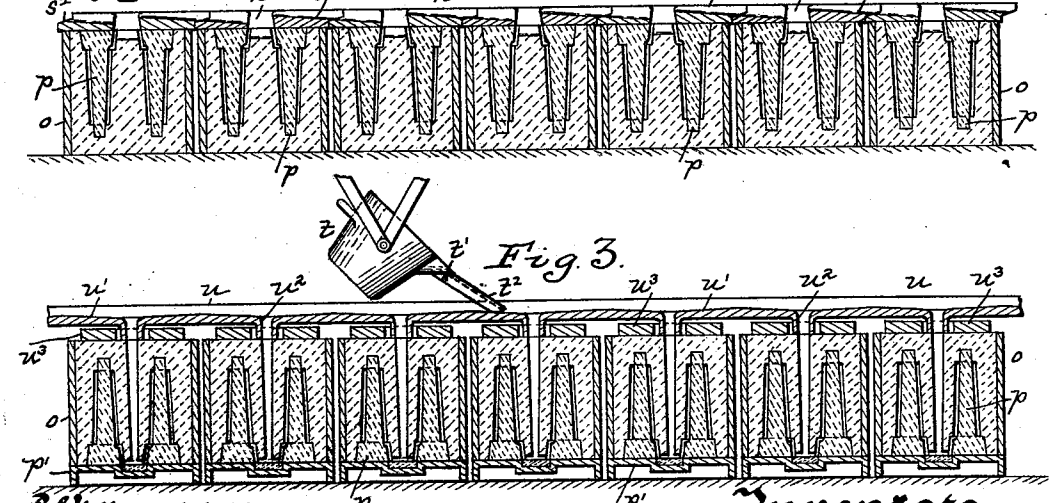

Fig. 3.

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STEPHEN JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

CASTING SAND MOLDS.

SPECIFICATION forming part of Letters Patent No. 521,521, dated June 19, 1894.

Original application filed October 24, 1892, Serial No. 449,910. Divided and this application filed November 23, 1893. Serial No. 491,698. (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 Casting Sand Molds; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the casting of sand molds, its object being to provide a convenient and rapid manner for the casting of a series of molds by the use of a suitable ladle which can be shifted from mold to mold when found necessary so as to reduce the labor of casting in the ordinary foundries, this application being a division of application filed by me October 24, 1892, Serial No. 449,910. The general custom for casting metal in small molds has been to employ hand ladles which are carried by the workmen by means of a long handle, such weight of metal as the ordinary man can carry in the ladle being received from the cupola and being carried by him to the molds, and poured into the molds; this work being very laborious, as in large foundries the molds are often a long distance from the cupola and it requires the carrying of the metal this distance; and after reaching the molds the molder must support his ladle above each mold and pour carefully so as to cause the metal to flow into the pouring gate of the mold and prevent the metal from overflowing, and in making small castings he must move from mold to mold and repeat the operation, this work being the heaviest in the ordinary foundry operations. By my invention a large body of metal can be taken and carried to the molds and fed to the molds, the heavy work usually done by the molder being thus overcome.

To these ends my invention consists, generally stated, in combining with a series of molds having pouring gates entering the same and an exposed continuous runner extending along the same, a ladle carried on a track and having the spout or outlet above the runner of the molds and adapted to move along the track and feed the metal to the continuous runner of the series of molds.

It also consists in certain other details of construction and combination of parts, all of which will be more fully hereinafter 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 my invention, some of the parts being shown in full lines, and Figs. 2 and 3 show other forms of my invention.

Like letters of reference here indicate like parts in each of the figures of the drawings.

The preferred form of my invention is illustrated in Fig. 1 in which the ladle A is of the form described and claimed in said application, Serial No. 449,910, of which this application is a division. The ladle A is prefably spherical in shape, having the form of a large hollow ball with a receiving opening a in one side thereof, through which the metal may be introduced into the ladle. It is formed of suitable metal sections or shells suitably lined with refractory material, and has the pouring outlet c at the lower end, which is controlled by a suitable valve or stopper d. The ladle is hung on suitable trunnions f (shown in dotted lines) in a frame g from a suitable track h, which in the drawings is shown as an overhead track, and which is arranged to extend from the cupola or other receiving point to and above the line of molds into which the metal is to be cast, the frame g having the flanged rollers or wheels g' traveling on the track h, and so supporting the ladle. The valve rod d' and its stopper d are operated by any suitable means, such as by the lever I mounted on the bracket I'. After the metal has been poured into the ladle, and it is desired to bring the ladle into pouring position, it is turned through the lever I, or by other suitable mechanism, and in order to hold it in place, I secure upon one trunnion a ratchet wheel f' into which a pawl or catch f^2 supported on the frame g takes, this pawl being controlled by the lever f^4 and acting to hold the ladle in whatever position is desired, these parts being shown in dotted lines, and being particularly described and claimed in said application, Serial No. 449,910. The ratchet wheel f' is made with deep teeth in order to give a strong hold between it and

the pawl, and to prevent the freeing of the ladle by any but a long movement of the pawl. In order to turn the ladle it is necessary to withdraw the pawl, and in bringing it to its pouring position to turn the ladle on trunnions, and then cause the pawl f^2 to engage, when the ladle will be held in that position until it is desired to bring it back to its receiving position.

As shown in Fig. 1, I have illustrated the ladle shown in said application Serial No. 449,910 in connection with the series of sand molds m with which it is specially adapted to be employed, that series of molds m being shown with a continuous runner n' extending along the same from which runner the pouring gates n extend down into the molds. The continuous runner is illustrated as being inclined from one of these pouring gates to the next pouring gate, as at n^2, the purpose of such inclination being to feed any of the metal down into the next pouring gate so that as soon as one mold is filled the ladle may be moved, and in case any metal is flowing therefrom, that metal will be fed into the next pouring gate. Any suitable form of bridge between the several molds in the series may be employed, such bridge being shown at m', and is formed by the sand m^2 of the series of molds. The bridge m' is adapted to extend over the space o' between the flasks o of the series of molds m. The cores p in the series of molds m extend from the bottom upward, and are shown as resting upon the bottom boards p'.

In Fig. 2 I have shown another form of my invention, in which the metal may be poured into the series of molds from a converter ladle. This ladle s may be hung in the same manner as described in connection with Fig. 1, and the molten metal may pass therefrom through its spout s' onto the continuous runner, which in this case is formed of runner blocks or weights s^2 having inclined surfaces s^3 thereon which direct the metal into several pouring gates n of the molds. The cores p are inserted in the tops of the series of molds and the pouring gates are formed between the different mold cavities.

In Fig. 3 I have also shown another form of ladle from which the molten metal may be poured by the tilting of the ladle through a spout in the upper part thereof. This ladle t has the ordinary spout t' thereon, and has hinged thereto a supplemental spout t^2 which acts to direct the metal from the ladle t into the continuous runner. The continuous runner u in this case is formed of a long trough, generally the length of the series of molds, and has the inclined surfaces u' thereon and the pouring gates u^2 formed between them. A number of mold weights u^3 are placed around the pouring gates u^2 and under the continuous runner u to assist in weighting the molds.

The construction of the different molds and runners illustrated forms the subject matter of other applications filed by me on October 24, 1892, Serial Nos. 449,901, 449,902, and 449,903, and on November 11, 1893, Serial No. 490,650.

In the operation of pouring from such ladle, it is desirable to hold the ladle as nearly as practicable over the pouring gate of one mold, and then bring it quickly to the next mold, and so doing away with the necessity of checking the flow of the metal, and for this purpose any suitable shifting or step by step mechanism may be employed. I have illustrated one form thereof which is considered preferable for the purpose, and which may be employed with any form of ladle, the track h where it extends over the series of molds having a rack h' thereon, and one or both wheels g' having a geared face g^2 engaging with that rack, so that upon the turning of the wheel a fixed distance, according to the distance between the pouring gates, the ladle with its frame may be carried that distance. To shift the frame and ladle along the track, I prefer to employ a lever k which is mounted on the frame, and has the pawl or dog k' engaging with a ratchet wheel k^2 secured to the wheel g', or on the same shaft therewith, so that by drawing down the lever k the pawl or dog will through said ratchet wheel turn the wheel g', which by means of its gear face engaging with the rack face of the rail h will carry the frame the desired distance. In order to regulate this distance, I secure to the frame g the adjustable stop r which extends out in the course of the lever, so that when the lever is drawn down it will strike against this stop, and its movement be checked thereby, the stop being adjustable on the frame so that it can be regulated according to the distance between the pouring gates of the molds. The lever k has also the counter weight k^3 on an extension thereof, and when the lever is free, the counter weight will draw it up, the dog k' passing over the ratchet teeth of the wheel, and the lever assuming its normal position ready for the next stroke in moving the ladle and its frame. The form of the propelling mechanism or the stop mechanism can, of course, be varied, as found desirable.

In employing the apparatus as above described, the ladle, (of any suitable form) is run along its track to the cupola or other point at which it receives its charge, such, for example, as where a series of these molds are arranged to be fed from another larger ladle carrying a large body of metal which is filled at the cupola and carried along the track to different parts of the foundry at which the ladles, such as described, may be filled. The ladle is then drawn in any suitable way to the point at which the metal is to be cast. The ladle is then brought over the series of molds to be poured, and the operator brings the pouring spout or outlet c over the first pour-

ing gate in the series of molds and raises the stopper or valve *d* a sufficient distance to permit the proper stream of metal to flow into the mold. He holds or secures the stopper in this position, and as soon as he sees that this mold is filled, he draws down the lever *k* giving the full stroke thereto, which draws the frame and ladle over so that the spout is brought above the next pouring gate in the series of molds, and upon releasing the lever *k* it returns to its normal position ready for the next stroke. The metal which flows from the spout during its passage from one pouring gate to the next pouring gate will flow down the inclined face of the continuous runner into one of the pouring gates, so that there is no fear either of the loss of metal or of the splashing of the metal such as where it strikes a flat surface, this often causing the burning of the workmen if they were too close thereto. He continues in this way to fill all the molds in the series, or a number of series of molds, feeding the metal in the manner above described, having the metal under full control and regulating the stream as he finds proper, and in some cases, if necessary, closing off the stream entirely by forcing the stopper into the seat of the spout. As soon as he has filled this series of molds the ladle can be quickly shifted onto another track and brought over another series of molds, or the track carrying the ladle shifted over another row of molds and the pouring continued, or a bridge trough extended to another row of molds, in either case the flow of metal continuing from the ladle, if so desired, until it is emptied. In this way the pouring of the metal to small sand molds can be easily and properly accomplished and the flow of metal to the same be regulated, while the heavy labor of carrying the metal to the molds is entirely overcome.

In case the operator desires to pour a series of molds of different sizes or widths, he can adjust the stop *r* according to the space between the molds and so arrange for the carrying of the ladle the proper distance between each mold to be poured. The operation is substantially the same with the ladles and molds illustrated in the other figures of the drawings, and which are simply illustrative of the general invention.

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

1. The combination of a series of molds having pouring gates entering the same, and having an exposed continuous runner on and extending along the upper part of the series between and communicating with the pouring gates, and a ladle carried above such continuous runner adapted to move above the molds and to feed the metal to the continuous runner, substantially as set forth.

2. The combination of a series of molds having pouring gates extending down into the same, and having an exposed continuous runner on and extending along the upper part of the series of molds between and communicating with the pouring gates, a ladle carried above the continuous runner, and propelling mechanism for moving the ladle, said mechanism operating to move the same intermittently for regulated distances corresponding to the distances between the pouring gates, substantially as set forth.

3. The combination of a series of molds having pouring gates extending down into the same, and having an exposed continuous runner on and extending along the upper part of the series of molds between and communicating with the pouring gates, a ladle carried above the continuous runner, propelling mechanism carried by the ladle frame for moving the ladle, said mechanism operating to move the same intermittently for regulated distances corresponding to the distances between the pouring gates, and stop mechanism controlling such intermittent movement, substantially as set forth.

4. The combination of a series of sand molds having pouring gates extending down into the same, a series of mold weights placed on said molds and having holes therein, and a trough extending over the molds and forming a continuous runner, said trough having tubular extensions passing through the mold weights and communicating with the pouring gates of the molds, substantially as set forth.

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

STEPHEN JARVIS ADAMS.

Witnesses:
J. N. COOKE,
ROBT. D. TOTTEN.