

(No Model.)

S. J. ADAMS.
SAND MOLD.

No. 521,454.

Patented June 19, 1894.

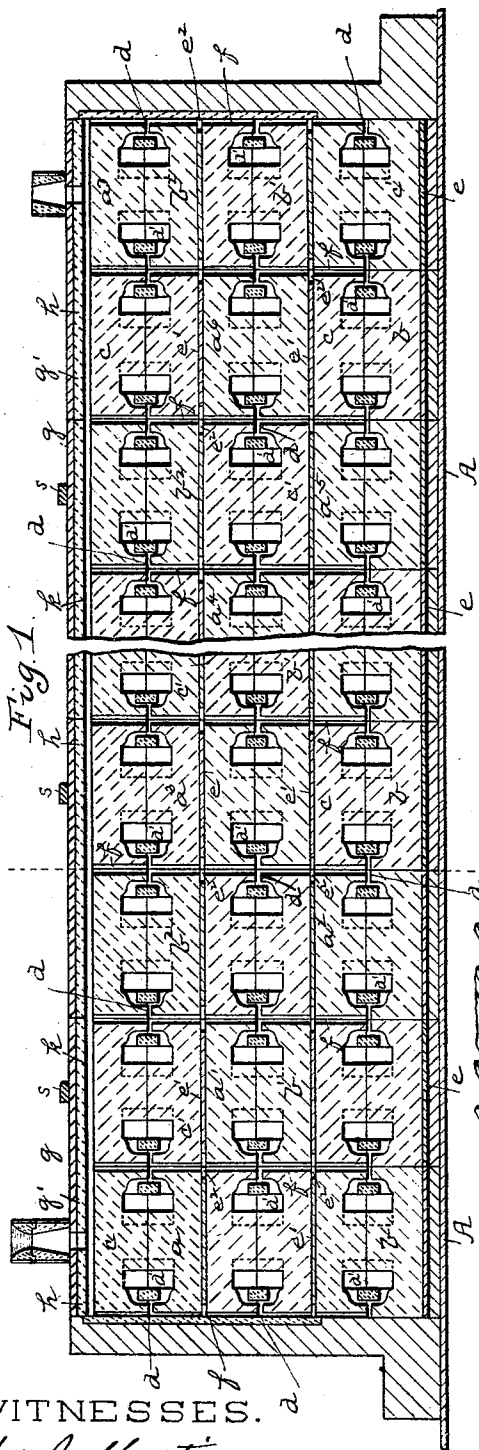


Fig. 1.

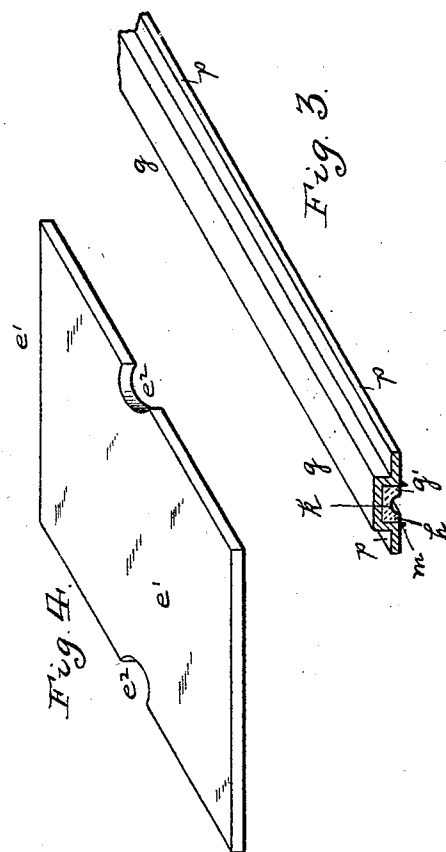


Fig. 3.

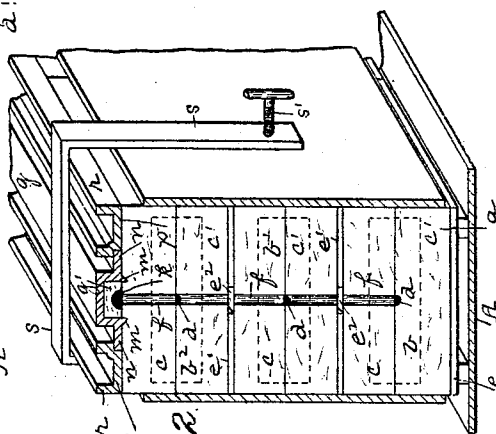


Fig. 2.

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STEPHEN JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

SAND MOLD.

SPECIFICATION forming part of Letters Patent No. 521,454, dated June 19, 1894.

Application filed October 24, 1892. Serial No. 449,909. (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 sand molds and to devices for feeding the metal to a large number of molds at one time, and the arrangement of the molds for receiving the same so that they may be built up in sets, two or more in height, and the metal may be carried from a common point to all the molds in the series of sets so arranged; as well as to certain improvements in the formation of the continuous runner for feeding the metal to the series of molds.

To these ends my invention consists, generally stated, in a series of sets of sand molds placed in line and in contact with each other, each set being formed of two or more molds, the one resting upon the other, a continuous runner extending along said molds, and down take channels or runners leading from the continuous runner to the mold cavities in each set of molds.

It also consists in a continuous runner formed of an inverted trough resting on the series of molds and forming a joint therewith, so as to confine the metal and feed it to the down take channels leading to the mold cavities in the series of molds.

It also consists in certain other improvements, both in the series of sets of molds, and in the inverted trough, as hereinafter more particularly described.

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 longitudinal section of a series of molds illustrating the invention. Fig. 2 is a perspective end view of the molds showing the face of one set of molds in the series. Fig. 3 is a perspective view of the trough-shaped runner employed for feeding the metal to the molds, and Fig. 4 is a perspective view of the bottom plate employed with the different molds in each set of molds.

Like letters of reference indicate like parts in each of the views.

The series of sets of molds *a a'*, &c., are built upon a metallic or like bed plate *A* so as to provide an even surface for supporting the same. The sets of molds are shown as three high, such as at *b b' b''*. Each mold illustrated is what is known as a two-part mold having a cope *c* and drag *c'* so as to inclose any form of casting desired, the cross runner *d* being formed between the cope and drag and leading into the mold cavity *d'*. The lower bottom plates *e* are generally of the ordinary form having cross ribs thereon, and these bottom plates rest upon the bed plate *A* and support primarily the lower molds *b*. The molds above the lower molds are each preferably supported on the bottom plates *e'*, which bottom plates, as shown in Fig. 4, are flat, that is, without any supporting ribs on the lower surfaces, and have recesses *e''* formed in their sides through which the down take channels *f* extend so as to provide for carrying the metal past the bottom boards of the molds above the bottom molds to the cross runners leading to the mold cavities below the molds supported on such plates. In this way a set of any desired height may be built up together, the down take channels or runners *f* preferably being formed by grooves extending along the sides of the different molds in the set above the bottom molds, and as one set of such molds is placed against another such set, they will close or form together the down take runner leading to the cross runners which communicate with the mold cavities in the several molds. Any number of sets of such molds are built in this way upon the bed plate in line and in contact with each other, and the metal may be fed to the molds through the down take channel or runner in any suitable way, that is, with any form of continuous runner, or, for that matter, by direct pouring in each down take runner.

I have illustrated in this application one form of continuous inclosed runner adapted to feed the metal to the series of molds which may be employed either with a series of molds, one high, or a series of sets of molds, such as illustrated in the drawings. This runner is formed of an inverted trough adapted to rest upon the series of molds, as at *g*, which may be lined with either sand, fire clay, or other suitable material, as at *h*, and in which is

formed the runner groove *k*, the inverted trough resting on and forming a joint with the molds, and the runner groove communicating with the down take runners *f* so that the metal may be fed therefrom to the mold cavities with which it communicates. I prefer to form the trough *g* of metal and to line the same with fire clay blocks *g'* fitting and secured therein, so that the trough may be quickly lifted from one series of molds to another without the necessity of forming a new lining of sand after each use. In order to insure a close joint between the trough body and the series of molds on which it rests, I provide the trough with the ribs *m* which are adapted to be pressed into the sand of the molds and so insure such tight joint. The trough may also have the horizontal plates *n* extending out therefrom so as to partially or wholly cover the surface of the top of the series of molds, and to form at the same time the necessary mold weight for confining such top surfaces. Such plates may either extend for the full width of the mold, or where the molds are of considerable width separate plates *p* may rest on the molds along the sides of the inverted trough, so as to cover the body of the mold sufficiently to confine the metal in casting. In the latter case, I prefer to provide the plates *p* with ribs *r* which extend up practically to the same height as the inverted trough so that when the clamp is placed over the molds to confine them it will bear upon the inverted trough and upon the said ribs *r* and hold the plates to place. When such inverted trough is employed, separate side plates may be employed fitting against the sides of the series of sets of molds, and may be held to place by suitable clamping mechanism, such as that illustrated in the drawings, an E-shaped clamp *s* extending over the trough and down along the sides of the molds, and having suitable clamping devices, such as the jack screw *s'* shown, to bear against the side plates and bind the whole together ready for the casting operation.

When the invention is employed, I prefer to form each set of molds separately, forming first the molds *b* upon the bottom boards *e*, and then forming the next mold which rests upon the flat bottom board *e'* with the recesses or openings *e²* therein, and so building up the set, and while they are so arranged, either in the molding operation or afterward, forming the down take channel or runner *f* leading to the cross gates communicating with all the mold cavities in the set. The set so formed is carried out and placed upon the bed plate *A* and a like set when formed is placed against the same, any number of sets of molds being thus built up together. The inverted runner trough is then placed over the series of molds so that its runner groove *k* communicates with the down take runners in the series of molds, the side plates

are secured and clamped in position and the ends of the molds properly confined by abutments, and a suitable pouring gate or reservoir is placed in communication with the runner groove in the trough. When so arranged the metal is poured from a suitable ladle into the reservoir and flows thence into the runner groove *k* of the inverted trough, being confined therein, and passing through the groove until it reaches the first down take runner *f* when it flows down the same past the molds above the lowest and passing along through the recesses *e²* in the bottom plates *e'* until it reaches the first cross gate *d* leading to the mold cavity *d'* in the lowest mold and filling the same, and as it rises again within the channel filling the other mold cavities in the set of molds in the same manner. When these are filled, the metal flows on in the inverted trough, filling in like manner the mold cavities in each set of molds through the down take runner leading thereto. When the metal reaches and fills the last of the molds in the series, it rises within the reservoir and as the metal is confined by the trough above described and a head of metal is formed in the reservoir or reservoirs, it acts to hold the metal in place and to force the gases through the sand walls of the mold and to insure the formation of perfect castings, preventing shrinkage or blowing thereof. As soon as the metal is sufficiently set, the trough shaped runner may be lifted therefrom and placed upon another like series of molds and quickly arranged for use therewith, the parts being clamped together and the trough-shaped runner being used with as many such series of molds as found necessary. Where the fire clay lining for the trough shaped runner is employed as it is properly held therein it will prevent the cutting of the metal into the body of the trough shaped runner and even though highly heated by contact with the metal will not be otherwise affected thereby, and as the runner is lifted from one series of molds and secured upon another, it provides a runner which is not so liable to chill the metal flowing through the same. In this way a large number of molds may be poured from one central point, the labor, time and skill heretofore found necessary for pouring each such mold separately being done away with, and much more perfect castings being obtained as the metal is practically fed to the mold cavities under pressure and when confined, and practically all liability of shrinking or blowing is overcome.

In an application of even date herewith, Serial No. 449,908, the broad principle of the employment of a series of sets of molds placed in line with each other, each set formed of two or more molds resting one on the other, and the continuous runner extending along said molds above the mold cavities communicating with the down-take runners leading to

the mold cavities, is set forth and claimed. No claim is made in this application to that broad principle.

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

1. In sand molds, the combination of a series of two or more sets of molds placed in line and in contact with each other, each set being formed of two or more molds the one resting on the other, said sets of molds having a down take channel or runner leading between the sets to the cross gates communicating with the mold cavities in the sets of molds, and the molds above the bottom mold in each set being supported on bottom boards having recesses or openings therein for the down take channels, substantially as set forth.

2. In combination with a series of sand molds having down take channels leading to the mold cavities, and a continuous runner formed of an inverted trough resting on said series of molds and forming a close joint therewith, and having a runner groove communicating with the pouring gates leading to the mold cavities, substantially as and for the purposes set forth.

3. In combination with a series of sand molds having down take channels leading to the mold cavities, a continuous runner formed of an inverted trough resting on said series of molds and forming a close joint therewith, and having a runner groove communicating with the pouring gates leading to the mold cavities, said inverted trough being formed of a metal body having a tile or like lining therein in which the runner groove is formed, substantially as and for the purposes set forth.

4. In combination with a series of sand molds having down take channels leading to the mold cavities, a continuous runner formed of an inverted trough resting on said series of molds and forming a joint therewith, and having a runner groove communicating with the pouring gates leading to the mold cavities, said trough having longitudinal ribs formed

thereon to enter the sand and insure a tight joint, substantially as and for the purposes set forth.

5. In combination with a series of sand molds having down take channels leading to the mold cavities, a continuous runner formed of an inverted trough resting on said series of molds and forming a joint therewith, and having a runner groove communicating with the pouring gates leading to the mold cavities, said trough having horizontal plates extending out at the side thereof, substantially as and for the purposes set forth.

6. In combination with a series of sand molds having down take channels leading to the mold cavities, a continuous runner formed of an inverted trough resting on said series of molds and forming a joint therewith, and having a runner groove communicating with the pouring gates leading to the mold cavities, and separate horizontal plates extending along the sides of the trough to confine the mold, substantially as and for the purposes set forth.

7. In combination with a series of sand molds having down take channels leading to the mold cavities, a continuous runner formed of an inverted trough resting on said series of molds and forming a joint therewith, and having a runner groove communicating with the pouring gates leading to the mold cavities, and separate horizontal plates extending along the sides of the trough to confine the mold, said separate plates having upwardly extending ribs, and a clamp extending over said trough and horizontal plates and bearing on said ribs, 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.