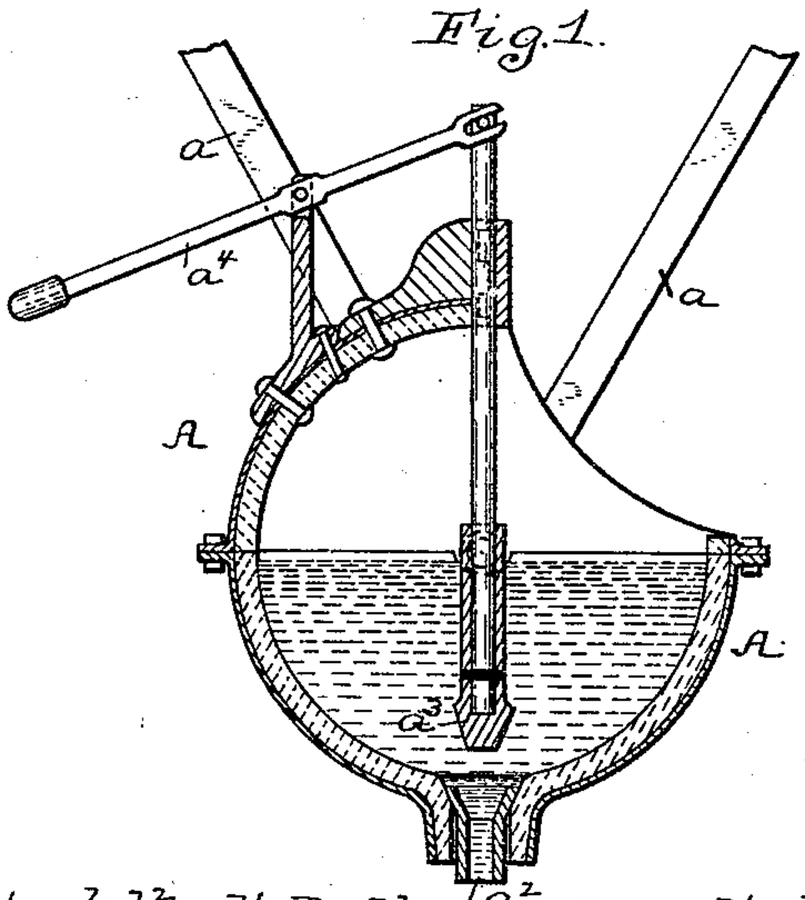
(No Model.)

S. J. ADAMS.

SAND MOLD.

No. 521,448. Patented June 19, 1894.

Fig. 1.



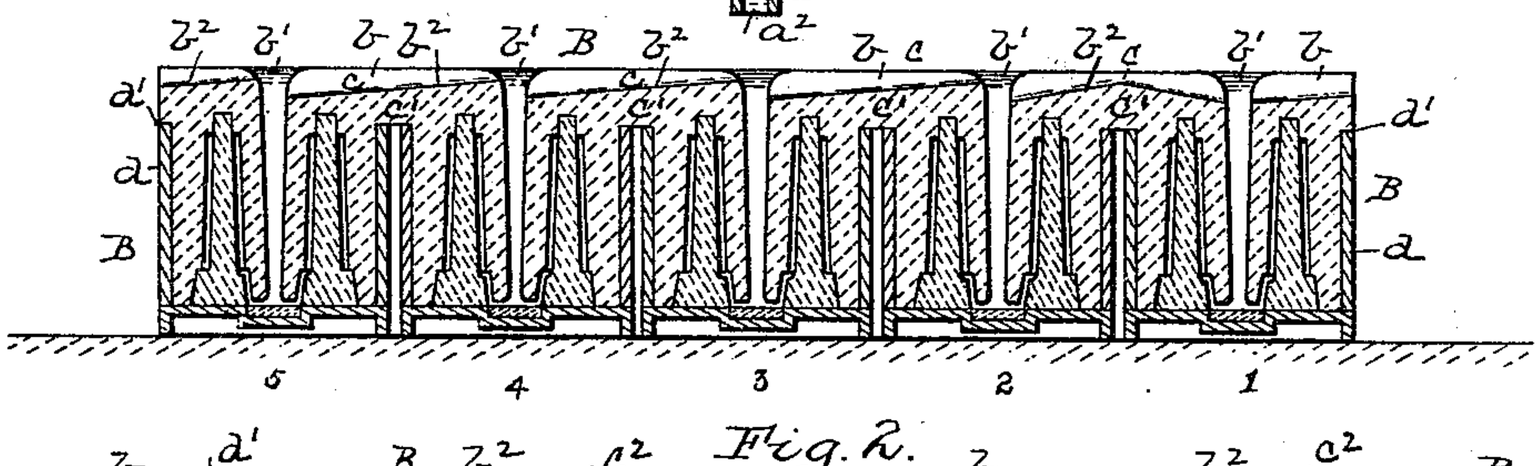


Fig. 2.

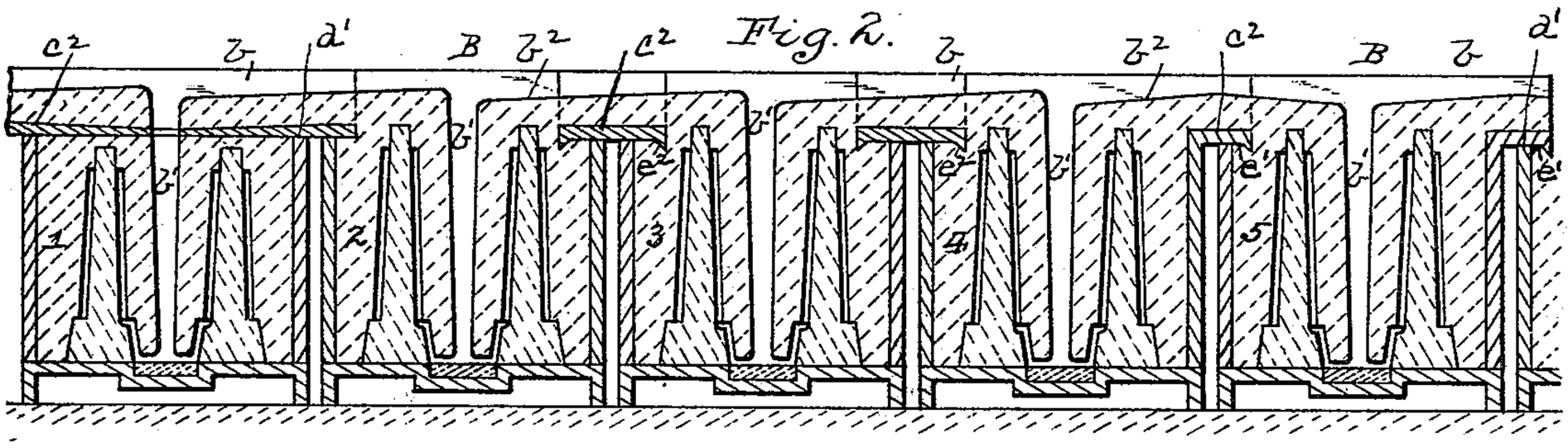
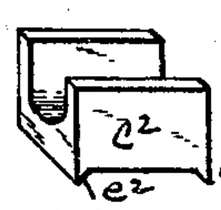


Fig. 4.



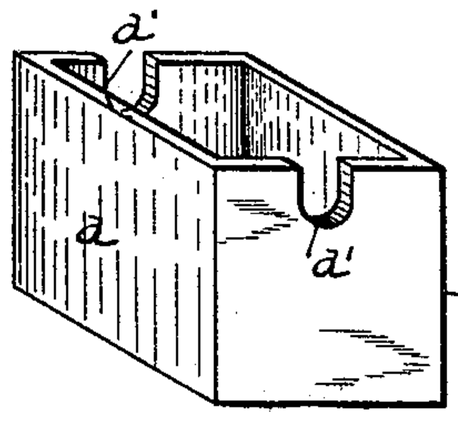


Fig. 3.

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STEPHEN JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

SAND MOLD.

SPECIFICATION forming part of Letters Patent No. 521,448, dated June 19, 1894.

Application filed October 24, 1892. Serial No. 449,901. (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 or casting of metal in sand molds, and to the construction of runners for feeding the metal to the pouring gates of these molds. In the formation of small 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 so 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 each pouring gate of the mold while he supported the ladle of metal; this requiring skill and endurance and being practically the heaviest work in the formation of small molds. When it is appreciated that some molders can make between three and four hundred molds per day, and that it is necessary for them to carry their 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 this work occupies a large portion of the 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, on account of the total cessation of pouring between each mold and passing to the next one, and as the metal is exposed within the hand ladles and liable to chill somewhat, the molds are not cast with the metal at as high a heat as desired.

The object of my invention is to provide for the casting of these sand molds more rapidly, and to do away with the hand labor by so arranging and constructing the molds that they may be poured continuously, and that ladles carrying a much larger amount and supported on tracks, or in other suitable way, may be employed for the casting of the metal.

To these ends my invention consists, generally stated, in the combination of a series of sand molds and a runner formed in the sand of the mold above the mold cavities extending along the same and communicating with the pouring gates leading down into the several molds, so that the metal may be fed to such runner and pass therefrom into the pouring gates of the different molds, and that a continuous stream may be fed to such runner so as to supply the metal to the different molds.

It also consists in combining with the series of sand molds such a runner or runners extending along the same, and bridges between the different molds, so as to carry the metal over the space between the molds and the flasks of the molds where such flasks are employed.

It also consists in certain improvements in the construction of the runners, the flasks and the bridges between the flasks, as 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 showing one form of runner employed therewith, and showing the casting ladle above such series. Fig. 2 is a like view of another series of molds, showing different constructions of runners and bridges between the molds. Fig. 3 is a perspective view of one form of flasks where the runners are made in the sand of the mold; and Fig. 4 is a perspective view of a connecting bridge.

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

I have illustrated in Fig. 1 the form of ladle which I prefer to employ, that ladle forming the subject matter of a separate application of even date herewith, Serial No. 449,910, and the ladle A which is illustrated being hung from a frame *a* running on a track above the series of molds B, the ladle having the pour-

ing spout a^2 which is controlled by a stopper a^3, operated by a lever a^4. In Fig. 1 the series of molds illustrated has the continuous runner b formed in the upper surface thereof, this runner extending over the spaces between the different molds by means of bridges c, and being formed continuous over the line or series of molds in order that a continuous stream of metal may be fed to the series of molds, and the necessity of checking the flow of metal to the mold while the ladle is shifted from one mold to the other being overcome, as by the employment of a continuous runner the fear of the splashing of the molten metal as it flows from the ladle is overcome, and the metal as it flows therefrom may be directed by said runner into the pouring gates b' leading down into the mold cavities.

I have illustrated the continuous runner as formed on an incline from the edge of one pouring gate to the next pouring gate, the incline b^2 of the runner being so constructed in order that as soon as one mold is filled the operator can shift the ladle gradually along to a point above the next pouring gate, and any metal flowing from the ladle during its movement from one pouring gate to the next gate will flow down such incline in the runner into the pouring gate over which the ladle is brought, so enabling the operator to continue pouring into one gate until that mold is filled and preventing the overflow of the metal by any metal flowing back into that pouring gate. That is to say, that the operator fills one pouring gate, and all the metal flowing from the ladle into the runner during the shifting of the ladle is directed into the next pouring gate with the metal fed thereto from the ladle, so that it adds to the stream from the ladle, flowing with it into the pouring gate until that mold is filled, and the metal flowing from the ladle during the time that it is next shifted acts in the same way. If preferable, however, the runner may be constructed as shown in the mold to the right of Fig. 1, so that it will be inclined in both directions toward the pouring gate of that particular mold, though this is not considered desirable.

In forming the bridges between the different molds, I may employ different forms, as illustrated in the drawings, simply packing sand between the molds so as to bridge between them as shown at c', or employing a rigid bridge c^2 which is formed of metal, fire brick or other such material, and enters seats formed for it in the sand of the mold, such a bridge being illustrated in perspective in Fig. 4, and as the mold is formed, seats to receive such bridge being formed in the upper surface thereof. It will be seen that in any of the cases where the runner is formed in the surface of the molds themselves, and where a flask d is employed, it will be necessary to form in said flask recesses or depressions d' within which the runner passing from one mold to the other is formed, such depressions or recesses being formed in both ends of the flask where a small sand bridge c' or a separate fire brick or like bridge c^2 is employed.

If desired, I may form the bridge on the flask as shown in Fig. 2, such a bridge extending out at one end of the flask and entering a depression d' formed in the other end of the adjacent flask and such bridges being lined with sand so as to protect the body of the bridge while the bridge itself enters a seat e' formed for its reception in the body of the mold and so forms a continuous runner over the top of the mold. Where I use the separate fire brick or like bridge c^2 or form the bridge as part of the flask, in order to insure a tight joint of the bridge with the sand of the mold, I form around the under face thereof a rib e^2, which can be pressed down into the sand and so insure a tight joint. The separate fire brick bridge c^2 may have such ribs formed at each edge thereof.

In all the forms of my invention illustrated in the drawings, it is evident that where a movable ladle is employed, such as illustrated in Fig. 1, after the molds have been arranged for the casting, the operator will bring the ladle above one mold of the series, such, for example, as above the first of the mold 1 in Fig. 1. He then raises a stopper a^3, so as to permit the metal to flow through the pouring spout a^2, and the metal will flow through the pouring gate b', filling the mold cavities thereof, and as soon as that mold is filled, by means of suitable machinery the ladle will be drawn over to a point above the next mold, such as the mold 2. The ladle may also be arranged to move continuously, the flow being regulated by the stopper to just meet the demands of the molds. Where a mold such as shown to the right of Fig. 1 is employed, the metal passing from the ladle into the continuous runner will flow back into the pouring gate of the mold 1, as the runner in that mold is inclined in both directions toward that pouring gate. The metal passing onto the inclined runner of the mold 2 will, however, flow down into the pouring gate of the mold 2, and as soon as that mold is filled when the ladle is again moved all metal escaping from the ladle after it leaves the pouring gate of the mold 2 will flow down through the inclined runner to the pouring gate of the mold 3; this being the preferred construction, as it enables the operator to fill the one mold entirely before he shifts his ladle, and to know that all the metal after the ladle leaves that pouring gate will flow into the next pouring gate, all fear of the metal overflowing being thus prevented. He so continues throughout the entire series, and can then close the spout of the ladle and shift the ladle above the next series of molds on another track and continue the operation. The molds are thus arranged for the continuous pouring of the metal and for the pouring of the same without the necessity of stopping the flow of the metal from the ladle, the flowing of the metal

from the same being regulated to such a stream as found best for the purpose and being continued throughout the entire series of molds, and it being evident that as the metal is always flowing in the continuous runner and is directed by the same into the one or the other pouring gate, all fear of the spilling of the metal is overcome, while the metal may be poured much more accurately and rapidly than if poured by hand; the great labor incurred and time occupied in pouring the molds in the old hand way being thus overcome.

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

1. The combination of a series of sand molds and a continuous runner extending along the same and formed in the sand of the molds above the mold cavities and communicating with the several pouring gates leading to the mold cavities of the several molds, substantially as and for the purposes set forth.

2. A sand mold having two or more mold cavities and having a pouring gate extending down into the mold and communicating with the mold cavities, and having a runner formed in the sand of the mold above the mold cavities and extending along the same entirely across the upper part of the mold, in combination with another sand mold adjoining the same and with which said runner communicates, substantially as and for the purposes set forth.

3. The combination of two or more sand molds, a runner formed in the sand of the molds extending along the upper part thereof and communicating with the pouring gates, and a bridge runner extending over the space between the two adjoining molds, substantially as and for the purposes set forth.

4. The combination of two or more sand molds having the top surfaces thereof approximately on the same level and having pouring gates extending down into and communicating with the mold cavities thereof, and a runner formed in the sand of the molds and extending between the pouring gates of the two molds and inclined from the pouring gate of one mold to the pouring gate of the adjoining mold, substantially as and for the purposes set forth.

5. The combination of two or more molds having pouring gates extending down into and communicating with the mold cavities thereof, a runner formed in the sand of and extending along the top of the molds between the pouring gates, and a rigid bridge over the spaces between the molds, substantially as and for the purposes set forth.

6. The combination of two or more sand molds, one having a seat formed in the upper part of the sand thereof, and a bridge runner extending from the other mold and entering said seat and extending over the space between the two adjoining molds, substantially as and for the purposes set forth.

7. The combination of two or more sand molds, one having a seat formed in the upper part thereof, and a bridge runner extending from the other mold over the space between the two adjoining molds and entering said seat, said bridge runner having a lip on the edge thereof to press into the seat of the mold, substantially as and for the purposes set forth.

8. The combination of two flasks for sand molds, one having a recess in the top edge thereof, and a bridge extending between the two adjoining flasks and fitting in said recess, substantially as set forth.

9. In sand molds, the combination of two adjoining flasks, one flask having a recess therein and the other flask having a bridge secured thereto and extending over and entering into the seat formed in the adjoining flask, 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.