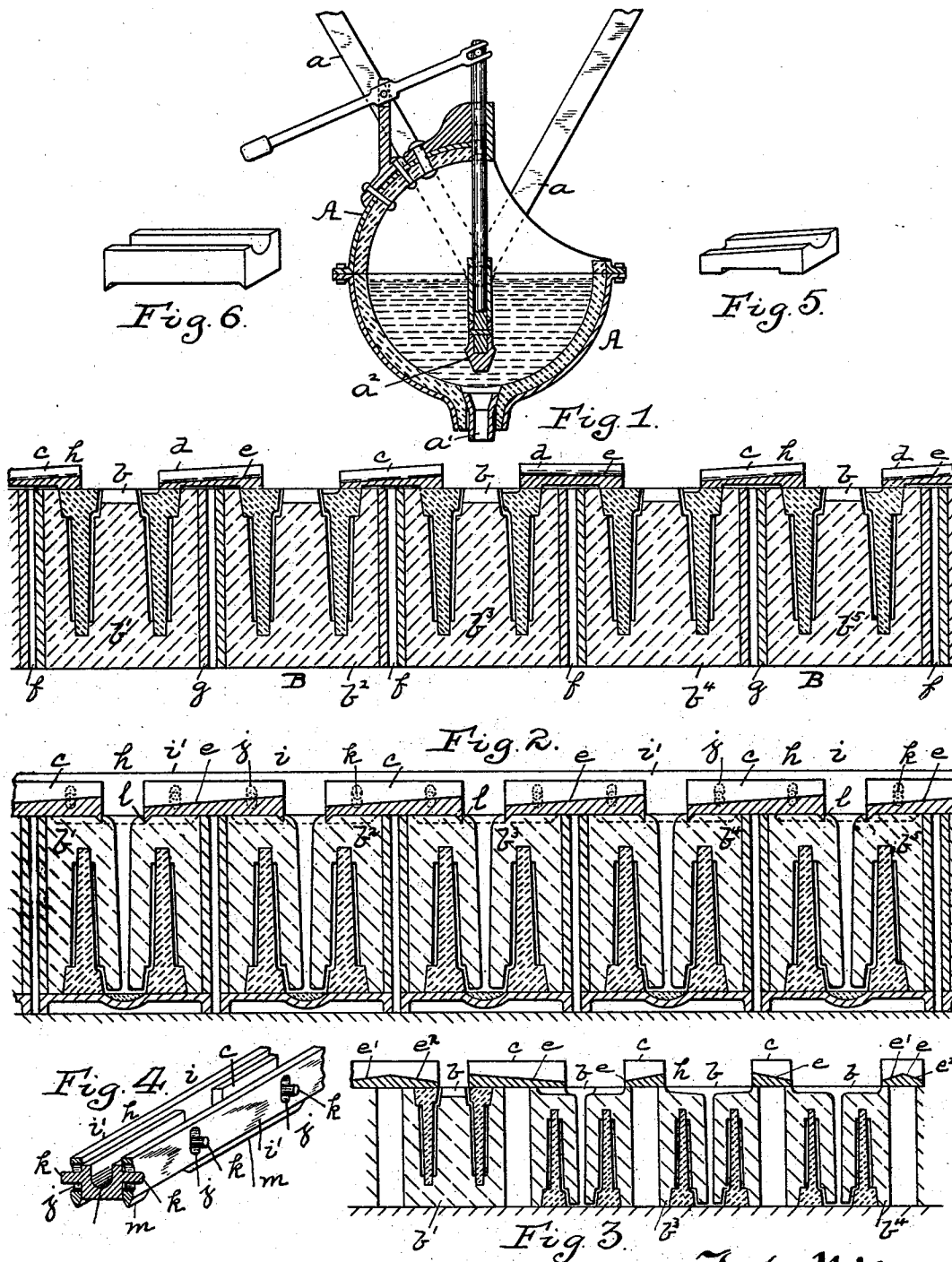


(No Model.)

S. J. ADAMS.  
SAND MOLD.

No. 521,753.

Patented June 19, 1894.



Witnesses:  
*H. J. Hartis.*  
*Luella H. Knox.*

Inventor:  
*Stephen Jarvis Adams.*  
By *Kay, Tatum & Cooke,*  
Attorneys.

# UNITED STATES PATENT OFFICE.

STEPHEN JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

## SAND MOLD.

SPECIFICATION forming part of Letters Patent No. 521,753, dated June 19, 1894.

Original application filed October 24, 1892, Serial No. 449,902. Divided and this application filed November 11, 1893. Serial No. 490,850. (No model.)

### *To all whom it may concern:*

Be it known that I, STEPHEN JARVIS ADAMS, 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 molds, and to the construction of runners for feeding the metal to the pouring gates of these molds. In the formation of molds it has been practically the universal custom to form the 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 a dozen or more molds, according to the size of mold or casting made, 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 pour each mold by hand, 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, and consequently many imperfect castings are made.

In an application for Letters Patent filed by me on October 24, 1892, Serial No. 449,902, I have described and claimed 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 channel formed on its upper surface to direct the flow of the metal, and an extension at the side thereof adapted to extend over the space between the two molds, 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 junction between the two molds over which the lip extends.

The present application is a division of the said application Serial No. 449,902, and the invention includes one of the forms set forth in said application, and it consists, generally stated, in combining with two sand molds set adjacent to each other a block resting on the sand molds and adapted to bridge the space between the molds, and extending toward but not to the center of said molds, and having a channel therein to receive the metal and direct it to the pouring gates of one of the molds.

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 my invention in connection therewith. Fig. 2 is a like view of another series of molds showing another form of my invention. Fig. 3 is a like view, showing other forms of my invention, and Figs. 4, 5 and 6 are detail views of the different forms of weights and runners containing my invention.

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

The preferred form of my invention is illustrated in Fig. 1 of the drawings, and in connection therewith I have illustrated the lower end of a ladle such as preferably employed for the pouring of molds, said ladle forming

the subject matter of a separate application filed by me on October 24, 1892, Serial No. 449,910, the ladle A being hung from a suitable frame *a* so as to be movable along and above the series of molds B, the ladle having a spout *a'* controlled by a stopper *a''*.

The several molds of *b'*, *b''*, *b'''*, &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. The molds shown are formed in the usual way with the ordinary pouring gates *b*, the runner feeding the metal being entirely above the bodies of the molds.

In order to direct the metal from the ladle A into the pouring gates *b*, I have shown in the invention in Fig. 1 in the form of rigid blocks *c* which may be made of metal, fire-brick, asbestos, or like material, these blocks extending simply between the different pouring gates and preferably having an inclined upper surface *d* in which is formed a groove *e* leading from one pouring gate to the next pouring gate. These blocks *c* are of such length as to extend between the two adjoining pouring gates or runners *b* over the space *f* between the flasks *g*, but not of such length as to extend to the center of the mold and meet at such center, the series of blocks serving as above stated, to bridge the spaces between the flasks and to direct any metal falling on the blocks into the pouring gates. In such construction it would be necessary to employ a movable ladle which can be carried from mold to mold, the ladle being brought over the one pouring gate and as soon as that mold is filled shifted to the next, the metal passing from the ladle during its movement into the groove *e* and flowing through the same into the next pouring gate. The employment of the traveling ladle with the series of molds having a continuous runner to receive the metal and direct it into the mold cavities forms the subject matter of a separate application filed by me November 23, 1893, Serial No. 491,698, the same being a division of application Serial No. 449,910.

For convenience in handling, the blocks *c* may be placed loosely within a frame, as is illustrated in Fig. 2, this frame *i* being composed of the side bars *i'* *i''*, and preferably having the elongated slots *j* therein. The blocks *c* are secured between said bars *i'* *i''* by means of the pins *k* thereon engaging with said slots *j* in the frame. The blocks *c* are further provided with lips *l* at each end and the lips *m* on each side so that they will engage with the sand in the series of molds to properly support the blocks during the pouring of the metal. The supporting of the blocks *c* in the frame *i* overcomes the necessity and labor of placing the blocks individually upon the series of molds, and the elongated slots *j*, if employed, enable the operator to force the individual blocks down until

the lips *l* and *m* are pressed into the sand of the mold.

In Fig. 3 as further illustrating my invention, some of the blocks *c* are shown as being inclined in both directions as at *e'* *e''*, so that the metal can pass down either side of the groove *e* into the pouring gates *b* while the ladle is being shifted over the tops of the series of molds from one pouring gate or runner to another. In case the pouring gates are formed in the opposite ends of the molds to that in which the cores are inserted, no mold weight would be required, and the blocks *c* could be made much shorter, simply covering the space between the molds.

In employing the invention herein described in casting the metal, 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 manner, and the fire-brick bridges or blocks *c* are then placed upon the molds so that they extend between the pouring gates, such bridges being generally employed where it is not necessary to weight the molds, such as where the cores enter the mold cavities from below or opposite to the pouring end of the mold. 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 into 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''*, it not being necessary to check the flow of the metal, but the metal entering the continuous runner *h* on the mold blocks, which directs it over the space between the two molds and into the pouring gate of the next mold. When the mold is filled, by again shifting the ladle, it is brought over the pouring gate of the next mold *b'''*, and the metal flowing from the ladle during its passage to that pouring gate will enter the runner *h* formed in the bridge or block *c* and then flowing along the same into the pouring gate next to be filled, and passing with the stream flowing from the ladle into that pouring gate, and so continuing until the molds in the series such as the molds *b''*, *b'''* are all filled. By forming the runners inclined from one pouring gate to another 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. By the employment of these bridges or blocks 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 runner blocks.

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

1. In combination with two sand molds set adjacent to each other, a block resting on the sand molds adapted to bridge the space between the molds, and extending toward, but not to the centers of the molds and having a channel therein to receive the metal and direct it to the pouring gate of one of the molds, and a traveling ladle adapted to be moved from the pouring gate of one mold to the pouring gate of the other mold, above the bridge block, substantially as and for the purposes set forth.

2. In combination with two sand molds set adjacent to each other, a block resting on the sand molds adapted to bridge the space between the molds, and extending toward but not to the centers of the molds and having an inclined channel therein to receive the metal and direct it into the pouring gate of one of the molds, and a traveling ladle adapted to be moved from the pouring gate of one mold to the pouring gate of the other mold, above the bridge block, substantially as and for the purposes set forth.

3. In combination with two sand molds set adjacent to each other, a block adapted to bridge the space between the molds, and having a channel therein to receive the metal

and direct it into the pouring gates of the molds, said channel being inclined from its center toward its ends, substantially as and for the purposes set forth.

4. In combination with two sand molds set adjacent to each other, a block adapted to bridge over the space between the molds, said block having lips thereon for engaging with the sand on top of the molds, substantially as and for the purposes set forth.

5. In combination with a series of sand molds set adjacent to each other, blocks having channels therein and bridging over the spaces between the molds, extending toward but not to the centers of the molds, and a frame extending over the series of molds, and loosely supporting said blocks, substantially as set forth.

6. In combination with two or more sand molds set adjacent to each other, blocks having channels therein and adapted to bridge over the spaces between the molds, said blocks being supported in a frame extending over the series of molds by means of pins on said blocks engaging with openings in said frame, 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:

J. N. COOKE,

ROBT. D. TOTTEN.