

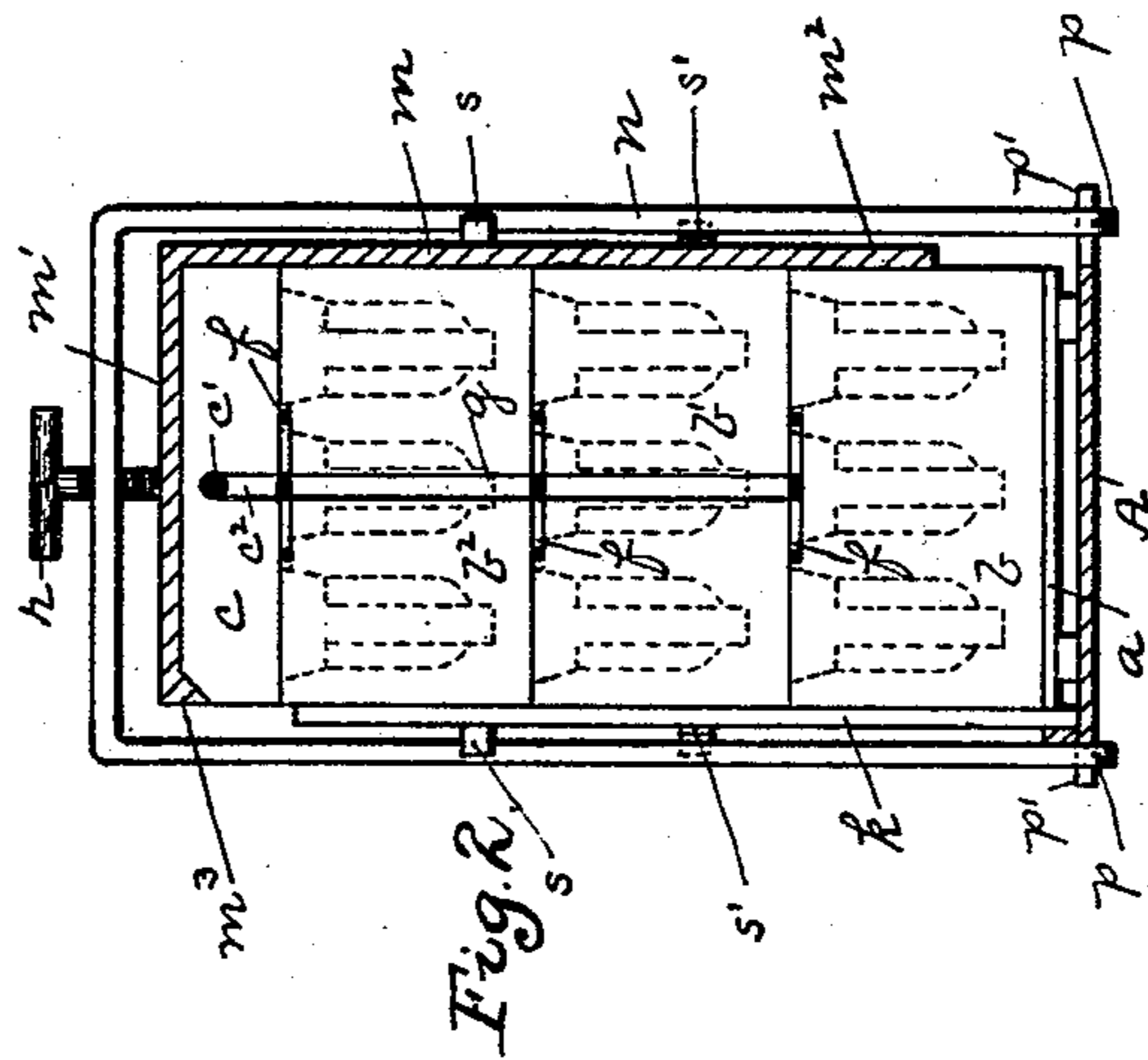
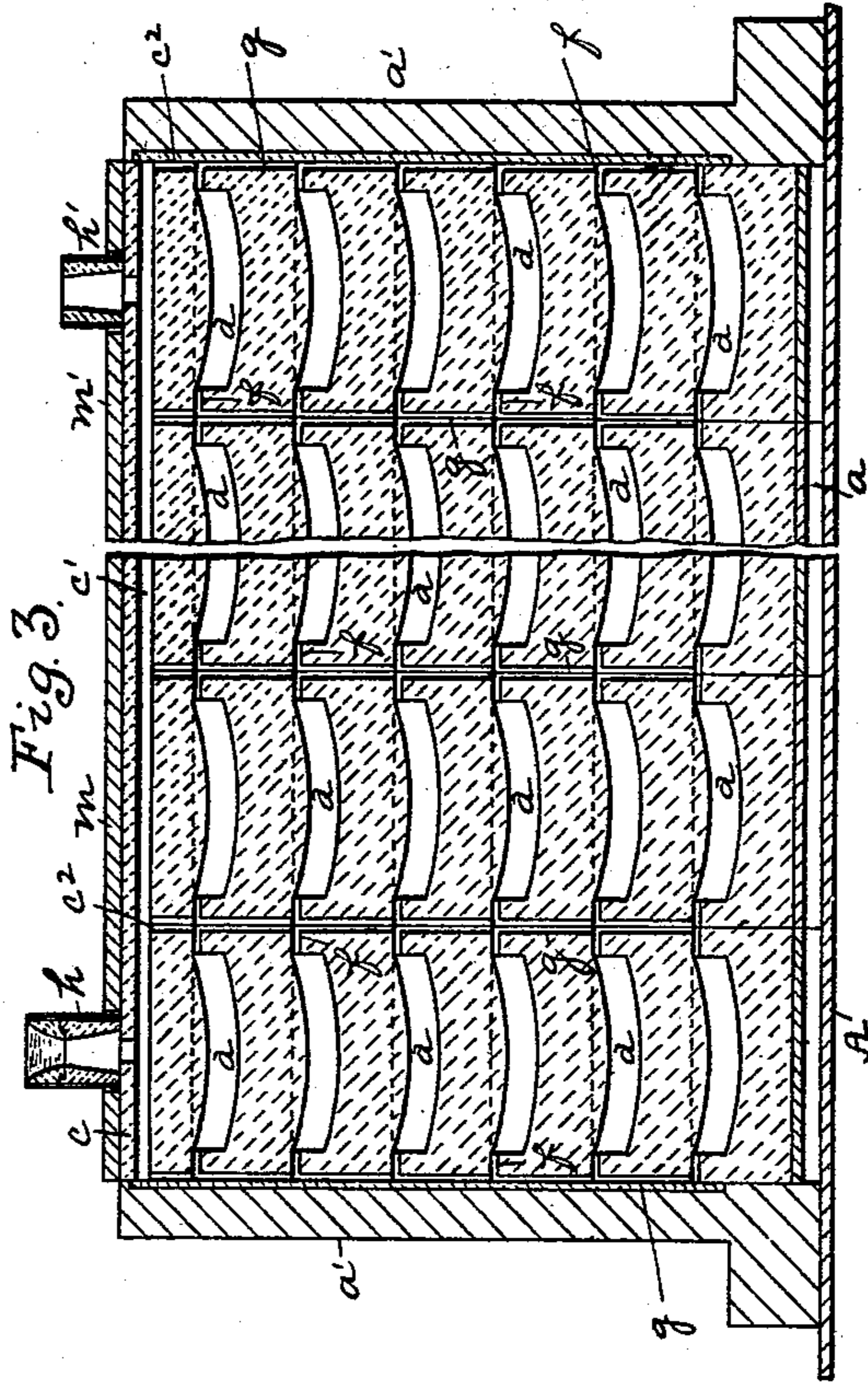
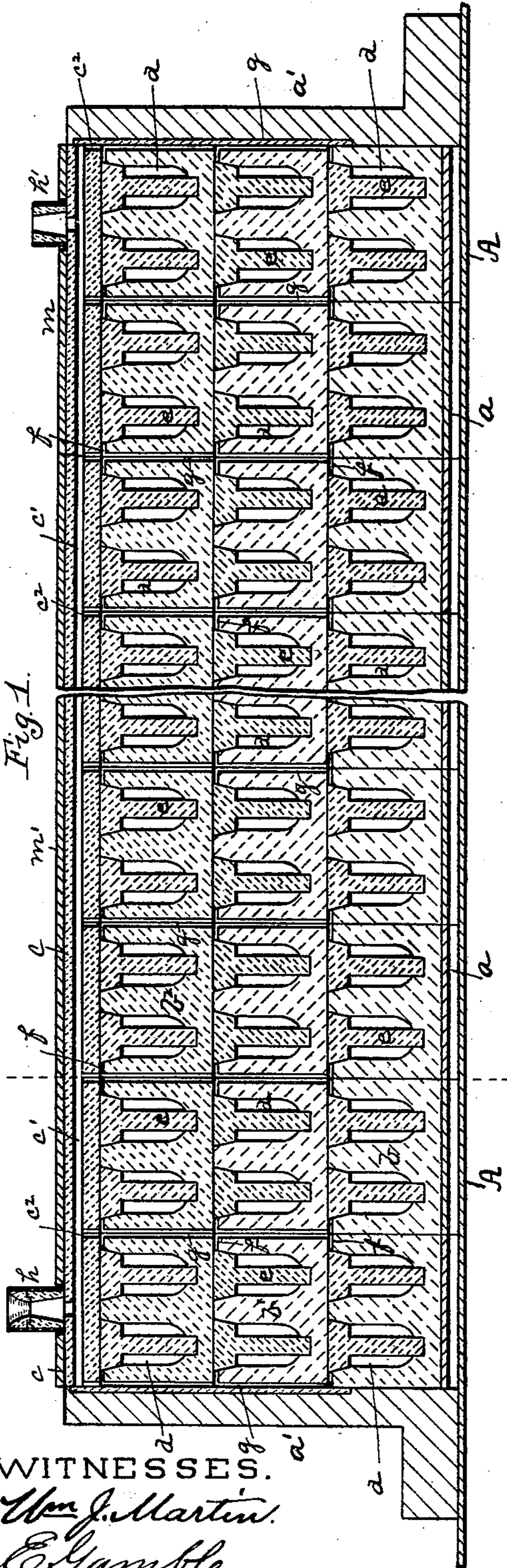
(No Model.)

2 Sheets—Sheet 1.

S. J. ADAMS.
SAND MOLD.

No. 521,453.

Patented June 19, 1894.



WITNESSES.
Wm. J. Martin.
E. Gamble

INVENTOR.
Stephen Jarvis Adams.
By *Kay, Totten & Cooke,*
Attorneys

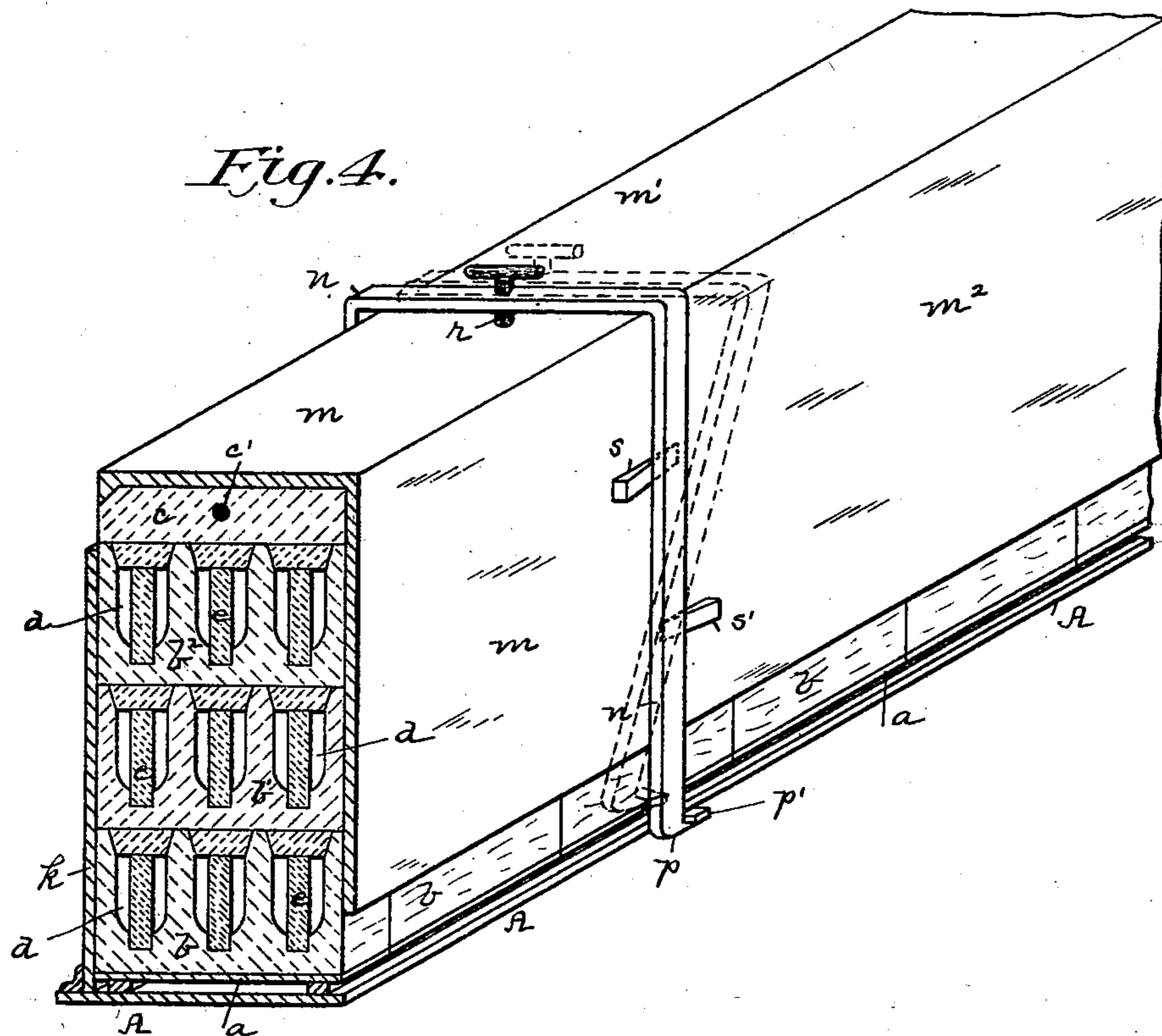
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

STEPHEN JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

SAND MOLD.

SPECIFICATION forming part of Letters Patent No. 521,453, dated June 19, 1894.

Application filed October 24, 1892. Serial No. 449,908. (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 certain improvements in the arrangement of the sand molds for feeding the metal thereto so that the metal may be continuously poured at one point and be directed from the same into different mold cavities in a series or set of molds.

The invention relates to the same general class as that described in the application for patent filed by me of even date herewith, Serial No. 449,905, and is included to some extent within the claims thereof.

The present invention consists, generally stated, in a series of molds in line and in contact with each other, and a series of separate sand molds having inclosed runner passages extending through the same placed on the series of molds and communicating with the feeding passage leading to the mold cavities therein.

It also consists in a series of sets of molds, the upper molds in each set resting on the ones below them and forming therewith the cross runners or passages leading to the mold cavities in the lower molds, while the two sets of molds have formed between them the channels or runners leading downwardly to the several cross runners leading to the mold cavities.

It also consists in certain other improvements which will be hereinafter more particularly described 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 longitudinal section of a series of sets of molds embodying the invention, and Fig. 2 is a cross section of the same, or, as might otherwise be stated, an end view of one of the sets of molds in the series. Fig. 3 is a view showing another form of mold embodying the invention. Fig. 4 illustrates in perspective the set or series of molds with

the mold floor having the rigid side plate secured thereto and a confining cover thereon.

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

I have illustrated the invention in connection with two classes of molds, one which might be termed tubular molds, such as for wagon boxes, pipe balls, and like articles, and the other in connection with a shallower mold, such as a brake shoe mold. In both cases I employ a supporting bed plate A on which the bottom boards a supporting the molds rest, and I employ suitable abutments a' at each end of the series of molds.

I have illustrated the invention with a series or sets of molds; that is to say, with two or more molds placed the one above the other and with two or more such sets placed in line and in contact with each other, and this form is considered desirable, though it is to be understood that as far as applicable the invention may be employed with a single series of molds, that is, without their being placed in sets one above the other.

In said drawings the sets of molds are shown three high, such as the molds $b\ b'\ b^2$, and they are arranged in a series of molds longitudinally between the abutments a' a'. Above each set of molds is the runner mold c which may in some cases extend over two or more such molds, as may be found desirable. The several molds in each set have the mold cavities d and where cores are employed these cores e are set therein and the cross runners f leading to the mold cavities d are formed between the top surface of one mold and the bottom surface of the mold resting upon it, so that the upper molds of the set serve the purpose of either inclosing the mold cavities, as in Fig. 3, or of mold weights to confine the cores, as in Figs. 1 and 2, and in either case the cross runners f are formed between the two molds, such as between the molds b and b' and the molds b' and b². The lower mold in each set is, of course, preferably supported on a bottom board to provide for the carrying or handling of the set, but such bottom board is not required between the other molds in the set as they may be placed the one upon the other, being properly guided to position and serve the purpose just above described. In order to form the down take channels lead-

ing to the mold cavities, I arrange the grooves forming the same between the faces of the two adjoining sets of molds, such as the vertical runner or channel g which extends from the top of the molds b^2 entirely along the faces of said molds b^2 and between those molds in the set, and communicates with the like channel which extends entirely along the faces of the molds b' and feeds into the cross runners f leading to the mold cavities in the molds b . Means for introducing the metal from the continuous runner into the several mold cavities in the sets of molds is thus provided. The runner mold c is also preferably made to serve the same purposes as the upper molds in the sets, that is, to close the cross runners or channels and to close the top of the mold cavity in the top mold, or to act as a mold weight to hold the cores in place. It has the inclosed runner c' extending through it and the several runner molds which contain the continuous runner c' over the series of molds are so arranged that the portions of the continuous runner therein are in communication with each other, while by means of down take channels c^2 at suitable points the metal is carried from said continuous runner into the vertical runners and cross passages leading to the mold cavities in the sets. I am thus enabled to build within a comparatively short space a large number of molds, not only by arranging them in line and in contact with each other, but in sets of several molds vertically, and I also provide a means for casting molds of the description shown, such as tubular molds, by means of a continuous inclosed runner passage communicating with a series of molds, obtaining the advantage of the weight of the metal within the runner and within the reservoirs communicating therewith to insure the filling of the mold cavities and to force the gases therefrom through the sand walls of the molds, so preventing the shrinkage or blowing, such as has been more fully described in said application, Serial No. 449,905. The metal may be fed to the continuous runner c by any suitable reservoir or pouring device connected therewith, such as the reservoir h and a like reservoir may be arranged at the other end of the series, such as the reservoir h' , as above described.

It is, of course, necessary to confine the molds during the pouring of the metal either by the employment of flasks or by retaining covers, or like devices. In the present application the bed plate A is provided with a vertical side plate k extending up at one side thereof and rigidly secured to the bed plate, the side plate being shown arranged vertically, that is, conforming to the side faces of the molds, so that this side plate secured to the bed plate acts to confine one side of the sand mold. It also acts beyond that as a guide to the workmen in bringing the molds into line with each other.

In order to confine the top and the opposite

side of the series of molds, I prefer to employ an L-shaped plate m , such as shown in the drawings, fitting over the top of the series, as at m' , and down along one side thereof, as at m^2 . As the side plate k is rigid with the bed plate, the L-shaped plate may be made sufficiently heavy to confine the top and the opposite side without the use of clamps; but I prefer to employ suitable clamping devices, and for this purpose I have illustrated the U-shaped clamp n which fits over the top plate m' and against the side plate m^2 and is forced or wedged to place by suitable devices. In order to hold it in place in connection with the support for the molds, I prefer to provide the clamp with lugs p extending out on one side of the base of each arm which pass under and engage with lugs p' on the bed plate or like support and so connect the clamp to the bed plate; and to force the cover to place, I prefer to employ the jack-screw r working through the top of the clamp and pressing against the plate m' of the cover. A like screw can also be provided at the side. In order, however, to provide a simple and easy means for clamping the side plates against each other, I prefer to form on the side plate m^2 or on it and the vertical plate k rising from the bed plate the wedges s s' which, as shown, extend horizontally with their inclines toward each other, so that as the clamp is passed downwardly over the plates, when it passes between the wedges at an angle, as shown in dotted lines, it can easily pass between the wedges, but when forced into a vertical position it will engage with the wedges to force the side plates evenly toward each other. For single molds, that is, where they are not arranged in sets of several molds set one on the other, it is not necessary to employ the two wedges secured to the side plates and any suitable stop which will hold the clamp and as it is rocked force it up on to the wedge will serve the desired purpose. Where the molds are built up in the shape illustrated, however, it is desirable to have the wedging pressure act evenly on the board, and consequently I prefer to employ the double wedges. This obviates the necessity of the employment of the loose wedges which are liable to be mislaid. When such devices are employed, the same rocking movement to clamp the side plates will force the lips p under the lugs p' on the bed plate to hold the clamp down to the bed plate, and after the clamp is thus brought to a vertical position, by means of the jack screw working against the top plate m' , the bed plate and top plate may be forced toward each other, so securely clamping all the protecting plates and properly confining the mold. If desired, the top plate may have the V-shaped rib m^3 extending along the side opposite to the plate m^2 which will act to confine the upper edge of the series of molds if the plate k , does not extend high enough for that purpose.

In building up the sets of molds and arranging the series of molds as above described, the bottom mold *b* in each set may be first formed within a suitable flask and upon the bottom board, and if cores are employed therewith, the cores inserted and another like mold then be formed and placed directly upon the same by means of suitable guiding mechanism, the cores inserted in that, and the same course continued according to the number of molds in each set, the top or runner mold *c* being built upon the set at the same time, if desired. The set is then carried out by suitable means to the bed plate *A* and built thereon against the vertical wall or plate *k* and against a suitable abutment, as at *a'*. Another set is built up and placed upon the bed plate in the same way until the desired number of sets of molds in the series is obtained, when the other abutment *a'* is placed at the end of the series to confine that end thereof, and the cover plate placed upon the series of molds and wedged to place in the manner described, the pouring reservoir for feeding the metal to the series of molds into the continuous runner *c'* being arranged in any suitable way. As the metal is fed to the series of molds so built up and confined, it will flow first into the continuous runner and then down through the first down take channel to the lowest mold in the set and through the cross runner *f* to the mold cavity or cavities fed thereby, being conducted past the other molds in the set by the down take channel or runner *g* extending along the same. When the lower mold is filled, the upper molds will be filled in the same manner, and the metal will then pass through the next portion of the continuous runner above the next set of molds and fill this in the same way, finally filling all the molds in the cavities in the series of sets of molds and rising within the reservoir at the other end, so indicating that all the mold cavities are filled with metal; the body of the metal within the inclosed pouring gate and within the reservoirs acting as a head or body to prevent the escape of gases and force the gases through the sand walls of the mold, so insuring practically perfect castings. In this manner a large number of small molds may be easily and quickly poured, and the great labor, time and skill heretofore required for pouring each such mold separately done away with. In the same way the employment of separate weights for confining the cores within the molds, the shifting of these weights from mold to mold, is also done away with, which also are important factors in the pouring of metal in the ordinary way.

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

1. In sand molds, the combination with a series of molds placed in line and in contact with each other, of a series of separate sand molds resting thereon and having a continuous horizontal runner extending through the

same, and down-take runners leading from the horizontal runner to the mold cavities in the lower series of molds, substantially as set forth.

2. In sand molds, the combination of a series of sets of 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 above the mold cavities of the several sets, and down-take runners or channels leading from the continuous runner to the cross gates communicating with the mold cavities in the sets of molds, substantially as set forth.

3. In sand molds, the combination of a set of molds placed the one on the other, each mold having a mold cavity or cavities, and cores placed within the same, and the mold resting on the one below it confining said cores in place, substantially as set forth.

4. In sand molds, the combination of a set of molds placed the one on the other, each mold having a mold cavity or cavities, and cores placed within the same, and the mold resting on the one below it confining said cores in place and forming with said mold cross runners leading from the down take runner to the mold cavities in the lower mold, substantially as set forth.

5. In sand molds, the combination of a series of sets of molds placed in line and in contact with each other, vertical down take channels formed between the sets of molds to feed the metal to the cross runners leading to the mold cavities in such sets of molds, and a separate sand mold having an inclosed runner extending through the same communicating with the down take channels leading to the mold cavities of such sets of molds, substantially as set forth.

6. In sand molds, the combination of a bed plate having a vertical side plate rigid therewith, a series of molds placed in line with each other and resting on said bed plate and against said vertical plate, and a mold cover placed upon the top and the other side of the set or series of molds, substantially as set forth.

7. In sand molds, the combination of a bed plate having a vertical side plate rigid therewith, a series of molds placed in line with each other and resting on said bed plate and against said vertical plate, a mold cover placed upon the top and the other side of the set or series of molds, and a clamp engaging with such mold cover and the vertical plate extending up from the bed plate, substantially as set forth.

8. In sand molds, the combination of a bed plate having a vertical side plate rigid therewith, a series of molds placed in line with each other and resting on said bed plate and against said vertical plate, and a mold cover placed upon the top and the other side of the set or series of molds, said mold cover being

formed of a top plate and a vertically downwardly extending plate, substantially as set forth.

9. In sand molds, the combination of a bed plate having a vertical side plate rigid therewith, a series of molds placed in line with each other and resting on said bed plate and against said vertical plate, and a mold cover placed upon the top and the other side of the set or series of molds, said mold cover being formed of a top plate and a vertically downwardly extending plate, said top plate having a downwardly extending rib extending along the side opposite to the vertically downwardly extending plate, substantially as set forth.

10. In sand molds, the combination of a bed plate, a series of sand molds placed thereon in line with each other, side and top confining plates, and a U-shaped clamp passing over the side and top confining plates and clamped to the side plates, substantially as set forth.

11. In sand molds, the combination of a bed plate, a series of sand molds placed thereon in line with each other, side and top confining plates, the side plates having secured thereto a stop and a wedge, and a U shaped clamp passing over the side and top confining plates and between such stop and wedge so that when rocked it will ride up said wedge

to clamp the parts together, substantially as set forth.

12. In sand molds, the combination of a bed plate, a series of sand molds placed thereon in line with each other, side and top confining plates, and a U-shaped clamp passing over the side and top confining plates and clamped to the side plates, one or both of said side plates having double inclined wedges formed thereon, the inclines of which extend toward each other, and the clamp being adapted to be placed between such wedges and then rocked to engage therewith and clamp the side plates together, substantially as and for the purposes set forth.

13. In sand molds, the combination of a mold support having lugs thereon, a series of sand molds placed in line with each other, top and side plates confining said molds, and a U-shaped clamp passing over the top and side plates and clamping the same to the molds and having lips or lugs thereon adapted to engage with the lugs on the mold support, substantially as 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.