

(No Model.)

S. J. ADAMS.

Mold and Flask for Forming Castings.

No. 239,302.

Patented March 29, 1881.

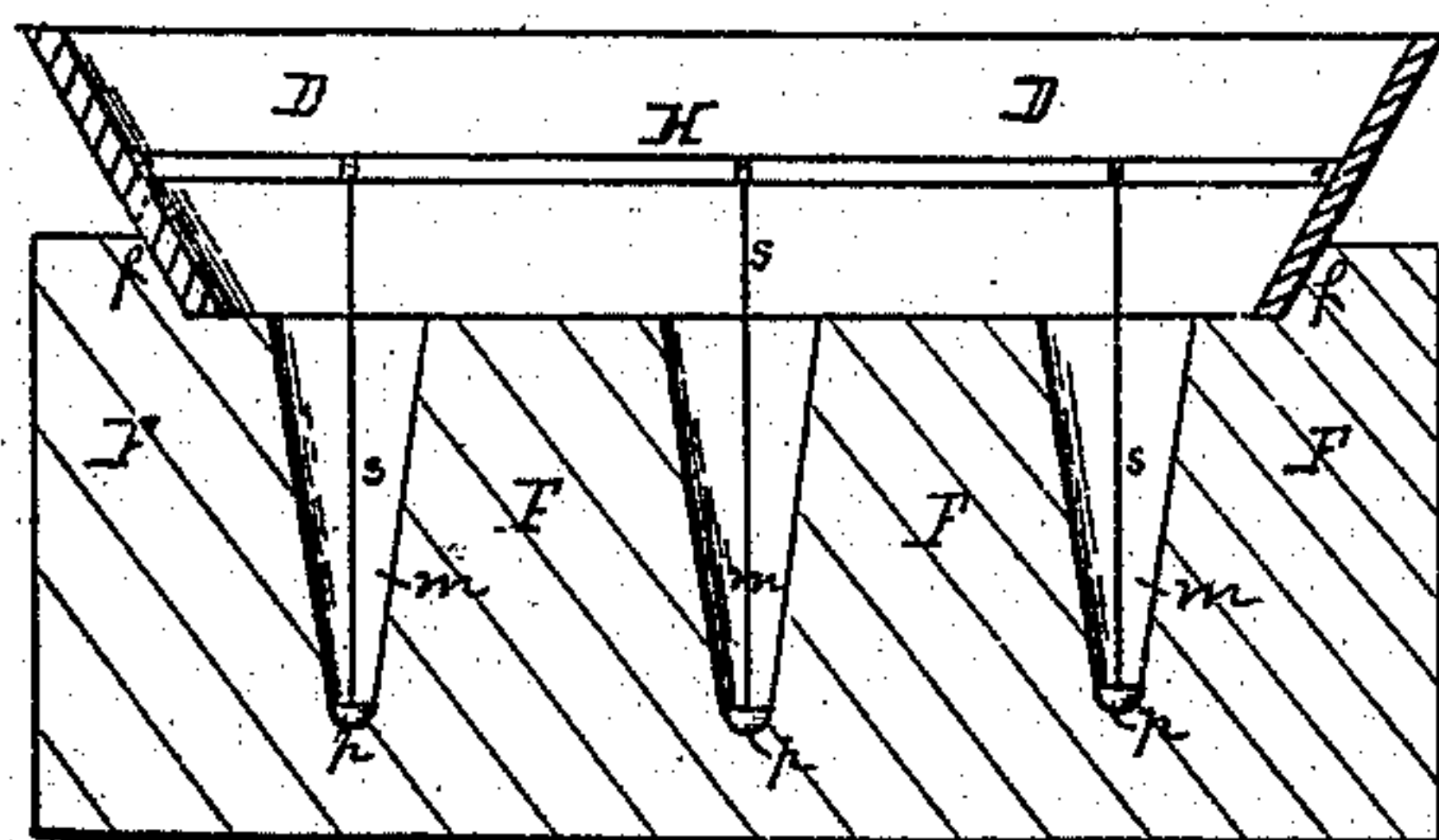


Fig. 2.

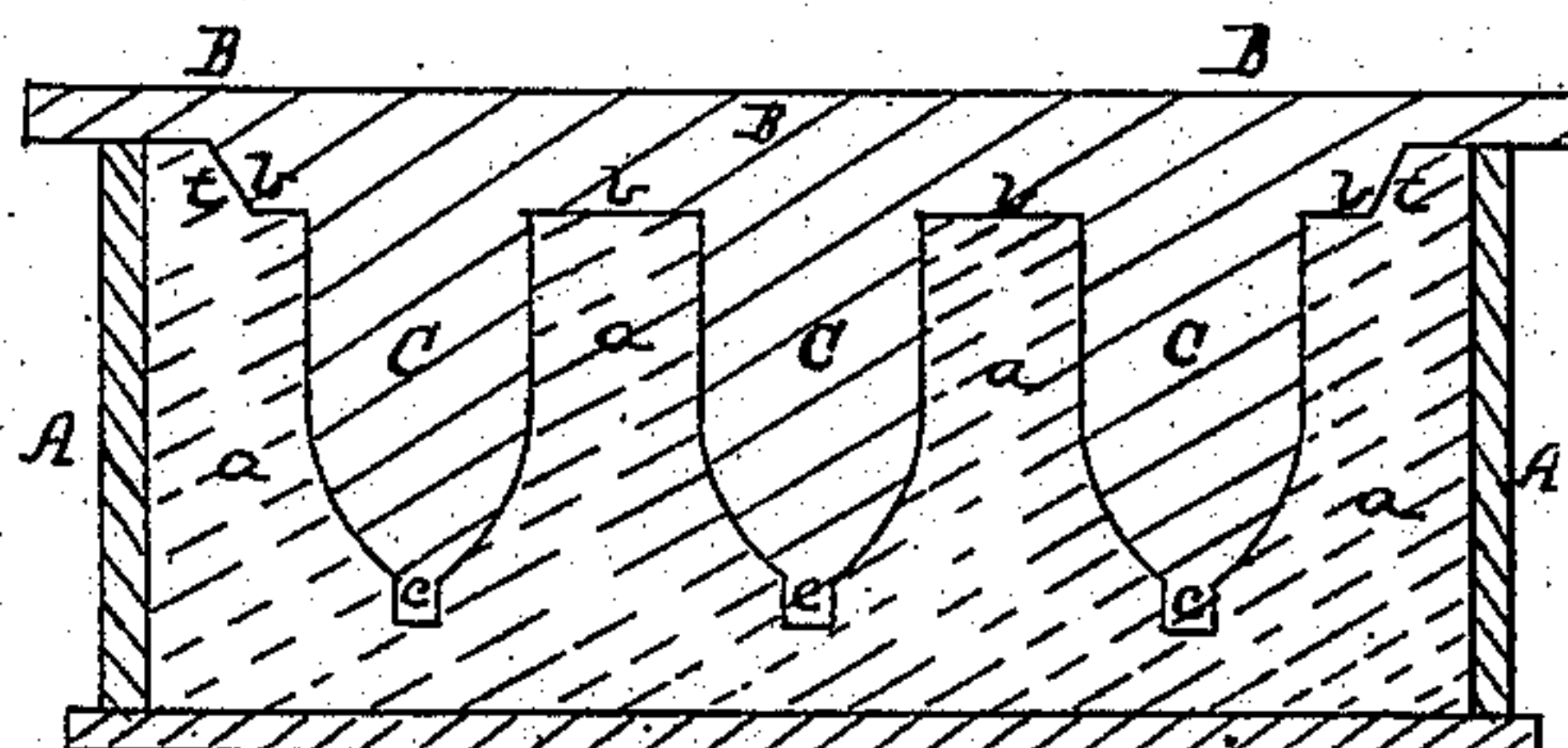


Fig. 1.

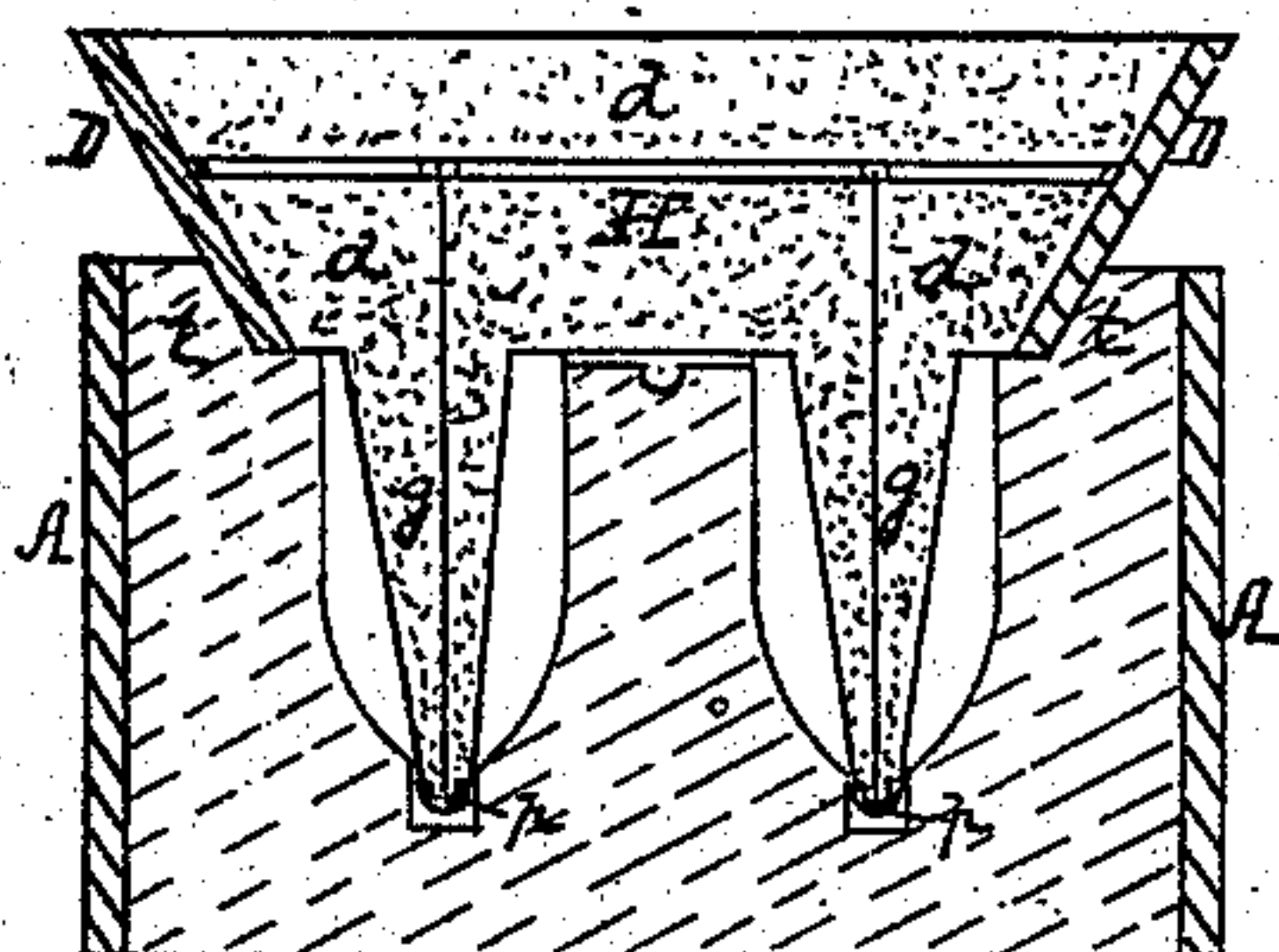


Fig. 3.

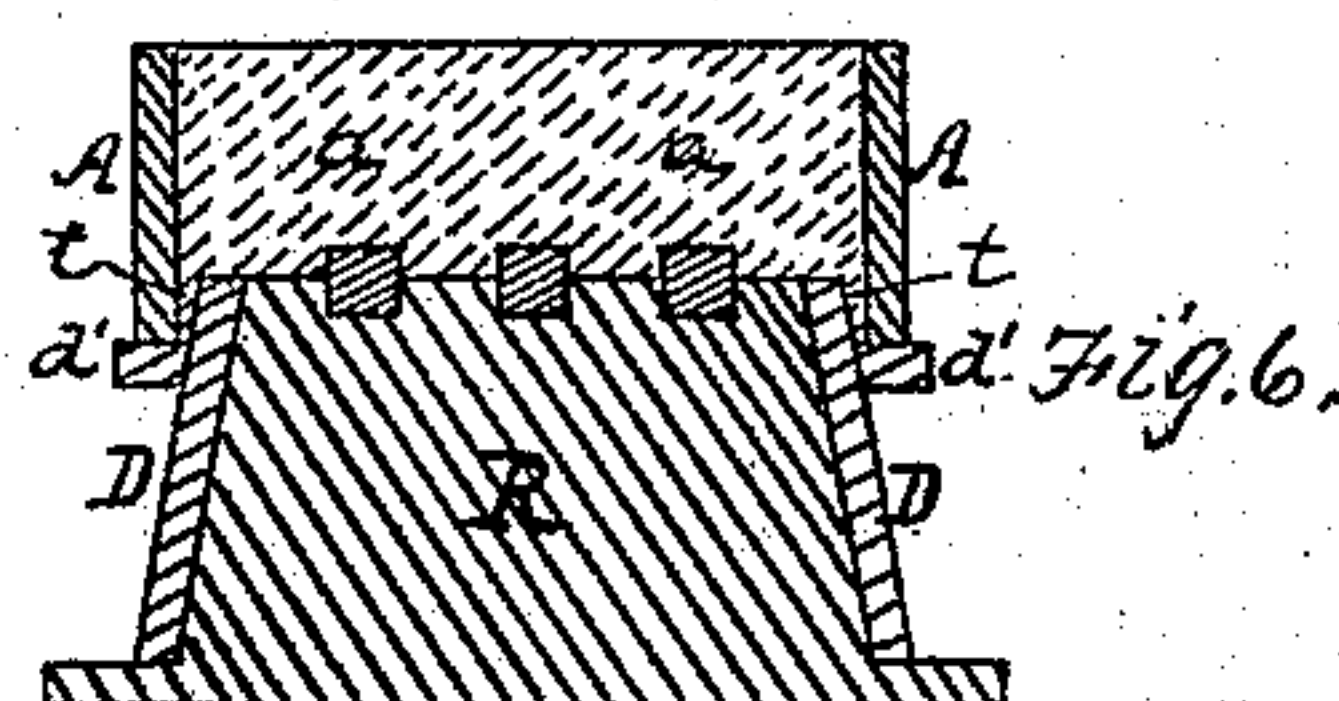


Fig. 6.

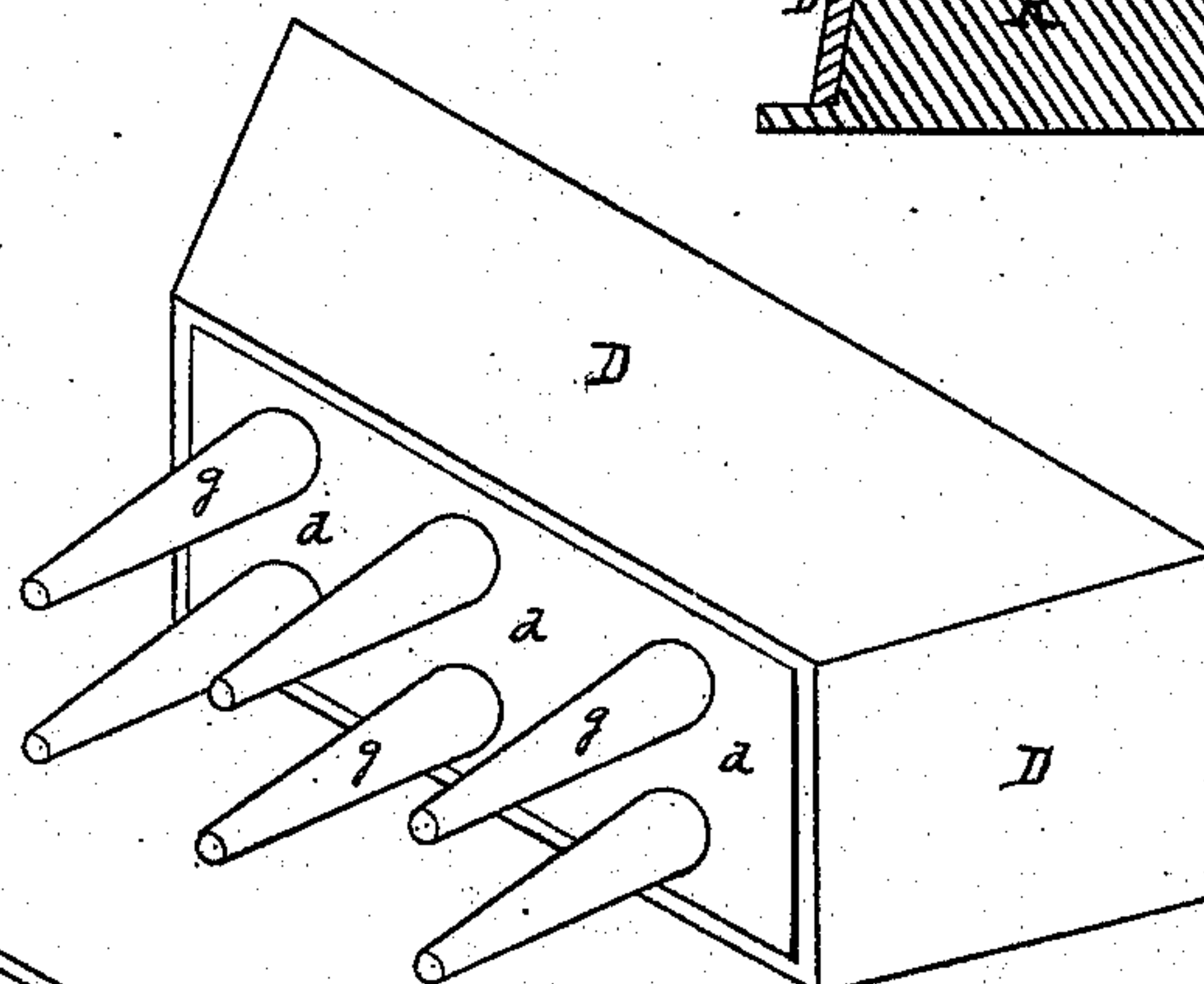


Fig. 5.

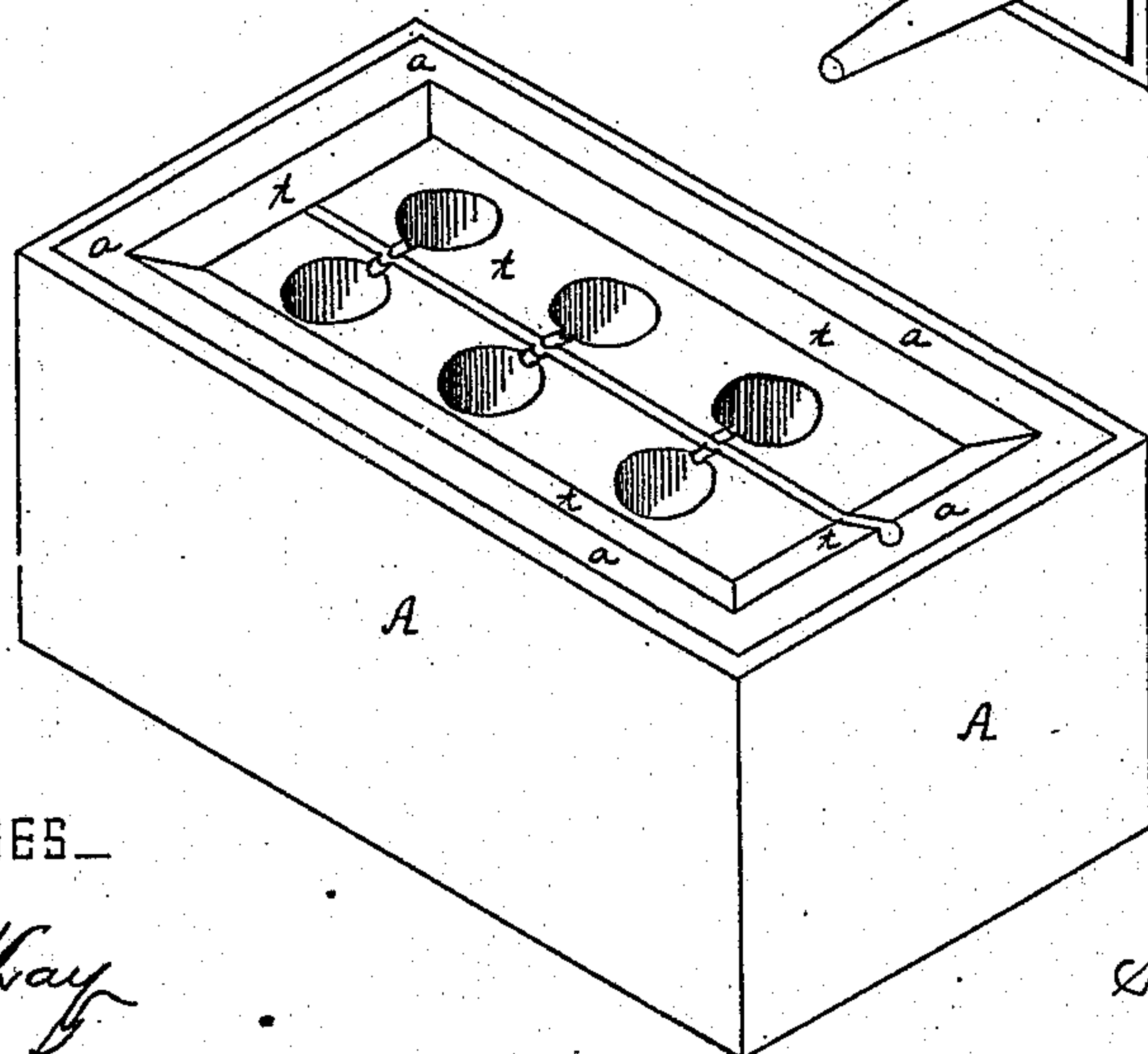


Fig. 4.

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MOLD AND FLASK FOR FORMING CASTINGS.

SPECIFICATION forming part of Letters Patent No. 239,302, dated March 29, 1881.

Application filed November 20, 1880. (No model.)

To all whom it may concern:

Be it known that I, S. JARVIS ADAMS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Molds and Flasks for Forming Castings; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal section of the drag of the flask, the molds being formed therein and the patterns ready to draw. Fig. 2 is a like view of the cope and its reverse pattern-block before the mold is formed therein. Fig. 3 is a cross-section of the cope and drag in place, forming the complete mold. Fig. 4 is a perspective view of the drag with the molds formed therein. Fig. 5 is a like view of the cope with hanging cores; and Fig. 6 is a cross-section, illustrating my invention where the base of the cope molds its own seat in the drag-sand.

Like letters of reference indicate like parts in each.

My invention relates to the molds and flasks used in forming castings, and it has special reference to the securing of the two parts or cope and drag of the flask in their proper relative positions, so that the recesses or projections of the cope shall occupy the proper positions in connection with the recesses or projections of the drag, and so form a perfect mold.

Heretofore many different devices have been formed for this purpose, and means have been devised for obtaining a very delicate adjustment of the two parts together. In these flasks, however, the relative adjustment of the parts has depended upon guides and like devices on the sides or frame of the flasks, and therefore many difficulties have been encountered, even where the cope and drag and their guides were originally made to fit perfectly. Some of the difficulties encountered were the imperfect adjustment of the pattern or pattern-board to the flask, being thrown out of line by grains of sand between the flask and pattern-board. The flask would also swell and shrink out of shape in the changes of weather, and because of the damp sand and steam gener-

ated by the hot metal, so that the adjustments were thrown out of line. The wear and loosening of the guides or adjustments on the flask and on the pattern-boards would also give continual annoyance, and cause an imperfect adjustment of the molds.

The object of my invention is to provide a means for the relative adjustment of the cope and drag which does not depend upon the sides or frame of the flask and is not subject to any of the difficulties above mentioned.

My invention consists, first, in forming in the sand of the drag, above the mold, a guide or seat for the reception of the cope, and seating the base of the cope in or around the guide so formed in the drag, so that the relative positions of the cope and drag depend on the sand of the drag and not on the guides on the sides or frame of the flask; and, second, in certain improvements in the construction of the cope and devices for supporting the cores thereon.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

In the drawings referred to, A represents the drag of the flask, which is formed of wood or metal, and is of any desired shape, being either round, square, or angular.

The plate or block B, carrying the patterns C, is provided with a raise or projection, *b*, beyond which the patterns for forming the molds extend, the patterns shown being for the formation of pipe mandrel or balls, though any desired form of patterns may be used. The projection *b* of the plate extends all around the patterns, as shown, and corresponds in size and shape to the base of the cope, so that upon the formation of the mold a recess or seat, *t*, corresponding to the shape of the cope-base will be formed in the sand *a* of the drag above the molds. At the base of each pattern C is formed an extension, *c*, for molding the core-print in the sand.

The cope D of the flask is made smaller at the base than the drag, and is preferably made of metal, as that is not liable to shrink or swell, and may be round, square, or of other desired shape, its base being of the same size and shape as the projection *b* on the pattern-plate B, so that it will fit into the seat in the

drag-sand formed by said projection. The mold in the cope D is made by fitting the base of the cope into a suitable recess or guides, *f*, in the reverse pattern plate or block F, the patterns on the reverse plate corresponding in position to the patterns on the plate B, so as to form a mold at the base of the cope, which, when the cope and drag are placed together, as hereinafter described, will form a perfect mold. Where a circular cope is used a feather-guide on the side of the cope may be arranged to fit into a corresponding recess in the drag-sand, and thus direct the parts into their proper relative positions. This is not necessary in angular or oblong copes. The pouring-gates are formed either in the cope or drag, as desired, at the same time when the molds are made.

Where pipe-balls, as illustrated in the drawings, or other long hollow castings are to be formed, a nest of molds may be formed in the drag and their corresponding cores on the base of the cope. These long hanging cores are supported by core-rods *s*, which extend from the body of the cope-sand *d* into the cores *g*. The rods *s* may, if desired, be supported by and extend from a suitable skeleton-support, H, attached to the inner sides of the cope. I have found the most efficient support to be formed of thin metal blades extending across the inside of the cope, their edges being in the direction of the packing of the sand, so that it will not interfere with the formation of the mold by jarring or ramming. A skeleton-support, loose in the cope, may also be employed to advantage, being made in the form of a star or comb, and having the core-rods *s* attached thereto. At the end of each core-rod *s* is a button or cup, *p*, which forms a support for the base of the sand-core and protects the end thereof in handling. The core is thus braced from the cup *p* along the core-rods to the skeleton-support and cope-frame, and I am enabled to use the mold without baking the cores, as is usual where single cores are used.

My improved flask is used in the following manner: The drag A is placed on top of the pattern-plate B, carrying the raise *b* and patterns C, and the mold is formed either by jarring or in other suitable way. The pattern-plate is then withdrawn, and above the molds will be formed the seat *t* for the reception of the base of the cope, the seat and molds being both formed in the sand of the drag, and being in proper relative position to each other. The cope D is then placed on the reversed pattern-block F, being guided to place thereon by the recess or guides *f*. Where long hollow castings are to be formed, as shown, the core-rods *s* extend into the core-molds *m* of the pattern-block, the cups *p* resting at the base of the core-molds. The mold is now formed in the usual manner, and when lifted from the pattern-block the hanging cores *g* will extend out from the cope, being supported thereon by the rods and cups. Where no hanging cores are attached to the cope the core-supports are

dispensed with, the cope-mold being formed in substantially the same manner. Both the cope and drag molds having been formed, the cope is placed on the drag so that its base fits into and seats itself in the seat or guide *t* in the sand *a* of the drag, above the molds. As the relative positions of the cope and drag depend on the base of the cope and its seat in the drag-sand, I dispense entirely with the guides on the cope and drag frames, and therefore overcome all the objections and difficulties arising from the use of these guides. The cope is thus seated in its proper relative position with the drag and a perfect mold formed, and the only liability of throwing the parts out of line is in the displacement of the guides or raises forming the seat in the drag-sand. In forming long hollow castings the bases of the cores fit into the core-prints at the base of the molds, the cups *p* being below the molds and not coming in contact with the hot metal in casting.

In Fig. 6 is shown another means for forming the molds, in which the base of the cope forms its own seat in the sand of the drag. The cope D is reversed and placed over the match-block R, which extends up through it and holds the pattern at the base of the cope. The cope is preferably provided with lugs *d'* on its sides, and the drag A is inverted and placed on top of the cope, resting on these lugs. The mold in the drag is then formed, the base of the cope forming the seat *f* in the sand of the drag. The cope and drag are then turned over, the match-block R removed, and the mold in the cope formed in the usual manner, after which the cope is lifted off, the pattern removed, and the mold completed by placing the cope on the drag, it being guided to its place by the seat formed in the drag-sand. When the mold is formed in this manner the necessity for corresponding accuracy between the projection on the pattern-plate and base of the cope is overcome, as the base of the cope forms its own seat.

In forming large hollow castings the cope may be formed circular and only one core attached thereto. The molds may also be formed in the sand of the drag by means of a revolving cutting and sleeking tool or pattern, as described in a previous application made by me, and the seat for the cope at the same time pressed into the sand by a projection above the patterns. Different shapes of guides or seats in the drag-sand for the reception of the cope, such as a depression at each corner, or a raised seat fitting into a corresponding depression in the cope-sand, may also be employed.

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

1. The combination of the drag A, having the seat *t* formed in the sand thereof, above the mold, and the cope D, the base whereof is adapted to fit into or around the seat formed in the sand of the drag, substantially as and for the purposes set forth.

2. The cope D, in combination with the skeleton-support H, carrying the core-supporting rods s, substantially as and for the purposes set forth.

5 3. The cope D, in combination with the skeleton-support H, the core-supporting rods s, and the cups p, attached to the ends of the rods s, substantially as and for the purposes set forth.

10 4. The core-supporting rod s, in combination

with the cup p, attached to the end of the rod and adapted to support the core around the rod, substantially as set forth.

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

S. JARVIS ADAMS.

Witnesses:

G. M. SHAW,
JAMES I. KAY.