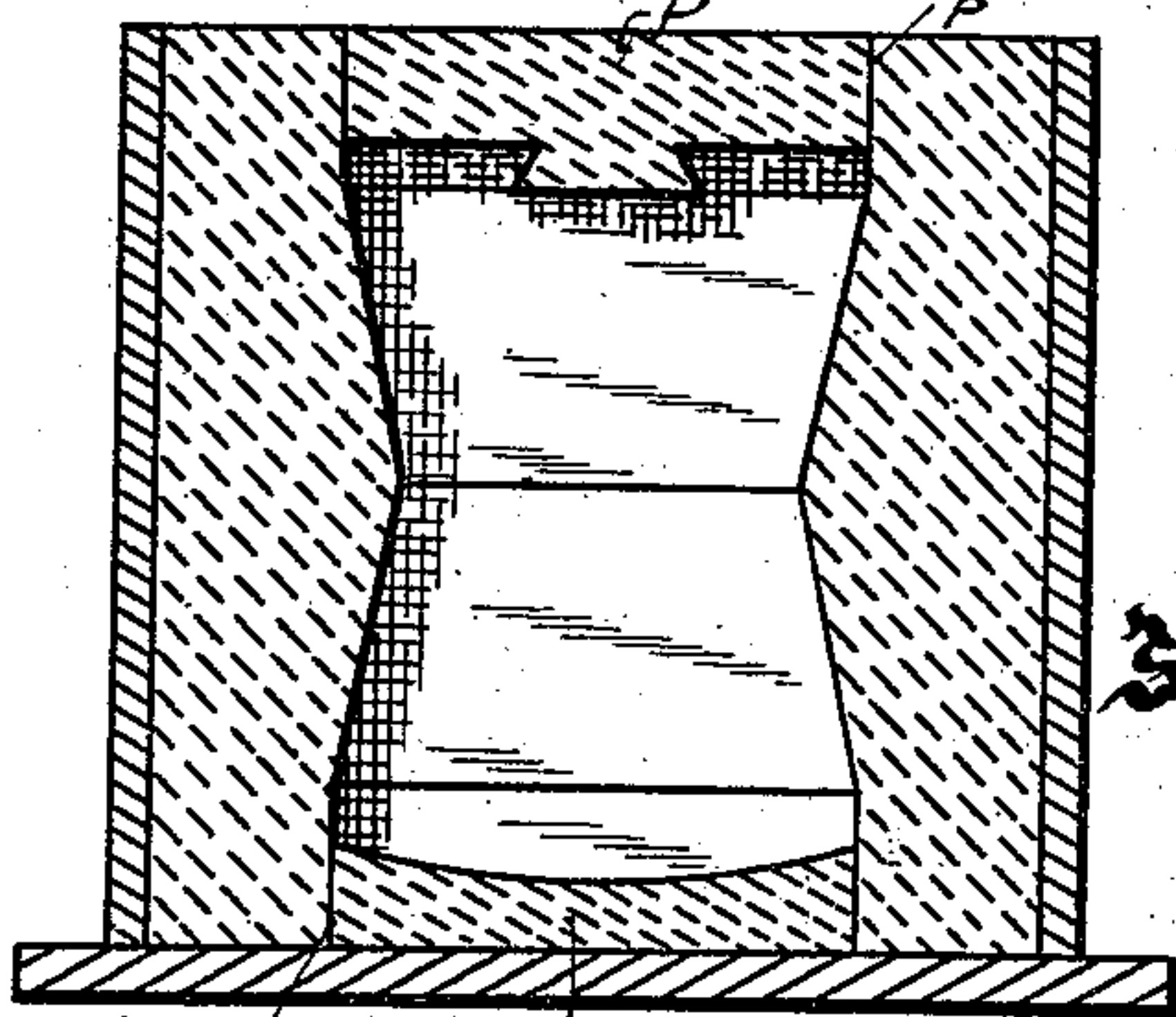
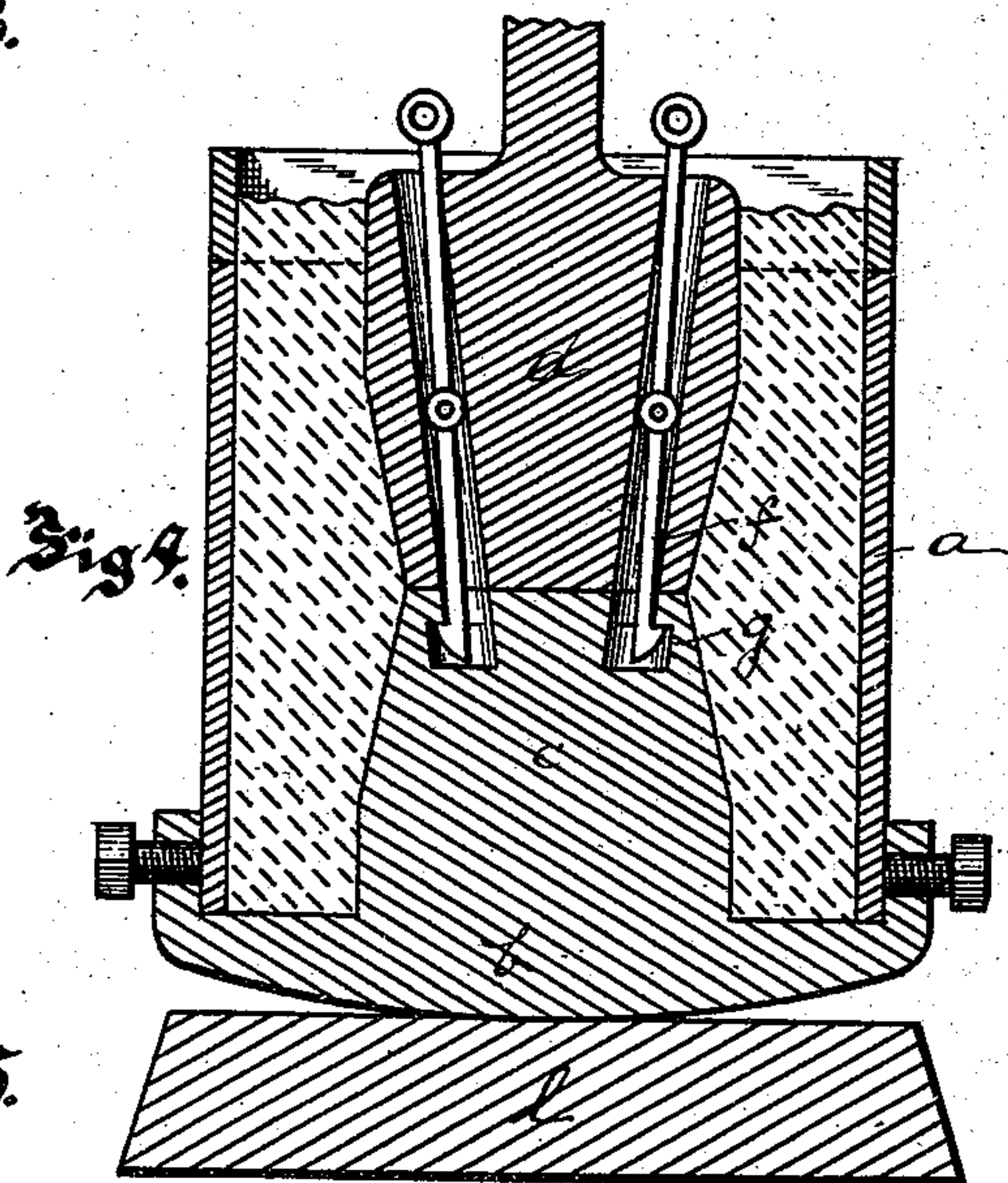
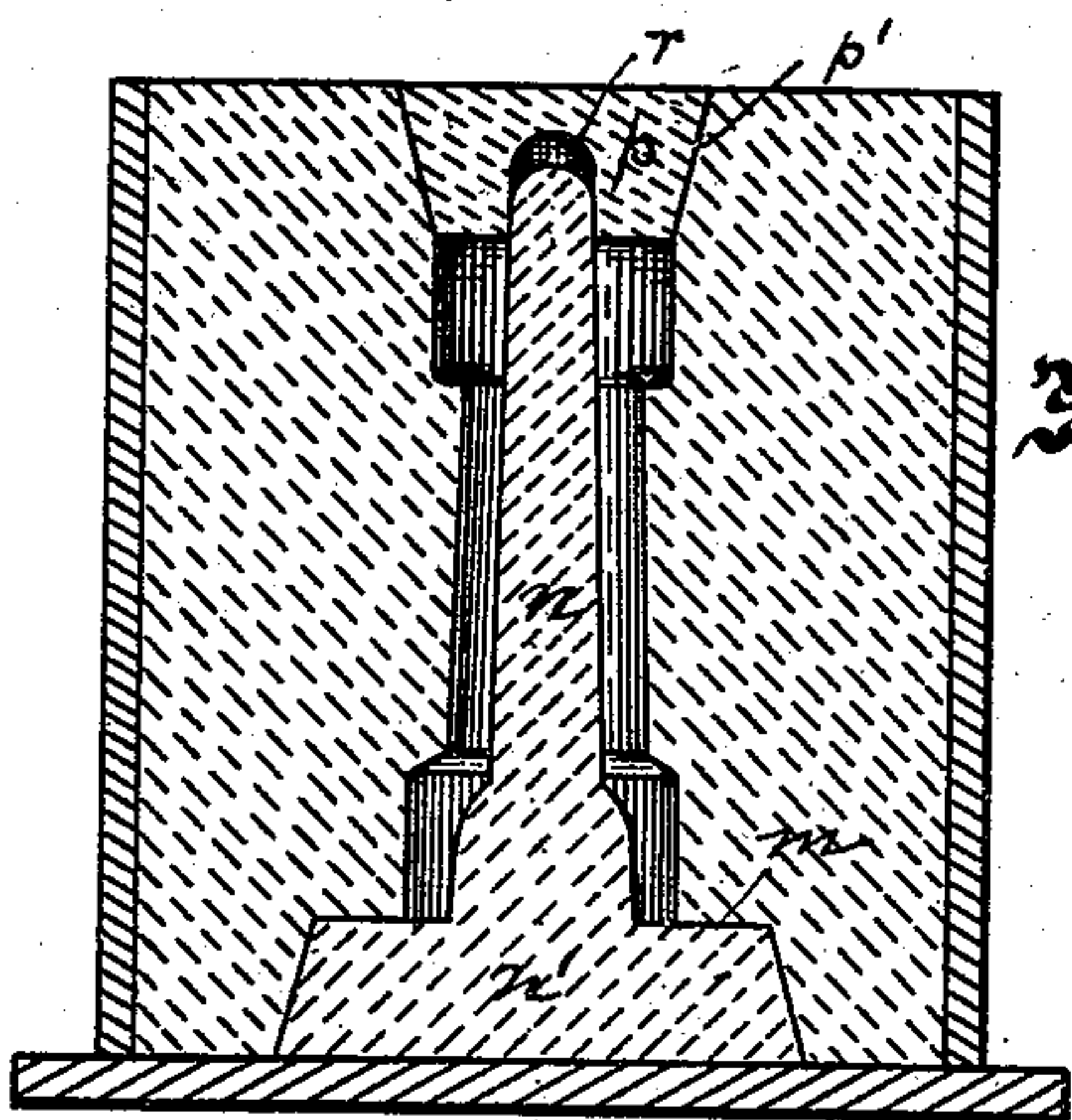
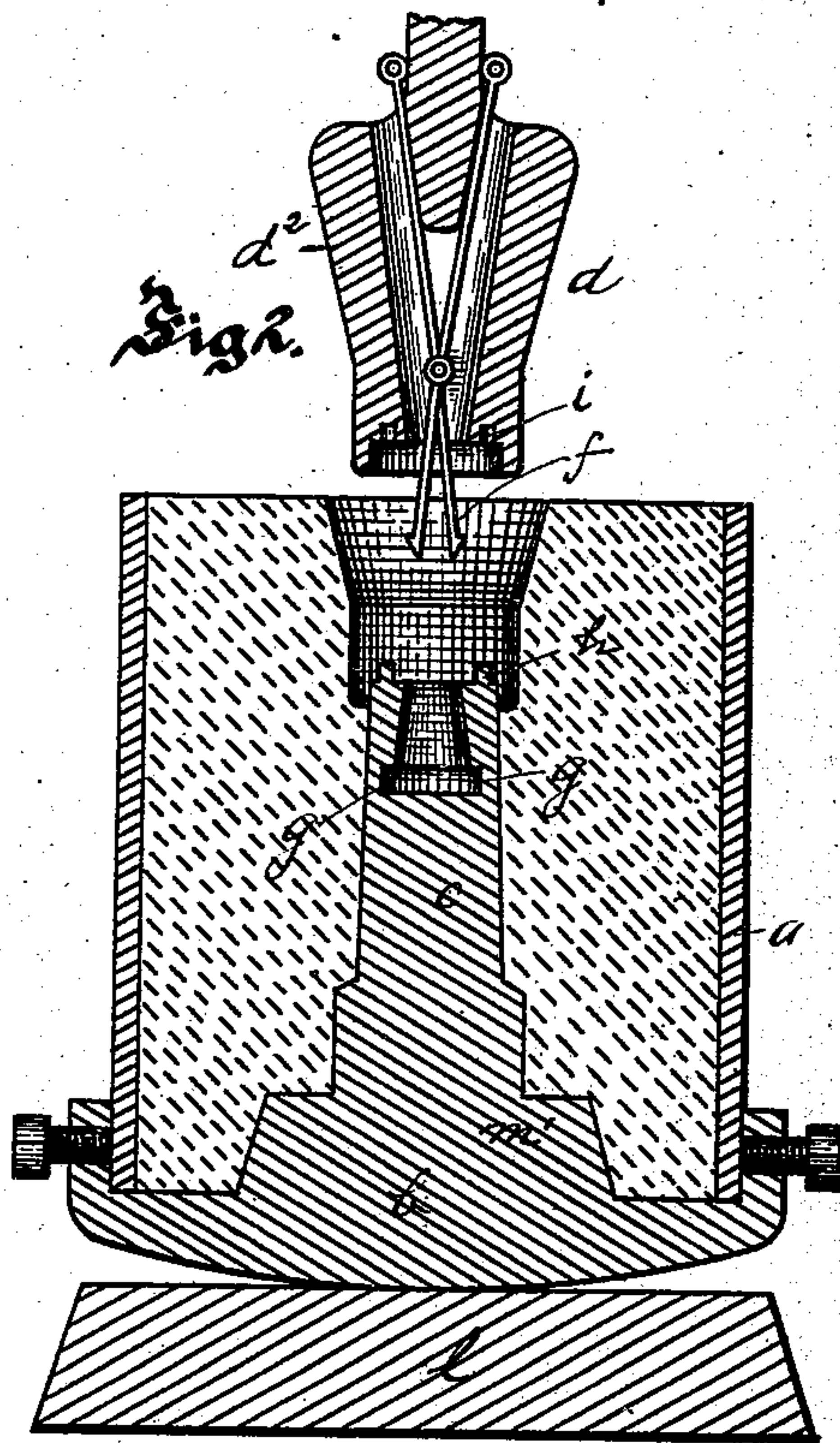
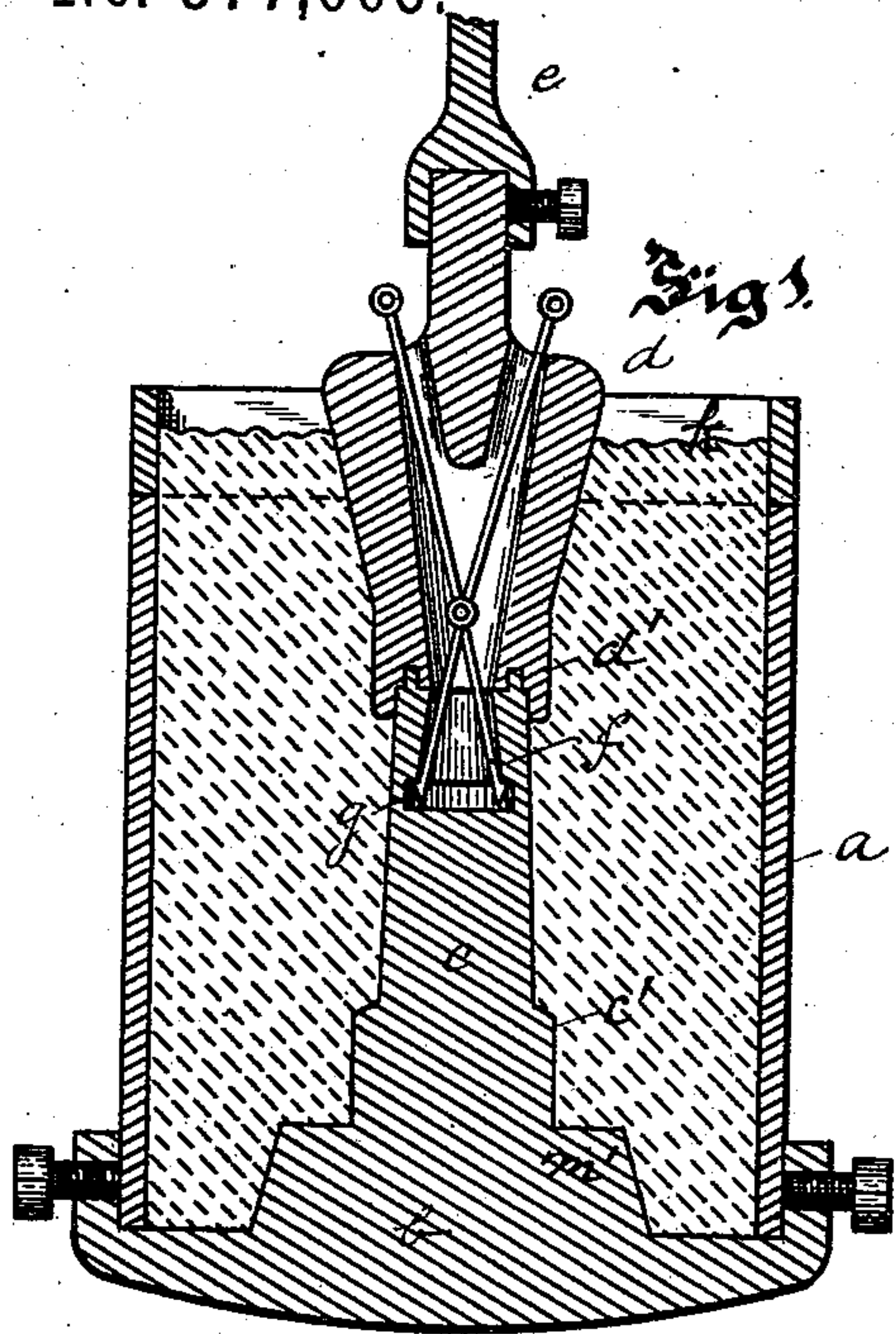


(No Model.)

S. J. ADAMS.
SAND MOLD APPARATUS.

No. 377,005.

Patented Jan. 31, 1888.



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UNITED STATES PATENT OFFICE.

S. JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

SAND-MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 377,005, dated January 31, 1888.

Application filed March 31, 1887. Serial No. 233,098. (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 Sand-Molding Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the manufacture of sand molds, having special reference to that class of molds which are formed by jarring the sand around the pattern when contained within a flask, and the invention being especially applicable, though not exclusively so, to use with the apparatus for forming molds fully described in my application for Letters Patent for sand-mold apparatus filed by me February 9, 1886, Serial No. 191,323. In that application is described a sand-molding apparatus having the flask, the pattern, and pattern-block secured at one end of the flask and extending up within the same, and a rod or extension connected to the pattern or its block through the flask, the sand being packed within the flask by lifting and dropping mechanism above the flask, which engages either with this rod extending through the flask, or which forms this rod, and the base of which enters and engages directly with the pattern or pattern-block, and is subsequently withdrawn from the mold made, the pattern being withdrawn from the opposite end of the flask.

It is well known that in the manufacture of tubular castings a much more perfect casting can be obtained where the mold is formed vertically within a single flask, so that instead of there being a longitudinal joint within the finished mold along the edges of the mold-cavity, as is the case where the mold is formed in a two-part flask, one cavity of the mold being molded in each part thereof, the body of the mold-cavity is molded by a true cylindrical pattern, and a much more perfect mold-cavity is formed. There are, however, certain classes of molds—such as those for the formation of certain classes of wagon-boxes—which have enlargements at each end, while the central portion or body of the casting is of less diameter than its ends, which have not heretofore been formed in one-part flasks, it being necessary in molding this class of articles to divide

the pattern longitudinally and mount it upon a match-plate and form one-half of the mold in each flask, and then place the two half-molds together.

My invention has for its object the formation of this class of molds in one-part flasks and the molding of the same vertically, so that a more perfect and truly cylindrical or other shaped mold-cavity is obtained and the liability of the formation of fins on the casting—such as occurs where a match-plate is employed—is overcome.

To this end my invention consists, generally, in the combination of a one-part flask and a two-part pattern therein, the parts of said pattern being connected within the flask during the formation of the mold, and after the mold is formed being then separated and withdrawn from the opposite ends of the flask, whereby a long mold having enlargements at both ends may be formed in this one-part flask, each part of the pattern being arranged so that it can be withdrawn from the finished mold without marring the same, so that in this way a more perfect mold-cavity is formed than where the patterns are mounted on the match-plate and the two parts of the mold formed in separate flasks.

It also consists in other details of construction, as hereinafter more specifically set forth.

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 vertical section showing a flask with my improved pattern therein and connections thereto for imparting the jar to the flask and pattern. Fig. 2 shows the manner of withdrawing the parts of the pattern from the one-part flask. Fig. 3 is a vertical section of the finished mold ready for casting. Fig. 4 is a longitudinal section showing another form of the pattern illustrating my invention, and Fig. 5 shows the finished mold formed by this pattern and having the cores inserted ready for casting.

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

The flask *a* is made of suitable size and length, according to the size and length of the pattern and the number of patterns employed

within the same flask. At the base of this flask is the pattern-block *b*, to which the lower part, *c*, of the two-part pattern is secured, the upper part, *d*, of said pattern being secured to the lower part, *c*, by any suitable means and extending up above the flask *a*.

In employing my invention I prefer to connect the flask and the patterns to the lifting and dropping mechanism for imparting the jar through this upper pattern, *d*, the pattern having an extension, as shown in the drawings, which can either be rigidly secured to the vertically-moving rod *e* of the lifting and dropping mechanism or be connected thereto by a suitable joint, the form of lifting and dropping mechanism shown being the same as that illustrated in my application for patent, Serial No. 191,323, above referred to. In the construction shown in Figs. 1 and 2 the upper part, *d*, of the pattern is connected to the lower part, *c*, thereof by suitable catches, *f*, which fit within seats *g*, formed at the upper end of the lower pattern, *c*, and secure the two parts rigidly together during the formation of the mold, the two parts being further held in line, if so desired, by one part entering within the other, as in Fig. 1, so as to preclude the formation of a fin or other imperfection in the casting at the junction of the two patterns, or by pins in one part entering seats in the other part of the pattern. These catches *f* can be withdrawn by any suitable means operated from the upper end of the pattern, the catches shown in the drawings being mounted on levers, the handle ends of which are within reach of the operator above the flask, and after the formation of the mold these catches may be drawn in to permit the upper portion, *c*, to be withdrawn at the upper end of the flask.

The particular form of engaging devices between the upper and lower parts of the pattern may of course be varied, as would be well known to the skilled mechanic, any suitable engaging device by which the two parts can be separated without requiring the turning of either part of the pattern when in the sand being suitable for the purpose.

The pattern shown in Fig. 1 is for the molding of what is known as a "wagon-box," this box having an enlargement at the base, as at *c'*, and an enlargement at the top, as at *d'*, while the body between these enlargements is formed of less diameter than the enlargements, and this part or body, if tapering, as shown, is generally formed as part of the lower pattern, *c*, though it may of course be formed as part of the upper pattern, the pattern shown being simply reversed in its position.

In forming the mold by this apparatus a pattern-block, with its part pattern *c*, is secured to the flask, the upper part, *d*, of the pattern secured to the lower part, *c*, thereof, and the flask is filled with sand, a suitable reservoir, *k*, being preferably employed to feed the sand to the flask and insure the uniform compacting of the same therein. The upper part, *d*,

of the pattern is then secured to the lifting and dropping mechanism, and by means of this mechanism the flask, with its pattern, is raised and dropped upon the jarring-block *l* until the sand is properly compacted within the flask. The operator then disconnects the apparatus from the lifting and dropping mechanism and removes the reservoir, leveling off the sand even with the upper end of the flask. He then disconnects the upper part, *d*, of the pattern from the lower part, *c*, thereof, and withdraws this part *d* of the pattern vertically through the top of the mold formed. The lower part, *c*, of the pattern can then be withdrawn from the mold by any suitable means—such as by dropping it out of the mold—and the mold is then ready to receive its cores. In the formation of these tubular wagon-boxes it is of course necessary to employ a core extending entirely through the part of the mold-cavity in which the casting is to be formed and to center this core properly within the mold-cavity. For this purpose a seat or cope-print is generally formed at the base of the mold, as at *m*, this cope-print being molded by the enlargement *m'* at the base of the lower part, *c*, of the pattern, and the core *n*, when inserted, is brought to a central position within the mold-cavity by means of a corresponding core-head, *n'*, which fits within the seat *m*, the core extending up through the mold-cavity and above the enlargement formed by the base *d'* of the upper pattern, *d*. In order to close the upper end of the mold it is also necessary to employ a core, *p*, and the seat *p'* for this core is formed by the portion *d''* of the pattern *d*, which is preferably made tapering to form a tapering seat to direct the core to place, and in order to center the core *n* with the core *p*, I form a core-seat, *r*, within the core *p*, into which the upper end of the core *n* enters, this core-seat acting to hold the core *n* centrally within the cavity of the mold. After the formation of the mold and the withdrawing of the patterns as above described, the core *n* is inserted within the cavity of the mold, its head *n'* fitting into the seat *m* at the base of the mold, and the core *p* is then inserted in the upper end of the mold-cavity, fitting within the seat *p'*, and the upper end of the core *n* fitting within the core-seat *r* of the core *p*, when the mold is finished.

In Figs. 4 and 5 is shown another form of apparatus embodying my invention, this apparatus being for the formation of a mold for casting what is known as a "forging-die," and the parts thereof corresponding substantially to the two parts of the apparatus shown in Figs. 1 and 2, except that a different shape of pattern is employed. In this case the lower part, *c*, of the pattern is connected to the upper part, *d*, thereof at the narrowest part of the pattern, so that each part of the pattern can be withdrawn from the mold without injuring the same, the two parts of the pattern being connected as above described, and after the formation of the mold the upper part, *d*,

is disconnected from the lower part, *c*, and withdrawn through the upper part of the flask. The flask is then turned over and the lower part, *c*, thereof withdrawn, and suitable cores, *n p*, are inserted within seats *m p'*, formed in the mold, these cores being of proper shape to form the top and bottom faces of the die, the bottom core, *n*, being generally formed of a metal block or "chill," which acts to chill and case-harden one face of the die, while the other core, *p*, is provided with a suitable dovetail extension which forms a dovetail recess in the finished casting, by means of which it can be secured to the forging apparatus. As heretofore formed this class of molds required what is known as a "four-part" flask for its manufacture, and it was exceedingly difficult to bring all the parts in proper relative position, so that the casting of this class of articles presented difficulties which are entirely overcome by my improved apparatus.

I am thus enabled by employing a two-part pattern within the one-part flask to mold the articles to be formed much more accurately and to overcome the formation of fins along the edges of the finished casting, while at the same time I am enabled to form the molds more rapidly, and, as all the parts are arranged so that the mold can be formed by jarring, I am enabled to form more perfect molds, and can employ practically unskilled labor for the work.

I do not claim the mold heretofore described in this application, as that forms the subject-matter of a divisional application filed by me October 29, 1887, Serial No. 253,750.

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

1. In a sand-molding apparatus, the combination of a one-part flask with a separable two-part pattern therein and releasable means for holding said parts together, whereby the parts of the pattern are held together during molding and released after molding, substantially as and for the purpose set forth.

2. In sand-molding apparatus, the combination of the flask *a*, the pattern-block carrying the pattern *c*, the pattern *d*, and engaging devices between the pattern *c* and the pattern *d*, substantially as and for the purposes set forth.

3. In sand-molding apparatus, the combination of the flask *a*, the pattern-block carrying the pattern *c*, the pattern *d*, fitting around the end of the pattern *c*, and suitable engaging devices between said patterns, substantially as and for the purpose set forth.

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

S. JARVIS ADAMS.

Witnesses:

JAMES I. KAY,
J. NEGLEY COOKE.