

(No Model.)

2 Sheets—Sheet 1.

S. J. ADAMS.
SAND MOLDING MACHINE.

No. 374,163.

Patented Dec. 6, 1887.

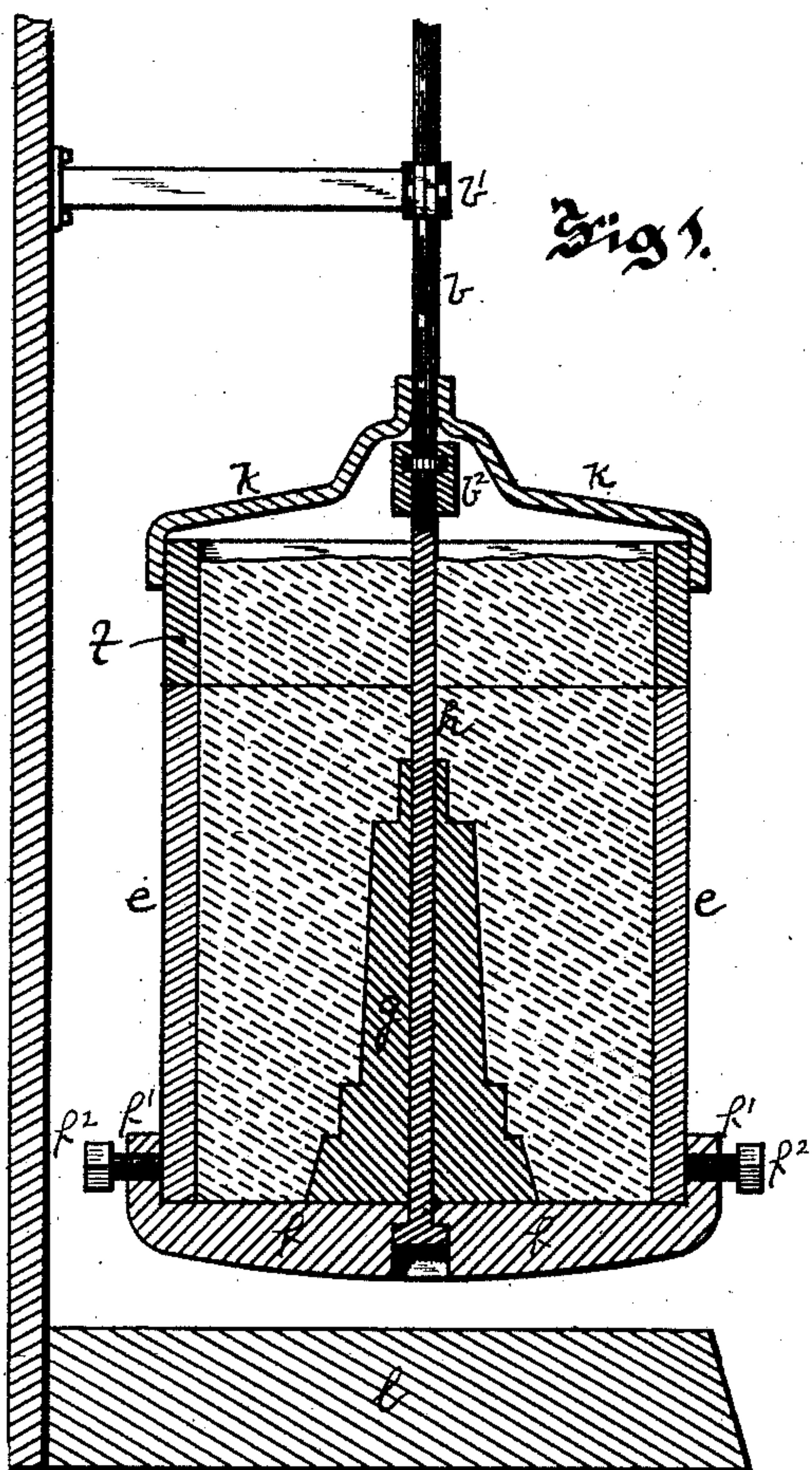


Fig. 1.

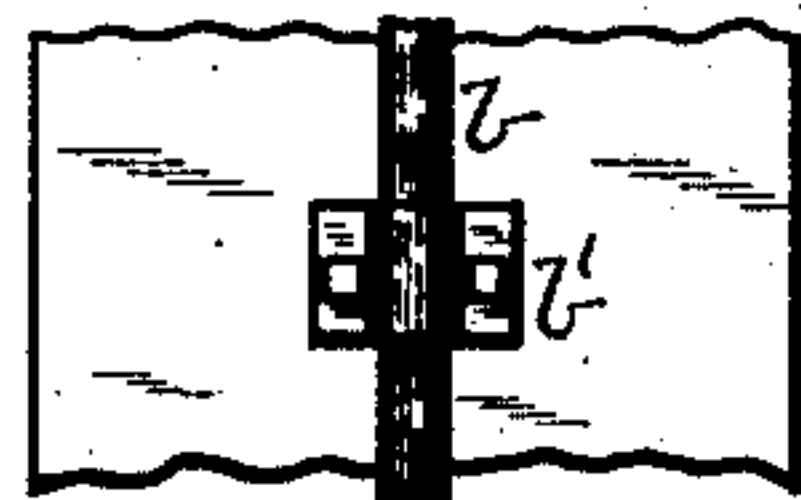
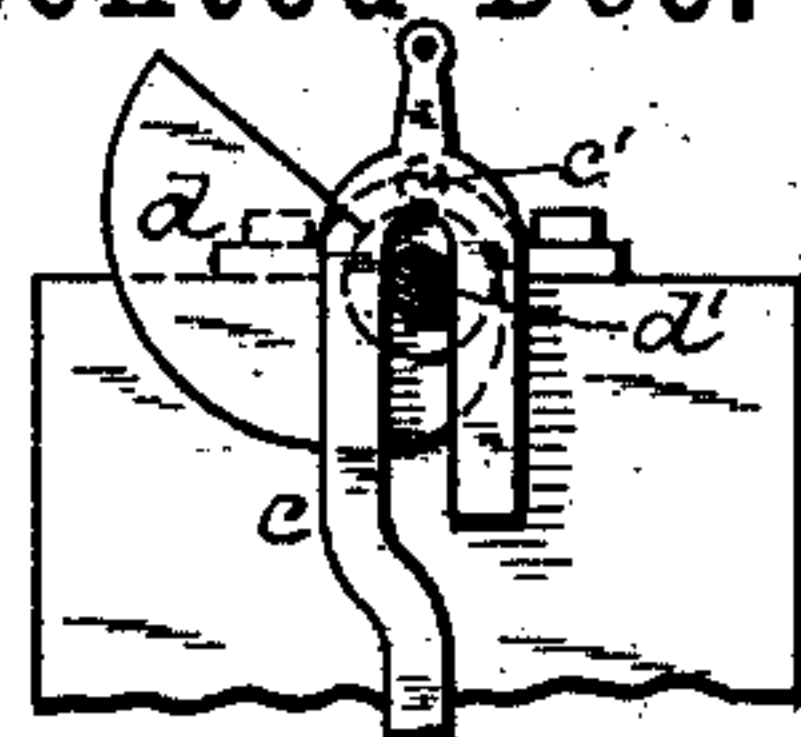


Fig. 2.

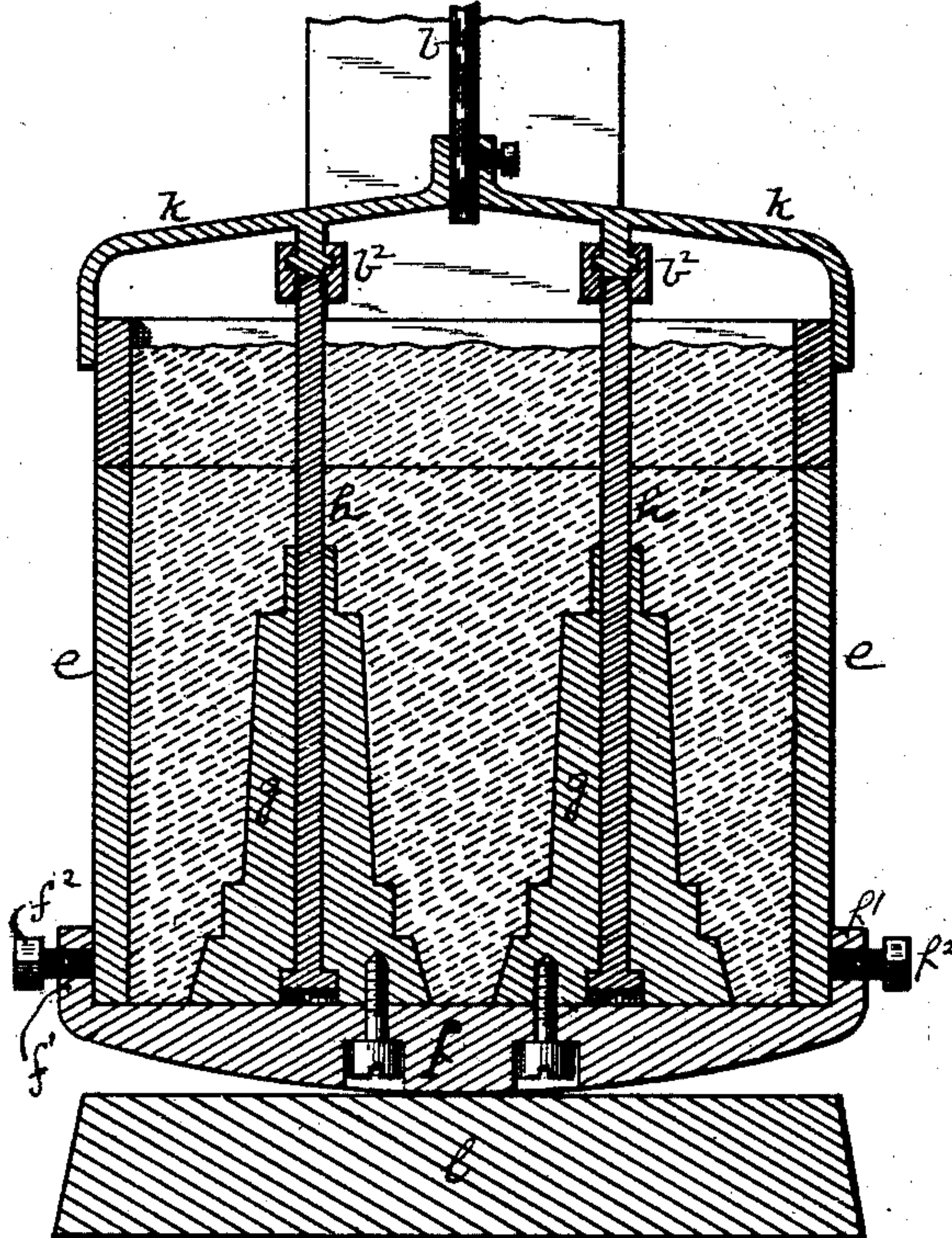


Fig. 3.

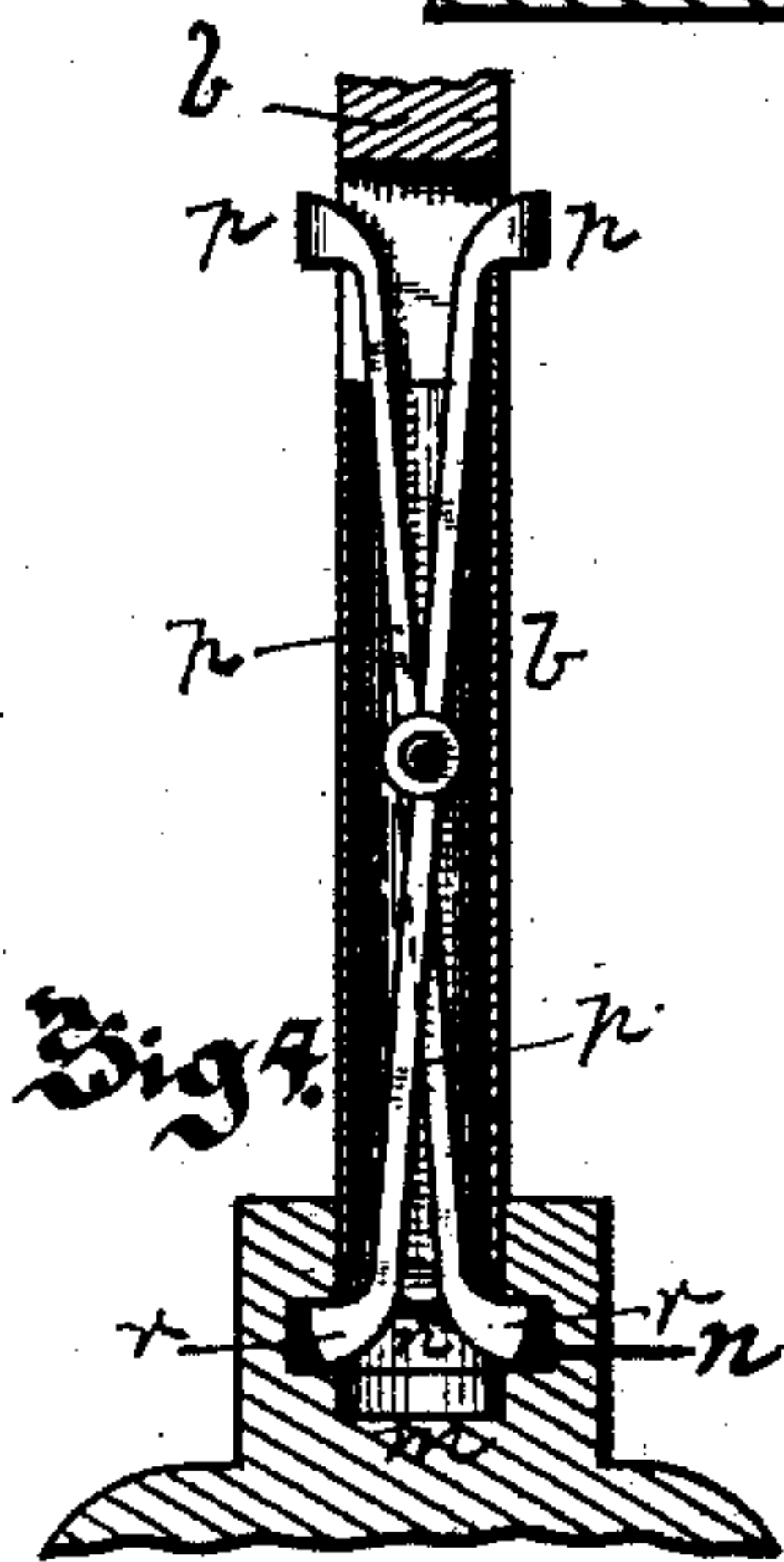
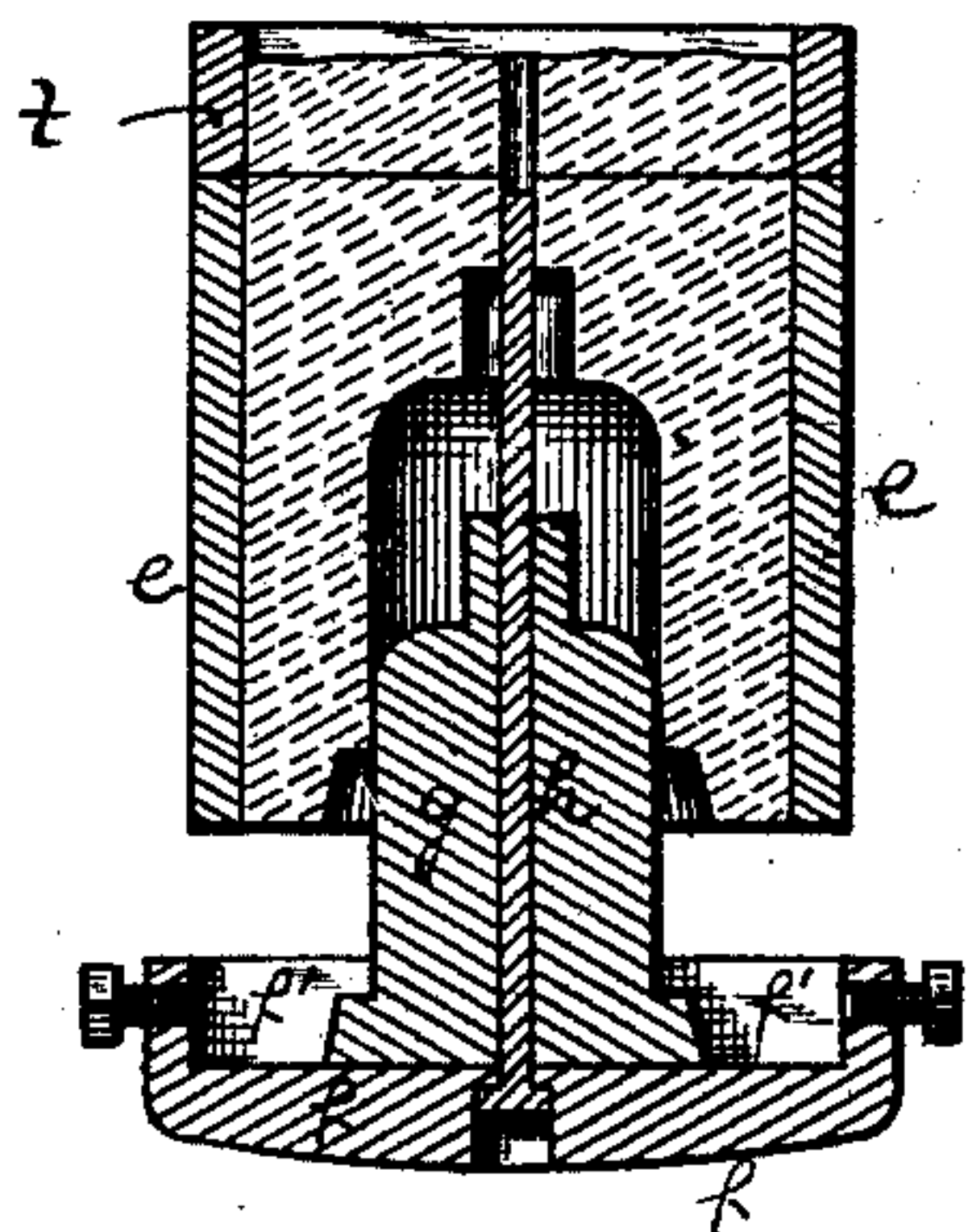


Fig. 5.

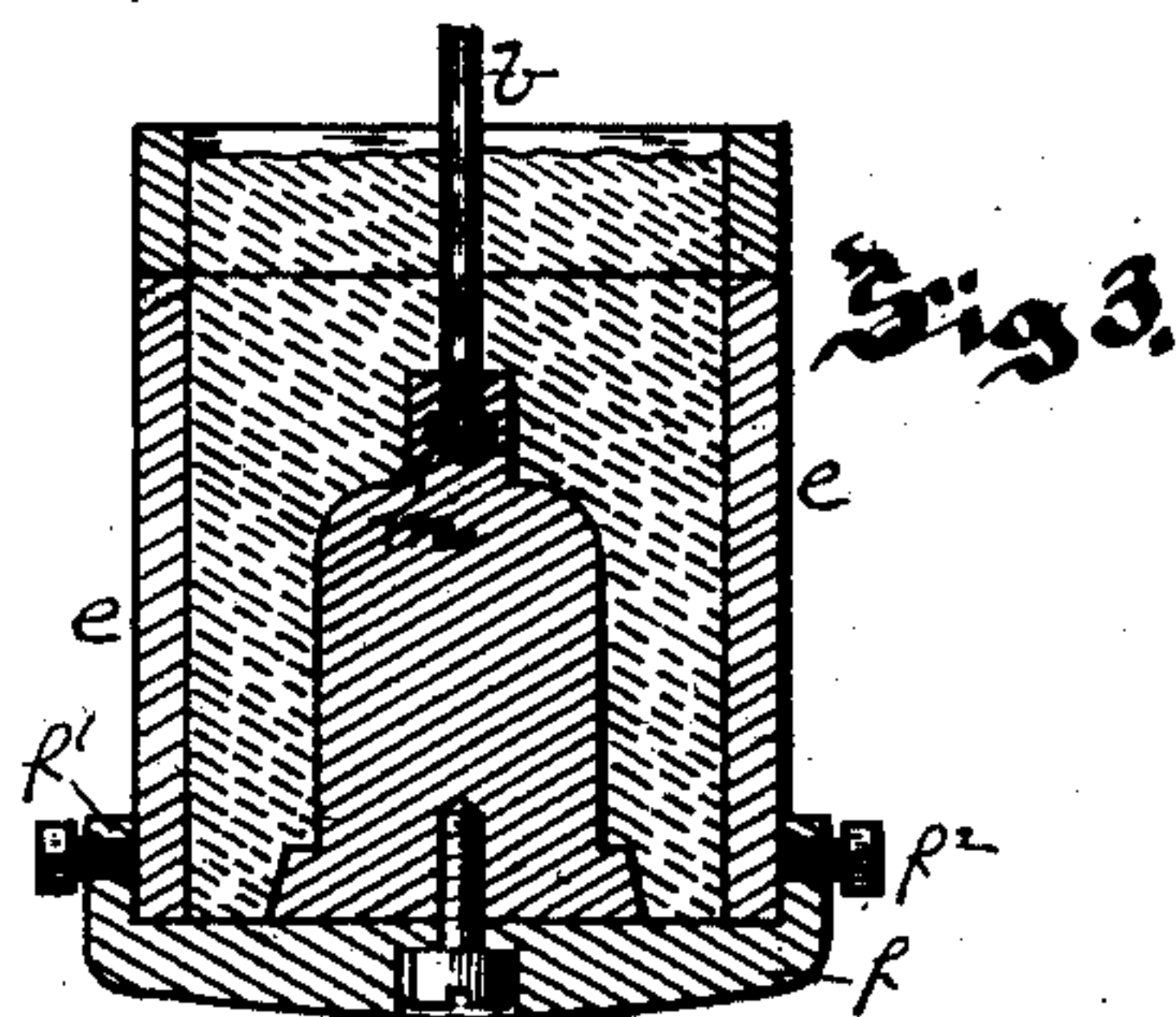


Fig. 6.

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(No Model.)

2 Sheets—Sheet 2.

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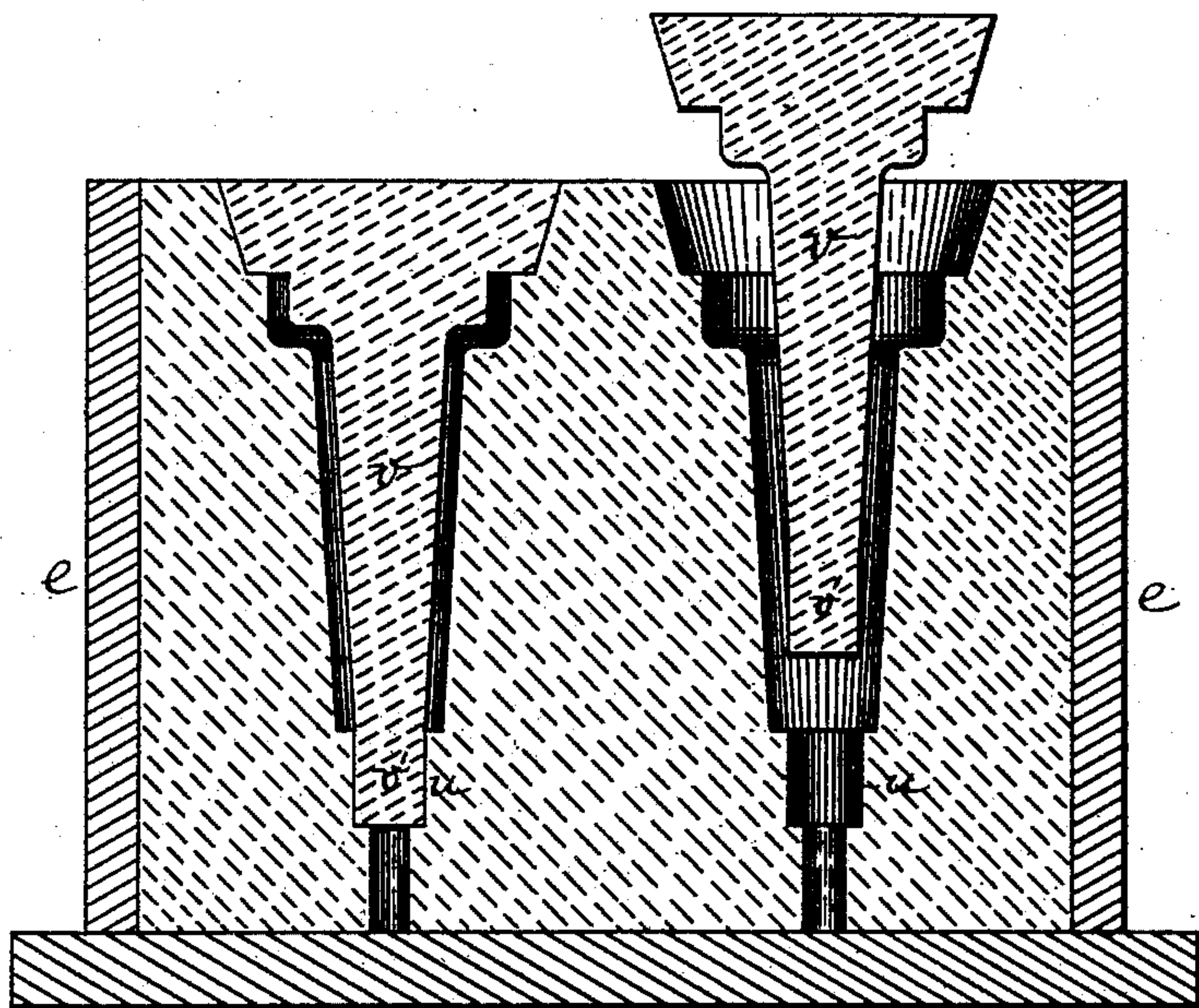
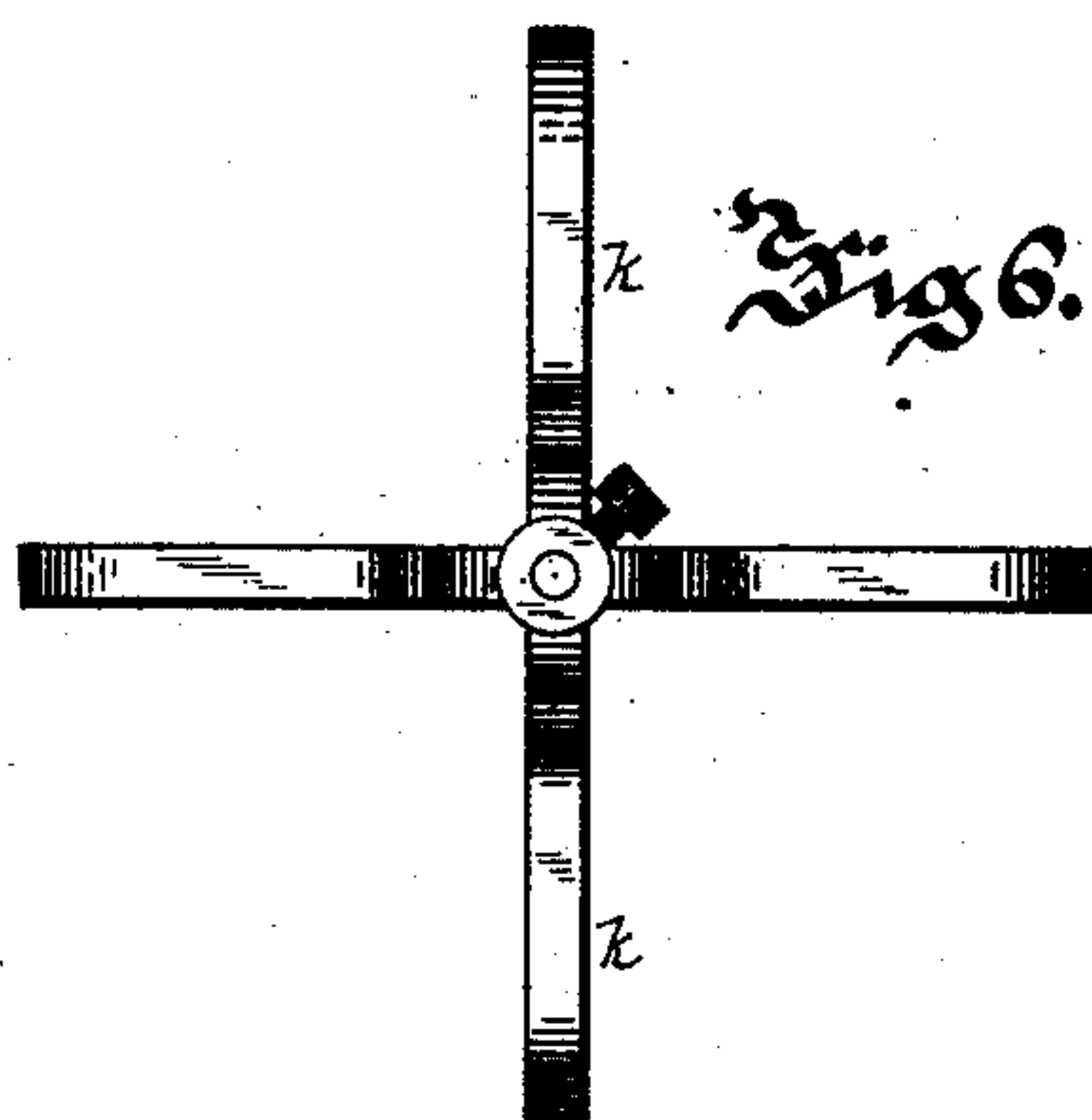


Fig 7.

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UNITED STATES PATENT OFFICE.

S. JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

SAND-MOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 374,163, dated December 6, 1887.

Application filed February 9, 1886. Serial No. 191,323. (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, (Case B;) and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for forming molds in sand by the jarring process, its object being to simplify the apparatus heretofore employed for forming these molds by this process. In this jarring process the flask containing the pattern and the sand is raised to a short distance and dropped upon the jarring-block and a jar is imparted to the sand within the flask, these jars being repeated until the sand is packed sufficiently to form a perfect mold. It is found that a more evenly-packed mold can be obtained by this process than where the sand is either rammed by hand or pressed around the pattern by machine.

The apparatus heretofore generally employed for the manufacture of molds by this process consists of a jarring-table, on which the flask and the bottom plate to which the pattern is secured have been placed, the sand being fed into the flask and the jarring-table being raised by suitable reciprocating apparatus and dropped from the jarring-block; but this apparatus was found to be complicated, and on account of the severe jarring was necessarily made very heavy and cumbersome, and so was liable to get out of order. The guides and bearings for the table were generally exposed to the sand, so that they were worn out rapidly and required frequent adjustment and repair. By my invention these objections are entirely overcome.

It consists, essentially, in combining with lifting and dropping mechanism a pattern and its pattern-block and a flask, these three elements being detachably connected, whereby the pattern and its block support the flask during the formation of the mold, and may be first disconnected from the lifting and dropping mechanism and then withdrawn from the mold formed.

It also consists in the pattern and pattern-block, with a rod or extension of the pattern passing upwardly through the sand and re-

movably connected with the lifting and dropping mechanism, so that the pattern may be placed within the flask, the sand fed thereto, this rod then connected to the lifting and dropping mechanism, and the pattern, block, and flask raised thereby to impart the jar to the sand within the flask, and when the mold is formed the rod be disconnected from the lifting and dropping mechanism and the pattern withdrawn from the mold.

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 cross-section, partly in full lines, of the flask and jarring apparatus. Fig. 2 is a section at right angles to Fig. 1, showing connections between two patterns and the jarring apparatus. Fig. 3 is a vertical section of a modification of my invention. Fig. 4 is an enlarged detail view illustrating the means by which the jarring apparatus is connected to the pattern, Fig. 3. Fig. 5 illustrates the pattern withdrawn from the finished mold. Fig. 6 is a top view of the skeleton frame shown in Fig. 1, and Fig. 7 is a sectional view of a finished mold with the cores therein, showing the manner of closing the lower part of the mold formed.

Like letters of reference indicate like parts in each.

In my improved apparatus the lifting and dropping mechanism, by means of which a jar is imparted to the sand, is preferably arranged above the flask and pattern, this lifting and dropping mechanism *a* being preferably formed of a rod or bar, *b*, sliding in suitable guides, *b'*, and having at the upper end a slotted plate, *c*, provided at the upper end with a lug or pin, *c'*, which extends out in the course of the cam *d*, this cam being mounted on the cam-shaft *d'*, and the slotted plate *c* fitting over the cam-shaft and being guided in its vertical movement thereby. The slotted plate is preferably connected to the rod *b* by means of a loose joint which will permit of sufficient lateral play of the slotted plate to allow of its being drawn aside out of the course of the cam *d*, the lug *c'* on the slotted plate being drawn into the course of the cam whenever it is desired to impart the reciprocating jarring motion to the rod *b* in forming the mold.

At the base of the rod *b* is a suitable swivel-socket, *b*², or other suitable joint, by means of which the rod *b* may be connected to the pattern, as hereinafter described.

5 The flask *e* is of the ordinary construction, and rests upon the pattern plate or block *f*, to which the pattern *g* is connected, the pattern-block *f* having flanges *f*¹, which extend up on the sides of the flask, and being secured to the flask by set-screws *f*², or other suitable devices.

In the construction of my improved apparatus shown in Figs. 1 and 2, the pattern and its pattern-block are provided with a bar, *h*, which extends up through the flask, and is provided with means for connecting with the swivel or other joint *b*² at the end of the rod *b*. I prefer to extend this rod *h* entirely through the pattern *g*, as shown, in order to render the parts strong and lasting; and it may either be connected to the pattern, as shown in Fig. 2, or to the pattern-block, as shown in Fig. 1.

Where several patterns are employed in the same mold, one or more bars *h* may be employed, the bars either extending up through the patterns or extending up separately from the pattern-block.

The form of joint between the jarring apparatus and the bar *h* preferred by me is the ordinary screw-joint, a screw-thread being formed at the upper end of the rod *h* and within the swivel *b*², so that after the flask has been filled with sand it is placed below the lifting and dropping mechanism, and the rod or pattern-extension *h* and bar *b* are connected by this swivel-joint.

In order to brace the pattern and center the rod *h* and hold it in proper position with relation to the flask, I generally provide the bar *b* with a yoke or skeleton frame, *k*, the ends of which extend down the sides of the flask and so act to center the several parts of the apparatus, at the same time preventing any side motion of the flask when it is dropped in jarring.

Below the pattern plate or block *f* is the jarring-block *l*, which is firmly embedded in the earth, and may be of any suitable height, according to the size of flask and its desired height above the floor, this depending upon the kind of mold made and the desire of the workman.

In Figs. 3 and 4 is shown another form of my improved apparatus, in which the bar *b* extends down through the same and is connected to the top of the pattern, the rod *h* being dispensed with. In this construction suitable means are provided for connecting the rod *b* to the pattern which will not disturb the sand of the finished mold when the bar is withdrawn therefrom. One construction suitable for the purpose is illustrated in the drawings, a seat, *m*, corresponding to the size of the bar *b*, being formed in the head of the pattern, and an annular recess, *n*, being formed below the top of said seat, and the bar *b* being provided with a suitable catch which will enter this an-

nular recess *n* and connect the bar to the pattern. In the construction preferred by me the lower end of the bar *b* is made hollow, as shown, and pivoted therein are one or more levers, *p*, having at their lower ends the lugs *r*, which lugs are adapted to engage with the top of the recess *n* in the head of the pattern, the levers extending out through suitable slots in the bar above the flask, where they may be operated by the workman so as to withdraw the lug *r* and free the bar from the pattern. The bar *b* is inserted into the seat *m*, and the lugs *r* of the levers, entering the recess *n*, so connect the bar to the pattern, and after the formation of the mold these lugs *r* at the base of the levers are drawn into the bar by pressing together their upper ends, and the bar is raised out of the sand mold. Two or more of these patterns connected in either manner above described to the raising and dropping mechanism may be employed, if desired, this being shown in Fig. 2.

When my improved apparatus is in use, in the construction shown in Figs. 1 and 2, the flask is set in or secured to the pattern block or plate, the flask filled with sand, a reservoir, *t*, for holding a surplus of sand, being generally employed therewith, as is fully described in patents heretofore granted to me, and the pattern is then connected to the lifting and dropping mechanism by means of a swivel or other joint at the ends of the bar *b* and the corresponding portion of the rod *h*. The apparatus is then set in motion, and, through the reciprocating bar *b*, the rod *h*, and the pattern or pattern-block to which it is connected, the pattern and pattern-block, together with the flask and sand, are lifted and dropped upon the jarring-block *l*, this being repeated a sufficient number of times to properly pack the mold. After finishing the mold the workman disengages the reciprocating bar *b* from the rod *h*, which extends up above the flask, and then disengages the flask from the pattern-block and withdraws the pattern from the finished mold at the opposite end from that connected to the bar *b*, this being preferably accomplished by dropping the pattern out of the flask and mold, as shown in Fig. 5. The finished mold is then inverted, the core *v* placed therein, and it is ready for casting, the base *v*¹ of the core entering the core-seat *u*, formed in the mold for its reception, and so closing the opening formed in the mold by the rod or pattern-extension *h*.

When the apparatus shown in Fig. 3 is employed, the bar *b* is lowered and inserted into the seat *m* at the top of the pattern and connected thereto as above described. The flask is then filled with sand and jarred in the manner above described, and as soon as the mold is finished the workman withdraws the lugs *r*, disconnecting them from the head of the pattern, and draws the bar *b* out of the sand mold. The pattern is then withdrawn from the bottom or opposite end of the flask, as above described, the core inserted, and the mold is

ready for casting. As the flask and sand therein are raised in this manner by the lifting and dropping mechanism through the pattern or its block, they are guided in their movement by the guides *b'* of the bar *b*, and lateral movement of the flask is prevented by means of the yoke or skeleton frame *k*, which extends over the top of the flask; this frame also serving to steady the upper portion of the patterns in their proper position with relation to the flask.

The apparatus is simple in construction, enabling me to use patterns entirely separate from the lifting and dropping mechanism, being simple and readily detached from the same; also enabling me to withdraw the pattern or card of patterns from the lower end of the mold without being obliged to use the heavy cumbersome jarring-table with its guide apparatus, as heretofore used, and at the same time enables me to place the lifting and dropping mechanism above the flask, if so preferred, in which case there is no liability of its becoming worn by the molding-sand entering any of its bearings.

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

1. In molding apparatus, the combination of

lifting and dropping mechanism, a pattern and its block, and a flask, the three elements being detachably connected, whereby the pattern and the pattern-block support the flask during the formation of the mold, and may be first disconnected from the lifting and dropping mechanism and then withdrawn from the mold, substantially as set forth.

2. In molding apparatus, the combination, with lifting and dropping mechanism, of a flask and a pattern and its block provided with a rod or extension of the pattern passing up through the flask and detachably connected to the lifting and dropping mechanism, substantially as and for the purposes set forth.

3. In molding apparatus, the combination of the lifting and dropping mechanism provided with the skeleton frame *k*, the flask, and the pattern and its block detachably connected to the lifting and dropping mechanism and supporting the flask, substantially as and for the purposes set forth.

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

S. JARVIS ADAMS.

Witnesses:

JAMES I. KAY,
J. N. COOKE.