

(No Model.)

A. J. DOANE.

CORE ARBOR.

No. 317,102.

Patented May 5, 1885.

Fig. 1.

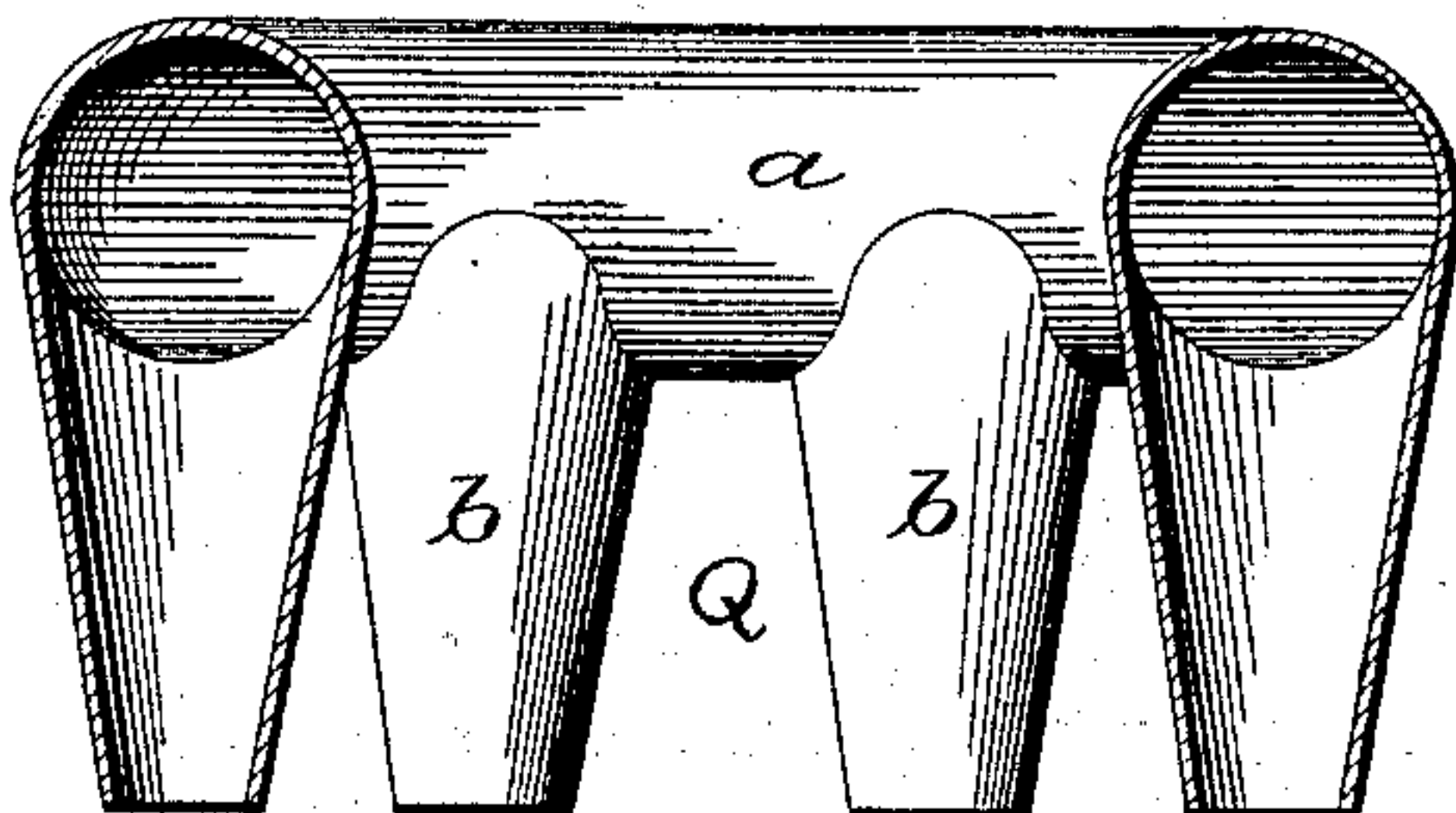


Fig. 2.

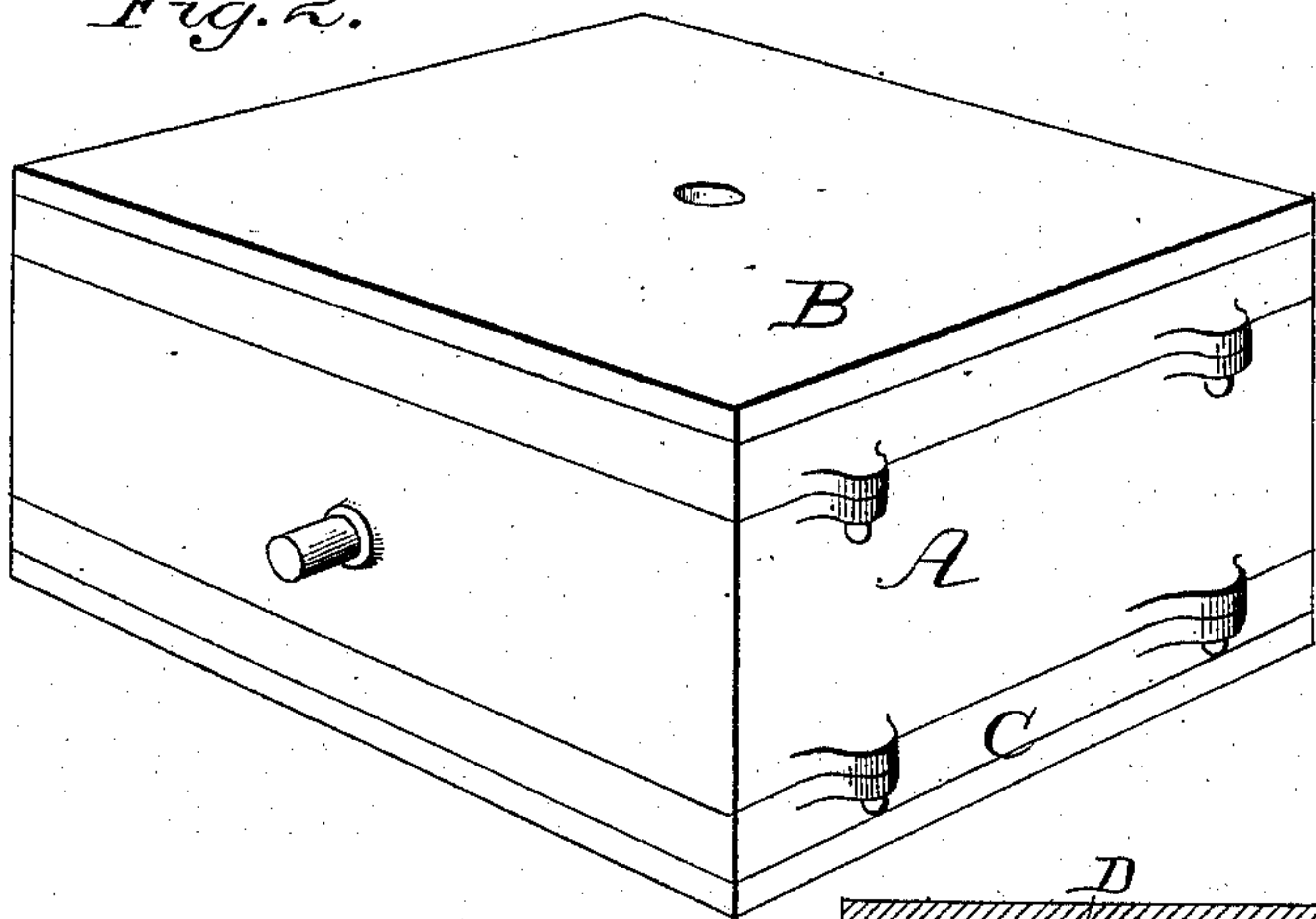


Fig. 3.

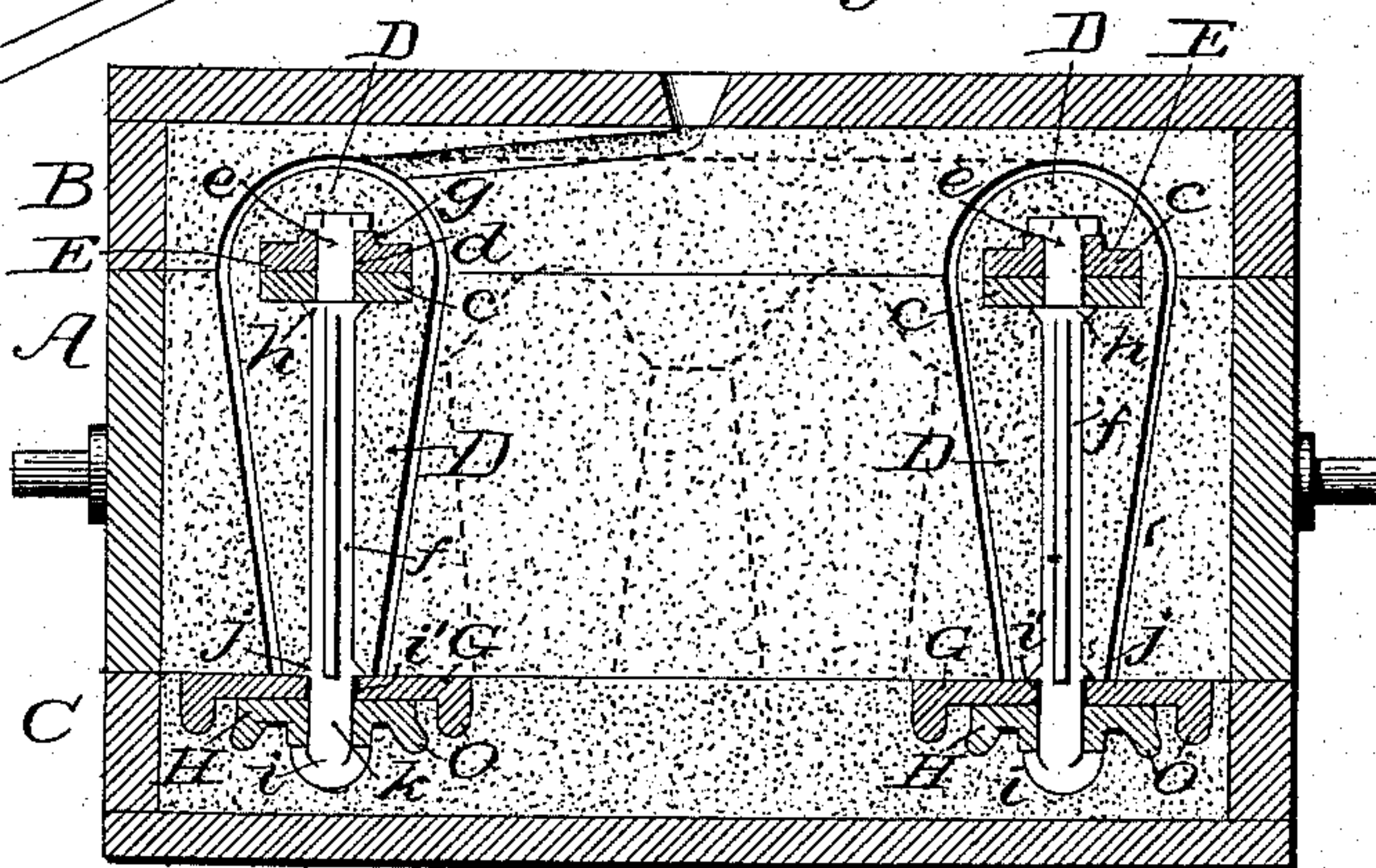
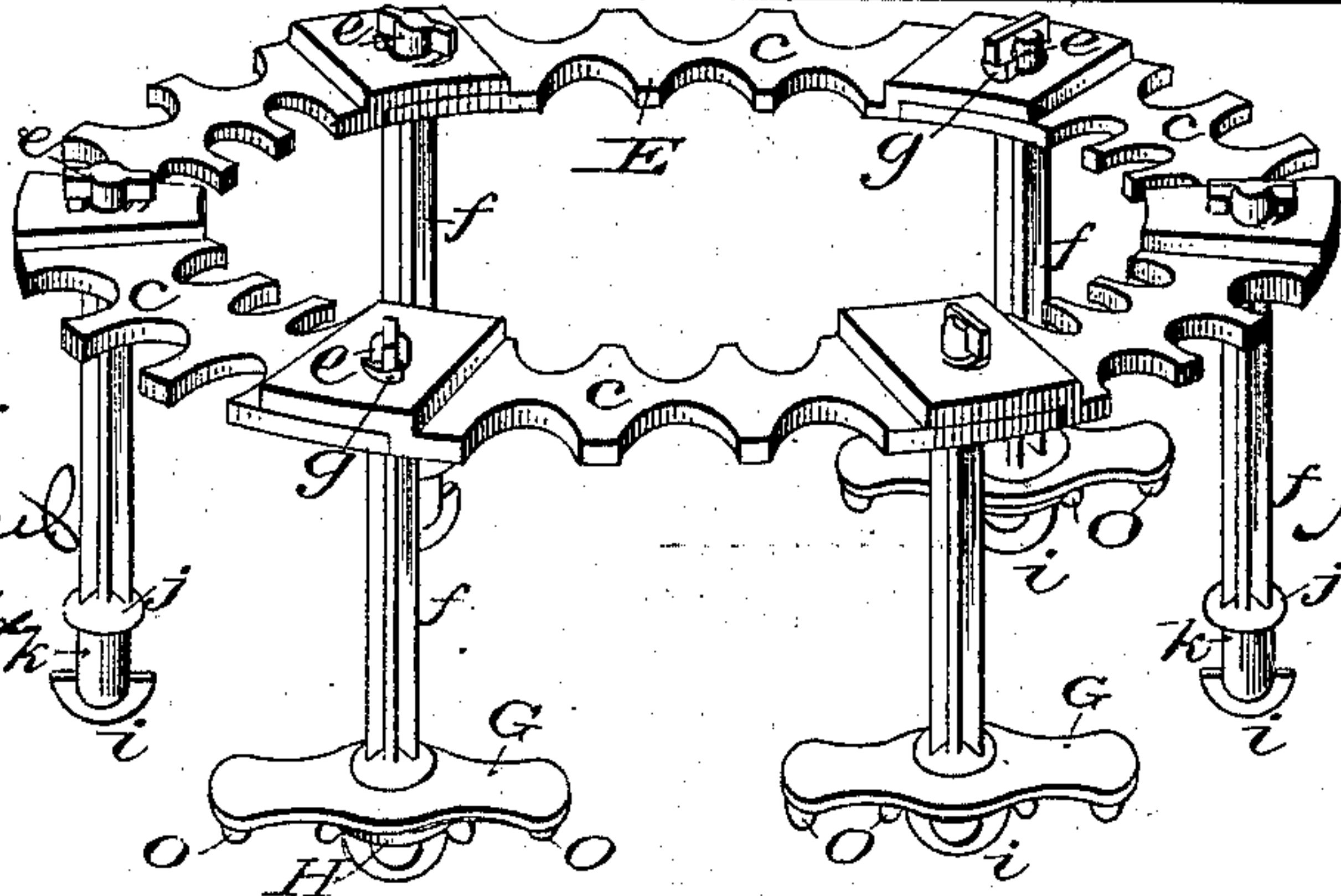


Fig. 4.



Witnesses:

Jas. F. Duffield
Walter S. Dodge

Inventor:

Andrew J. Doane,
by Dodge & Son,
Attys.

UNITED STATES PATENT OFFICE.

ANDREW J. DOANE, OF NORWALK, CONN., ASSIGNOR OF TWO-THIRDS TO
CHARLES N. ARNOLD AND THEODORE E. SMITH, BOTH OF SAME PLACE.

CORE-ARBOR.

SPECIFICATION forming part of Letters Patent No. 317,102, dated May 5, 1885.

Application filed November 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. DOANE, of Norwalk, in the county of Fairfield and State of Connecticut, have invented certain new and
5 useful Improvements in Molds, of which the following is a specification.

This invention relates to molds for casting, and is more especially designed for casting the upper section or radiator of heating-furnaces,
10 though susceptible of use for various other castings.

The invention consists, primarily, in a novel construction and arrangement of the core-bars, hereinafter set forth.

15 In the accompanying drawings, Figure 1 is a sectional view of the casting to be made; Fig. 2, a perspective view of the mold complete; Fig. 3, a vertical transverse section of the same; Fig. 4, a perspective view of the
20 skeleton or core or arbor.

Heretofore it has been the more general practice, in making castings of the character mentioned, to suspend the core by arbors or hangers having threaded or perforated stems
25 extending through and above the cope, and there secured by nuts, keys, or equivalent devices, which, being exposed, were frequently moved or misplaced, thus permitting the sus-
30 taining arbors to fall, or causing them to rise, as the case might be, and thereby ruining the mold. Such molds being quite expensive, their injury is of course a source of considerable loss, not only in the cost of the mold, but in the matter of time and production. This
35 difficulty is wholly overcome, the time and care required to produce a perfect mold are lessened, and the certainty of attaining accuracy in the casting is enhanced by the present invention, which will now be more fully ex-
40 plained with the aid of the drawings.

Referring first to Fig. 1, O indicates the casting to be produced, consisting of a hollow annular head or flue, *a*, with a series of vertical pipes or flues, *b*, connecting therewith
45 and extending downward therefrom. The core D needed for such a casting requires a central skeleton or support which must be capable of separation in order that it may be removed from the finished casting. Such skel-
50 eton or center E is composed of a series of

overlapping segmental plates, *c*, the ends of which are formed with eyes or perforations *d*, through which are passed the T-heads *e* of shouldered stems or arbors *f*, which arbors not only serve to unite the sections, but answer
55 also as the central support for the cores of the vertical pipes or flues *b*, and serve to hold the core, as a whole, in its proper position. The eyes or perforations *d* of the upper or overlapping end of each section *c* are partially en-
60 circled by inclines *g*, upon which the ears or projections of the T-heads *e* ride as the stems or arbors *f* are turned, thus drawing the two plates or sections firmly together and down
65 upon the shoulder *h* of the stems or arbor, thereby making the whole skeleton frame rigid. The plates or section *c* are formed with scalloped edges to render them light, and particularly to cause the sand of the core to firmly
70 adhere thereto, separated as little as possible by the plates *c*.

Instead of suspending the core from above, as heretofore, by the arbors projecting above the cope of the mold, and there provided with nuts, keys, or like fastenings, the stems are
75 placed below the plates *c*, and consequently support above them the annular plate formed by the several segments.

The lower ends of the arbors or stems *f* are made of essentially the same form as the up-
80 per ends—that is to say, they have each a T-head, *i*, a shoulder, *j*, and an intermediate smaller neck, *k*, advisably of cylindrical form.

The several segments *c* being united and secured by the stems or arbors, as above ex-
85 plained, and as illustrated in Fig. 4, large washers or flat plates *G*, having openings *i'*, are applied to the lower ends of the stems, after which a smaller washer having an open-
90 ing, *m*, with lateral enlargements *m'*, and encircled by inclines *n*, is applied to each stem and turned to draw the parts firmly together. Each plate *c* and stem or arbor *f* being a duplicate of all the others, the distance between the under side of said plate and the upper side of
95 plates or washers *G* will be uniform throughout.

In preparing the mold for use the cope B is first rammed up, with the pattern of the upper half of the ring *a* in place, its convex side
100

uppermost. The cope B is then turned over, bringing the concave side of the pattern uppermost, and a proper quantity of sand is riddled or sifted into the same. The arbor or skeleton core having been first put together, as shown in Fig. 4, but without the plates G and washers H, is set into this part of the pattern, the stems or arbors *f* extending upward. The remaining part of the pattern, embracing the lower half of ring *a* and the tubes or flues *b*, is set in place upon the first part of the pattern, which then occupies a proper position relatively to the skeleton core or support, the stems or arbors *f* of which project above the open mouths of the flues or tubes *b* of the pattern. The cheek A is then put in position, resting upon the still inverted cope. The cheek is filled and rammed, and the core is likewise filled in and rammed through the open mouths of the pattern flues or pipes *b*. The proper parting is then made, the plates G and washers H are applied, the nowel C is put on and rammed, and the mold is ready for finish.

Beginning with the nowel, it is first drawn off, then the plates G and washers H are removed, then the cheek A is drawn off and the section of the pattern which includes the pipes or flues *b* is removed. The cheek is then replaced, the plates G and washers H are then placed upon the stems *f*, and the cheek, cope, and nowel reunited. The entire mold is then turned over end for end, the cope is removed and the remaining portion of the pattern is withdrawn, whereby the cope is replaced, a runner is made for the iron, and the mold is ready for use.

This is the mode or order of procedure which experience has shown to be advisable; but it may be varied as the fancy or judgment of molders suggest or dictate.

When thus completed, all parts of the skeleton and support of the core are hidden and protected. The core, instead of being suspended by rods or arbors having exposed fastenings—such as nuts or wedges—the slightest turn or displacement of which is sufficient to raise or lower the core and thereby ruin the mold by causing the casting to be too thin in places, is supported by rigid arbors, which, by reason of their construction and arrangement, come every time to the same position, and is further supported by the sand forming the vertical portions of the core.

The practical use of this improved mold and arbor has demonstrated its great superiority, the result being certain and uniform, the cost far less than under the former plan, and the time required in preparing the mold being materially lessened, thus increasing the amount of work that may be done in a given time.

I do not wish to restrict myself to the precise details of construction herein set forth, for they may be varied considerably. Thus the arbors may be made to pass through one

of the sections, and to screw into the upper or overlapping one, or into both, and keys, wedges, or equivalent fastenings may be substituted; but the construction and arrangement shown and described insures greater accuracy and readiness of application, hence is preferred.

I am aware that it is not new to cast hollow bodies with the mouth or opening down, or to support a core from below, instead of suspending it; but I am not aware that any one has hitherto concealed the fastening devices of a core, embedded them in the sand, or otherwise secured them against accidental displacement.

It is not essential in all cases that the three-part flask be used, the invention being applicable also in part to two-part flasks for various articles.

The stems or arbors *f* may in such case be extended through the nowel under the board, or to the top of the mold, suitable bearings for the washers to rest upon being in such case provided at the outer face of the mold or under the board.

I am aware that it is not new to employ a spindle within a core to give it strength and support; and I am further aware that such spindle has been completely embedded within the flask or mold.

I am also aware that a mold has been furnished with a metallic block, through which to pass the shank of a core-spindle for the purpose of insuring accurate adjustment of the core. The first of these plans, broadly considered, I disclaim, and the second I do not use.

Having thus described my invention, what I claim is—

1. In a mold, the combination, with the cheek and nowel, of an arbor to support the core, and a supporting-plate for said arbor, embedded in the sand of the nowel, and having its face flush with the parting between the cheek and nowel, substantially as shown.

2. The combination, in a mold, of a cheek, a nowel, a core, a supporting-arbor for said core, and fastening devices for said arbor embedded in the sand of the nowel, substantially as and for the purpose set forth.

3. In combination with cheek A, cope B, and nowel C, core D, provided with skeleton frame or support E, consisting of overlapping sections *c*, arbors *f*, passing through and connecting said sections, plates or washers G applied to the arbors at the parting-line of the cheek or nowel, and washers H applied to the arbors below the plates G, all substantially as described and shown.

4. The skeleton for a mold-core, substantially as described, consisting of overlapping segmental plates *c*, provided with openings *d* and inclines *g*, arbor *f*, provided with T-heads *e* and shoulders *h* at their upper ends, and with T-heads *i* and shoulders *j* at their lower ends, plates, or washers G, and washers H, having

openings *m*, and inclines *n*, said parts being constructed and combined substantially as and for the purpose explained.

5. In combination with flask-sections A B, core D, provided with an internal separable skeleton support, *e*, substantially as described, having stems *f* projecting through and be-

yond the face of section B, and plates G and washers H applied to said stems, substantially and for the purpose set forth.

ANDREW J. DOANE.

Witnesses:

J. BELDEN HURLBUTT,
WM. A. JACKSON.