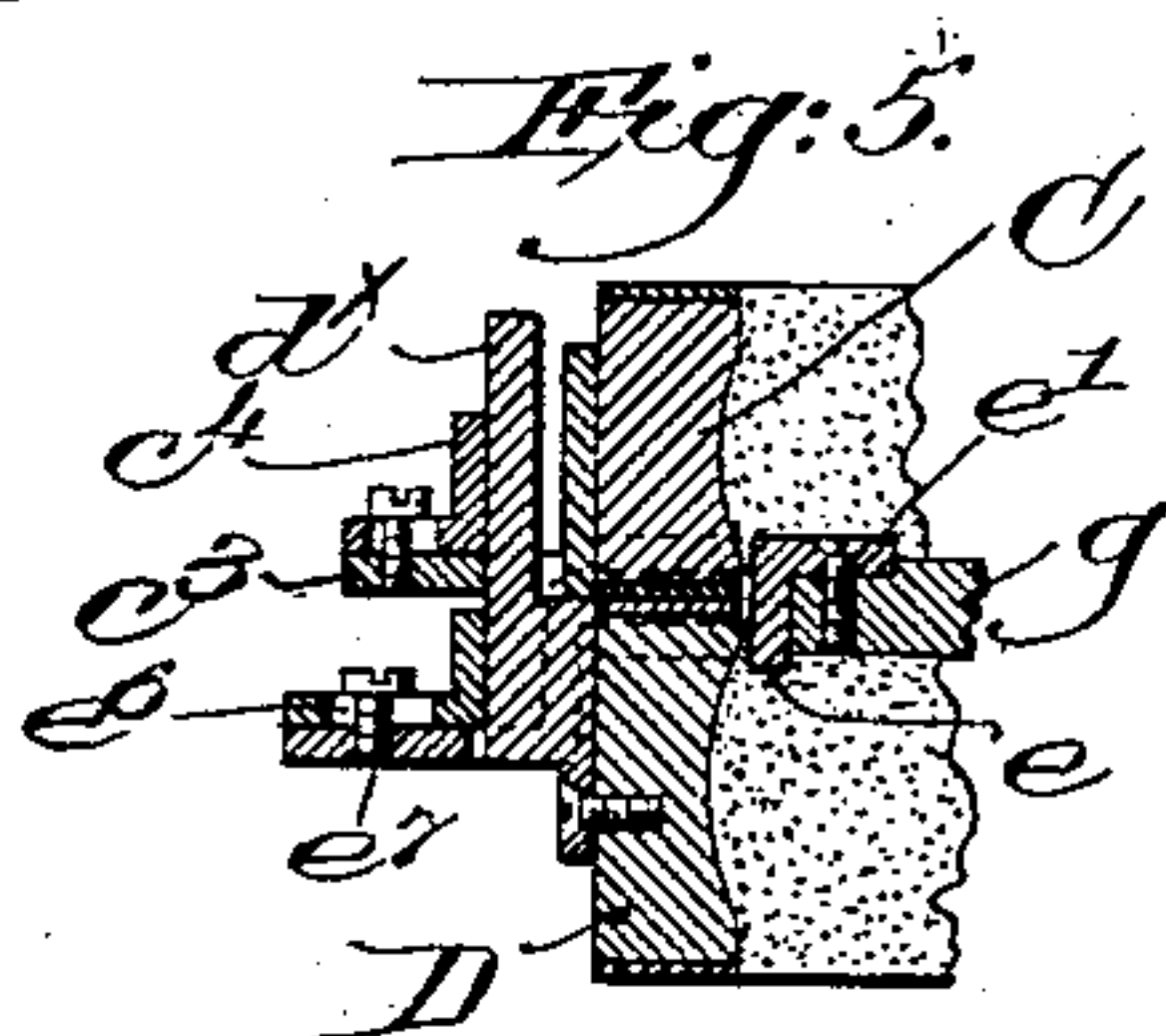
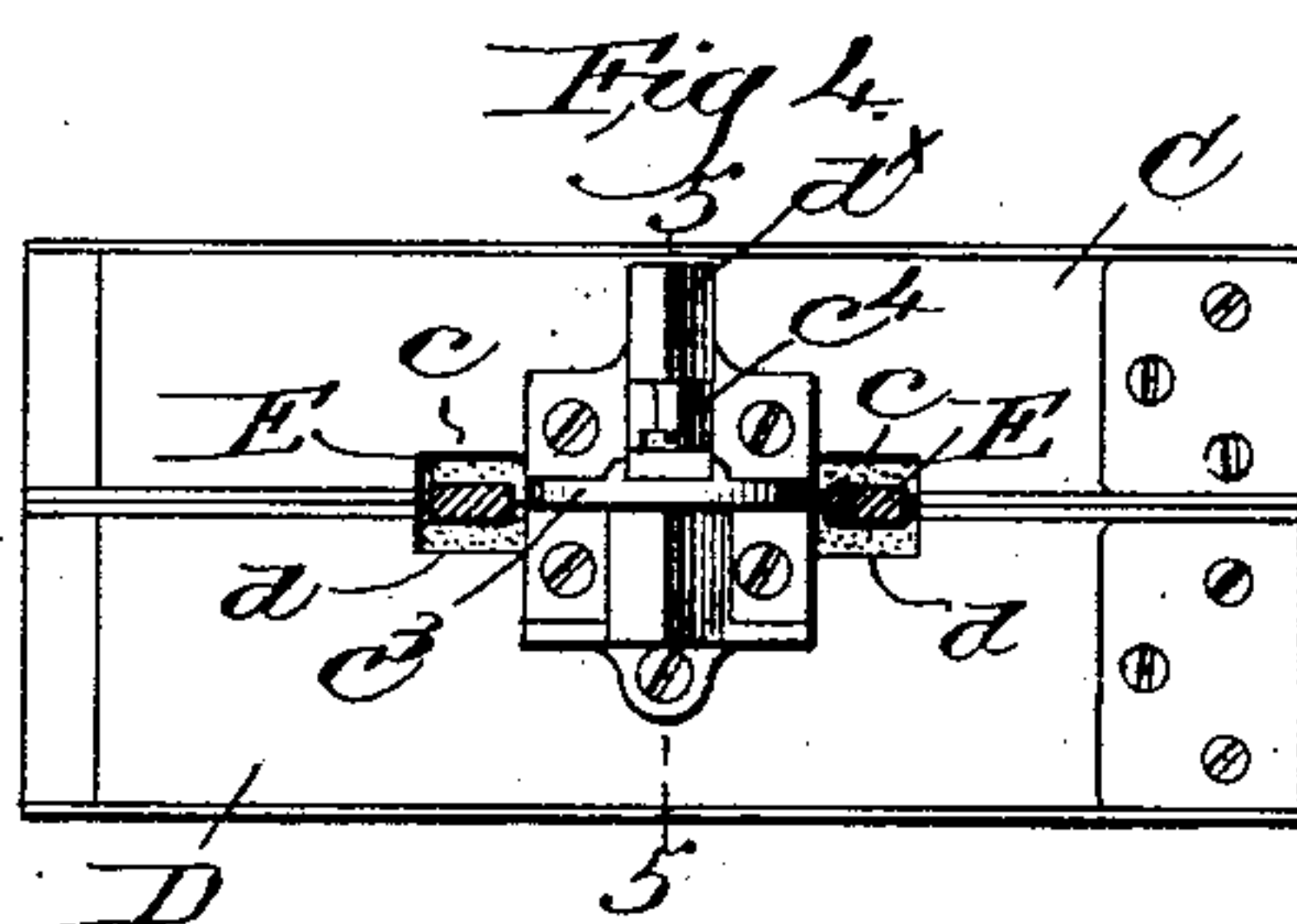
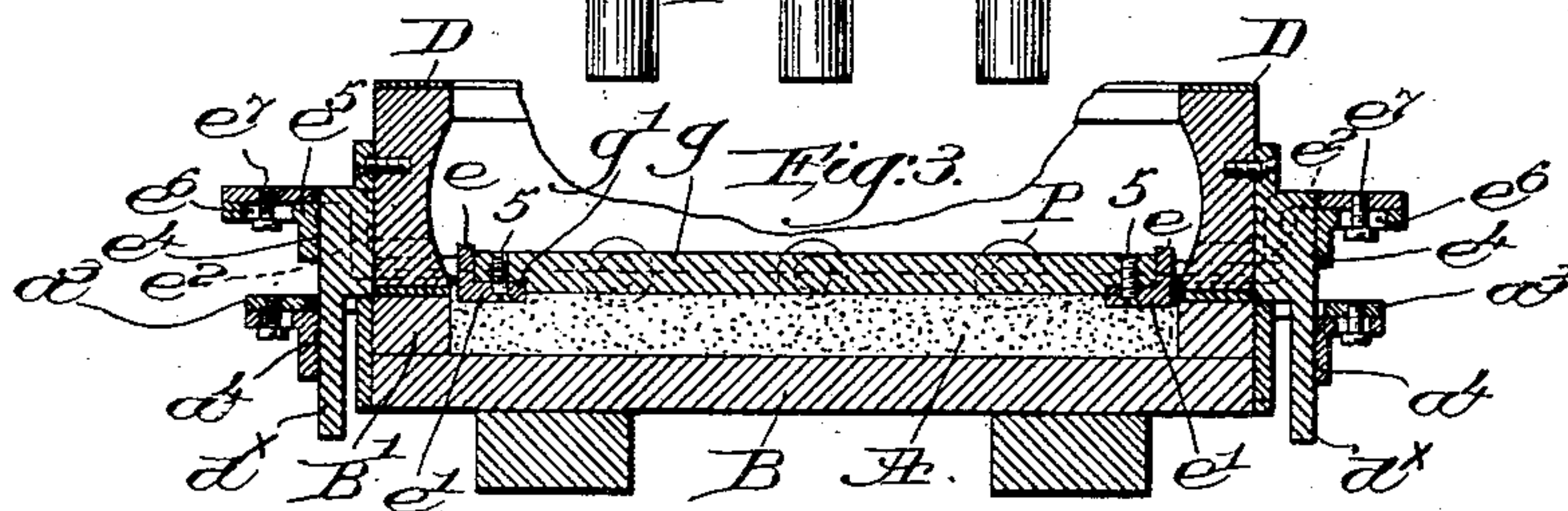
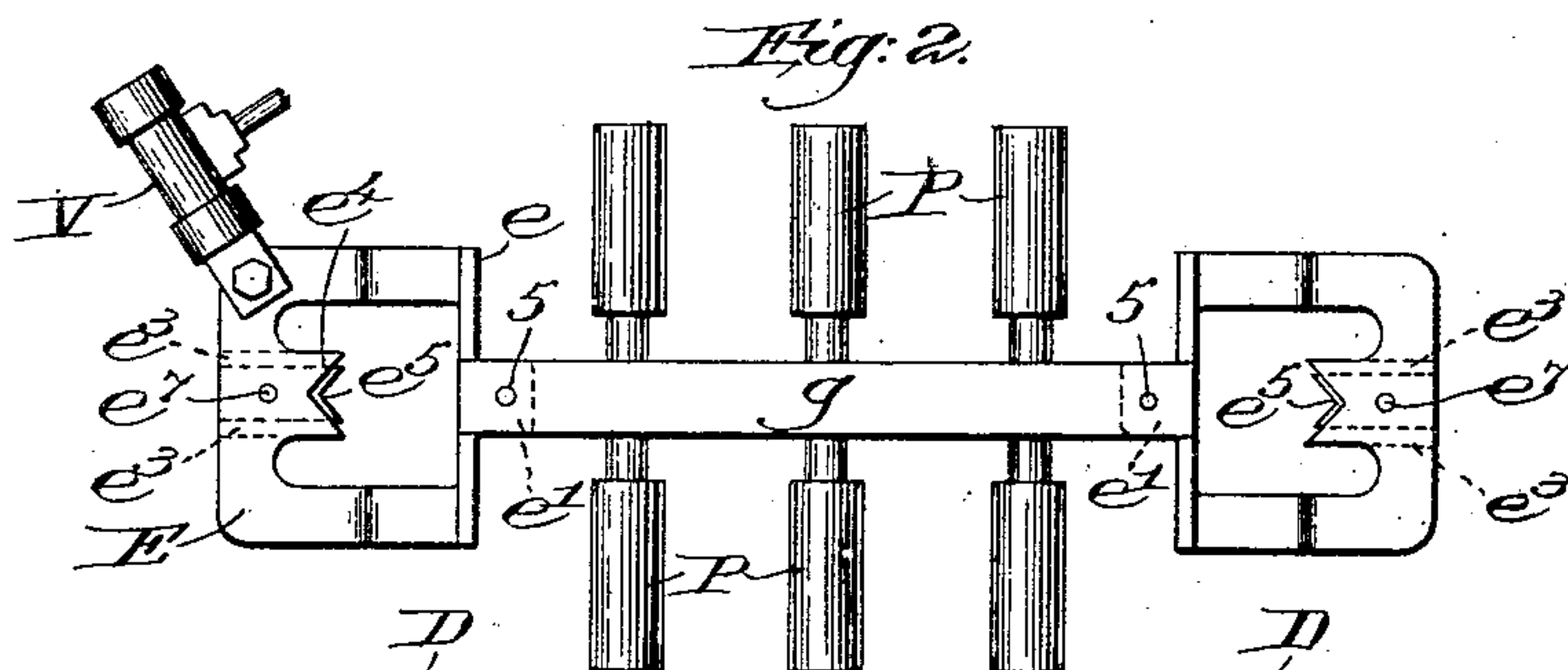
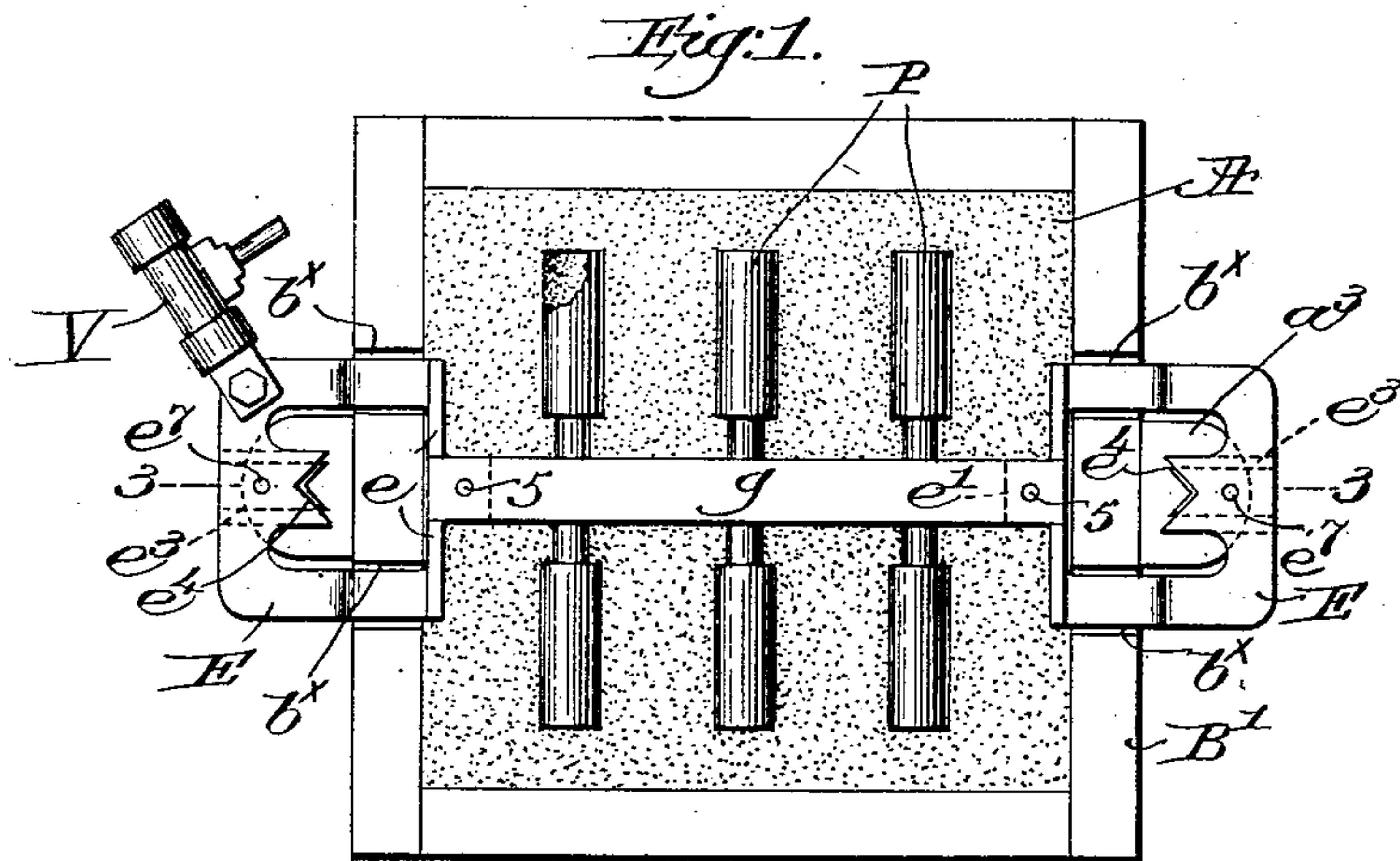


W. C. WRIGHT.  
MOLDING APPARATUS.  
(Application filed Oct. 17, 1901.)

(No Model.)



Witnesses,  
Edward H. Allen.  
Adolph H. Kaiser

Inventor,  
William C. Wright,  
by Crosby Gregory,  
attys



# UNITED STATES PATENT OFFICE.

WILLIAM C. WRIGHT, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO  
DRAPER COMPANY, OF PORTLAND, MAINE, AND HOPEDALE, MASSACHUSETTS.

## MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 703,034, dated June 24, 1902.

Application filed October 17, 1901. Serial No. 78,969. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. WRIGHT, a citizen of the United States, residing at Hope-  
dale, county of Worcester, State of Massa-  
5 chusetts, have invented an Improvement in  
Molding Apparatus, of which the following de-  
scription, in connection with the accompany-  
ing drawings, is a specification, like charac-  
ters on the drawings representing like parts.  
10 In that class of molding wherein the part-  
ing face of the mold is obtained by the use  
of a "match" which is mounted in and sup-  
ported by a suitable frame it is now com-  
mon practice to secure the pattern provided  
15 with a proper gate to a frame which rests  
upon the top of the match-frame during the  
construction of the drag, the pattern and  
gate at such time being supposed to rest  
firmly and truly in the corresponding de-  
20 pressions in the face of the match. Fre-  
quently the match and pattern do not contact  
equally, as they should, and some portion or  
portions of the pattern will not bottom on  
the match, so that when the sand is rammed  
25 into the drag-flask the unsupported part of  
the pattern will yield and the completed  
drag will be imperfect by reason of such dis-  
tortion of the pattern. The cope will also be  
affected by such distortion, so that the cast-  
30 ing subsequently made from the mold will be  
imperfect, and when the pattern is drawn it  
will damage the mold, because the pattern has  
not in the first instance been accurately and  
equally supported throughout by the match,  
35 and such damage must be repaired by care-  
ful handwork or a new mold must be made.  
Inasmuch as the frame connected with the  
pattern rests upon the top of the match-frame,  
it will be manifest that any sand, grit, or  
40 other foreign matter between the adjacent  
faces of the two frames will operate to pre-  
vent the true and fair bottoming of the pat-  
tern on the match, with the results before  
mentioned. Sometimes the ramming of the  
45 drag is not uniform throughout, so that the  
sand in some portions thereof will be harder  
than in other portions, and when the cope is  
rammed the part of the pattern above the  
less compact portions of the drag will yield  
50 relatively to the other part of the pattern,

causing the production of a distorted mold.  
It will be manifest that this result must fol-  
low because the pattern cannot "settle" as a  
whole, owing to its rigid connection with the  
supporting-frame which rests on the drag- 55  
flask when the cope is constructed. These  
and other practical objections to this class of  
machine-molding have caused great annoy-  
ance, expense, and expenditure of time in  
correcting the resulting faulty molds, and 60  
the imperfections of the apparatus and its  
mode of operation have given rise to great  
dissatisfaction therewith.

My present invention relates to molding ap-  
paratus employed in the general class of work 65  
hereinbefore referred to; and it has for its  
object the production of novel and improved  
molding apparatus whereby the objectionable  
features referred to are entirely obviated,  
the apparatus embodying my invention be- 70  
ing also thoroughly adapted for the produc-  
tion of rapid and accurate work without the  
use of highly-skilled labor.

The various novel features of my invention  
will be hereinafter described in the specifica- 75  
tion, and particularly pointed out in the fol-  
lowing claims.

Figure 1 is a plan view and shows a match  
sustaining a pattern provided with a vibra- 80  
tor extension and with guides on the latter in  
accordance with one embodiment of my in-  
vention. Fig. 2 is a plan view of the pattern  
and its attached parts removed from the  
match. Fig. 3 is a longitudinal sectional  
view on the line 3 3, Fig. 1, but also showing 85  
in vertical section a portion of the drag-flask.  
Fig. 4 is an end elevation of the superposed  
cope and drag flasks with the pattern in po-  
sition, the vibrator extension being cut off  
outside of the flasks to more clearly show cer- 90  
tain devices thereon to be hereinafter de-  
scribed; and Fig. 5 is a vertical sectional de-  
tail on the line 5 5, Fig. 4.

In the specification and claims I shall use  
the term "drag" to designate the sand mold 95  
made in the drag-flask and the term "cope"  
to designate the other part of the mold made  
in the cope-flask.

The match A, composed of any suitable ma-  
terial and having in its upper face the con- 100



figuration corresponding to the pattern cooperating therewith, is contained in a suitable frame comprising a bottom board B and upright sides B', the match and its frame being of usual construction with the exception that in accordance with my invention the opposite ends of the match are cut away or recessed to leave clearance-spaces  $b^x$ , for a purpose to be described, said clearance-spaces being clearly shown in Fig. 1.

The pattern P of any configuration is shown as provided with a gate g, and this gate, herein illustrated as an elongated rigid bar, preferably of metal, has attached thereto, preferably at both ends, what I have termed "vibrator extensions" E, said extensions being shown as shaped to constitute handles and detachably connected with the gate by suitable means, as screws 5, the inner end of each loop-like extension E having a cross-piece e provided with a foot  $e'$ , which, as shown in Fig. 3, is adapted to enter a suitable seat  $g'$ , formed in the gate.

Referring to Figs. 1 and 3, wherein the pattern is shown in position on the match ready for the construction of the drag, it will be noted that the sides of the loop-like extensions pass through the clearances  $b^x$  of the match-frame and do not contact in any way with the latter, so that the pattern, its gate, and the extensions E are supported wholly by the match, and if the pattern and the match correspond throughout, as they should, the former will be accurately and truly seated on the match throughout all its parts, and when the sand is rammed into the drag-flask D there can be no distortion of the pattern or any part thereof, because it is uniformly supported at all points by the match.

The vibrator extensions are upturned between the inner and outer ends thereof, as at  $e^2$ , so that the parts which project beyond the match-frame and also beyond the flasks during the construction of the mold are elevated above the general plane of the face of the match, as clearly shown in Fig. 3, and each loop-like extension E is herein shown as provided on its under face with parallel ribs  $e^3$  to constitute a guideway for a substantially U-shape guide  $e^4$ , the depending portion of each guide having a bevel-sided recess  $e^5$ , while the top or head of the guide is longitudinally slotted, as at  $e^6$ , to receive the shank of a set-screw  $e^7$ , which is screwed into the extension. These guides are adapted to receive the drag-pins  $d^x$ , secured exteriorly to the ends of the drag-flask D, (see Figs. 3, 4, and 5,) so that when the latter is in position for the construction of the drag the said drag-pins will cooperate with the guides  $e^4$  and also with guides  $a^4$ , adjustably attached to supporting-plates  $a^3$ , secured to the match-frame.

When the molder has rammed the sand in the drag-flask and has completed the drag, the latter, with the match, is turned upside down in usual manner and the match is lifted off, leaving the pattern and its attached

parts—namely, the gate and extensions—in position on the drag and vertically supported wholly by the sand constituting the drag. For this purpose the ends of the drag-flask are cut away or recessed to form clearances  $d$ , as best shown in Fig. 4, and similarly the cope-flask C is provided in its ends with clearances  $c$ , so that when the two flasks are superposed, as in Figs. 4 and 5, the loop-like extensions E will receive no vertical support whatever from the drag-flask, nor can any vertical pressure be exerted thereupon by or through the cope-flask. After the match has been lifted off, as hereinbefore referred to, the cope-flask is put in position on the drag-flask and the drag-pins  $d^x$  cooperate with the cope-guides  $c^4$ , herein shown as adjustably supported on plates or ears  $c^3$ , rigidly attached to the cope-flask. Heretofore in this class of molding apparatus, wherein the pattern has been rigidly attached to a surrounding frame, the latter has had rigidly secured to it guides to cooperate with the drag and cope flasks, and when the fit has become faulty by reason of wear it has been an exceedingly difficult and troublesome matter to correct the same.

In my present invention by making the guides  $e^4$  adjustable any looseness due to wear or otherwise can be quickly and readily compensated for by adjusting the guides on the extensions E by means of the set-screws  $e^7$ . This adjustment when necessary is preferably effected after the match has been removed from the drag, the molder at such time loosening the set-screws  $e^7$  and setting up the guides against the drag-pins to snugly engage the same, after which the guides are secured in such adjusted position by tightening up the set-screws. Manifestly the pattern will thereby be accurately positioned relatively to the drag, and when the cope-flask is applied it will also be positioned relatively to both the drag and the pattern.

When the sand is rammed in the cope-flask, it being remembered that the pattern is vertically supported wholly by the drag and independent of the drag-flask, it will be manifest that should any part of the sand forming the drag be less compact than other parts the pattern will tend to sink in the less compact part, but the pattern will sink as a whole, and thereby the bending or displacement of one part of the pattern relatively to another is obviated, and while the part of the pattern in the drag may be slightly displaced it will be displaced as a whole, and the completion of the cope will compensate for such displacement, and the completed mold will be perfect and will produce a perfect casting. The cope having been completed, it is usual in machine-molding to vibrate the pattern while the cope is being lifted and also when the pattern is drawn, and for this purpose any suitable vibrator, as V, may be connected with one of the vibrator extensions E, one well-known form of vibrator comprising a piston rapidly reciprocated in a suitable cylinder by com-



pressed air, the vibrations thus transmitted by the vibrator extension to the pattern and its gate loosening the same from the sand of the mold.

5 The construction of the vibrator extensions herein illustrated and described to form handles is very convenient in manipulating the pattern when placing the same on the match or when drawing the pattern, and by means  
10 of a vibrator extension connected with the pattern and which is exterior to the flasks the vibration can be readily imparted to the pattern.

I believe it to be broadly new in machine-  
15 molding apparatus to sustain the pattern wholly by the drag independently of the drag-flask during the construction of the cope.

From the foregoing description, taken in connection with the drawings, it will be mani-  
20 fest that if the pattern is true and the match is in proper condition it will be impossible to distort or bend any part of the pattern or the gate during the formation of the drag, because the pattern is supported wholly by the  
25 match at such time, and all parts of the pattern will be fairly and truly bottomed.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

30 1. In molding apparatus, a match and its frame, the latter having a recessed portion, a pattern provided with a gate and a vibrator extension on the latter, the pattern, gate, and vibrator extension being supported wholly by  
35 the match independently of the match-frame during the construction of the drag, the vi-

brator extension passing through the recessed portion of the frame and out of contact with the latter.

2. In molding apparatus, a match and its 40 frame, the latter having recessed portions, a cooperating pattern, and oppositely-extended vibrator extensions connected with the pattern and constructed as handles, said vibrator extensions passing through the recessed 45 portions of the frame out of contact with the latter.

3. In molding apparatus, a pattern and its gate, extensions on the opposite ends of the latter, projecting beyond the flasks during 50 the construction of the mold, and drag and cope flasks having external means thereon to cooperate with said extensions to position the pattern and flasks, the latter having clear-  
ance portions to receive said extensions, 55 whereby the pattern, gate, and extensions, will be supported wholly by the drag during the construction of the cope.

4. In molding apparatus, a drag, and its flask, a pattern sustained wholly by the drag 60 independently of its flask during the construction of the cope, and adapted to be engaged exterior to the drag and cope flasks to be vibrated preparatory to separation of the cope and drag and withdrawal of the pattern. 65

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM C. WRIGHT.

Witnesses:

LINCOLN WRIGHT,  
GEORGE B. ARNOLD.