

(No Model.)

2 Sheets—Sheet 1.

W. S. WITHERS.
MOLDING APPARATUS.

No. 393,804.

Patented Dec. 4, 1888.

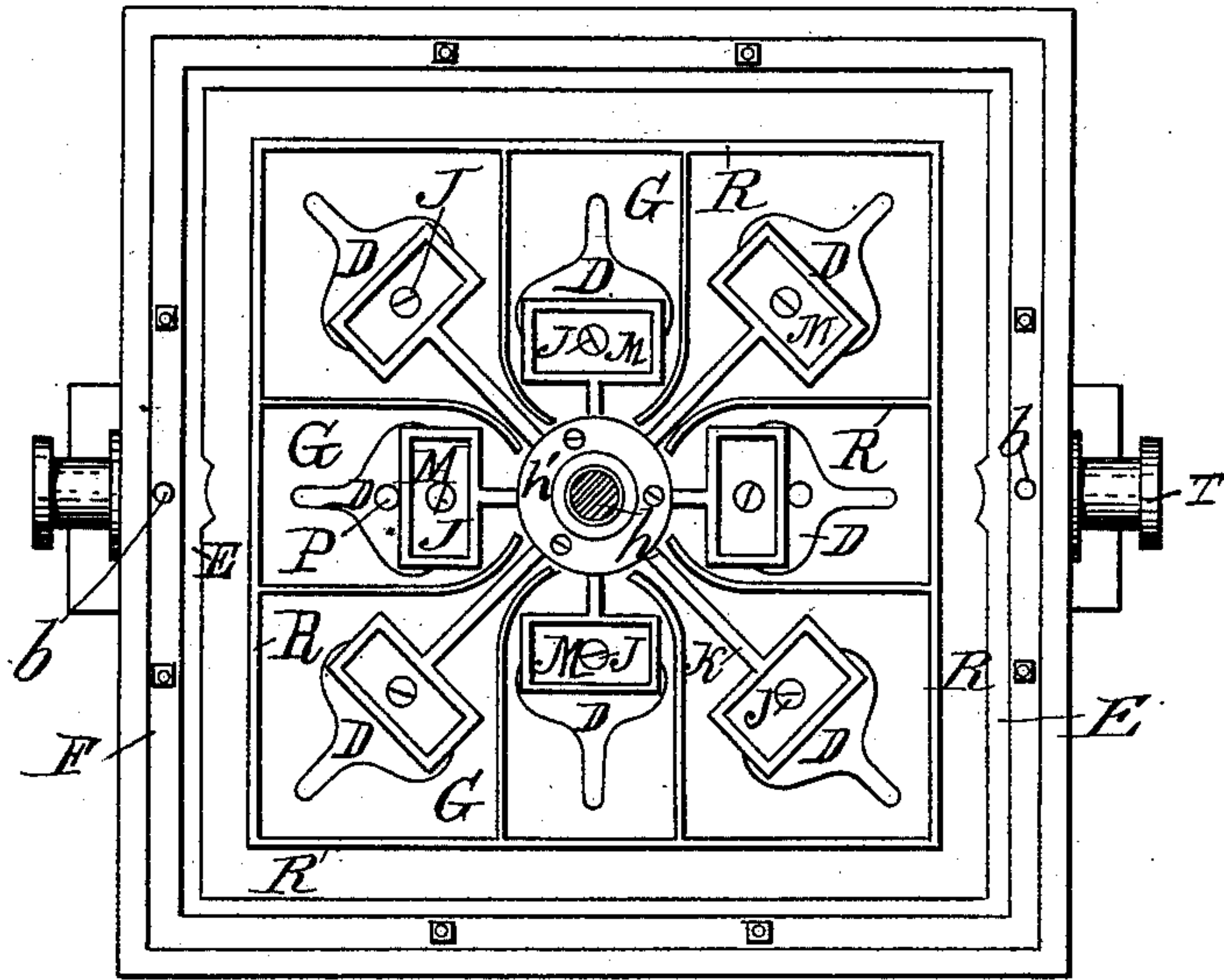


FIG. 1.

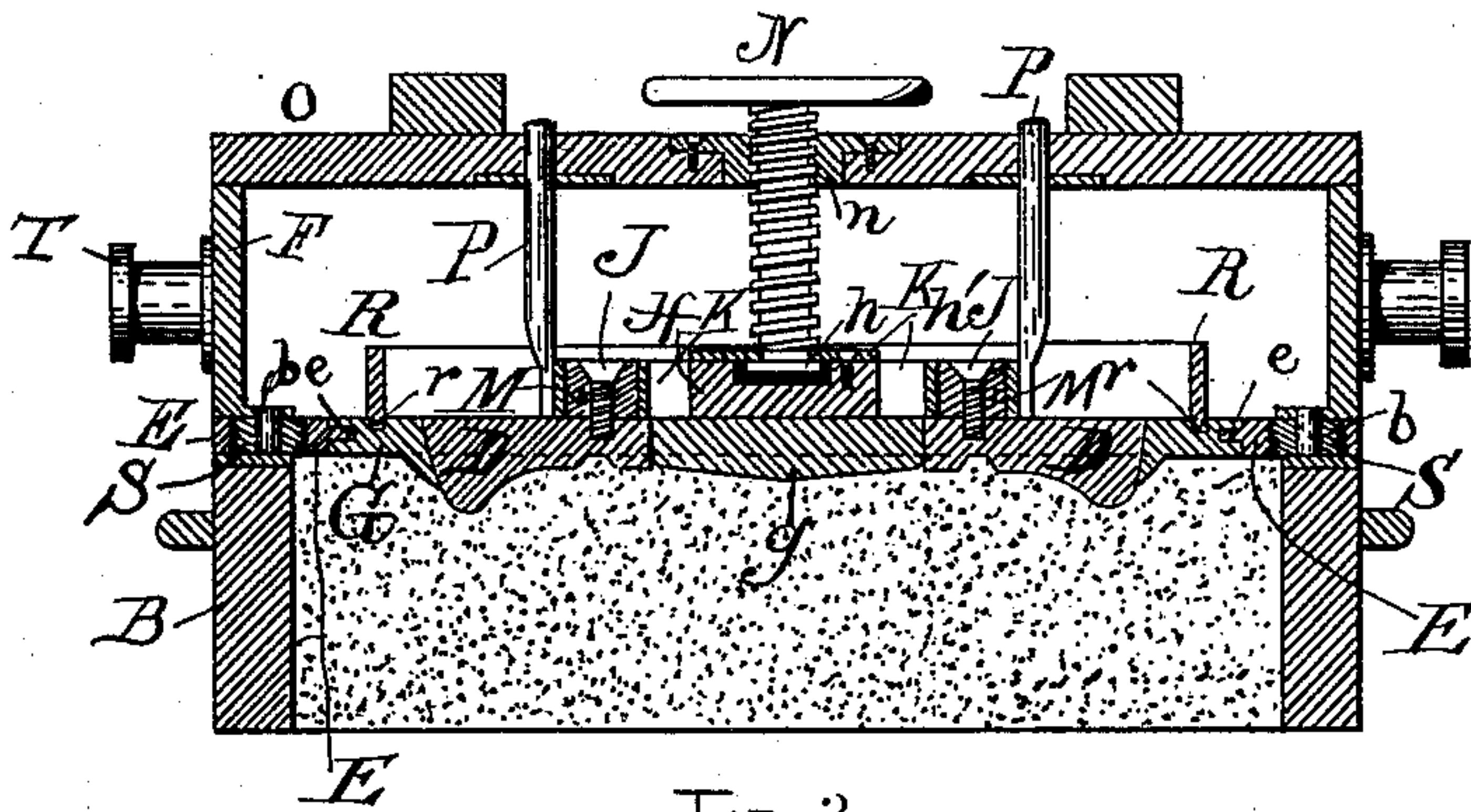


FIG. 2.

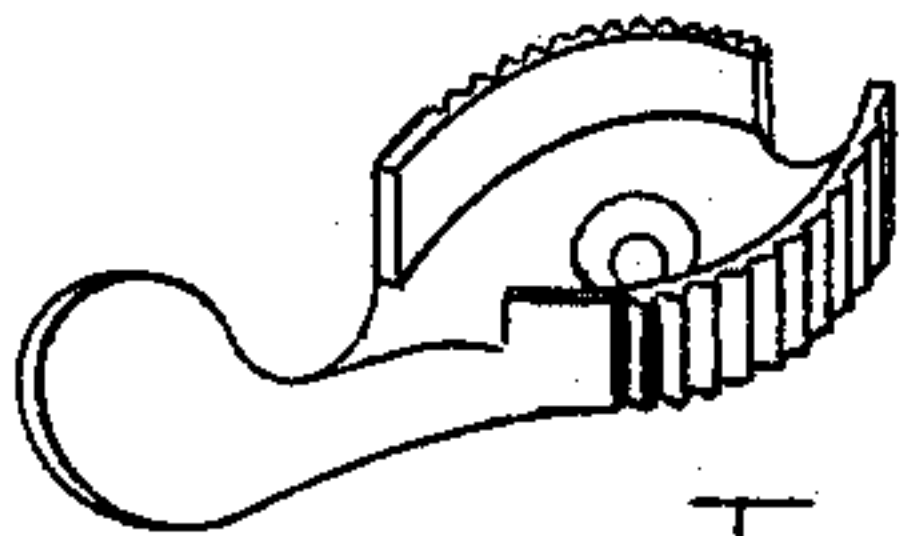


FIG. 3.

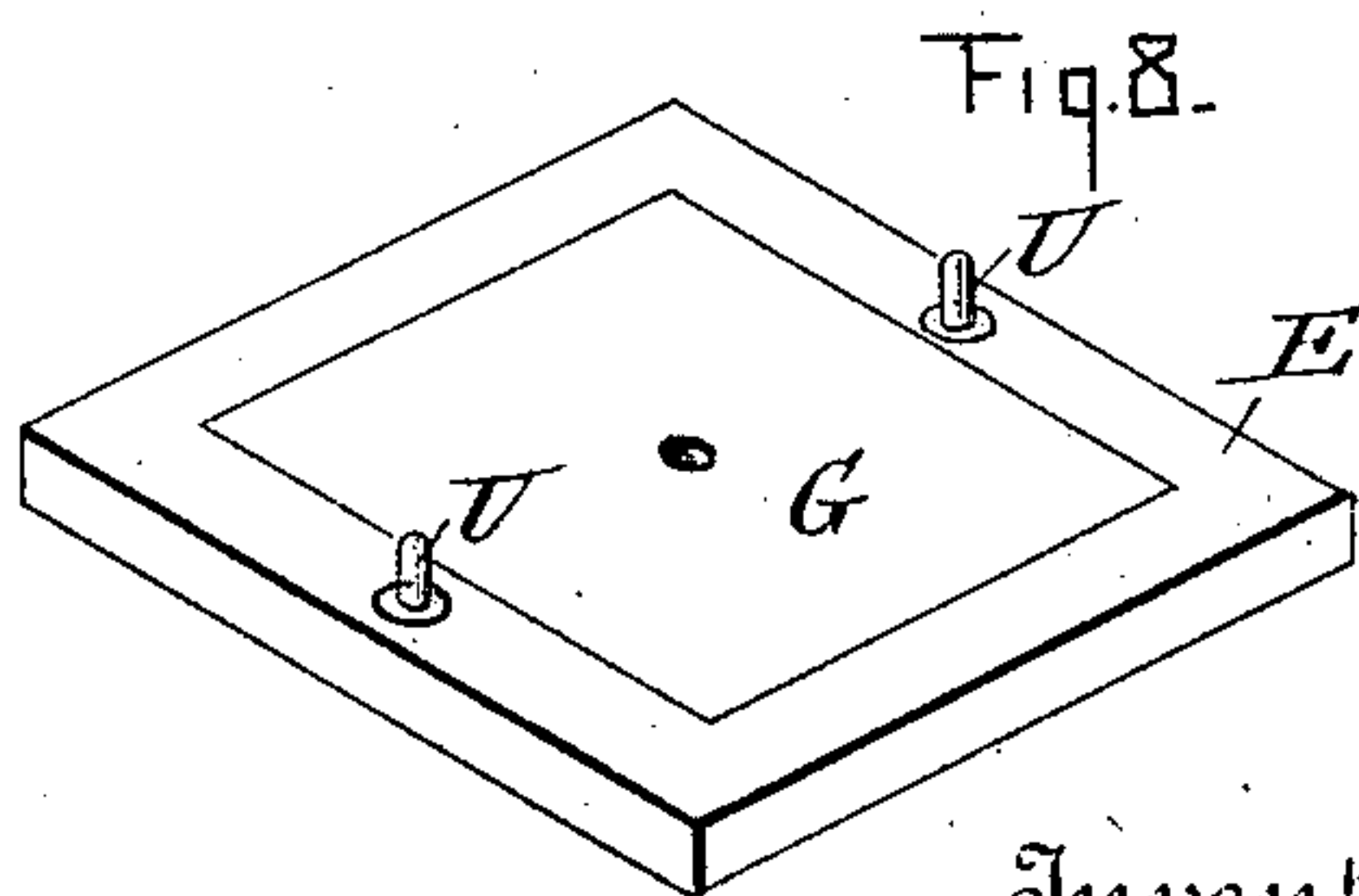


FIG. 4.

Witnesses.

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2 Sheets—Sheet 2.

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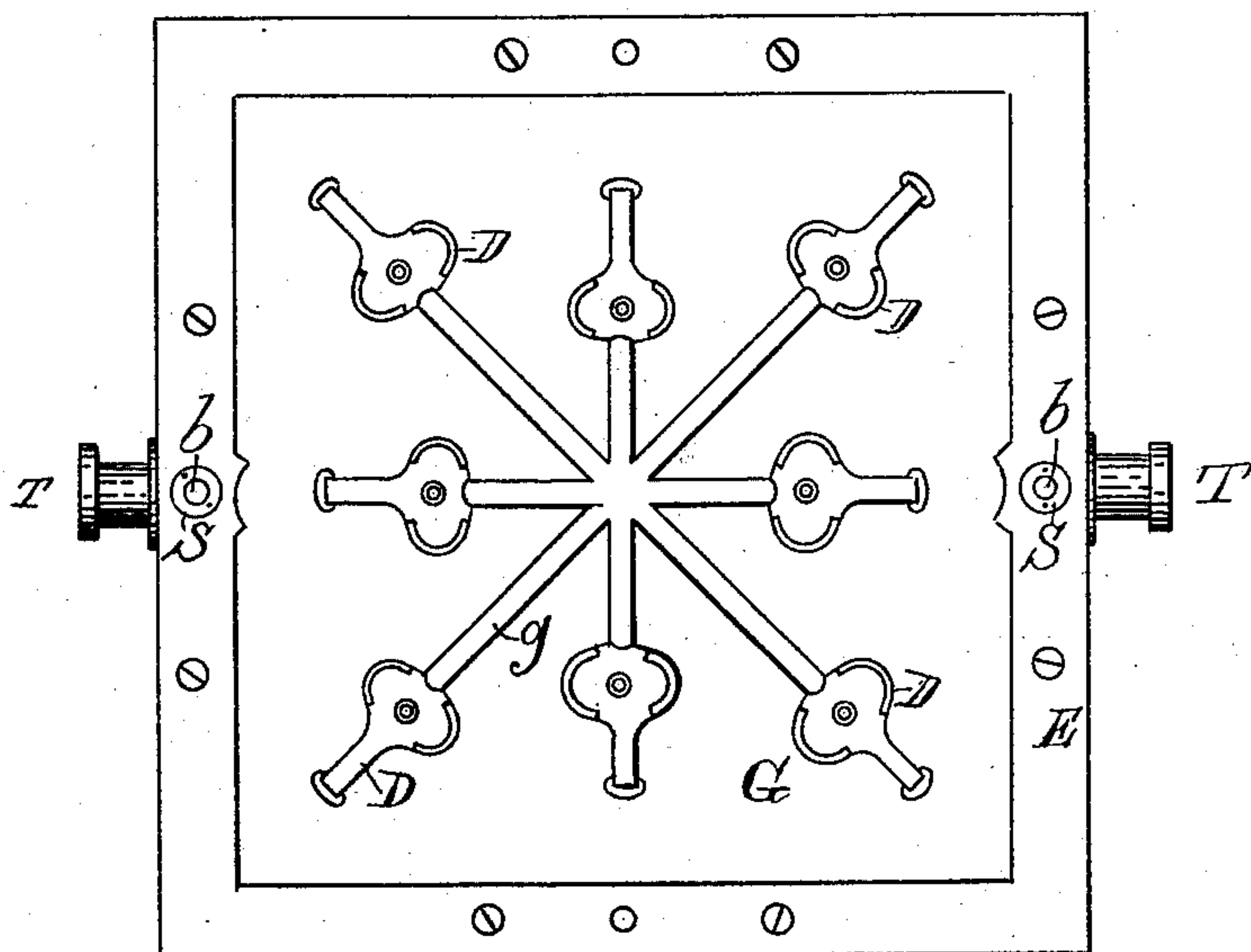


FIG. 4.

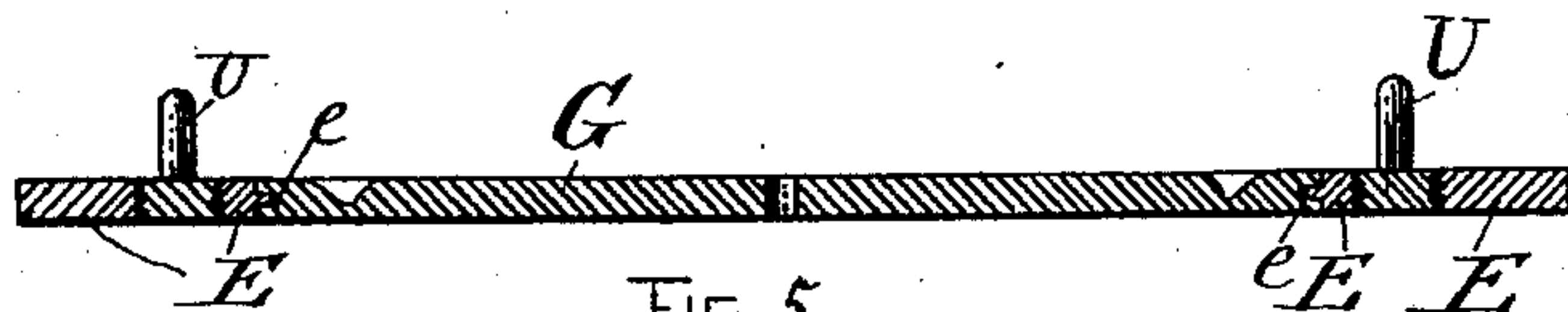


FIG. 5.

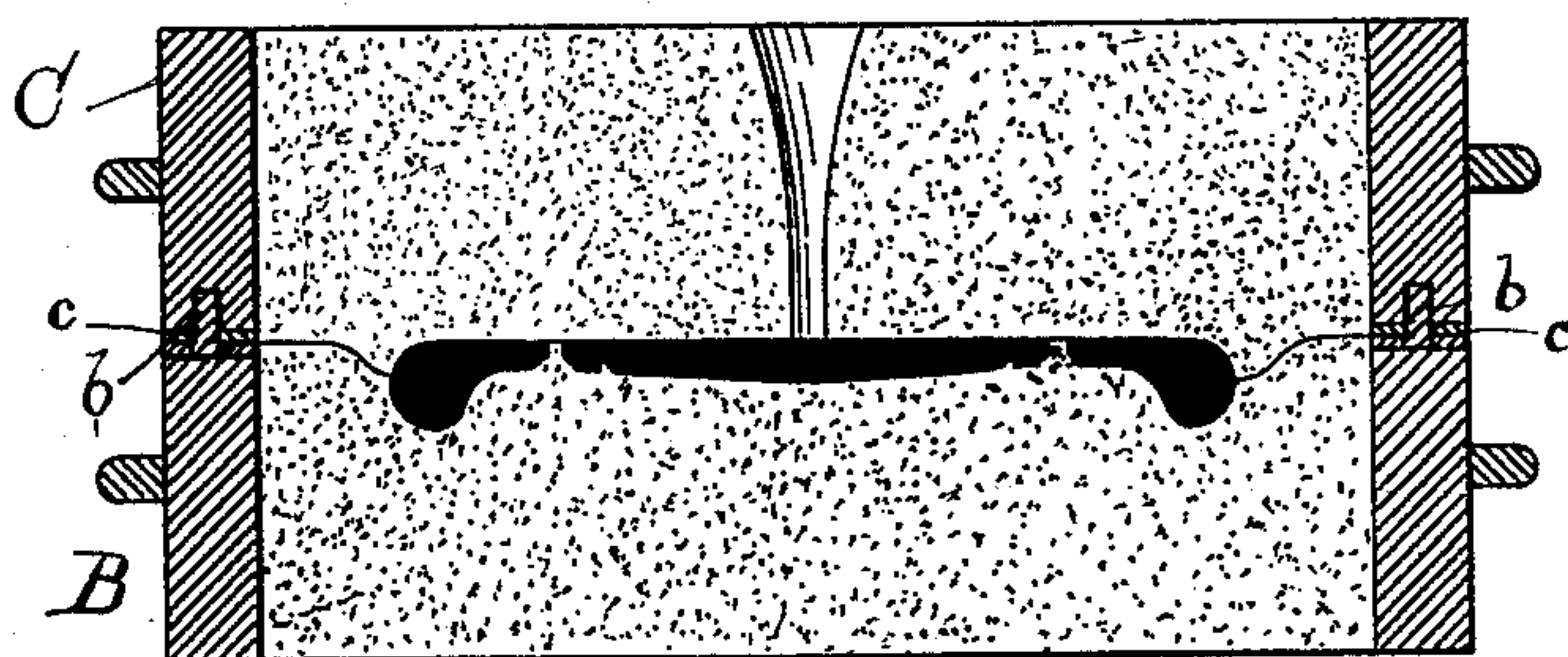


FIG. 6.

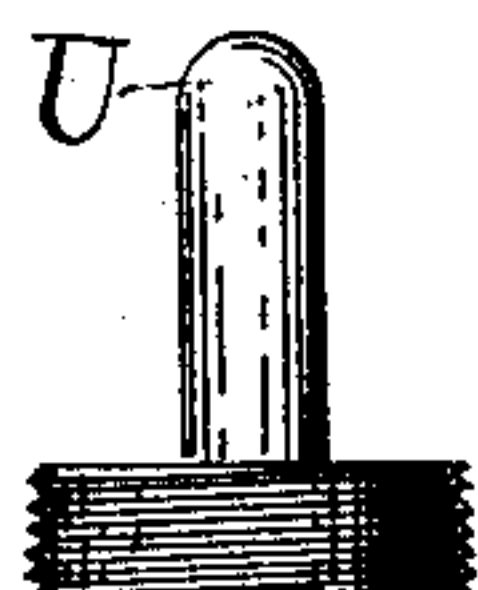


FIG. 7.



FIG. 9.

Witnesses.

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UNITED STATES PATENT OFFICE.

WALTER S. WITHERS, OF ATLANTA, GEORGIA.

MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 393,804, dated December 4, 1888.

Application filed May 5, 1888. Serial No. 272,971. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. WITHERS, a citizen of the United States, and a resident of Atlanta, in the county of Fulton and State of Georgia, have invented a new and useful Improvement in Molding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, such as would enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures marked thereon, which form a part of this specification.

This invention relates to apparatus for making sand molds for metal castings, the object being to so improve the means for making such molds as to facilitate the operation.

In the accompanying drawings, Figure 1 is a plan showing the back side of the plate and the patterns and the arms by which they are attached to a common and central hub. This figure also shows the frame to which the plate is attached and trunnions by which the frame, with the plate and one part of the flask, may be turned over when used in a machine for ramming and handling the flask. Fig. 2 is a vertical section showing the plate and its frame, the patterns and runners, and the flask and sand. Fig. 3 is a perspective of a casting such as would be produced from a mold made by the apparatus shown in the several figures. Fig. 4 is a view of the face of the plate, showing the patterns and gates. Fig. 5 is a section through a plate upon which one side of mold may be rammed whenever the patterns have one side sufficiently plain to permit it, as is the case in the form of casting shown in Fig. 3. Fig. 6 is a vertical central section through the two parts of the mold and the containing-flask. Fig. 7 is a side view of one of the pins, showing the screw by which it is attached to the plate. Fig. 8 is a perspective view of one of the plates and pins united. Fig. 9 is a section of bushing S.

In the figures, like reference-marks indicating corresponding parts in the several views, B is the drag, and C is the cope, made of the ordinary form, except that the pins *b* are in the drag and the plates *c* are in the cope. It is immaterial, however, which part the pins or holes are in so long as they correspond with the pins and holes in the plates with

which they are used in molding, as neither part of the flask is laid down on a board, as in the usual way of making molds.

In making castings like that shown in Fig. 3, and many other castings having a tolerably plain side, I prefer to use two forms of apparatus for the two parts of the mold—that is, I use the apparatus shown in Figs. 1, 2, and 4 for the side having a very irregular form, and that shown in Fig. 5 for the side that is so plain as to permit it.

The apparatus shown in Figs. 1, 2, and 4 and the pattern shown in connection therewith produce a drag like that shown in Fig. 6, sand being rammed against it in the usual way. This part of the apparatus consists of a frame, E, of a hard metal, preferably brass, attached to a box-shaped frame, F, of any suitable material. The frame E has on and extending the entire length of its inner edge a tongue, *e*, as shown in Fig. 2. In the frame E is cast a plate, G, of a soft or easily-fused metal, that incloses that portion of the pattern which is not to be molded in the drag, the face of this plate coming exactly to the parting-line on the patterns. Whatever form the pattern may have the face of this plate should meet the parting-line and the edge of the rearward extensions that, moving the plate, should be of such form as will permit them to be drawn vertically or parallel to each other through the plate G, that is cast around them. Patterns for the gates or runners *g* may be cast integrally with the plate G.

The plate G is of a metal more easily melted than that of which the frame E is made, in order that the plates may be readily melted out and replaced by others without injury to the frame or other parts of the apparatus, by reason of which it may be used successively in connection with patterns of various designs.

To attach the patterns to the central hub, H, the screws J are inserted in the patterns, as shown in Figs. 1 and 2, and stand about as high as the loops in the ends of the arms K, that are attached to the central hub, H. With the patterns in their places and the hub and arms in proper position, metal, M, is poured into the loops until they are filled. The surfaces against which the metal, M, comes may be roughened or provided with holes or be

tinned, and the metal, M, be of such kind as will unite with the tinned surfaces.

The screw N passes through a nut, *n*, in the cover O, and is connected with the hub by means of the head *h* and the washer *h'*. It is preferable to have the guiding-pins P attached to the arms that carry the patterns and slide through holes in the cover to lessen the wearing of the patterns and the holes in the plate through which they pass. When but a single pattern is to be molded, it is attached to the hub H in a more simple manner.

The form of the face of the plate G is governed by the parting-line of the patterns; but its thickness should usually be about half an inch. Additional strength, in case the holes for the patterns weaken the plate so much as to require it, should be added in the form of a flange, R, having a dovetail edge, *r*, the flange R being so placed as to cause the metal in casting the plate G to run around and grasp the dovetail *r*, which will cause the flange to support and strengthen the plate to any desired extent, according to its width.

Bushings S, Fig. 4, are screwed into the plate the holes in the center of said bushings coinciding with and being entered by the pins *b* in the drag, as shown in Fig. 2. The exteriors of these bushings are provided with screw-threads of a uniform size and pitch with those shown on the pin in Fig. 7. These bushings are interchangeable with the said pins in order to allow the apparatus to be used with either the drag or cope part of the flask, as may be desired.

Sand being rammed against the plate G and the patterns above described, and the flask and plate being turned over, as shown in Fig. 2, the screw N, on being turned in the right direction, will withdraw the pattern from the sand, after which the box or frame F, together with the plate, may be removed and the result will be the drag part of the mold, as shown in Fig. 6. When the form of the cope part of the mold is somewhat complicated, it may be made in the way above described

from another pattern inclosed in a plate and frame in the same manner, but with the reverse side of the pattern exposed to make the impression in the sand of the cope, pins U being inserted in the plate instead of the bushings S, the patterns and plate being otherwise adapted to that purpose; but when the cope side of the casting is comparatively plain, as is the case in the one shown, it is preferable to use a plate adapted by the form of its surface to form the cope part of the mold by ramming the sand against it, such a plate being shown in Fig. 5 of the drawings.

This apparatus is especially adapted to be used in connection with mechanism for ramming the sand and handling the flask, for which reason trunnions T, attached to the frame F, may be provided.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a molding apparatus, the plate G, the patterns D, the hub H, carrying the arms K, and the screws and metal by which the arms are attached to the patterns, the screw N, pivoted in the hub, and the nut *n* and a frame supporting the nut, substantially as shown and described.

2. In a molding apparatus, the combination of the plate G, carrying the patterns D, the frame E, and the interchangeable pins U and bushings S.

3. In a molding apparatus, the combination of the frame F, the cover O, the frame E, the plate G, the flange R, the patterns D, the arms K, connected to a central hub, H, the screw N, the nut *n*, and the guide-pins P, arranged substantially as described, and for the purpose specified.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

WALTER S. WITHERS.

Witnesses:

A. P. WOOD,
A. A. WOOD.