

(No Model.)

2 Sheets—Sheet 1.

S. P. M. TASKER.
SAND MOLDING MACHINE.

No. 356,856.

Patented Feb. 1, 1887.

Fig. 1.

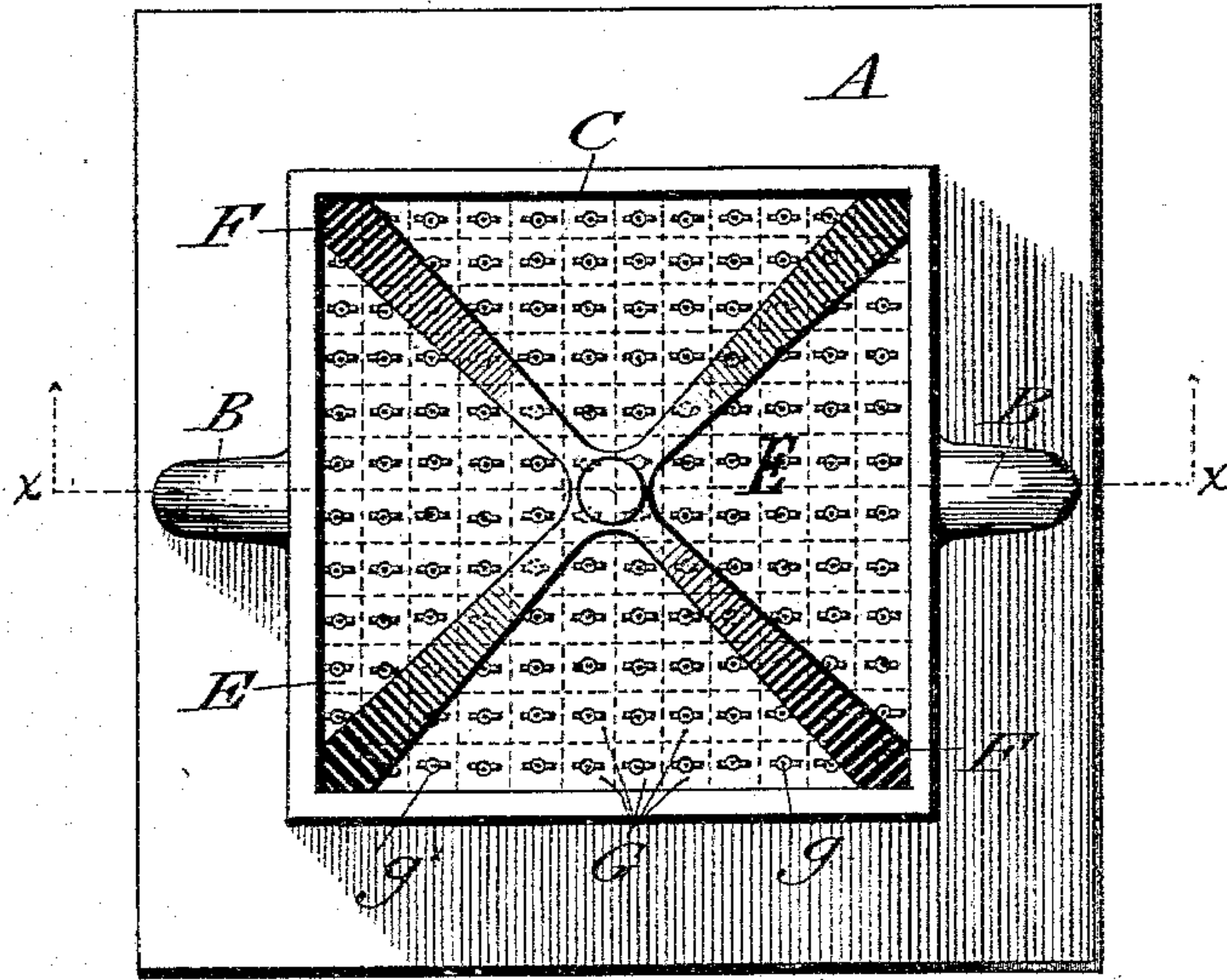


Fig. 4.

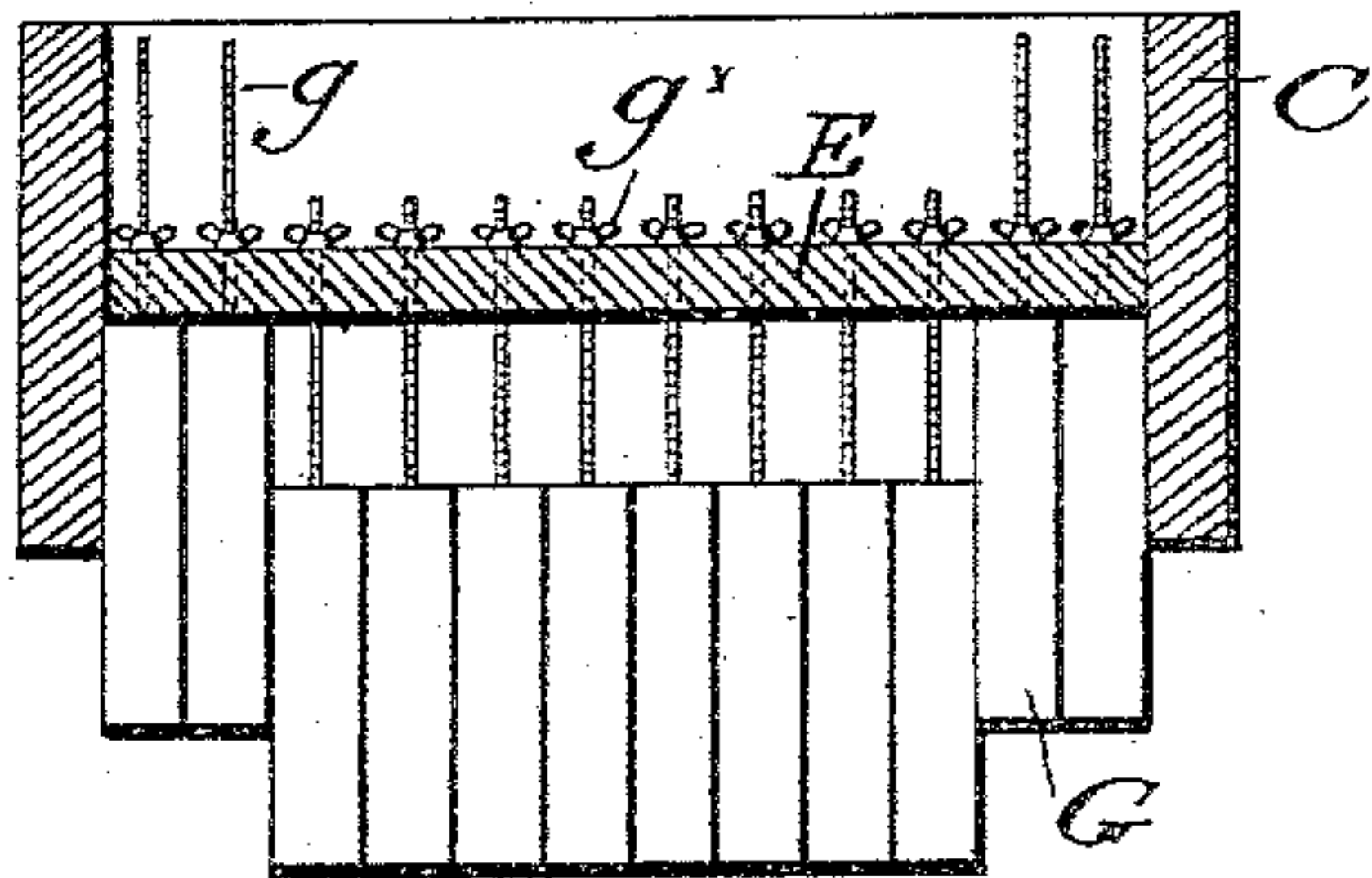


Fig. 2.

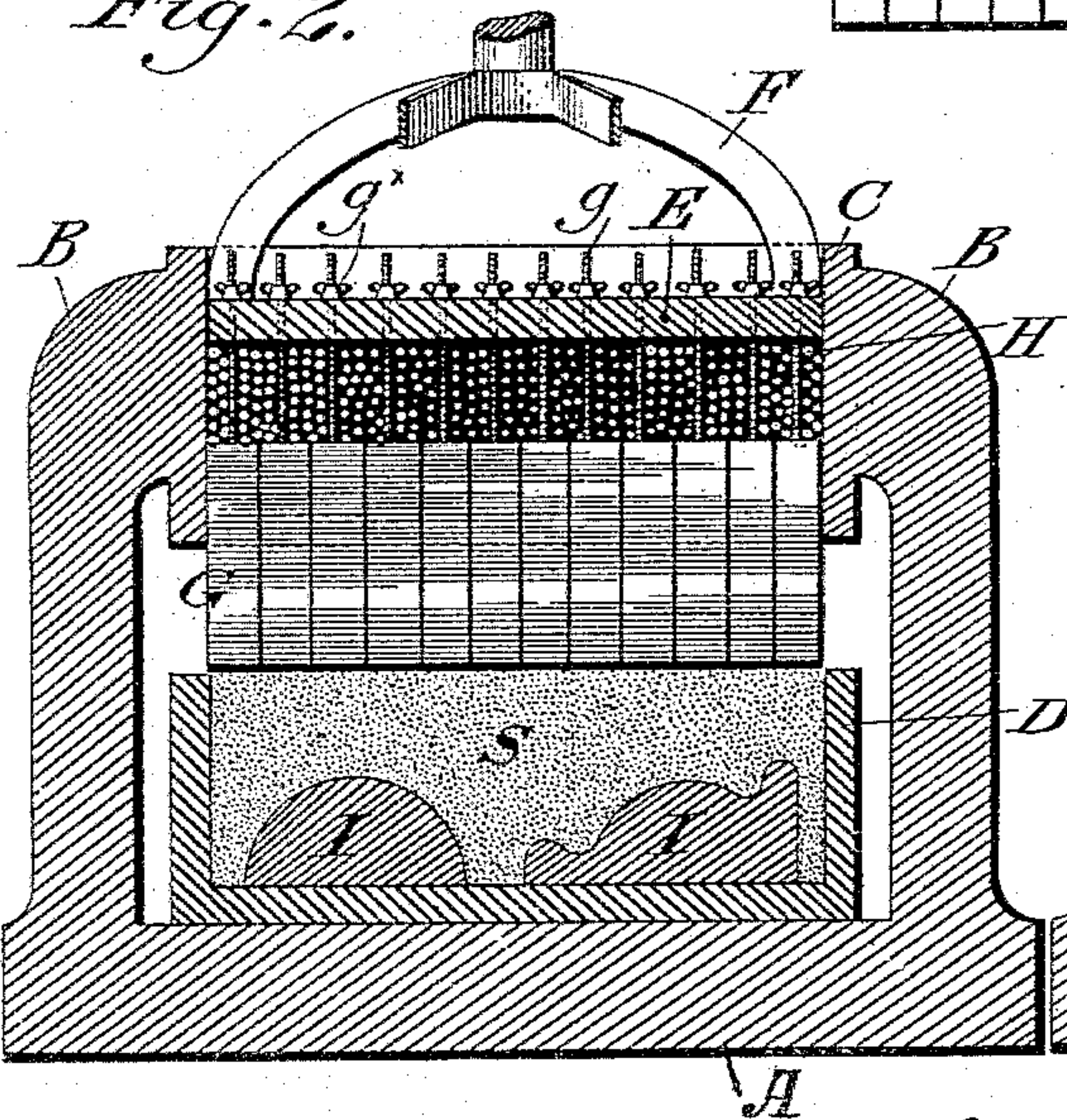
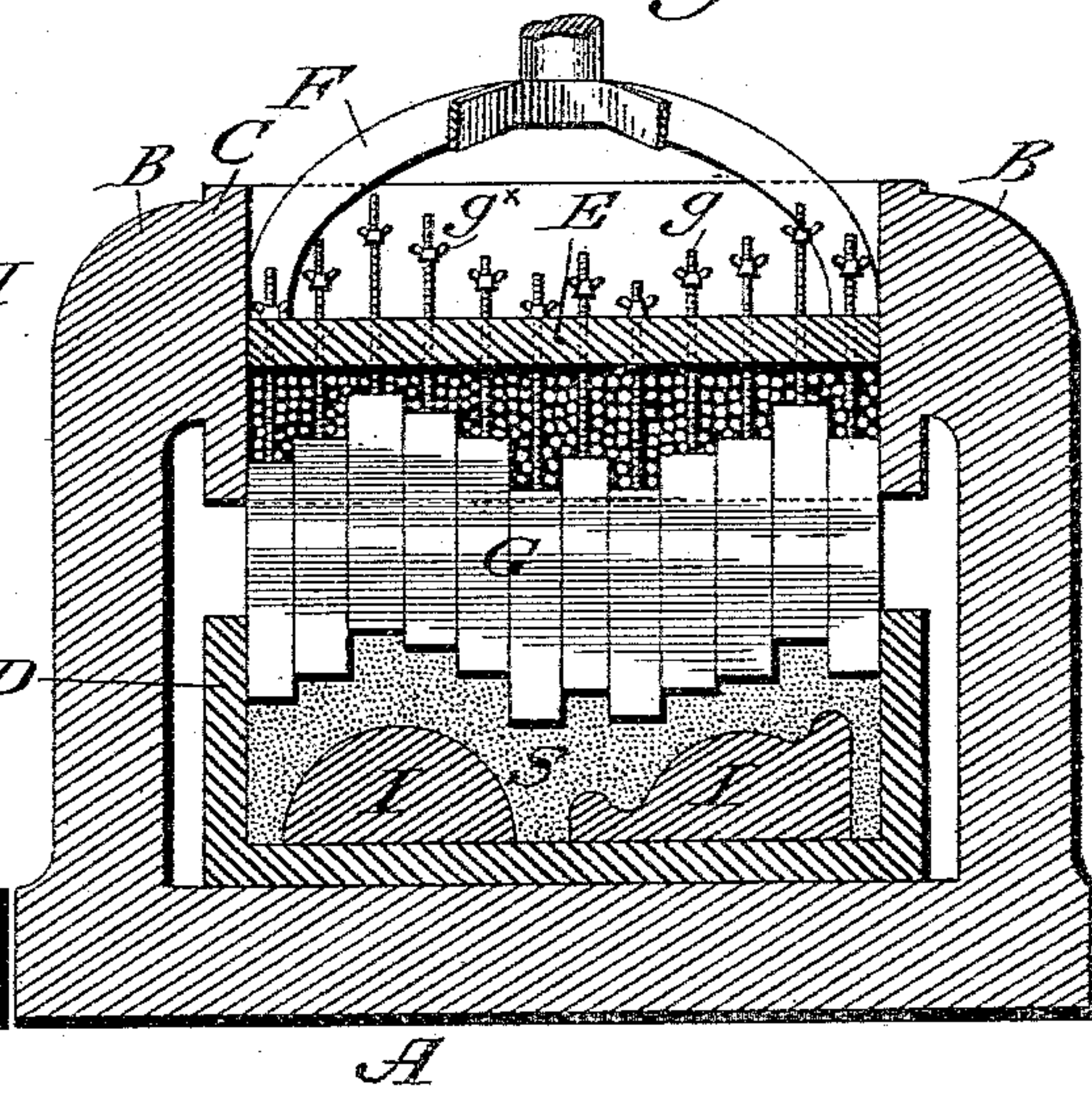


Fig. 3.



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2 Sheets—Sheet 2.

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Fig. 5.

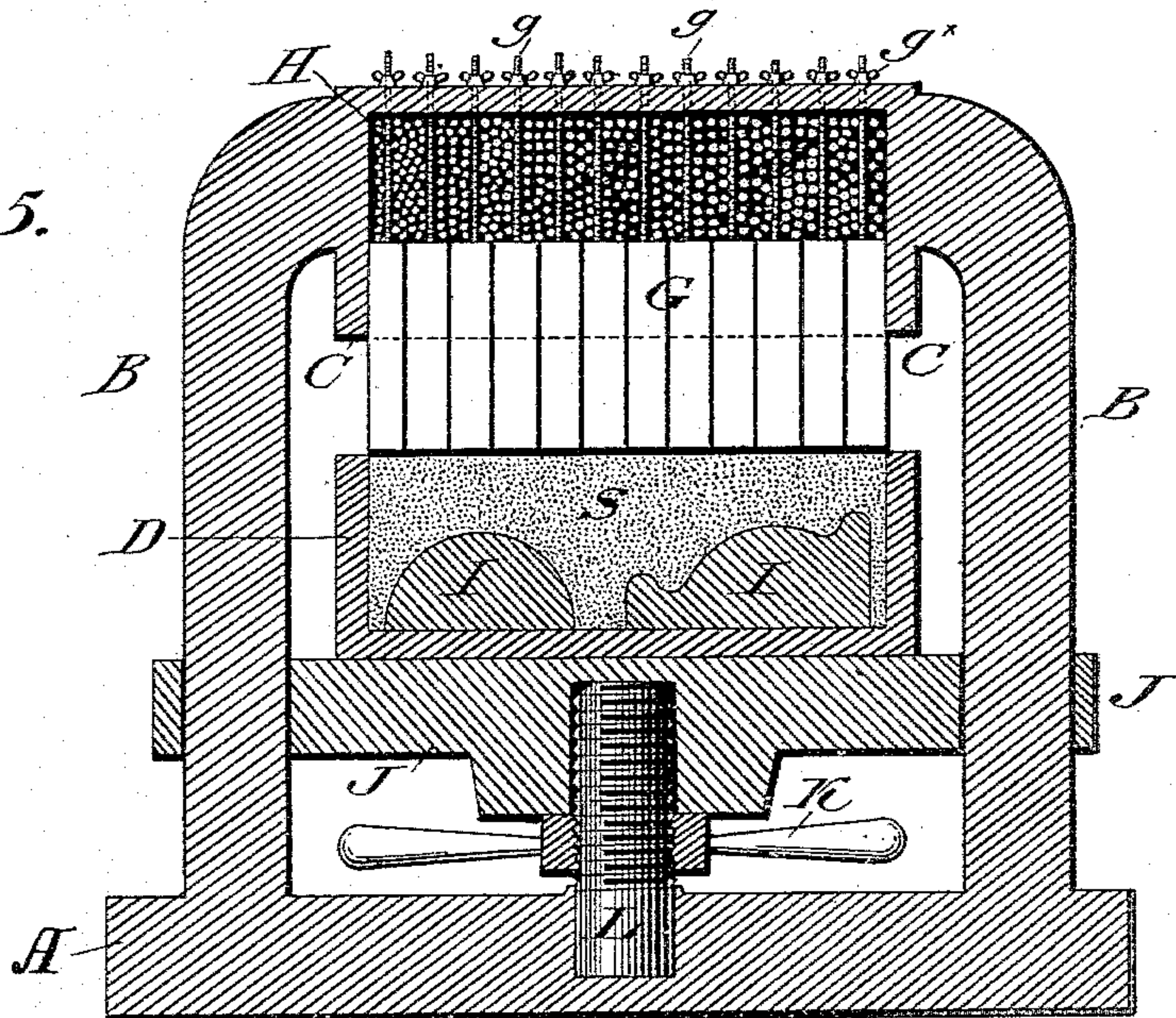
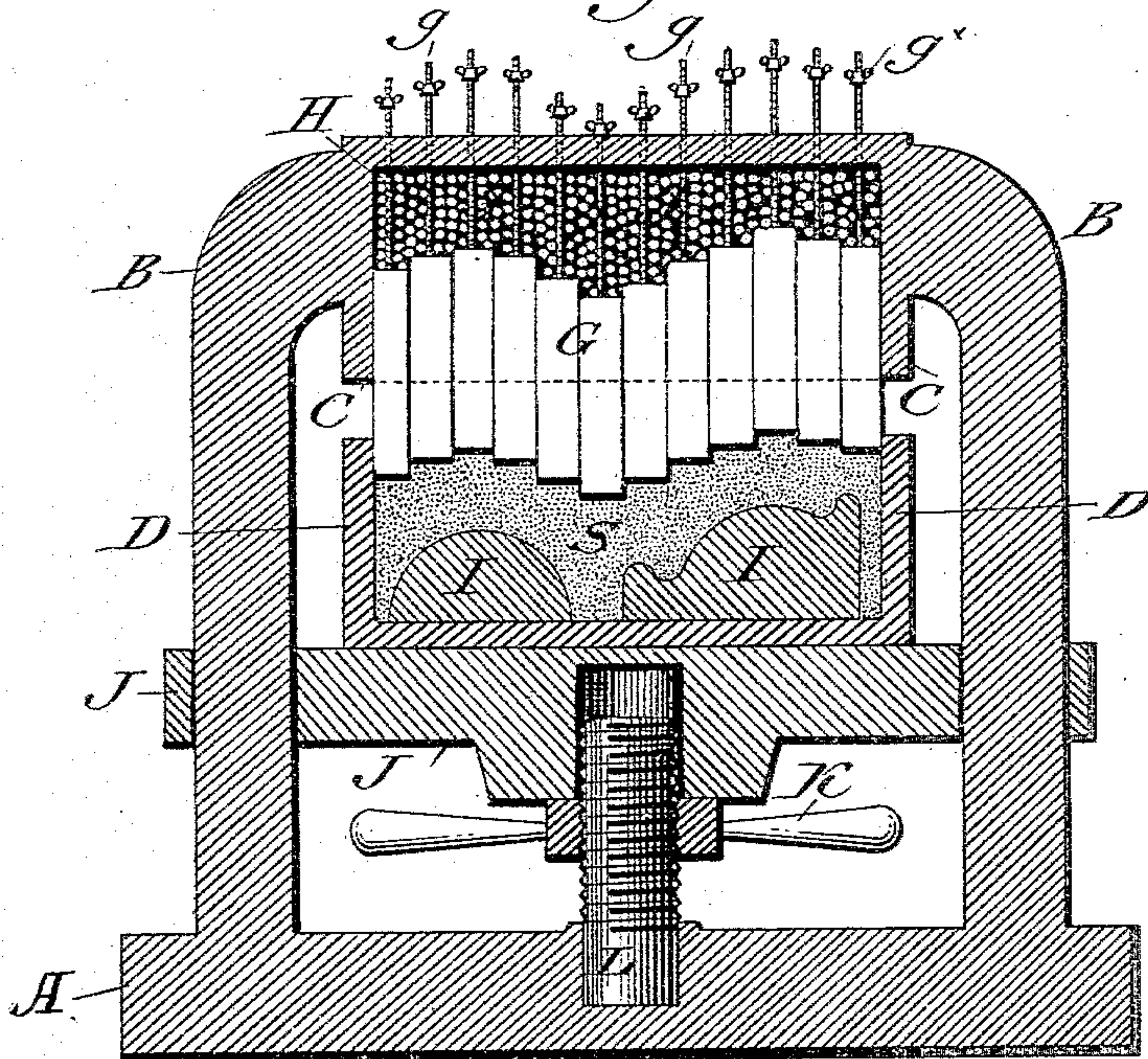


Fig. 6.



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UNITED STATES PATENT OFFICE.

STEPHEN P. M. TASKER, OF PHILADELPHIA, PENNSYLVANIA.

SAND-MOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 356,856, dated February 1, 1887.

Application filed December 17, 1886. Serial No. 221,854. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN P. M. TASKER, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain Improvements in Sand-Molding Machines, of which the following is a specification.

Broadly stated, my invention relates to systems of compressing a mixture of dampened earth known as "green sand," and of the character usually employed in the molder's art, by a yielding force applied over the entire upper surface of such sand contained in a flask about patterns within said flask, such operations being technically known as "tamping" or "ramming."

In the foregoing operations it is essential that every portion of the sand should be evenly and equally compressed about the patterns, as irregular compression results in a manner well known to practical molders in defective castings.

Heretofore many attempts have, with greater or less success, been made to effect the requisite compression by the employment of flexible pressers or diaphragms employed in connection with a flask containing the patterns, and urged to action by air, water, or other fluid, or by a plastic or semi-plastic substance. Heretofore, also, resort has been had to the employment of an assemblage of independently-moving rammers or pressing-bars actuated by springs or by flexible pressers employed in connection with hydraulic, pneumatic, or other pressure.

My present invention will be readily understood by reference to another invention made by me and forming the subject-matter of an application for patent filed October 21, 1886, and allowed November 6, which invention comprehends a machine in which a flexible presser or pressing diaphragm adapted to act direct upon the sand is backed by a sufficient quantity of shot, pebbles, sand, or other material not being a plastic, the particles of which are neither coherent nor adherent, but capable of sliding past each other, after the manner of the granules of any granular substance, and forced upon the sand by pressure exerted upon the shot.

Generally stated, the object of my present

invention is the construction of a machine in which an assemblage of independently-movable rammers or pressing-bars is backed by a sufficient quantity of shot, pebbles, sand, or other material not being a plastic, the particles of which are neither coherent nor adherent, but capable of sliding past each other after the manner of the granules of any granular substance when pressure is exerted upon given surface-areas of the mass, and in which the said granular mass is in turn backed by a resisting medium, either fixed or movable. This object I attain by a machine, a convenient embodiment of which is represented in the accompanying drawings and described in this specification, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the drawings, the first three figures represent a machine in which the flask rests upon a fixed bed-plate or base, and in which a movable platen is employed. In Figures 5 and 6 an arrangement is shown in which the flask is adapted to be elevated and the platen is fixed. Both of these constructions, however, alike embody the invention.

In the drawings, Fig. 1 is a top plan view of the apparatus represented in Figs. 2 and 3, except that for clearness the mass of shot and the platen are supposed removed and skeleton platen connection shown in dotted lines. Figs. 2 and 3 are central vertical sectional elevations through the machine of Fig. 1, section being supposed in the plane of the dotted line xx upon said figure and sight being taken in the direction of the arrows upon said line. In Fig. 2 the parts are shown in the positions which they occupy before pressure is exerted upon the sand to be molded and in Fig. 3 in the positions which they occupy after the platen has been brought down and pressure exerted. Fig. 4 is a fragmentary central vertical sectional detail through a portion of the machine represented in Figs. 1, 2, and 3, designed to illustrate how the assemblage of rammers may be readily adjusted for employment with a smaller flask than that shown in Figs. 2 and 3. Figs. 5 and 6 are central vertical sectional elevations through a modified form of machine embodying my invention, in Fig. 5 the parts being represented in the positions

which they occupy before pressure is applied, and in Fig. 6 in the positions which they occupy after the flask has been elevated and pressure applied.

5 Similar letters of reference indicate corresponding parts.

Referring now, especially, to the first four figures of the drawings, A is a bed plate or base, from which are erected standards B, for supporting a plunger-casing, cylinder, box, or other preferred receptacle, C, formed of metal or other suitable material, and preferably conforming in outline to the outline of the flask D, which is placed upon the bed-plate in alignment below it. This plunger-casing contains a plunger or platen, E, which accurately fits it, and is adapted to have movement within it, being actuated to such movement by pressure exerted upon it through the medium, for instance, of a skeleton connection, F, by hydraulic, pneumatic, steam, or other power, or by levers, screws, or other mechanical motion-imparting devices.

The plunger-casing is as to its entire lower opening (and in the form of apparatus represented it is simply a supported vertically-walled band to which the plunger is fitted) inclosed or closed up by the upper extremities of an assemblage of rammers or pressing-bars, G, formed of any preferred material—for instance, metal or very hard wood—each of which bars is preferably of the same length, and all of which are preferably of the same cross-section and general dimensions. These rammers are preferably considerably longer than they are wide or deep, and when placed side by side as an assemblage, as already stated, fill the plunger-casing and so completely inclose it as to its under opening, forming in effect a flexible closed bottom to said casing. Each of these rammers is provided with a vertical upwardly-extended screw-threaded rammer-rod, *g*, which passes through a vertical opening formed in the plunger or platen, and above the platen is armed with a thumb-nut, *g*^{*}, or kindred contrivance, which by its set prevents the dropping of its rammer beyond a given level, and also serves to adjust such level and to retain the rammer in any given elevated position.

The rammer-rods are conveniently of a length about equal to that of the rammers, in order to admit of the set of the rammers away from the platen a considerable distance.

55 Contained between the plunger or platen, the walls of the casing, and the closely-touching upper extremities or heads of the rammers, forming the bottom of said casing, is a mass of shot, pebbles, sand, or other material, H, the particles of which are capable of sliding past one another when pressure is exerted upon given portions of the mass.

In the drawings leaden shot are supposed to be represented; but many materials not of a plastic or semi-plastic nature may be advantageously employed—as, for instance, sawdust,

or sawdust mixed with plumbago, talc, soap-stone, or other lubricant.

I believe shot to be, perhaps, best adapted to the purpose; but I do not confine myself to it, as other substances the particles of which are capable of sliding past each other will, as stated, answer the purpose.

Within the flask are contained patterns I and molding sand S.

The operation is as follows: The flask containing the patterns, and preferably filled almost full of molding-sand, is placed below the lower extremities of the assembled rammers suspended upon a common level from the platen. The rammers as a collected whole are adapted to pass into the flask, so as to fill it from wall to wall. Force is then exerted to depress the plunger and drive the assembled rammers, backed by the shot, into the sand within the flask, with the result that such of the rammers as happen to come over the sand regions of least resistance, (which are those of greatest depth or those most remote from the surfaces or thicker parts of the patterns,) encountering less resistance, descend under their weight quite deeply into the sand, while such of the rammers as happen to come over the sand regions of greatest resistance, (which are those of the least depth or those closest to the surfaces or thicker parts of the patterns,) being unable to descend as deeply as the rammers first referred to, ascend relatively to the platen E, and displace a quantity of shot above them, which distributes itself laterally and vertically downward above and upon those rammers which have descended most deeply into the sand, until by the unequal vertical distribution of the rammers, occasioned by the unequal resistance of the sand, the mass above the rammers becomes ultimately distributed in substantially reverse correspondence with the distribution of the compacted sand beneath the rammers, which, under the distributed pressure of said rammers, becomes evenly compressed and compacted to a uniform solidity and hardness about the patterns, substantially as represented in Fig. 3.

The thumb-nuts upon the rammer-rods are useful, after the manner shown in Fig. 4, to retain the outlying rammers permanently up against the plunger or head of the casing, when it is desired to decrease the pressing area of the rammers to fit them for employment with a smaller flask.

In the machine shown in Figs. 5 and 6 the platen is fixed, constituting a solid cover or top to the plunger-casing, which in such case would be more properly termed a "rammer-casing," and the flask is mounted upon a vertically-moving platform, J, housed between the standards B, and conveniently raised and lowered by a lifting-nut, K, threaded upon a fixed stem, L, erected from the bed-plate and passing into an orifice in the platform. The operation of this machine is substantially identical with that already described with

reference to the machine of the first three figures. Instead of the lifting-nut and threaded stem, a toggle or any other suitable lifting contrivance may be employed to raise and
5 lower the platform.

It is obvious, of course, that the form of the machine may be greatly varied, as it is manifestly inconsequential what form of plunger, plunger-casing, or platform is employed, or
10 what the character of the flask or patterns to be molded may be.

I prefer to employ an assemblage of rammers each of square cross-section and all of the same dimensions of cross-section, as shown
15 in the drawings; but it is not essential that this should be done, as it is only important that when the rammers are assembled they should fit snugly against each other without openings or interstices through which particles of the mass above them might fall, and that they should together constitute a solid pressing body, capable, however, of local deflection from a level top and bottom plane.

Having thus described my invention, I claim
25 and desire to secure by Letters Patent—

1. In a machine for making molds, an assemblage of rammers or pressing-bars backed by a mass of shot, pebbles, sand, sawdust, or
30 other material the particles of which are capable of sliding past each other without either cohering or adhering and adapted to compress sand, in combination with a flask containing sand and a pattern, substantially as set forth.

2. In a machine for making molds, an assemblage of rammers or pressing-bars backed by a mass of shot, pebbles, sand, sawdust, or
35 other material the particles of which are capable of sliding past each other without either cohering or adhering and adapted to compress sand, in combination with a plunger and a flask containing sand and a pattern, substantially as set forth.

3. In a machine for making molds, the following elements in combination: a flask containing a pattern to be molded and sand or
45 kindred molding material, a press having an assemblage of rammers or pressing-bars adapted to bear upon the molding-sand and backed by shot, pebbles, sand, sawdust, or

other material the particles of which are capable of sliding past each other without either
50 cohering or adhering, and suitable means for forcing together the shot-backed assemblage of rammers and the pattern-containing sand within the flask, substantially as and for the
55 purpose set forth.

4. In a machine for making molds, the combination of an assemblage of rammers or pressing-bars, means for raising or lowering said rammers, a mass of shot, pebbles, sand, sawdust, or other materials the particles of which
60 are capable of sliding past each other without either cohering or adhering, backing the rammers, a plunger, and a flask containing sand and a pattern, substantially as set forth. 65

5. In a sand-molding machine, a flask containing sand and a pattern, a platen, an assemblage of independent rammers, each hung from but free for vertical movement with reference to the platen and each so closely fitted
70 to its neighbors as to exclude sand or similar substances, a mass of shot, pebbles, or kindred solid particles of such character as to render the mass mobile between said platen and the rammers, and means for causing the approach
75 of said platen and said flask, substantially as set forth.

6. In a sand-molding machine, a flask containing sand and a pattern, a platen, an assemblage of independent rammers, each hung from
80 but free for vertical movement with reference to the platen and each so closely fitted to its neighbors as to exclude sand or similar substances, a mass of shot, pebbles, or kindred solid particles of such character as to render
85 the mass mobile between said platen and the rammers, means for causing the approach of said platen and said flask, and means for holding out of action any desired number of said rammers, substantially as set forth. 90

In testimony whereof I have hereunto signed my name this 2d day of December, A. D. 1886.

STEPHEN P. M. TASKER.

In presence of—

J. BONSALE TAYLOR,
WM. C. STRAWBRIDGE.