(No Model.)

3 Sheets—Sheet 1.

J. R. DAVIES.

MOLD FOR CASTING.

No. 332,504. Patented Dec. 15, 1885.

Fig. 1.

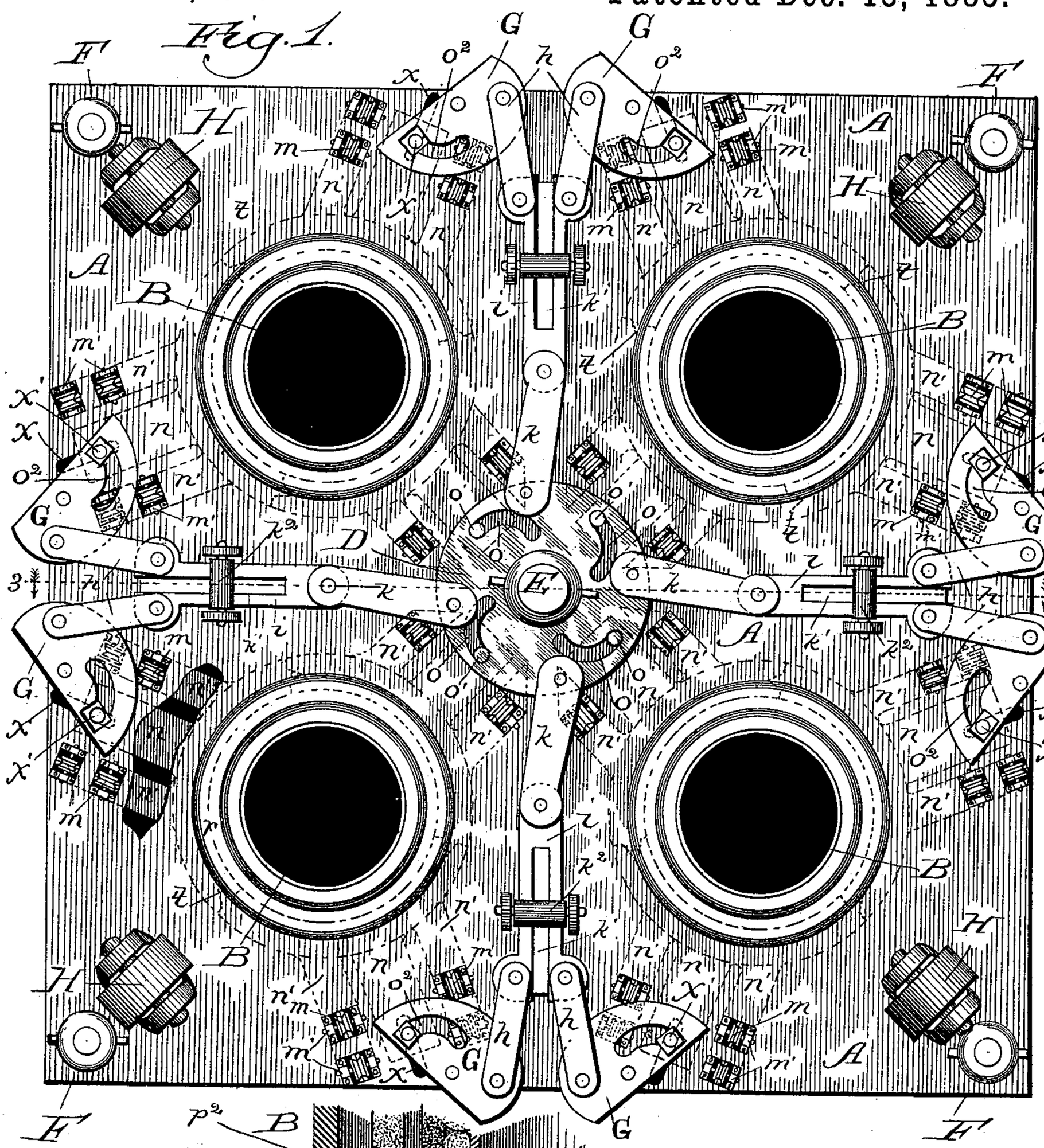

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

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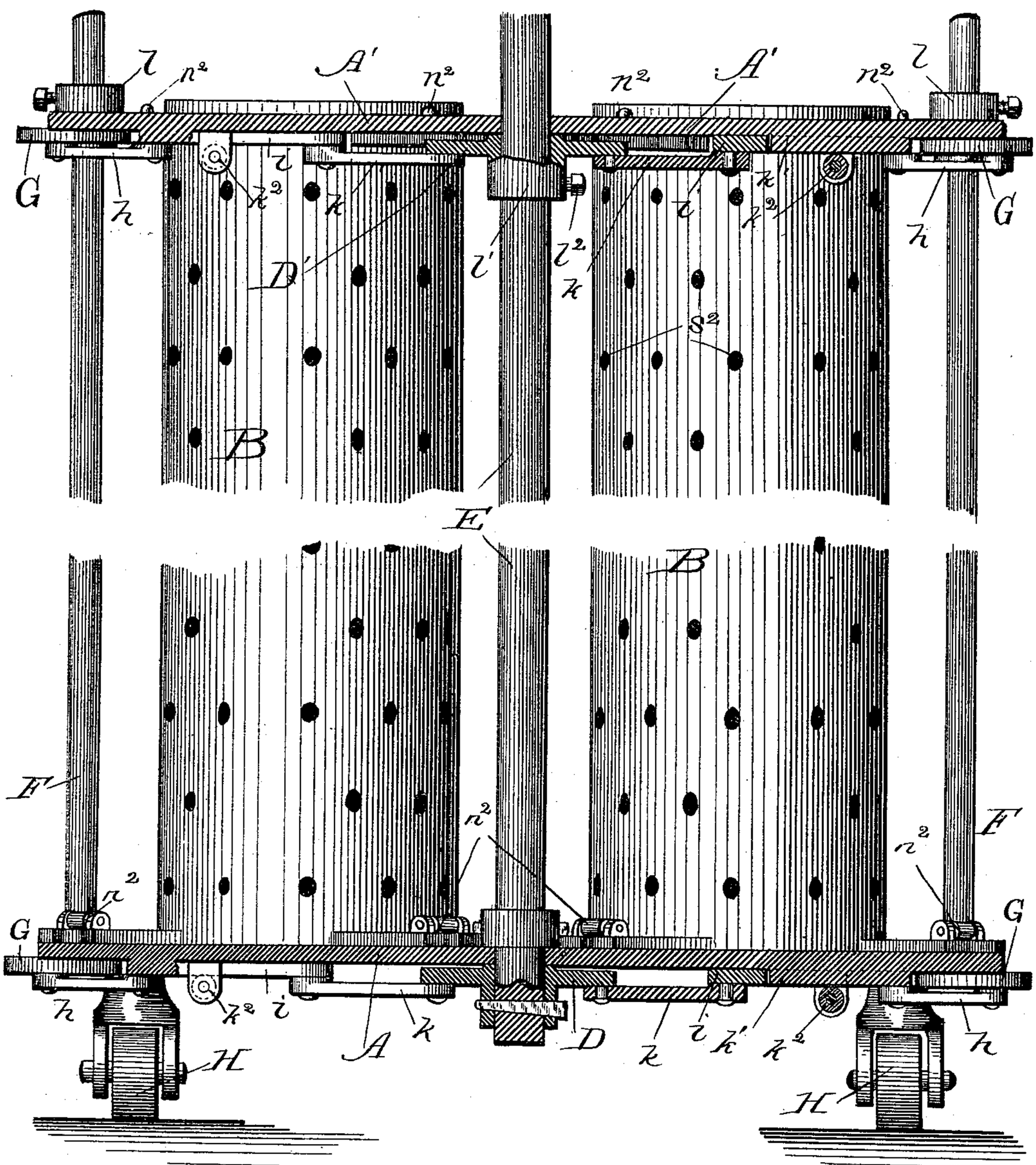
Fig. 3.



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3 Sheets—Sheet 3.

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Fig. 4.

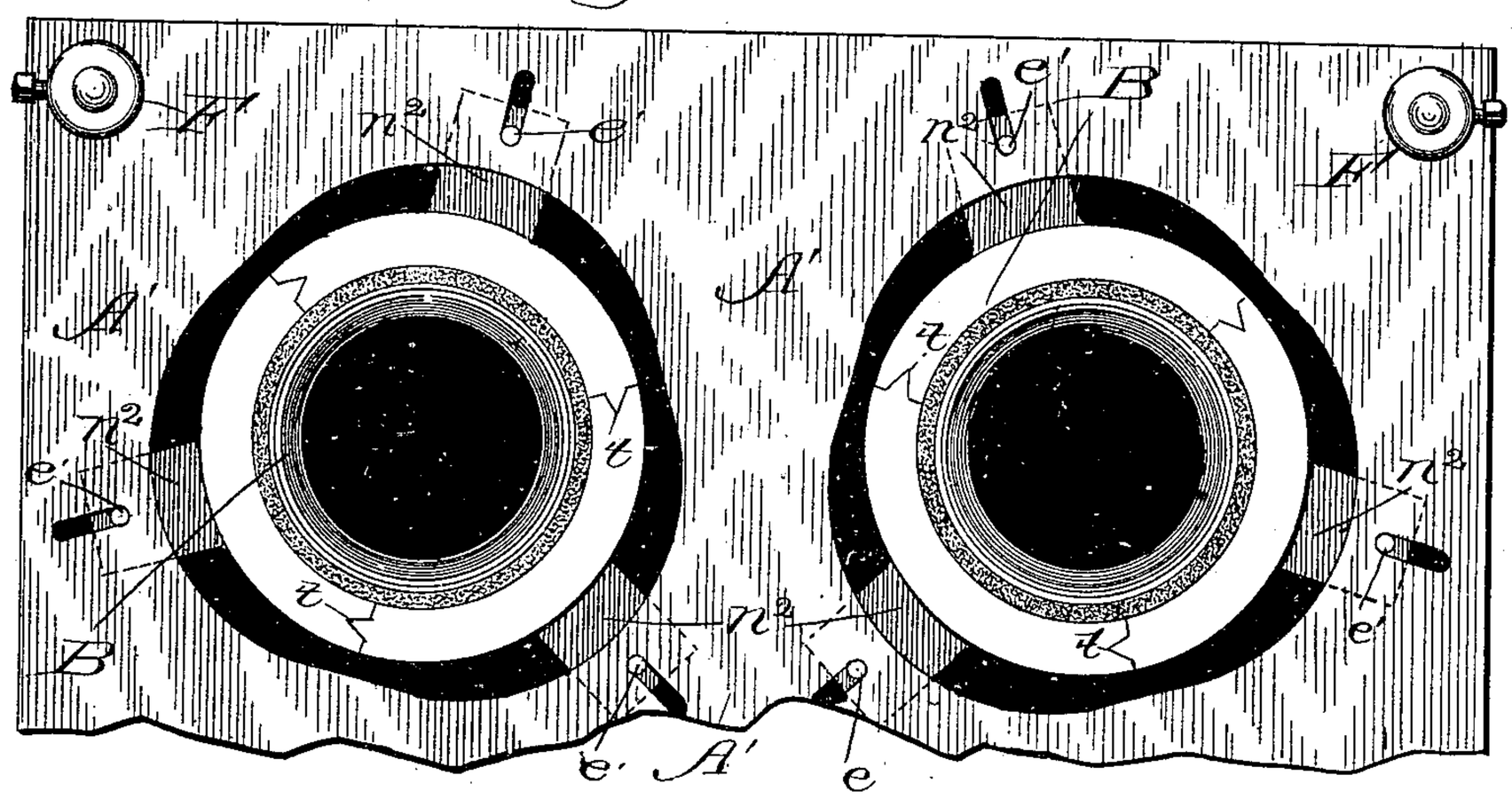


Fig. 5.

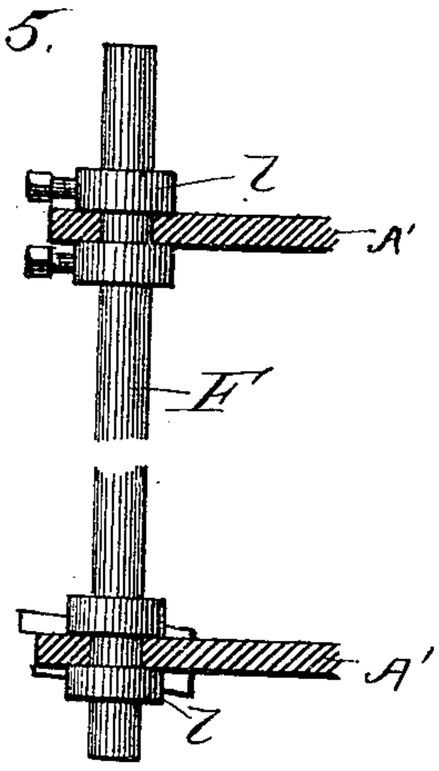


Fig. 6.

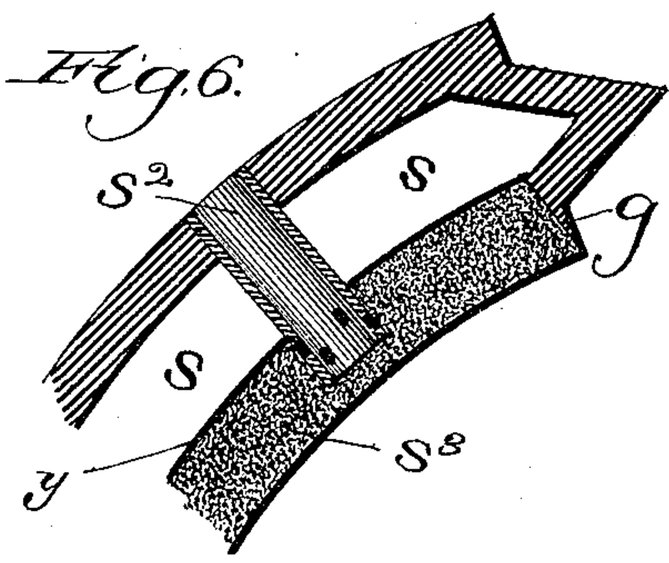
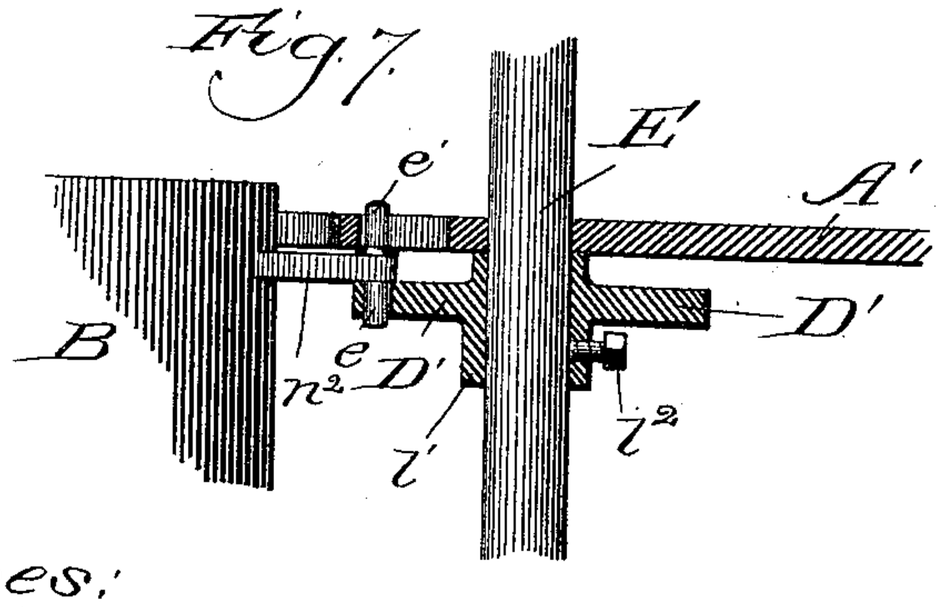


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN R. DAVIES, OF CHICAGO, ASSIGNOR OF ONE-HALF TO WM. W. FLINN, OF HIGHLAND PARK, ILLINOIS.

MOLD FOR CASTING.

SPECIFICATION forming part of Letters Patent No. 332,504, dated December 15, 1885.

Application filed August 22, 1885. Serial No. 175,039. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. DAVIES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Molds for Casting; and I hereby declare the following to be a full, clear, and exact description of the same.

My present invention is in the nature of an improvement upon that for which Letters Patent of the United States No. 131,214 were granted to me on the 10th day of September, 1872.

The general object of my present invention is the same as that set forth in the aforesaid Letters Patent—viz., the production of castings in a more speedy and cheap manner than by the ordinary means.

The particular purposes of the improvements hereinafter set forth are: better to adapt the construction set forth in the Letters Patent referred to, to the casting of objects of longer dimensions than those for the casting of which provision is made by the aforesaid construction, to provide a suitable cooling-space, and to afford an adjustable and detachable ring for the core-bar of each sectional flask or mold.

To these ends my invention consists in the general construction whereby the aforesaid purposes are accomplished; and it also consists in certain details of construction and combinations of parts, all as hereinafter set forth.

Referring to the drawings, Figure 1 is a bottom plan view of my device, showing the mechanism at the base of the molds for separating and closing the sections forming them; Fig. 2, a vertical section of a portion of a mold, showing details of construction; Fig. 3, a vertical section taken on the line 3 3 of Fig. 1, viewed in the direction of the arrows and inverted; Fig. 4, a broken plan view of a portion of the mechanism applied to the sections of molds toward their upper extremities, for the purpose of operating in conjunction with the mechanism toward the lower extremity of the same to actuate the sections; Fig. 5, a broken view in elevation of a detail; Fig. 6, a sectional view of a broken section showing the construction of the joints, whereby said cleats or ribs are afforded for the lining; and Fig. 7, a sectional view of a portion of the mechanism toward the upper extremities of the molds, for operating the sections.

A is the base-plate upon which the molds are carried, the mechanism for operating the latter being below the lower surface of the base-plate, so as to prevent molten metal from falling upon parts of such mechanism that would interfere with its operativeness.

The location of the mechanism referred to is, as will be seen on reference to my Letters Patent referred to, different from the position of the same shown in the latter, which is on the upper surface of the base-plate A.

B B are the molds, comprising each longitudinal section, preferably three in number, as shown, which fit together to form a mold by means of V-shaped joints *t*, the latter affording the preferred form of joint, though it may be plain, if desired. Each section of a mold is provided with a cooling-space, *s*, (clearly shown in Fig. 2 of the drawings,) into which lead lateral openings *s'*, to admit the nozzle of an air-tube, through which cold air or cold water is introduced into the cooling-space for purposes of cooling. The cooling-spaces of a mold are independent of each other in the sections—that is, they do not communicate with each other—since thereby it is possible to control the contraction and expansion of each section independently and produce equalization thereof, which is necessary to cause them to fit each other properly and allow them to be actuated with exactness. The unequal expansion or contraction of the joints which would tend to prevent their proper adjustment, and thus produce inequalities in the castings, is avoided by the provision of the cooling-spaces and the proper control of the same. Tubes s^2 extend through the sides of the molds into the space containing the lining s^3, where they are perforated to afford communication with the outer air, to lead off gas and steam generated by drying the lining. The plate A is provided with an opening for each mold, constructed to afford a countersunk angular seat, *r*, for the ring C, which is provided with a flange to fit upon the seat, as shown in Fig. 2, and supports the core *q*. The core is formed, preferably, in one of the usual ways, wherein a metal cylinder, *p*, is wound on its external surface

with straw rope p', upon which loam p^2 is plastered, and reduced to the shape to afford the desired configuration. C′ is the core-bar, bolted to the inner side of the cylinder p. The ring C is readily removable, to make room for others of varying sizes to support cores of different diameters. In the center of the base-plate, on the lower side of the same, is a disk, D, secured upon and to move with a vertical oscillatory shaft, E, which extends through the base-plate and through the center of the disk D, which is provided with a series of eccentrically-arranged slots, o. Each section of a mold is provided at its lower extremity with three flanges, n n', (shown in dotted lines in Fig. 1,) the lateral ones n' of which are V-shaped longitudinally on their undersides, and extend through slots formed in the bed-plate to fit into the V-shaped peripheries of rollers m, supported in suitable bearings, m', extending from the lower surface of the bed-plate, and each central flange, n, may, if desired, move underneath a roller, m^2, suitably located, as shown in Fig. 3, on the upper surface of the bed-plate, to prevent canting of a section while being moved when the mechanism hereinafter described, adjusted upon the molds toward their upper extremities, is not employed. Each central flange, n, is provided with a pin, o', which projects into the slots o of the disk D, whereby on turning the shaft E these sections, owing to their connection with the central disk, and the other sections, owing to their connection therewith, hereinafter described, will be opened and closed.

To the lower surface of the central disk, D, are pivoted toward their extremities four arms, k, one for each mold employed, (of which molds, however, more or fewer may be used, if desired.) Toward the opposite extremity of each arm k is pivoted a slide, i, working on a guide, k', on the base-plate, and supported by a roller, k^2, carried in suitable bearings formed upon the base-plate. Rods h connect the slides i pivotally with plates G, provided with eccentric slots o^2, similar to the slots o in the central disk, D, and pivotally secured upon the base-plate. The base-plate is slotted, as shown at x, Fig. 1, to permit movement of the bolt x', which serves to connect each plate G with a central flange, n, on a section of a mold, B, except the sections adjacent to the central disk, D, which are pivoted to the flanges n of such sections in the manner already described.

From the foregoing description it will readily be seen that by turning the central shaft, E, in one direction by means of a crank, if desired, applied to the upper end of the shaft, the sections forming the molds will be separated to permit removal of the castings longitudinally by means of derricks, cranes, or other similar devices, and that they will be closed to form the molds by turning the shaft E in the opposite direction. This operation is very readily performed with molds of a length sufficient for comparatively short castings; but to permit the casting of gas-pipes, water-pipes, sewer-pipes, lamp-posts, and other similar objects of considerable length, for which purpose of course the molds must be correspondingly long, difficulty is encountered in moving the sections forming the molds by actuating them with the mechanism hereinbefore described applied only toward the lower end of the device, principally for the reason that they are liable to stick toward their upper extremities, and thus entail very undesirable consequences. To obviate this, I provide the mechanism of which the following is a description: A′ is a plate, similar to the bed-plate A, adjustably supported toward its corners by means of adjustable collars l upon vertical rods F, which pass through it, and provided with openings to admit through it the molds B and central shaft, E, having a collar, l', and set-screw l^2, to afford a support for the plate A′ at its center. The openings through the plate A′ are of the form shown in Fig. 4 of the drawings, to afford recesses for the reception of the sections of the molds when separated, and to permit such separation. A disk, D′, surrounds the central shaft below the plate A′, being supported by the collar l', which may be formed integral with the same, as shown, and is provided with eccentrically-arranged slots, like those on the disk D on the base-plate A. Through these slots project, in a downward direction, pins e from flanges n^2, and guide-pins e' extend from the upper surfaces of the flanges n^2 through slots in the plate A, all operating in a manner analogous to that described for the mechanism toward the base of the device, and for the same purpose, and the mechanism in the form of the arms k, supported slides i, rods h, and slotted pivoted plates G, at the lower end of the device, is provided to connect in the same manner the disk D′ with the flanges n^2, extending from the sections toward their upper extremities. Turning of the central shaft, therefore, operates to actuate the sections of the molds simultaneously at their upper and lower extremities.

To permit the whole device to be readily moved from one position to another, carriage-rollers H are provided toward the corners of the base-plate A on its lower surface.

For the purpose of a continuous operation, the molds are to be lined with suitable compositions composed of fire-clay and plumbago, or any similar material that will answer the purpose. The lining is applied as follows: The mold being open, the pattern is inserted and the lining applied in a plastic condition. The mold is then closed, thereby pressing upon the interior surface of the lining the exact form of the pattern, care being taken to have the space between the pattern and the body of the mold quite filled, and to prevent the lining in the different sections from being united, and to afford lateral confines for it, what is known in the art of molding by the terms "sand-cleats" or "ribs" g are provided at each extremity of the lining-space,

The vent-tubes s^2 assist in holding the lining securely in place.

It is to be understood that each section of mold is a shell containing a cooling-space, *s*, which is separated by the inner wall, *y*, of the shell from the lining. The lining is applied to the inner surface of this shell, and is made to conform to the surface of the pattern (which is sustained in a hanging position within the mold around the core by a derrick or crane, or the like) by closing the mold-sections, and thus compressing the lining against the pattern. When the mold has been thus formed, the lining is suitably hardened by heating or drying it in a furnace or otherwise.

The body of each mold I usually make of cast-iron; but when it is desired to cast steel in them they are to be made of copper, for the reason that copper molds will retain heat longer than those made of iron. When dried, the lining is coated with some substance that will impart to it a smooth surface. For this purpose a composition of fish-oil, resin, and lamp-black, heated and mixed, may be used, being applied with a brush; or fish-oil, plumbago, and pulverized charcoal may be used for the purpose; or it may be coated with soot by burning pitch under the molds to cause the smoke to enter them.

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

1. The combination, with a mold for repeated and continuous use in casting metals, and composed of three or more sections, of mechanism, substantially as described, provided upon the mold toward its opposite extremities, to open and close the sections, as set forth.

2. The metallic base-plate A, having one or more molds, B, formed each in three or more sections, in combination with mechanism, substantially as described, upon each mold toward its opposite extremities, to open and close the sections, as set forth.

3. The combination, with a cluster or series of sectional molds upon a base-plate, of operating mechanism, substantially as described, upon the opposite extremities of the molds, for simultaneously opening and closing the molds composing the cluster or series, as set forth.

4. The combination, with a cluster of sectional molds, B, on a base-plate, A, provided with a central shaft, E, and mechanism, substantially as described, upon the base-plate A and shaft, for opening and closing the sections of the molds, of mechanism, substantially as described, upon the shaft E and molds toward their upper extremities, constructed to operate simultaneously with the mechanism of the base-plate A and shaft, to open and close the molds, as set forth.

5. A mold for casting metals, composed of three or more sections provided with non-communicating cooling-spaces *s*, having openings *s'*, in combination with mechanism, substantially as described, for opening and closing the sections, as set forth.

6. A mold for casting metals, composed of three or more sections provided with non-communicating cooling-spaces *s*, having openings *s'*, and a lining, s^3, vented by means of tubes s^2, communicating through the section with the external air, and mechanism, substantially as described, for opening and closing the sections, as set forth.

7. A mold for casting metals, composed of three or more sections provided with non-communicating cooling-spaces *s*, having openings *s'*, and lining s^3, confined by sand-cleats *q*, and vented by means of tubes s^2, communicating through the sections with the external air, and mechanism, substantially as described, for opening and closing the section.

8. A metallic base-plate, A, having one or more molds, B, formed in sections having flanges *n* and flanges *n'*, V shaped longitudinally on their lower surfaces, rollers *m* on the lower surface of the base-plate, having V-shaped peripheries, forming guides for the flanges *n'*, an oscillatory shaft, E, supported upon the base-plate A and carrying disks D and D' toward its opposite extremities, and mechanism, substantially as described, connecting the disks D and D' with each section of a mold, whereby all the sections may be opened and closed simultaneously, as set forth.

9. A cluster or series of sectional molds, B, supported upon a base-plate, A, and having independent cooling-spaces *s*, communicating with the external air, and linings s^3, vented by means of tubes s^2, communicating with the external air, a central shaft, E, upon the base-plate carrying, to move with it, a disk D, on the lower surface of the base-plate, and a disk, D', toward its upper extremity, flanges *n* and *n'* upon opposite extremities of the sections of the molds, a plate, A', surrounding the molds toward their upper extremities, and supported above the base-plate A and on the central shaft, and mechanism, substantially as described, connecting the disks D and D' with their adjacent flanges *n*, the whole being constructed and arranged to operate substantially as set forth.

JOHN R. DAVIES.

In presence of—
WILLIAM W. FLINN,
MASON BROSS.