No. 807,024. PATENTED DEC. 12, 1905.

C. D. GRIMES, B. F. EILERMAN & T. A. LEGLER, JR.

MOLD FOR MAKING CASTINGS.

APPLICATION FILED FEB. 8, 1905.

3 SHEETS—SHEET 1.

Fig. 3

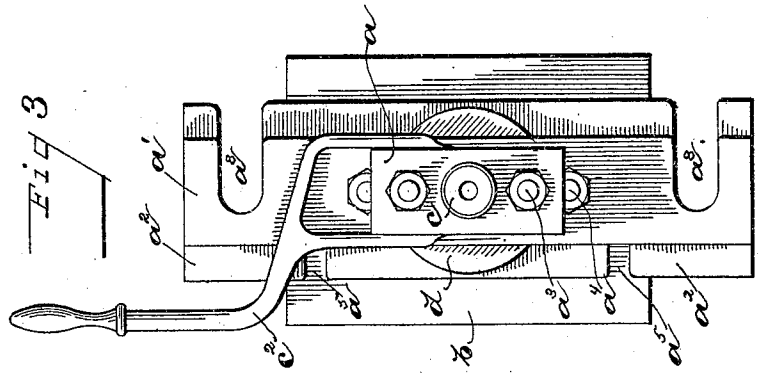


Fig. 2

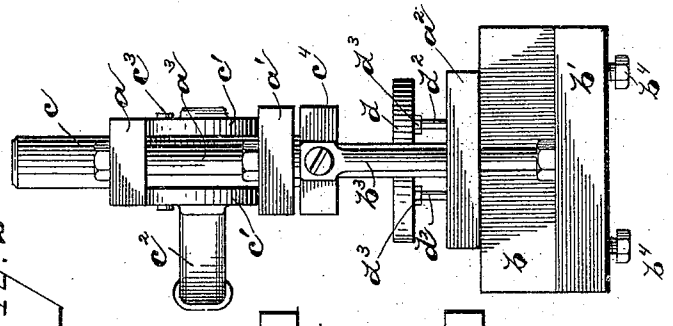
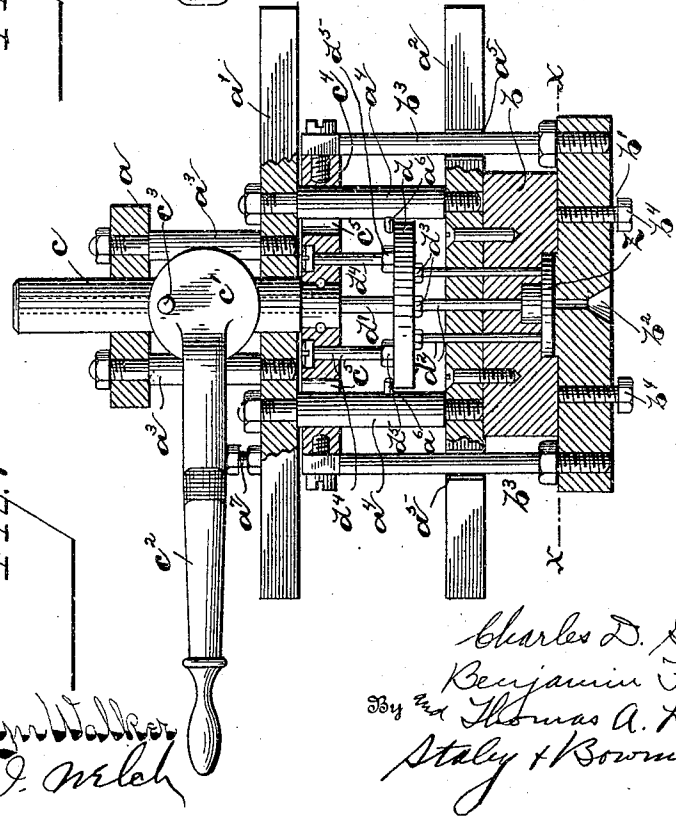


Fig. 1



Witnesses

L. Deweller Walker.

Chas. D. Miles

Inventors

Charles D. Grimes

Benjamin F. Eilerman

By and Thomas A. Legler Jr.

Staley & Bowman Attorneys

No. 807,024. PATENTED DEC. 12, 1905.

C. D. GRIMES, B. F. EILERMAN & T. A. LEGLER, JR.

MOLD FOR MAKING CASTINGS.

APPLICATION FILED FEB. 8, 1905.

3 SHEETS—SHEET 2.

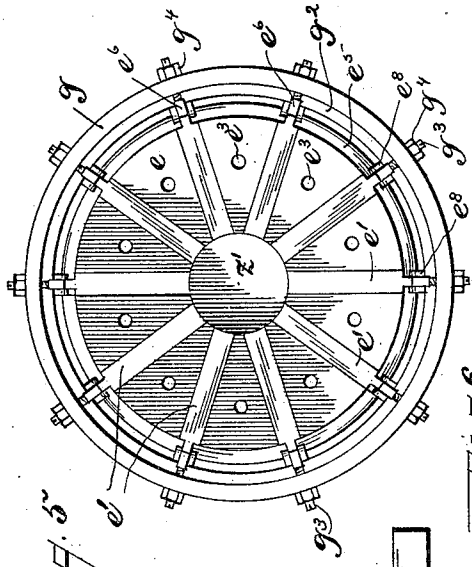


Fig. 5.

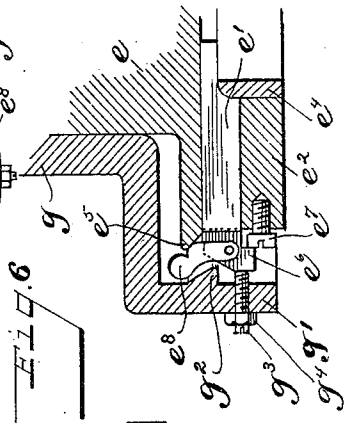


Fig. 6.

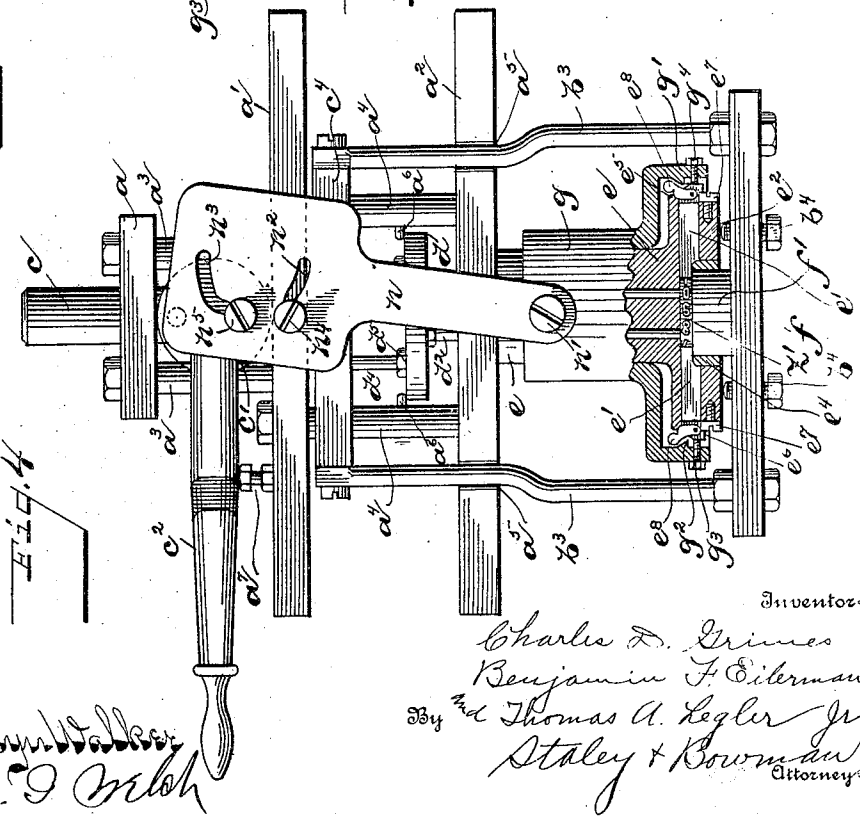


Fig. 4.

Witnesses

J. Hamilton Walker

Chas. D. Wilson

Inventors

Charles D. Grimes

Benjamin F. Eilerman

and Thomas A. Legler Jr

By Staley & Bowman

Attorneys

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

No. 807,024. PATENTED DEC. 12, 1905.

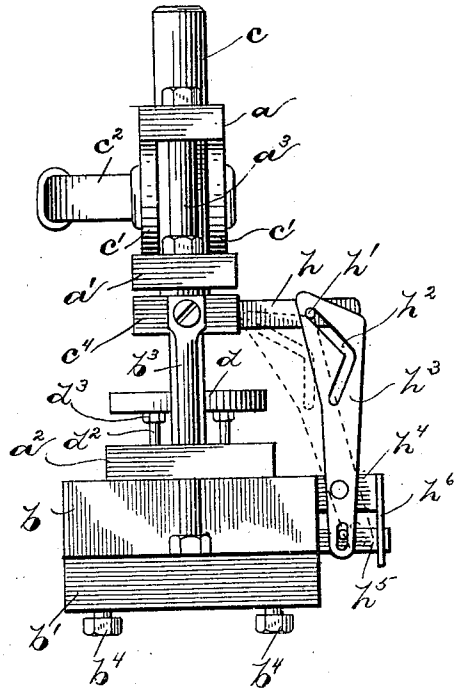
C. D. GRIMES, B. F. EILERMAN & T. A. LEGLER, JR.

MOLD FOR MAKING CASTINGS.

APPLICATION FILED FEB. 8, 1905.

3 SHEETS—SHEET 3.

Fig. 7.



Witnesses

H. Newell Walker

Chas. F. Mech

Inventors

Charles D. Grimes

Benjamin F. Eilerman

By Thomas A. Legler, Jr.

Staley & Bowman

Attorneys

ANDREW, B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES D. GRIMES, BENJAMIN F. EILERMAN, AND THOMAS A. LEGLER, JR., OF DAYTON, OHIO.

MOLD FOR MAKING CASTINGS.

No. 807,024. Specification of Letters Patent. Patented Dec. 12, 1905.

Application filed February 8, 1905. Serial No. 244,739.

To all whom it may concern:

Be it known that we, CHARLES D. GRIMES, BENJAMIN F. EILERMAN, and THOMAS A. LEGLER, JR., citizens of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Molds for Making Castings, of which the following is a specification.

Our invention relates to improvements in founding devices, and particularly to metallic dies or molds for use in making smooth castings from molten metal.

The object of our invention is to simplify the construction, as well as the means and mode of operation of such devices, whereby they will not only be cheapened in construction, but will be rapid, accurate, and efficient in operation and unlikely to get out of repair, and, further, provide a device whereby castings from molten metal may be cheaply and rapidly made by a person unskilled in the molding art.

A further object is to provide a device for making "undercut" castings wherein the operation of opening the mold will automatically withdraw the various false cores or drawbacks which may be necessary to give the proper form.

With the above primary and other incidental objects in view our invention consists of the parts, constructions, and mode of operation, or their equivalents, hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is a plan view, partly in section, of the device as adapted to making and ejecting from the mold simple castings of such shape as will permit them to be readily delivered. Fig. 2 is a side view of the device as shown in Fig. 1. Fig. 3 is an end view of the same. Fig. 4 is a plan view of the device, partly in section, as adapted for making undercut castings or castings with figures or characters in relief thereon, as type-wheels, &c. Figs. 5 and 6 are detail views of parts of the mechanism of the device illustrated in Fig. 4. Fig. 7 is a modification of the device illustrated in Fig. 4.

Like parts are represented by similar characters of reference throughout the several views.

Our present invention is especially adapted to be used in conjunction with the casting-machine illustrated in our pending application, Serial No. 220,645.

In constructing the device there is employed a framework comprising the transverse bars a, a', and a^2, rigidly connected together by the longitudinal studs a^3 a^3 and a^4a^4. These studs a^3 and a^4 are preferably formed with shoulders adjacent to their screw-threaded ends. However, they may consist of bolts each incased in a section of pipe interposed between the cross-bars a, a', and a^2 to serve as spreaders. A two-part mold is located adjacent to the bar a^2, the drag b being rigidly secured to said bar by screws, while the cope b' is removably held in position, as hereinafter described, and is provided with the ingate b^2. Slidably mounted in suitable bearings in the transverse bars a a' is a plunger c, which is operated by eccentrics c', having an operating-lever c^2. The eccentrics c' are preferably arranged in duplicate, one on either side of the plunger c, as shown in Fig. 2, and the operating-lever c^2 is correspondingly bifurcated, as indicated in Fig. 3. The eccentrics c' are pivotally secured to the plunger c at the points c^3 and bear against the inner side of the bars a a'. Secured to the inner end of the plunger c is a head c^4, having openings c^5 therein, through which extend the studs a^4 a^4. Pivotally attached to the head c^4 on opposite sides thereof are links b^3, rigidly secured at their opposite extremities to the cope b'. The transverse bar a^2 is recessed or notched, as at a^5, in order to accommodate the said links b^3. By this construction it will be seen that upon operating the lever c^2 the plunger c, with its attached head c^4, will be moved inward, causing the mold to open along the parting line x x by moving the cope b' away from the drag b by means of the connecting-links b^3 between the cope b' and the head c^4, and so permit the removal of the finished casting, (indicated at z.)

To facilitate the delivery of the finished casting, we provide ejector means for same, as follows: The plunger c is formed with a longitudinal bore, as indicated by dotted lines, Fig. 1. Into this bore extends the stem d' of a head d, which is provided with one or more ejector-pins d^2. The number of ejector-pins employed depends upon the size and shape of the casting. These ejector-pins are secured to the head d, preferably by being screw-threaded into same, and provided with lock-

nuts d^3, as illustrated, and extend through suitable openings in the transverse bar a^2 and the cope b and are of such length that when in their normal position their ends will coincide with the inner walls of the mold and form therewith a continuous surface.

By means of the screw-threaded connection of the ejector-pins with the ejector-head d, as before mentioned, adjustment of the ejector-pins is permitted to bring the ends of the said pins into proper relation with the inner surface of the mold when in their normal position.

Extending upward from the ejector-head d through the head c' and having their head when in normal position countersunk in said head c' are two or more bolts d^4. Like the ejector-pins, these are provided with lock-nuts d^5 to provide for proper adjustment and have screw-threaded connections.

The operation of the lever c^2 will cause the head c' to move inward and open the die or mold in the manner hereinbefore described preparatory to the discharge of the casting. Upon the further movement of the lever c^2 the head c^4 will contact the ejector-head d or the lock-nuts on the bolts d^4, if provided as illustrated, and will carry said ejector-head with it, causing the ejector-pins d^2 to press upon the finished casting z and push it from the mold, the ejector-pins d^2 being moved until they protrude into said mold. Upon the return movement of the lever c^2 the head c^4 will move independent of the ejector-head d until the heads of the bolts d^4 are engaged by the head c^4, when the ejector-head, together with the pins, will be drawn back to normal position.

Lateral projecting stops a^6 are provided on the studs a^4 a^4 to limit the movement of the ejector-head d when the ends of the ejector-pins are flush with the inner surface of the mold.

As a further precaution the adjustable stop a^7 is provided to limit the movement of the operating-lever c^2. The stud d' of the ejector-head d, extending within the bore of the plunger c, serves as a guide to keep the various parts in proper alinement.

The hinged connection of the cope b' with the head c^4 permits the cope to be swung aside to permit the inspection of the mold or the substitution of a different mold.

The extended ends of the transverse bars a' a^2 provide means by which the device may be clamped in position for use, and there is further shown in said bars (see Fig. 3) notches or recesses a^8 to adapt the device to use on parallel rods, as are shown in the aforementioned pending application.

As so far described the device is adapted for making castings of such shape and possessing such draw as will enable same to be readily delivered from the mold. However, it is frequently desired to make undercut castings having either depressions or projections, or both, in their surface. To accomplish this, one or more drawbacks or false cores, which form a part of the mold-walls, are employed. These false cores have formed on that surface which forms a part of the mold the irregular configuration in relief, or intaglio, the reverse of the configuration desired on the casting. These false cores must be withdrawn from the finished casting before the same can be ejected from the mold. Means for making such undercut castings and automatically withdrawing the false cores in combination with the structure above described is illustrated on Sheet No. 2.

Referring to Fig. 4, the device illustrated therein consists of the same structure, comprising the transverse bars a a' a^2 and studs a^3 a^4, the plunger c, the head c^4, the operating-lever c^2, the ejector-head d, and coöperating parts, as were above described and illustrated on Sheet 1, except that the links b^3 have been extended to accommodate a mold of different form. The casting z' in Fig. 4 is a type-wheel having in relief on its periphery a series of ten figures. The mold for forming this type-wheel consists of the drag e, secured to the transverse bar a^2 and having its face formed with a series of radial slots in which are located a series of longitudinally-movable false cores e' e', each of which has formed intaglio in its inner end one of the characters to be formed in relief on the periphery of the casting. The false cores e' are held in position by a plate e^2, secured by screws engaging in the screw-holes e^3 in the face of the drag e. In a mold of this type the cope f is preferably formed with a projecting portion f', which when the mold is closed extends within a ring e^4, secured to the plate e^2 and extending somewhat above said plate to form a portion of the bearing for the false core c'. The drag e has formed on its periphery a bead e^5. The outer ends of the false cores extend beyond the drag e and are beveled on their upper portion and have formed on their lower side a projection or shoulder e^6. A series of screws e^7, radially arranged in the plate e^2, are adapted to be contacted by the shoulder e^6, and so limit the inward movement of the false cores e'. Pivotally secured to each of the false cores e' is an offset lever member e^8, the shoulder of which bears upon the bead e^5 and forms a fulcrum for the member e^8. Slidably mounted on the drag e is a sleeve g, having the flange g', provided with the internal bead g^2. As the sleeve g is moved upward by means hereinafter described the bead g^2 will contact the upper portion of the lever member e^8 and by pressing this portion inward will cause the false cores to be withdrawn. Upon the reverse movement of the sleeve g screws g^3 in the flange g' will contact the bevel portion of the false core and return said cores to their normal position. It will be seen by reference to Fig. 6 that the relation of the screws g^3

and the bead g^2 is such that at the time the bead g^2 contacts the lever member e^8 the screws g^3 will be sufficiently removed from end of the false core to permit an outward movement of the same. Through the screws g^3 and the lock-nuts g^4 thereon adjustable means is provided for moving the false cores inward until their inner ends are flush with the walls of the mold.

It is to be understood that while the device is shown to be adapted to casting type-wheels it is not limited to the making of castings circular or symmetrical in form, but may be employed to form castings of various irregular shapes.

The means for moving the sleeve g for the purpose before mentioned consists of plates n, preferably arranged in duplicate, one on each side of the device, pivotally secured to the sleeve g at the point n'. It is to be understood that only one plate n might be used. However, as stated, the duplicate plates are preferred to give more even pressure and prevent the skewing of the parts. In the upper portion of the plate n are two cam-slots n^2 n^3 of peculiar shape. A fixed screw or pin n^4 in the transverse bar a' extends through the slot n^2. A similar pin or screw n^5, projecting from the cam c', engages the slot n^3. The curvature of the cam-slots n^2 n^3 is such that during the initial movement of the operating-lever c^2 the plate n will be moved laterally about its pivotal connection n', a portion of the slot n^2 being on the arc of the circle of which n' is the center. A further movement of the lever will, through the engagement of the screw n^5 with the slot n^3, move the plate n to its extreme lateral position, during which movement the coöperation of the cam-slot n^2 and stationary screw n^4 will cause the plate n and sleeve g to move upward, whereby the withdrawal of the false cores e' is accomplished, as before described. When the plate n has reached its extreme position, the slot n^3 will coincide with the path of travel of the screw n^5 and the operating-lever c^2 will be capable of further movement independent of the plate n and sleeve g, whereby the finished casting will be ejected.

In Figs. 1, 2, 4, and 7 there are shown set-screws b^4, by means of which the relation of the cope and drag may be adjusted and the thickness of the casting regulated.

There is illustrated in Fig. 7 a modified form of device in which there is employed but a single drawback. Such construction is desirable in making castings of irregular surface, a cam of peculiar shape, or a casting having a hole therein. All the main features of the modified form are such as have been before described, the variation being limited to the means for moving the drawback. Extending laterally from the head c^4 is an arm h, having thereon a projecting pin h', adapted to engage a cam-slot h^2 in a lever member h^3. The lever member h^3 is pivotally secured to a projection h^4 on the drag b and has a slotted connection with the drawback h^5. It will be seen that when the head c^4, with its lateral arm h, moves downward upon the movement of the operating-lever the pin h', through its engagement with the cam-slot h^2, will move the lever member h^3 about its pivotal connection until it assumes the position indicated in dotted lines and the drawback h^5 will be withdrawn. A plate h^6, secured to the projection h^4, constitutes a guide for the outer end of the drawback. When the lever member h^3 has been operated, the lower portion of the cam-slot h^2 will coincide with the path of the pin h', thus permitting the lever member to remain stationary after the drawback has been withdrawn, while the head c^4 and pin h' continue their movement.

It is obvious that several drawbacks might be operated by having a set of such mechanism for each, or several drawbacks which were adapted to move in the same direction might be connected together and operated by a single lever member.

It will be seen that we thus provide a simple, cheap, and efficient device of great utility by which castings may be rapidly and accurately made by a person unskilled in the molding art.

Having thus described our invention, we claim—

1. In a device as described, a main frame, a two-part mold, one of said parts being secured to said frame, a plunger, an eccentric pivoted to said plunger and bearing upon adjacent oppositely-disposed portions of the main frame, connections between said plunger and the movable part of the mold, a second plunger, ejector means carried by said second plunger, means for transmitting movement to said second plunger by the movement of said first-mentioned plunger, substantially as specified.

2. In a device as described, a main frame, a two-part mold, one part of which is secured to said frame, a plunger, an eccentric pivoted to said plunger and bearing on adjacent portions of the main frame, connections from said plunger to the movable part of said mold, casting-ejector devices, means for giving to said casting-ejector devices a limited movement in either direction by the movement of said plunger, substantially as specified.

3. In a device as described, a main frame and a movable head mounted therein, a lever to move said head, a mold, the drag of which is secured to said main frame, the cope of which is secured to and movable with said movable head, casting-ejector devices adapted to be contacted and given a limited movement by said movable head near the limit of its stroke, and means to return said casting-ejector devices to normal position by the movement of said movable head near the limit of its return stroke, substantially as specified.

4. In a device as described, a main frame, a

movable head mounted therein, means for giving to said head a reciprocating movement, a mold, the drag of which is secured to said main frame, and the cope of which is secured to and movable with said head, casting-ejector devices, means whereby said head will be given a movement independent of said casting-ejector, means for giving to said head an additional movement coincident with the movement of said casting-ejector devices, means for giving to said head a return movement independent of said casting-ejector devices, means for giving to said head an additional return movement coincident with the return movement of said casting-ejector devices, substantially as specified.

5. In a machine as described a main frame, an operating-lever, a separable mold, a series of movable false cores forming a part of said mold, casting-ejector means, means connected with said operating-lever for operating all of said parts, viz. the separable mold, the false cores and the casting-ejector by a single operation of the lever and means for returning said parts to normal position by the reverse movement of said lever, substantially as specified.

6. In a device as described, a main frame, a movable head mounted therein, means giving to said head a reciprocating movement, a mold, the drag of which is secured to said main frame, and the cope of which is secured to said movable head, casting-ejector devices, false cores forming a part of said mold, a reciprocating member to operate the false cores upon the movement of the mold, means for giving to said cope an additional movement independent of said reciprocating member whereby the cope will be opened and the casting ejected, substantially as and for the purpose specified.

7. In a device as described, a separable mold, one or more drawbacks, protruding ends on said drawbacks, a lever member pivoted to each of said drawbacks, a longitudinally-movable member adapted when moved in one direction to operate said lever members and withdraw said drawbacks, and when moved in the opposite direction to contact the protruding ends of said drawbacks and return said drawbacks to normal position, an operating-lever, means for opening said mold and withdrawing said drawbacks by giving to the cope of said mold an initial movement independent of the movement of said drawbacks, and means for giving to said cope an additional movement simultaneous with the movement of said drawbacks through the operation of said operating-lever, substantially as specified.

8. In a device as described, a main frame, a mold, drawbacks forming a part of said mold, a longitudinally-movable member adapted upon movement to operate said drawbacks, an operating-lever, a link connected to said movable member, camways in said link, a projection on said main frame engaging one of said camways and a projection on said operating-lever engaging the other camway, substantially as and for the purpose specified.

9. In a device as described, a mold, an operating-lever, drawbacks forming a part of said mold, protruding ends on said drawbacks, a lever member pivoted to each of said drawbacks, a longitudinally-movable member adapted when moved in one direction to operate said lever member and withdraw said drawbacks, and when moved in the opposite direction to contact the protruding ends of said drawbacks to return said drawbacks to normal position, means for simultaneously moving the cope of said mold and withdrawing said drawbacks by the operation of said lever, substantially as specified.

10. In a device as described, a separable mold, one or more casting-ejectors, an operating-lever, means for opening said mold and ejecting the casting by giving to the cope of said mold an initial movement independent of said casting-ejector, means for giving to said cope additional movement simultaneous with the movement of said casting-ejectors through the operation of said operating-lever, substantially as specified.

11. In a device as described, a separable mold for irregular casting, a casting-ejector, a drawback, an operating-lever, connections between said lever and said separable mold, connection between said lever and said casting-ejector, connection between said lever and said drawback, and means for operating all of said parts by the single operation of said lever, substantially as specified.

In testimony whereof we have hereunto set our hands this 27th day of January, A. D. 1905.

CHARLES D. GRIMES.
BENJAMIN F. EILERMAN.
THOMAS A. LEGLER, Jr.

Witnesses:
ELLENORE OHMER,
JOHN ROEHM.