3 Sheets—Sheet 1.

T. F. HAMMER.

MATCH-PLATE MOLDING.

No. 193,508. Patented July 24, 1877.

fig. 1

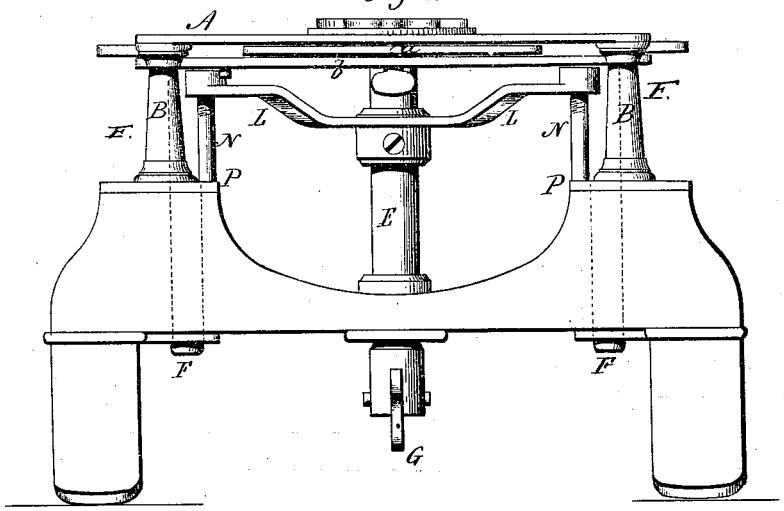


fig. 2

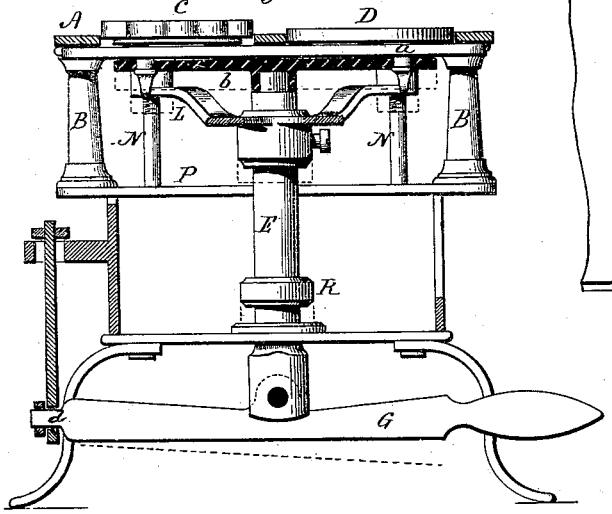
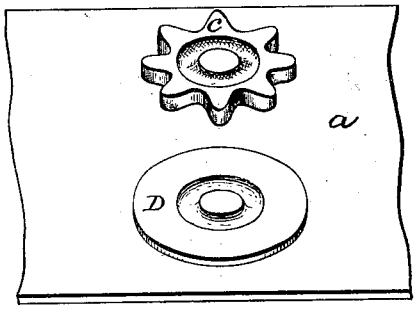


fig. 3.



Witnesses.
J. H. Shumway.
Clara Broughton

Thorvald F. Hammer
Inventor
By Atty.
Wm. E. Earle

3 Sheets—Sheet 2.

T. F. HAMMER.

MATCH-PLATE MOLDING.

No. 193,508. Patented July 24, 1877.

fig. 4

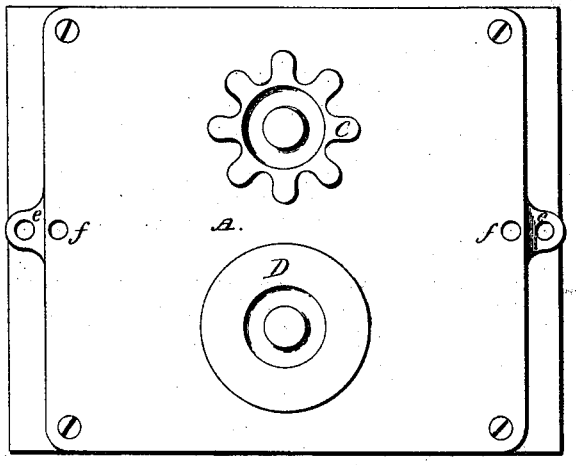
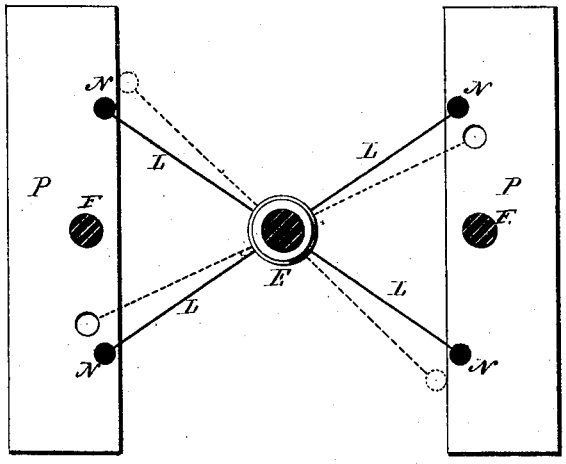


fig. 5



Witnesses.
J. H. Shumway.
Clara Broughton.

Thorwald F. Hammer
By Atty. Inventor
Wm. E. Earle

3 Sheets—Sheet 3.

T. F. HAMMER.

MATCH-PLATE MOLDING.

No. 193,508. Patented July 24, 1877.

fig. 6

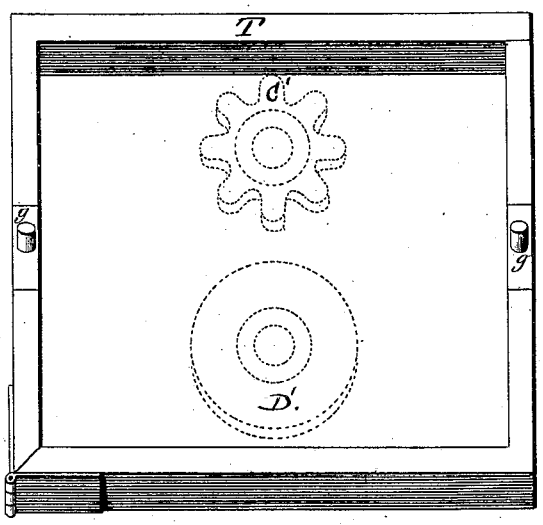


fig. 7

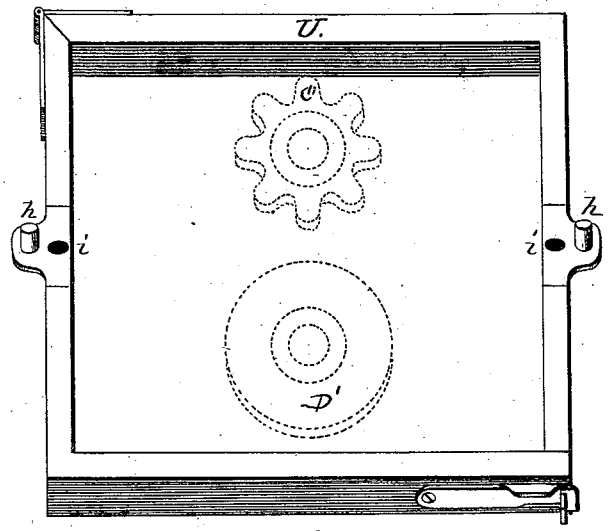
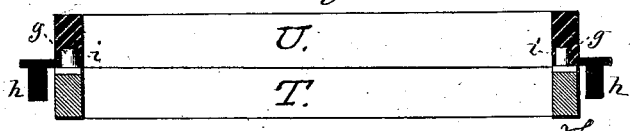


fig. 8



Witnesses.
J. H. Chumney
Clara Broughton.

Thorwald F. Hammer
By Atty. Inventor
Wm. E. Earle

UNITED STATES PATENT OFFICE.

THORVALD F. HAMMER, OF BRANFORD, CONNECTICUT.

IMPROVEMENT IN MATCH-PLATE MOLDINGS.

Specification forming part of Letters Patent No. **193,508**, dated July 24, 1877; application filed March 30, 1877.

To all whom it may concern:

Be it known that I, THORVALD F. HAMMER, of Branford, in the county of New Haven and State of Connecticut, have invented a new Improvement in Match-Plate Molding; and I do hereby declare the following, when taken in connection with the accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent in—

Figure 1 a front view; Fig. 2, a transverse central section; Fig. 3, a perspective view of the match-plate or mold-board; Fig. 4, a plan view; Fig. 5, a horizontal section beneath the carriage, looking downward, and in Figs. 6, 7, and 8, views of the flask.

This invention relates to an improvement in what is called "match-plate molding"—that is to say, that class of molding for castings in which the pattern is formed upon, or made fast to, the mold-board, and the two parts of the flask arranged successively on the mold-board and filled, then removed from the board. The two match together and form a complete mold.

The usual method in this class of molding-patterns, or such as require to be part in one portion of the flask, and part in the other, is to attach one portion of the pattern to one side of the match-plate, and the other portion to the opposite side; then one part of the flask is filled upon one side of the match-plate, and the other part upon the other. Hence the match-plate must be reversed, or two match-plates employed in molding a single pattern.

In the use of machines for molding, this difficulty is much greater than in hand-molding, because two machines are required, one machine for one part of the flask, and the other for the other.

The object of this invention is to overcome these difficulties; and it consists, first, in the peculiar construction of flasks and match-plate, as hereinafter described, whereby the flasks may be conveniently arranged upon the match-plate, and insure the proper relative position of the molds in the two parts when set together; second, in mechanism for drawing the patterns from the sand, as more fully hereinafter described, and recited in the claims.

A is the match-plate or mold-board, which, in dimension, is proportioned to the work to be done. This plate is shown arranged on suitable supports B, so as to stand firmly, and through this match-plate openings are formed corresponding to the patterns by which the molds are to be made—in this case represented as a flanged pinion, C, showing the toothed portion, and D the flange portion. These two parts are arranged with their axes equidistant from their respective sides of the match-plate, and in a line transversely across the match-plate. On a plate, *a*, beneath the match-plate, the patterns are securely attached, and this plate *a* is arranged on a vertically-moving carriage, *b*, the carriage being supported on a central shaft, E, and on suitable guides F, and so that by raising or lowering the shaft E, the patterns will be caused to pass up above the surface of the match-plate, as seen in the drawing, or down below the surface, as indicated in broken lines, Fig. 2. To thus move the patterns, a lever, G, is hung upon a loose fulcrum, *d*, on the back side of the machine, and, connected to the lower end of the shaft projects at the front in a suitably-formed handle.

From the shaft arms L extend radially outward, and to the ends of these arms adjustable posts N extend downward, so as to rest upon a horizontal bearing, P. The shaft E is attached to the carriage *b*, so as to permit a partial rotation of the shaft without effect upon the table. The posts N are adjusted by partial horizontal rotation, so as to hold the pattern at its proper elevation. By turning the lever G in a horizontal plane, the shaft E will be correspondingly turned until the posts N will pass off from their horizontal bearing P, as indicated in broken lines, Fig. 5; then the shaft, carriage *b*, plate *a*, and patterns, will drop until arrested by a collar, R, on the shaft, as indicated in broken lines, Fig. 2, or otherwise. When raised again the lever is returned, bringing the posts N again to a bearing with the patterns in their proper position for molding.

At each end of the match-plate two perfo-

rations, *e f*, are made to receive corresponding pins on the flasks, the two, *f*, for one part, and two, *e*, for the other. The flask is fitted for these pins, as seen in Fig 8. The flasks are made to open at one angle, and close at the opposite, in the usual manner for snap-flasks. The one part, T, Fig. 6, is provided with a stud, *g*, at each end, corresponding to the perforations *f* on the match-plate; the other part, U, Fig. 7, is provided with a stud, *h*, at each end, corresponding to the perforations *e* on the match-plate, and the second part, Fig. 7, is also provided with perforations *i*, corresponding to the studs *g* on the part Fig. 6, so that when the two parts are set together, the studs on the part Fig. 6 will set into the perforations *i*, Fig. 7, and thus insure the proper relative position of the flask when set together, and the studs *g* on the one part, and the studs *h* on the other part, with the corresponding perforations *e f* on the match-plate, insure precisely the same position of the two parts of the flask when set upon the mold-board.

In molding, the first part, Fig. 6, is arranged upon the match-plate, and filled with sand in the usual manner. So soon as this is done, and while the flask is yet on the match-plate, the patterns are drawn down through the match-plate, as before described. The match-plate, supporting the sand closely around the pattern, prevents any chipping or damage to the mold in so removing the patterns. This done, that part of the flask is removed, and laid face up, and the second part correspondingly placed on the match-plate, the patterns raised, and the molding proceeded with as before, and the flask removed, and placed over the other, as seen in Fig. 8. In this case it will bring the flange-mold D′ in the second part over the pinion-mold C′ in the first part, and the pinion-mold C′ of the second part over the flange-mold D′ of the first part, making two complete molds, each consisting of two different sections.

It will be understood that different match-plates are to be provided for different and corresponding forms of patterns.

The posts N are adjustable vertically for the purpose of raising or lowering the carriage to adjust the patterns relatively to the surface of the match-plate.

It will be understood that the peculiar arrangement of the studs on the flask and perforations on the match-plate are applicable to match-plate molding generally, and not necessarily dependent on the arrangement and operation of the patterns. The parts of the pattern may be thus arranged, and permanently attached to the match-plate, for molding in ordinary machines, or for molding by hand, and thereby save duplicate machines, or turning of the match-plate, and the adjustment of the two parts of the pattern is much more easily accomplished on the same side of the plate than on the reverse side.

I claim—

1. A match-plate, constructed with two perforations, *e f*, at each end, and all on the same central line, in combination with two parts of a molding-flask, the one constructed with studs *g*, corresponding to the perforations *f* on the plate, and the other part with studs *h* corresponding to the other perforations *e*, and the said other part with perforations *i*, corresponding to the studs *g* on the said one part, substantially as described.

2. The combination, for molding purposes, of a match-plate and patterns, the plate constructed with apertures or recesses corresponding to the patterns, the said patterns arranged on a vertically-moving rotating carriage provided with adjustable supports N, and means, substantially such as described, for turning the said carriage-posts to a bearing when the patterns are raised, or turning them from the said bearing to lower the patterns, substantially as described.

THORVALD F. HAMMER.

Witnesses:

JOHN E. EARLE,

CLARA BROUGHTON.