(No Model.) 3 Sheets—Sheet 1.

M. G. IMBACH.

MOLD.

No. 383,885. Patented June 5, 1888.

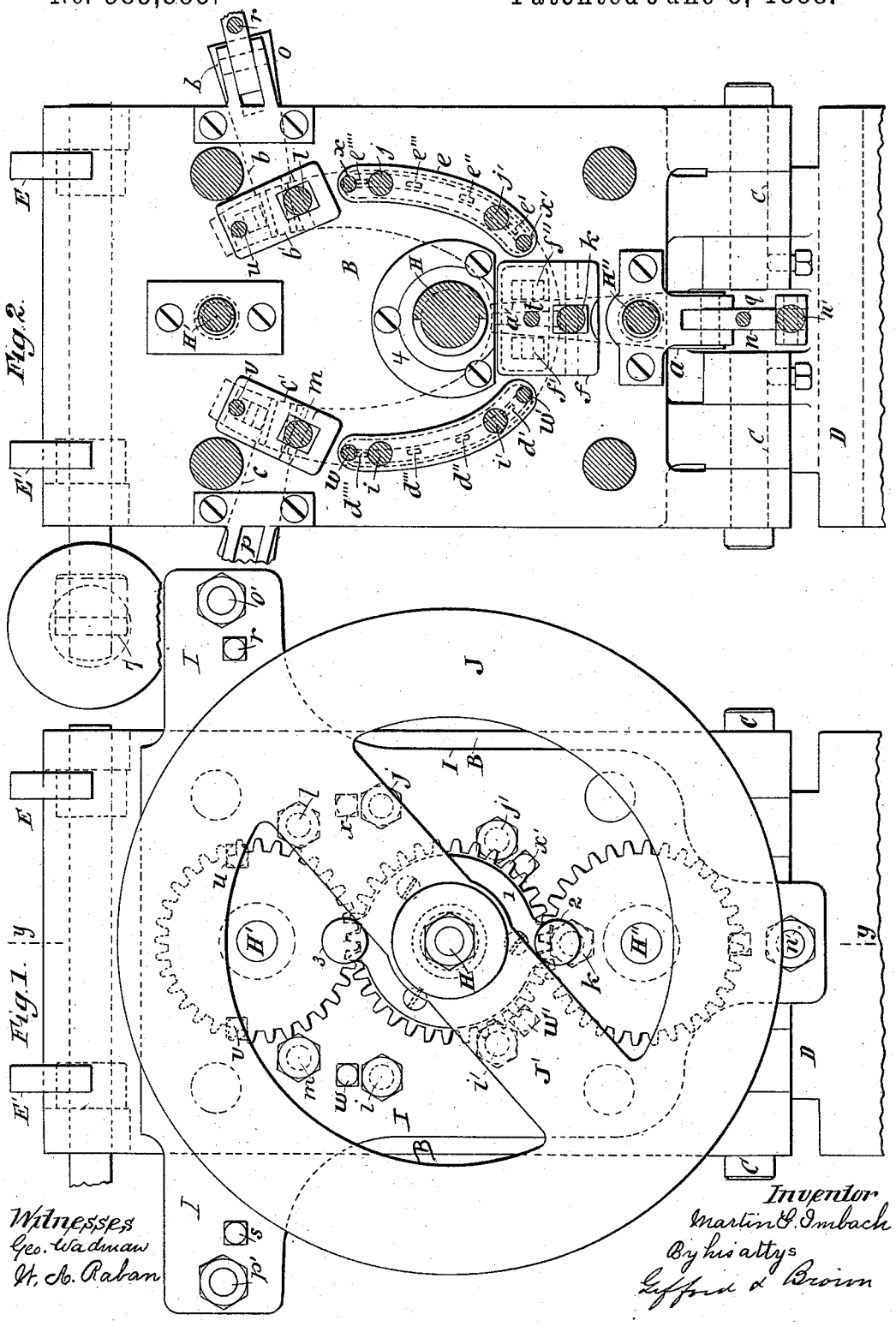

Fig. 2.

Fig. 1.

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Fig. 4.

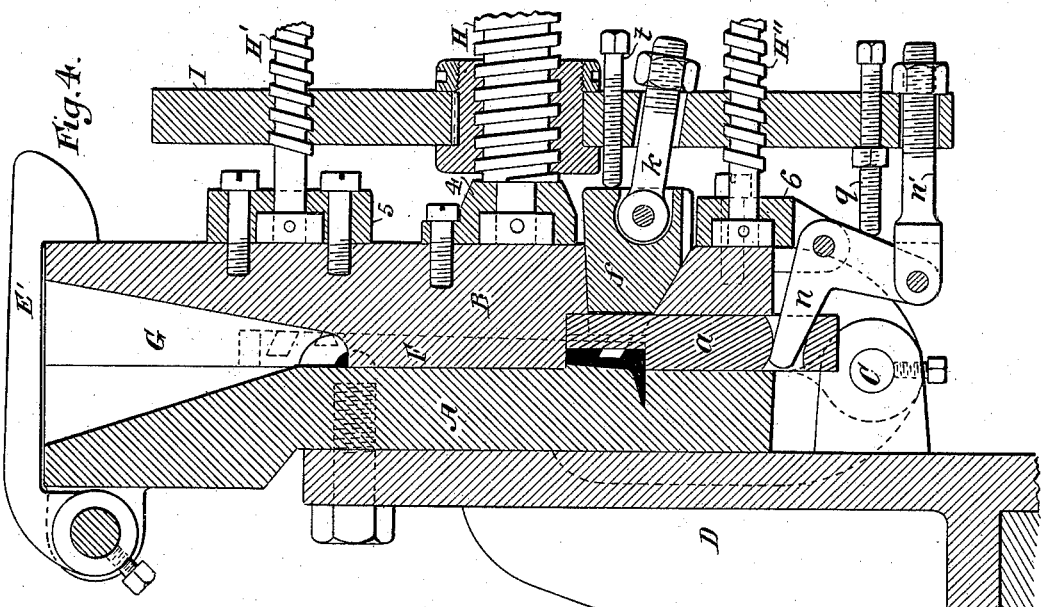
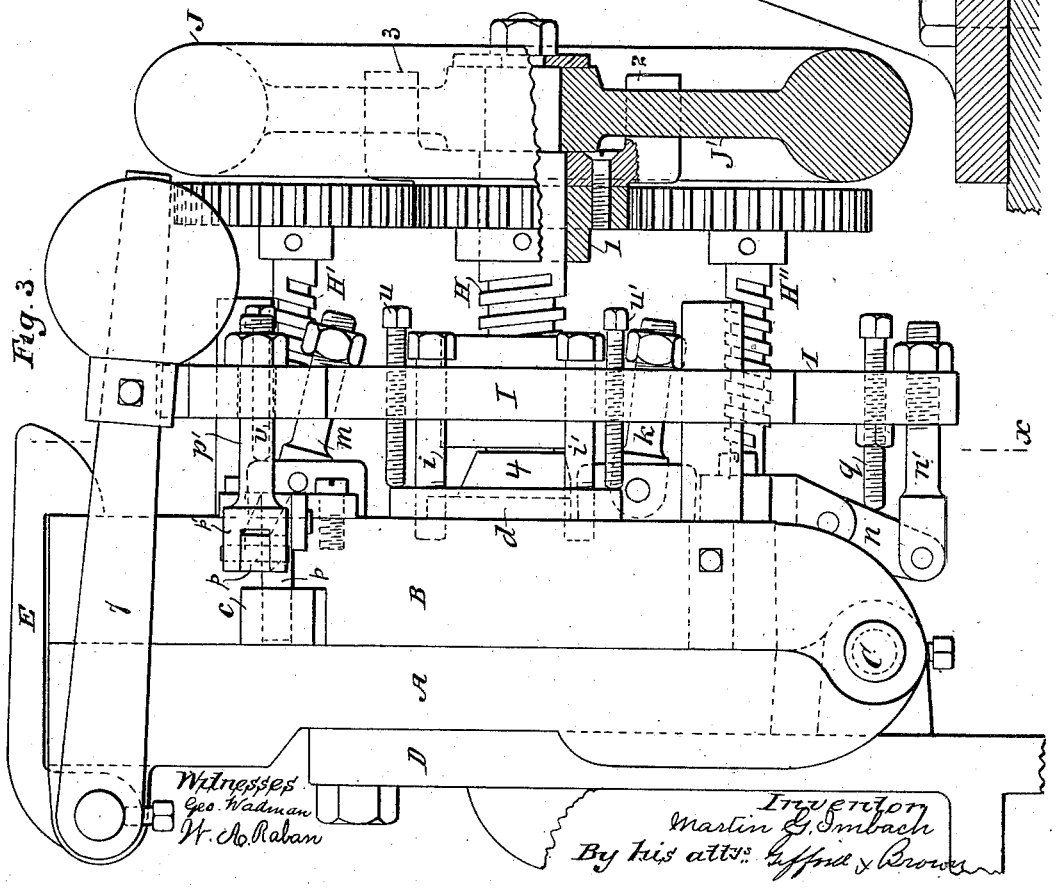


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

M. G. IMBACH.

MOLD.

No. 383,885. Patented June 5, 1888.

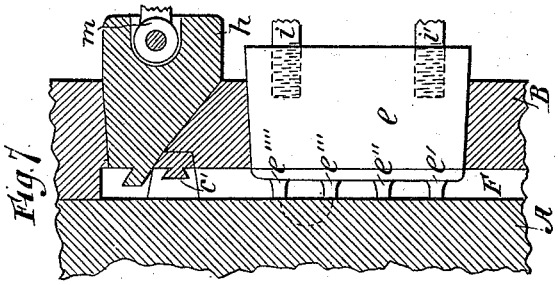

Fig. 1.

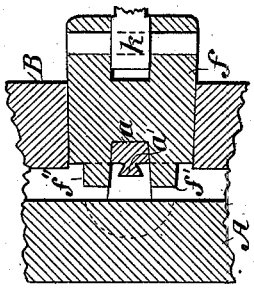

Fig. 6.

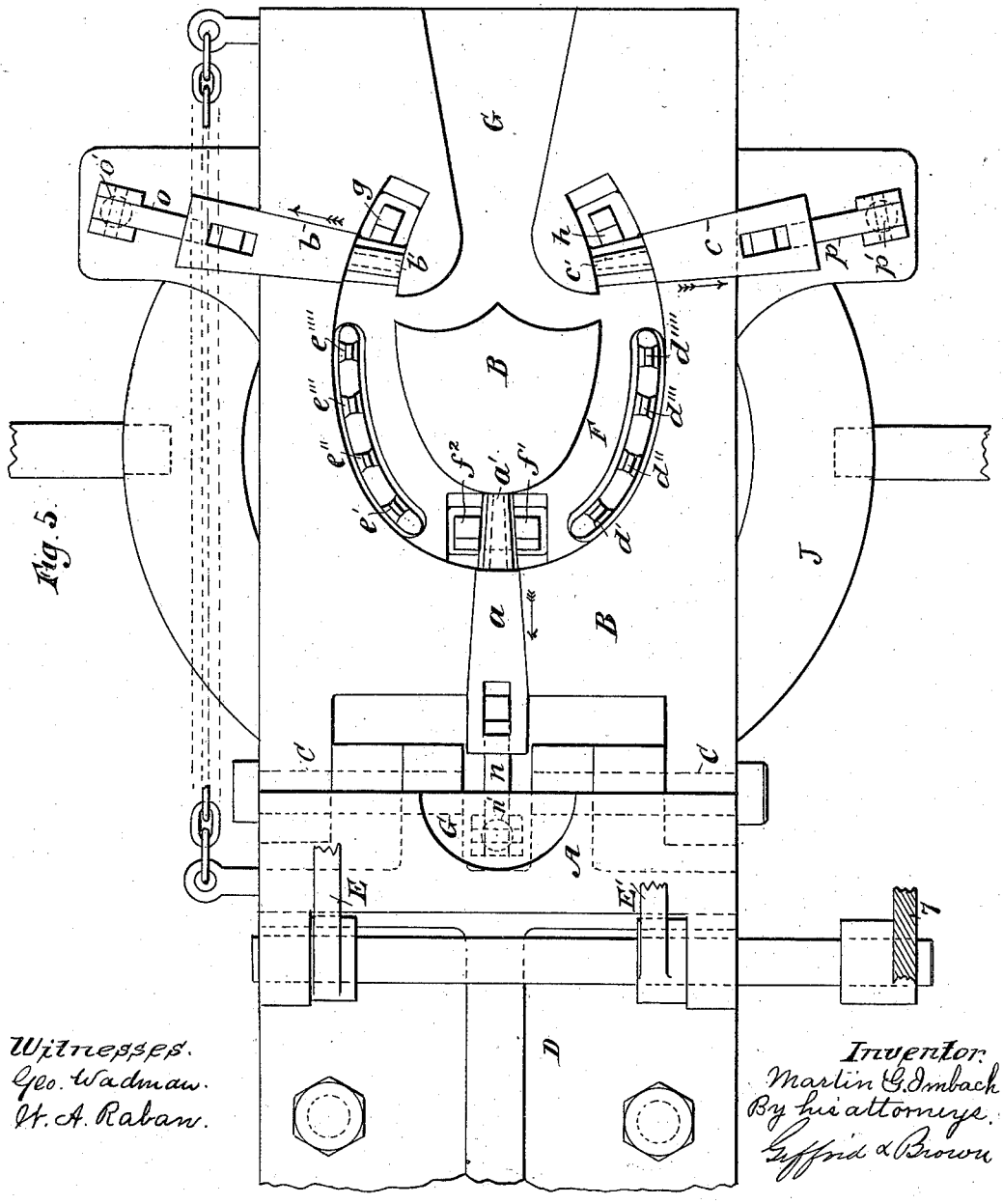

Fig. 5.

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UNITED STATES PATENT OFFICE.

MARTIN G. IMBACH, OF BROOKLYN, ASSIGNOR TO THE IMPROVED HORSE SHOE COMPANY, OF NEW YORK, N. Y.

MOLD.

SPECIFICATION forming part of Letters Patent No. 383,885, dated June 5, 1888.

Application filed August 20, 1887. Serial No. 247,407. (No model.)

To all whom it may concern:

Be it known that I, MARTIN G. IMBACH, of Brooklyn, Kings county, and State of New York, have invented a new and useful Improvement in Molds, of which the following is a specification.

The object of my invention is to construct a mold within which a horseshoe similar to that shown and described in Letters Patent No. 344,452 may be cast of steel or wrought-iron. It is known that wrought-iron requires a temperature of about 4,000° for melting. Such is the rapidity with which the iron sets on exposure to cooling that it has been found practically impossible to employ chills in the ordinary way in connection with the molds, because the iron almost immediately contracts around the chills and embraces them so tightly as to make their removal very difficult, if not impossible.

My improvement consists in providing means whereby the chills employed for making the horseshoe referred to may be removed from the mold-cavity almost immediately the mold is filled and before the mold has been open.

Figure 1 is a front view of the mold. Fig. 2 is a section on the line *x x* of Fig. 3. Fig. 3 is a side elevation with the hand-wheel partly in section. Fig. 4 is a vertical section through line *y y* of Fig. 1, certain parts being omitted. Fig. 5 is a view of the interior of the mold when it is opened. Fig. 6 is a detail showing a transverse section through the chill *a* and a longitudinal section through the chill *f*. Fig. 7 is a detail showing the positions, viewed sidewise of the chills, for the nail-holes and at the heel of the shoe.

A and B are the two halves of an iron mold, which are hinged at C.

A is permanently supported in an upright position upon the stationary bracket or support D.

E E′ are dogs hinged to A and adapted to hold the mold closed, as shown.

In the drawings I have shown the shape for the horseshoe as formed almost entirely in the face of mold B, the face of mold A being made so as to give the surface form to the top of the horseshoe; but this is not an essential feature, since one-half of the article may be made in each half of the mold.

F, Fig. 5, represents the shape for the horseshoe in the mold B, which, it will be understood, is in form the reverse of the bottom of the horseshoe.

G is the channel through which the iron is poured into the shape.

In the form of horseshoe to which I have referred it is necessary to form by chills the nail-holes, the mortises to receive the tenons of the adjustable calks, as also the seats for the dovetail keys by which the calks are secured to the shoe. It is necessary, also, to provide means for securing the removal of these chills instantly the mold is filled.

a′, *b′*, and *c′* are the chills, whereby are formed the seats for the dovetail keys respectively at the toe and the two heels. Each of these chills is mounted upon a slide, *a*, *b*, and *c*, which is provided with a proper guideway cut in the face of the mold B. By suitable mechanism, hereinafter described, each of these slides may be withdrawn in the direction of the arrow, Fig. 5.

d′ d″ d‴ d⁗ and *e′ e″ e‴ e⁗* are the chills for forming the nail-holes on each half of the shoe. A single slide, *d*, bears all of the nail-hole chills for one half of the shoe, and a corresponding slide, *e*, bears all those for the other half. Each of these slides fits in a passage-way cut through the mold B at right angles with the plane of the horseshoe, and is provided with mechanism, hereinafter to be described, whereby it may be moved in and out to insert and withdraw the nail-hole chills into and out of the cavity for the horseshoe.

f′ f″, *g′*, and *h′* are the chills for forming the mortises for the toe and heel calks, respectively. These chills are mounted, respectively, on the slides *f*, *g*, and *h*. Since the mortises are made at an angle of inclination to the plane of the horseshoe, it is necessary that the slides for insertion and withdrawal should be made to move at the same angle, and this is accomplished by cutting the passages for the respective slides through the mold B at the desired angle.

It will be observed that the slide *a* must cross the path of the slide *f*. To permit of

this the shoulders of the slide *f* are cut away sufficiently adjacent to the chill. Thus in Fig. 6 it will be observed that the shoulder of *f* between *f'* and *f''* is cut away sufficiently to admit of the passage of the slide *a*.

It now being understood that as soon as the mold is filled, and before the iron has cooled sufficiently to lay hold upon the chills, the chills are to be withdrawn, it remains to describe the mechanism by which I intend to do so. On the rear of mold B is journaled a short shaft, H, upon which a screw-thread is cut. On this screw-thread is mounted a plate, I, which lies parallel with the mold B, and which, obviously, may be moved to and from the mold B by turning the screw H. To this plate each of the chill-slides already described is connected, so that all of the slides are operated by the movement of the plate. For those chill-slides, as the nail-hole and heel and toe mortise chill-slides, which are to be moved nearly in the same line of motion as the plate I, a simple bolt-connection is sufficient. Thus the chill-slides *d* and *e* are connected with the plate I by the bolts *i i'* and *j j'*, respectively. The slides *f*, *g*, and *h* are connected to the plate by the bolts *k*, *l*, and *m*, respectively, though in order to permit of the inclined movement of the latter slides their respective bolts are pivoted to them, as shown. The slide *a* is moved by the right-angled lever *n*, one arm of which is connected with plate I by bolt *n'*. Likewise the slide *b* is moved by the right-angled lever *o* and bolt *o'*, which are similar in construction to the right-angled lever *p* and bolt *p'*, which operate slide *c*. All of these right-angled levers and their moving bolts are like *n* and *n'*, which are most clearly shown. The several bolts by which the various slides are connected with the plate I are secured to the plate by a nut, as shown, so that they can be adjusted, and it will be preferable to adjust these nuts so that in withdrawing the various slides they are started successively, thereby avoiding a large part of the resistance which would result from starting all of the chills at once.

The stop-screws *q*, *r*, *s*, *t*, *u*, *v*, *w w'*, and *x x'* may be employed, one for each slide, to force the chills forward as the plate I is advanced and to lock the chills, so as to resist the pressure of metal from within. The screw-shaft may be assisted by other corresponding screw-shafts, H' H'', geared to the central shaft, H. Motion is imparted to these screw-shafts by the hand-wheel J.

It will be observed that all of the mechanism for operating the chill-slides is connected with the mold B, so that when the mold is opened by swinging the mold B downward the described mechanism is carried with it.

In operation, the mold being closed, the melted wrought-iron is poured into the mold through the channel G. As soon as it is filled, so quickly does the metal set that the attendant should immediately operate the plate I, so as to withdraw all of the chills. Then the mold may be opened and the article cast removed.

The advantage of my mold is, that it enables me to employ chills in the casting of wrought-iron or steel, thereby producing conformations which otherwise would be practically impossible.

Although I have shown a mechanism operated by hand and by a screw for withdrawing the chills, it is plain that levers might be employed, and that it might be run by power instead of by hand.

By making the hand-wheel loose on the shaft and providing a collar, *l*, fast to the shaft H, with studs 2 3 projecting upward from the collar into the path of the spokes J' of the hand-wheel, the hand-wheel, which is weighted, may be used percussively on the screw to start it if the chills withdraw with difficulty.

The pieces 4, 5, and 6 are merely plates secured to the mold B to form journals for the ends of shafts H H' H'', respectively.

The weighted lever 7 may be made fast to the shaft to which the dogs E E' are fixed, so as to insure the mold being held shut, and suitable arrangements will be employed for raising the mold B in closing.

I claim—

1. In combination, the mold, chills mounted on slides adapted to move at an angle with each other, the plate I, a bolt or bolts whereby the slide or slides moving toward the plate I are connected therewith, and the lever or levers *n* and bolt or bolts *n'*, whereby the motion from the plate is conveyed to the slide or slides moving in other directions, substantially as described.

2. In combination with a mold adapted for wrought-iron or steel casting, a chill adapted to form a seat for a key, and another chill adapted to form a mortise, said chills being respectively mounted on slides which move at an angle with reference to each other, whereby the chills may be withdrawn from the mold-cavity, substantially as described.

3. In combination with a mold adapted for casting horseshoes, chills for forming mortises for the calks, and chills for forming key-seats for the keys attaching the calks, said chills being mounted, respectively, on slides, whereby they may be withdrawn from the mold-cavity, substantially as described.

4. In combination, a stationary support, D, a mold-half, A, secured thereto in an upright position, the mold-half B, pivoted to A at the bottom, chills mounted upon slides, the plate I, connections between the chills and the plate I, the screw H, whereby the plate I is moved to and from the mold, and a bolt or bolts, U, whereby the distance of the chill-slides from the plate I may be regulated, substantially as described.

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