

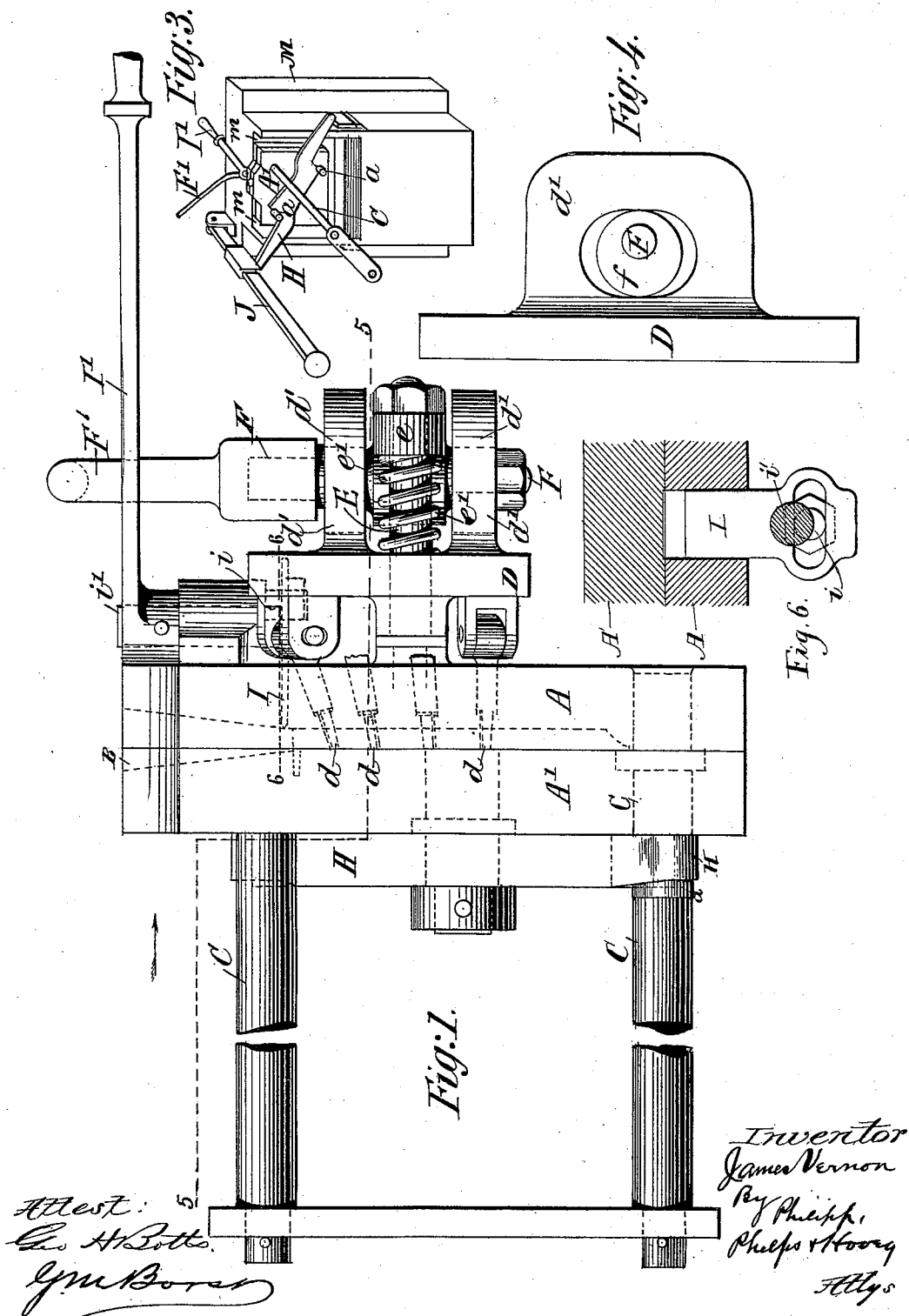
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3 Sheets—Sheet 1.

J. VERNON.
MANUFACTURE OF HORSESHOES.

No. 464,209.

Patented Dec. 1, 1891.



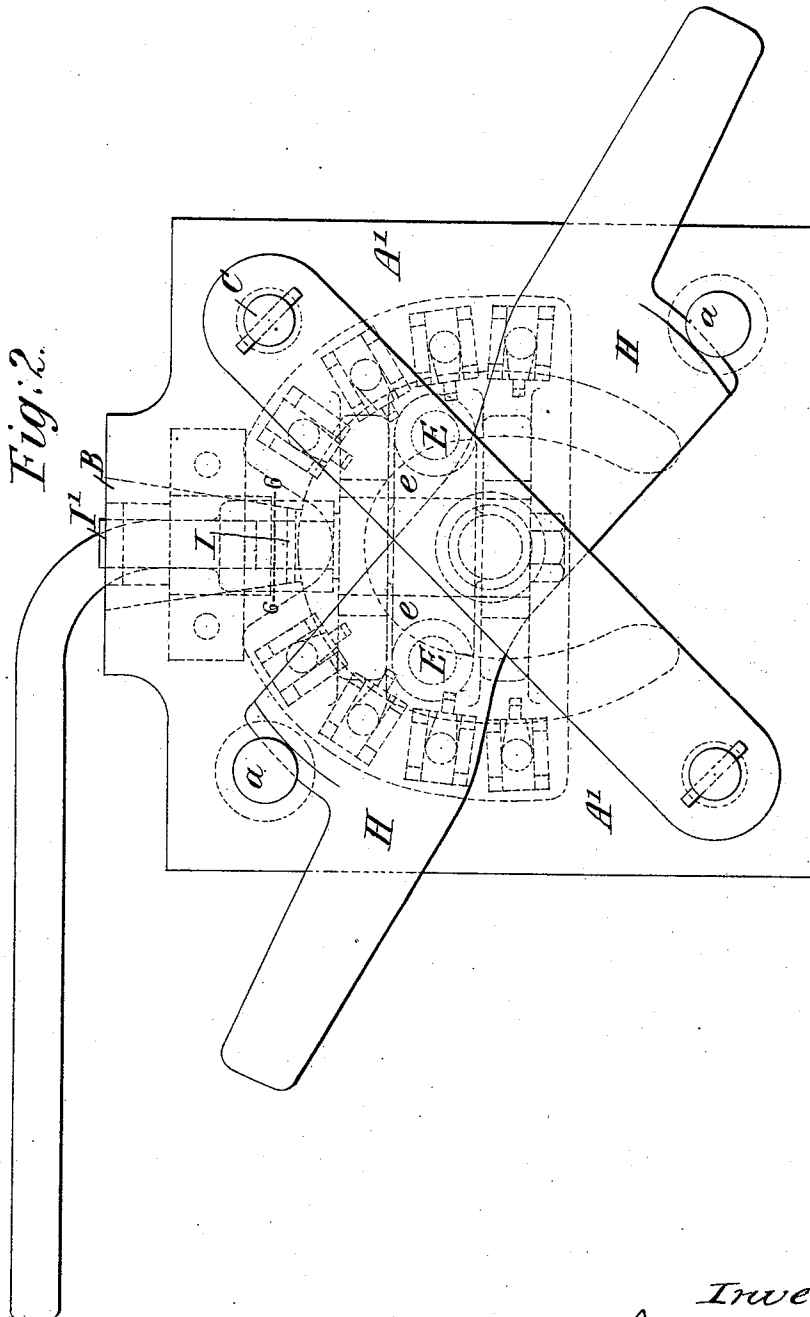
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(No Model.)

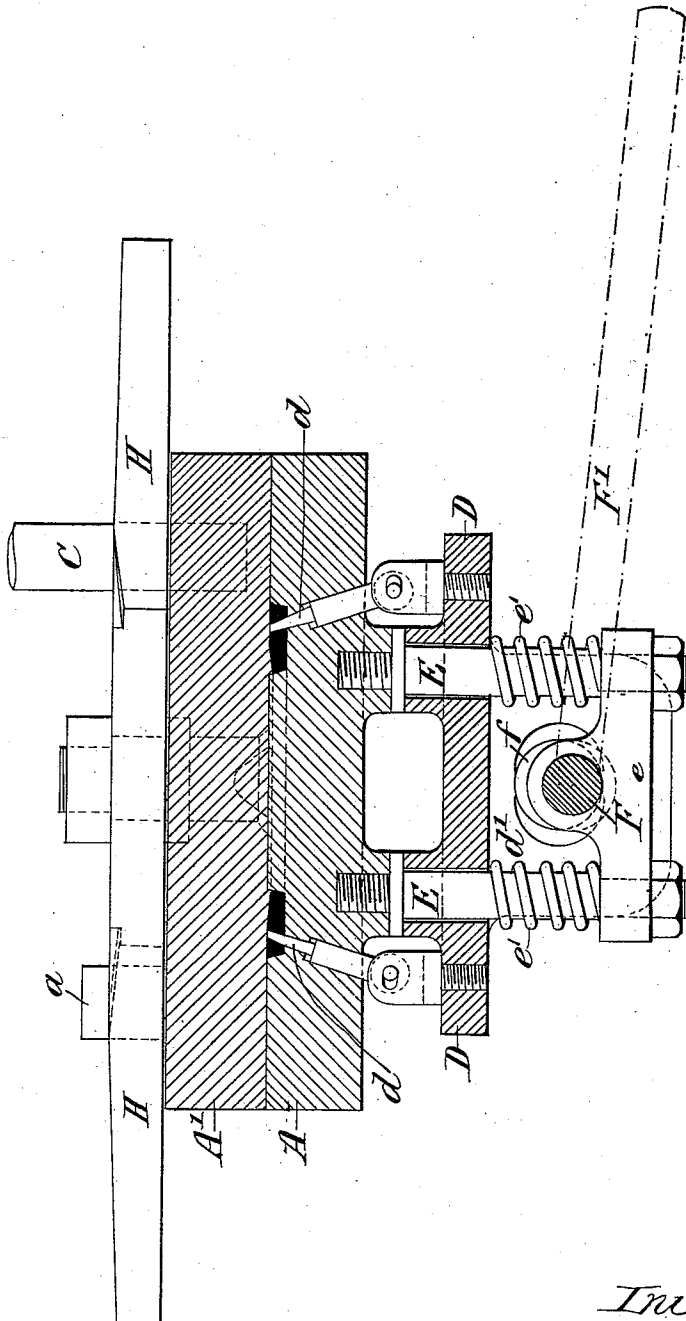
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Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES VERNON, OF NEWTON-STEWART, SCOTLAND.

MANUFACTURE OF HORSESHOES.

SPECIFICATION forming part of Letters Patent No. 464,209, dated December 1, 1891.

Application filed November 18, 1889. Serial No. 330,739. (No model.)

To all whom it may concern:

Be it known that I, JAMES VERNON, of Newton-Stewart, Scotland, have invented certain new and useful Improvements in the Manufacture of Horseshoes, of which the following is a specification.

The object of the present invention is to provide for the manufacture of horseshoes complete in one operation with the view to obviate the necessity of making separately the nail-holes, clips, calkins, or other recesses or projections which may be required.

In carrying out my invention I avail myself of the process of casting and annealing iron and steel, and I employ a mold which will enable me to produce, by casting, a shoe of the form required in a single operation, which may be afterward rendered fit for use by the well-known annealing process.

The mold constructed according to my invention is illustrated in the accompanying drawings, whereof—

Figure 1 is a side elevation, and Fig. 2 an end view, looking in the direction of the arrow, Fig. 1. Fig. 3 is a perspective view of the mold mounted in a block. Fig. 4 is a detail in plan, to be presently described. Fig. 5 is a sectional plan, the section being taken on the line 5 5 of Fig. 1; and Fig. 6 is a detail section on the line 6 6 of Figs. 1 and 2, showing the chisel and operating parts.

The mold or chill is preferably of cast metal, which may be lined with fire-clay, plumbago, or other suitable lining material required. It is of two parts—a stationary back part A and movable front part or cover A'. The back part A is by preference recessed to the form of the casting, and the cover A' is plain, save for the depression for the toe-clips of the shoe and recesses for anti-concussion pads, if used.

Between the two parts of the mold is the runner-hole B for admitting the molten metal.

The stationary or back part A of the mold, which is set in a metal block, as indicated in Fig. 3, or otherwise suitably supported, carries a pair of guide-rods C C' whereon the cover A' slides.

For the purpose of forming the nail-holes the following mechanism is employed: A series of nail-hole cores or plugs *d*, corresponding to the holes to be formed in the shoe, pass through the stationary back part A and

are pivotally mounted on a carrier D, preferably by a slotted pivotal connection to lugs upon the carrier, as shown clearly in Fig. 5. The carrier D slides upon guide-rods E, secured to the back part A, and is normally pressed forward into position with the nail-hole cores within the mold by means of springs *e'* upon the guide-rods E, pressing against the carrier D, and a cross-head *e* upon the outer end of the guide-rods. The carrier D is provided also with lugs *d'*, having slots within which operate cams *f* on the spindle F. (See Figs. 4 and 5.) The spindle F turns in a bearing carried by cross-head *e*, and is provided with a key or lever F' for controlling it. By the movement of the lever F' in one direction the carrier D and cores *d* are retracted against the tension of springs *e'* and the cores withdrawn from the mold. Upon the movement of the lever in the opposite direction the carrier is released and the cores are returned to the position shown in the drawings by springs *e*.

H is a locking-lever pivoted centrally of the cover A' and arranged to engage with the heads of pins *a*, carried by the back part A and passing through the cover A'.

I is a horizontally-sliding chisel carried by the back part A of the chill for cutting off the runner from the casting.

I' is a lever for rotating the vertical shaft *i'*, upon the end of which is the cam *i* for operating the chisel I.

J is a lever which may be pivoted to the mold-support (see Fig. 3) and employed to disengage the locking-lever H when it is desired to open the mold.

In mounting the mold a block M will preferably be employed on which the mold is secured in position to leave a space *m* in the supporting-block, as shown in Fig. 3, in which a heated iron may be introduced for warming the mold before being used.

To cast a shoe of a given size the mold of the proper dimensions is taken and closed, as illustrated. The molten metal poured into the runner-hole B flows all around the nail-hole cores and fills up the mold. Just before the metal sets the chisel I is advanced to strike off the runner above the toe of the shoe. After the metal has set the mold is opened by releasing the locking-lever and withdrawing the

cover. The cores *d* are then drawn back clear of the casting by the plate D and cam-shaft operating the same. The casting will thus be allowed to fall from the mold onto the ground, whence it is removed to the annealing-furnace to be submitted to the toughening process, which will render it fit for use.

By preference a set or sets of molds are arranged in a bench or table in such a way that they may be removed and others substituted when different forms and sizes of shoe are desired to be made.

The back part A of the mold is, as has been described, preferably pierced to permit the passage of a group of cores for the nail-holes; but in some cases the movable cores may be superseded by cores of sand or clay inserted in the mold in the proper positions, after the manner of ordinary cores, and afterward picked out in the usual way. In any case the holes pierced in the mold will form guides for the inclination of the cores, and will thus insure the proper inclination of the nail-holes in the shoe.

By the use of the nail-hole cores having a pivotal connection to the carrier I am enabled to withdraw all the cores from the casting simultaneously. As is well known, the nail-holes in horseshoes are formed at varying inclinations, corresponding with the natural angle of the hoof, which is acute at the toe and less so toward the quarters, the object being to get a good grip of the horn at all points without endangering the quick or sensitive part of the hoof. In machine-made shoes the withdrawal of all the cores at the same moment has heretofore been found impracticable when the cores are set at different angles, which difficulty is avoided by my construction.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination, with a horseshoe-mold having openings for the nail-hole cores, of nail-hole cores set at different angles and a

movable carrier on which the nail-hole cores are loosely mounted independently of each other, substantially as described.

2. The combination, with a horseshoe-mold having openings for the nail-hole cores, of nail-hole cores set at different angles and a movable carrier on which the nail-hole cores are mounted independently of each other by slotted pivotal connections, substantially as described.

3. In a horseshoe-mold, the combination of the stationary back part A, having openings for the nail-hole cores, movable cover A', nail-hole cores *d*, set at different angles, carrier D, on which the cores are loosely mounted independently of each other, and means for advancing and retracting the carrier and cores, substantially as described.

4. In a horseshoe-mold, the combination of the stationary back part A, having openings for the nail-hole cores, movable cover A', nail-hole cores *d*, set at different angles, carrier D, on which all the cores are mounted independently of each other by slotted pivotal connections, guide-rods E, on which the carrier slides, springs *e'* for advancing the cores, and cams *f* and lever F' for retracting the cores, substantially as described.

5. In a horseshoe-mold, the combination of the stationary back part A, having openings for the nail-hole cores, movable cover A', having runner-hole B, nail-hole cores *d*, set at different angles, carrier D, on which all the cores are mounted independently of each other by slotted pivotal connections, guide-rods E, on which the carrier slides, springs *e'* for advancing the cores, cams *f* and lever F' for retracting the cores, chisel I, mounted to slide in said back part A, and means for reciprocating said chisel for cutting off the runner, substantially as described.

JAMES VERNON.

Witnesses:

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