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P. CLIFFORD.

MOLD FOR LACING HOOKS.

APPLICATION FILED APR. 27, 1903.

NO MODEL.

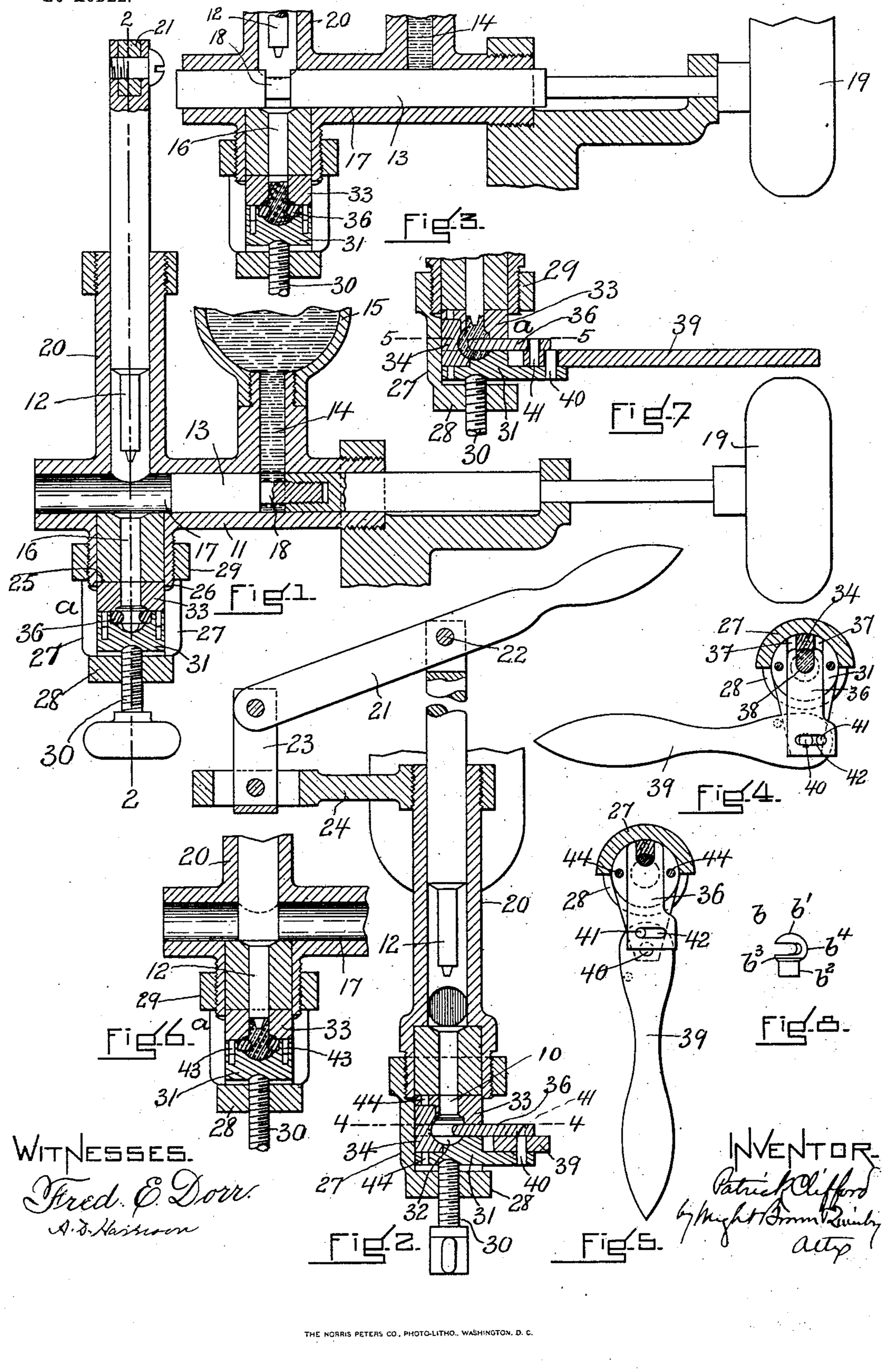

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE.

PATRICK CLIFFORD, OF QUINCY, MASSACHUSETTS.

MOLD FOR LACING-HOOKS.

SPECIFICATION forming part of Letters Patent No. 750,602, dated January 26, 1904.

Application filed April 27, 1903. Serial No. 154,385. (No model.)

To all whom it may concern:

Be it known that I, PATRICK CLIFFORD, of Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Molds for Lacing-Hooks, &c., of which the following is a specification.

This invention has for its chief object to enable small articles, such as lacing-hooks for boots and shoes, to be quickly and economically made by a molding process, so that an article of this character can be produced with the minimum of cost and without the multiplicity of operations and the labor required in producing lacing-hooks as heretofore made.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a vertical sectional view of the chief parts of a molding-machine embodying my invention. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents a view similar to a portion of Fig. 2, showing the mold adjusted to form a lacing-hook. Fig. 4 represents a section on line 4 4 of Fig. 2. Fig. 5 represents a section on line 5 5 of Fig. 7. Fig. 6 represents a view similar to a portion of Fig. 1, showing the shank-forming plunger depressed to complete the shank of the lacing-hook. Fig. 7 represents a view similar to a portion of Fig. 2, showing the mold adjusted as illustrated in Fig. 5. Fig. 8 represents a side view of a molded lacing-hook.

The same reference characters indicate the same parts in all the figures.

In the drawings, *a* represents a matrix adapted to mold a lacing-hook *b* of the form shown in Fig. 8. Said matrix, which is composed of separable sections connected and supported as hereinafter described, is provided with a sprue-hole or inlet 10, which admits molten metal to the forming-cavity of the matrix. 11 represents a supporting frame or structure having means for supporting the matrix *a*, the shank-forming plunger 12, and the matrix-charging plunger 13, all hereinafter described. The frame 11 contains a conduit adapted to conduct molten metal to the sprue-hole of the matrix, said conduit being constructed to coöperate with the charging-plunger 13 in delivering charges of predetermined amount to the matrix, each charge being measured and of sufficient quantity to form one hook without waste or surplus. The said conduit comprises a substantially vertical portion 14, which is preferably the outlet of a reservoir 15 for the molten metal, a substantially vertical portion 16 offset from the portion 14 and registering with the sprue-hole 10, and a substantially horizontal intermediate portion 17, connecting the portions 14 and 16. The charging-plunger 13 is formed to move in and closely fit the interior of the intermediate conduit portion 17 and is provided with a charge-receiving cavity 18, preferably formed by cutting an annular groove in the periphery of the plunger 13. The plunger is movable in the conduit portion 17 so that the cavity 18 may coincide with the conduit portion 14 and receive a charge of molten metal therefrom, as indicated in Fig. 1, and may then be moved until it coincides with the conduit portion 16, as shown in Fig. 3, the charge contained in the cavity 18 being confined therein by the walls of the conduit portion 17 during the movement of the plunger from one position to the other or until the cavity 18 commences to coincide with the conduit portion 16, whereupon the charge falls from the cavity 18 through the conduit portion 16 into the matrix. The plunger 13 may be moved by hand or in any other suitable manner. I have here shown the plunger as provided with a handle 19 adapted to be grasped by the operator.

After the plunger has been moved forward to deliver a charge of metal to the matrix and has been returned to its starting position the shank-forming plunger 12 is depressed, as shown in Fig. 6, the lower end of said plunger being formed to enter and form a cavity in the shank portion of the lacing-hook, so that when the hook hardens it is provided with a shank which is tubular at its outer portion and is therefore adapted to be clenched or upset to attach it to a boot or shoe. The plunger 12 is movable in a guide 20, formed on the supporting-frame, and may be reciprocated

by any suitable means, such as a lever 21, pivoted at 22 to the upper end of the plunger 12 and connected by a link 23 with an arm 24, affixed to the plunger-guide 20.

The matrix *a* is detachably secured to the supporting-frame, so that it may be removed and its sections separated to permit the removal of the molded lacing-hook. The means here shown for detachably securing the matrix in position to receive the molten metal and coöperate with the plunger 12 comprise a seat 25, formed on the lower end of the portion of the frame through which the conduit 16 extends, a flange or shoulder 26, projecting downwardly around said seat, and a cage or holder for the matrix below the seat 25 and flange 26, said holder comprising a curved back portion 27 and a bottom portion 28. The said back portion 27 is preferably formed on an internally-screw-threaded collar or nut 29, which is engaged with an external screw-thread on the supporting-frame. In the bottom portion 28 of the matrix-holder is a clamping device 30, adapted to be forced upwardly against the bottom of the matrix *a* to press the top of the matrix against the seat 25, said device being here shown as a thumb-screw engaged with an internally-threaded orifice formed in the bottom portion 28. The height of the matrix is such that when its upper end is pressed against the seat 25 there is a sufficient space between its lower end and the bottom 28 of the holder to permit the downward movement of the matrix until its upper end is clear from the surrounding flange 26, whereupon the matrix may be moved sidewise out of the holder and its parts separated, this being permitted by the depression of the clamping-screw 30. It will be seen, therefore, that after a hook has been formed in the matrix the latter may be released from the supporting-frame for removal by turning downwardly the screw 30. After the removal of the hook from the matrix the apparatus may be prepared for another operation by inserting the matrix in the holder and turning up the screw 30 until the upper end of the matrix bears firmly on the seat 25. The flange or shoulder 26 properly centers the matrix and insures the alinement of its sprue-hole with the conduit portion 16. The matrix *a* is composed of a plurality of separably-connected sections so formed that the matrix may be dismembered and stripped from the lacing-hook formed therein. The preferred construction of the matrix is as follows: 31 represents the base or bottom section of the matrix, the same being provided with a cavity 32, which forms a portion of the crown b' of the hook. 33 represents the top section of the matrix, which forms the exterior of the shank b^2 and the shouldered base portion b^3 of the head of the hook. 34 represents an intermediate section, which is interposed between the back portions of the sections 31 and 33 and forms the rear portion b^4 of the neck of the lacing-hook. 36 represents a sliding section, which is movable horizontally in guides 37 37, Fig. 4, formed in the base-section 31, and is provided with a U-shaped recess or cavity 38, formed to shape the under side of the head portion b', the inner side of the neck portion b^4, and the top of the shouldered base portion b^3 of the hook. The sliding section 36 is held at the commencement of the molding operation in the position shown in Figs. 2 and 4, said section being then at the outward extreme of its movement. After the charge of molten metal has been inserted in the cavity of the matrix the sliding section 36 is moved inwardly to the position shown in Figs. 3 and 5, the inner end of its cavity 38 being thus moved toward the back matrix-section 34 and caused to impart the desired form to the inner side of the neck, the bottom side of the head, and the top side of the base portion of the hook. The sliding section 36 is moved inwardly and outwardly by means of a lever 39, pivoted at 40 to an ear on the base-section and having a stud 41, which is eccentric to the pivot 40 and enters a slot 42 formed in the sliding section 36. The top section 33 is provided with dowel-pins 43, which enter sockets formed for their reception in the base-section 31. The back or intermediate section 34 is provided at its upper and lower ends with dowel-pins 44, which enter sockets formed in the sections 31 and 33, said sections being recessed for the reception of the intermediate section, as clearly shown in Figs. 2 and 3.

The receptacle 15 or some other suitable part of the apparatus should be heated to keep the metal in a fluid condition until it reaches the matrix.

The portions of the sliding section of the matrix forming the sides of the recess therein fit closely in grooves in the sides of the intermediate or back section and prevent the metal displaced by the inward movement of the sliding section from exuding between the sliding section and the back section.

I claim—

1. A molding-machine comprising a supporting-frame having a conduit, a matrix communicating with said conduit and having a shank-forming portion in line with the conduit, means for measuring and delivering charges of molten metal through said conduit to the matrix, a shank-forming plunger movable into and out of the conduit, and a guide therefor arranged to direct said plunger into the conduit and into the shank-forming portion of the matrix.

2. A molding-machine comprising a supporting-frame having a conduit composed of an upper portion, a lower portion offset from the upper portion and an intermediate connecting portion, means for transferring charges of molten metal from the upper to the lower portion, a matrix communicating with the lower portion, a shank-forming

plunger, and a guide therefor arranged to direct said plunger into the shank-forming portion of the matrix.

3. A molding-machine comprising a supporting-frame having a conduit composed of an upper portion, a lower portion offset from the upper portion, and an intermediate connecting portion, a charge-feeding plunger movable in said intermediate portion, a matrix communicating with the said lower portion, a shank-forming plunger, and a guide therefor arranged to direct the plunger into the shank-forming portion of the matrix.

4. A molding-machine comprising a supporting-frame having a matrix-seat, a conduit extending through said seat, a sectional matrix detachable from said seat and having a shank-forming portion in line with the conduit, means for detachably securing a matrix to said seat, and means for measuring charges of molten metal and feeding the same through the conduit to the matrix.

5. A molding-machine comprising a supporting-frame having a matrix-seat, a conduit extending through said seat, a sectional matrix detachable from said seat and having a shank-forming portion in line with the conduit, means for detachably securing a matrix to said seat, a shank-forming plunger, and a guide therefor arranged to direct said plunger into the conduit and into the shank-forming portion of the matrix.

6. A sectional matrix formed to mold a lacing-hook and comprising a base-section, a top section, an intermediate or back section, and a sliding section, said sections being separably connected.

7. A sectional matrix formed to mold a lacing-hook and comprising a base-section, a top section, an intermediate or back section, and a sliding section, said sections being separably connected and provided with means for operating the sliding section.

8. A molding-machine comprising a supporting-frame having a conduit, a sectional matrix communicating with the conduit and having a shank-forming portion in line with the conduit, and a head-forming portion below the shank-forming portion, means for detachably securing the head-forming portion to the shank-forming portion, and means for measuring charges of molten metal and delivering the same to the conduit.

9. A molding-machine comprising a supporting-frame having a conduit, a sectional matrix communicating with the conduit and having a shank-forming portion in line with the conduit, and a head-forming portion below the shank-forming portion, said head-forming portion having a sliding section movable edgewise into and out of the matrix-cavity.

In testimony whereof I have affixed my signature in presence of two witnesses.

PATRICK CLIFFORD.

Witnesses:

C. F. BROWN,

E. BATCHELDER.