

(No Model.)

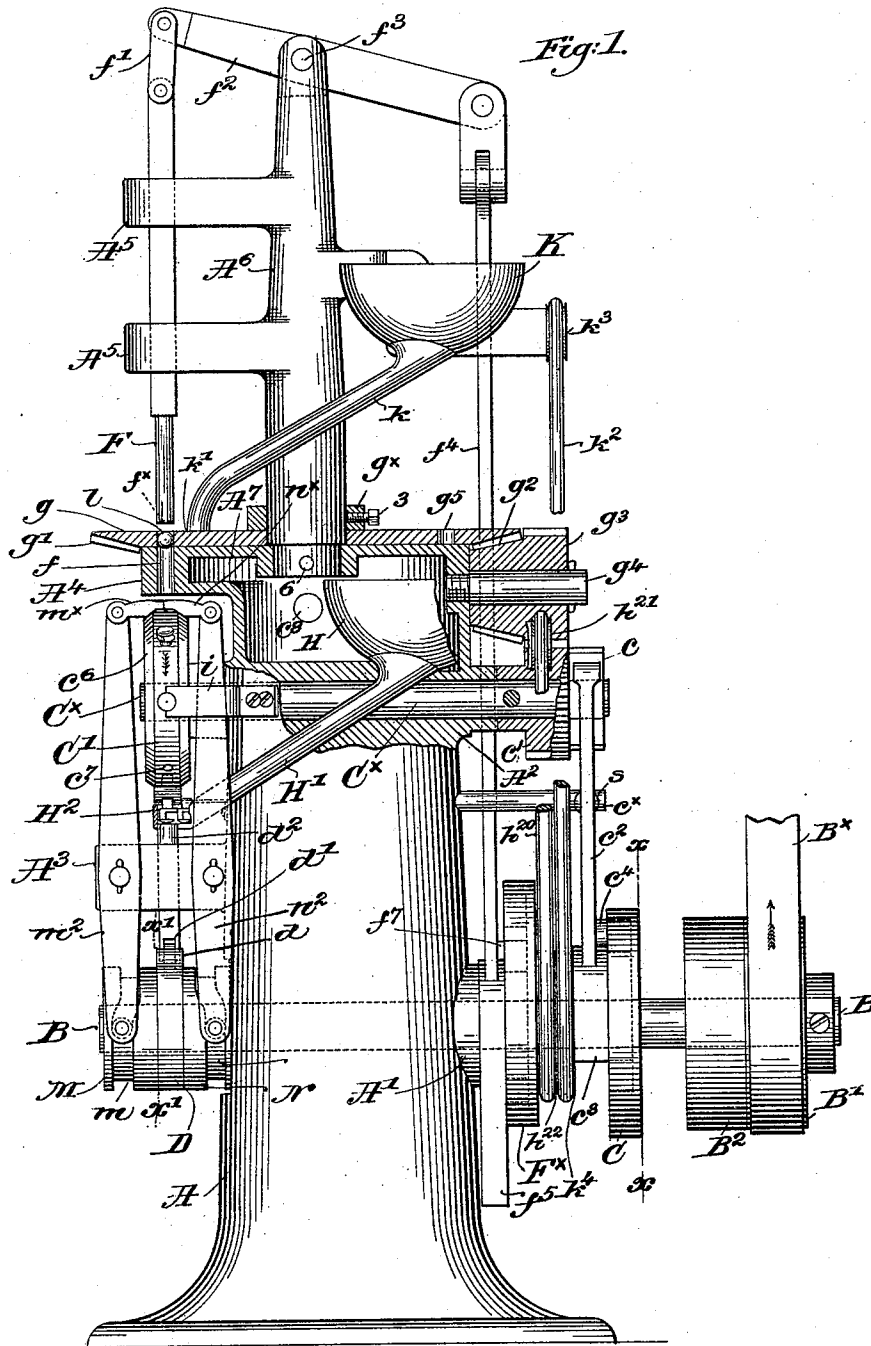
3 Sheets—Sheet 1.

H. H. CUMMINGS.

MACHINE FOR APPLYING PLASTIC MATERIAL TO LACING HOOKS.

No. 538,223.

Patented Apr. 23, 1895



Witnesses:

Edward G. Allen.

Thomas G. Summons.

Inventor.

Henry H. Cummings.
by Crosby & Company Attys

(No Model.)

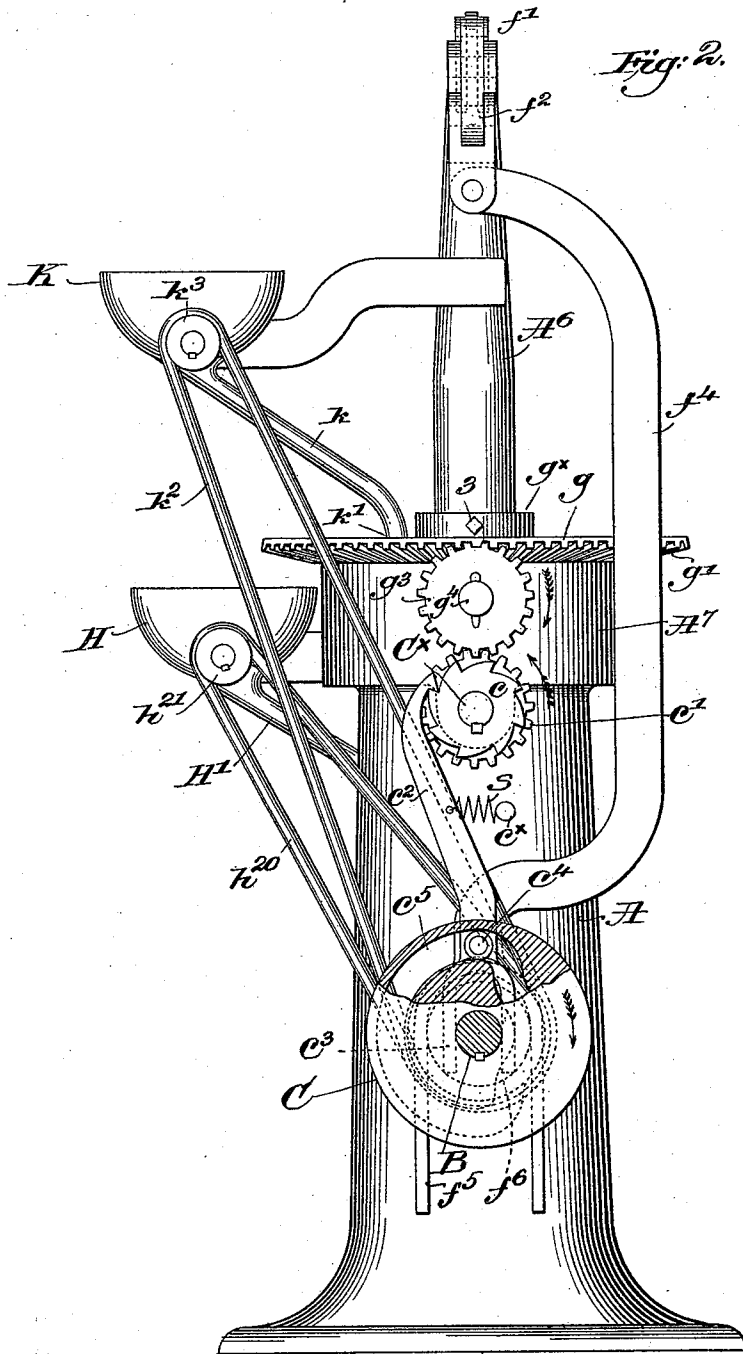
3 Sheets—Sheet 2.

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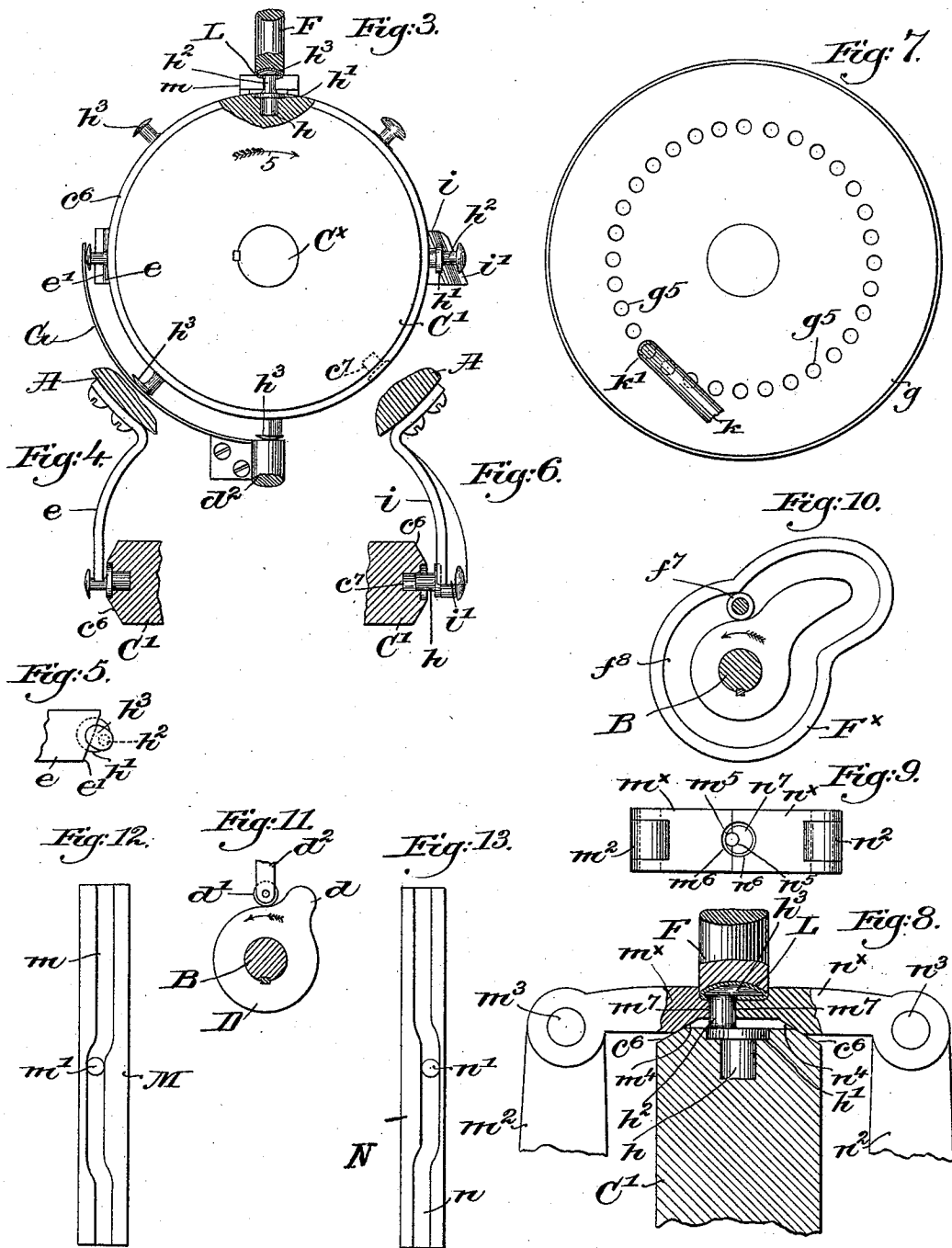
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UNITED STATES PATENT OFFICE.

HENRY H. CUMMINGS, OF MALDEN, MASSACHUSETTS, ASSIGNOR TO THE
REVERSIBLE RIVET COMPANY, OF PORTLAND, MAINE.

MACHINE FOR APPLYING PLASTIC MATERIAL TO LACING-HOOKS.

SPECIFICATION forming part of Letters Patent No. 538,223, dated April 23, 1895.

Application filed February 2, 1895. Serial No. 537,109. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. CUMMINGS, of Malden, county of Middlesex, State of Massachusetts, have invented an Improvement in Machines for Applying Plastic Material to Lacing-Hooks, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention has for its object the production of an apparatus for automatically and expeditiously applying suitable plastic material to lacing hooks, to cover the entire surface of the head therewith, the lacing hooks being preferably fed to an intermittingly movable carrier, which brings them one by one into position to have applied thereto the plastic material, suitable dies being moved into operative position at such point to support the hook and to shape the plastic material as it is pressed into the dies and about the head of the hook. After the material has been so applied the hook is released by the dies, farther movement of the carrier bringing the finished hook into position to be discharged. The plastic material is fed to the dies in such manner that the proper quantity to cover a single head is presented to the action of the dies as one hook after another is moved by the carrier into position to be operated upon.

In accordance therewith my invention consists in various details of construction and arrangement hereinafter to be described and particularly pointed out in the claims.

Figure 1, in side elevation, and partly in section, represents an apparatus embodying my invention, for applying plastic material to lacing hooks. Fig. 2 is a rear elevation of the apparatus shown in Fig. 1, to the left of the line $x-x$, and partially broken out. Fig. 3 is a front elevation, partially broken out, of the intermittingly movable carrier for the lacing hooks, showing the positions of a hook from the time it is operatively engaged by the carrier until it is automatically discharged therefrom completed. Fig. 4 is a detail of a positioning device to turn the heads in the proper direction on the carrier. Fig. 5 is a detail of the outer end of said device. Fig. 6

is a detail of the throw-off for the completed hooks. Fig. 7 is a top or plan view of the perforated plate into which the portions of the plastic material are delivered, to be fed to the shaping and compressing mechanism. Fig. 8 is a detail on an enlarged scale and principally in section, of a hook held in the carrier and with the dies in position to support the neck of the hook and shape the plastic material to the head. Fig. 9 is a top view of the dies in the position shown in Fig. 8. Fig. 10 is a face view of the cam for operating the plunger which co-operates with the dies in applying the plastic material to the head of the hook. Fig. 11 is a sectional detail to the right of the line $x'-x'$, Fig. 1, of one of the cams, to be referred to. Figs. 12 and 13 represent the cams developed which actuate the two parts of the die.

I have herein shown the apparatus as mounted upon a column-like base or stand A, having suitable bearings A' to support the main shaft B provided with usual fast and loose pulleys B', B², respectively, rotation being imparted to said shaft from any suitable source of power, by means of a suitable belt B^x. The base has in its upper portion a bearing A² for a shaft C^x, having fast thereon a ratchet wheel c, and a spur gear c'. The teeth of the ratchet wheel are engaged by one end of a pawl c², forked at its lower end at c³ to embrace or straddle the main shaft B, as shown in full lines Fig. 1, and in full and dotted lines Fig. 2, the said pawl having thereon a suitable roller or other stud c⁴ to enter the groove in a cam C. The shape of the said groove is shown in full and dotted lines in Fig. 2, by means of which the pawl is given a rising and falling movement to rotate the ratchet wheel c intermittingly, the pawl being held in engagement with the teeth of said ratchet by a suitable spring s, shown in Figs. 1 and 2, as secured at one end to a suitable pin c^x inserted in the standard A.

The shaft C is extended through the bearing A² in the standard, and projects therefrom at the front of the machine, and the said shaft has secured thereto on the projecting portion a holder or carrier C', the periphery of which is beveled, as shown at c⁶, Figs. 1, 3, 4, and 6,

for a purpose to be described, the said carrier, clearly shown in said figures having formed therein peripheral recesses c' , shown in Fig. 3 as eight in number, to receive therein the shank h and base h' of the lacing hooks, in such manner that the necks h^2 thereof will project radially from the periphery of the carrier.

A hopper H is suitably mounted upon or adjacent to the standard A, and having therein an agitator of any usual or common construction, to deliver the lacing hooks placed in said hopper in bulk into an inclined chute H', open at its lower or delivery end at H², the agitator delivering the hooks into the chute upside down or with their shanks uppermost, as shown in Fig. 1, the delivery end of the chute being located below and in the same vertical plane with the series of recesses or seats c' in the carrier.

As shown in Fig. 1, the main shaft is extended through the standard, and projects beyond its front side, and it has secured thereto a cam D, see Figs. 1 and 11, the periphery of the cam having a lump d , formed thereon to engage at every revolution a roll d' mounted in the lower end of a pusher d^2 , extended through and vertically reciprocable in a bracket A³, the upper end of the pusher normally entering the lower open end or gate H² of the chute H', to form a movable bottom therefor, the top of the pusher being of suitable size to act upon but one hook at a time.

At each revolution of the cam D, the pusher is quickly raised from the position shown in Fig. 1, by means of the lump d on the cam, into the position shown in Fig. 3, to lift a lacing hook from the delivery end of the chute and push it into the recess c' in the carrier, at that time immediately above it, the shank and base of the hook entering said recess, the intermittent movement of the carrier and the reciprocation of the pusher being timed to cooperate to effect this insertion. As the pusher is raised, it acts as a detent to hold the series of hooks in place in the chute, the outermost hook of the series resting against the pusher, and when the latter is retracted into the position shown in Fig. 1, the weight of the series of hooks will cause them to slide down the chute, and the outermost one will slide into position over the pusher to be inserted into the next recess in the carrier at the next reciprocation of the pusher.

A guard G, see Fig. 3, shown as a curved plate supported concentric to the carrier, has its lower end adjacent the pusher when in its uppermost position, so that in the rotation of the carrier in the direction of the arrow 5, Fig. 3, the heads h^3 of the hooks will be moved over the inner side of the guard and maintained in their respective recesses or seats until they are carried up to or above the horizontal.

It is obvious that while the hooks will be presented shank uppermost to the carrier, they may be so turned axially as to present

their heads improperly to the dies herein to be described, to receive the plastic material, and to insure the correct position of the hooks, I have shown in Figs. 4 and 5, a positioning device consisting of an arm e secured to the standard A, and with its outer beveled end e' in position to bear against the neck h^2 of each stud and to turn it as it is moved by the positioning device, until the hook is in proper position to be capped, this being made possible by the eccentric relation of the neck h^2 to the longitudinal center of the base and shank.

In the rotation of the carrier, the hooks are brought one by one into position beneath a guide-way f in an overhanging portion A⁴ of the standard, through which a sufficient quantity of the plastic material is forced by a reciprocating plunger F. The plunger F is mounted to be moved longitudinally in bearings A⁵ secured to or forming a part of a post A⁶, erected upon the top of the standard A, as clearly shown in Figs. 1 and 2, and held from rotation by any suitable means, as a set screw 6, Fig. 1, the upper end of the plunger being connected by a link f' to one end of a lever f^2 pivoted at f^3 to the post A⁶, and jointed at its other end to a link f^4 , forked or slotted at its outer end, as at f^5 , to embrace a collar or annular enlargement f^6 on the main shaft. The said link is provided with a suitable roller or other stud f^7 , Figs. 1 and 10, to enter the irregular groove f^8 of a cam F^x, secured to and rotated by the main shaft, the shape of the groove in the cam being such that the plunger will be gradually lowered to enter the guide-way f and carry in advance of it the portion of plastic material which is to cover the head of the hook then in position beneath said guide-way.

Peripherally grooved cams M and N are secured to the main shaft at opposite sides of the cam D, as shown in Fig. 1, the grooves m and n , respectively, of said cams being entered by suitable rolls or studs m' , n' , on levers m^2 , n^2 , fulcrumed on the bracket A³, the upper ends of the said levers having pivoted thereto at m^3 and n^3 , dies m^x and n^x , shown best in Figs. 8 and 9, which are moved toward and away from each other by the rotation of the cams M and N. Each die is cut away on its under side and beveled as at m^4 , n^4 , respectively, to slide over the beveled portions c^6 of the periphery of the carrier, as they are moved toward and away from each other for a purpose to be described. The dies are separated in such manner that substantially the outer half of the neck h^2 of the hook will enter the recess m^5 in the die m^x . The top of the die is recessed at m^6 , Fig. 9, to receive the plunger, and the bottom of the said recess is shaped at m^7 , Fig. 8, to receive the back of the head h^3 of the hook, and leave a space between it and the recess to receive the plastic material. The die n^x is recessed at n^5 to embrace the other or inner half of the neck of the hook, and it is also recessed at n^6 to receive the plunger, the bottom of the recess being so shaped at n^7 to

extend beneath the remaining portion of the head and leave a space for the reception of the plastic material. When the dies are closed upon a hook, as shown in Fig. 8, the neck h^2 will be surrounded and laterally supported by said dies, and the bottoms m^7 and n^7 of the recesses m^6 and n^6 , will form a continuous space underneath the head h^3 , into which the plastic material L will be pressed when the plunger F has entered the spaces m^6 , n^6 , in the two dies, the end of the plunger being concaved at f^x to conform to the shape of the top of the head, and leave sufficient space for the proper thickness of the material L therethrough.

It will be readily observed from the foregoing and more particularly from an inspection of Fig. 8, that when the plunger F descends, carrying before it the proper amount of plastic material, the latter will be forced into the spaces surrounding the head h^3 of the hook, and, as a consequence, the entire head will be covered with the plastic material, the slight seam or ridge formed by the junction of the dies m^x and n^x , being preferably so located that said seams will be as short as possible, and the covering is practically homogeneous and continuous. The plunger is lifted thereafter by the continued rotation of the cam F^x , and then the movement of the cams M and N will separate the dies, so that the capped hook may be moved along by the carrier, and a new one brought into position to be capped.

Inasmuch as the depression n^7 in the die n^x is shown greater than a semi circle, it is obvious that the die cannot be moved laterally and directly away from the head of the hook, but it must drop, as it were, out of the horizontal plane of the head as it is moved laterally, and this dropping motion is herein provided for by the beveled periphery c^6 of the carrier and the beveled under sides n^4 of the die, the result being such that the die is lowered as it is thrown laterally away, the lowering being sufficient to carry it away from engagement by the head of the hook, and this is also true, although in a less degree, of the die m^x .

I have herein shown a convenient and effective feeding apparatus for feeding predetermined quantities of the plastic material into position beneath the plunger F, the feeding apparatus consisting mainly of a plate or disk g , rotatably mounted on the base of the post A^6 , and resting upon the top of the standard, a collar g^x secured in place by a set screw 3 on the post, preventing the plate from rising, and maintaining the bevel gear teeth g' upon the under side of the plate in engagement with the teeth of the bevel gear g^2 , herein shown as forming a part of the spur gear g^3 , rotatably mounted on a short stud g^4 , and in engagement with the toothed gear c' . The feed plate g has a series of perforations g^5 therein, arranged in a circle, see Fig. 7, having such a diameter that said perforations one after another will be brought over and to register with the guide-way f in the overhanging

portion A^4 of the standard, so that the plunger F can descend through such perforation and into the guide-way.

The top of the standard has preferably formed therein a heating chamber A^7 , see Fig. 1, into which steam or other suitable heating medium may be introduced by means of an opening c^8 , such medium heating the top of the standard, which, as clearly shown in Fig. 1, forms a bottom for all of the perforations g^5 in the feed plate, except that one which at any time is over the guide-way f , and as the pellets or portions of plastic material are delivered to the perforations, as will be described, they are, by the rotation of the feed plate g , moved around and over the heated top of the standard to soften and render pliable or plastic the same by the time they are presented to the action of the plunger F.

A hopper K is shown as mounted on the post A^6 , and provided with a delivery chute k , which conveys the pellets of plastic material from the hopper to the feed plate g , the delivery end k' of the hopper resting upon the surface of the plate over the line of perforations, and just beyond the path of the plunger, so that the pellets will be carried in a path nearly equal in extent to the entire circle so as to afford ample time for them to be softened and rendered plastic.

Any suitable agitator may be mounted in the hopper K to separate and deliver the pellets to the chute k , one of said pellets being shown at l in Fig. 1 in position to be acted upon by the plunger F. The agitator may be driven by a belt k^2 passed over the agitator pulley or sheave k^3 , and around a suitable sheave k^4 on the main shaft, while the agitator for the hook-receiving hopper H may be conveniently actuated by a belt or band h^{20} passed around the agitator sheave h^{21} and sheave h^{22} on the main shaft.

After the hooks have been capped, it is desirable to positively remove them from the carrier, as the recesses c^7 therein are preferably made of suitable size to assist in holding the hooks in place by friction, and to discharge the capped hooks I have provided a simple form of throw-off, shown as a plate i secured to the standard and best shown in Figs. 1, 3 and 6, the plate being bent or inclined at its outer end, as at i' , with relation to the periphery of the carrier C' , so that as the latter rotates, the innermost end of the inclined part i' of the throw-off will project beneath the head of the hook, and as the movement of the carrier continues, the inclination of the throw-off at i' will gradually draw the capped hook out of the recess in the carrier and release it therefrom, the hooks being received in any suitable box or other receptacle not shown.

As shown best in Figs. 12 and 13, wherein the cam grooves m and n are developed, the groove n is arranged to move its die n^x into operative position slightly in advance of the die m^x , in order that if the positioning de-

vice has not accurately positioned the hook, the said die n^* will complete the proper positioning thereof before the die m^* is brought up into full operative position, and in the movement of the dies into operative position, they are moved inwardly and upwardly in reversal of their downward and outward movement hereinbefore described, after the head has been capped or covered, such movement being attained by means of the beveled under portions of the dies and the beveled periphery of the carrier.

By the apparatus herein described, lacing hooks having a strong neck may be rapidly and effectively treated to completely cover their heads with plastic material, the whole operation from beginning to end being entirely automatic, so that a great saving in time and labor is thereby attained.

In operating with hooks such as herein shown, there is no occasion for supporting the head thereof during the operation of covering the same, as the necks of the hooks are sufficiently stiff and rigid to support their heads.

The depth of the base seat in the holder or carrier regulates the thickness of the material under the head of the hook.

It is of course most desirable to feed the plastic material in pellets or portions of predetermined size, as the rapidity of operation is thereby greatly enhanced, but it will be obvious that if desired, a sheet of the material, properly warmed to render it plastic, might be presented beneath the plunger F, the plunger punching out from the sheet a pellet or portion thereof at each descent, sufficient to cover the head of the hook, and such a modification of my invention will be obvious.

My invention is not restricted accordingly to the construction and arrangement of parts herein shown, as it is obvious that modifications may be made therein, or that some of the parts may be re-arranged without departing from the spirit and scope of this invention; nor is the invention restricted to the precise construction of lacing hook herein shown, for by suitable changes in the various operative parts of the apparatus to conform to changes in the shape of the hook, other forms might be used, so long as the neck of the hook is of sufficient strength to support the head while the plastic material is applied thereto.

I claim—

1. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly movable carrier to receive the hooks, the heads whereof are to be covered; dies movable toward the exposed heads of the hooks as they are presented singly thereto by the carrier to surround and leave a space about the hook head; and a reciprocating plunger to apply a portion of plastic material to and to press it around the head within the dies, substantially as described.

2. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly rotatable carrier having peripheral seats to receive the hooks, the heads whereof are to be covered, a pusher to push the hooks into the said seats leaving their heads exposed, a reciprocating plunger, and co-operating dies movable toward the exposed heads of the hooks as they are presented singly thereto by the carrier to form an inclosed space about the head of the hook and to compress plastic material into said space to cover the head, substantially as described.

3. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—a hopper to contain the hooks, an intermittingly movable carrier to receive the hooks therefrom one by one and hold them with their heads exposed, dies, and a co-operating plunger to form an inclosed space about the head of each hook in turn to be filled by plastic material forced thereto by the plunger, substantially as described.

4. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—a hopper to contain the hooks, a chute leading therefrom and having an open delivery end adjacent the periphery of the carrier, an intermittingly rotatable carrier having peripheral seats to receive the hooks, the heads whereof are to be covered, a pusher to push the endmost hook from the delivery end of the chute and into a seat in the carrier, and means to actuate the pusher while the carrier is at rest, substantially as described.

5. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly movable carrier to receive the hooks, the heads whereof are to be covered, a plunger reciprocable in a path normal to the hook-sustaining portion of the carrier, dies movable toward the exposed heads of the hooks as they are presented singly by the carrier beneath the plunger, and a guide-way between the dies and the plunger, through which a portion of plastic material may be impelled by the plunger to be forced into the dies and cover the head of the hook, substantially as described.

6. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly rotatable carrier having a series of peripheral seats to receive the hooks, the heads whereof are to be covered, a pusher at the under side of the carrier to insert the hooks singly in the peripheral seats, and a guard concentric to said carrier to positively maintain the hooks in the carrier, substantially as described.

7. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly rotatable carrier having a series of peripheral seats to receive the hooks, the heads whereof are to be covered, a pusher at the under side of the car-

rier to insert the hooks singly in the peripheral seats, co-operating dies, and a plunger to surround and form an inclosed space about each hook head as it is presented singly by the rotation of the carrier, and a positioning device intermediate the pusher and dies to properly present the heads of the hooks to the dies, substantially as described.

8. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly rotatable carrier having a series of peripheral seats to receive the hooks, the heads whereof are to be covered, a pusher at the underside of the carrier to insert the hooks singly in the peripheral seats, a guard concentric to said carrier to positively maintain the hooks in the carrier, and a positioning device to turn the heads of the hooks in the same direction, substantially as described.

9. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly rotatable carrier having a beveled periphery, and a series of hook-receiving seats therein, dies movable toward each other to surround the head of one hook after another when presented thereto by the carrier, the under sides of the dies being beveled to rest upon and move over the beveled periphery of the carrier, and actuators for and to which the dies are pivoted, whereby the dies have a combined longitudinal and vertical movement to clear the head of the hook, substantially as described.

10. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—a carrier having a seat therein to receive the shank and base of a hook, and beveled at opposite sides of the seat, separable dies to surround and laterally support the neck of the hook, and recessed to extend beneath the hook head, the under sides of the dies being beveled to rest upon the beveled portions of the carrier, and means to move the dies laterally toward and from each other, the beveled portions of the dies and carrier co-operating to raise or lower the dies toward or away from the head of the hook, substantially as described.

11. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly rotatable carrier having a series of peripheral hook-receiving seats therein, means to insert hooks thereinto with their heads exposed, co-operating dies, and a plunger to form a space about the head of one hook after another and to press plastic material thereinto and cover the head, a positioning device to properly present the heads of the hooks to the action of the dies, and a throw-off to automatically remove the covered hooks from the carrier, substantially as described.

12. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly movable carrier to receive the hooks, the heads whereof

are to be covered, dies movable toward the exposed heads of the hooks as they are presented singly thereto by the carrier to surround and leave a space about the hook head, a reciprocating plunger, a guide-way intermediate it and the dies, and means to feed to the plunger portions of plastic material to be impelled thereby through the guide-way, and into the dies to cover the head of the hook surrounded thereby, substantially as described.

13. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly movable carrier to receive the hooks, the heads whereof are to be covered, dies movable toward the exposed heads of the hooks as they are presented singly thereto by the carrier to surround the hook head, a rotatable feed plate having a circular series of perforations therein, a heated support upon which said plate is rotated, and which forms a bottom for the series of holes therein, a guide-way between the dies and feed plate, and adapted to register with one of the holes therein at a time, a reciprocating plunger to pass through the guide-way and the registering hole in the feed plate, to co-operate with the dies and to force thereinto the plastic material previously held in the hole in the feed plate, and means to deliver portions of plastic material to the feed plate beyond the plunger, substantially as described.

14. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—an intermittingly rotatable carrier to receive the hooks, the heads whereof are to be covered, co-operating dies to surround the exposed heads of the hooks when presented singly thereto by the carrier, a heated chamber, an intermittingly rotatable plate mounted thereon and provided with a circular series of perforations, a guide-way intermediate the periphery of the carrier and the perforated plate to convey from the latter pellets of plastic material and present them to the dies, a hopper to deliver pellets of plastic material to the perforated plate, and a plunger to finally close the space about the head of the hook and force the plastic material around it, substantially as described.

15. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—a holder having a seat therein to receive and support the shank and base of a hook, separable dies to surround and laterally support the neck of the hook, and recessed to extend beneath and out of contact with the hook head and leave an uninterrupted space thereunder, and means to force plastic material into the dies and about the head of the hook, substantially as described.

16. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—a holder having a seat therein to receive and support the shank and base of the hook, with the head and neck of the hook projecting therefrom, dies to surround the

neck and head and to leave an uninterrupted space about and beneath the head, the depth of the seat for the hook base regulating the thickness of plastic material to be inserted
5 between the dies and bottom of the hook head, and means to force such material into the dies to cover the head, substantially as described.

10 17. In an apparatus for applying plastic material to lacing hooks, the following instrumentalities, viz:—a holder having a seat therein to receive and support the shank and base of the hook, with the neck and head thereof exposed, separable dies to surround and later-

ally support the neck of the hook, and re- 15
cessed to extend beneath and out of contact with the hook head, and means to move the dies laterally toward and from each other, and to raise or lower them toward or away from the hook head, substantially as described. 20

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY H. CUMMINGS.

Witnesses:

JOHN C. EDWARDS,
AUGUSTA E. DEAN.