

(No Model.)

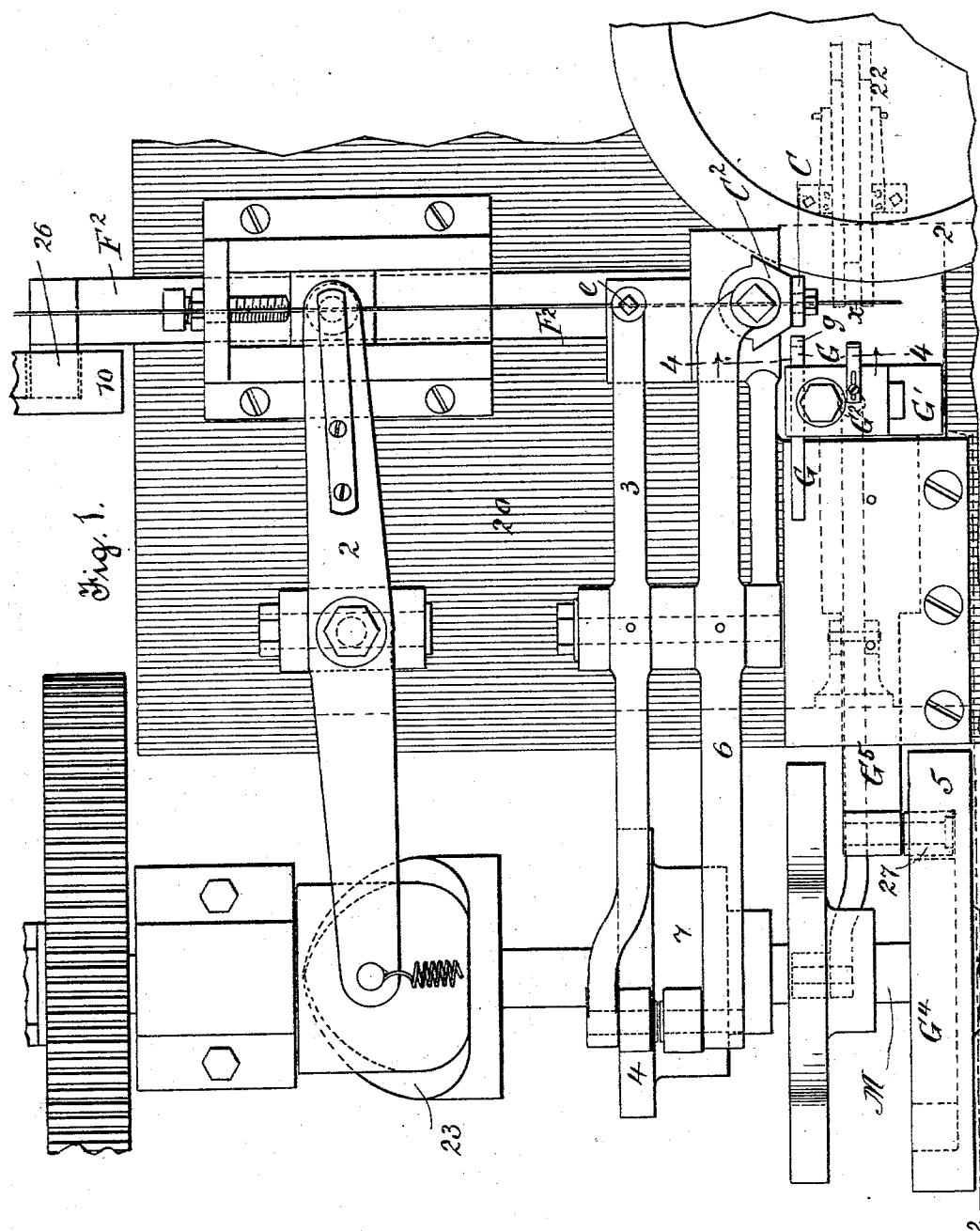
3 Sheets—Sheet 1.

F. B. MANVILLE.

MACHINE FOR FORMING LOOPS IN ENDS OF WIRE.

No. 551,335.

Patented Dec. 10, 1895.



Witnesses

H. J. Clemons
Wm. H. Chapin

Inventor,

Frank B. Manville
by Chapin & Co
Attys.

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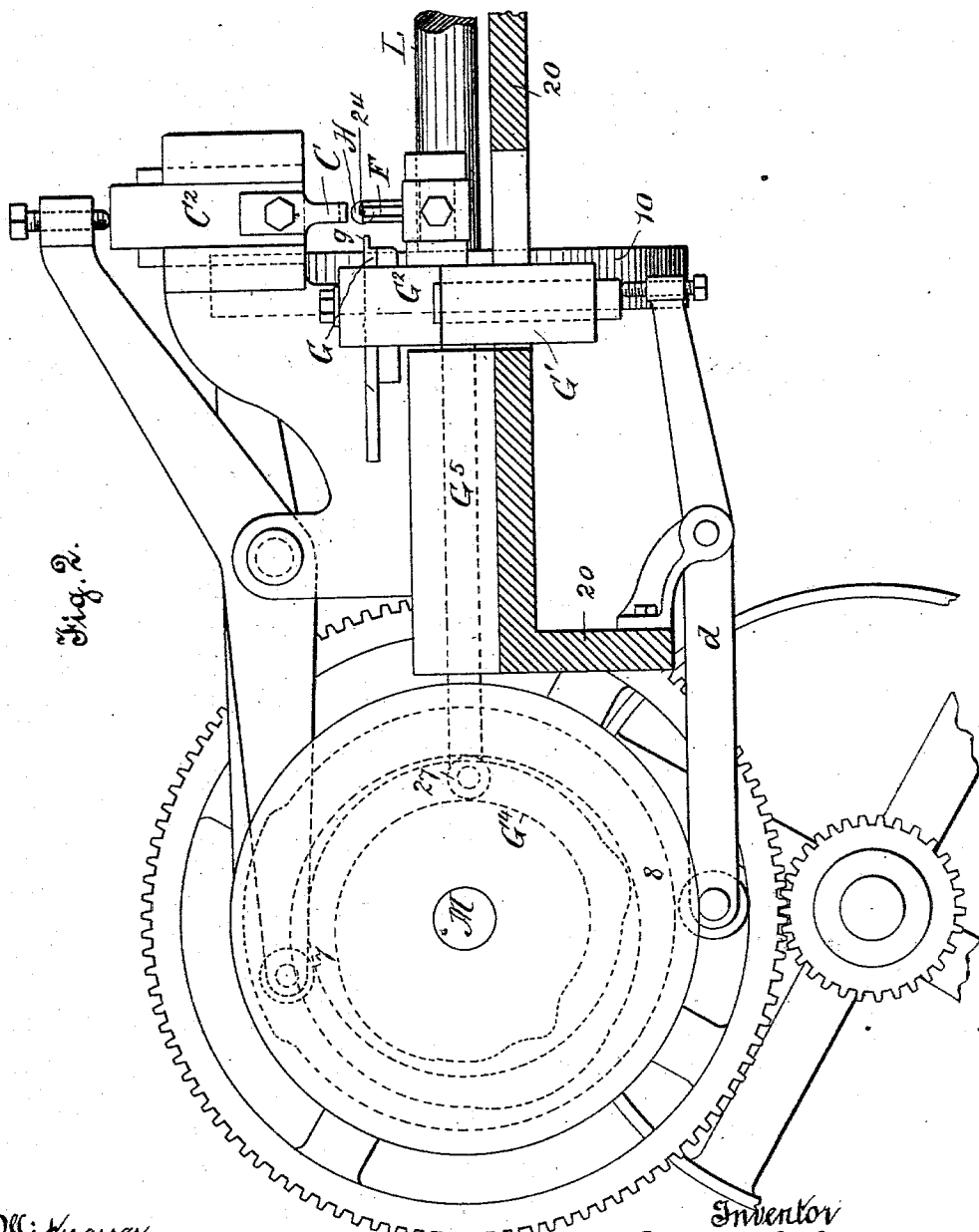
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H. J. Clemons
Wm. H. Chapin

Inventor
Frank B. Manville,
by Chapin & Co. Attys.

(No Model.)

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Fig. 8.

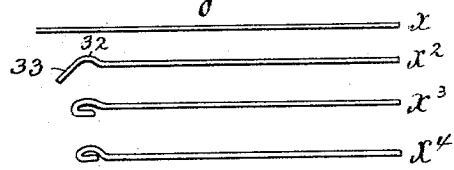


Fig. 3.

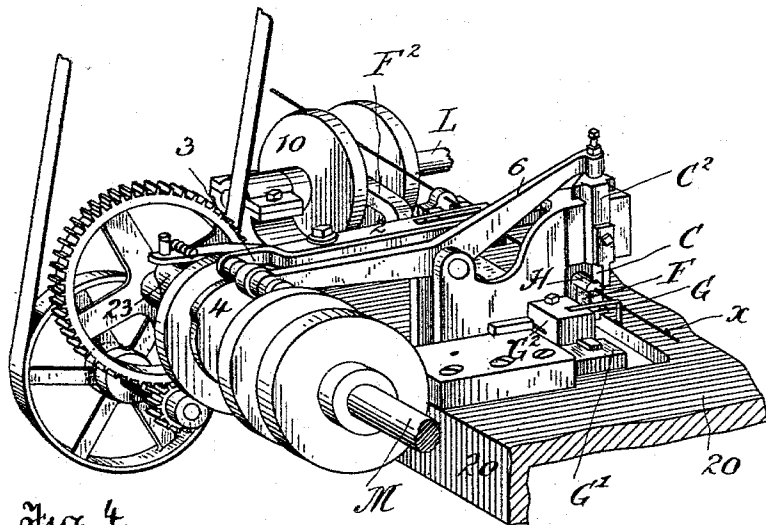


Fig. 4.

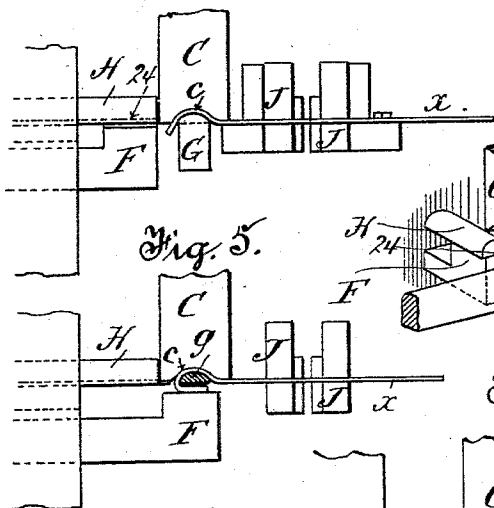


Fig. 5.

Fig. 7.

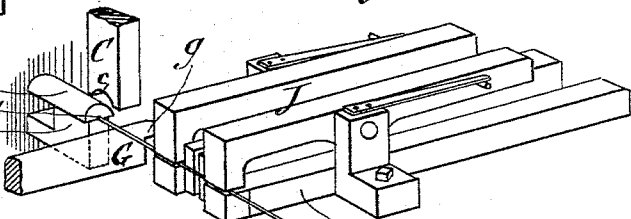
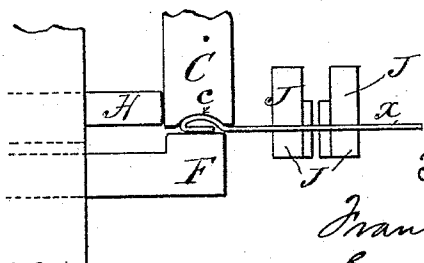


Fig. 6.



Witnesses,
H. J. Clemons
Wm. H. Chapin

Inventor
Frank B. Manville
by Chapin & Co.
Attorneys

UNITED STATES PATENT OFFICE.

FRANK B. MANVILLE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO
THE GOLDEN SPRING HOOK AND EYE COMPANY, OF SPRINGFIELD,
MASSACHUSETTS.

MACHINE FOR FORMING LOOPS IN ENDS OF WIRE.

SPECIFICATION forming part of Letters Patent No. 551,335, dated December 10, 1895.

Application filed April 25, 1895. Serial No. 547,105. (No model.)

To all whom it may concern:

Be it known that I, FRANK B. MANVILLE, a citizen of the United States of America, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Machines for Forming Loops in the Ends of Wires, of which the following is a specification.

This invention relates to improvements in machines for forming a loop in the end of a length of wire, the wire being intermittently fed to the loop-forming mechanism and having lengths thereof cut off from the supply.

The machine of the present invention embodies, as to all of its equipments, (although the invention is not necessarily to be limited to the use at once of all thereof,) means or instrumentalities, viz: for feeding the wire forward intermittently; a device operating forward of the rear extremity of the forwardly-fed wire for taking and gripping the wire, and which gripping device is on a turn-table or turret; a device for confining the wire to the rear of the portion which has been forwardly projected and which is to be cut off; a former and a plunger die coacting therewith, by means of which the wire near its extremity is given a bowed form and its end adjacent the bow is angularly deflected, the plunger-die moreover serving as a shear for cutting off the forwardly-fed length of wire, the end of which is to receive the loop; a mechanism for imparting to the angularly-deflected extremity of the wire a return-bend under the bow-formed portion, thereby producing the loop, and means for flattening the loop.

The improved mechanisms are applicable on machines for making garment-hooks of the kind substantially such as shown in Letters Patent to C. J. Brosnan, dated July 11, 1893, No. 501,320, these hooks being susceptible of production on a garment-hook machine which is in part of known construction, but which has in addition to the usual mechanisms the present novel mechanisms for making the loop or "hump," the forming of the hump being the initial operation.

The invention is hereinafter fully described and explained and set forth in the claims.

Reference is to be had to the accompanying drawings, in which the improvements are illustrated.

Figure 1 is a plan view of so much of a garment-hook machine as comprises the present improved mechanisms. Fig. 2 is a sectional elevation of Fig. 1, the line of section being taken about on line 2 2 of Fig. 1. Fig. 3 is a perspective view comprising the novel mechanism. Figs. 4, 5, and 6 are views substantially in elevation and somewhat in the nature of diagrams illustrating the relations of the parts which shear off the wire and form the loop, different stages of the operation being illustrated, and in these views the grippers which take the wire as it is forwardly fed and which are understood as being mounted for bodily-traveling movements are shown as comprised in the right-hand portions of these views. These views are such as would be seen looking to the right from the line 4 4, Fig. 1. Fig. 7 is a perspective view showing the parts comprised in said Figs. 4, 5, and 6. Fig. 8 illustrates the wire as in the various stages of the loop-ending thereof to be hereinafter particularly referred to.

Similar characters of reference indicate corresponding parts in all of the views.

The machine embodies a suitable frame or table 20, and has rotating thereon a turn-table 22, a portion of which is seen in Fig. 1, and on which a series of automatically-operating vises or grippers are understood as mounted, one set of which grippers is shown at J in Fig. 7. These grippers receive the length of wire *x*, which is fed thereto and holds it while the suitable length is cut off and the loop is formed in its one end. As common in hook-machines, these grippers are moved on and by the turn-table to carry the wire successively to the other mechanisms which transform it into the completed hook.

A suitable wire-feed motion is provided, the same not involving novelty, and is actuated and controlled by the lever 2 and the cam 23. The wire is fed between a wire-guide constituted by the horizontally-ranging parts H and F, the flat faces of which are contiguous and which have the groove 24, as indicated in Figs. 2 and 7. The said part H is

stationary and is supported by a suitable standard therefor. The said part F, which also constitutes a part of the wire-guide, is formed of hardened steel and has its end perpendicular to constitute a shear-face, with which the plunger-die C coacts. Said part F is a slide, and it stands normally in a reeced position (seen in Figs 4 and 7)—that is, with its end flush with (or it may be slightly outside of) the end face of the stationary wire-guide bar II. Reciprocatory movements, as hereinafter specified, are imparted to said slide F horizontally and longitudinally by means of its extension-bar F², which extends in suitable ways therefor across the machine under the wire-feed, and has by the cam-roll 26 an engagement with a cam-groove in the rotary cam-wheel 10, which is mounted on the shaft L, Figs. 2 and 3.

The part G, herein termed the "former" or "former-die," consists of a bar which is rigidly supported on a slide-block G², which is mounted for a slight degree of vertical movement in a primary slide G', the cam-roll 27 on the extension member G³ of which is in operative engagement with the cam G⁴ on the cam-shaft M. The secondary slide G², on which the former is directly mounted, derives at the proper instant its vertical movement through means of the cam-lever *l* and the cam 8 on shaft M. The upper edge of the former is convex, the convexity more or less nearly approaching in degree a semicircle, and as seen in Figs. 2, 3, and 7, its end is of step form, whereby the nose *g*, having a thickness and cross-sectional contour approximately corresponding to the loop to be formed in the end of the wire, is produced.

The plunger-die C is carried at the lower end of the vertical slide C², and it has its face at its inner edge in the plane of the end of the aforesaid slide-bar F when the latter is in its reeced position, so as to have a shearing action relative thereto, as is clear on reference to Fig. 4. The lower end of the plunger-die C is constructed with the concavity *c* to more or less nearly conform to the arching surface of the top of the former G. The vertical reciprocatory movement of the plunger-die C² is imparted by the lever 6 and actuating-cam 7.

A device for clamping the wire at a place to the rear of the forwardly-fed portion is provided, the same consisting of a plunger-finger *e*, which is carried at the extremity of the lever 3, which is operated by the cam 4. This confining device is for the purpose of holding the wire while the feed-jaws retrace in readiness to impart the forward "hitch." This confining device, as well as the wire-feed motion, embodies no novelty, and is not claimed herein.

Of course it is understood that the cams are so designed, graded, mounted, and timed, the one relative to another, that the actions of the machine which will be next described will duly ensue in the proper succession.

Mode of operation: The wire from the coil is fed to the jaws of the wire-holding device J on the turn-table and the sufficient length having been so forwardly fed the clamping device *e* 3 4, at the rear, operates to hold the wire temporarily against any movement. The former G is now moved forward to its full extent and the plunger-die C descends, shears off the wire, and the former is now given its upward movement, carrying the wire within the depression *c* in the bottom of the plunger-die, (see Fig. 4,) whereby the end of the wire has imparted to it the bowed form 32 and the angularly deflected extremity 33, as seen in the section x^2 of Fig. 8. The plunger-die has, by a very slight depression in its operating-cam, a slackening of its pressure against the former G and the interposed wire, whereby the former is permitted to be freely withdrawn, but only partially back to its normal position, whereby its nose *g* is brought under the die C, and this brings the recess or right angular space under the nose of the former opposite the slide F. Said slide F now moves forward under the nose, imparting the return-bend to the deflected portion 33 of the wire whereby such portion of the wire lies under the nose of the former, around which it is, by the slide, wrapped. (See Fig. 5 and the section x^3 of Fig. 8.) The former *g* is now fully returned to its normal position, its nose being withdrawn from within the loop and from its interposition between the plunger and the top of slide F, and the plunger-die is given a further descending movement, flattening the loop between it and the slide F, and bringing it to the condition or formation seen in Fig. 6 and in the section x^4 of Fig. 8.

It will be explained that the maximum extension of the former under the plunger-die is imparted in order to bring the thickest and strongest portion of the former under the plunger to withstand the initial wire-bending operation, as this is much preferable to attempting to perform this operation by the nose portion *g*, which is not so rigid or strong and which would, in all probability, soon become broken off.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for forming a loop in the end of a wire, in combination, a former having a convex surface over which the wire is brought, a slide-bar having its location normally at one side of, and movable under a portion of, the former, a plunger die movable toward and away from the former, and also coacting as a shear with the end of the said slide-bar, and means for operating the plunger and for imparting the reciprocatory movements to the said slide-bar, substantially as and for the purpose set forth.

2. In a machine for forming a loop in the end of a wire, in combination, a vertically movable plunger-die, a former-die consisting of a bar having a convex upper surface over which the wire is brought and movable hori-

zontally to be projected under and away from under the plunger-die, a slide-bar having its location normally at one side of, and movable under a portion of, the projected former and having its end when in its normal position so located as to be coacted with, shear-like, by the plunger-die, means for causing the projected movement of the former under the plunger, means for effecting the descent of the plunger, means for effecting the step-by-step withdrawal of the former from under the plunger, means for effecting the projection of the slide-bar under the plunger, and means for imparting a final further approached movement of the plunger toward the underlying portion of the slide-bar, substantially as described.

3. In a machine of the character described in combination, wire-guides comprising a stationary bar and a slide bar, F, having their contiguous surfaces grooved for the passage therethrough of the wire, and the end of the slide bar constituting a shear member, a former arranged adjacent, and transversely of the length of, said wire-guides, across which the wire is fed, and a plunger-die movable toward and away from the former and sidewise coacting as a shear with the end of said slide-bar F, substantially as described.

4. In a machine of the character described in combination, wire-guides, a stationary bar, and slide bar, F, the end of the slide bar constituting a shear member, a former arranged adjacent, and transversely of the direction of the wire feed, and across which the wire is fed, and a plunger-die movable toward and away from the former and sidewise coacting as a shear with the end of said slide bar, means for causing the plunger and former to approach, the one relative to the other, and means for projecting the slide, F, closely under the former, substantially as and for the purpose set forth.

5. In a machine of the character described, in combination, a plunger-die having a depression in its lower end, the bar H, and the slide-bar F, the end of which constitutes one member of a shear, and across which end the said plunger has a shearing movement, said slide-bar being movable under and away from under the plunger, the former-die G, movable crosswise under the plunger, and means for imparting to the plunger, former, and slide-bar, their reciprocatory movements, substantially as described.

6. In a machine of the character described

in combination, a slide bar, F, a plunger-die, C, having the depression in its lower end, and having a shearing movement across the end of said slide bar, F, the former, G, having the nose of reduced thickness, movable crosswise under the plunger, the said slide bar being movable under and away from under the plunger, wire-guiding and confining devices, means for imparting to the plunger and slide reciprocatory movements, and means for imparting to the former a forward movement, a partially retreating movement, and subsequently a complete retreating movement, substantially as and for the purposes set forth.

7. In a machine of the character described in combination, a slide bar, F, a plunger-die, C, having the depression in its lower end, and having a shearing movement across the end of said bar, F, the former, G, having the nose of reduced thickness, movable crosswise under the plunger, the said slide being movable under and away from under the plunger, wire-guiding and confining devices, means for imparting to the plunger and slide reciprocatory movements, and means for imparting to the former a forward movement, a partially retreating movement, and subsequently a complete retreating movement, and mechanism for finally effecting further approached relations of the plunger and slide-bar, substantially as and for the purposes set forth.

8. In a machine of the character described, the combination with a vertically reciprocatory plunger die and means for actuating it, of a former die G, a slide G², on which the former die is directly mounted, another slide G', which is horizontally movable toward and away from the line of movement of the plunger, and on which said former-supporting-slide G², is vertically movable, and mechanisms for effecting the horizontal and vertical movements of said slides G' and G²; the slide F, horizontally movable at right angles to the line of projection of the former die and also under the plunger and arranged normally with its end flush with the vertical face of the plunger, and mechanism for imparting periodically a reciprocatory movement to the said slide F; and guides for constraining the wire in its course under the plunger and across the former, all substantially as described.

FRANK B. MANVILLE.

Witnesses:

WM. S. BELLOWS,

WM. H. CHAPIN.