

No. 649,931.

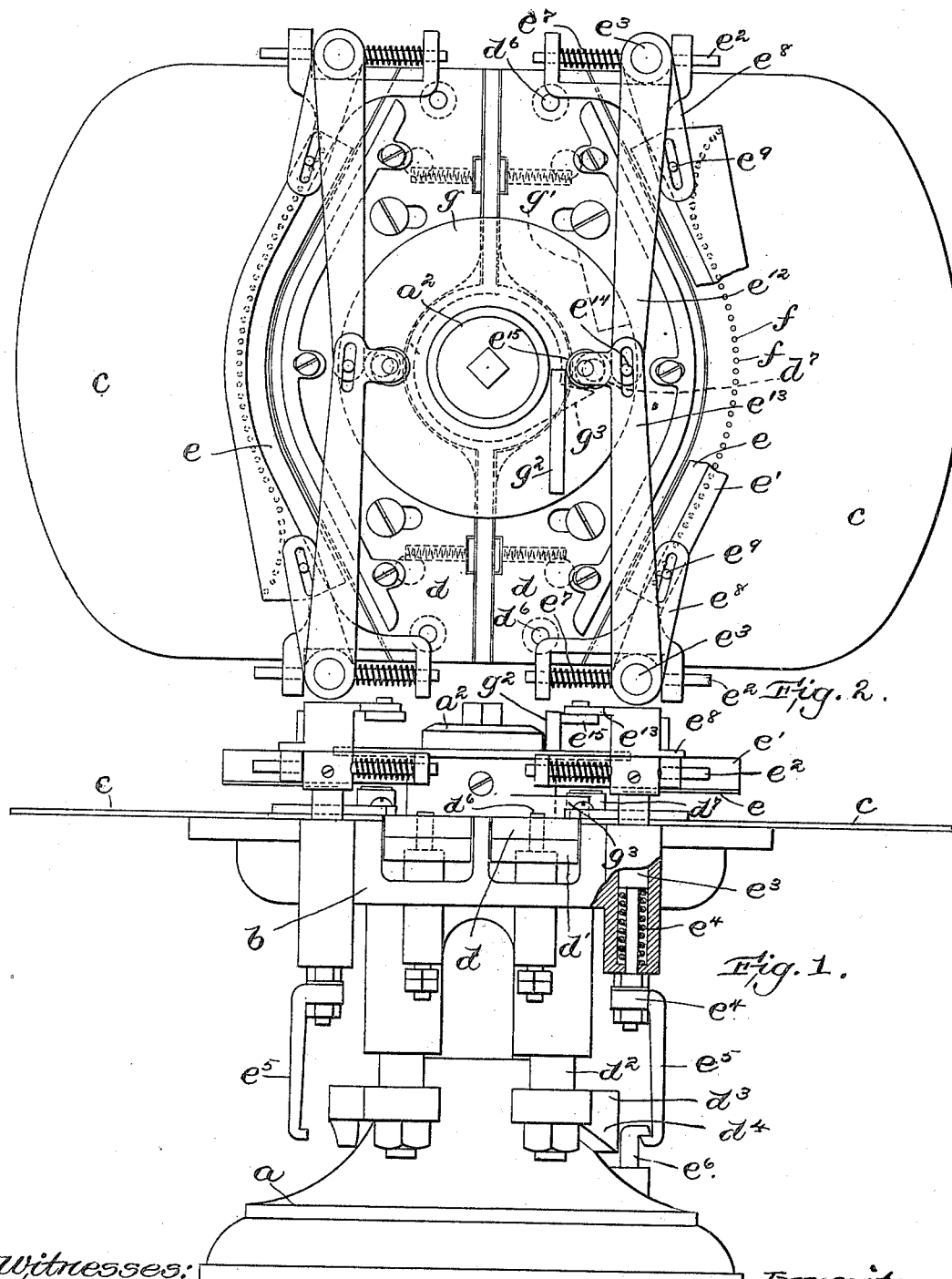
Patented May 22, 1900.

N. HAYWARD.  
FOLDING AND MARKING MACHINE.

(Application filed May 15, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:

A. J. Harrison

P. H. Pezzetta

Inventor:

N. Hayward

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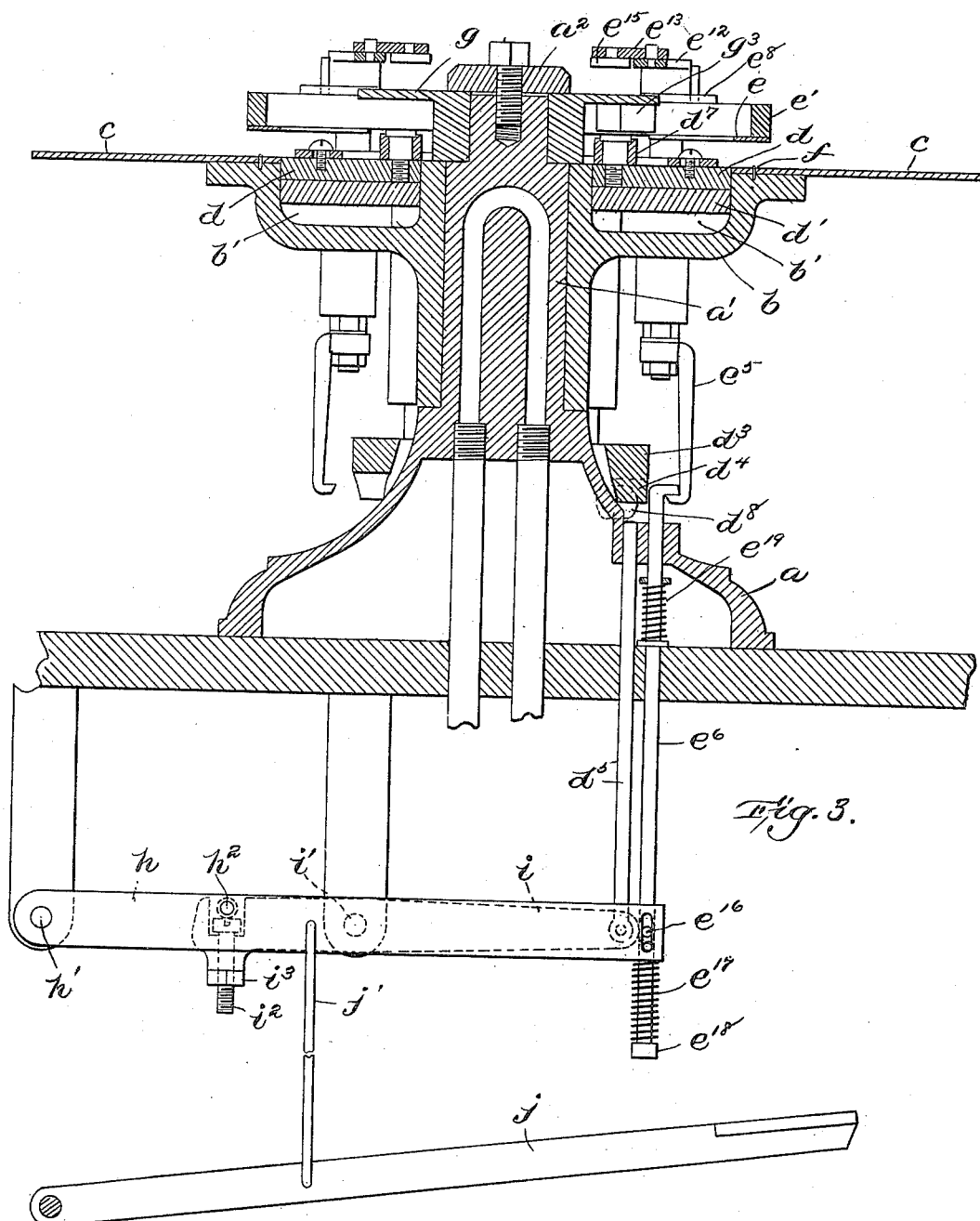
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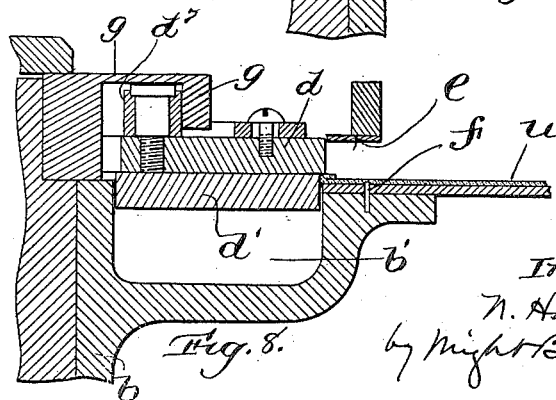
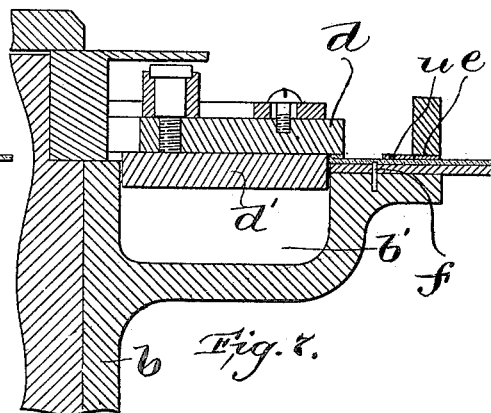
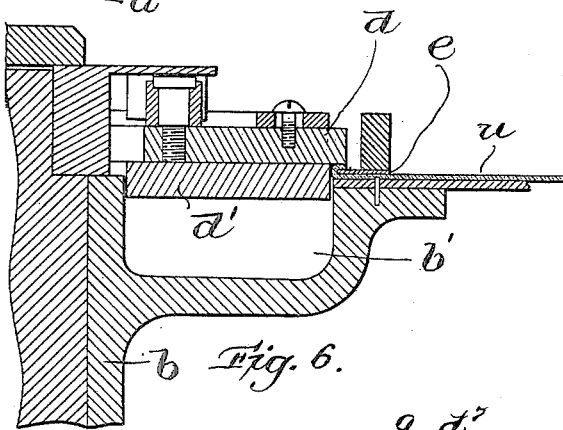
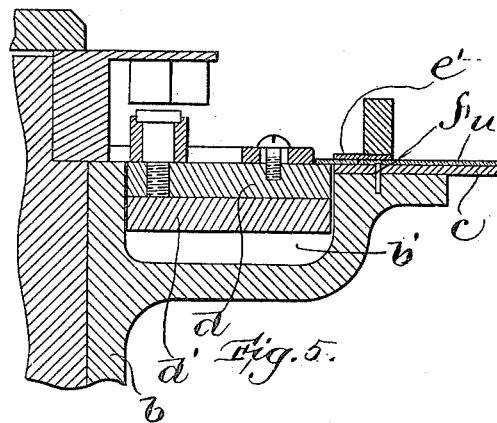
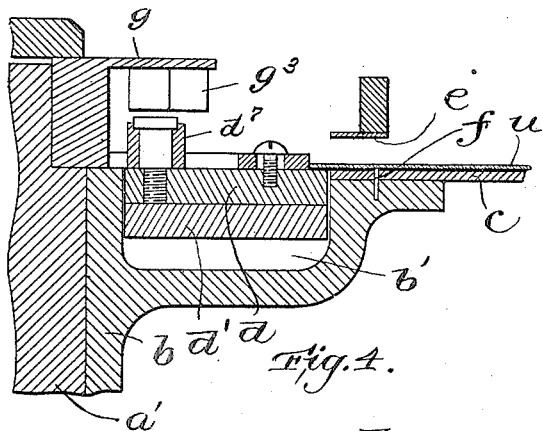
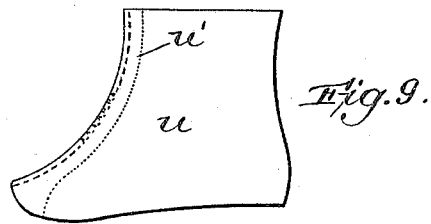
Inventor:  
N. Hayward  
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N. HAYWARD.  
FOLDING AND MARKING MACHINE.

(Application filed May 15, 1899.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

NATHAN HAYWARD, OF BROCKTON, MASSACHUSETTS.

## FOLDING AND MARKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 649,931, dated May 22, 1900.

Application filed May 15, 1899. Serial No. 716,808. (No model.)

*To all whom it may concern:*

Be it known that I, NATHAN HAYWARD, of Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Folding and Marking Machines, of which the following is a specification.

This invention has relation to machines for folding the edges of pieces of flexible material, such as the quarters and other parts of shoe-uppers.

The invention has for its object to provide improvements in the folding-machine described in United States Letters Patent No. 628,798, granted to me July 11, 1899, the improvements relating particularly to the means for operating the former, around which the edge of the material is folded, and to the treadle mechanism whereby the former is depressed and the folder which folds the edge of the material over the former is elevated.

The invention also has for its object to provide means in an upper-folding machine for marking one side of the shoe-upper to form a guide which shall enable the operator to accurately locate the line of stitching which is commonly placed at a distance from the folded edge of a shoe-quarter to ornament the same.

With these ends in view the invention consists in the novel features of construction and arrangement which I shall now proceed to describe and claim.

Of the accompanying drawings, Figure 1 represents a side elevation, partly in section, of a folding and marking machine constructed in accordance with my invention. Fig. 2 represents a plan view thereof with parts broken away. Fig. 3 represents a vertical sectional view thereof, illustrating also the treadle mechanism by which parts of the machine are operated. Figs. 4 to 8, inclusive, represent detail sectional views on an enlarged scale, showing different positions of the folding mechanism. Fig. 9 represents a detail plan view on a reduced scale, showing a shoe-quarter after being folded and marked.

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

Referring to the drawings, *a* designates a base provided with an upwardly-projecting stud or stem *a'*, on which is journaled a ro-

tary frame *b*, supporting on opposite sides of its axis of rotation two folding mechanisms, similar to each other in construction and arrangement, and two work-supporting tables *c c*. Between the tables *c* and the central stem *a'* the frame *b* is recessed at *b' b'* to receive two folders *d d*, which are given a vertical and horizontal movement and cooperate with former-blades *e e* in folding the edge of the work. The former-blades *e*, tables *c*, and folders *d* have their edges curved to conform to the curvature of the work.

The folding mechanisms being alike in construction, a detailed description of one of them will suffice. The former-blade *e* of each is attached to the lower side of a bar *e'*, forked at its end and guided on rods *e<sup>2</sup>*, which are secured in vertical posts *e<sup>3</sup>* on both sides of the machine. Said posts are guided in sockets in the frame *b* and are normally projected upwardly by means of springs, Fig. 1. At their lower ends the posts are connected by a yoke, from the middle of which a hooked plate *e<sup>5</sup>* projects downwardly in position to be engaged by a treadle-rod *e<sup>6</sup>*, mounted in a vertical bearing in the base *a*. The depression of the rod *e<sup>6</sup>*, when in engagement with the hooked plate *e<sup>5</sup>*, causes the former-blade *e* to descend upon the work supported on the table *c* and to clamp said work to the table.

Pivotaly mounted on the posts *e<sup>3</sup> e<sup>3</sup>* are arms *e<sup>8</sup> e<sup>8</sup>*, having slotted ends, which are engaged by pins *e<sup>9</sup>* on the bar *e'*, to which the former-blade *e* is attached. On the hubs of the arms *e<sup>8</sup>*, above the latter, are two longer arms *e<sup>12</sup> e<sup>13</sup>*, interlocking at their ends by means of a slot in the arm *e<sup>13</sup>*, occupied by a pin *e<sup>14</sup>* on the arm *e<sup>12</sup>*. The arm *e<sup>13</sup>* carries a roller *e<sup>15</sup>*, adapted to engage a cam *g<sup>2</sup>*, which is formed as a lug on the upper side of a plate *g*. Said plate is clamped to the upper end of the stem *a'* by a plate *a<sup>2</sup>*, bolted to said stem, the hub of the plate *g* engaging a shoulder on the stem. By this arrangement the cam *g<sup>2</sup>* operates against the roller *e<sup>15</sup>* when the frame *b*, carrying the folding mechanisms, is rotated, causing the interlocked ends of the arms *e<sup>12</sup> e<sup>13</sup>* to move outwardly, whereby the former *e* is moved in an outward direction and is withdrawn from the fold in the work. Springs *e<sup>7</sup> e<sup>7</sup>*, surrounding the rods *e<sup>2</sup>* and in-

terposed between the posts  $e^3$  and the ends of the bar  $e'$ , operate to return the former  $e$  inwardly.

The folder  $d$  consists of a plate mounted on a folder-carrier  $d'$ , which is carried by vertical posts  $d^2$ , connected by a yoke  $d^3$  at their lower ends. Said posts pass through sockets in the frame  $b$  and are surrounded by springs therein which normally depress the posts and the folder-carrier. A cam lug or boss  $d^4$  on the yoke  $d^3$  is adapted to become positioned over a treadle-rod  $d^5$ , to which an upward movement is given at the proper time, causing the folder-carrier  $d'$  to be elevated. When the folder  $d$  has risen far enough to clear the edge of the former-blade  $e$ , it becomes released from two pins  $d^6$ , engaging it at their ends, and is automatically projected outwardly by springs, causing the edge of the work to be folded over the former-blade. Upward pressure on the rod  $d^5$  being then discontinued the folder  $d$  is pressed downwardly upon the work by the tension of the springs surrounding the posts  $d^2$ . The former-blade is then withdrawn, as described, and the fold is held under pressure. The release of the work from the folder is effected during the rotation of the frame  $b$  by the engagement of the cam-boss  $d^4$  on the yoke  $d^3$  with a roller-stud  $d^8$  on the base  $a$ , which exerts an upward pressure on the folder-carrier and lifts the folder clear of the work, whereupon said folder is retracted by the engagement of a cam  $g^3$ , formed as a lug on the under side of the plate  $g$ , with a roller-stud  $d^7$ , affixed to the upper side of the former  $d$ , and is again brought into engagement with its release-pins  $d^6$ .

I provide an improved treadle mechanism by which, with the operation of a single treadle, both of the rods  $d^5$  and  $e^6$  are moved to actuate their respective mechanisms.  $h$  represents a lever fulcrumed at  $h'$  to a fixed support and slotted at its end to engage a pin  $e^{16}$  on the rod  $e^6$ , and  $i$  represents a second lever fulcrumed at  $i'$  to a fixed support and connected at its end with the rod  $d^5$ . The lever  $h$  is connected by a link  $j^{12}$ , attached to the lever between its fulcrum and its point of connection with the rod  $e^6$ , with a treadle  $j$ , and at  $h^2$  said lever is provided with a stud projecting laterally over the heel of the lever  $i$  and adapted to abut the head of a screw  $i^2$ , which is capable of vertical adjustment in the heel of said lever  $i$  and is adapted to be locked in place by means of a lock-nut  $i^3$ . The depression of the treadle  $j$  causes the two levers  $h$   $i$  to be oscillated in opposite directions, the lever  $h$  being swung downwardly and depressing the rod  $e^6$  and the lever  $i$  being swung upwardly by reason of the engagement of the stud  $h^2$  with its heel, thereby elevating the rod  $d^5$ . Such depression of the treadle therefore effects the operation of both the former  $e$  and the folder  $d$  when the frame  $b$  is properly positioned to bring the hooked plate  $e^5$  and cam-boss  $d^4$  into operative rela-

tion with the two treadle-rods. The pin-and-slot connection of the lever  $h$  with the rod  $e^6$  compensates for the extra movement which said lever  $h$  undergoes, and a spring  $e^{17}$ , interposed between the lever and a nut  $e^{18}$  on the lower end of the rod  $e^6$  restores the levers and rods to their normal relation after action. A spring  $e^{19}$  normally elevates the rod  $e^6$ .

In order to mark the under surface of a shoe-quarter during the folding operation above described, I embed in the work-supporting table  $c$  a number of pins or marking devices  $f$   $f$ , arranged in a row and following the proposed line of stitching in the shoe-quarter. The upper ends of these pins are allowed to project slightly above the upper surface of the table  $c$  and are located beneath the position normally occupied by the former-blade  $e$ , so that when the latter descends upon the work it presses the work against the ends of the pins  $f$   $f$  and forms a row of marks or indentations upon the under side of the work. These indentations are shown at  $u'$  in Fig. 8, in which  $u$  represents the shoe-quarter, and it will be seen that they occupy a place corresponding to the position of the line of stitching subsequently placed on the shoe-quarter. The pins  $f$   $f$  collectively constitute a marker, whose projection above the surface of the work-supporting table is slight, being insufficient to interfere with the proper positioning of the former  $e$  when the work is interposed between said former and the table.

The cycle of operations of the above-described machine is as follows: The operator moves the frame  $b$ , if necessary, to bring one of the folding mechanisms in front of him, and said frame is automatically stopped when it reaches the proper position by the engagement of the roller-stud  $d^7$  on the folder which is about to be called into operation with an abutment or tooth  $g^3$ , projecting from the hub of the plate  $g$ . The backward rotation of the frame is prevented by the coaction of the rear side of the cam-boss  $d^4$  on the operative side of the machine with the roller-stud  $d^8$  on the base  $a$ . The work is now placed on the table  $c$  with its inner edge overlapping the folder  $d$ , and the treadle  $j$  is depressed, causing the former-blade  $e$  to descend upon and clamp the work to the table and by pressing said work against the pins  $f$  to mark the under side of the work, as described. The folder  $d$  meanwhile rises and is projected over the former-blade  $e$ , causing the edge of the work to be folded around said blade. The treadle  $j$  is then released, and the frame  $b$  is rotated around to the right, its rotation being permitted by reason of the fact that the roller-stud  $d^7$  has moved out beyond the end of the stop or tooth  $g^3$  during the projection of the folder  $d$ . The rotation of the table brings the roller  $e^{15}$  into action against the cam  $g^2$  and causes the former-blade  $e$  to be retracted, as hereinbefore set forth. The novel means for retracting the former-blade dispenses with one of the hand operations re-

quired with the machine described in the patent hereinbefore alluded to. The other folding mechanism is now brought in front of the operator and a fresh piece of work inserted therein, while the fold in the piece of work just operated upon is left to "set" by the pressure of the folder and the heat supplied by steam-pipes attached to the machine. The rotation of the frame to bring the second folding mechanism into position causes the roll  $d^8$  on base  $a$  to engage boss  $d^4$  of said mechanism and lift its folder-carrier, and the cam  $g'$  then acts on the roller-stud  $d^7$  to retract the folder  $d$ , releasing the work which may have been under pressure in said mechanism. Figs. 4 to 8, inclusive, show the successive operations of the parts during the folding operation, certain portions of the machine being omitted in these figures for the sake of clearness.

I do not confine myself to the exact construction and arrangement hereinbefore described, as the same may be considerably modified without departing from the spirit of the invention.

I claim—

1. In a machine of the character specified, a base, a former-blade, means for folding the work around the edge of said blade, a frame carrying said blade and said means, and mounted to rotate on the base, and mechanism operated by the rotation of said frame for withdrawing the former-blade from the fold in the work.

2. In a machine of the character specified, a base, a former-blade, means for folding the work around the edge of said blade, interlocking arms connected with said blade, a frame mounted to rotate on the base and carrying said blade and arms, and a cam fixed to the base and adapted to operate against said arms to move them and withdraw the blade from the fold in the work when said frame is rotated.

3. In a machine of the character specified, a base, a frame mounted to rotate thereon, folding mechanism carried by said frame, an operating device mounted in the base and adapted to engage and operate the folding mechanism, a stop fixed to the base, and a part carried by the frame and adapted to coact with said stop to arrest said frame after rotation, with its folding mechanism in an operative relation to said operating device.

4. In a machine of the character specified, a base having a stem, a frame mounted to rotate thereon, folding mechanism carried by said frame and including a folder arranged to be projected away from said stem to fold the work, an abutment carried by said folder,

an operating device mounted in the base for operating the folding mechanism, and a stop mounted on said stem and adapted to coact with said abutment to arrest the frame after rotation with its folding mechanism in an operative relation to said operating device, said folder when projected moving the abutment out of the path of the stop, and thereby releasing the frame.

5. In a machine of the character specified, a former-blade, a folder adapted to coöperate therewith in folding the work, two parts movable in opposite directions to operate said former-blade and folder, respectively, two pivotal levers engaged with the respective intermediate its ends and the other having provision intermediate its ends, for engaging the heel of the first said lever, and a treadle connected with the second said lever, said treadle when depressed moving the rod-engaging ends of the two levers in opposite directions.

6. In a machine of the character specified, a work-supporting table, mechanism for folding the edge of a piece of work supported on said table, and a device coöperating with said mechanism for marking one side of the work so supported.

7. In a machine of the character specified, a work-supporting table, mechanism for folding the edge of a piece of work supported on said table, said mechanism including a member adapted to descend upon the work so supported, and a marker located so as to be underneath the work and adapted to coöperate with said member in marking the under side of the work.

8. In a machine of the character specified, a work-supporting table, a clamping member adapted to descend upon and clamp the work to the table, said member having a former around which the edge of the work is folded, and a marker projecting above the surface of the table and adapted to coöperate with said clamping member in marking the underside of the work.

9. In a machine of the character specified a work-supporting table, mechanism for folding the edge of a piece of work supported on said table, and a device coöperating with said mechanism for marking one side of the work so supported, said device consisting of a series of pins embedded in the table with their ends projecting above the surface thereof.

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

NATHAN HAYWARD.

Witnesses:

C. F. BROWN,  
P. W. PEZZETTI.