

No. 645,871.

Patented Mar. 20, 1900.

J. K. P. PINE.  
FOLDING MACHINE.

(Application filed Oct. 3, 1894.)

(No Model.)

5 Sheets—Sheet 1.

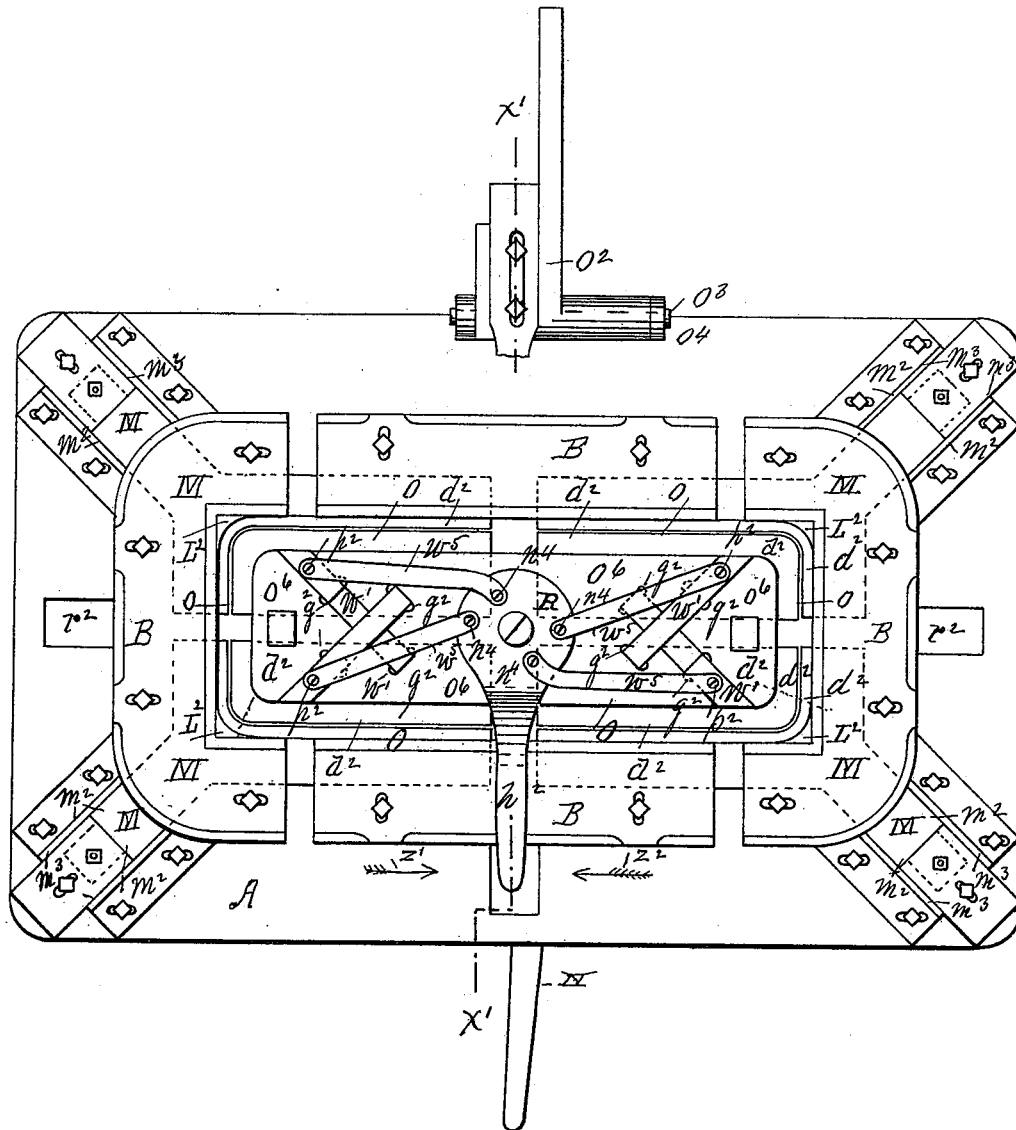


FIG. 1

WITNESSES  
Charles S. Brinshaw  
D. W. C. C. C.

INVENTOR  
James K. P. Pine  
by W. E. Hagano,  
att'y

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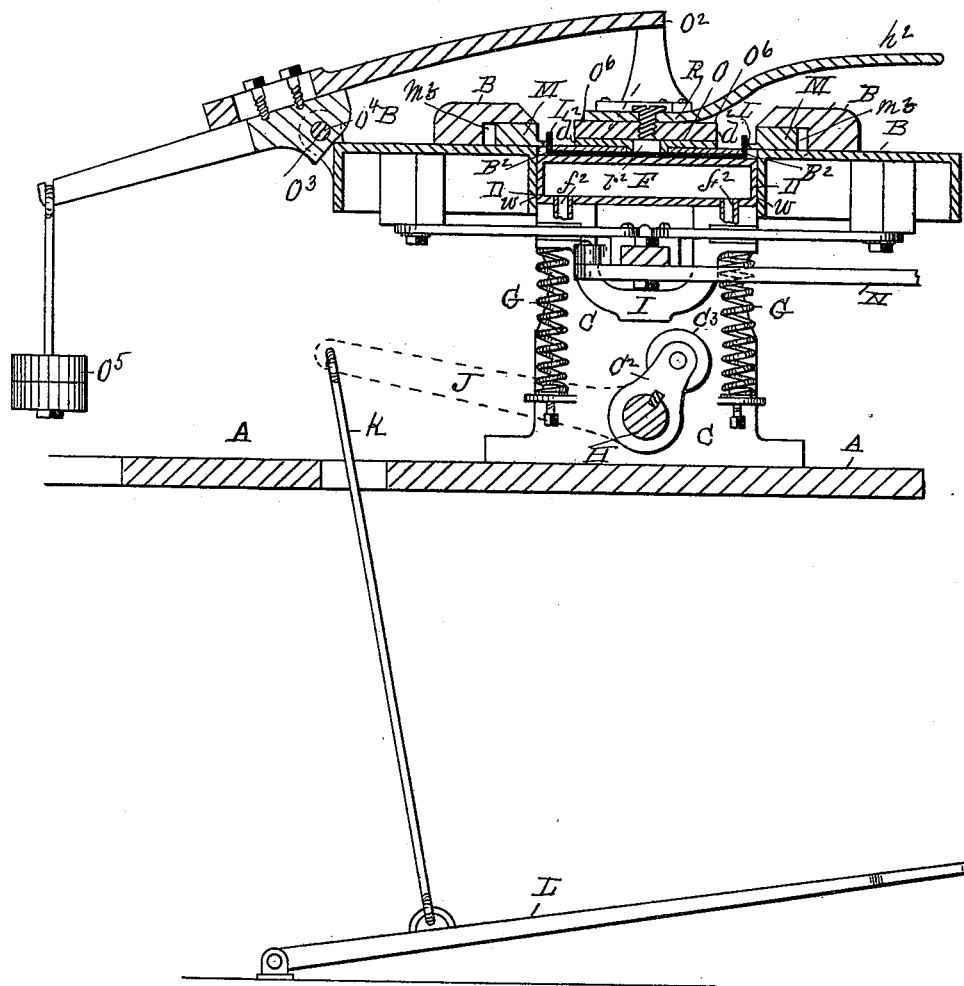
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**5 Sheets—Sheet 2.**



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WITNESSES

Charles S. Brinck  
DeWitt Clinton

INVENTOR  
James H. P. Pine  
by W. E. Hagan  
att'y

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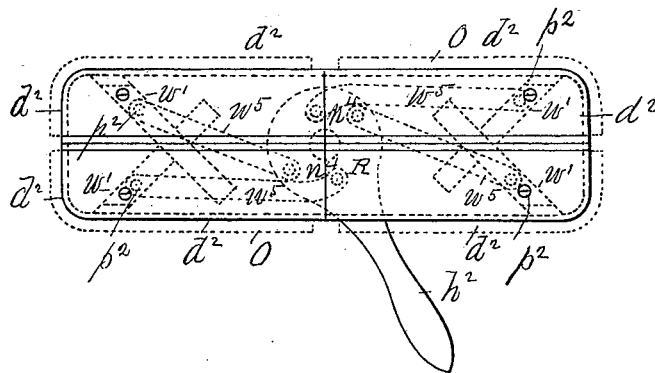


FIG 3

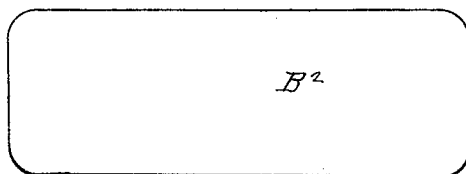


FIG 4

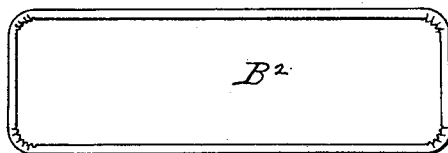


FIG 5

WITNESSES

Charles S. Brintnall  
Morton S. Buckland

INVENTOR

James K. P. Pine  
by W. E. Hagan  
att'y

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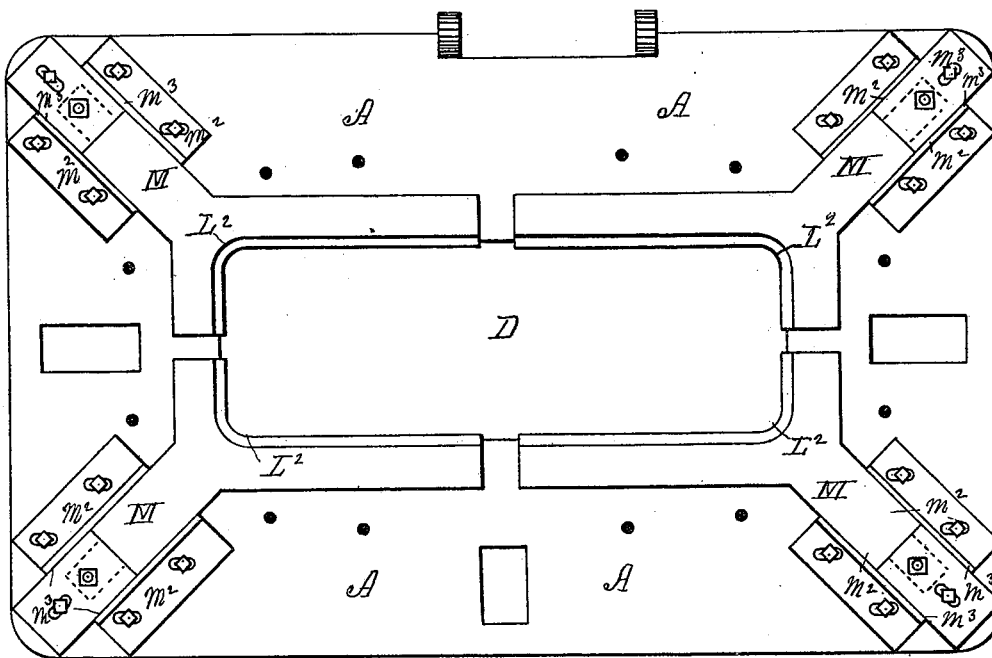


FIG 6

WITNESSES

*Alfred S. Brintall*  
*Chas. P. Stimpson*

INVENTOR

*James K. P. Pine*  
*by W. E. Hagan atty*

No. 645,871.

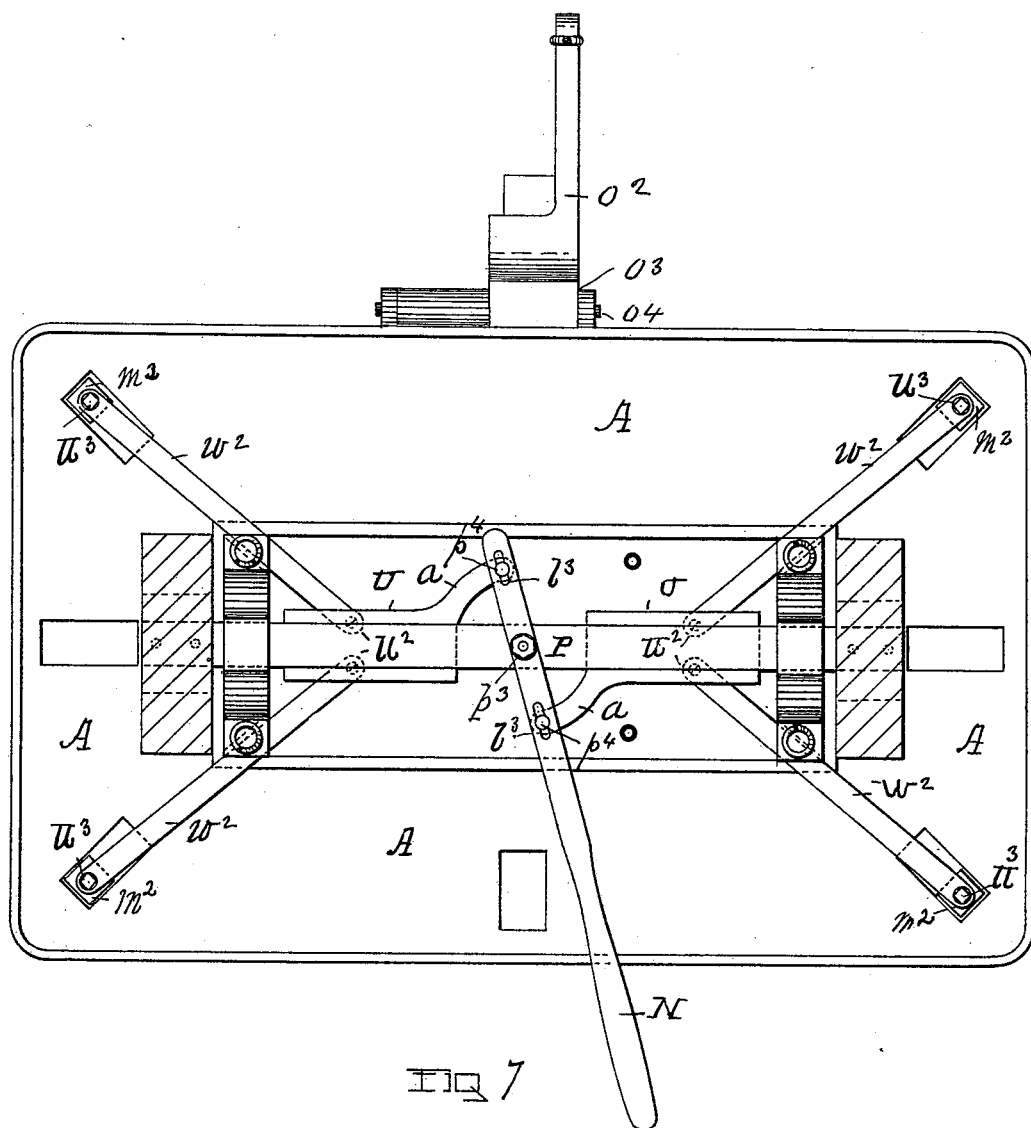
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5 Sheets—Sheet 5.



WITNESSES.

William A. Sweet

Charles S. Brintnall

INVENTOR

James K. P. Pine

By W. E. Hagan atty

# UNITED STATES PATENT OFFICE.

JAMES K. P. PINE, OF LANSINGBURG, NEW YORK, ASSIGNOR TO THE  
UNITED SHIRT AND COLLAR COMPANY, OF TROY, NEW YORK.

## FOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 645,871, dated March 20, 1900.

Application filed October 3, 1894. Serial No. 524,787. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES K. P. PINE, of Lansingburg, in the county of Rensselaer, in the State of New York, have invented an  
5 Improvement in Machines for Inturning the Edges of Cuffs or Like Articles, of which the following is a specification.

My invention relates to improvements in machines for inturning or infolding the edges  
10 of cuff-blanks or analogous articles, and by which improvements the infolds are formed in the blanks and pressed with the fabric folded back on itself by the combined action of the support on which the blanks are placed,  
15 a templet having edge portions which define the form of the cuff or other article and are operated to be in contact with the blanks being infolded, and infolders actuated to carry the subtending edges of the blanks inwardly  
20 or over the defining edges of the templet, with the infold thus formed fixed in the blanks by pressure between the support and the infolders before the templet has been moved away from the blanks and before the infold-  
25 ers have been withdrawn from the folded edges thereof.

Accompanying this specification to form a part of it there are five plates of drawings containing seven figures illustrating an appli-  
30 cation of my invention with the same designation of parts by letter reference used in all of them.

Of the illustrations, Figure 1 is a top view of a machine of this kind with the blank-  
35 holder or templet shown as applied thereto. Fig. 2 is a section taken on line  $x' x'$  of Fig. 1. Fig. 3 is a view of the blank-holder or templet shown as detached from the machine, with what is its under side when in  
40 use shown as facing the view and with its plate when expanded indicated by a dotted line. Fig. 4 shows a blank before being infolded, and Fig. 5 a blank after having been infolded. Fig. 6 is a top view of the machine  
45 with the templet removed and showing the infolders, their slides, and slideways, with that part of the machine-frame extending over the infolders removed. Fig. 7 is a view of the under side of the apparatus, illustrat-  
50 ing a mechanism for operating the infolders.

The several parts of the apparatus thus illustrated are designated by letter reference,

and the function of the parts is described as follows:

The letter A designates the table of an in- 55 folding-machine embodying my invention, and B its frame, which latter is supported on studs C, of which there is one at each end of the frame.

The letter D designates the bed, which is 60 adapted to be vertically moved in slides  $w$  in the frame B. This bed is provided with a chamber F, in which gas and air are admitted through pipes  $f^2$ , as shown at Fig. 2.

The letters G designate springs, of which 65 there are two at each end of the machine, on which springs the bed D rests.

The letter H designates a rock-shaft hav- 70 ing its bearings in the studs C at each end of the machine.

The letter C<sup>2</sup> designates an arm keyed to the rock-shaft H at each end, which arms each at their outer ends are provided with a roller C<sup>3</sup>.

The letter I designates depending feet at- 75 tached to the bottom of the chamber F and which are supported on the springs G, of which feet there is one at each end of the shaft H, immediately over the arm C<sup>2</sup> thereat, and the letter J designates a lever which is 80 keyed to the shaft H at its lower end, and at its outer end this lever by means of a rod  $k$  connects with the foot-treadle L, by which construction the bed D is slightly raised as the foot-treadle is pressed down. 85

The letters M M M M designate infolders or folders which are of an L form on their inner edges and each of which has projected from its outer angle a guide  $m^2$ , arranged to move cornerwise in a slideway  $m^3$ , formed in 90 the machine-frame, said infolders being so arranged as to inclose on their inner edges an oblong square and to be as thus constructed actuated to move inwardly toward or out- 95 wardly from each other by the lever N, said infolders being shown by full and dotted lines at Fig. 1 and by full lines at Fig. 6.

The letter P designates a guide-bar ar- ranged centrally and longitudinally upon the under side of the table A, and the letters U 100 U designate slide-plates, of which there is one arranged upon and at each end of the guide-bar P, adapted to slide back and forth thereon. Each of these slide-plates U at its

inner end is constructed with a laterally-off-set arm  $a$ .

The letters  $w^2$  designate links, of which there are two for each of the slide-plates U, one at each side of the latter, with the inner end of each of these links at  $u^2$  pivoted to one of the opposite sides of each of the slide-plates U and the outer end of each of these links pivoted at  $u^3$  to the under side of one of the infolder guide-bars  $m^2$ .

The letter N designates a lever which at  $p^3$  is pivoted to the cross-center of the bar P.

The letters  $l^3$  designate slots which are formed longitudinally in the lever N, and  $p^4$  a slide-pin arranged in the outer end of each of the offset arms  $a$  to slide in one of the slots  $l^3$ , whereby as the lever N is laterally reciprocated on its pivot the infolders M are moved inwardly and outwardly over the bed through the operation of the pivoted connection made by the links  $w^2$  with the infolder guide-bars  $m^2$  and the connection made between the offset arms  $a$  and slide-plates U with the lever N.

The letters  $L^2$  designate an opening made in the top of the machine-frame for the entrance of the blanks and around which opening the L-form infolders are arranged so as to inclose on their inner infolding edges an oblong square, with the inner bottom edges of the infolders sufficiently above the bed for the entrance of the blank edges when the infolders are moved inwardly, with the parts appearing as shown at Fig. 2.

The letter O designates the templet or blank-holder, which is in this instance of its use connected to the front end of a lever  $O^2$ , which latter is hinged at  $o^4$  to the machine by a pin  $o^3$ , and at its rear end, where extending beyond its pivot, this lever is provided with a counterpoise  $c^5$ . As thus connected, the templet or blank-holder may be operated to descend onto and to rise from off the bed D. This templet O has in this embodiment of my invention four plates  $d^2$   $d^2$   $d^2$   $d^2$ , corresponding in shape upon their outer edges to the inner edges of the infolders and constituting the movable corners, ends, and sides of the templet parts on which the infolds are produced to adapt them to the machine to which it is shown as applied, with the templet-plates shown as arranged on the under side of the templet-stock, in which the mechanism operating them is located and where as thus placed they are in contact at their edges with the blank, and as moved outwardly thereon to render the blank smooth and evenly spread out. These plates  $d^2$  have in this instance of their use rectilinear side and end edges and when drawn inwardly, as shown at Fig. 3, their outer edges are in alinement with the ends and sides of the stock which they are beneath. These templet-plates may for convenience be operated to move outwardly and inwardly by the following mechanism, which is shown at Fig. 3 by dotted lines and at Fig. 1 by full lines.

The letter R designates a crank-disk cen-

trally pivoted at  $r^2$  and provided with a handle  $h^2$ , projected from its front side.

The letters  $w'$  designate slides arranged to move in slideways  $g^2$ , and each of these slides is connected to one of the plates  $d^2$  and each of these slides is pivotally connected at  $p^2$  to one of the link-bars  $w^5$ , with each of the latter at its inner end pivotally connected at  $n^1$  to said crank-disk at a point between its center and periphery. As thus constructed when the radially-extended handle  $h^2$  is moved in the direction indicated by the arrow  $Z^2$  the slides  $w'$  and each of the plates  $d^2$  are moved inwardly and withdrawn, so that they do not project beyond the bottom edge of the templet ends and sides. When the handle  $h^2$  is moved in the direction indicated by the arrow  $Z'$ , then the slides and connected templet-plates are drawn outwardly.

The operation of the apparatus thus described is as follows: A blank  $B^2$  having been placed on the bed D, the templet or blank-holder is caused to descend upon the blank, with the plates  $d^2$  resting thereon, and the handle  $h^2$  is moved in the direction indicated by the arrow  $Z'$  to move the plates  $d^2$  diagonally outwardly over the blank, said plates occupying the position shown at Fig. 1. The infolders M are then moved inwardly to carry the edges of the blank over the outer edges of the plates  $d^2$ . The handle  $h^2$  is then moved in the direction indicated by the arrow  $Z^2$  to draw the plates  $d^2$  from out the infolds thus formed, with the plates appearing as shown in full lines at Fig. 3. The foot-treadle is then operated to raise the bed D to press the infolds between the infolders and the bed. The templet is then raised and the infolders M are caused to move outwardly, leaving the infolded blank upon the bed. As thus made and arranged to be operated by the mechanism herein shown and described the edges of a blank can be infolded and the templet-plates removed before the infold is pressed and the contingency of opening out the infolds by the removal of the templet avoided. When the templet-plates are being moved outwardly over the blank by their engagement with the surface of the latter, they operate to smooth out and condition the blank for infolding.

While I have shown my invention as applied to the infolding of rectangular edges and rounded corners, it can be applied to infold square corners and other forms of blanks by having the outer edges of the templet-plates correspond in form to the inner edges of the infolders, and while I have shown the bed of the machine as raised to press the infolds between the bed and the infolders I do not limit my invention as respects these features to the construction of the bed and infolders which I illustrate and describe.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for infolding cuff-blanks or analogous articles, the combination of a support for the blanks, a templet having expand-

ing and contracting plates, edge portions of which are adapted to bear directly upon the blanks upon said support, and within edge portions of the blanks, infolders constructed to move inwardly and outwardly whereby the edge portions of the blanks may be folded over the edge portions of the templet, and means whereby the folds of the blanks may be pressed between the support and the infolders after withdrawal of the plates of the templet from the folds and thereby fixed with a sharp fold.

2. In an infolding-machine for blanks of a cuff or analogous article, the combination of a bed on which blanks are placed, infolders constructed to move inwardly and outwardly, a templet having expanding and contracting plates, edge portions of which are adapted to bear directly upon the blanks while they are supported upon said bed and inward of edge portions of the blanks, so that such edge portions of the blanks may be folded over the edge portions of the templet, means whereby the templet may be accurately positioned upon the blanks and removed therefrom, and means for producing a relative vertical movement between the bed and the infolders sufficient to produce a sharp fold in the blanks after withdrawal of the plates of the templet from beneath the infolders.

3. In an infolding-machine the combination with a bed; of a templet having laterally expanding and indrawing plates on its under surface; means whereby said templet is operated to descend onto, and rise from off a blank placed on said bed, and to have its plates in contact with the blank at their inner and outer edges when resting thereon, and to have its plates alternately moved outwardly and inwardly diagonally or cornerwise; infolders arranged on said bed; means to move said infolders inwardly to carry the subtending edges of the blank over the expanded edges of the templet-plates, and then to move outwardly; and means whereby the infolds thereby formed may be pressed between the infolders and the bed after the templet-plates are withdrawn therefrom, and before the infolders have been moved outwardly, substantially as shown and described.

4. In a machine for inturning the edges of cuff-blanks or analogous articles, the following elements in combination, namely; a bed or table on which the blanks are placed in succession; infolders constructed to move inwardly and outwardly on all sides simultaneously; a templet provided with radially expanding and contracting plates on its under surface; means for accurately placing the

templet vertically upon and raising it off from the blanks resting upon the bed or table; means for maintaining the bed in position beneath the templet and in proper relation to the infolders while the infolders are operating; and means for forcing the bed against the infolders after the templets are withdrawn, whereby by operating the several elements as and in the order specified a cuff or collar may be infolded on all sides at one operation and the infold fixed therein with a sharp fold by pressure, after the templet-plates have been withdrawn from the infolds, substantially as and for the purpose specified.

5. In an infolding-machine the combination with a bed on which the blanks are placed to be infolded; a templet having plates on its bottom which at the ends and sides of the templet are together laterally expansible and contractible with their inner and outer edges in contact with the blank being infolded; means for moving outwardly and inwardly said templet-plates; infolders having slideways on the machine-bed; means substantially as described for moving inwardly and outwardly said infolders; and means substantially as described for forcing the bed and infolders to engage independently of the templet-plates substantially as and for the purposes set forth.

6. The combination with a bed, of infolders provided with slideways, a templet provided with plates on its under surface; means whereby said templet may be operated to descend onto, and rise from off a blank placed on said bed and have its plates together expanded and drawn inwardly at the sides and ends of the templet at the same time with the inner and outer edges of the templet-plates in contact with the blank being infolded; means whereby said infolders may be moved inwardly and outwardly and when being moved inwardly to carry the subtending edges of the blank over the expanded edges of the templet-plates to form the infold; and means to press the latter between the bed and infolders after the templet-plates have been drawn from the infold, and before the infolders have been moved outwardly substantially as and for the purposes set forth.

Signed at Troy, New York, this 28th day of September, 1894, in the presence of the two witnesses whose names are hereto written.

JAMES K. P. PINE.

Witnesses:

W. E. HAGAN,  
E. O. HOUSE.