

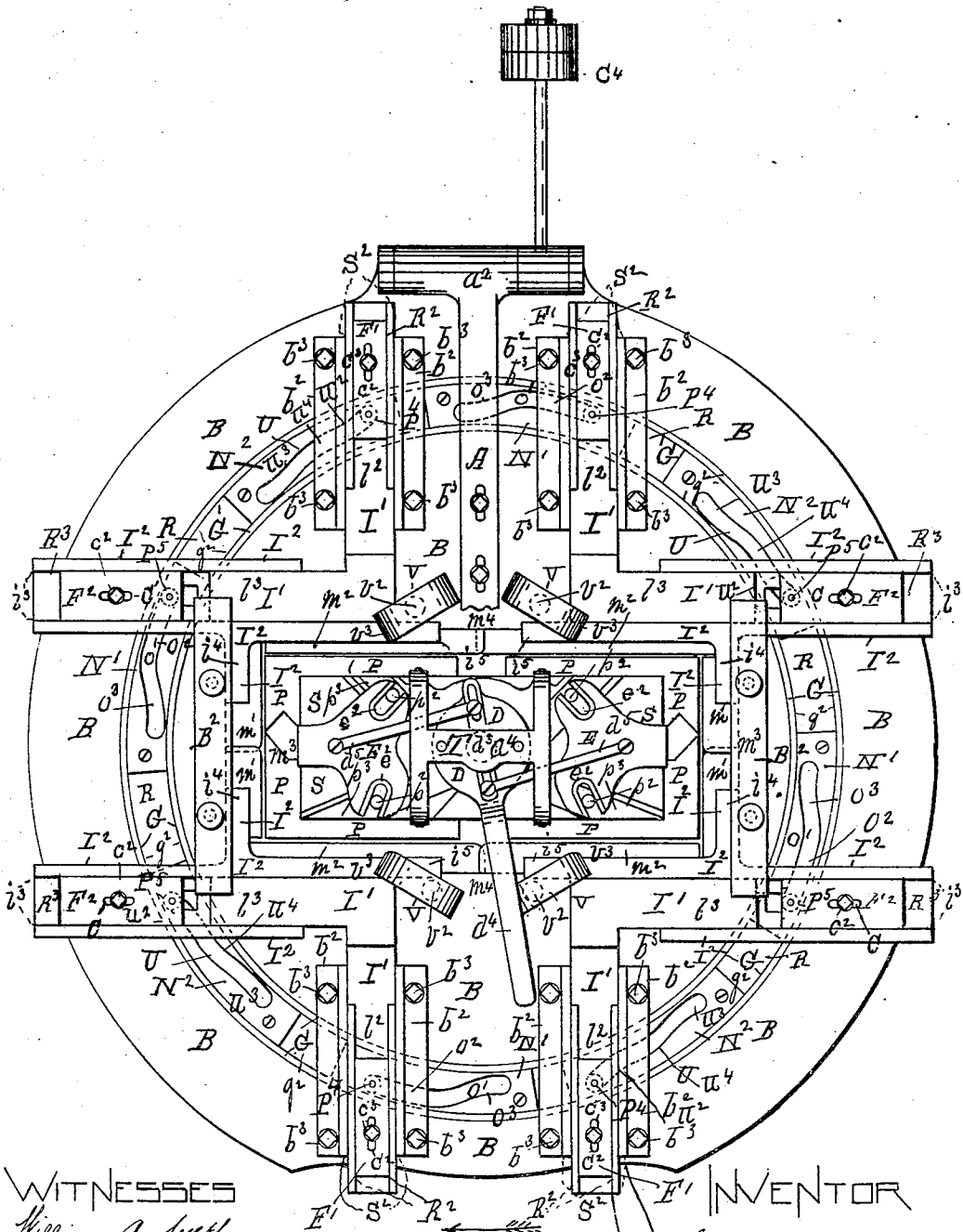
G. J. DORMANDY.
FOLDING MACHINE.

APPLICATION FILED JUNE 29, 1901.

935,783.

Patented Oct. 5, 1909.

6 SHEETS—SHEET 1.



WITNESSES

William A. Sweet

Charles S. Brintnell

Fig 1

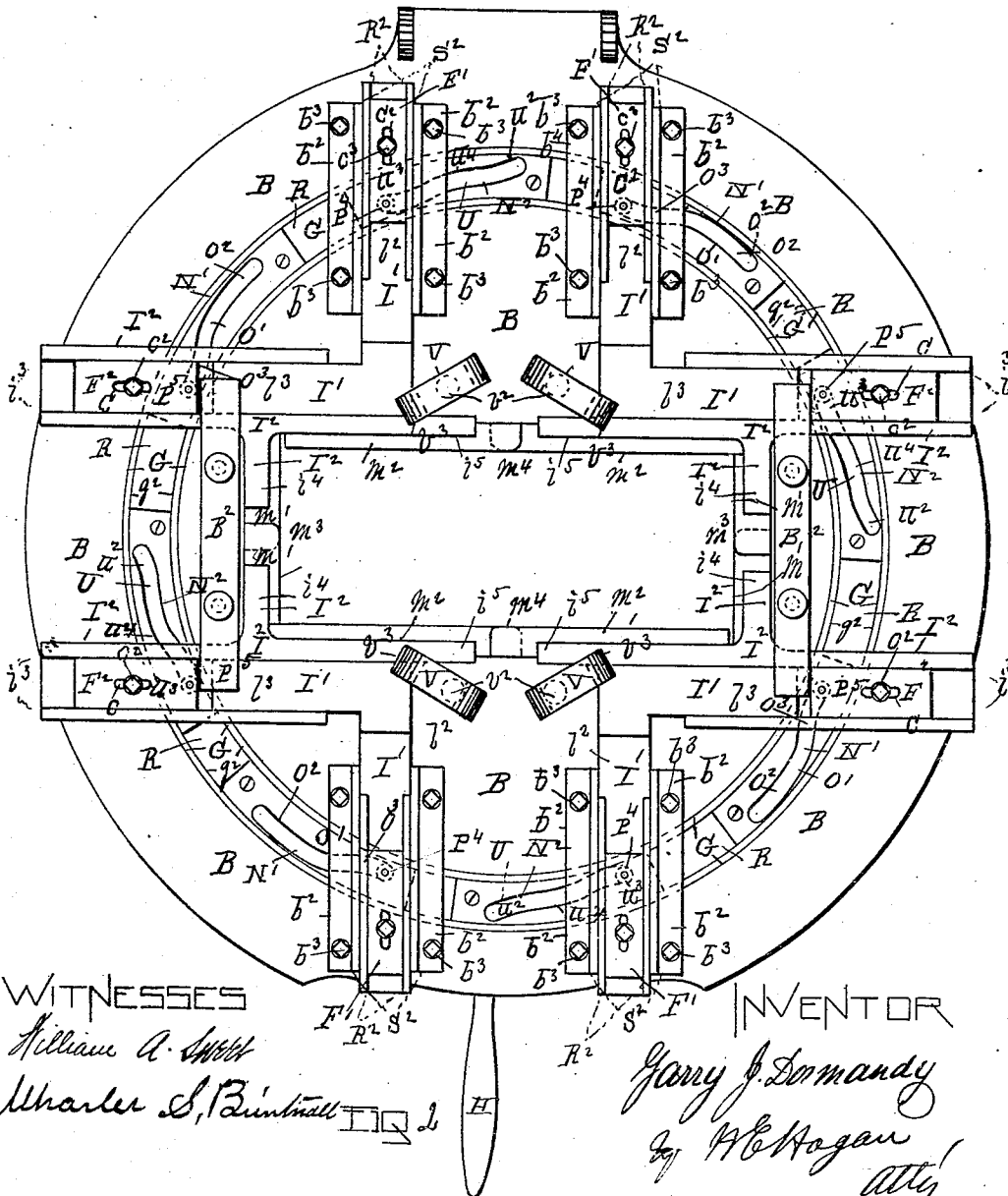
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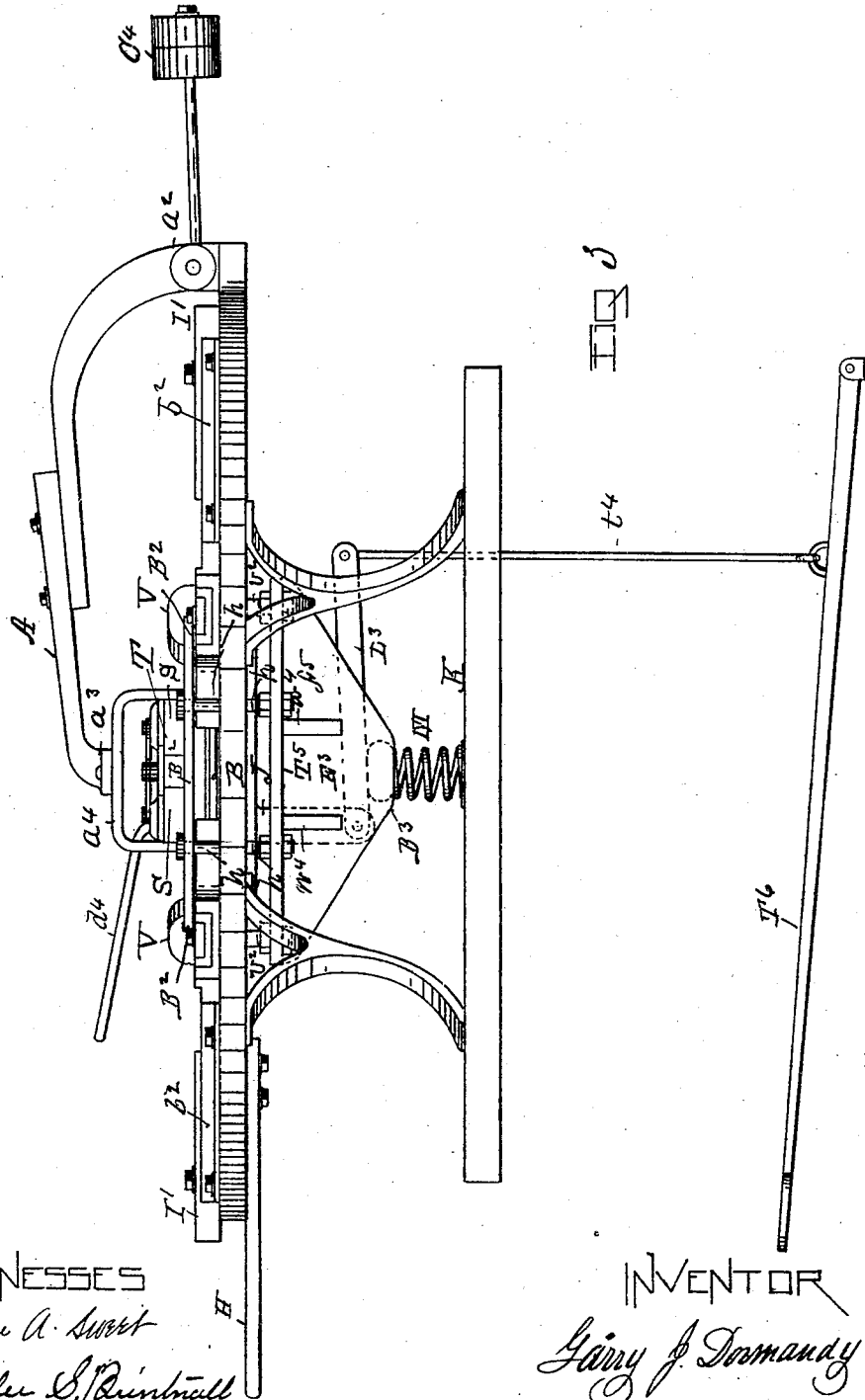
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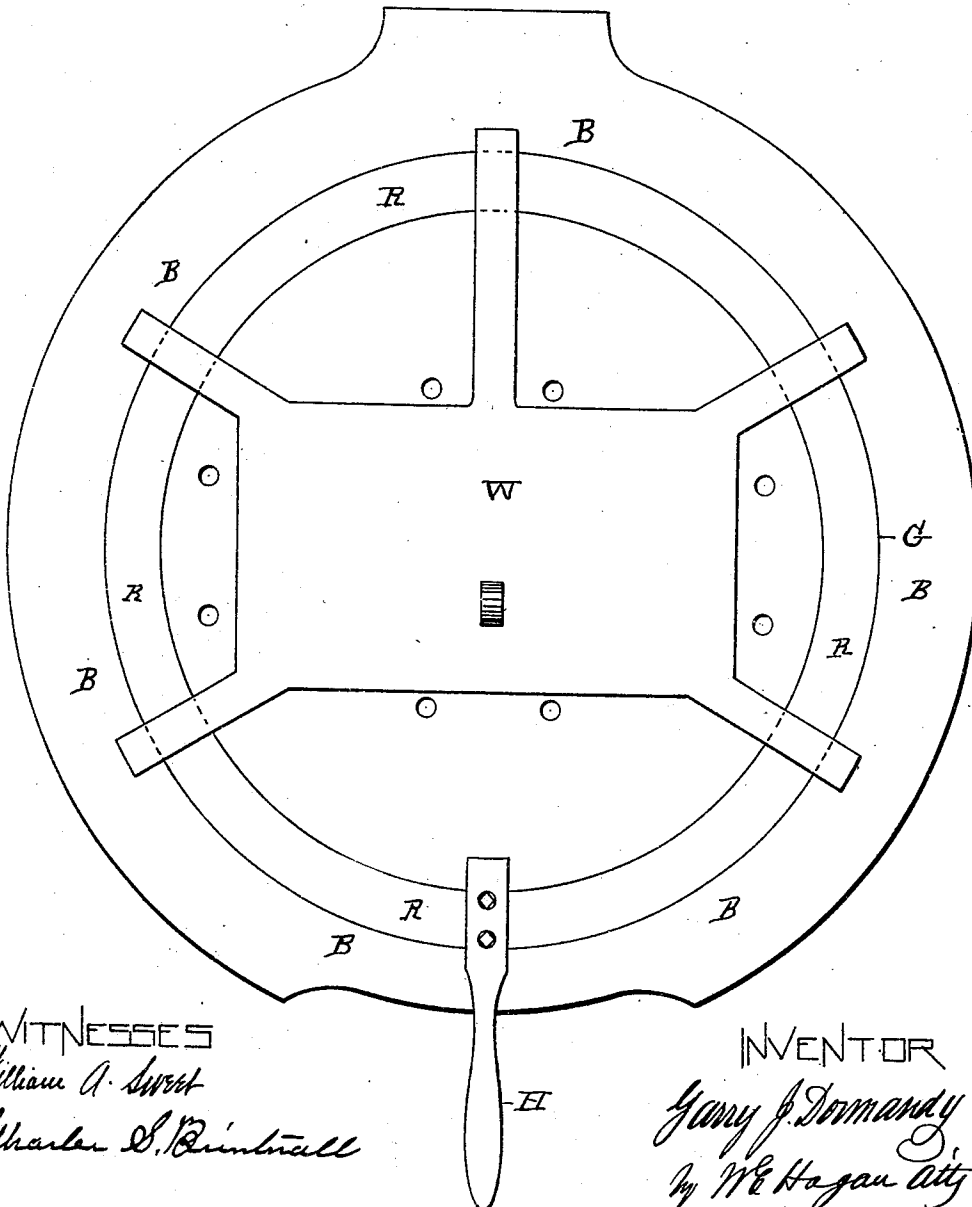
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By W. C. Hogan,
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6 SHEETS—SHEET 4.

FIG 4



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6 SHEETS—SHEET 6.

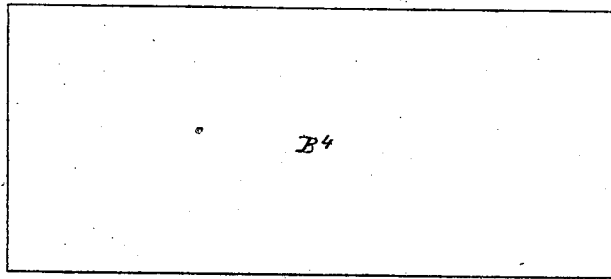


FIG 11

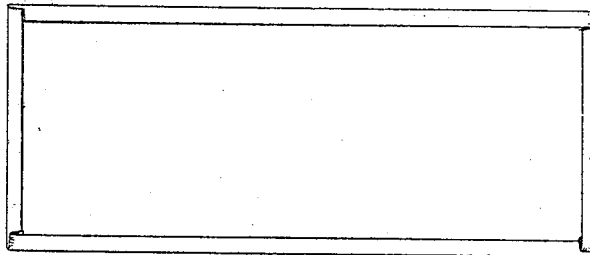


FIG 12

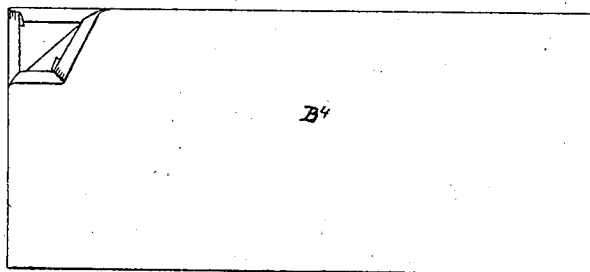


FIG 13

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UNITED STATES PATENT OFFICE.

GARRY J. DORMANDY, OF TROY, NEW YORK, ASSIGNOR TO UNITED SHIRT AND COLLAR COMPANY, OF TROY, NEW YORK.

FOLDING-MACHINE.

935,783.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed June 29, 1901. Serial No. 66,524.

To all whom it may concern:

Be it known that I, GARRY J. DORMANDY, of the city of Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Folding-Machines, of which the following is a specification.

My invention relates to folding machines, and more particularly to machines employed to inturn or infold edge portions of the blanks from which cuffs, collars, shirts and other articles are made.

Of the numerous objects and advantages pertaining to the present improvements, several will be enumerated in the detail description hereinafter following; among them may here be mentioned the object of adapting machines of this class to form the infolds upon the edges of blanks with alternately overlapping and underlapping corners, by substantially one operative movement, or one advancing movement of the mechanism, instead of two or more operations or movements, as has been attempted by older mechanisms of the same class; this object being accomplished by means of infolders operated in groups or series, that is alternately operated to move inwardly preferably with two differing directions of folding movement by the advancing movement of the mechanism, whereby one series of the infolders will be operated to move inwardly, first in one direction, for example sidewise, and in sequence moved inwardly at a different angle, or endwise; and another series of the infolders at or about the same time will be moved first inwardly endwise and then in sequence moved inwardly sidewise, thus alternately forming the infolds on the edges of the blank with underlapping and overlapping corners, whereat the edges of the blank can be locked or anchored when sewed. Each group or series will consist of one or more infolders. Any two identical blanks so formed can be interlocked with each other and sewed.

Accompanying this specification to form a part of it there are six plates of drawings containing thirteen figures illustrating an application of my invention with the same designation of parts by letter reference used in all of them.

Of these illustrations Figure 1, is a top view of a machine which embodies my in-

vention, and which is shown to contain, as 55 is usually though not invariably the case, an expanding and contracting templet, and showing the templet-plates thereof expanded so as to be over the blank, the edges of which are to be infolded, and as resting therein 60 with the infolders in a position to be moved inwardly, and the arm by which the templet is operated to descend on to, and rise from off the blank or bed shown as broken off. Fig. 2, shows in top view the same parts 65 that are illustrated at Fig. 1, with the exception that the templet is omitted, and the infolders are illustrated as having been moved inwardly. Fig. 3, is a side elevation of the machine, and Fig. 4, is a view of the 70 underside of the bed or table on which the mechanism is mounted to be operated. Figs. 5 and 6, are perspective views of two of the infolders, Fig. 6 showing also the slide-pin-plate F^2 engaged in the slideway I^3 in an 75 extension of the infolder-bar I^2 . Fig. 7, is a perspective of one of the slide-bars, of which there are two pairs used, with those of each pair arranged at diametrically opposite points to slidably engage one of the 80 infolder-bars. Fig. 8, is a perspective of one of four similar slot-plates, each having an arc-form exterior, and arranged at diametrically opposite points to connect with the slide-pins of one of the infolder-bars and 85 one of the slide-bars. Each of the slot-plates shown at Fig. 8, has a slot formed therein part of which is concentric and part eccentric. Fig. 9, is a perspective of one of four other slot-plates, each having the 90 same exterior arc-form as those shown at Fig. 8, but having the slot formed in each of them made with a centrally located concentric part, and at each end of the latter a connecting slot-part that is eccentric to the 95 ring with which these slot-plates connect. These slot-parts shown at Fig. 9 are each of them arranged to connect with the slide-pin of one of the infolder-bars and at diametrically opposite points to have another 100 of them connect with the slide-pin of one of the slide-bars where located between two of the slot-plates shown at Fig. 8, so that the slot-plates shown at Figs. 8 and 9 will be alternately arranged in the ring which op- 105 erates them. Fig. 10, is a cross-section taken on the line $z-z$ of Fig. 6, illustrating the method of connecting the slide-pins and slot

of the slot-plates; it being in each instance as shown at Fig. 10. Fig. 11, illustrates a blank cut from the fabric and having a form adapted to be infolded by the mechanism herein shown; Fig. 12, a blank in which the infolds have been formed to alternately overlap and underlap at the corners and in succession; and Fig. 13, two of the blanks which have been folded as shown at Fig. 12, and placed with their infolded edges arranged to be together with one of the corners of the outer blank shown as turned over and down, to illustrate how the interlocking of the blanks thus infolded can be accomplished at the corners before the blanks are sewed together.

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 B designates the bed constituting a support for the blanks to be infolded, W, the web on the under side of the bed, and R, a to-and-fro moving member or slide, shown in the form of a ring, having formed in its upper surface a groove g^2 , and provided with a handle H, by which to be reciprocatingly rotated in an annular slide-way G formed in the bed.

The letter T designates a templet for defining the blanks to be folded. Specifically it is of the form having expanding and in-drawing plates which when expanded will have on their outer edges the shape of the blank to be infolded. The letter A designates an arm which at its rear end a^2 is hinged to the bed, and at its front end a^3 , it connects with a bridge a^4 , upwardly projected from the templet stock S, on which connection the templet is operated to descend on to, and rise from off the bed. The arm A and connected parts form a convenient means for positioning the templet upon and removing it from the blanks. A counterpoise C^4 may be employed in connection with the arm A, the weight or adjustment of which will depend on whether the templet is desired to be normally in elevated or in lowered position. Preferably the counterpoise will overbalance the templet. No claim is made herein to the form of templet or positioning mechanism apart from the combination thereof with other features of this application; on the other hand it is not desired to impose limitations to the precise form thereof, as any well known or convenient positioning mechanism or templet may be employed.

The letters P, P, P, P, designate the templet-plates and they are each provided with an upwardly projected slide-pin p^2 , and a slide-way p^3 , formed in the stock S.

The letters E, E, designate plates of which there is one at each end of the stock S, having a slide-way centrally formed in the lat-

ter parallel to its sides to receive a slide-bar on the bottom of each of the plates E, which slide-ways and slide-bars are not shown.

The letters e^2 , designate a slot that is formed in each side of each of the plates E, and thereat adapted to receive one of the slide-pins p^2 , of one of the plates P.

The letter D designates a disk that is centrally pivoted to the stock d^3 , and the letter d^4 designates a handle laterally projected from the side of the disk.

The letters d^5 , d^5 , designate links each of which at one of its ends pivotally connects with one of the plates E, and at their inner ends they each connect with the disk D, at diametrically opposite points; whereby when the disk is reciprocatingly rotated the templet-plates are moved outwardly and inwardly.

To the before named parts excepting where used with my novel infolding mechanism I make no claim herein.

I will next describe the infolding mechanism including the slide-ways S^2 , the slide-bars I^1 engaged therein, used in actuating the infolders, the infolder-bars I^2 , and the folder-plates or thin blades m^1 , m^2 , which actually contact the blanks, and their operating mechanism. The thin infolder plates or parts m^1 , m^2 are rigidly secured under the infolder bars I^2 and with the latter may be said to constitute the infolders. The infolders thus shown as constituted of distinct heavy parts or bar-parts and thin or plate parts connected together, may be varied either in construction, form or style from what is shown.

The letters S^2 designate slide-ways of which there are two at the front and two at the rear of the machine bed, all of which are arranged to project inwardly from the outer edges of the bed in parallel direction. Each of those slide-ways S^2 , is produced by and between the bars b^2 , b^2 , of which there are two for each slide-way, secured to the machine bed by bolts b^3 .

The letters I^1 , I^1 , I^1 , I^1 , designate four slide-bars, they being L-form bars, each having a long arm l^2 arranged to slide in one of the slide-ways S^2 , with the short arm l^3 of the several slide-bars I^1 , arranged to be parallel to each other, and outwardly projected from the short-arm at right-angles thereto.

The letters I^2 , I^2 , I^2 , I^2 , designate the infolder-bars each of which is provided with a slide-way i^3 , formed in its outer end for the movement therein of the short arm l^3 , of that one of the slide-bars I^1 , which is next adjacent thereto. The slideway S^2 and i^3 , for the side-bars I^1 and the infolder bars I^2 , respectively, may be parallel to the respective sides of the blank adjacent the corner at which such parts are located, or may be at any desired angle to each other, but are

preferably at a right angle to each other, in the illustrative machine hereof. Each of the said infolder bars I^2 , is constructed with a laterally and rectangularly projected end bar-part i^4 , from the underside of which there is extended inwardly and laterally the end plate-part m^1 .

The letter m^2 designates a side plate-part which is arranged to project inwardly from the underside of that part of each of the folder-bars I^2 , designated at i^3 , and which side plate-part m^2 , is arranged to extend inwardly in each instance of its use where its inner end will subtend the rectangularly projecting end bar-part i^4 . Each of the plate-parts m^1 , as indicated at m^5 , is made to project beyond the inner end of the bar-part i^4 , of each of the infolder bars I^2 , and each of these plate-parts m^2 , is made to project beyond the end of that part of the folder-bars I^2 , designated at i^3 , the extension of the plate-part m^2 being indicated at m^6 .

With the four infolders thus constructed and arranged, when they are moved together inwardly their infolder end plate-parts m^2 , and the infolder side plate-parts m^2 , inclose an oblong square with the ends of the infolder plate-part m^2 lapping past each other at m^3 , and the ends of the side plate-parts lapping past each other at m^4 .

To facilitate the movement of the ends of the plates m^1 , and m^2 , at m^3 , and m^4 , where overlapping to form a continuous infolding edge and to prevent the ends of the plates so operated from catching in the fabric when moving over it the inner corner edges of the plates are rounded off as shown at m^7 , and the free overlapping end of each of the plates is slightly curved upwardly as indicated at m^8 . Sometimes it is unnecessary to make the adjacent infolders overlapping and I do not wish to be confined to this feature.

The letters N^1 designate slot-plates of which there are four so designated, and the letters N^2 designate four other slot-plates, all of which before designated slot-plates have an arc-form on their inner and outer edges by which they are adapted to be inserted in the annular groove g^2 , formed in the ring R , and secured therein by screws as shown, so as to move with said ring when it is operated in the annular slide-way G , formed in the machine bed. The letter O designates a slot that is formed in each of the plates N^1 , each of which slots has an eccentric slot-part designated at O^3 , and a concentric slot-part O^2 , each connecting with the other. Each of these slot-plates N^2 has formed therein the slot U , which latter at one of its ends has the eccentric slot-part u^2 , and at its other end the eccentric slot-part u^3 , and the intermediately centrally located and connected concentric slot-part u^4 .

The letters F^1 , designate slide-pin plates

of which there are four so designated, each of which is adapted to be inserted within a sink or recess R^2 , formed in the short-arm z^2 , of each of the slide bars I^1 , of which there are two at the front and two at the rear of the machine as before stated. As the slot-plates N^1 , and N^2 , are alternately arranged in the ring R , each pair of the bars I^1 , at the front and at the rear will have one of the plates F^1 , immediately over one of the slot-plates N^1 , and the other of the plates F^1 of the same pair over one of the slot-plates N^2 , and thus position the slot O^1 , of the plates N^1 , so as to be diametrically opposite to each other, and also cause the slots U , of the plates N^2 , at the front and rear to be diametrically opposite each other. The slide-pin plates F^1 , are adjustably connected to the short-arm of that one of the slide-bars I^2 , over which it is placed by the slot C^2 , and the screw c^3 .

The letters P^4 , designate slide-pins of which there is one projected downwardly from the inner end and underside of each of the two slide-pin plates F^1 , located at the front and rear of the machine. The slide-pin P^4 , upon one of the slide-pin plates F^1 at the front of the machine is entered within one of the slots O^1 , of the slot-plate N^1 , thereat, and the slide-pin P^4 , of the other slide-pin plate F^1 also at the front is entered within the slot U , of the slot-plate N^2 , thereat. The slide-pin P^4 , of one of the slide-pin plates at the rear of the machine is entered within the slot O^1 , of the slot-plate N^1 , thereat; and the slide-pin P^4 , of the other slide-pin plate F^1 at the rear of the machine is entered within the slot U of the slot-plate N^2 , located thereat.

The letters F^2 , designate slide-pin plates of which there are two arranged at each side of the machine. Each of these slide-pin plates F^2 , is arranged within a sink or recess R^3 , formed in the outer arm of one of the folder-bars I^2 , and thereat adjustably secured by means of a slot C , in the slide-pin plate and the screw c^2 , threaded into the outer arm of that one of the infolder-bars I^2 , in which said slide-pin plate is located.

The letters P^5 , designate slide-pins of which there is one downwardly projected from the inner end and underside of each of the two slide-pin plates F^2 , located at each side of the machine at diametrically opposite points; with the slide-pin P^5 , of one of the slide-pin plates F^2 , entered within the slot O^1 of the slot-plate N^1 , located at each side of the machine and each of the other pins P^5 , located within one of the slots U , of each of the slot-plates N^2 , where diametrically opposite at the sides of the machine.

The letters B^2 , designate presser-bars which are each mounted upon the upper ends of posts or studs h , which latter are extended downwardly through slide-passages

formed in the bed to connect with the presser-frame the operation of which will be detailed hereinafter.

The letters V, designate pressers each of which is mounted upon the upper end of one of the studs or posts v^2 , which are each provided with a passage-way in the machine bed, in which

slide-pins moving in the slot-plates N^1 , located at that end of the concentric slot parts O^3 , of each of the slots O^1 , whereat their movement begins, and wherein at the initial movement of the ring they will move without operating the corresponding slide-bars

while the slide-pins of all slot-plates N^2 , are movement of the eccentric parts U, when the handle in direction indicated by this initial movement moves the ring R, and N^1 , and N^2 , to move slide-way G, formed

presser-bars B^2 , and the studs or bars v , connect has two V-form ends E^3 , of which but one is shown (see Fig. 3) each of which ends is provided with two strengthening webs w^4 .

The letter B^3 , designates a horizontally arranged bar which connects the two ends of the presser-frame f^5 , said bar being indicated by a dotted line.

The letters M, designate a spiral spring of which there is one arranged beneath the bar B^3 , and the table K, at each end of said bar (there being but one of said springs shown).

The letter J, designates a bar depending from the underside of the machine bed and the letters L^3 , designate a lever having its fulcrum end pivoted to the lower end of the depending bar J, with the outer end of this lever pivotally connecting with the rod t^4 , of the foot-treadle T^6 , with the lever L^3 , between its fulcrum and its connection with the treadle-rod bearing upon the bar B^3 . When this foot-treadle is pressed downwardly it pulls down upon the outer end of the lever L^3 , and this bearing upon the bar B^3 , pulls down the presser-frame and causing the presser V, to bear upon the infolder-bars I^2 , and the bars B^2 , to bear upon the slide-bars I^1 , to thus press the infolds formed on the edges of the blank as they are between the infolders and the bed with said pressers and presser frame as well as the presser-bars B^2 , actuated to rise when pressure is withdrawn from the treadle and the springs M become operative.

The mechanism just described forms a convenient means to effect the pressing of the blanks between the bed and infolders, before the latter are moved outwardly. No claim is made herein to this presser mechanism apart from the combination thereof with other features; on the other hand it is not intended to limit the claims to the use of such presser mechanism, as other convenient forms may be used or all may be dispensed with when desirable.

The handle H, when in position to commence the infolding of a blank on the bed is placed as shown at Fig. 1, with all of the

in the bed. As the handle actuates the slide-pins of one pair of the slot-plates N^2 , where located diametrically opposite to each other at the front and rear will each operate one of the slide-bars I^1 , together with that one of the folder-bars I^2 , with which it connects by which the latter will be moved sidewise and thus carry a portion of the side edge of the blank over the templet edge thereat, while one of the slide-pins of that pair of the slot-plates N^2 , of which there is one at each side of the machine at diametrically opposite points, will actuate each of the two folder-bars thereat to move inwardly endwise and thus carry the edges of the blank thereat over the templet.

When the slide-pins operating in the slot-plates N^2 , reach the end of their initial movement in the eccentric slot-parts u^2 , of the slots U in which located, they cease to act upon the slide-bar or infolder-bar which they actuated at the beginning; but the slide-pins moving in the concentric slot-parts of the slots O^1 , of the plates N^1 , at the beginning having by the continued movement of the ring been caused to enter the eccentric slot-part O^3 , become active and operate to move inwardly endwise at diametrically opposite points the infolder-bars first actuated to move inwardly sidewise; and the slide-pins operating the other diametrically opposite slide-bars will cause the latter to move inwardly sidewise the infolder-bars which have been actuated to move inwardly endwise at the beginning.

While the slide-pins in the slot-plates N^1 , are moving in the eccentric parts O^3 , of the slots O^1 , the slide-pins moving in the slots U, of the slot-plates N^2 , pass from the concentric slot-part u^4 , to enter the terminal eccentric slot-parts of the slots U, of each of the slot-plates N^2 , and while moving therein the slight eccentricity of the slot-part u^3 , prevents the pins which are moving in the eccentric slot-parts O^3 , of the slot-plates N^1 , from giving a retrograding movement to the folder-bars I^2 , having their slide-ways in the slide-bars being operated upon.

During the initial movement of the slot-plates N^2 , alternatingly placed in the ring

R, with relation to the plates N^1 , there are formed upon each of the blank-sides at diagonally opposite ends a side infold by the inward movement thereof of the folder-bars I^2 , and their folder-plate parts m^2 , while at the same time there are formed at the other diagonally opposite corners of the blank an end infold by the inward movement of the folder-plate parts m^1 . This having been done and the advance movement of the ring continuing the slot-plates N^1 , become active to operate the slide-pins of the remaining slide-bars I^1 , and the infolder-bars I^2 , thus bringing into line the side infolder-plate parts m^2 , m^3 , of each side, and the end infolder-plate parts m^1 , m^1 , of each end, the side infolder-plate parts overlapping each other at m^4 , and the end folder-plate-parts at m^3 , the inward movement of the diametrically opposite folder bars I^2 , as each is operated by one of the slide-bars I^1 , turning down at diagonally opposite corners in the blank one of the end-folds, and the infolder-bars I^2 , operated directly by the plates N^1 , in turning down a side infold at the other opposite corner of the blank; so that by one advance movement of the ring R, there is formed on the blank B^4 , an infold upon all of its edges; with the infolds at the ends and sides alternately overlapping and underlapping at the corners.

The letters R^4 , designate a friction roller arranged on each of the slide-pins P, and P, illustrated as applied to the latter at Fig. 12, the latter showing the same arrangement of slide-pin-plate, slide-pins and friction roller that occurs when either the plates N^1 , or N^2 , are used. When the infolds have been thus formed upon the blank the ring is returned to original position to repeat the operation upon a new blank or blanks.

To produce alternately underlapping and overlapping infolds at the corners of the blank by one advancing movement of the mechanism I employ a series of infolder-bars actuated to move inwardly in one direction, and in sequence to move inwardly in another direction and at the same time to have another series of infolder-bars also arranged to move inwardly in two differing directions of movement to complete the formation of the infolds with overlapping and underlapping corners.

When in the claims herein I say "infolder bar", I refer to a movable bar or member to which an infolder plate is attached, and through which the infolder plate derives motion from a so-called slide-bar. "Slide-bar" likewise refers to a bar or member fitted by means of suitable guides or ways secured to the bed to move to and fro. The slide-bars and infolder bars combined form a convenient means of fitting the infolders or plates to move to and fro between an inward and an outward position with two

ranges of movement of differing direction, according to my invention. The several slot-plates and slide-pins intermediate these infolder bars and slide-bars and the said ring R, will be understood to form a cam engagement, the cam being a convenient infolder operating instrumentality.

As already made clear, one purpose of my invention is the production of blanks infolded in such manner that any two thereof may be fitted together to interlock or form a lock-corner cuff or other article, thereby dispensing with the necessity of employing two machines for folding two blanks that will interlock, or, in a given machine, two distinct infolder operations or adjustments, for that purpose. It will be apparent that since one of two identical blanks to be interlocked must be turned up side down before the two can be fitted together, the form of blank must be one that is symmetrical about at least one center line, either the longitudinal or lateral. When the blank is of a form symmetrical about one, for example the lateral line, it is merely desirable that each interlocking corner upon one side of that center line be formed with its infolds in the reverse order of the infolds of the symmetrically opposite corner. When however, the blank is symmetrical with respect to the longitudinal, as well as the lateral center line, as is the case with all rectangular blanks, such as has been selected for the illustrative machine hereof, it is especially desirable that the two folds meeting at each corner should be turned in, in the reverse order of that of both of the symmetrically opposite corners. Thus in Fig. 11 the upper left corner is formed in a reverse manner to that of the lower left corner as well as that of the upper right corner, because in the latter two cases the side fold is turned in after the end fold, while in the upper left corner the end fold is turned over afterward. The lower right corner is obviously formed similarly to the upper left, and either of these is adapted to interlock with either of the other two corners of a similar blank when turned up-side-down. The advantage is that not only may any two such blanks be interlocked, but either end of one such blank will lock into either end of the other, and the operator's attention is not required to select the proper end, in making up a cuff or like article.

By "infolder" in the claims I mean to include not only the infolding plate which actually contacts the blank edges, but also the infolder stock or body portion if there be one; as a whole the two constitute the infolder. By pressing folds beneath the infolders I mean any such pressing, whether by forcing down the infolders, or otherwise.

In claims 15, 16 and others, where a "series" or "plurality" of infolders are re-

cited as having certain characteristics or operation, this merely means that at least two (or perhaps more, but not necessarily all) of the infolders on the machine are to have such characteristics or operation.

In claims 35 to 42 inclusive, certain terms are used, which I explain as follows: "Slide device" refers to the device including the inwardly and outwardly sliding slide, such as I^1 , and all those concomitant parts which in operation are rigid with the slide, necessarily move with it, and are substantially parts of it. For example, the adjustable slide pin plates F^1 and pins p^4 are parts of the "slide device." By "movable actuating device" I refer to the ring R and all parts which are rigid with and substantially part of it, whether integral or attached. For example, the cam plates N^1 N^2 and the screws attaching them to the ring are included in the "movable actuating device." By a "direct connection" I mean an actually contacting connection, whether rigid, sliding, or otherwise. For example, the infolders have direct connection with the slides or slide devices. Also the "movable actuating device" has direct connection with the "slide devices," namely by the cam plate of the former contacting the cam pin of the latter. The infolders move in a horizontal plane immediately above the bed. The two slides for each infolder move in the same plane, and so does the actuating ring for the slides. Thus great simplicity is obtained and simple adjustments afford capability of much desirable variation in action.

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

40 1. In a folding machine, a bed, a templet, a plurality of independent infolders, each of which embraces a corner of the blanks to be folded so as to fold adjacent edges thereof, means for moving each of said infolders 45 bodily inward successively in two approximately straight lines, one of which is at an angle with the other, and means for retaining each of said infolders in its inward position until the completion of the fold producing operation.

50 2. In a folding machine, a bed, an expandible templet, a plurality of independent infolders, each of which embraces a corner of the blank to be folded so as to fold adjacent edges thereof, means for moving each 55 of said infolders bodily inward successively in two approximately straight lines, one of which is at an angle with the other, and means for retaining each of said infolders in its inward position until the completion 60 of the fold producing operation.

65 3. In a folding machine, a bed, a templet, a plurality of independent infolders, each of which embraces a corner of the blank to be folded so as to fold adjacent edges thereof,

means for moving each of said infolders bodily inward successively in two approximately straight lines, one of which is at an angle with the other, means for retaining each of said infolders in its inward position 70 until the completion of the fold producing operation, and means for pressing the blanks beneath said infolders while in their infolding position.

4. In a folding machine, a bed, a templet, 75 a plurality of independent infolders, each of which embraces a corner of the blank to be folded so as to fold adjacent edges thereof, means for moving each of said infolders bodily inward successively in two approxi- 80 mately straight lines, one of which is at an angle with the other, means for retaining each of said infolders in its inward position until the completion of the fold producing operation, and means for pressing the folded 85 blank beneath said infolders.

5. In a folding machine, a bed, a templet, a plurality of infolders, means for moving said infolders inward in two different directions successively, the directions of the 90 first movement of adjacent infolders being at an angle with each holder, and the direction of the second movement of each infolder being in a line parallel with that of the first movement of the adjacent infolder. 95

6. In a folding machine, a bed, a templet, a plurality of infolders together approximately inclosing the area occupied by a blank to be folded, each of said infolders inclosing a part of two adjacent sides of said area, 100 means for moving said infolders inward in two different directions successively, the directions of the first movement of adjacent infolders being at an angle with each other, and the direction of the second move- 105 ment of each infolder being in a line parallel with that of the first movement of the adjacent infolder.

7. In a folding machine, a bed for receiving a blank to be folded, a templet, a plu- 110 rality of infolders each of which is formed with blades one of which extends at an angle to the other, whereby it is adapted to operate upon a portion of each of two adjacent sides of the blank, infolder bars on 115 which said infolders are mounted, slides for guiding said infolder bars, and means operating through said infolder bars for moving said infolders inward in two different directions successively. 120

8. In a folding machine, a bed, a templet, a plurality of infolders, a rotatable ring, a plurality of cams in said ring, and connections between said cams and said infolders for moving said infolders inward in two 125 different directions successively.

9. In a folding machine, a bed, a templet, a plurality of infolders, each of which is formed with blades one of which extends at an angle to the other, whereby it is adapted 130

to operate upon parts of two adjacent sides of a blank to be folded, a rotatable ring, cams in said ring, and connections between said infolders and said cams for moving said infolders successively in the direction of each of their sides.

10. In a folding machine, the combination with a bed, of a templet adapted to move onto the bed, infolder bars each having on its inner edge an infolder provided with an up-turned inner end, each up-turned end being arranged to move over the end of the adjacent blade when moved inwardly, said infolders on each bar inclosing a part of one end and a part of one side of the area which they together inclose, and means substantially as described for moving said infolder bars inwardly, said means operating to first move diagonally opposite bars side-wise and the intermediate bars endwise, and afterward to move the first-named bars endwise and the last-named bars sidewise, whereby there will be formed upon a blank placed upon the bed infolds having overlapping and underlapping corners.

11. In a machine for infolding the edges of blanks for cuffs or like articles, the combination of a support for the blanks to be infolded, a templet having edge portions adapted to bear upon and define the blanks on said support, a plurality of independent angular infolders each of which embraces a corner of the blank and is provided with an infold receiving slot at or near the corner thereof, means for moving said infolders inwardly and outwardly to infold edge portions of the blanks over edge portions of the templet, said means being operative to give either of said infolders two ranges of movements above the edge portions of the blanks on either side of the corner, whereby they may be folded in succession, the fold entering the said slot when the first portion is infolded, and the second portion folded over said first portion, to form a lock corner, and means for pressing the folded blanks beneath said infolders.

12. In a machine for infolding the edges of blanks for cuffs or like articles of symmetrical form, the combination of a support for the blanks to be infolded, a templet having edge portions adapted to bear upon and define the blanks on said support, means for infolding edge portions of the blanks over edge portions of said templet, said means comprising independent infolders each of which embraces a corner of the blank, a plurality of simultaneously operating means for moving said infolders in two different directions above the edges of the blank, said moving means being operative to successively move adjacent infolders in different directions, and means for pressing the folded blanks beneath said infolders.

13. In a machine for infolding the edges

of blanks for cuffs or like articles, the combination of a support for a blank to be infolded, a templet having edge portions adapted to bear upon and define the blanks on said support, means for infolding edge portions of the blank over edge portions of said templet, comprising a series of infolders each embracing a corner of the blank and fitted to move inwardly and outwardly and in cooperation with each corner of the templet, means for moving said infolders successively in two different directions above and approximately parallel with the edges of the templet, said moving means being operative to simultaneously move adjacent infolders in different directions, and means for pressing the folded blanks beneath said infolders.

14. In a machine for infolding the edges of blanks for cuffs or like articles of symmetrical form, the combination of a support for the blanks to be infolded, a templet having edge portions adapted to bear upon and define the blanks upon said support, a plurality of independent angular infolders each of which embraces a corner of such blank, means for moving said infolders inwardly and outwardly to fold edge portions of the blanks over edge portions of the templet with two successive ranges of inward movement each of which is approximately parallel with one of the edges of said templet, whereby the contiguous edge portions of the blanks meeting at each corner may be intumed successively and in the reverse order to the contiguous edge portions of the adjacent corner, whereby the blanks produced will be of such description that any two thereof may be interlocked in making up the cuff or like article, and mechanical means for pressing the folded blanks beneath said infolders.

15. In a folding machine the combination of a plurality of cooperating but independent infolders each of which embraces an angular corner of a blank so as to infold adjacent edges thereof and each of which has a fold receiving slot for forming the fabric into a lock corner, and means for moving each of said infolders bodily inward successively in two different directions, so as to cause said edges to be successively folded, said moving means constructed for so actuating said several infolders in the same operative movement that all of said infolders will occupy their inward positions at the completion of the fold producing operation.

16. In a folding machine, the combination of a plurality of cooperating but independent infolders, each of which embraces an angular corner of a blank so as to infold adjacent edges thereof, and each of which has a fold receiving slot for forming the fabric into a lock corner, and mechanism for

moving each of said infolders bodily inward in such manner as to cause said edges to be successively infolded, said infolder moving mechanism constructed for so actuating such infolders by the same operative movement that all of such infolders will occupy their inward positions at the completion of the fold producing operation.

17. In a folding machine, the combination of a plurality of coöperating but independent infolders, and mechanism for moving all of said infolders inward by the same operative movement so that all of said infolders will occupy their inward positions at the completion of the fold producing operation; at least one of such infolders constructed to embrace an angular corner of a blank so as to infold adjacent edges thereof and having an infold receiving slot for forming the fabric into a lock corner, and said mechanism constructed for moving such slotted infolders in such manner as to cause said adjacent edges to be successively infolded.

18. In a folding machine, the combination of a plurality of coöperating but independent infolders, each of which embraces a corner of a blank so as to infold adjacent edges thereof, mechanism for moving all of said infolders bodily inward by the same operative movement, so that all of said infolders will occupy their inward positions at the completion of the fold producing operation; two of said infolders which are operative upon adjacent corners of the blank being provided with infold receiving slots for forming the fabric into lock corners, and said moving mechanism being constructed and fitted to move each of said last named two infolders in such manner as to cause the adjacent edges of the blank infolded thereby to be successively infolded.

19. In a folding machine, a bed, a templet, a plurality of infolders each operating successively to fold two adjacent edges of the blank, means for giving each of said infolders successive rectilinear movement in two directions, and means for pressing the folded blanks beneath said infolders.

20. In a folding machine, a bed, a contractible templet, a plurality of infolders each adapted to fold two adjacent edges of the blank, means for giving each of said infolders rectilinear movement dissimultaneously in lateral and longitudinal directions, and means for pressing the folded blanks beneath said infolders.

21. In a machine adapted to fold an approximately quadrilateral blank, a bed, a templet, four infolders, and means for moving each of said infolders first inward upon said bed in a line at an angle of approximately 90° with the first direction of movement of the adjacent infolder and afterward in a line at an angle of approximately 90° with its own former movement.

22. In a machine adapted to fold an approximately quadrilateral blank, a bed, a templet, four infolders, means for moving each of said infolders first inward upon said bed in a line at an angle of approximately 90° with the first direction of movement of the adjacent infolder and afterward in a line at an angle of approximately 90° with its own former movement, and means for pressing the folded blanks beneath said infolders.

23. In a folding machine, a bed, a templet, a plurality of independent infolders, each of which embraces a corner of the blank to be folded so as to fold adjacent edges thereof, means for moving each of said infolders bodily inward successively in two approximately straight lines, one of which is at an angle with the other, means for retaining each of said infolders in its inward position until the completion of the fold producing operation, and means for pressing the folded blank in the place where infolded.

24. In a folding machine, a bed, a templet, a plurality of independent infolders, each of which embraces a corner of the blank to be folded so as to fold adjacent edges thereof, means for moving each of said infolders bodily inward successively in two approximately straight lines, one of which is at an angle with the other, means for retaining each of said infolders in its inward position until the completion of the fold producing operation, and means for pressing the folded blank between the infolders and the bed.

25. In a machine for infolding the edges of blanks for cuffs or like articles, the combination of a support for the blanks to be infolded, a templet having edge portions adapted to bear upon and define the blanks on said support, a plurality of independent angular infolders each of which embraces a corner of the blank and is provided with an infold receiving slot at or near the corner thereof, means for moving said infolders inwardly and outwardly to infold edge portions of the blanks over edge portions of the templet, said moving means being adapted to impart to each of said infolders inward movement in two successive components, each component of movement being with respect to one of the two blank edges meeting at such corner, whereby such meeting edges may be folded in succession, the fold entering the slot when the first portion is infolded, and the second portion folded over said first portion, to form a lock corner, and means for pressing the folded blank between the infolders and the bed.

26. In a machine for infolding the edges of blanks for cuffs or like articles, the combination of a support for the blanks to be folded, a templet having edge portions adapted to bear upon and define the blanks on said support, means for infolding edge

portions of the blanks over edge portions of said templet, said means comprising independent infolders each of which embraces a corner of the blank, a plurality of simultaneously operating means for moving each of said infolders in two different directions above the edges of the blank, said moving means being operative to successively move inwardly the adjacent portions of two different infolders, and means for pressing the folded blank between the infolders and the bed.

27. In a machine for infolding lock corner blanks for cuffs or like articles, the combination of a support for the blank to be folded, a templet having edge portions adapted to bear upon and define the blanks on said support, means for infolding edge portions of the blank over edge portions of said templet comprising a series of independent infolders having provision for forming the fabric into a lock corner, each of said infolders embracing a corner of the blank and fitted to move inwardly and outwardly and in cooperation with each corner of the templet, means for moving each of said infolders successively in two different directions above and approximately parallel with the edges of the templet, said moving means being operative to simultaneously move adjacent infolders in different directions, and means for pressing the folded blank between the infolders and the bed.

28. In a machine for infolding lock corner blanks for cuffs or like articles having symmetrical form and angular corners, the combination of a support for the blanks to be folded, a templet having edge portions adapted to bear upon and define the blanks upon said support, a plurality of independent angular infolders having provision for forming the fabric into a lock corner, each of which infolders embraces an angular corner of the blank, means for moving said infolders inwardly and outwardly with a two-component motion to fold edge portions of the blanks over edge portions of the templet, each component of which is approximately parallel with one of the edges of said templet, whereby the contiguous edge portions of the blanks meeting at each corner may be intumed successively and in the reverse order to the contiguous edge portions of the adjacent corner, and means for pressing the folded blank between the infolders and the bed.

29. In a machine for infolding lock corner blanks for cuffs or like articles having symmetrical form and angular corners, the combination of a support for the blanks to be folded, a templet having edge portions adapted to bear upon and define the blanks upon said support, a plurality of independent angular infolders having provision for forming the fabric into a lock corner, each

of which infolders embraces an angular corner of the blank, means for moving said infolders inwardly and outwardly with a two-component motion to fold edge portions of the blanks over edge portions of the templet, each component of which is approximately parallel with one of the edges of said templet, whereby the contiguous edge portions of the blanks meeting at each corner may be intumed successively and in the reverse order to the contiguous edge portions at each adjacent corner, and means for pressing the folded blank in the place where infolded.

30. In a folding machine, a bed, a templet, a plurality of separate angular infolders, each operating successively to fold two adjacent edges of the blank, means for giving each of said infolders an inward movement comprising successive rectilinear components of inward movement in two different directions, and means for pressing the folded blank between the infolders and the bed.

31. In a folding machine, a bed, a contractible templet, a plurality of separate angular infolders, each adapted to fold two adjacent edges of the blank, means for giving each of said infolders an inward movement comprising two rectilinear components of movement dissimultaneously in lateral and longitudinal inward directions, and means for pressing the folded blank between the infolders and the bed.

32. In a machine adapted to fold an approximately quadrilateral blank, a bed, a templet, four infolders, means for moving each of said infolders first inward upon said bed in a line at an angle of approximately 90° with that of the adjacent infolder and afterward in a line at an angle of approximately 90° with its own forward movement, and means for pressing the folded blank between the infolders and the bed.

33. In a folding machine, an infolder constructed and fitted to embrace a corner of the blank to be folded and to engage and fold a portion of each edge of said blank adjacent said corner, actuating means, outwardly extending slides intermediate of said actuating means and said infolder, one of which slides at an angle with the other, said infolder having sliding connection with one of said intermediate slides, whereby the infolders may be moved inwardly successively in two directions, all the folding and return movements of all said parts being approximately in the horizontal plane.

34. In a folding machine, an infolder constructed and fitted to embrace a corner of the blank to be folded and to engage and fold a portion of each edge of said blank adjacent said corner, actuating means, outwardly extending slides intermediate of said actuating means and said infolder, one of which slides at an angle with the other in the same plane, and both slides adapted at

their outer ends to be pushed inward and pulled outward by said actuating means in the direction of their lengths respectively, said infolder having sliding connections with one of said intermediate slides, whereby the infolders may be moved inwardly successively in two directions, all the folding and return movements of all said parts being approximately in the horizontal plane.

35. In a folding machine, the combination of a templet, a series of separate infolders, at least one thereof constructed and fitted to embrace a corner of the blank to be folded and to engage and fold a portion of each edge of said blank adjacent said corner and fitted for inward and outward movement, separate slide devices, one moving at an angle with the other, the infolder having direct connections with both and sliding connection with at least one of said slide devices, and a movable actuating device directly connected to each of said slide devices for successively moving them, all the folding and return movements of all said parts being approximately in the horizontal plane.

36. In a folding machine, the combination of a templet, a series of separate infolders, at least one thereof constructed and fitted to embrace a corner of the blank to be folded and to engage and fold a portion of each edge of said blank adjacent said corner and fitted for inward and outward movement, separate slide devices, one moving at an angle with the other, the infolder having direct connections with one and sliding connection with the other, and a movable actuating device directly connected to both of said slide devices for successively moving them, all the folding and return movements of all said parts being approximately in the horizontal plane.

37. In a folding machine, the combination of a templet, a series of separate infolders, at least one thereof constructed and fitted to embrace a corner of the blank to be folded and to engage and fold a portion of each edge of said blank adjacent said corner, two slide devices, one moving at an angle with the other, a movable actuating device for actuating said slide devices, direct operative connections between each slide device and said actuating device, and direct operative connections between each slide device and said infolder, the connections between said slide devices and said actuating device being detachable, and all the folding and return movements of all said parts being approximately in the horizontal plane.

38. In a folding machine, an infolder constructed and fitted to embrace a corner of the blank to be folded and to engage and fold a portion of each edge of said blank adjacent said corner, two slide devices, one moving at an angle with the other, a movable actuating device for actuating said slide

devices, direct operative connections between each slide device and said actuating device, and direct operative connections between each slide device and said infolder, the connections between said slide devices and said actuating device being adjustable.

39. In a folding machine, an infolder constructed and fitted to embrace a corner of the blank to be folded and to engage and fold a portion of each edge of said blank adjacent said corner, two slide devices, one moving at an angle with the other, a movable actuating device for actuating said slide devices, direct operative connections between each slide device and said actuating device, and direct operative connections between each slide device and said infolder, the connections between said slide devices and said actuating device being both adjustable and detachable.

40. In a folding machine, the combination of a templet, a series of infolders, each infolder having two slide devices, one moving at an angle with the other, a movable actuating device directly connected with both of said slide devices for actuating the same, and operative connections between each slide device and said infolder, the connections between said slide devices and said actuating device including cams, for moving said infolders inwardly successively in two directions, and the said cam connections being detachable.

41. In a folding machine, an infolder, two slide devices, one moving at an angle with the other, a movable actuating device directly connected with each of said slide devices for actuating the same, and operative connections between each slide device and said infolder, the connections between said slide devices and said actuating device including cams, for moving said infolder inwardly successively in two directions, and the said cam connections being adjustable.

42. In a folding machine, an infolder, two slide devices, one moving at an angle with the other, a movable actuating device directly connected with each of said slide devices for actuating the same, and operative connections between each slide device and said infolder, the connections between each slide device and said actuating device including cams, for moving said infolders inwardly successively in two directions, and the said cam connections being both adjustable and detachable.

43. In a folding machine for making lock corner blanks the combination of a plurality of cooperating but independent infolders each of which embraces a corner of a blank to be folded so as to fold adjacent edges thereof said infolders having provision for forming the fabric into a lock corner, and means for moving each of said infolders bodily inward successively in two different

directions so as to cause said edges to be successively folded, said moving means constructed for so actuating said several infolders in the same operative movement that all of said infolders will occupy their inward positions at the completion of the fold producing operation.

44. In a folding machine for making lock corner blanks the combination of a plurality of cooperating but independent infolders each of which embraces a corner of a blank to be folded so as to fold adjacent edges thereof, and means for moving each of said infolders bodily inward successively in two different directions so as to cause said edges to be successively folded, said moving means constructed for so actuating said several infolders in the same operative movement that all of said infolders will occupy their inward positions at the completion of the fold producing operation; and each of said infolders having a slot within which the fold it first forms may pass prior to its forming the second fold.

45. In a folding machine for making lock corner blanks the combination of a plurality of cooperating but independent infolders each of which embraces a corner of a blank to be folded so as to fold adjacent edges thereof said infolders having provision for forming the fabric into a lock corner, means for moving each of said infolders bodily inward successively in two different directions so as to cause said edges to be successively folded, said moving means construct-

ed for so actuating said several infolders in the same operative movement that all of said infolders will occupy their inward positions at the completion of the fold producing operation; a contractible templet and means for pressing the folds beneath said infolders after the contraction of said templet.

46. In a folding machine for making lock corner blanks the combination of a plurality of cooperating but independent infolders each of which embraces a corner of a blank to be folded so as to fold adjacent edges thereof, and means for moving each of said infolders bodily inward successively in two different directions so as to cause said edges to be successively folded, said moving means constructed for so actuating said several infolders in the same operative movement that all of said infolders will occupy their inward positions at the completion of the fold producing operation; and each of said infolders having a slot within which the fold it first forms may pass prior to its forming the second fold; a contractible templet, and means for pressing the folds beneath said infolders after the contraction of said templet.

Signed at the city of Troy, N. Y., this 7th day of March 1901 and in the presence of the witnesses whose names are hereto written.

GARRY J. DORMANDY.

Witnesses:

E. H. HOUSE,
E. O. HOUSE.