

J. K. P. PINE.
MACHINE FOR BENDING COLLARS AND THE LIKE.
APPLICATION FILED AUG. 18, 1905.

974,426.

Patented Nov. 1, 1910.

3 SHEETS-SHEET 1.

FIG. 2.

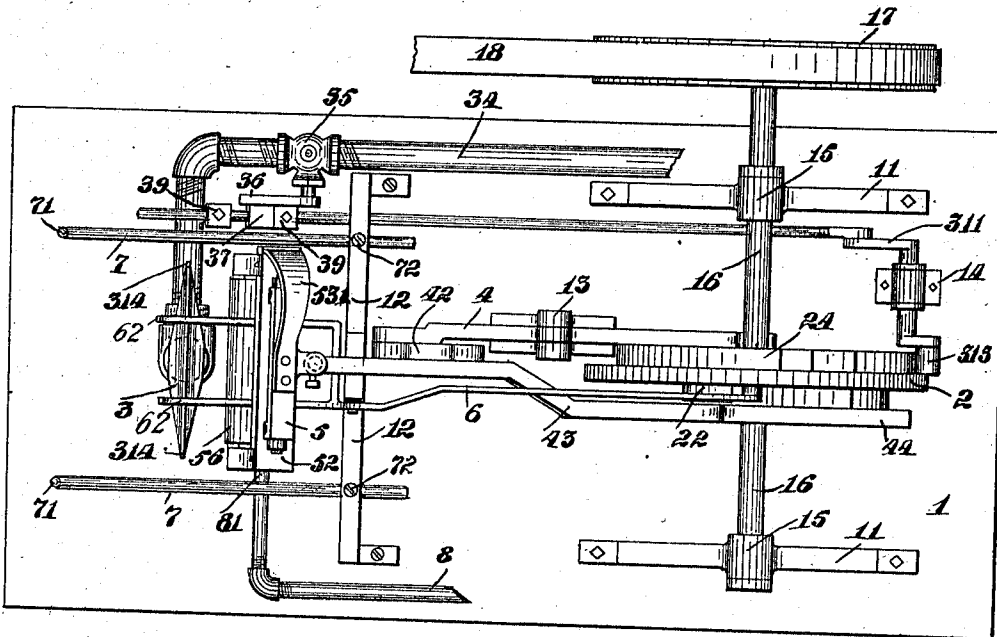
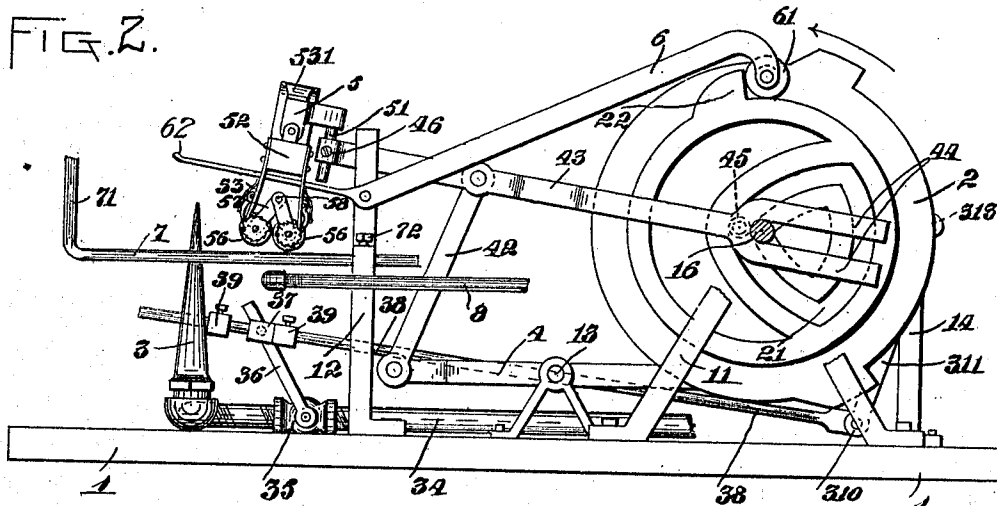


FIG. 1.

WITNESSES

Wm. S. Greer

Geo. H. Fisher

James K. P. Pine

INVENTOR

By S. Dickerson, Broker,
Residence of James K. Pine,
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FIG. 12.



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3 SHEETS—SHEET 2.

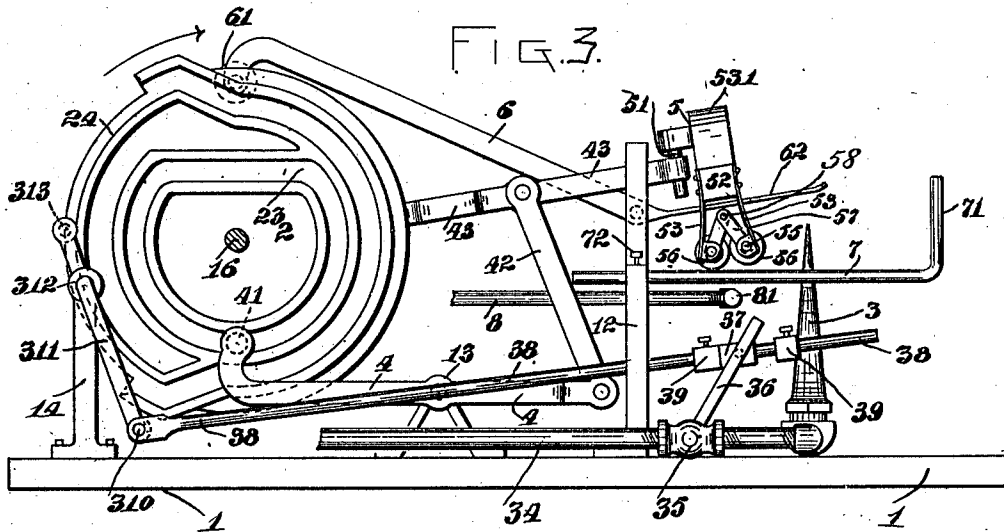


FIG. 4.

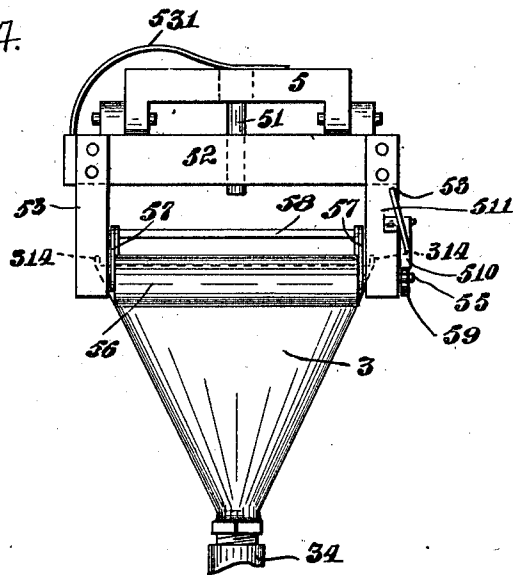
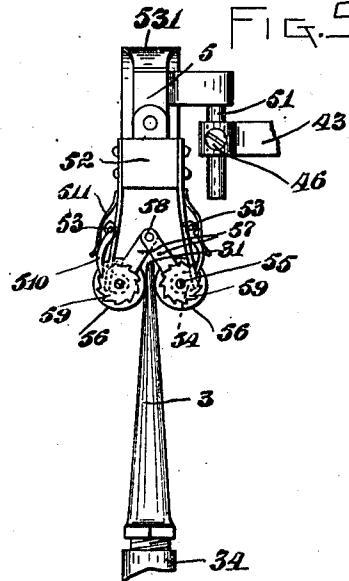


FIG. 5.



WITNESSES

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3 SHEETS—SHEET 3.

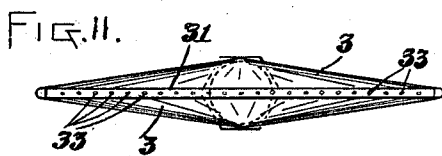
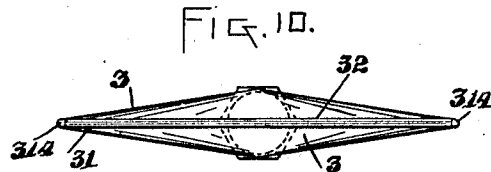
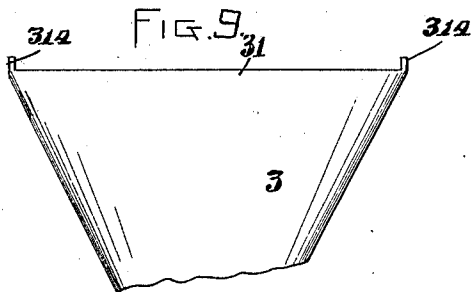
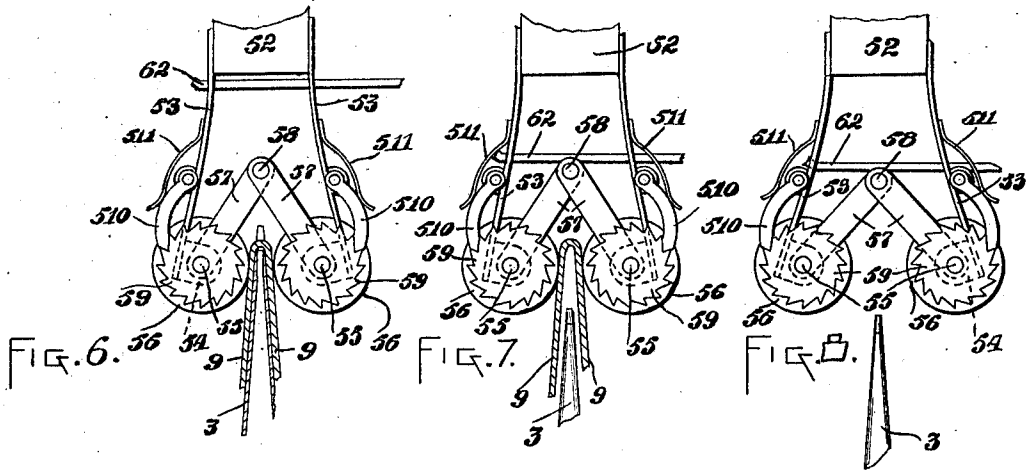
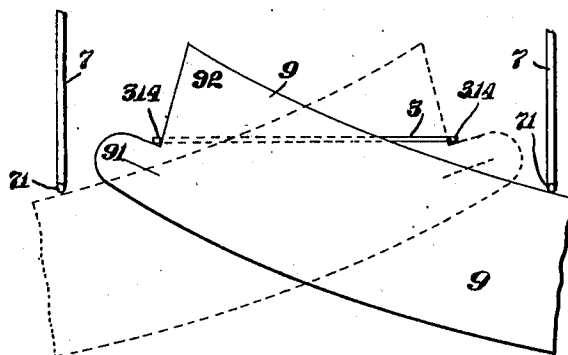


FIG. 13.



WITNESSES

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UNITED STATES PATENT OFFICE.

JAMES K. P. PINE, OF TROY, NEW YORK, ASSIGNOR TO UNITED SHIRT & COLLAR COMPANY, A CORPORATION OF NEW YORK.

MACHINE FOR BENDING COLLARS AND THE LIKE.

974,426.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed August 18, 1905. Serial No. 274,787.

To all whom it may concern:

Be it known that I, JAMES K. P. PINE, a citizen of the United States, and a resident of Troy, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Machines for Bending Collars and the Like, of which the following is a specification.

My invention relates to a machine for bending starched articles, and more particularly a machine for folding or bending the corner of a collar, cuff or similar article. Men's linen collars of the wing or wing-point form are ordinarily laundered flat, and the wing or corner is afterward bent outward. On account of the stiffening of the collar by the starch therein, the material is very likely to crack along the line of fold.

My device is a novel machine for bending starched articles such as wings of collars and it also provides novel means for dampening the collar to a sufficient extent before or as it is folded, and means for adjustment so that collars of different sizes and patterns may be folded on the same machine.

In the drawings, Figure 1 is a plan view of a machine embodying my invention. Figs. 2 and 3 are side elevations of the opposite sides thereof. Fig. 4 is a partial end elevation showing the fold producing device. Fig. 5 is an end elevation of the part shown in Fig. 4. Figs. 6, 7 and 8 are partial end elevations on an enlarged scale of the fold-producing portion of the device, showing its different positions. Fig. 9 is a partial end elevation showing the support for the article to be folded. Fig. 10 is a plan view of the same. Fig. 11 is a similar plan view showing a modification. Fig. 12 is a partial detail plan view of a heating device. Fig. 13 is a partial diagrammatic plan view showing the gage portion of the device.

I will first describe a particular form of machine constituting one embodiment of my invention and will afterward point out the novel features in the claims.

Broadly speaking my machine for producing a bend in starched fabric articles contemplates first a member having an edge over which the article may be bent, said edge corresponding with the line of the bend. Second, a bending device for cooperating with said edged member upon both sides of the edge of the latter, preferably

comprising for example a pair of rollers, one of which may pass on one side and the other on the other side of the edge when an article is being bent. Third, a mechanism for producing relative movement between said first and second elements so that on their relative approach the fabric may be bent about the edged member and on the separation or relative movement from each other, the article may be released to permit its removal and the insertion of a new one; this mechanism acting preferably upon the bending device only so as to cause it to approach and recede from the edged member. In connection with the above principal elements, I also preferably provide heating means such as passages for steam circulation by which the edged member or the bending device may be maintained in highly heated condition, which would be important in bending the wings of wing collars. Also an apparatus by which the starch of the starched article may be moistened so as to break the starch along the apex of the edged member previously to its bending; and the action thereof should be such that the moistening ceases as or immediately before the bending takes place in order that the bending may be in the nature of an ironing action and leave the finished article without any moisture. To this end my invention in its preferred form contemplates also such an apparatus that the starch breaking medium or steam can be intermittently applied along the edge to be bent, and this intermittent action is secured automatically in the specific form of machine illustrated in the drawings, through the agency of appropriate mechanical connections. Other preferred features or details will appear in the following detailed description, which as previously stated discloses but one of many forms which my improvements may assume.

1 designates the base of the machine, from which rise standards 11, 12, 13 and 14. The standards 11 are provided with suitable bearings 15 for a shaft 16, on which is a pulley 17 connected by a belt 18 to any source of power. Mounted on the shaft 16 is a cam wheel 2, on one side of which is an approximately triangular cam groove 21 and a cam 22, (see Fig. 2), and on the other side of which is a cam groove 23 and a cam surface 24, to be hereafter described, (see Fig. 3). Suitably supported on the base 1

is a support 3 for the article to be folded. This is shown as a hollow chamber flared at its top and having an edge 31 formed with a slot 32 (see Fig. 10), or in the modified form shown in Fig. 11, formed with a plurality of apertures 33. To the chamber of the support 3 leads a pipe 34 which is connected with a supply of steam or other suitable dampening medium. In the pipe 34 (see Fig. 3), is a valve 35 having a handle lever 36 pivotally secured to a block 37, which is apertured to slide freely on a rod 38. On the rod 38 are set collars 39, one at each side of the block 37. One end of the rod 38 is pivoted at 310 to a lever 311 pivoted at 312 to the standard 14. At the other end of the lever 311 is a pin 313 which may advantageously be provided with a roller, and which moves on the cam surface 24 on the cam wheel 2. As shown, the support 3 is provided at its upper corners with upwardly extending lugs 314, (see Fig. 9). Pivoted on the standard 13 is a lever 4, at one end of which is a roller pin 41 running in the cam groove 23, Fig. 3. The other end of the lever 4 is connected by a link 42 to a lever 43, the end 44 of which is bifurcated to pass over and be guided by the shaft 16, Fig. 2. On the lever 43 is a roller pin 45 engaging in the cam groove 21. At the other end of the lever 43 is a socket 46, in which is adjustably mounted by means of a pin 51 a yoke 5, to which is pivoted a cross bar 52, Fig. 4. A flat spring 531 is shown as secured on the upper side of the yoke 5, and as having its free squared end bearing on the upper face of the bar 52. At the ends of the bar 52 (see Figs. 6, 7 and 8), are flat springs 53 having at their free ends lugs 54 forming bearings for the parallel shafts 55 of two rollers 56, Fig. 5. The ends of the shafts 55 are connected by links 57 pivoted together by a shaft 58. Ratchet wheels 59 secured at the end of each of the shafts 55 engage with oppositely disposed dogs 510 pivoted on the spring straps 53 and maintained in engagement by flat springs 511. Pivoted on the standard 12 is a lever 6, one end of which is provided with a roller pin 61 adapted to cooperate with the cam 22 on the cam wheel 2. At the other end of the lever 6 is a forked portion 62, which passes between the strap springs 53 and is adapted to bear against the pivot shaft 58. This forked portion of the lever or bar 6 is beyond the point where said bar is pivoted, and as seen in Fig. 1 is preferably made with two branches by reason of the bar being forked at this point. The forked bar portion 62 is extended as explained between the springs 53 and in such a position that when moved downwardly the branches thereof will press the shaft 58, causing the links 57 to act as a toggle to separate the rollers 56 and release the collar. The forked por-

tion 62 is given such length that when the rollers are shifted from the idle position of Figs. 1, 2 and 3 to a position above the support 3, the portion 62 will still be in proper relation for actuating the links 57 to separate the rollers. Passing through suitable apertures in the standard 12 are gage rods 7, the free ends 71 of which are up-turned, the rods 7 extending at each side of the support 3. The rods 7 are made longitudinally adjustable in the standard 12 by set screws 72. Connected with a gas supply is a pipe 8, the end 81 of which is provided with gas emission apertures 82 (see Fig. 12), and is placed as shown in Figs. 2 and 3 of the drawings for a purpose to be hereafter described.

The operation of my device is as follows: The collar 9 or other article to be folded is placed on the edge 31 of the support 3, the upper edge of the body of the collar bearing against the upturned end 71 of the gage rod 7, and the lug 314 on the support 3 engaging in the corner of the collar between the nose 91 and the wing 92. It is obvious that the gages 7 may be so set as to bend a corner 92 of any desired size and shape. By providing the gages 7 and lugs 314 in duplicate, both corners of the collar may be bent, as indicated in Fig. 13. The machine standing in the position indicated in Figs. 1, 2 and 3 of the drawings, is then started, when the levers 4 and 43 act to move the rollers 56 toward the edge 31 of the support 3, and then downward over the edge and over the collar 9, as shown in Fig. 6. The further movement of the machine raises the rollers 6 off the support 3 with the collar inclosed between them, as shown in Fig. 7. When the shaft 58 rises to the position shown in Fig. 7, it is forced by the quick downward movement of the forked end 62 of the lever 6 so as to spread the rollers apart (see Fig. 8). This releases the collar and permits the operator to remove it. The cams on the cam wheel 2 are so timed that immediately before the bending action of the rollers is applied to the collar, the valve 35 is opened and then immediately cut off so as to permit a small quantity of steam to pass out of the apertures 32 or 33 to moisten the collar so as to prevent its cracking during the folding operation. By properly adjusting the set collars 39, the time of the steam admission and cut-off may be regulated as desired, but practically the steam should be cut off as the bending takes place, that is, not later than the actual bending, since the article is to be left dry. By this I mean it may be before the bending takes place if it be immediately before, not long enough before to permit the collar to dry or the starch to stiffen before the bending. When the rollers 56 are moved away from the support 3 and returned to the position

shown in Figs. 1, 2 and 3 of the drawings, they are located immediately over the gas apertures 82 in the pipe end 81, which dries the rollers of any superfluous moisture. By reason of the pivotal motion of the bar 52 on the yoke 5, which motion is controlled and limited by the spring 531, any slight adjustment of the downward movement of the rollers over the collar is made by the support 3. This is advantageous particularly when the wing of the collar or other article to be folded is of fewer plies than the body of the collar.

It is obvious that many mechanical changes may be made in my device without departing from my invention, and that parts of the device may be used without others.

What I claim is:—

1. In a bending machine, a hollow support for the article to be folded having an edge portion apertured for the escape of a dampening medium, a device or member for bending the article over said edge portion by a movement of said device or member toward said support, means for supplying dampening medium to the interior of said support; and automatically operating means whereby said supplying means is intermittently operated substantially in the manner and for the purposes set forth.

2. In a bending machine, a hollow support for the article to be folded, having an edge portion apertured for the escape of a dampening medium, a device or member passing on both sides of said edge portion for bending the article over said edge portion by a movement toward said support, means for supplying dampening medium to the interior of said support; and automatically operating means whereby said supplying means is intermittently operated substantially in the manner and for the purposes set forth.

3. In a wing bending machine, a hollow support for the article to be folded having an edge portion apertured for the escape of a dampening medium, means for supplying such dampening medium to said support, and means including a pair of rollers, one of which passes on each side of said edge portion, for folding the article over the edge of said support.

4. In a wing bending machine, a hollow support for the article to be folded having an edge portion apertured for the escape of a dampening medium, means for supplying such dampening medium to said support, means for folding the article over the edge of said support, and a guide on said support for the article to be folded.

5. In a wing bending machine, a hollow support for the article to be folded having an edge portion apertured for the escape of a dampening medium, means for supplying such dampening medium to said support,

means for folding the article over the edge of said support, and guides, one of which is adjustable, for the article to be folded.

6. In a wing bending machine, a hollow support for the article to be folded having an edge portion apertured for the escape of a dampening medium, means for supplying such dampening medium to said support, means for folding the article over the edge of said support, and guides, one of which is on said support and one of which is adjustable, for the article to be folded.

7. In a wing bending machine, a hollow support for the article to be folded having an edge portion apertured for the escape of a dampening medium, means for supplying such dampening medium to said support, means for folding the article over the edge of said support, and guides for adjusting each end of the article to be folded in suitable relation to said support.

8. In a wing bending machine, a support for the article to be folded having an edge portion, a pair of rollers, one of which passes on each side of said edge portion, for folding a wing on said article over said support, and reciprocating means for moving said rollers into and out of operative position.

9. In a wing bending machine, a support for the article to be folded, having an edge portion and a device for bending the article over said edge portion by a movement of said device toward said support, said device comprising a pair of intermittently actuated spring-pressed rollers, one of which passes on each side of said edge portion.

10. In a wing bending machine, a support for the article to be folded having an edge portion, a pair of rollers, one of which passes on each side of said edge portion, for folding a wing on said article over said support, and means for restraining said rollers from rotation in one direction.

11. In a wing bending machine, a support for the article to be folded having an edge portion, a pair of rollers, one of which passes on each side of said edge portion, for folding a wing on said article over said support, and means for moving said rollers laterally toward said support and thereafter on each side of said support.

12. In a wing bending machine, a support for the article to be folded having an edge portion, a pair of rollers, one of which passes on each side of said edge portion, for folding a wing on said article over said support, means for forcing said rollers toward each other during their folding movement over said support and means for moving them apart from each other to release the article after the folding operation.

13. In a wing bending machine, a support for the article to be folded having an edge portion, a pair of rollers, one of which passes

on each side of said edge portion, for folding a wing on said article over said support, means for forcing said rollers toward each other during their folding movement over said support and positively actuated means for quickly moving them apart from each other to release the article after the folding operation.

14. In a wing bending machine, a support for the article to be folded having an edge portion, a pair of intermittently actuated rollers, means for moving said rollers into and out of operative position one on each side of said edge portion, and means for drying said rollers intermediate of the folding operations.

15. In a wing folding machine, a support for the article to be folded having an edge portion, a pair of rollers, and means comprising a cam wheel and connections therefor for moving said rollers toward, over, off and away from said support.

16. In a wing folding machine, a support for the article to be folded having an edge portion, a pair of rollers, means comprising a cam wheel and connections therefor for moving said rollers toward, over, off and away from said support, and additional means for permitting a slight adjustment of said rollers with respect to said support.

17. In a wing folding machine, a support for the article to be folded having an edge portion, a pair of rollers, and means comprising a cam wheel and connections therefor for moving said rollers toward, over, off and away from said support and for separating said rollers after their movement off said support.

18. In a wing bending machine, a hollow support for the article to be folded having an edge portion apertured for the escape of a dampening medium, means for supplying such dampening medium to said support, a pair of rollers, and means comprising a cam wheel and connections therefor for moving said rollers toward, over, off and away from said support and for intermittently admitting a supply of a dampening medium to said support.

19. In a machine for producing a bend in starched fabric articles, the combination of the following elements: a member having an edge over which the article may be bent, said edge corresponding with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof; mechanism for producing relative movement between said first two elements whereby by the approach of one of said elements the fabric may be bent about said edge, and on the separation thereof the article may be released to permit its removal and the insertion of a new article; means for maintaining said first

and second elements in heated condition; and means for intermittently applying a starch-breaking medium such as steam to the article along the line of said edge; together with means operated from the afore-said mechanism for automatically operating said medium-applying means, whereby the starch may be broken and the medium supply stopped immediately in advance of the bending.

20. In a machine for producing a bend in starched fabric articles, the combination of the following elements: a member having an edge over which the article may be bent, said edge corresponding with the line of the bend; a bending device comprising a pair of rotatable rollers for cooperating with said edged member on both sides of the edge thereof; mechanism for producing relative movement between said first two elements whereby by the approach of one of said elements the fabric may be bent about said edge, and on the separation thereof the article may be released to permit its removal and the insertion of a new article; means for maintaining said first and second elements in heated condition; and means for moistening or breaking the starch in the article along the apex of said edged member previously to its bending.

21. In a machine for producing a bend in starched fabric articles, the combination of the following elements: a member having an edge over which the article may be bent, said edge corresponding with the line of the bend; a bending device comprising a pair of spring-pressed ratchet-controlled rollers for cooperating with said edged member on both sides of the edge thereof; mechanism for producing relative movement between said first two elements whereby by the approach of one of said elements the fabric may be bent about said edge, and on the separation thereof the article may be released to permit its removal and the insertion of a new article; means for maintaining said first and second elements in heated condition; and means for moistening or breaking the starch in the article along the apex of said edged member previously to its bending.

22. In a machine for producing a bend in starched fabric articles, the combination of the following elements: a member having an edge over which the articles may be bent, said edge corresponding in shape with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof; mechanism for reciprocating said bending device toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new

article; said first and second elements being adapted to be maintained in heated condition; and means to supply steam in the interior of said edged member for moistening or breaking the starch in the article along the apex of said edged member previously to the bending of the article.

23. In a machine for producing a bend in starched fabric articles, the combination of a member having an edge over which the article may be bent, said edge corresponding in shape with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof; and mechanism for reciprocating said bending device from a normal position toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article, means to supply steam to the interior of said edged member for moistening or breaking the starch in the article along the edge thereof, and a drying or heating means located at the normal position of said bending device.

24. In a machine for producing a bend in starched fabric articles, the combination of a member having an edge over which the articles may be bent, said edge corresponding with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof; and mechanism for actuating said bending device as follows: moving it forward and toward said edged member, whereby the fabric may be bent about said edge, and then away from said edged member and backward to a normal position where it may be dried or heated; and a drying or heating means located at the normal position of said bending device.

25. In a machine for producing a bend in starched fabric articles such as wing collars, the combination of a member having an edge over which the articles may be bent, said edge corresponding with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof, means operating intermittently for applying along the apex of said edged member a starch-breaking medium to each article before its bending, and mechanism for reciprocating said bending device toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article.

26. In a machine for producing a bend in starched fabric articles such as wing collars, the combination of a member having an edge over which the articles may be bent, said edge corresponding with the line of the bend; a

bending device for cooperating with said edged member on both sides of the edge thereof, means for heating one or both of said elements the edged member and the bending device, means operating intermittently for applying along the apex of said edged member a starch-breaking medium to each article before its bending, and mechanism for reciprocating said bending device toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article; said mechanism also controlling the flow of starch-breaking medium.

27. In a machine for producing a bend in starched fabric articles such as wing collars, the combination of a member having an edge over which the articles may be bent, said edge corresponding with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof, means operating intermittently for applying along the apex of said edged member a starch-breaking medium to each article before its bending, a single mechanism serving the following functions: first, for reciprocating said bending device toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article, second, for reciprocating said device laterally to and from a normal position where it may be heated or dried, and third, for controlling the flow of starch-breaking medium; and a drying or heating means located at the normal position of said device.

28. In a machine for producing a bend in starched fabric articles such as wing collars, the combination of a hollow member having an edge over which the articles may be bent, said edge having an apertured portion connecting with the hollow interior and corresponding with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof, means for heating the bending device, means for supplying a starch-breaking medium to said hollow member, and mechanism for reciprocating said bending device toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article.

29. In a machine for producing a bend in starched fabric articles such as wing collars, the combination of a hollow member having an edge over which the articles may be bent, said edge having an apertured portion con-

necting with the hollow interior and corresponding with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof, means for heating the bending device, means for supplying a starch-breaking medium to said hollow member, a valve for opening and closing said supply intermittently, and mechanism for reciprocating said bending device toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article.

30. In a machine for producing a bend in starched fabric articles such as wing collars, the combination of a hollow member having an edge over which the articles may be bent, said edge having an apertured portion connecting with the hollow interior and corresponding with the line of the bend; a bending device for cooperating with said edged member on both sides of the edge thereof, means for heating the bending device, means for supplying a starch-breaking medium to said hollow member, a valve for opening and closing said supply intermittently, and mechanism for reciprocating said bending device toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article; said mechanism also operating said valve whereby the article may be softened along the line to be bent previously to being bent.

31. In a machine for producing a bend in starched fabric articles, the combination of the following elements: a member having an edge over which the articles may be bent, said edge corresponding with the line of the bend; a bending device comprising a pair of connected rollers for cooperating with said edged member on both sides of the edge thereof; mechanism for reciprocating said bending device toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article; means for maintaining said first and second elements in heated condition; and means for moistening or breaking the starch in the article along the apex of said edged member previously to the bending of each article.

32. In a machine for producing a bend in

starched fabric articles, the combination of a member having an edge over which the articles may be bent, said edge corresponding with the line of the bend; a bending device comprising a connected pair of rotatable rollers for cooperating with said edged member on both sides of the edge thereof; and mechanism for reciprocating said bending device from a normal position toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article, and a drying or heating means located at the normal position of said bending device.

33. In a machine for producing a bend in starched fabric articles, the combination of a member having an edge over which the articles may be bent, said edge corresponding with the line of the bend; a bending device comprising a pair of spring-pressed ratchet-controlled rollers for cooperating with said edged member on both sides of the edge thereof; and mechanism for reciprocating said bending device from a normal position toward and from said edged member, whereby by its movement toward the edged member the fabric may be bent about said edge, and on its recession the article may be released to permit its removal and the insertion of a new article, and a drying or heating means located at the normal position of said bending device.

34. In a machine for moistening and bending on a substantially straight line a starched article, the combination of a stationary hollow member having an edge or apex over which the article is bent and a bending member fitted to move toward and from said edge, means for admitting steam to said edged member and permitting its exit at said edge whereby the fabric may be moistened along the line to be bent, a valve therefor, and mechanism for opening and closing said valve and moving said bending member all in harmony, whereby an article placed in contact with said edge may be first moistened in the line to be bent and then bent, the steam being cut off before or as the bending takes place.

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

JAMES K. PINE.

Witnesses:

A. L. STREETER,
W. A. OWENS.