

May 12, 1959

J. M. TODD

2,886,221

COLLAR FORMING MACHINE

Filed Oct. 22, 1954

4 Sheets-Sheet 1

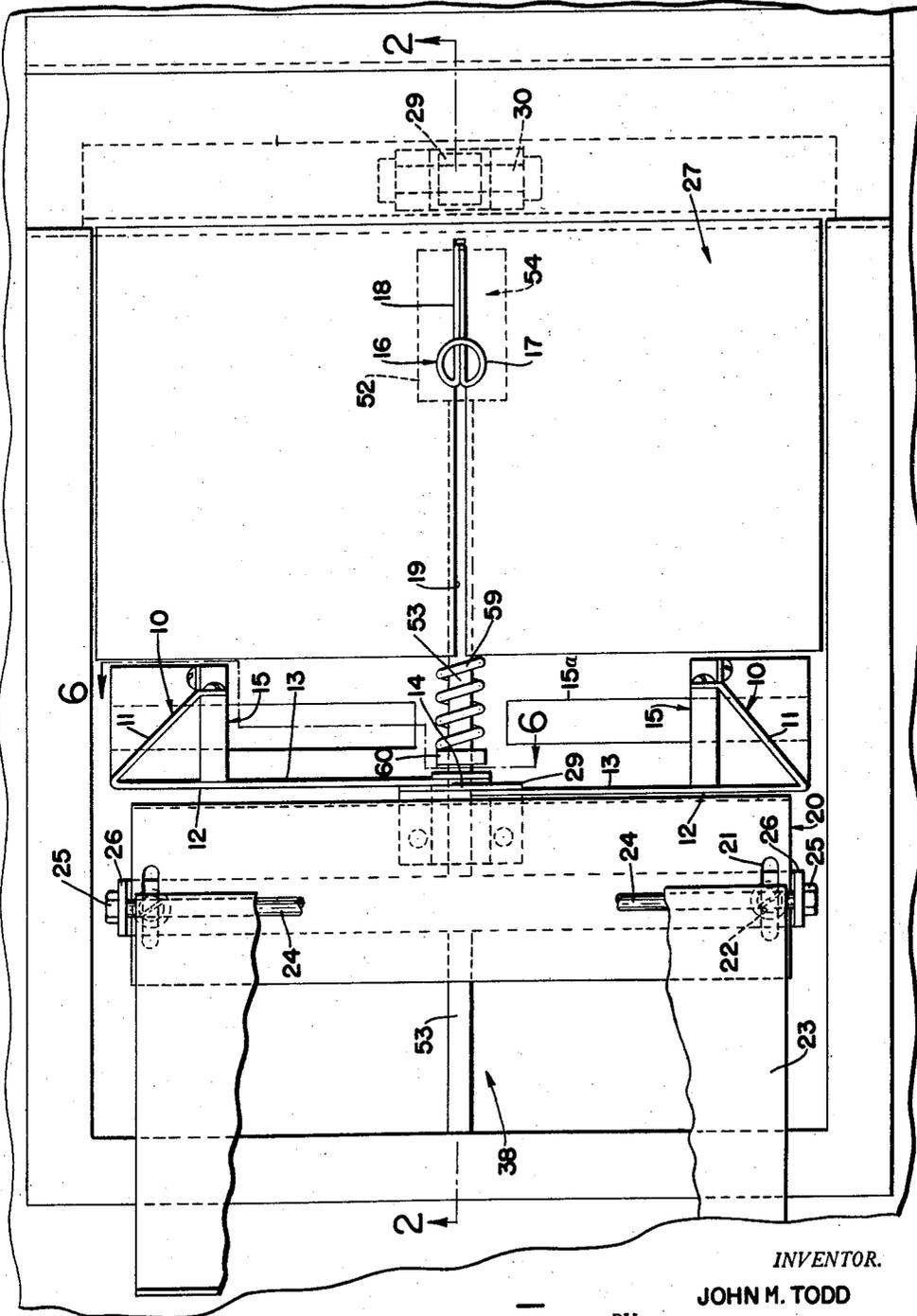


FIG. 1

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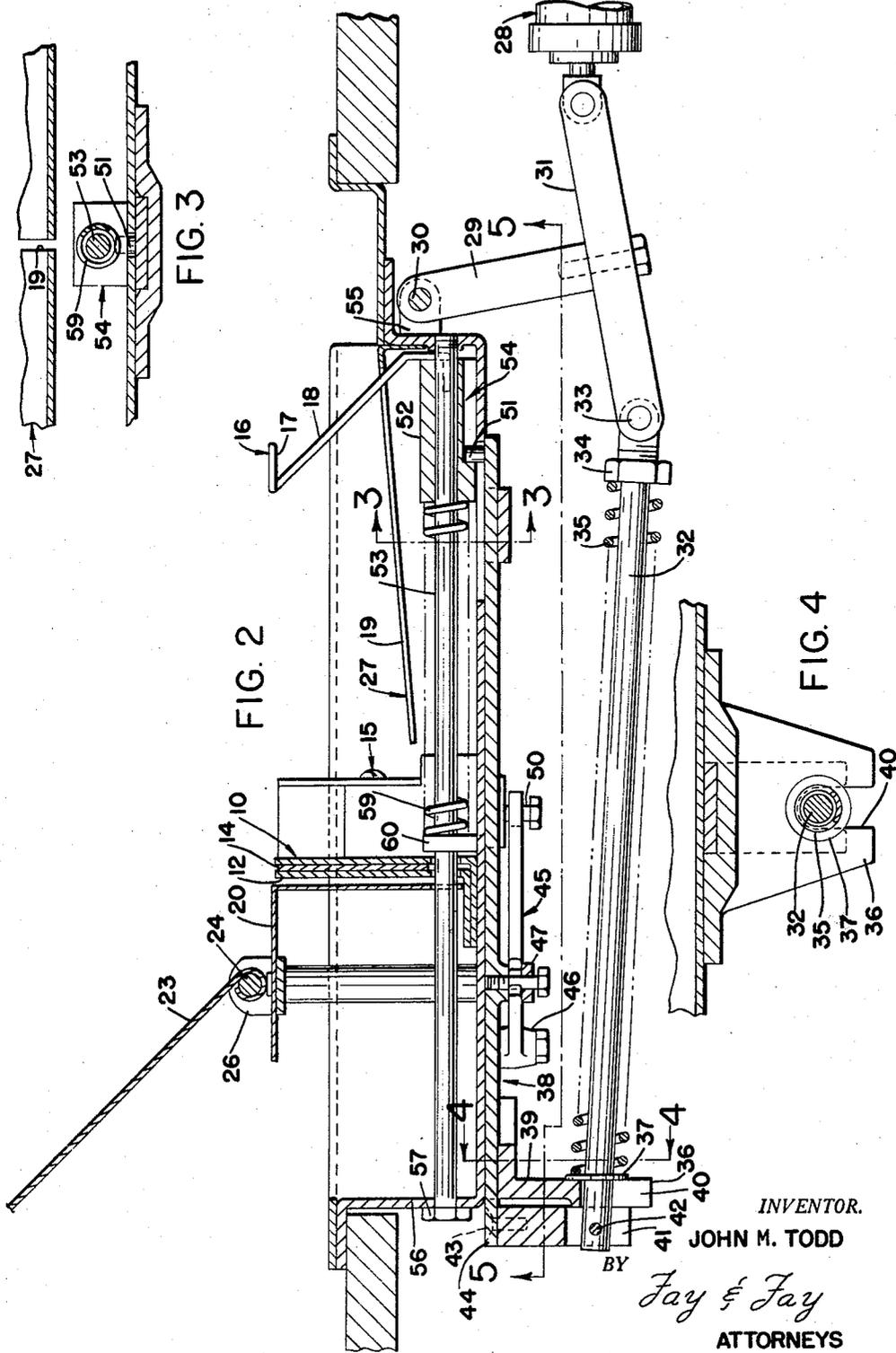
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4 Sheets-Sheet 3

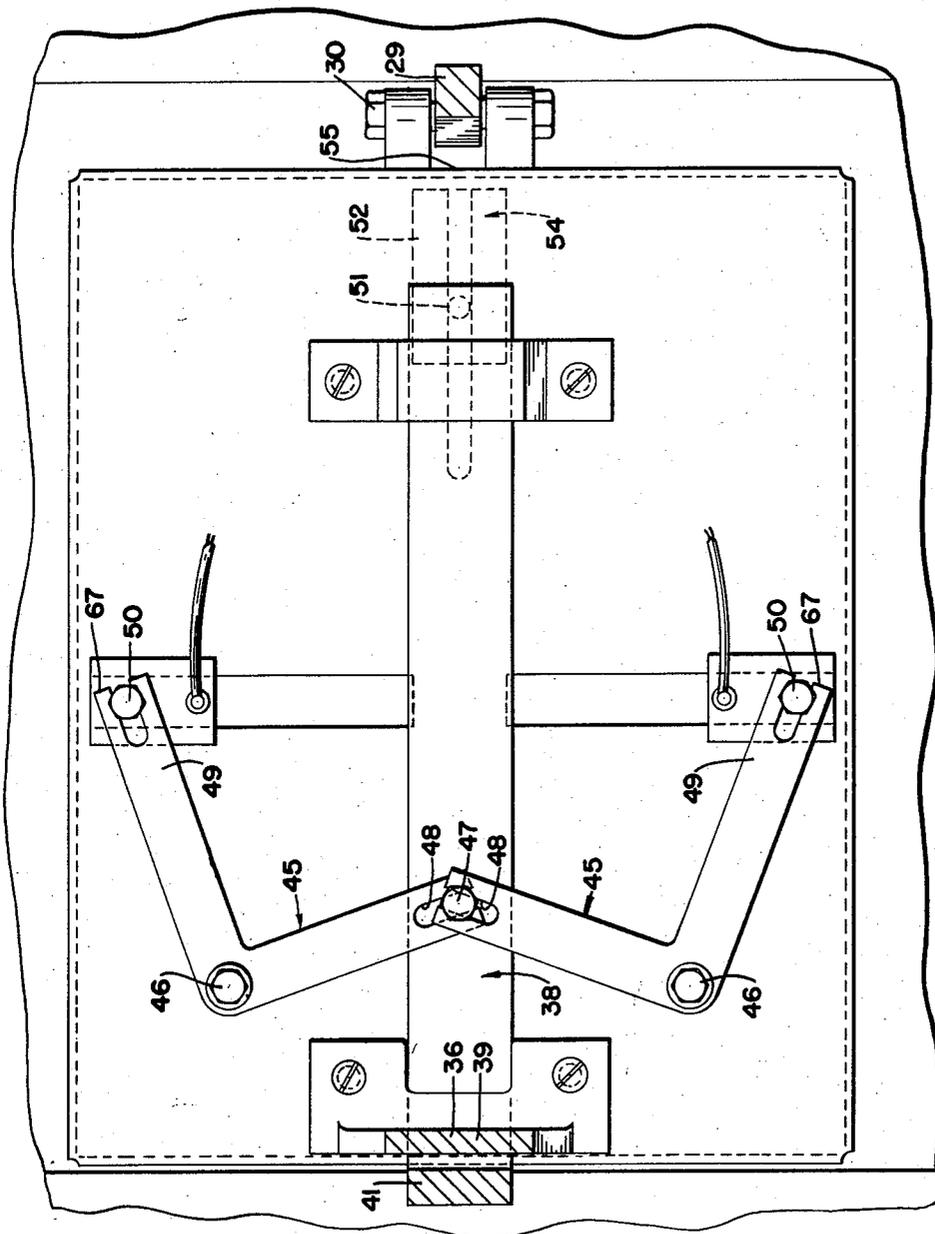


FIG. 5

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FIG. 6

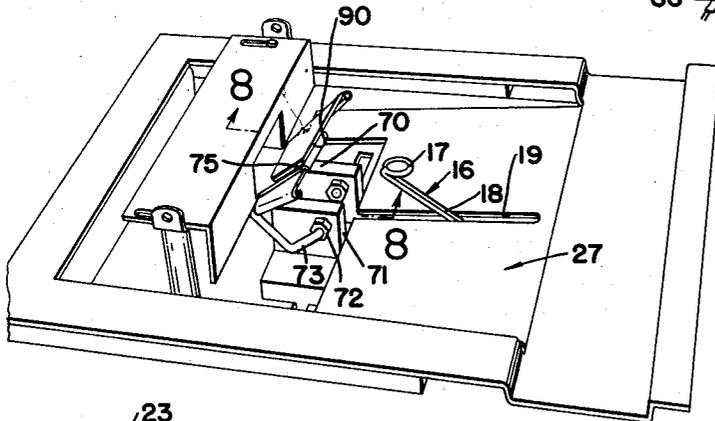
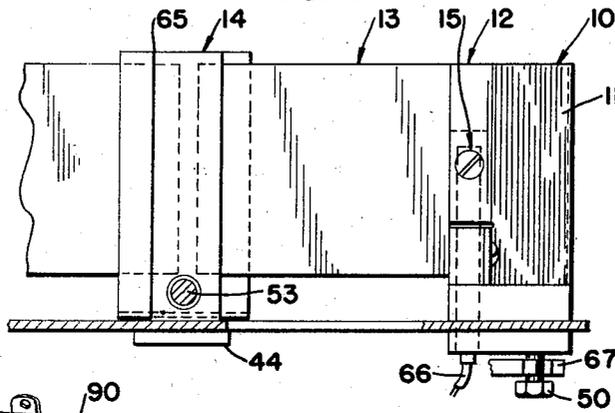


FIG. 7

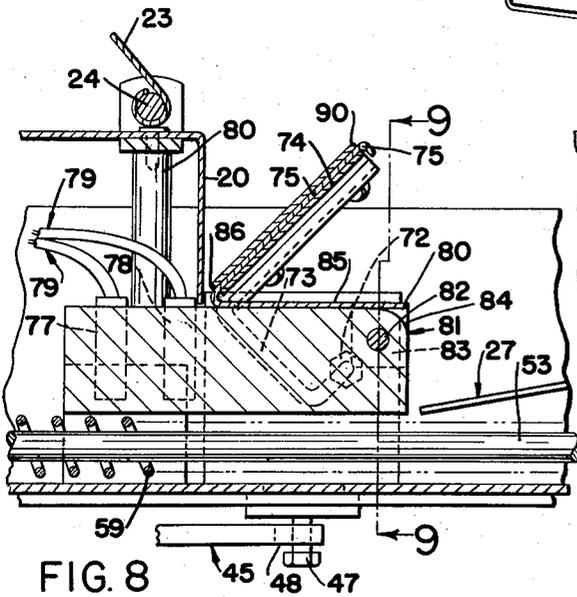


FIG. 8

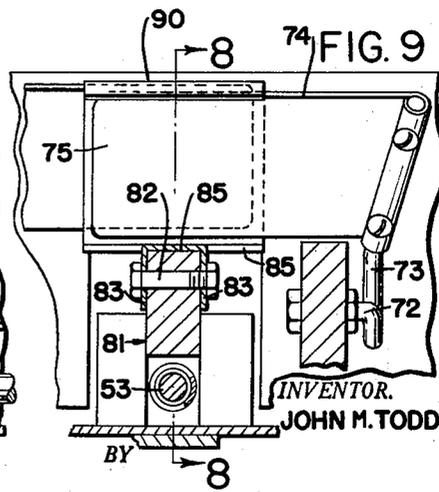


FIG. 9

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COLLAR FORMING MACHINE

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Application October 22, 1954, Serial No. 463,925

7 Claims. (Cl. 223—52.1)

This invention, relating as indicated to a collar forming machine, is particularly directed to a forming and ironing machine for the neckbands and collars of soft-collared shirts, particularly sport shirts, to permit the folding of these collars in a flat fold, semi-flat, or an upright collar, in a single machine with suitable adjustments. These folding operations may be either in the factory or in laundry operations, and the increasing proportion of soft-collared shirts in the sport shirt classification, requiring a variety of folds, as those indicated above, necessitate flexibility in design and machine operations. Up until the present time the popularity of the upright collar for factory and laundry folding operations was very much in the predominance.

This invention is directed to an apparatus which may be readily adjustable to form and press the collar in a variety of positions, as required, still providing heat to the various blocks of collar forming portions, so that the shirt may be folded over a folding board in the manner described in previously known patents, such as the McEwen et al. Patent No. 1,937,430.

This invention is an improvement over Campbell Patent No. 2,192,786, and incorporates therein adjustable front blocks for the forming of shirt collars and employs in this connection a wire hook member, with a loop at the end thereof, projecting outwardly from this assembly to catch the collar portion. This front hook, or it could be a forming block, is spring mounted and may have one or more adjustable locking members, so that its movement is limited by stops, and it is not a positive action, as will be further explained later. As such, because of this independent movement, a greater variety of folding operations is permitted, with either wide or narrow V's as desired. It is also possible to make a heart-shaped collar with this apparatus by rounding the shape of the blocks. The blocks would be essentially the same and have telescopic band portions but would be in the shape of a heart as distinguished from the wide or narrow V's described above. With this combination of ironing and collar forming blocks, the tabs of sport shirts do not cause trouble, as they might well do. This is particularly aided by the sloping surface projecting over the well in the collar forming apparatus of the forming or finishing table.

The adjustment means of this apparatus consists of a pair of collar forming portions, which are positively driven by a drive mechanism, possibly with an air cylinder, a shaft, and a pair of bell cranks, to drive the collar forming blocks in a slide which is perpendicular to the shaft so that there is a positive action moving each of the blocks outward a comparable amount. Said blocks have a base portion with a heating element therein and an adjustable rod extending upwardly at an angle. Surrounding said rod is a thin metallic unit, or band, which extends transverse of the member to a center portion. Said bands collapse or telescope one within the other, and a third or center member may be positioned between these expanding blocks to heat the center portion

of the collar as may be necessary. Heat from the blocks is transmitted through the wire and the metal bands to the collar.

With these two rear collar forming blocks, which may be supplemented on occasion by an intermediate block, is a third block, arbitrarily called the front block, positioned with said other blocks at the apex of a triangle. This member may have an adjustable stop member, so that when the collar is placed over the collar forming block it may be said to form with the front collar forming block a specific shape, with either wide or narrow V's, or possibly heart-shaped collars. With various collar angles, such as the flat, or semi-flat, or the vertical block, the action would be the same.

An object of this invention is to produce a collar forming machine that may use a single adjustable collar forming block or a multiplicity of collar forming blocks to form collars in a flat, semi-flat, or upright position while the folding operations are continuing.

A further object of this invention is to produce an improved collar forming machine that will form sport shirt collars in a flat, semi-flat, or vertical position, and provide heat to the collar during folding operations in an improved manner so as to make heart-shaped collars, or wide or narrow V's as desired.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the following description setting forth in detail one approved method of carrying out the invention, such disclosed method, however, constituting but one of the various ways in which the principles of the invention may be used.

In the drawings:

Fig. 1 is a top plan view, with some parts broken away, of the vertical type former;

Fig. 2 is a cross-sectional view along the lines 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view along the lines 3—3 of Fig. 2;

Fig. 4 is a cross-sectional view along the lines 4—4 of Fig. 2;

Fig. 5 is a view from the bottom showing the arrangement of the bell cranks and the slides along the lines 5—5 of Fig. 2;

Fig. 6 is a view of one of the vertical collar forming devices along the lines 6—6 of Fig. 1;

Fig. 7 is a perspective view of an adjustable collar forming device shown in a semi-flat position;

Fig. 8 is a cross-sectional view of Fig. 7 showing the construction of the adjustable form of the collar forming device; and

Fig. 9 is a view along the lines 9—9 of Fig. 8.

In the drawings Fig. 1 shows a top view, with some parts broken away, of the vertical type former. In other views, particularly in Figs. 7, 8 and 9, is the adjustable type former. The front hook member is the same in either modification. In this view 10 shows one of the rear forming blocks for the back of the shirt collar. Said block 10 has an angulated portion, which is vertical, 11, and a straight portion 12. The other block is substantially the same. The heating element shown generally at 15 is in the metallic portion of the block to transmit heat to the band. Said band is shown at 13 and overlaps at 14 a center portion which separates the two bands of the oppositely disposed forming elements. Said bands move outwardly in slides shown at 15a by a mechanism to be described. The third block, which forms the apex of the triangle, is shown generally at 16, having a hook portion 17 and an upwardly sloping portion 18. Said block has a heating element in the base portion of the block. Said front block moves perpendicular to the di-

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rectional movement of said first two blocks in the slot shown at 19. A shirt board 23 is pivoted around a rod 24 and this is secured to a flanged member 26 by means of a nut 25. The shirt board is used in connection with folding the shirt by banding, an envelope, or other means. In the adjustable modifications, shortly to be described, an adjustable stop is shown which prevents the shirt from moving back too far and is particularly valuable in connection with the forming of the collar so that the correct position of the collar can be made relative to the forming blocks.

Fig. 2 is a view through the center line along the lines 2—2 of Fig. 1, and shows the operating mechanism previously described. The vertical forming blocks are shown at 10. The rod 24 and the folding board 23 are shown in their respective positions. The front hook member is shown at 16 with its horizontal loop 17, and the upwardly sloping portion of the hook at 18. This fits in a slide which is sloped, shown at 19. Said sloping member is shown particularly at 27. The operating means for this shirt forming element consists of some external source of power, perhaps either air or steam, and this cylinder member is shown at 28. It operates through a pivot arm 29, pivoted at 30 and connected to an intermediate arm or link 31. Said arm is connected to a connecting rod 32 through a pivot point 33, and has mounted thereon a stop member 34 and a connecting rod spring 35. At the opposite end there is a stop member 36 and a washer 37. The base frame proper, shown generally at 38, has a dependent portion or flange 39, in which there is an aperture 40. The connecting rod fits through said aperture and is connected to a dependent flange 41 by a pin 42. Said flange 41 is fastened as by means of screws 43 to the slide member 44. Said slide member is connected to the forming blocks by means of bell cranks shown generally at 45. These bell cranks are pivoted at 46, and are connected to the slide member at 47 by means of elongated grooves or slides 48 in each of the members. The opposite end of the bell crank 49 has a similar slide and is connected by means of a pin or bolt 50 to the forming block itself. Upon a movement of the connecting rod the slide moves to the left in Fig. 2 and the bell cranks move inwardly to compress the forming blocks. They are then in position to expand upon a shirt and iron the same. Upon a release of the pressure in the cylinder 28, spring 35 returns the slide to its original position. The same slide 44 is connected by means of pin 51 to the front forming block 52. Said front forming block has a separate connecting rod 53 secured to the opposite ends of the well portion shown generally at 54, said ends being indicated at 55 and 56. Said connecting rod is secured, as by means of bolts shown at 57. Mounted on said rod is a spring element 59, and positioned intermediate the ends is a stop member 60.

Upon movement of the connecting rod, this front forming block will move to the left in Fig. 2, and approach the other forming blocks. Upon a release of spring tension the forming block will move outwardly, but at this point it is not controlled and the tension in its own spring member 59 will control the amount of its movement. In the event that the collar is formed in a wide or narrow V, it will take a different position. If it is desired, the movement may be limited so that the front forming block may only move a limited amount. The shorter the movement, perhaps the wider the V in the collar which is formed, and this is particularly desired in connection with certain sport shirts which it is desired to be folded in a certain manner. In any event, the outward movement of the front forming block is independent of the rear forming blocks, at least to the extent mentioned herein.

The additional figures are Figs. 6, 7 and 8, of which Fig. 6 is a view along the lines 6—6 of Fig. 1 showing the forming block 10, having the sloping front surface 11

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and the rear surface 12. The forming block connects to the oppositely disposed forming block by means of a metal band 13, and is connected by means of a center band 65 which has the connecting rod 53 passing through the base portion of the band, the slide member 44 shown immediately therebeneath. Heating elements are placed in the base and are connected by means of wires 66 to provide heat to the solid base portion and to the metal band surrounding the same. The ends of the bell crank are shown at 67, connected by means of pins 50 to the base of the forming block.

Fig. 7 is a modification of Figs. 1 through 6, but the mechanical means for movement of the blocks is substantially the same. In this view the numbers referring to the adjustable blocks will be given different numbers. These blocks are shown at 70 and 71, and have heaters not shown. Said blocks are connected by means of a pivot at 72 having a copper rod 73 extending into the metal band 74. Said metal bands of the oppositely disposed forming blocks overlap at 75. If it is desired to adjust the forming block to a flat, semi-flat, or almost vertical position, it is pivoted at 71 to the correct position, and heat still passes into the forming elements through the good conducting copper rods 73. The details of this adjustable forming block are shown in connection with Figs. 8 and 9. Heating elements 77 and 78 are shown herein connected by means of wires shown generally at 79.

The front forming block, connecting rod and spring need not be described any further, but they are shown at 53 and 59. The sloping tab support member is shown generally at 27, the bell cranks at 45, and the pivot slides at 48. The adjustable stop member is shown in this view at 20. It is in a fairly rearward position as shown herein. The supports therefor are shown at 80, and the pivot rod at 24 to the folding board 23. This support member may be adjusted so that the shirt may not be forced over the forming elements too far or an incorrect fold might be made.

In connection with Fig. 7 and this adjustable means for forming the collar in a collar forming machine, it is important to point out that the front block or hook member 16 with its hook portion 17 and its sloping surface 18 is critical in that the hook or loop portion 17 must be in the same horizontal plane as the top of the band 90. Briefly, in connection with sport shirts, the neckband is formed in such a way that the warp or weft threads of the cloth may be seen to disappear in the seam with the shirt and the body of the shirt proper, whereas in dress shirts collar threads proceed around in parallel alignment with the seam of the body of the shirt. For this reason the latter type may use upright collar forming machines whereas the former, i.e., the sport shirts, must have such provisions in connection with their forming. In general, however, the fastening means, such as a button or the like, should be in the same plane as the seam between the collar portion and the body of the shirt, so that in forming the shirt, upside-down as it is, the same relationship must take place, and since the collar is formed over the heated collar forming band and the top of the band is at this seam, the hook portion must be in the same plane.

Fig. 8 is a view along the lines of the arrows in Fig. 7 showing the central heating block in position. Fig. 7 does not have a central heating block shown therein, but it is added in this figure to show the manner in which heat may be applied to the center of the band. Said block is shown generally at 81, and has pivoted to one end thereof at 82 a dependent flange 83, which is shown on either side of the center heating block. The corner of said block is rounded off as is shown at 84, and a metal band is connected to the flanges at 85, and is angulated as shown at 86 to be positioned between the bands of the forming blocks. Heat to the blocks is supplied by heaters 77 and 78, connected by means of wires

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79. As the blocks are adjusted the center block may be adjusted as well, pivoting at pivot point 82 to fit any particular position that is desired, depending upon the original angle with respect to the portion resting on the block. The center block may be adjusted to almost a vertical position. Details of this arrangement are shown at Fig. 9. This series of blocks then provides heat to both sides of the collar and the back portion, and some heat can be provided to the front portion of the collar by means of the front forming block.

This arrangement of parts permits forming a collar in a flat position, semi-flat position, or almost any angle that is desired, and may form a heart-shaped collar, and the apparatus need no longer be restricted to a vertically formed collar. Some of these collars take up a considerable amount of space, and sport shirts are not adapted to these shirt folding machines. A sport shirt looks better for display purposes when folded in a specified manner. Sometimes it is desirable to put these in narrow V's, other times in wide V's, a heart shape, or various combinations, and variety and adaptability of equipment is important. This combination of parts provides collar forming with sufficient heat in the forming operation, besides an adjustment so that a variety of collars can be formed in a single machine without making adjustments therefor.

Operation

To operate the machine, first the correct block is chosen. It may be the vertical block, for a V shaped or heart-shaped collar, or it may be the adjustable block, and the block may be set at any particular angle that is desired. A suitable source of power, as by means of steam or air, is connected to the machine, and the blocks are closed within the immediate vicinity of each other by movement of cylinder 28 through intermediate arm 31 pivoted at pivot point 30, so that connecting rod 32 moves to the left in the figure, pressing connecting rod spring 35. This bears against washer 37 and against dependent flange 36, and forces the pin 42 to move the dependent flange 41 and the slide member 44 to the left. Bell cranks connected around their pivot points force the slides to move inwardly with respect to one another, and the front forming block is connected by means of pin 51 to its block. Said front forming block then compresses spring 59 on its connecting rod 53. The blocks then are in close proximity to one another and a shirt is positioned over the block. In the adjustable case the shirt is pushed as far as it can go against the adjustment member 20, and then the power or air is removed from the connecting rod, and spring 35 returns the slide to the most outwardly position that is permitted by the blocks. However, before reaching its most outward position the front block may be arrested by a closure member, such as a button, on the front portion of the collar, in which event this block stops its motion before the other blocks and the outwardly expanding blocks continue. The V of the shirt then would be widened. It may be so adjusted that the front block will stop with a vertical dimension which is specified by the user to give a proper appearance to the shirts. Upon completing the folding operations the collar forming elements are then returned to their original positions and the shirt is lifted off the collar forming elements. The tabs of the collars in some of these sport shirts may be long and the sloping surface 27 prevents these tabs from catching in the well of the collar forming machine.

In connection with the forming of dress shirts on the adjustable forming machine, it would be necessary to have the sloping portion 18 of the front hook or forming block 16 to be of such a length before reaching the hook portion or loop 17, that the horizontal projection is equivalent to that of the forming band itself. This depends, of course, on whether it is in a flat, semi-flat, or nearly vertical position. The foregoing consideration

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of the collar designs for dress and sport shirts will make this construction evident. Generally, the slope of the collar forming band will be the same as that of the front hook portion.

Although the present invention has been described in connection with a few preferred embodiments thereof, variations and modifications may be resorted to by those skilled in the art without departing from the principles of the invention, the variations and modifications being considered to be within the true spirit and scope of the present invention, as disclosed in the foregoing description and defined by the appended claims.

I claim:

1. In a collar forming and ironing machine adapted to form the collar of a shirt, said collar having a fastening means therefor, a pair of horizontally disposed collar forming elements, means for moving said elements laterally to which each of said collar forming elements is connected, a third collar forming means forming the apex of a triangle with said collar forming elements and adapted to co-operate and move in a direction perpendicular to said pair of collar forming elements, each of said pair of collar forming elements having a base member with heating means therein adapted to conduct heat to the collar forming elements and collar, each of said pair of collar forming elements further having a band connected thereto projecting towards the third collar forming element forming the apex of the triangle.

2. In the collar forming and ironing machine of claim 1, in which the front collar forming block has an upright portion resiliently mounted and a further portion in the nature of a hook projecting outwardly from the end of said upright portion, whereby the front forming block is adapted to grasp the collar adjacent the fastening means, and form the collar.

3. In a collar forming and ironing machine adapted to form the collar of a shirt, said collar having a button or other fastening means therefor, a pair of horizontally disposed collar forming elements, means for uniformly moving said elements laterally with respect to one another to which each of said collar forming elements is connected, said elements comprising a base member having heating means therein, and an upright portion pivotally mounted therefrom comprising a rod and a heat conducting collar band therefor, said bands being in the same plane and substantially overlapping in operation, forming a heated back to iron and form the collar, a front forming block positioned at the apex of a triangle with respect to said pair of collar forming elements and co-operatively connected to the means for moving said collar forming blocks, said front block adapted to contact the collar at the front portion adjacent the fastening means, said block comprising an upright portion and a hook portion projecting outwardly from the block, said block and hook being resiliently mounted, whereby the means for moving said blocks will be used to stretch and tighten the collar, and the heating means within said pair of collar forming blocks being used for ironing and forming the collar while other operations, such as folding, continue, said latter blocks being pivotally mounted so they may be adjusted to serve a flat, semi-flat, or upright collar.

4. The collar forming apparatus of claim 3, in which there is a center block between said pair of co-operatively connected collar forming blocks, said center block being formed of a thin sheet of heat conducting material adapted to be positioned between said co-operatively connected blocks and providing a continuous metal portion for ironing and smoothing the back of the collar.

5. The collar forming apparatus of claim 4, in which the center block has a base portion and the thin sheet metal portion forming the center block being pivotally connected to said base portion, whereby said block may be angularly positioned to adjust it to any angle for forming a shirt, such as the flat, semi-flat or upright position,

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to provide heat continuously across the collar forming block.

6. In a collar forming apparatus for collars of sport shirts having tabs, a pair of co-operatively connected forming blocks adapted to move outwardly at a uniform rate, said collar forming blocks having a base portion with heating means therein, and an upright portion pivotally connected thereto, comprising a rod member, said rod members having a heat conducting material band attached to said rod members adaptable to telescope together, a front forming block forming the apex of the triangle with said pair of collar forming blocks, said block being co-operatively connected to said blocks and adapted to move together forming said collar, said front block having a resilient means for mounting said block and a hook portion projecting outwardly from the end of said block, and a planar surface sloped relative to said front block, so that the tabs of the collar may be pre-

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vented from catching on the surfaces surrounding the forming blocks.

7. The collar forming apparatus of claim 5 which has a shirt board pivotally mounted on the apparatus on the opposite side of said collar forming blocks from said front block, and an adjustable positioning stop connected to the apparatus below said shirt board mounting, said adjustable positioning stop adapted to prevent the shirt from moving forward too far before the blocks are moved outwardly to form the collar.

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