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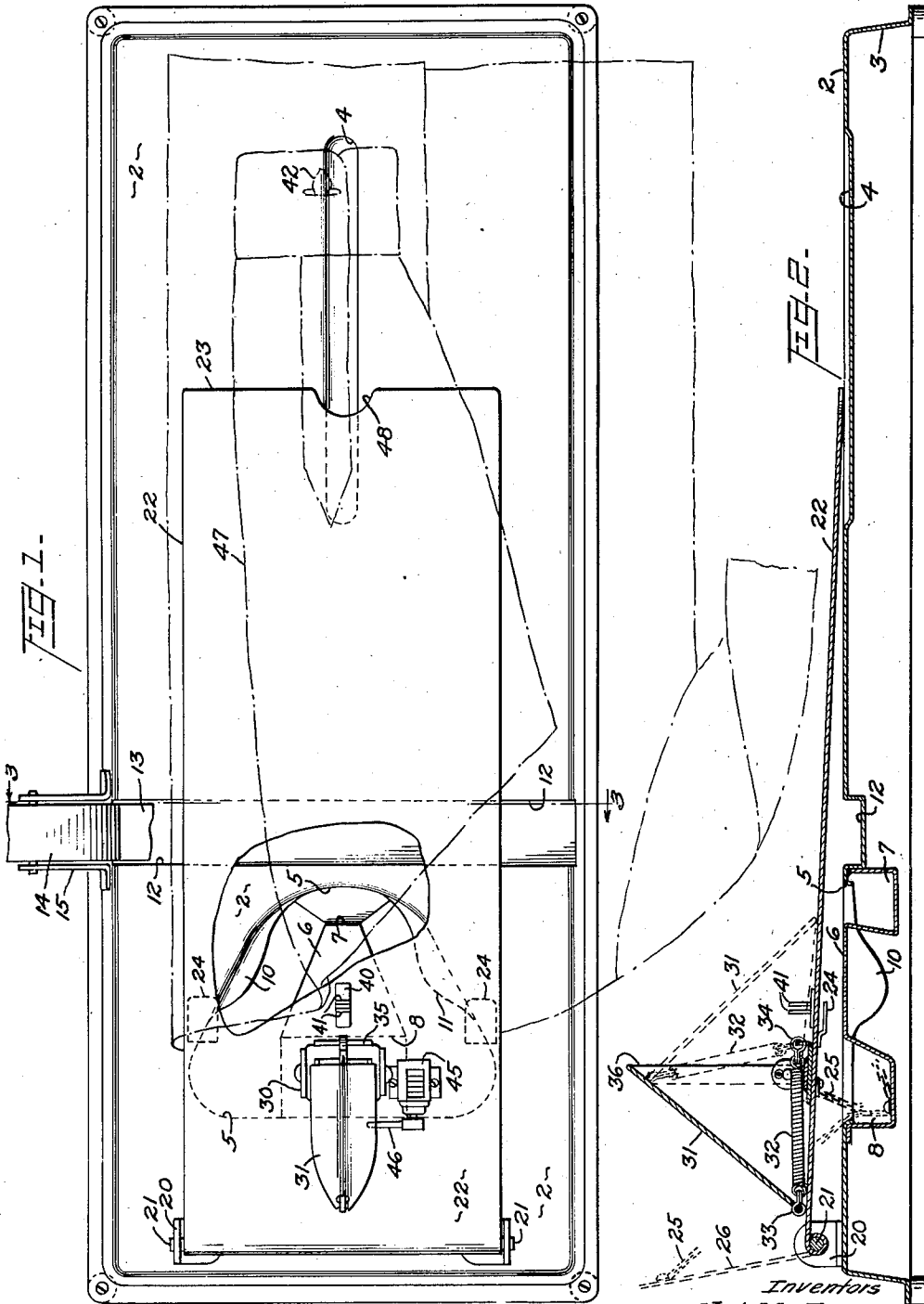
N. S. McEWEN ET AL

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SHIRT FOLDING MACHINE

Filed June 29, 1932

2 Sheets-Sheet 1



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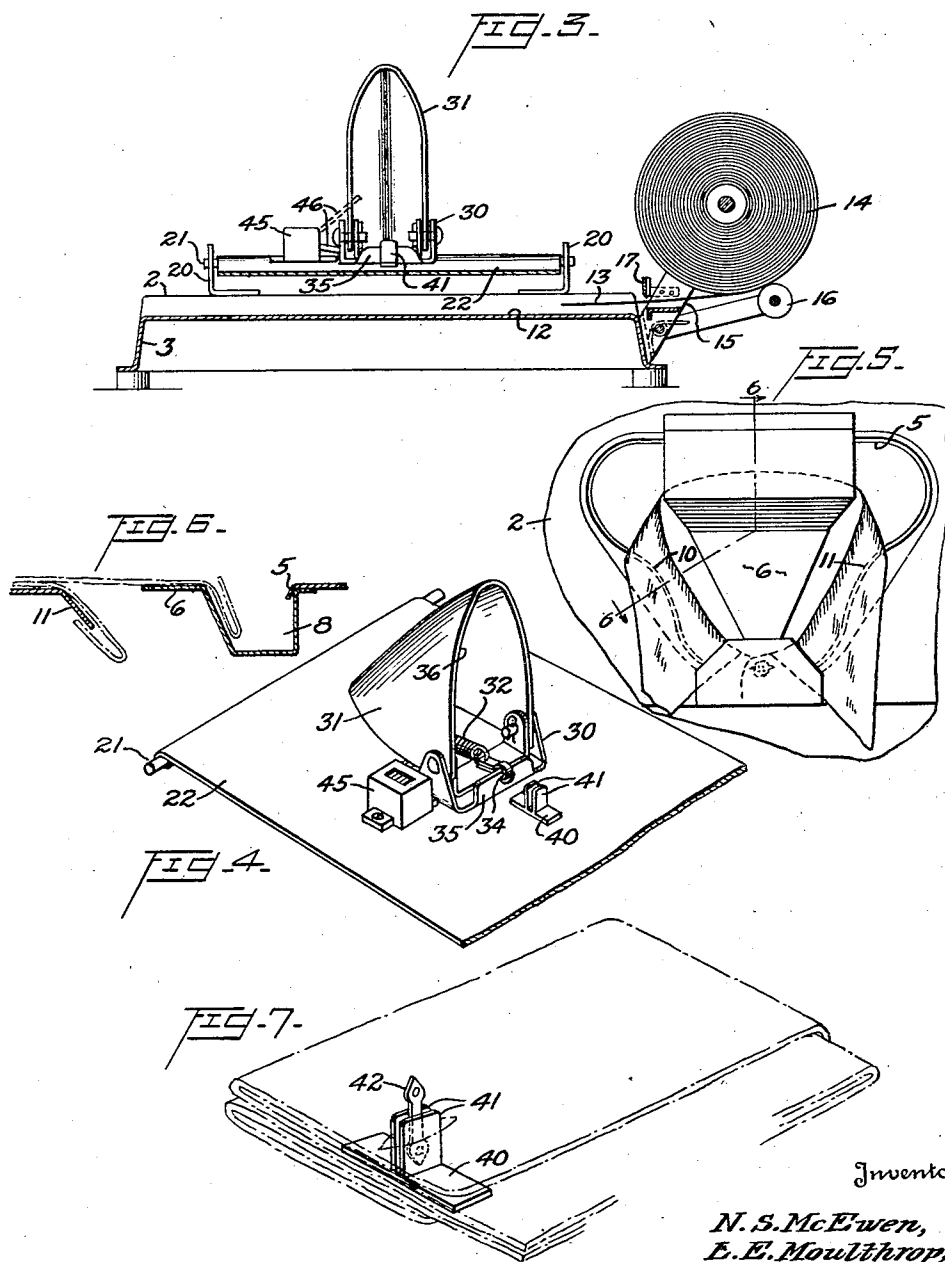
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SHIRT FOLDING MACHINE

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22 Claims. (Cl. 223—15)

This invention relates to shirt folding machines and has for its object to provide a device which is simple in construction and more efficient in operation than those heretofore proposed.

5 With these and other objects in view the invention resides in the novel details of construction and combinations of parts as will appear more fully hereinafter and be particularly pointed out in the claims.

10 Referring to the accompanying drawings forming a part of this specification and in which like numerals designate like parts in all the views,—

Fig. 1 is a top plan view of the device with indication of a partially folded shirt;

15 Fig. 2 is a central longitudinal vertical sectional view of the device;

Fig. 3 is a transverse vertical sectional view of the device taken as on the line 3—3 of Fig. 1 and looking in the direction of the arrows;

20 Fig. 4 is a perspective detail view of the holding clamp carried by the board over which the shirt is folded;

Fig. 5 is a detail view in bottom plan illustrating the functioning of the collar wings and neckband-centering means carried by the base;

25 Fig. 6 is a detail sectional view, right side up, through a collar wing and the neckband-centering means, said view taken as on the line 6—6 of the bottom plan view of Fig. 5 and looking in the direction of the arrows; and

30 Fig. 7 is a perspective view of the cuff button-hole registering means and the fastener held thereby for securing the cuff.

By this invention there is provided a device for 35 folding and securing shirts so that all shirts are folded to the same size, the device also capable of holding the folded shirt tightly while the hands of the operator are free to apply the shirt securing band. This is an important feature since 40 with heretofore known constructions the operator has had to apply pins during the folding of the shirt to hold the shirt while the securing band was applied, or else both hands of the operator were not free simultaneously during the entire 45 stage of banding the folded shirt, making this banding operation extremely awkward. No securing pins are necessary according to this invention and therefore, not only is there a saving in the cost of the pins, but there is a saving in the 50 larger item of the time and labor required for their application.

Besides the foregoing advantages, this device has means thereon for centering the shirt, including additional means coacting with an at- 55 tached collar for further insuring the centering

of the neckband portion. In addition, this device has means thereon for registering the buttonholes of cuffs, particularly of the folded or French type, preparatory to the insertion of a cuff holder, and also it is to be observed that this 65 means is so formed as to hold the cuff holder while the cuff is applied thereto; whereby a very efficient and quick securing of the cuff results. Lastly, the device is adapted to position the securing band, so that all of the completed folded 65 shirts will not only be uniform in appearance but have the securing band in a position to hold most advantageously the shirt in its folded form.

As seen from the drawings the device comprises a base preferably stamped from sheet metal to 70 form a shirt supporting table 2 with depending sides 3 to provide a space under said table for accommodating the neckband, or the attached collar, of the shirt. The table has formed in its upper surface a central longitudinal depression or groove 4 for receiving buttons of the shirt 75 and, near one end, there is provided a somewhat triangularly shaped opening 5 in the table symmetrical with respect to its longitudinal center, said opening for receiving therethrough the neck- 80 band or attached collar and having its edges rounded, or inwardly and downwardly turned, as shown. Thus it will be appreciated that when the ironed and buttoned shirt is laid on the table 2 with its front down and with the neckband 85 in the opening 5, the remainder of the shirt may be centered on said table by swinging the shirt about its neckband as a center until the buttons fall within the smooth depression 4, which latter is of a length to receive at least two buttons. The 90 opposite sides of the opening 5, extending symmetrically toward the longitudinal center of the table, assist in centering the neckband portion as will be readily understood.

Within said opening, and substantially in the 95 plane of the table, is a triangularly shaped centering plate 6 spaced from the edges of said opening, the opposite ends of said plate bent downwardly thence outwardly and then upwardly to terminate in edge portions secured to the under side of the 100 table. By this construction there is formed a narrow pocket 7 to receive the front of the neckband, and a wider pocket 8 to receive the back thereof, said pockets extending into the space provided under the table by the sides 3 thereof, 105 the plate 6 further assisting in the centering of the neckband in the opening 5.

The opposite sides of said opening are provided with the similarly formed ears or wings 110 and 11 each disposed at substantially 45° to 115

the table surface as clearly indicated in Fig. 6. These wings are opposite the side edges of the centering plate 6 and the edges of said wings are arcuately tapered into the edge of the opening 5 as clearly shown in Fig. 2. From Figs. 5 and 6 it will be understood that these wings fit under the points and sides of shirt-attached collars, preventing them from being mashed, and greatly assisting in centering the neckband portion of such shirt in the opening 5 by causing the neckband to be sprung between said wings and the points of plate 6 adjacent the pockets 7 and 8.

Closely adjacent the neckband opening 5 there is provided in the upper surface of the table a channel 12 extending transversely thereacross substantially at right angles to its longitudinal center, said channel for receiving and positioning the band of paper or other suitable material for securing the folded shirt. In this connection the channel may be of a depth to hold a stack of twenty-five or more bands each pre-cut to a length to pass around and secure said shirt, or the channel may be of a lesser depth but sufficient to hold and guide the free end 13 of a roll of paper indicated at 14 suitably mounted on a bracket 15 carried by the base of this device. If desired there may be provided a spring pressed roller 16 to resist unwinding of the roll, and a shear or cutter 17 attached to said bracket for severing a band-length of the paper.

Adjacent the neckband opening 5 and at the end of the table 2 is a pair of upstanding ears such as 20 in which is mounted a rod 21 to which is attached one end of the shirt folding board 22 which is of a longitudinal dimension to provide the proper length of the completely folded shirt when the tail of the shirt is folded up and over the extreme end edge 23 of said board. To the under surface of the board is secured a pair of tabs 24, one adjacent each side edge, to receive one end of the usual cardboard used as a stiffener for the folded shirt. Also to the under side of said board is secured one end of a chain 25, the other end of which is secured to the bottom wall of the pocket 8, said chain of a length to permit the board to be raised and held in elevated position at an angle of about 95° to the table 2, so that said board may assume the position shown in dotted lines at 26 which is just past the vertical plane passing through the rod 21. The chain will naturally fall and be confined in the pocket 8 when the board is in lowered position.

To the upper surface of said board is attached a bracket having parallel upstanding portions such as 30 in which is pivoted the substantially triangular clamp 31 which is preferably transversely of U-shape formation, all as indicated in the drawings, to provide an interior space within which is disposed the spring 32 one end of which is secured to an end of the clamp as indicated at 33, and the other end of which is secured as at 34 to an upstanding tab portion 35 of the bracket 30. This off-center point of attachment 34 is important, since it is disposed below the horizontal plane of pivots of the clamp as well as between the vertical plane of said pivots and the portion of the board over which the shirt is folded, as clearly seen from Fig. 2.

The clamp is of a size so that when it is in shirt holding position, as shown in dotted lines in Fig. 2, the end to which the spring is secured will be substantially in the vertical plane of the clamp pivots, and when the clamp is in inoperative position, as is shown in full lines in said figure, the other and shirt-holding end of said clamp

will be in said plane. Because of these dimensions of the clamp and the location of the securement 34 of said spring, the latter will cause the clamp to remain both in its operative and inoperative positions under the tension of said spring. It thus results that a turning of the clamp about its pivots causes it to snap into position and be retained in that position until it is turned in the opposite direction, all as will be readily understood. The clamp is mounted on the board 22 symmetrically on the longitudinal center line thereof and the transverse U-shaped curvature of said clamp is made sufficient so that, when in its operative or holding position, the edge portions 36 will be spread so as to clamp an appreciable area of the folded shirt to the board 22.

Also in the longitudinal center line of the board 22, and adjacent the clamp, there is mounted a device for registering the buttonholes of a cuff in order to align the ends of the latter, said device comprising a plate 40 secured to said board and having two parallel upstanding blades 41 each in a transverse plane of said board. These blades are closely spaced so that, as seen in Fig. 7, they may frictionally hold a suitable cuff holder or fastener indicated at 42. The cuff-holder shown comprises a central bar portion whose opposite ends are enlarged and preferably pointed as shown. In operation it is placed between the blades 41, and the buttonholes of a cuff passed thereover as well as over the blades 41, the cuff ultimately coming to rest upon the base 40. The upwardly extending portion of the cuff holder is then sharply bent over the end of one of the blades, the cuff and contained holder is then removed from the blades, and the opposite or downwardly extending end of the holder bent either in the same direction as, or in the opposite direction to, the bending of its other end, the holder 42 preferably being made from cheap bendable sheet material such as aluminum. In Fig. 7 there has been illustrated a double or French cuff, but it will be understood that the holder 42 can be applied to any other type of cuff.

Adjacent the bracket 30 there is mounted a mechanical counter indicated at 45 whose shaft has mounted thereon an arm 46 of a length to extend across the path of an edge of the clamp 31. From Figs. 1 and 4 it will thus be understood that each time the clamp 31 is moved to inoperative position the arm 46 will be oscillated, which latter movement causes the counter to register, and when the clamp is moved to operative holding position a spring will cause retrograde oscillation of said arm to recondition the counter for subsequent registrations. By this arrangement an accurate count may be made of the number of shirts folded, which count may be checked with departments of a laundry having other shirt operations.

The operation of the device is as follows. A shirt is applied front down on the table 2 with the neckband or collar fitting about the centering plate 6 and extending into the pockets 7 and 8, and if the shirt has an attached collar then the wings 10 and 11 are brought into the space between the neckband and the turned over portion of said collar. The shirt is then swung about its neckband as a center, which will be a very small relative movement as will be understood, to bring buttons into the groove 4 in the table, thereby correctly centering the shirt on the table. During this operation the board 22 will, of course, be in its elevated position, and the clamp 31 will be in inoperative position with respect to said

board because the clamp has to be moved into that position in order to remove the previously folded shirt from said board.

A cardboard is then inserted in the tabs 24, and the board swung down, to the position shown in Fig. 2, to lay upon the shirt. The cuffs of the shirt are then secured by the holder 42, this being possible because the clamp is in its inoperative position and therefore uncovering the blades 41, and then the sides of the shirt are successively folded over the longitudinal edges of the board, with each sleeve folded to extend longitudinally of the board as indicated at 47 in Fig. 1. When the shirt is thus folded, the operator snaps the clamp 31 about its pivots to mechanically hold the neckband and shoulder portions, thereupon leaving the hands of the operator free to tightly and transversely draw the mid-portion of the shirt about the board adjacent the end edge 23, and to then fold upwardly over said edge 23 the tail portion and cuffs of the shirt.

The clamp is then slightly raised and the extreme end of the tail of the shirt slipped thereunder after which the clamp is permitted its full operative position for holding the tail as well as the previously mentioned portions of the shirt. The loosening of the clamp is insufficient to cause the counter 45 to be operated and one of the operator's hands may hold the shoulder portions against slipping from their tightly drawn position. The two hands of the operator are now free to slide the free end 13 of the paper securing band through the channel 12 and bring it up and over the folded shirt, to actuate the shear 17, and to secure the free ends of the band about said shirt. Then the clamp 31 is snapped to its full inoperative position, actuating the counter 45, and the folded shirt with its contained cardboard stiffener pulled off the board.

To assist in the ready removal of the shirt from the board, there is provided an arcuate cut-out section 48 in the end edge 23 and substantially on the longitudinal center line of said board; and it will be understood that the cardboard stiffener is precut to a length equal to the distance between the closed ends of the pockets formed by the holding tabs 24 and the edge 23 of the board, as a result of which and after the complete folding and securement of the shirt, pressure of the fingers at the area of the cut-out section will cause the cardboard stiffener to be removed without slippage along with the folded shirt. The device is then ready for application and folding of the next shirt with its stiffener, and the above operations are thereupon repeated.

It is obvious that those skilled in the art may vary the details of construction and arrangements of parts without departing from the spirit of the invention, and therefore it is not desired to be limited to the foregoing except as may be required by the claims.

What is claimed is:

1. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; and a clamp carried by said board to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt.

2. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; and a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free

to secure the folded shirt, said clamp positioned to operate upon the folded sleeves and the free end of the folded tail.

3. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; and a spring tensioned clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt, said clamp adapted to remain in operative and inoperative positions by virtue of an off-center attachment of its tension spring.

4. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt; and a spring disposed between said board and said clamp, said spring secured to the clamp to one side of its hinge whereby said clamp is under tension in either its operative or inoperative position.

5. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt; and a spring disposed between said board and said clamp, said spring secured to the clamp to one side of its hinge whereby said clamp is under tension in both its operative and inoperative positions.

6. In a device for folding shirts the combination of a base and plural means therein for centering a shirt; a board hinged to said base adjacent one of said means and over the edges of which the shirt is folded; and a clamp hinged to said board adjacent its hinged connection with said base, said clamp to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt.

7. In a device for folding shirts the combination of a base and plural means therein for centering a shirt, said means comprising a neckband-receiving recess and a button-receiving depression; a board hinged to said base adjacent said recess and over the edges of which the shirt is folded; and a clamp hinged to said board adjacent its hinged connection with said base, said clamp to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt; said clamp positioned to operate so that when the board is in lowered position said clamp is above the neckband-receiving recess of said base.

8. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; means secured to the upper side of said board to register the buttonholes of a cuff for ready insertion of a cuffholder; and a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt.

9. In a device for folding shirts the combination of a base upon which the shirt is placed; means in said base for positioning a shirt securing band; a board hinged to said base and over the edges of which the shirt is folded; and a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of

the operator free to fasten the securing band around the folded shirt.

10. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; means comprising spaced blades secured to the upper side of said board to register the buttonholes of a cuff for ready insertion of a cuff-holder; and a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt.

11. In a device for folding shirts the combination of a base upon which the shirt is placed; means in said base for positioning a shirt securing band; a board hinged to said base and over the edges of which the shirt is folded; means secured to the upper side of said board to register the buttonholes of a cuff for ready insertion of a cuff-holder; and a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free to fasten the securing band around the folded shirt.

12. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; and means on said board to register the buttonholes of a cuff for ready insertion therein of a cuff holder.

13. In a device for holding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; and means comprising parallel blades to enter and hold in registry the buttonholes of a cuff for ready insertion therein of a cuff holder.

14. In a device for banding folded shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; means to position a securing band beneath the folded shirt; and a support for a band supply, said support carried by said base adjacent said board.

15. In a device for banding folded shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; means comprising a channel to position a securing band beneath the folded shirt; and a support for a band supply, said support carried by said base adjacent said board.

16. In a device for banding folded shirts the

combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; means comprising a channel formed in said base to position a securing band beneath the folded shirt; and a support for a band supply, said support carried by said base adjacent said board.

17. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt; and means to count the number of shirts folded.

18. In a device for folding shirts the combination of a base upon which the shirt is placed; a board hinged to said base and over the edges of which the shirt is folded; a clamp hinged to said board to hold the shirt in folded position thereby leaving both hands of the operator free to secure the folded shirt; and means actuated by said clamp to count the number of shirts folded.

19. The combination with a shirt folding board of thin flat means carried by said board to register the buttonholes of a cuff as well as to insure the alignment of the ends of the latter.

20. The combination with a shirt folding board of means comprising thin flat parallel blades secured to the upper side of said board to enter and hold in registry the buttonholes of a cuff as well as to insure the alignment of the ends of the latter.

21. In a device for folding shirts the combination of a shirt folding board; and means carried by said board to register the buttonholes of a cuff to align the ends of the latter, said means comprising a blade of a dimension to substantially fill the applied buttonholes thereby insuring the alignment of the cuff ends.

22. In a device for folding shirts the combination of a shirt folding board; and means carried by said board to register the buttonholes of a cuff to align the ends of the latter, said means comprising a pair of blades, said means being of a dimension to substantially fill the applied buttonholes thereby insuring the alignment of the cuff ends.

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