A laundry folder for folding small pieces, having means for automatically centering the pieces transversely relative to a longitudinal center line and maintaining them so centered in their travel through the folder, including PE cells for spotting the pieces and centering them, the centering means including transversely shiftable belt means and the PE cells controlling the means for shifting the belt means; means for compensating for stretchability of laundry pieces such as knit shorts, so as to fold them in true straight line formation despite deformation as would otherwise be caused by the stretchability of the pieces; a wicket for placing the folded pieces on a supporting surface and means for lowering the supporting surface as the pieces are placed thereon in a stack, so that as the stack is formed, the top piece of the stack is always at substantially the same height.
LAUNDRY FOLDER FOR PIECES OF VARIABLE RESILIENCE

OBJECTS OF THE INVENTION:

A broad object of the invention is to provide in a laundry folder in which pieces to be folded are introduced into the folder and carried therethrough in a folding operation, means for centering the pieces, as they are introduced into the folder, relative to a longitudinal center line, whereby the pieces are folded about a line midway of the lateral edges thereof so as to provide an accurate fold therein.

Another object is to provide a folder of the foregoing character having shifting means for centering the pieces relative to the longitudinal center line by means of a pair of PE cells arranged for sensing an edge of the pieces as they are introduced into the folder and so arranged that normally only one of the cells is covered by the piece, but that if either of the cells, or both of them should be covered, which would be caused by the piece being out of the desired centered position the shifting means would be activated for shifting the piece in the appropriate direction into a centered position.

A still further object is to provide means for centering the pieces of the character just referred to, which includes a conveyor made of a pair of belts, each belt including a plurality of laterally spaced belt elements, with the belt elements of the two belts interspersed, and wherein one belt is longer than the other, and the means for shifting the belt means is operative for shifting the longer of the two belts, and thereby operative for shifting the laundry pieces laterally and thereby relative to the center longitudinal line of the folder.

Still another object is to provide a laundry folder having novel construction for accommodating highly stretchable items, such as knitted items, which are normally difficult to fold in straight line and even formations.

Still another object is to provide a folder of the character just referred to, for folding stretchable items and particularly items such as “boxer” shorts having a waistband of greater strength and resiliency than the remainder of the items, and more specifically a construction which includes folding blades for determining the side edges of the folds of the pieces, and in which those blades are adjustable in the progress of the pieces through the folder, so that as the leading edges, which include the waistbands, of the pieces pass by a predetermined folding point, the guide blades are then adjusted to a narrowspaced position to fold the following portion of the pieces at a lesser nominal width.

Still another object is to provide, in a laundry folder, a supporting table, which may include a conveyor, for receiving the folded pieces after having been folded and in conjunction with means for forming a stack thereon, and including novel construction for lowering the supporting member or conveyor each time a piece is placed thereon in a stack, and in an amount substantially equivalent to the thickness of a piece so stacked, whereby the top piece of a stack always remains at substantially the same height, whereby to form a more accurate stack.

Yet another object is to provide a construction of the character just immediately referred to utilizing a novel clutch means having friction means for normally holding the supporting surface as positioned, but which slips in response to a laundry piece being placed on the supporting surface.

DESCRIPTION OF A PREFERRED EMBODIMENT:

In the drawings:

FIG. 1 is a side view, partially diagrammatic in nature, of a laundry folder embodying the features of the present invention;

FIG. 2 is a view taken at line 2—2 of FIG. 1;

FIG. 3 is a larger scale detail view of certain elements of the folder as viewed at line 3—3 of FIG. 1;

FIG. 4 is a diagram of the electrical circuit utilized in controlling the centering of the laundry pieces in the feeding thereof, together with certain of the mechanics of the folder;

FIG. 5 is a side view similar to FIG. 1, and including a french fold means, to which a second principal feature of the invention is particularly adapted;

FIG. 6 is a side view of the french folding component isolated from the remainder of the construction;

FIG. 7 is a top view of the component FIG. 5 together with a piece to be folded of the kind known as “boxer shorts”;

FIG. 8 is a large scale sectional view taken at line 8—8 of FIG. 9c;

FIG. 9 is a diagrammatic illustration, oriented according to FIG. 7, showing several stages in the folding of the laundry piece;

FIG. 10 is a side view of certain of the elements at the exit end of the folder, relating to the means for controlling the platform on which the folded pieces are placed;

FIG. 11 is a large scale sectional view taken at line 11—11 of FIG. 10;

FIG. 12 is a side view of the conveyor at the exit end of the folder receiving the folded pieces, together with the wicket for stacking the pieces, and showing diagrammatically different positions of that conveyor; and

FIG. 13 shows a counter dial and electrical conductors connected thereto, which are included in a control circuit for controlling the operation of the folder.

Reference is now made to the details of the accompanying drawings, wherein FIG. 1 shows the overall construction of a laundry folder of the character to which the present invention is particularly adapted. The folder in its general construction may be similar to that shown in my prior U.S. Pat. No. 3,462,138, dated Aug. 19, 1969, to which attention is directed for detail construction, but, in the present instance, the folder need not include the upper french fold construction included in that patent. The folder includes a frame 10 having a feedboard 12 onto which the laundry pieces 14 are to be folded or placed, and from which the pieces are delivered onto a vertical-folding conveyor belt 16, and from that conveyor belt the pieces are delivered to a conveyor means 18 which includes a twist belt 20 and a training belt or folding belt 22, together taking the vertically folded piece from the conveyor means 16 and delivering it at its delivery end (the right hand end of FIG. 1) in a horizontal position. As the piece thus folded is so delivered, it rides over a roller 24 forming a gap 26 with the main belt 20 and the piece then rides down a curved apron 28 where it engages control means 29 for actuating a folding knife 30 which engages the piece at an intermediate portion and delivers it into a bight 32 between a pair of conveyors 34, 36. The conveyor 34 includes an endless belt trained on a pair of rollers, and the conveyor 36 also is an endless
belt trained on rollers, but which will be described more in detail hereinbelow.

One of the principal features of the invention is that the pieces to be folded will be folded accurately relative to a longitudinal center line, and to that end means is provided for centering the pieces on the feedboard 12. The feedboard 12 (FIG. 2) includes an upper roller 38 and lower rollers 40, 42, and a conveyor or belt means 44. The belt means 44 is made up of a plurality of laterally spaced belt elements including a first group 44a and another group 44b alternately arranged, the elements 44a being trained on the rollers 38, 40 while the other elements 44b are trained on the rollers 38, 42, and thus being longer than the elements 44a.

FIG. 2 shows a laundry piece 14 placed on the feedboard in a laterally centered position as is desired, relative to a longitudinal center line 46, but if the piece should be placed in a position not accurately positioned centrally, but displaced in either direction from a central position, means is provided for centering the piece so as to fold it at the center and thus provide an accurate fold.

This centering includes a pair of PE cells 48, 50, shown in FIGS. 1 and 2, the bulbs thereof 48a, 50a being shown in both figures, and the reflectors 48b, 50b being also shown in FIG. 1. The PE cells are arranged relative to the feedboard that the laundry piece on being placed on the feedboard in the desired position and traveling therealong, passes with its edge (here the left edge) as indicated at 14c between the bulbs and shuts off the one, but not the other PE cell, but if it should be positioned to the left as indicated at 14b, or to the right as indicated at 14c, the means for shifting the pieces comes into play, as described below.

Attention is directed next to FIG. 3 which is an end view of the feedboard 12. The lower roller 42 of the feedboard is mounted for axial shifting movement in its support which may be the side plates 52 of the folder in suitable bearing means 54. A pair of cylinders 56, 58 are provided for so shifting the roller 42, these cylinders having pistons connected with a lever 60 pivoted at 62 and having its extended end positioned between a pair of element 64 on a rod or other kind of element 66 connected with the ends of the roller 42. A pair of counteracting tension springs 68 are connected oppositely to the lever 60 and respectively to fixed elements 69 of the folder. The arrangement of the construction just immediately described, results in shifting of the roller 42 upon actuation of the cylinders 56, 58 in respective directions i.e., upon actuation of the cylinder 56 the roller 42 is shifted to the left (FIGS. 2, 3) and upon actuation of the cylinder 58 the roller is shifted in the other direction. This shifting movement of the roller 42 results in corresponding shifting of the laundry piece 14 theron and positioning it relative to the longitudinal center line 46 as referred to generally above. The actuation of the cylinders 56, 58, is controlled by the circuit of FIG. 4 which includes the PE cells 48, 50 and the operation of the control means is controlled according to whether the laundry piece passes over one or both or neither of the PE cells.

Referring specifically to FIG. 4, the circuit indicated in its entirety at 70 includes voltage sources 72 respectively connected with the PE cells. The PE cell 48 is connected in a conductor 74 which leads to a conductor 76 and to a voltage source 78 and also which includes a main control switch 80 which is mounted adjacent the feedboard (FIG. 2) and has a finger 82 (FIG. 1) extending above the feedboard for actuation by the pieces to be folded as they move over the feedboard. The conductor 76 leads to another conductor 84 which in turn leads to a conductor 86 and the latter connects with the conductor 74 completing a circuit through the PE cell 48.

The PE cell 50 is incorporated in a conductor 88 which connects on one side with the conductor 86 and on the other side with the conductor 90 and the latter connects with another conductor 92 completing a circuit through the voltage source 78 with the PE cell 50.

The switch 80 is so incorporated in the circuit of FIG. 4 that if it is open no control movements are effected, but when it is closed, the control movements are produced according to the positions of the pieces to be folded. In other words so long as there is no laundry piece moving over the feedboard, the complete circuit remains open, and it is only when a laundry piece moves over the feedboard and engages the switch finger 82 that the circuit is energized and controlled to produce the adjusting effect desired. The switch is positioned longitudinally of the feedboard relative to the PE cells 48, 50, and as a practical matter positioned slightly beyond those cells, so that the control of the circuit is produced under the control of those PE cells only when a laundry piece reaches that position which is preferably where the leading edge of the piece to be folded is actually beyond, although only slightly beyond, those PE cells.

FIG. 4 shows valve means 94, 96 for controlling the respective air cylinders 56, 58, these valve means including valves proper 94a, 96a and electromagnets 94b, 96b for actuating the valves. The valves are normally closed, and upon energization of the electromagnets the valves are opened and the corresponding air cylinders 56, 58 are energized resulting in corresponding shifting of the roller 42 as referred to above.

A conductor 98 leads from the conductor 76 to the electromagnet 96b and a relay 100 has a coil 100a in the conductor 76 and a normally closed switch 100b in the conductor 98.

A conductor 102 interconnects the conductor 90 and the electromagnet 94b, and a relay 104 includes a coil 104a in the conductor 90 and a normally closed switch 104b in the conductor 102. Circuit through the electromagnets includes a conductor 106 leading from the electromagnet 94b and connecting with a conductor 108 which in turn connects with the conductor 92; and another conductor 109 leading from the electromagnet 96b and connecting with the conductor 108.

Referring to the operation of feeding the laundry pieces into the folder, the operator upon acquiring the desired skill, places each piece as indicated in FIG. 2 in which it works up the feedboard and its left edge 14a disposed between the PE cells 48, 50, i.e., it covers the PE cells 50 but leaves the other PE cell 48 open; this being the desired position, there is no action occurring in the control in the machine with respect to centering the laundry piece. In such a situation, with the right PE cell 50 interrupted, and the left PE cell 48 open, and referring to FIG. 4, 4 - a circuit exists through the PE cell 48, energizing the relay 100 and holding the switch 100b open. Accordingly the electromagnet 96b is de-energized and the valve 96a remains closed. At the same time the subcircuit including the PE cell 50 is open, de-energizing the relay 104, and leaving the switch 104b open, and in this case also the electromagnet 94b is de-energized and the valve 94a is closed.
Assuming in a first instance that the laundry piece is accidentally placed off center and in one case, too far to the right as indicated at 14b, where the left edge is beyond the PE cell 50 and in which both PE cells are exposed. In this case, and referring to FIG. 4, the PE cell 50 being non-interrupted, a circuit is completed through that cell, conductors 88, 90, 92, 84, 76 and 74, in return to the cell. The relay 104 is thereby energized, closing the switch 104b and energizing the air cylinder 56. This cylinder then contracts and shifts the roller 42 to the left, and as represented in FIG. 2, the belt elements 44b at their lower ends are accordingly shifted, which shifts them to the left, and the laundry piece accordingly. This movement is precalculated in extent to move the laundry piece the desired amount so as to cover the PE cell 50, thereby de-energizing the valve means 94. The laundry piece is then centered relative to the longitudinal center line 46, and it progresses through the folder in that same orientation.

Assuming in another instance that the operator accidentally places the laundry piece too far to the left as indicated at 14b, where in its passage over the feedboard it covers both PE cells, and particularly the PE cell 48. In this case the circuit condition which before enabled the valve means 94 to remain de-energized is altered so that the PE cell 48 is interrupted, the relay 100 is de-energized, enabling the switch 100b to close, which closes a circuit through the electromagnet 96b of the valve means 96 and admits air to the cylinder 58 and contracts that cylinder and shifts the roller 42 to the right which carries the laundry piece to the right to its properly centered position. This movement uncovers the PE cell 48, and the electromagnet 96b of the valve means 96 becomes de-energized and air cylinder 58 becomes correspondingly de-energized.

In each of the above cases, whether the laundry piece was placed too far to the right or too far to the left, when it is returned to the desired central position, it continues through the folder in such central position, symmetrical relative to the center line 46, and an accurate fold is performed in the piece.

In any case, whether an adjustment is made to the left, or to the right, and after the respective air cylinder 56 or 58 is de-energized, the roller 42 is centered by the counteractering tension springs 68, and after a laundry piece has passed through the machine, the roller 42 is in position to receive the next piece in center position and if it is in the desired center position no control activity is exercised.

The PE cells 48, 50 may be spaced apart laterally according to the desired latitude; one convenient spacing is two inches, in a situation where a maximum of nearly 2 inches variation is permissible. For example in the case of a large towel if it were off center as nearly an inch, that would be acceptable, but if it should be off center more than that the centering control operation would come into play and bring the towel back to its desired position. The distance between the PE cells 48, 50 is of course as desired and in the case of larger pieces the spacing may be greater than the case of smaller pieces, being within the compass of the invention to provide means for adjusting that spacing to provide different ranges for different kinds of laundry pieces.

Attention is next directed to another phase of the invention which has to do with providing a fold in laundry pieces in which the different portions of those pieces are of different stretchability or yieldability. Attention is directed to the kind of garment as known as "boxer" shorts which include a waistband of greater retractive strength, and in the folding of this type of garment, that greater strength herefore has interfered with the folding of other portions of the garment whereby an undesirable shape of the final folded piece resulted. The present invention includes means for stretching that waistband, in the folding operation, so that it assumes a final folded dimension similar to or commensurate with the final folded dimension of the remaining portions of the garment.

Referring to FIGS. 6-9, the folder includes french fold means identified generally at 110 including a pair of main folding blades 112 mounted for relative lateral movement toward and away from each other by suitable means indicated diagrammatically at 114. Under the folding blades 112 are forming blades 116, which together with the folding blades 112 form a french folding means of known construction.

FIG. 7 shows a laundry piece 118 known as "boxer" shorts which the present invention is particularly adapted for folding because of the peculiar characteristics encountered in that piece. The boxer shorts 118 include a waistband 120 of resilient characteristics, but of relatively great strength, and of a strength substantially greater than the body or butt portion 119 of the piece, and while the body piece may be either stretchable or not stretchable, the consideration is that the waistband is substantially stronger than the body portion whereby when it does stretch and is enabled to retract, it tends to assume a dimension substantially smaller than the body portion. It is in connection with this phenomenon that the presently involved feature of the invention is concerned.

FIG. 7 shows auxiliary blades 122 mounted on respective ones of the main folding blades 112 and pivoted at axes 124 thereon, these axes being at an end of the blades 122 and their free ends are swingable about those axes in planes parallel to the planes of the blades 112, between an inner position 122a in which the outer edges of auxiliary blades are substantially coincident with the outer edges of the folding blades 112, and an outer position 122b in which the outer edges of those auxiliary blades extend laterally beyond the edges of the folding blades.

In the operation of the french folding construction, the piece 118 to be folded is fed through the folder (FIG. 5) as on the feedboard 12 and it rides upon the conveyor 119 into the french fold component where it rides on the folding blades 112 between the blades 112 and the undersides of the conveyor of folder 116; and the side flaps of the piece lap over the folding blades and move under the forming blades 116 in a known manner. The operation of such french folding means is of course known. Although not shown for simplicity, it will be understood that the folding blades 112 are supported from the left end and extend to the right in cantilever fashion, as is customary in french folding apparatus, the pieces to be folded sliding on the blades 112 as propelled by the adjacent conveyor belt with the outboard edges of the piece hanging down for engagement by the forming blades 116.

In the normal operation of folding laundry pieces in a french fold, they hug the folding blades 112, determining the maximum width of the final folded piece, in certain cases, but in the present instance where the waistband 120 is of greater strength and consequent greater retractile characteristics, any width of the folded piece
as determined by the folding blades 112, in a normal operation, would result in that same width being pro-
vided in the waistband 120, while the waistband were on the folding blades 112, but after it rode off the fold-
ing blades it would contract to a smaller dimension and be smaller than the remainder, or body portion, of the piece being folded.

To counteract that situation, the auxiliary blades 122 are provided. These are controlled by suitable means indicated diagrammatically at 126 which is operative for spreading and contracting those blades about their axes 124, which is under the control of a switch 128 having a finger 130 extending above the folding blades 112 (FIG. 6) for engagement by the laundry piece as it moves over the main folding blades 112. The operation is such that the blades 122 normally assume their outer diverging position and upon the laundry piece contact-
ing the switch 128, they are moved into their inner pos-
tion.

In the folding operation, the forming blades 116 are positioned sufficiently close to the folding blades 112 that they hold the side flaps of the laundry piece tight against each other and against the top portion of the laundry piece (see FIG. 8) so that in the final folded piece, the piece holds its shape as thus formed. Previ-
ously when the strong waistband was folded in the same dimensions as the remainder of the piece the waistband contracted to a much smaller dimension than the re-
mainder, but because of the auxiliary blades 122, this difficulty has been overcome.

The auxiliary blades 122 are biased apart by compression springs 125, to their outer position shown in full lines in FIG. 7. As the laundry piece 118 moves past the auxiliary blades 122, the central portion of the piece 118 sliding on top of the main folding blades 112 with the outer portions hanging down and being folded underneath the main blades 112 by the forming blades 116 in the manner shown in FIG. 8, it engages the switch finger 130 which operates a control means for actuating the means 126 for drawing the auxiliary blades 122 inwardly to their dotted line position in which their outer edges are coincident with the outer edges of the main forming blades. As the progress of the auxiliary blades 118 through the french folding device 110, the waistband 120 rides over the diverging edges of the auxiliary blades and these blades expand the waistband accordingly. The switch 128 is positioned longitudinally of the main folding blades 112 at such position that when the leading edge of the laundry piece engages it just beyond the auxiliary blades, and immediately after the full waistband leaves the auxiliary blades 122, those blades are immediately and abruptly withdrawn into their inner position. The body portion of the laundry piece then is enabled to hug the main folding blades 112 and they are folded into a transverse dimension as determined by the outer edges of the main folding blades.

As the laundry piece moves along the french folding component means, the side flaps are engaged between the forming blades 116 and the surfaces thereof above in a tight fitting arrangement, whereby they are friction-
ally held against withdrawal sideways and they thereby prevent the side flaps from being drawn out and reliev-
ing the positioning of the upper portion of the laundry piece as folded as described above. The friction be-
tween the outer edges of the main folding blades 112 and auxiliary blades 122 with the piece being folded, as indicated at points 132 (FIG. 8), further resists with-
drawal or pulling out of the side flaps as folded under the folding blades.

FIG. 9 represents diagrammatically and semi-
 schematically, different positions in progress of the laundry piece as it is being folded, in its progress through the folder. In FIG. 9a the laundry piece 118 is appro-
aching the auxiliary folding blades 122, being pos-
tioned at their divergently inner ends. As the laundry piece passes along the french folder component, the waistband 120 moves over the auxiliary blades 122 and thereby is increased in transverse width to a position represented in FIG. 9b and it is to be noted that the body portion of the laundry piece tends to incline in-
wardly more toward the dimension of the main folding blades 112. In FIG. 9c the waistband 120 has just passed beyond the auxiliary blades 122, and the latter have been retracted into their inner position, but the waistband has been expanded to an outer position be-

Although the waistband after it has left the folding blades, will contract, due to its resilience, it will con-
tract throughout its length, i.e., its transverse length or circumferential length, though doubled or folded, but any such contraction will be distributed throughout the entire length of the band and the original spacing of those portions as determined by the outermost diver-
gent ends of the auxiliary blades will determine the transverse spacing of the waistband in its folded condi-
tion and any contraction resulting in the waistband will not be continuous or cumulative through out the linear progression of the waistband, but in transverse dimen-
sion of the folded article as determined by the trans-
verse spacing of the outer divergent ends of the aux-
iliary blades 122. Accordingly any contraction of the waistband will be commensurate with the ultimate transverse dimensions of the body portion of the laun-
dry piece with the result that the final folded piece will be substantially rectangular in shape.

Attention is next directed to FIGS. 10 to 13 illustrating another important feature of the invention.

When the laundry pieces upon being folded by the knife 30 (FIG. 1) are forced up into and between the conveyors 34, 36, they ride between the latter convey-
ors and down over the final portion 134 of the con-
veyor 36, which is inclined sharply to the vertical. As-
associated with the conveyor 36 is a wicket 136 in an ar-
rangement similar to the construction disclosed and claimed in the co-pending application of the present Grannam and Edward L. McClain Ser. No. 45,188, filed June 10, 1970 now issued as U.S. Pat. No. 3,684,274, dated Aug. 15, 1972, in which the folded pieces 14 ride down over the conveyor portion 134 and over the wicket 136. The wicket 136 is movable between a retracted position shown in dot-dash lines in FIG. 10, and a forward advanced position shown in full lines in FIG. 10 by means of an air cylinder 138 working through a chain or flexible element 140 trained on a pulley 142 on the shaft of the wicket 136. Upon actu-
ation of that air cylinder the wicket is thrown from its retracted position to its advanced position, and upon de-energization of that air cylinder, the wicket is re-
tracted by a tension spring 144 also acting through the
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9 flexible element 140.

When the folded piece rides down over the final portion 134 of the conveyor 36, and upon engaging a control element such as the finger 146 of a switch 148, control means is actuated for energizing the air cylinder 138 and swinging the wicket down, and the folded piece 14 that is on the wicket at that time is thrown down onto a supporting surface or platform 146 which preferably is in the form of a conveyor for receiving the pieces, preferably in a stack, and after the stack reaches a certain number, e.g. 10, the conveyor is moved for conveying the stack onto a table or other surface 148. The conveyor 146 and its operation are of known type.

The conveyor 146 is mounted for vertical movement as controlled by guide elements 150 which may be in the form of slots receiving end elements in the rollers of the conveyor. These slots may be formed in the sidewalls 152 (FIG. 10) of the folder.

Connected to the conveyor and preferably to the rollers at the ends thereof is suitable means 154 which may be in the form of rods or bars interconnected with a member 156 having a rack 158 with which a pinion 159 meshes. The pinion is secured to a disc 160 which with another disc 161 have high-friction interengaging surfaces forming a friction clutch 162. The clutch 162 is mounted on a bar 164 in turn mounted on the side walls 152 of the folder and held against movement both axially and rotationally. The disc 160 is movably both rotationally and axially on the rod and biased into high friction engagement with the disc 161 by means of a compression spring 166. The movable disc 160 is provided with a pulley 168 trained over which is a chain or flexible element 170 secured at one end to a tension spring 172 and at the other end to the piston 174 of an air cylinder 176.

The friction between the discs 160, 161 is sufficient to hold the conveyor 146 at any given position, but the disc 160 will slip relative to the other, upon sufficient pressure being imposed on the conveyor to lower it. Such pressure is provided by the moving or slamming down of the wicket 136 in placing the folded pieces 14 on the conveyor, this action resulting in the downward movement of the conveyor at each actuation of the wicket, an amount or increment substantially equal to the vertical thickness of the folded piece, with the result that the top piece of a stack is always at substantially the same height, i.e., assuming a given uppermost position of the conveyor 146, when the first piece 14 is placed on the conveyor it assumes a given position, at a certain height, and when the next piece is placed down, the pressure of the wicket forces the conveyor down an amount caused by the action of the wicket acting through the piece then being placed, and in consequence the conveyor is moved down an amount substantially equal to the thickness of the folded piece. The pieces are continuously placed down in the stack and FIG. 12 indicates different phases or stages of the stacking operation, where the conveyor 146 is shown at different positions in the stacking operation.

A counter is indicated in its entirety at 178 which is of known kind, having a triggering finger 180 actuated by another finger 182 on the wicket. The counter 178 has the usual indicator which may be a hand 184 and the counter is arranged in an electric circuit 186 in such a way that when the desired number of pieces to be stacked is reached, such as 10, 15, etc., the circuit is energized and a control function performed for actuating the air cylinder 176 (FIG. 10) which drives the conveyor 146 for carrying the stack then formed out of the stacking position (to the right, FIGS. 10, 12) and energizing the air cylinder 176 to contract the cylinder, rotating the pulley 168 in retracting direction (counterclockwise, FIG. 10) and raising the conveyor 146 to its uppermost position for receiving again the first pieces of the new stack and then lowering as that stack is formed. The clutch means 162 is effective for holding the conveyor means 146 at any position, as indicated above, and the action of the air cylinder 176 is effective for moving the disc 160 against the friction holding it by the associated disc 161.

I claim:
1. In a laundry folder having an entrance end and exit end, conveyor means adapted for receiving, at the entrance end, laundry pieces to be folded and conveying them through the folder and delivering them from the exit end, means for folding the pieces in their progress through the folder, a french folder component constituting a segment of the conveyor and folding means, the french folder component including a pair of transversely spaced longitudinally extending main folding blades and a pair of forming blades thereunder, and also including a pair of auxiliary folding blades mounted on the main folding blade, and extending longitudinally along the main folding blades, and being mounted on pivoting axes at their rear end, relative to the direction of the pieces moving therealong, between an inner position in which their outer edges are substantially coincident with the outer edges of the main folding blades, and an outer position in which their outer edges diverge in a direction of the movement of the laundry piece therefore, and means for moving the auxiliary folding blades between their inner and outer positions.
2. A laundry folder according to Claim 1 wherein the auxiliary folding blades are biased outwardly into their outer position, which is a normal position, and the construction includes means for moving the auxiliary blades into their inner position.
3. A laundry folder according to claim 2 and including means responsive to movement of a laundry piece along the french folding component for actuating the means for moving the auxiliary blades into an inner position in a predetermined point of progress of the laundry piece along the folding component.
4. A laundry folder according to claim 3 wherein the control means as actuated by the laundry piece is positioned at the forward end of the auxiliary folding blades at such position that the auxiliary folding blades are not moved into their inner position until after the leading edge has moved by the auxiliary folding blades, whereby the auxiliary folding blades perform a spreading action on the forward portion of the laundry piece so long as that forward portion is in register transversely with the auxiliary folding blades, and further wherein the control switch is so positioned that after that forward portion moves beyond the auxiliary folding blades, the control means moves those blades into their inner position, whereby the remainder and trailing portion of laundry piece is folded about the main folding blades in a narrower formation than would be provided by the auxiliary folding blades.
5. A laundry folder according to claim 4 in conjunction with a laundry piece having a forward portion in
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the form of a strong and highly resilient waistband and a trailing portion which is less strong and resilient, and in which the waistband has a predetermined dimension in direction longitudinally of the progress of travel through the folder, and wherein the auxiliary folding blades normally assume their outer divergent position and whereby the waistband rides along those auxiliary folding blades to form a greater width in folded position than would be determined by the main folding blades, and wherein the control switch is positioned longitudinally relative to the folding blades at such position whereby the waistband immediately upon moving past the auxiliary folding blades it engages the control switch which thereby immediately effects movement of the auxiliary control blades to their inner position, whereby the trailing portion of the laundry piece, assumes a folded position as determined by the main folding blades.

6. In a folder for folding a laundry piece having a wide portion and a narrow portion, the combination comprising:

folding means,

conveyor means for conveying the piece through the folder and in doing so cooperating with the folding means for folding the piece,
said folding means including means for expanding the narrow portion of the piece to a width similar to that of the wide portion,
said expanding means being controllably operative according to a predetermined position of the narrow portion in its conveyance along the folding means.

7. A combination according to claim 6 wherein, when the laundry piece is conveyed through the folding means with the narrow portion and wide portion proceeding in succession longitudinally,

the expanding means is operative for expanding the narrow portion but ineffective in association with the wide portion.

8. A combination according to claim 7 and including, means actuated by the laundry piece for controlling the expanding means.

9. In a laundry folder having an entrance end and an exit end, a folding means having longitudinally extending blade means, conveyor means operable for conveying laundry pieces to be folded through the folder, and in doing so, folding the pieces around the folding blade means, auxiliary blades mounted at the side portions of the latter and movable thereon between an inner position in which their outer side edges are within the lateral limits of the folding blade means and an outer position in which their outer side edges extend laterally outwardly beyond the side edges of the folding blade means, and means for controllably moving the auxiliary blades between their said positions.

10. A method of folding a laundry piece having a wide portion and a narrow stretchable portion, the steps comprising,

expanding the narrow stretchable portion to a width similar to that of the wide portion, and folding the piece to a form in which the side edges of the narrow stretchable portion form substantially regular continuations of the side edges of the wide portion.

11. A method according to claim 10 and including the step of folding the piece to a form in which the side edges of the folded piece, including those of both the wide and narrow portions, are substantially parallel.

12. A method according to claim 10 wherein at least the narrow stretchable portion is folded about creases forming flaps that overlap and form plural thicknesses.