

Oct. 10, 1967

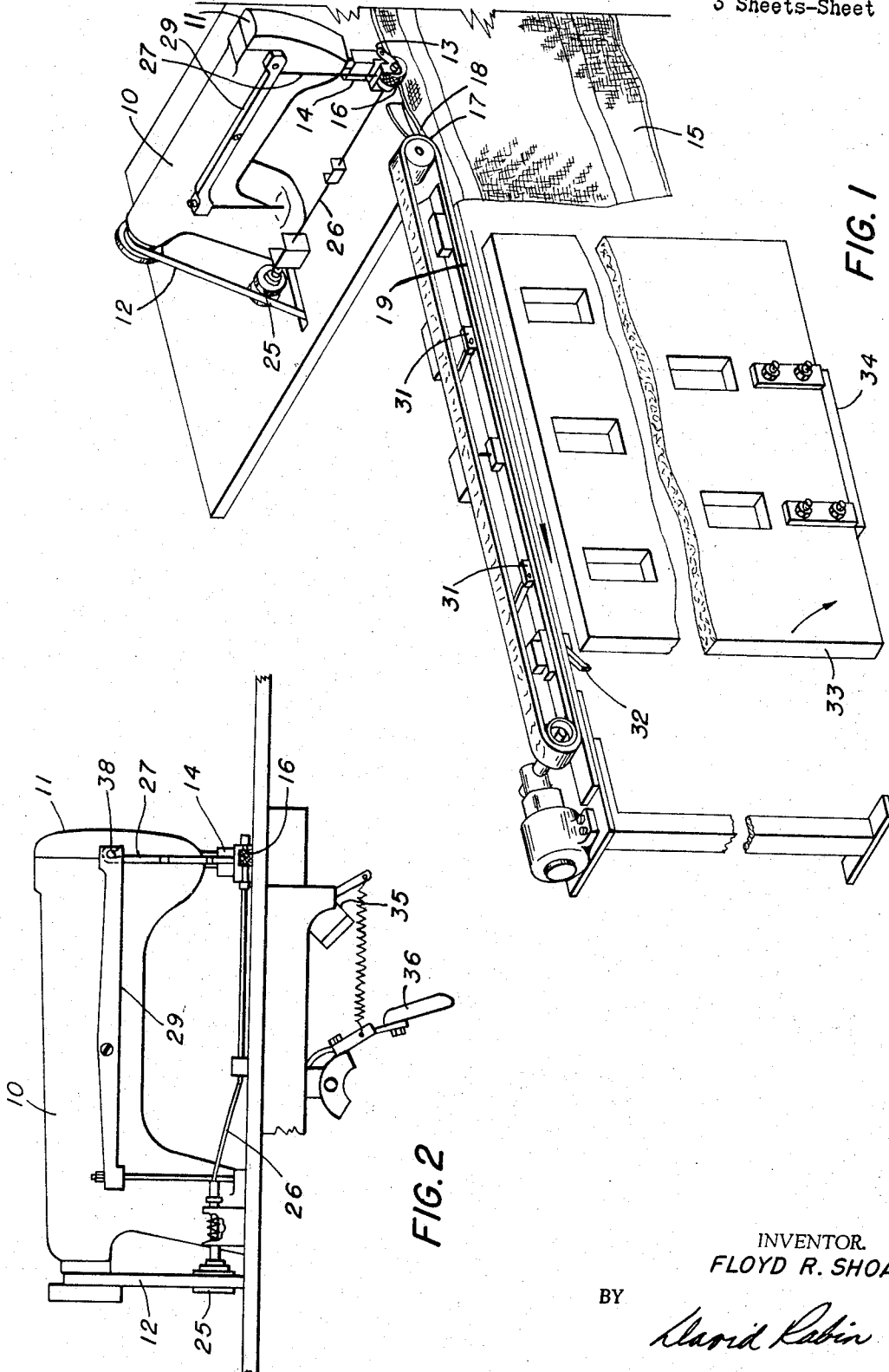
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3,345,963

GARMENT SEVERING AND STACKING APPARATUS

Filed Dec. 31, 1964

3 Sheets-Sheet 1



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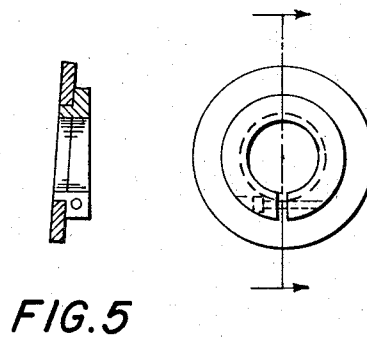
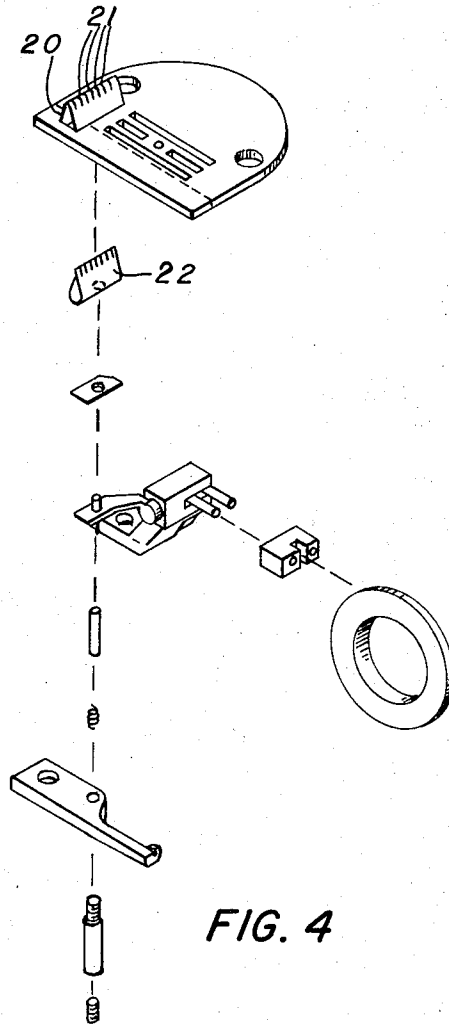
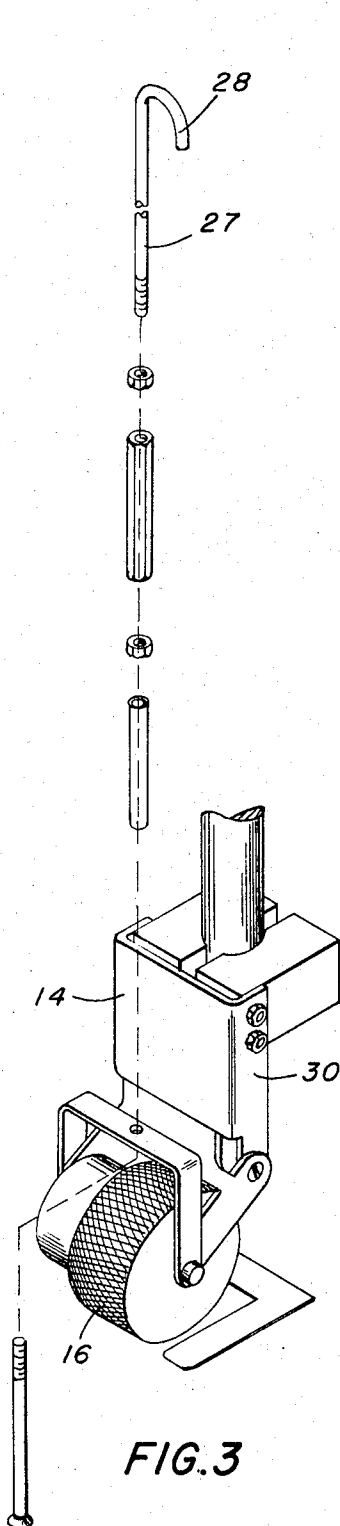
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GARMENT SEVERING AND STACKING APPARATUS

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3 Sheets-Sheet 2



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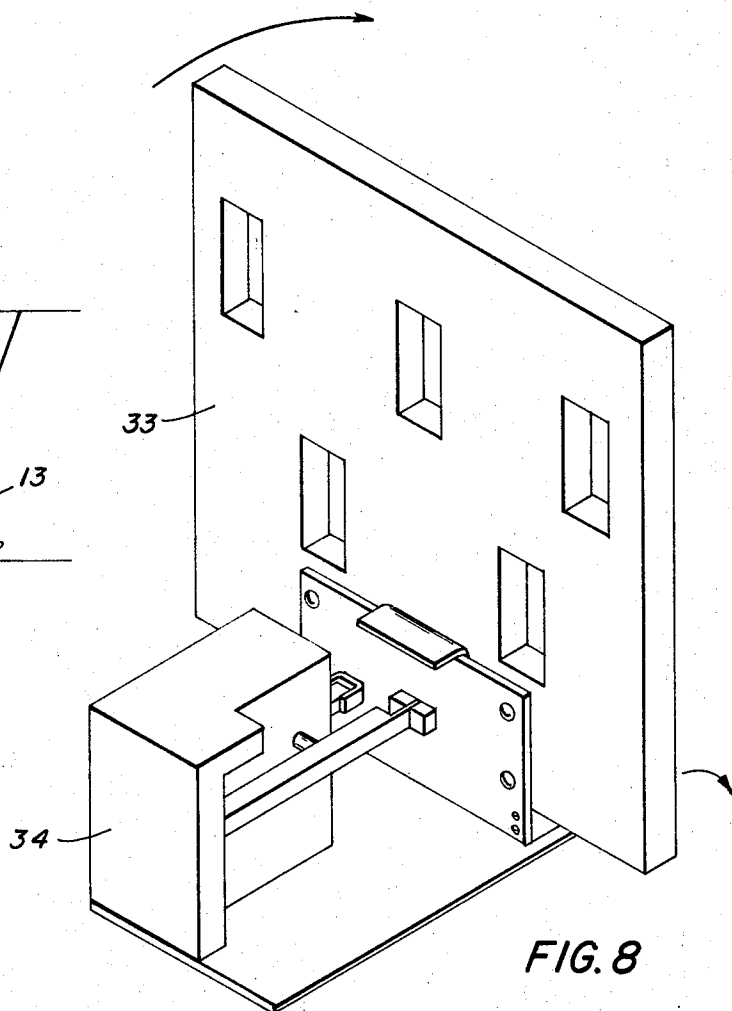
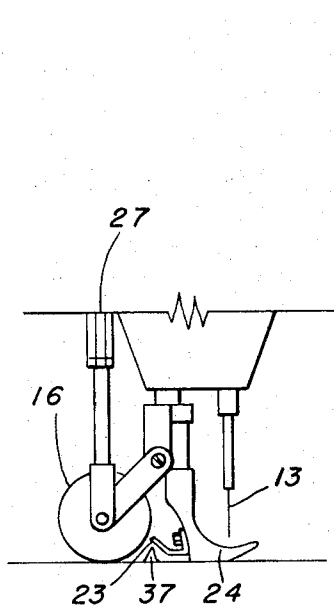
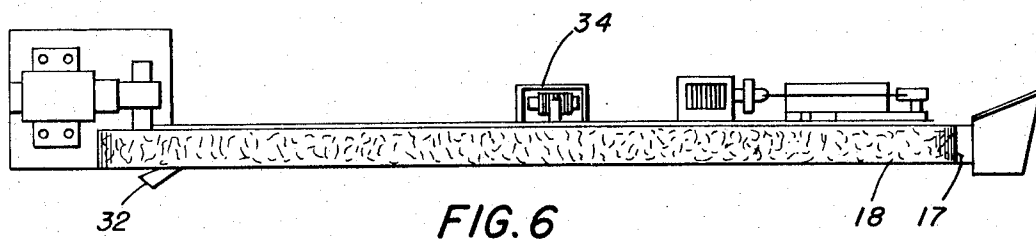
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GARMENT SEVERING AND STACKING APPARATUS

Filed Dec. 31, 1964

3 Sheets-Sheet 3



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3,345,963

GARMENT SEVERING AND STACKING APPARATUS

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18 Claims. (Cl. 112-2)

The present invention relates generally to accessories or attachments for sewing machines, and is particularly directed to sewing machine accessories for severing and separating seam-linked or chain seamed garments passing through the machine after sewing and for removing those severed and separated garments to a remote location for automatic, orderly and systematic stacking.

In the expeditious sewing of garments one article closely follows another in the sewing machine so that the seam runs from one piece to the next and connects them in continuous fashion in order to obviate the necessity of rethreading the needle and shuttle with each piece to be seamed. The seamed articles are subsequently cut apart. Under conventional operating practices, this separation is manually done and constitutes an expensive, time-consuming and monotonous application of manpower.

When garments are sewn so that the seam runs from one piece to the next, these linked articles accumulate on the discharge side of the sewing machine in a random and rather confused and disorderly fashion. Not only must these articles be manually severed and separated, but they must then be manually sorted and stacked for subsequent or reprocessing. Essentially the entire operation of sewing garments in continuous fashion so that they are linked one to the other by a common seam, severing and separating these linked together garments and sorting and stacking the resulting product requires two or three operators depending upon the circumstances of each particular situation. Even if three people were available to perform each of the three functions involved, the entire operation would still be rather time-consuming since the garments themselves are handled individually for each operation.

Accordingly, one of the objects of the present invention is to provide a completely automatic severing attachment or accessory for a sewing machine which is simple and durable in construction, and efficient in operation.

It is another object of the present invention to provide a removing and stacking attachment or accessory for a sewing machine for carrying severed garments to a remote location and systematically and orderly stacking these garments for subsequent handling or processing.

Yet another object of the present invention is to provide a combination cutting attachment and removing and stacking apparatus for a sewing machine which is economical and durable in construction and efficient and reliable in operation.

Still another object of the present invention is to provide a completely automatic cutting attachment and garment removing and stacking apparatus which will obviate the need of more than one operator to perform the entire operation.

Yet still another object of the present invention is to provide a sewing machine attachment as described in the foregoing paragraphs which will achieve substantial savings in time and labor, and which can be manufactured and sold at a reasonable cost.

It is another object of the present invention to provide a sewing machine attachment for removing severed

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and separated garments to a remote location that can be preset to precisely position the finally deposited severed and stacked garments.

Yet another object of the present invention resides in the provision of a removing and stacking sewing machine attachment for stacking finished garments in a variety of folds and configurations.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

Now referring to the drawings:

FIG. 1 is a perspective view showing the combination of the garment separating and severing attachment and the garment removing and stacking apparatus and their coaction and cooperation with the sewing machine;

FIG. 2 is a front elevational view of a sewing machine with the attached severing device which specifically discloses the positive drive arrangement and the kneeoperation of the machine pressure foot to which the severing device is secured;

FIG. 3 is an exploded perspective view of the roller tensioning means for the severing device showing the serrated driving wheel which positively directs a newly sewn garment from the needle, bedplate and pressure foot to the removal and stacking apparatus;

FIG. 4 is an exploded perspective view of the thread cutter portion of the thread severing device;

FIG. 5 is a vertical section on the line 5-5 of FIG. 4;

FIG. 6 is a top plan view of the garment removing and stacking apparatus showing the support mechanism and the positive drive for the endless conveyor belt;

FIG. 7 is a front elevational view of the garment separating and severing device showing the coating roller tensioning member and pressure foot straddling the thread cutting device;

FIG. 8 is a perspective view of the garment stacking member showing its pivoting and supporting mechanism.

Referring now more particularly to the drawings, and specifically to FIG. 1 thereof, the embodiment of the invention illustrated therein comprises a sewing machine, generally designated 10, having an operating head 11, driving means 12, reciprocating needle 13, and presser or pressure foot assembly 14. A garment is introduced for sewing under the pressure foot assembly 14 and as the garment is seamed it is directed back under the roller-tensioning device 16 which positively moves the sewn garment 15 along its directed path of travel toward the garment removal apparatus. As one garment is completely sewn, its edge has been introduced into the nip 17 of conveyor belt 18 and support member 19 and has commenced its directed movement along that belt's path of travel (see arrow). The garment now is vertically suspended in an unfurled condition, being secured only by its edge (see FIG. 1). As the roller tensioning device 16 and the belt 18 convey the garment, the connecting seam between the sewn garment and the garment to be sewn is extended under slight tension, since roller tensioning device 16 attempts to move the garment at a faster rate of speed than it is sewn, and directed into an inverted V-shaped thread receiving member 20 (FIG. 4) having a plurality of serrations 21. A cooperating inverted V-shaped cutter 22 is horizontally reciprocable

in receiving member 20 to sever threads introduced into one or more of serrations 21. The rear or heel 23 of presser foot 24 (FIG. 7) extends upwardly and at an angle in order to readily introduce the connecting threads joining a sewn and to be sewn garment into receiving member 20 during operation of the sewing machine.

In order to apply the requisite tension to the threads linking seamed garments and to permit this connecting chain to be readily severed by cutter serrations 21, there is provided a slip clutch 25 that is driven by the machine main driving belt. A shaft 26 is attached from the clutch to the serrated roller tensioning member 16 for rotating that member. Spring loading is provided for roller member 16 by rod 27 (FIG. 3) having a hook 28 at the point of connection 38 (FIG. 2) to the pressure foot elevating arm 29 (FIG. 1). The roller member 16 and bracket 30 (FIG. 3) are connected to the pressure foot assembly 14 (FIG. 1) in a manner similar to that disclosed in FIG. 7.

Once a newly sewn garment has been severed and separated and introduced into nip 17 between conveyor 18 and supporting member 19, it is moved along the path of travel of conveyor belt 18 (see arrow) at a constant rate of speed. The seamed edge of garment 15 is securely fixed between belt 18 and member 19 by tensioning means 31. These tensioning devices can be any one of a variety of springs or flexible metal members adaptable for such a purpose. As garment 15 is advanced by belt 18, it engages a prepositioned stop-motion switch 32 which instantaneously releases all tensioning means 31 and allows the vertically suspended garment 15 to fall freely from its previously secured vertically suspended position.

As garment 15 commences its free fall, garment receiving member 33 moves from its normal vertical position to a substantially horizontal position by pivoting at its pivoting and supporting mechanism 34. As member 33 is displaced from the vertical plane, it engages garment 15 at the instant that garment is released and guides it to a substantially horizontal position in a substantially flat condition.

Once the garment has been deposited, member 33 returns to its original position, and belt 18 and support member 19 are again pressed together by the reactivation of tensioning devices 31. Thus normal operation is resumed and continues until another newly sewn garment reaches stop-motion switch 32 and the depositing and stacking operation is repeated.

In the normal operation of sewing machine 10, when chain seamed articles are sewn and linked to one another successively, the sewing machine operator after terminating the sewing of one member in one direction, locks or secures the stitches by sewing back over the member for a short distance. A solenoid switch (FIG. 2) which can be knee actuated by depressing pad 36 is connected to the pressure foot assembly 14 so that upon displacement of the knee pad by the operator, the linkage to the pressure foot 24 (FIG. 7) will raise that foot and simultaneously stop conveyor belt 18 (FIG. 1) thus enabling the operator to backstitch the corners of the garment being seamed or hemmed to lock the chain stitch and prevent unraveling. Upon completion of the backstitching operation, the pressure foot 24 will be lowered and the conveyor will be reactivated by the release of pad 36 thus enabling the thread or chain seam extending between the garments to be severed by the thread severing mechanism 37 at the rear of pressure foot 24.

Obvious modifications and alternative embodiments are readily apparent. By extending conveyor belt 18 to any convenient or desired length, the removal of the severed garments to be stacked becomes even more remote from the machine than that illustrated in the preferred embodiment of the invention. Extending the length of V-shaped member 20 (FIG. 4) will enable an operator to

position more positively the chain stitches between garments for a greater distance. Modifying member 33 and its pivoting and supporting mechanism 34 would allow stacking of severed and separated garments in any number of arrangements. It is contemplated that a garment might be prefolded before the stacking operation by the precise configuration of member 33 should such an operation be desired.

It is to be understood that for the purposes of this application, the term "seam" is intended to cover the forming of a hem or border as, for example, when the edge of a remnant is folded over and sewn to prevent raveling, in addition to its normally understood meaning.

While the invention has been described in detail with particular reference to sewing machines and attachments therefor, it will now be understood that the invention is applicable to various other uses. That is, the invention may be applied wherever a particular operation is desired in response to a plurality of conditions.

In view of the foregoing detailed description it will now be appreciated that the invention fully accomplishes its intended objects and is well adapted to meet practical conditions of use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and the scope of the appended claims.

Having thus described my invention, what I claim as new is:

1. The method for severing connecting threads between successively sewn garments and stacking the separated garments comprising the steps of: introducing a garment into and through a sewing machine for seaming an edge; securing said garment along the newly seamed edge as it leaves the sewing machine and advances along a directed path of travel, said moving garment being vertically suspended in a fully unfurled condition; severing the connecting threads between said newly sewn garment and a subsequent garment to be sewn while continuously supporting said sewn and vertically suspended garment by its seamed edge as it moves along a directed path of travel; halting the directed movement of said sewn garment at a predetermined location as it remains vertically suspended in an unfurled condition; releasing and directing said unfurled garment from a vertical to a substantially horizontal flat position for stacking; and continuously repeating the above steps until a suitable number of said substantially horizontal flat garments are stacked.

2. A method for severing connecting threads between successively machine-sewn garments and systematically and remotely stacking these garments comprising the steps of: tensioning the connecting threads between a sewn garment and a garment to be sewn by securing said sewn garment along the newly sewn edge and moving it along a directed path of travel, said moving garment being vertically suspended by said sewn edge in a fully unfurled condition; severing said connecting threads while continuously supporting and moving said fully unfurled garment along a directed path of travel; halting the directed movement of said severed garment at a predetermined location while continuing to support said garment by said newly sewn edge in an unfurled condition; positioning said fully unfurled garment in an unfolded and flat condition at a selected location for stacking; and continuously repeating the above steps until a desired stack of said unfolded and flat garments is completed.

3. A severing attachment and positioning machine for trimming the connecting threads between successively sewn garments and depositing these severed and separated garments in one-upon-the-other fashion comprising in combination: a sewing machine; a pressure foot for maintaining garment alignment along a directed path of travel affixed to said machine; a roller tensioning device secured

to said pressure foot and situated for receiving a garment therefrom; thread severing means intermediate said pressure foot and said roller tensioning device and comprising an inverted V-shaped thread receiving member having a plurality of serrations and a cooperating inverted V-shaped cutter horizontally reciprocable in said thread receiving member; a conveyor belt having a supporting track juxtaposed therebeneath to receive garments emerging directly from said roller tensioning device into the nip between said belt and supporting track; tensioning means for depressing said belt against said track to rigidly secure a garment's sewn edge and support said garment in an unfurled and vertically suspended condition for movement along said belt's directed path of travel; a stop-motion switch positioned to engage a moving garment along said belt's directed path of travel when said garment reaches a predetermined position and release the tensioning force holding said belt against said track thereby relieving and freeing a garment's edge held therebetween; a garment receiving member pivotally mounted substantially beneath said belt and track for receiving an unfurled and substantially flat garment as it is released by said stop-motion switch; and a supporting and pivoting mechanism positioned to pivot said garment receiving member from a vertical to an inclined position for depositing an unfurled and substantially flat garment in a stack for handling.

4. A method for severing joining threads between sewn garments, removing to a remote location and stacking these separated garments comprising the steps of: extending the connecting threads between the seamed edge of a sewn garment and a garment to be next sewn by securing and supporting said sewn garment along said seamed edge and displacing the garment along a directed path of travel; severing said connecting threads while continuously supporting said garment by its edge and moving it in a directed path of travel; halting the movement of said severed garment at a predetermined location; releasing and guiding said severed garment to a preselected location; and continuously repeating the above steps until a desired number of garments are collected at said selected location.

5. A method for continuously severing connecting threads between successively sewn garments and stacking the severed and separated garments comprising the steps of: sewing an edge of a garment while pulling said garment along a directed path of travel; tensioning the connecting threads between said sewn garment and a subsequent one to be sewn by securing said garment along the newly sewn edge and continuing its directed movement, said moving garment being vertically suspended in a fully unfurled condition; severing said connecting threads while continuously supporting and moving said garment; controlling the directed movement of said severed garment by halting said movement at a predetermined location while continuing to support said vertically suspended garment by the newly sewn edge in an unfurled condition; releasing said garment's edge; positioning said fully unfurled garment in a preselected area in a substantially flat manner; and continuously repeating the above steps until a desired number of said positioned garments are stacked.

6. A severing attachment for a sewing machine and a positioning apparatus for trimming the connecting threads between successively sewn garments and depositing these severed garments in a predetermined location comprising in combination: a sewing machine pressure foot member for maintaining garment alignment; a tensioning device secured to said pressure foot and positioned in the directed path of travel for receiving a garment therefrom; thread severing means intermediate said pressure foot and said tensioning device, garment conveying means positioned to receive garments emerging from said tensioning device and transport said garments along a directed path of travel; means for releasably fastening a garment to said garment conveying

means; detecting means positioned to react to a moving garment along said conveying means' path of travel when said garment reaches a predetermined position and designed to simultaneously release said garment secured to said conveying means; a garment receiving member mounted substantially beneath said garment conveying means for receiving a garment released therefrom; and a garment receiving member supporting and pivoting mechanism positioned to pivot said member from a first position to another to deposit a garment for stacking and subsequent handling.

7. A severing attachment and positioning machine for trimming the connecting threads between successively sewn garments and depositing the severed garments in a preselected manner at a remote location comprising in combination: a sewing machine; a pressure foot affixed to said machine, said foot maintaining garment alignment along a directed path of travel; a tensioning device secured to the pressure foot and positioned for receiving a garment therefrom; thread severing means situated between said pressure foot and said tensioning device; conveyor means positioned to receive a garment emerging from said tensioning device and displace the garment along a directed path of travel; means for releasably securing a garment to said conveyor means; a stop-motion switch positioned to engage a moving garment along its directed path of travel when said garment reaches a predetermined position, said switch releasing said securing means thereby releasing and freeing a garment fastened to said conveyor means; a garment receiving member mounted below said conveyor means for receiving a garment as it is released by the stop motion switch; and a supporting and pivoting mechanism positioned to pivot said garment receiving member from a substantially erect to an inclined position whereby a carried garment is deposited in a substantially flat condition for stacking.

8. A severing attachment and positioning machine for cutting the connecting threads between successively sewn garments and depositing these separated garments in a stacked fashion comprising in combination: a sewing machine; a pressure foot for maintaining garment alignment in a directed path of travel affixed to said machine; a roller tensioning device secured to said pressure foot and positioned for receiving a garment therefrom; thread severing means intermediate said pressure foot and said roller tensioning device and comprising an inverted V-shaped thread receiving member having a plurality of serrations and a cooperating inverted V-shaped cutter horizontally reciprocable in said thread receiving members; a conveyor belt for moving a sewn garment, said belt having a supporting member therebeneath positioned to receive garments emerging from said roller device into the nip between said belt and supporting member; means for depressing said belt against said supporting member to rigidly secure a garment therein for movement along said belt's directed path of travel; a stop-motion switch positioned to engage a moving garment along said belt's path of travel when a garment reaches a predetermined position, said switch releasing the depressing means holding said belt against said supporting member thereby relieving and freeing a garment held therebetween; a garment receiving member mounted directly beneath said belt and supporting member for receiving a garment as it is released by said stop-motion switch; and a supporting and pivoting mechanism positioned to pivot said garment receiving member from a vertical to a substantially horizontal position and deposit a garment for stacking in a substantially flat condition.

9. In an apparatus for continuously sewing articles to be chain stitched together and conveyed to a location remote from a sewing machine for stacking, the process comprising the steps of: seaming individual articles on a sewing machine and linking successive articles being seamed with intermediate free lengths of continuous

stitches; severing linked articles as they move along a directed path of travel; conveying individual articles along a substantially horizontal path by supporting an edge of the article with the remainder being vertically suspended freely; presenting the suspended article to a predetermined position; releasing the article at the predetermined position to be received on a supporting member; displacing the article out of its plane of travel; removing the article from the support; and stacking the article at a preselected location.

10. The method of handling successively linked seamed fabrics comprising the steps of: feeding a first article to a sewing machine to be seamed along an edge thereof; feeding a second article to be seamed along an edge thereof following the terminal portion of the first article's seam forming an interconnecting chain seam between the first and second articles, as they move along a directed path of travel; severing the chain seam between the first and second articles as at least the chain seam is extended; releasably grasping and conveying the first article adjacent to said seam and extending it along a horizontal path permitting the remainder of the article to be freely suspended in a vertical plane; conveying said article to a predetermined position; releasing the article at said predetermined position; displacing the article out of the vertical plane and depositing it in a preselected position for stacking in a predetermined condition.

11. A thread severing mechanism for cooperative attachment on a sewing machine having a needle, bedplate assembly and pressure foot adapted for sewing continuous garment connecting seams comprising: roller tensioning means secured to the pressure foot and positioned for receiving a sewn garment as it emerges from the pressure foot and bedplate assembly, said means extending, lowering and tensioning the connecting threads by positively advancing a sewn garment at a faster rate than the following garment is being sewn; and reciprocating cutter means intermediate said roller tensioning means and pressure foot, said means receiving said connecting threads when said threads are extended, lowered and tensioned by said roller tensioning means for the severing thereof.

12. In a sewing machine having a needle, bedplate assembly and pressure foot and adapted for sewing continuous garment connecting seams, the combination with said machine of: a roller tensioning device comprising a garment advancing wheel having a serrated surface for positively displacing a garment disposed therebeneath, said wheel positioned to receive a sewn garment as it is discharged from the pressure foot and bedplate assembly, pressure means for depressing said wheel against the bedplate assembly to securely contact a garment held therebeneath, and wheel rotating means for driving said wheel whereby said roller tensioning device cooperates with the pressure foot and is vertically movable therewith to draw a garment through the machine along a directed path of travel and to extend, lower and tension threads connecting a sewn to an unsewn garment; and a thread cutter mechanism having an inverted V-shaped thread receiving member with a plurality of serrations and a cooperating inverted V-shaped cutter horizontally reciprocable in said thread receiving member, said member and cutter coacting to sever garment connecting seams when said roller tensioning device extends and lowers the connecting seams to engage said serrations.

13. In a sewing machine having a needle, bedplate assembly and pressure foot and adapted for sewing continuous garment connecting seams, the combination with said machine of: a roller tensioning device mounted on said pressure foot comprising a garment advancing wheel having a surface suitably constructed for positively displacing a garment disposed therebeneath and positioned to receive a sewn garment as it is discharged from the pressure foot and bedplate assembly, and wheel driving means; and a thread cutter mechanism having a thread receiving member and a cooperating cutter, said member

and cutter coacting to sever garment connecting seams when said roller tensioning device displaces a sewn garment.

14. A thread severing mechanism for cooperative attachment on a sewing machine having a needle, bedplate assembly and pressure foot and adapted for sewing continuous garment connecting seams comprising: roller tensioning means mounted on said pressure foot and movable vertically therewith positioned for receiving a sewn garment as it emerges from the pressure foot and bedplate assembly, said means operating to extend, lower and tension the connecting threads between a sewn garment the next following garment; and reciprocating cutter means intermediate said roller tensioning means and pressure foot, said means receiving said connecting threads when said threads are extended, lowered and tensioned by the roller tensioning means for the severing thereof.

15. In a sewing machine having a needle, bedplate assembly and pressure foot and adapted for sewing continuous garment connecting seams, the combination with said machine of: a roller tensioning device mounted in juxtaposition with said pressure foot and movable vertically therewith comprising a garment advancing wheel for positively displacing a garment disposed therebeneath, said wheel positioned to receive a sewn garment as it is discharged from the pressure foot and bedplate assembly, pressure means for depressing said wheel against the bedplate assembly, and wheel rotating means for driving said wheel whereby said roller tensioning device cooperatively coacts with the pressure foot and bedplate assembly to draw a garment through the machine along a directed path of travel and to extend, lower and tension threads connecting a sewn to a partially sewn garment; and a thread cutter mechanism having an inverted V-shaped thread receiving member with a plurality of serrations and a cooperating inverted V-shaped cutter horizontally reciprocable in said thread receiving member, said member and cutter coacting to sever garment connecting threads when said roller tensioning device extends and lowers said connecting threads to engage said serrations.

16. An apparatus for continuously sewing, handling and stacking textile articles comprising, in combination: a sewing machine; an article conveying apparatus and a stacking device arranged in juxtaposition with each other, said sewing machine having a presser foot, a chain stitch severing means behind said presser foot and aligned therewith; means for guiding a chain of stitches between successive sewn articles into said stitch severing means; means for extending and guiding a chain of stitches in rectilinear alignment with said presser foot and stitch severing means; means for releasably supporting sewn articles and conveying them along a directed path of travel to a predetermined position in a horizontal plane while permitting the sewn article to be draped in a vertical plane; means for receiving and transporting an article from said article supporting and conveying means out of the path of travel of succeeding sewn articles; and means for stacking the conveyed articles on top of each other.

17. A chain stitch severing attachment for a sewing machine having a presser foot and a fabric feeding means comprising: a chain stitch severing means driven by said sewing machine mounted directly in alignment with said presser foot; means for engaging and drawing a fabric being sewn away from said presser foot mounted in juxtaposition to said pressure foot and movable vertically therewith and for guiding a chain of stitches connecting successively sewn articles into said chain stitch severing means for severing the chain of stitches between successively chain stitch connected articles.

18. An apparatus for sewing, severing and conveying chain-stitched fabric articles, in combination: a sewing machine and a conveying apparatus for receiving sewn articles from the sewing machine, said sewing machine and conveying apparatus being in rectilinear alignment with each other, said conveying apparatus having means

for supporting and drawing a fabric discharged from said sewing machine and urging the fabric to travel in a horizontal plane away from said sewing machine; said conveying apparatus having means for releasably clamping a fabric as it is conveyed between limits, chain stitch severing means between said sewing machine and conveying means in the direct line of travel for cooperatively receiving and severing chain stitches connecting successively seamed articles, said conveying means having a rate of rectilinear travel faster than the fabric is being sewn to apply sufficient tension on the chain of stitches between successively sewn articles to extend the chain of stitches for severing.

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