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3,621,801

PLY NUMBERING AND SEWING SYSTEM

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2 Sheets--Sheet 1

FIG. 1

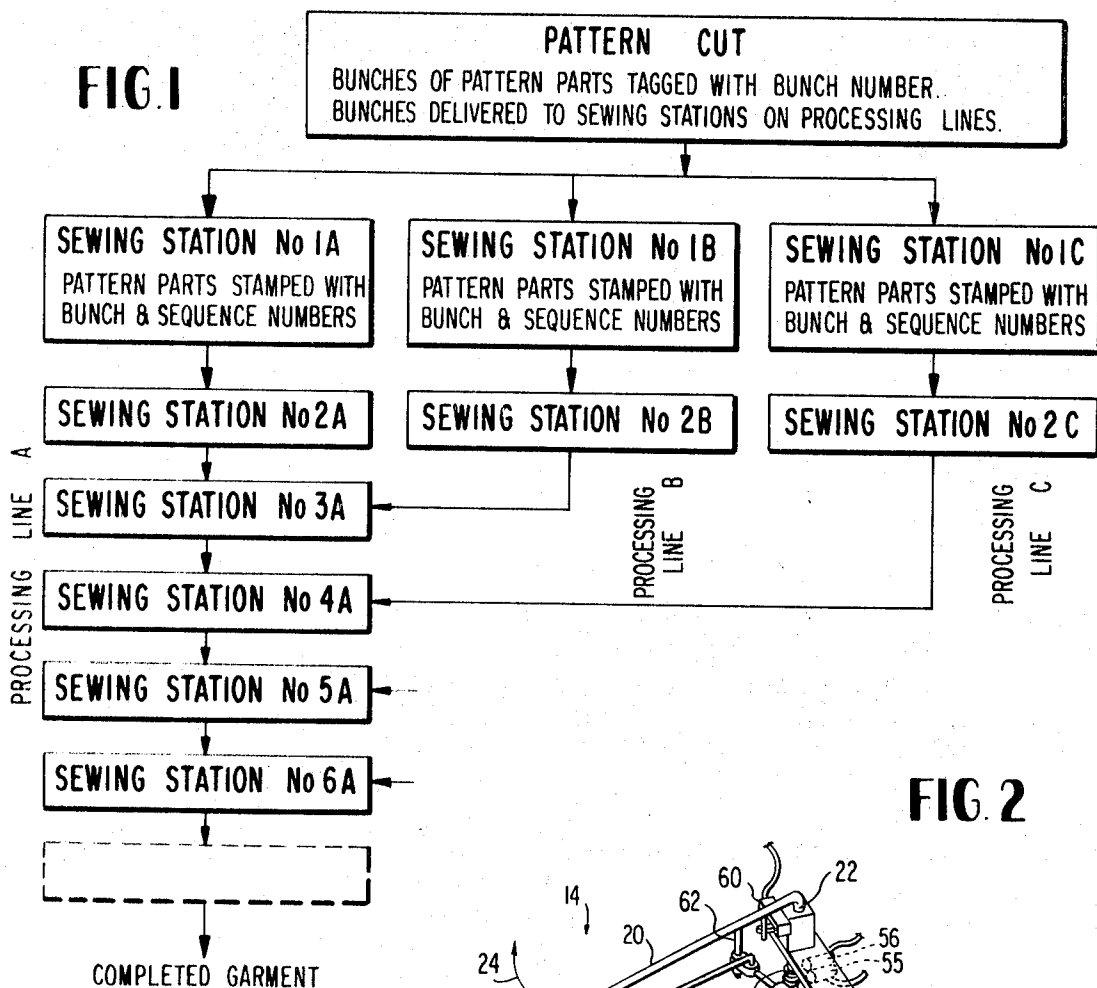
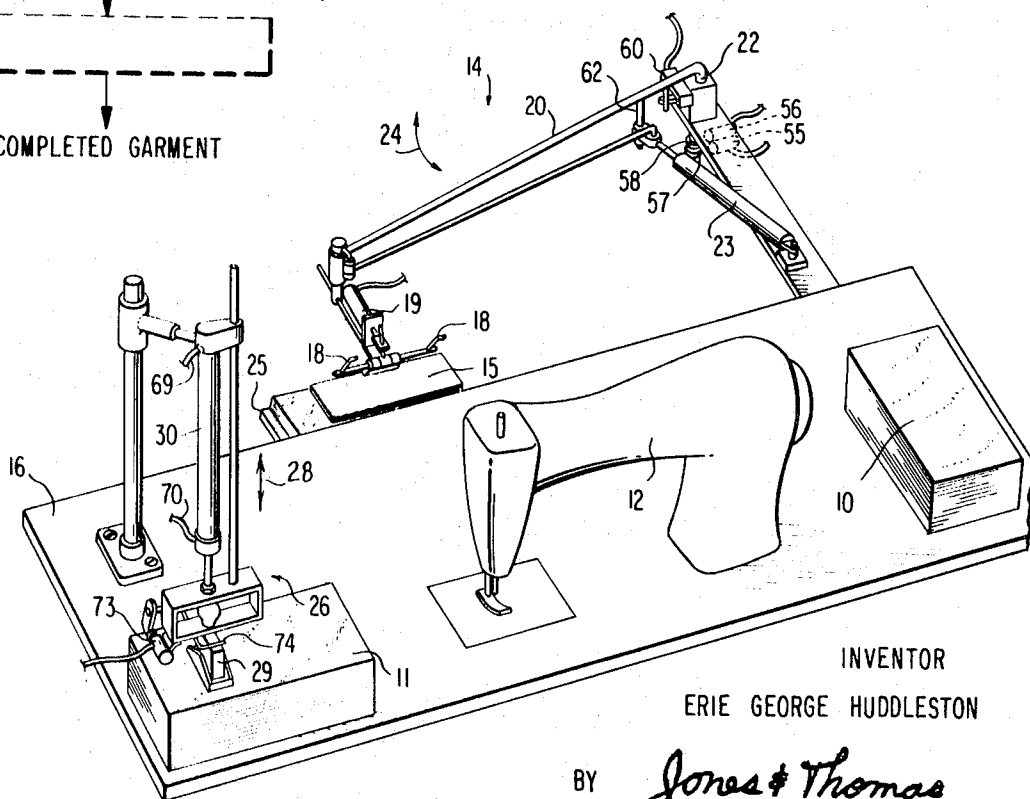


FIG. 2



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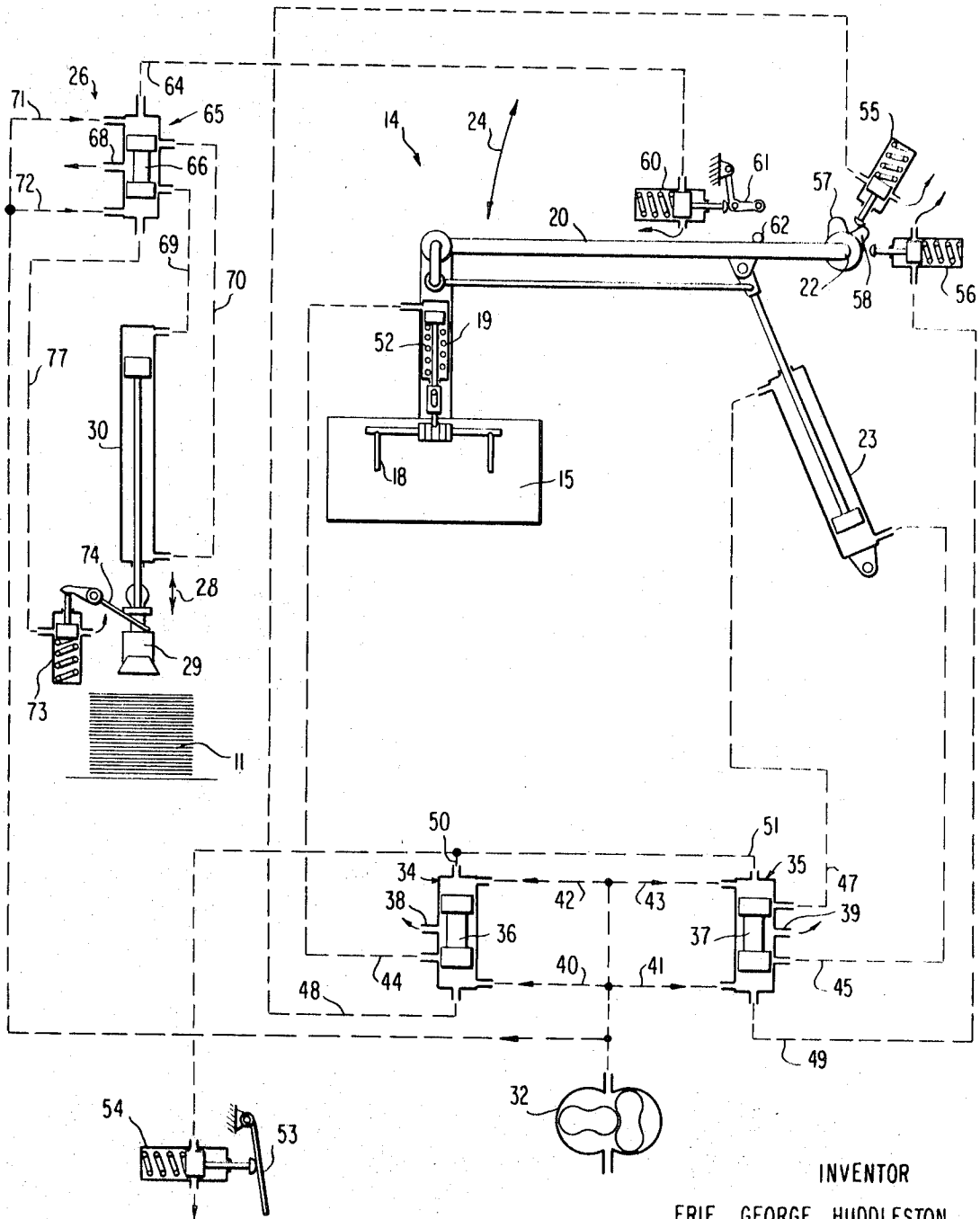
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FIG. 3



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PLY NUMBERING AND SEWING SYSTEM
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4 Claims

ABSTRACT OF THE DISCLOSURE

A numbering system in a process of manufacturing pants or similar garments wherein bunches of pattern parts are delivered from the pattern cutting room to sewing stations in various processing lines, and bunch and ply numbers are applied to the individual pattern parts in the bunches at the first sewing station of each processing line. When the first pattern parts from the first sewing stations are delivered to the second and subsequent sewing stations in each processing line the subsequent pattern parts are taken in order directly from their bunches and connected to the previously marked first pattern parts and will thereafter be identified by the bunch and ply numbers carried by the first pattern parts. A stamping mechanism at each first sewing station of the processing lines stamps the bunch and ply numbers on pocket parts, etc., which are attached to the first pattern parts in response to the movement of a stacker at the sewing stations.

BACKGROUND OF THE INVENTION

In order to fabricate garments on a mass scale and have the various pattern parts match in color tones, it has been the custom to cut a garment pattern in a plurality of layers of materials and stamp each pattern part in each bunch of pattern parts with a bunch number and a ply or sequence number. The bunches of pattern parts were then delivered to the various sewing stations in one or more processing lines, and the various sewing steps were performed to connect the pattern parts and other garment parts together to form the final garment. The operators could identify each pattern part by its bunch number and sequence number to be sure that the pattern parts being connected together came from the same ply of material from the cutting table. With this process, the final garment was likely to be color coordinated, even though the shade of the material in the layers of material from the pattern cutting table might have varied.

Since patterns are usually cut in large numbers of layers of material, the bunches of pattern parts were usually delivered to an area of the pattern cutting room where workers were employed to leaf through the bunches of pattern parts and individually apply bunch and sequence numbers to each pattern part. The bunches of pattern parts were then tied and delivered to the appropriate sewing stations in various processing lines in the sewing room. The application of bunch and sequence numbers to be individual pattern parts slows down the overall operation of manufacturing garments and requires the employment of a number of people and the use of floor area and equipment that would not otherwise be necessary.

SUMMARY OF THE INVENTION

Briefly described, the present invention comprises a coordinating system that does not require the stamping of individual garment pattern parts with bunch and sequence numbers in the cutting room. After the pattern parts are cut in the cutting room, they are maintained in their cut bunches and tagged with a bunch number. The bunches are delivered to the various sewing stations in the processing lines in the sewing room, and bunch and sequence numbers are applied only to the pattern parts

at the first sewing station in each processing line. The pattern parts subsequently attached to the first pattern parts at subsequent sewing stations, in each processing line are taken in sequence from bunches tagged with a bunch number that corresponds to the bunch number applied to the first pattern part and the first pattern part of the subsequent bunches of pattern parts will always be attached to the first of the sequence of the first pattern parts from a bunch. Thus, the pattern parts subsequently attached to the pattern parts from the first sewing station will assume the identity of the first pattern parts.

The first sewing stations in each processing line includes a stacker adjacent the sewing machine which includes a grasping member for retrieving the sewn product from the sewing machine and moving it to a remote location where it is stacked in order and out of the way of the operator. A stamping mechanism reciprocates in a vertical direction and is arranged to apply a stamp on the top layer of a stack of garment parts to be sewn at the sewing station in response to the movement of the stacker. The arrangement is such that when the machine operator retrieves the top garment part from the stack, sews it to another garment part and activates the stacker, the bunch number of the stack of garment parts and the next progressive sequence or ply number are automatically stamped by the stamper on the now top garment part on the stack of garment parts.

Thus, it is an object of the present invention to provide a system for applying bunch and ply numbers to pattern parts in a garment assembly process to coordinate the color matching of the garment parts, and which does not require the application of the identifying numbers to all of the pattern parts.

Another object of this invention is to provide a system of expediently and reliably assembling garment parts to form finished color coordinated garments.

Another object of this invention is to provide a stamping and stacking system at a sewing station in a processing line of a garment manufacturing plant which applies bunch and sequence numbers to garment parts before the garment parts are sewn together at a sewing machine, and retrieves the sewn garment parts from the sewing machine and stacks them in order of sequence numbers.

Another object of this invention is to provide a process of fabricating garments which reduces the numbers of employees required to carry out the process and which reliably matches together various pattern parts taken from a single ply of material cut from a plurality of plies of material.

Others objects, features and advantages of the present invention will become apparent upon reading the following specification when taken in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a block diagram of the ply numbering system, showing the manner in which the bunches of pattern parts are processed.

FIG. 2 is a perspective view of a typical first sewing station in a processing line.

FIG. 3 is a schematic illustration of the stacker and stamper and their control system.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in more detail to the drawing, in which like numerals indicate like parts throughout the several views, the block diagram of FIG. 1 illustrates several steps in a typical pants manufacturing process. A continuous length of cloth or material is spread on a cutting table (not shown) in long lengths folded back and forth on top of each other to form a plurality of layers or plies

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of material. A pattern is spread over the top layer of material and the pattern is then cut in the plurality of layers of material. The number of layers of material is limited only by the capacity of the cutting device to properly cut the material. When the pattern has been cut the pattern parts remain in bunches and tags are applied to the bunches, usually by a tie string surrounding the bunches to maintain the pattern parts in proper order. The tags bear the bunch numbers and the bunch numbers for all the bunches from a single pattern are usually identical.

The pattern bunches are then delivered from the cutting room to the sewing room to the various sewing or work stations in the processing lines in sewing rooms. For instance, the bunch of pant pocket facing pattern parts are delivered to sewing station 1a in processing line A and pocket material is stitched to the pocket facing. The bunch of fly pattern parts are delivered to sewing station 1b in processing line B and zipper lengths are sewn to each fly pattern part. The back pocket facing is delivered to sewing station 1c in processing line C and the back pocket material is sewn to the back pocket facing. The pattern parts processed through the first sewing stations in each processing line must be identified with bunch numbers and ply or sequence numbers before they leave the first sewing station. In many instances, the first sewing station will be the station where pocket material or other inside garment parts which are not pattern parts are connected to the outer color coordinated pattern parts and it is appropriate to apply the bunch and sequence numbers to these uncolored garment parts since they will normally not be visible when the final garment is being worn. Thus, as the machine operator at each first sewing station in a processing line connects together the garment parts, one of the garment parts, preferably a pocket part or similar non-color coordinated part, will be stamped with a bunch number that corresponds to the bunch number from the bunch of pattern parts and with a sequence number. The sequence number will correspond to the sequence of pattern parts taken from a bunch; that is, the first pattern part from a bunch should carry the sequence number one and the subsequent sequence numbers should correspond to the order of subsequent plies or layers of pattern parts.

When the garment parts are delivered from the first sewing station to a subsequent sewing station in a processing line they will have the bunch and sequence numbers properly applied thereto, either by having these numbers stamped on the non-color coordinated garment part if possible or directly upon the color coordinated pattern part if necessary. The machine operators at the subsequent sewing stations will inspect the garment parts delivered to their stations and match the bunch number of a subsequent bunch of pattern parts to be processed at her station with the bunch number of the previously sewn garment parts. Also, the pattern parts taken from a bunch at a subsequent sewing station are taken in sequence from the top of the bunch and matched with the proper sequence number of the stamped garment parts. In this manner, the latter garment parts will assume the identity stamped on the first garment parts. When these attached garment parts are then delivered to other subsequent sewing stations the machine operators follow the same procedure so that the initial stamp on the first garment part identifies the partially assembled garment portion and the subsequent operators always know which bunch to match with the garment portions and the sequence in which the pattern parts should be matched.

Eventually, the processing lines will merge; that is, processing line A which begins with the pocket facing being matched with the pocket parts and proceeds with the attachment of front pant panel and various other steps, will eventually have the zipper and fly pattern parts merge from processing line B into processing line A. Of course, if the garment portions from processing line B

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are stamped in accordance with the procedure described above, the machine operator at the sewing station where the processing lines merge will have no trouble in identifying the proper bunch and ply numbers and can match the garment portions together which bear identical numbers. Eventually, all of the processing lines will merge and the garments will be completed.

As is illustrated in FIG. 2, the garment parts at a first sewing station in a processing line will be delivered to the machine operator in a bunch 10. For instance, bunch 10 may comprise the pocket facing for a pair of pants and is to be matched with pocket material 11. The normal procedure would be for the operator to retrieve the top ply or layer of material from bunch 10 and match it with a pocket from stack 11 and stitch the garment parts together with machine 12. Stacker 14 is positioned generally behind or beyond the machine 12 and is arranged to maintain its grasping member or tray 15 in a position to retrieve the garment parts as they pass from machine 12. Tray 15 is generally flat and coextensive with the top surface of the working table 16 and includes a pair of gripping fingers 18 that are pivotal down into engagement with the tray by means of air actuated stacker ram 19. Support arm 20 movably supports tray 15 at one of its ends and is pivotal about its upright leg 22 toward and away from working table 16 in the directions as indicated by arrows 24. Air actuated support arm control ram 23 functions to oscillate support arm 20. When stacker 14 functions to move away from working table 16, its fingers 18 will first move in a downward direction into engagement with tray 15 to grasp any garment parts processed from machine 12, and then will move away from working table 16 to carry the garment parts away from the working table. Before the stacker reaches the end of its outward movement, fingers 18 will be lifted to drop the garment parts to a platform 25. Stacker 14 will then move back toward working table 16.

Stamper 26 is located above the stack of pocket parts 11 and reciprocates in a vertical direction as indicated by arrows 28. Stamper element 29 is of conventional construction and includes a number that can be set and maintained and which is normally set to correspond to the bunch number of the bunch 10 of pattern parts. Also, stamper 26 includes a set of numbers that changes in sequence upon each operation. These sequence numbers will normally be set to correspond to the plies of the pattern parts of bunch 10. Stamper 26 includes an air actuated pneumatic ram 40 that moves stamper element 29 in the direction as indicated by arrow 28.

As is schematically illustrated in FIG. 3, a source of air pressure 32 communicates with shuttle valves 34 and 35 which include respectively, shuttles 36 and 37, air exhaust ports 38 and 39, air inlet conduits 40, 42 and 41, 43, air outlet conduits 44 and 45, 47, and air bleed conduits 48, 50 and 49, 51. Air outlet conduits 45 and 47 of valve 35 are connected to the opposite ends of support arm control ram 23, while air outlet conduit 44 of valve 34 is connected to stacker ram 19. Coil compression spring 52 in stacker ram 19 is arranged to lift fingers 18 away from tray 15.

Bleeder valve 54 is located at the operators position and communicates with air bleed conduits 50 and 51 of valves 34 and 35. Bleeder valves 55 and 56 are located adjacent the downwardly extending leg 22 of support arm 20 and are operated by cams 57 and 58 upon the rotation of support 20. Bleeder valve 60 is positioned below the path of support arm 20 and includes toggle arm 61 that pivots out of the way of actuating pin 62 on support arm 20 when stacker 14 moves away from work table 16, but which moves inwardly to actuate bleeder valve 60 upon being engaged by actuating pin 62 upon the movement of stacker 14 toward working table 16.

Bleeder valve 55 is connected to air bleed conduit 48 of valve 34, bleeder valve 56 is connected to air bleed conduit 49 of valve 35 and bleeder valve 60 is connected

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to air bleed conduit 64 stamper shuttle valve 65. Shuttle valve 65 includes shuttle 66 that controls the flow of air through exhaust opening 68 and air outlet conduits 69 and 70. Air inlet conduits 71 and 72 communicate directly with the air source 32 and with opposite sides of shuttle 66. Bleed valve 73 communicates with the lower end of shuttle valve 65, and is actuated by lever 74, which is pivotable intermediate its ends and actuated at its other end by the reciprocation of stamper element 29. With this arrangement, air actuated stamping ram 30 is controlled by shuttle valve 65 to move stamping element into and out of engagement with the stack garment parts 11.

When the stamping and stacking function is to be performed at the first sewing station in a processing line, the operator sets the stamping element so that the constant number is the same as the bunch number of the bunch 10 of pattern parts on working table 16. Also, the sequence number is set on the number one so that the top layer of pocket parts in stack 11 will receive the bunch number and first sequence number on the first reciprocation of stamper 26. The operator causes stamper 26 to reciprocate so that the top pocket part is properly stamped. The operator then retrieves the top pocket part from stack 11 and inspects the stamp applied to this pocket part to make sure that the proper identification has been applied thereto. The operator then actuates stamper 26 to move stamping element 29 into engagement with the stack 11 of pocket parts to apply the bunch and second sequence number to the top layer of pocket parts. The operator then matches the first stamped pocket part with the top ply or pattern part from bunch 10 and stitches these garment parts together with sewing machine 12. When the parts have been sewn together, they will have progressed partially upon tray 15. The operator then actuates lever 53 with her leg or foot, to open bleeder valve 54. The air flowing from bleeder valve 54 partially depletes the air pressure in the upper ends of shuttle valves 34 and 35 which causes the shuttles 36 and 37 to move in an upward direction (FIG. 3). This opens air outlet conduits 44 and 45 to air pressure source 32. The air flowing through air outlet conduit 45 enters the rear of support arm control ram 23 and functions to actuate the ram to move support arm 20 about its downwardly extending leg 22 and move tray 15 away from work table 16. In the meantime, the air from shuttle valve 34 that flows through air outlet conduit 44 will enter stacker ram 19 and cause fingers 18 to engage the garment parts on tray 15 to carry the garment parts with the tray away from working table 16. After the operator has actuated lever 53, she immediately releases the lever to close bleed valve 54. The closing of bleed valve 54 does not function to shift shuttles 36 and 37 since the pressure from air source 32 will be substantially equal on both sides of the shuttles.

As stacker 14 moves away from work table 16, actuating pin 62 will pivot toggle arm 61 out of the way until the actuating pin clears the toggle arm, whereupon the toggle arm returns to its position as illustrated. Bleed valve 60 will not be actuated by this movement. As support arm 20 continues in its movement away from work table 16, cam 57 engages bleed valve 55 which causes the air pressure to be bled away from the lower end of shuttle 36 of valve 34 to shift shuttle 36 in a downward direction. This functions to close communication between air source 32 and air outlet conduit 44 of valve 34, and to open air outlet conduit 44 to exhaust port 38 of valve 34 to allow spring 52 to urge the air in stacker ram 19 through exhaust port 38 and lift the fingers 18 from tray 15. Thus, the garment parts carried by tray 15 will be released by fingers 18 and allowed to drop to platform 25 (FIG. 2).

As support arm 20 continues to move away from work table 16, cam 58 will engage the bleed valve 56, which functions to bleed the pressure from beneath shuttle 37

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of valve 35 and shift the shuttle to its down position. This closes communication from air source 30 to air outlet conduit 45, opens air outlet conduit 45 to exhaust port 39 of valve 35 and opens communication between air source 32 and air outlet conduit 47 to support arm control ram 23. Thus, air flows to the outer end of ram 23 and begins to reverse the movement of stacker 14 to move tray 15 back toward working table 16.

As support arm 20 moves toward work table 16 actuating pin 62 again engages toggle arm 61 and this movement causes bleed valve 60 to be opened. When bleed valve 60 is actuated in this manner, the air pressure is depleted from shuttle 66 of stacker valve 65, causing shuttle 66 to move in an upward direction. This causes the air from air source 32 to flow through air inlet conduit 72 and through air outlet conduit 69 to the upper end of stamper ram 30, and move stamper element 29 down into engagement with the top pocket part on stack 11. In the meantime, the operator will have removed the second previously stamped pocket part from the top of stack 11 for matching with another pattern part as the previously sewn parts were moved away from working table 16, so that when stamper element 29 engages the top layer on stack 11 it will engage the third pocket part and stamp the third sequence number on this pocket part.

When stamper element 29 engages stack 11, it reciprocates in its support and lever arm 74 functions to actuate bleeder valve 73 to bleed the air pressure through bleeder conduit 77 from beneath shuttle 66. In the meantime, actuating pin 62 of support arm 20 will have passed toggle arm 61 and bleeder valve 60 will have been closed. Thus, shuttle 66 will move in a downward direction (FIG. 3), and air from source 32 will pass through air inlet conduit 71 to air outlet conduit 70 to the lower end of stamper ram 30 and lift stamper element 29 away from stack 11. Thus, stamper 26 will move in a downward direction until it engages stack 11 and then will move in an upward direction regardless of the height of the stack 11. When tray 15 returns to the edge of working table 16, stamper 26 will have functioned to apply the bunch and sequence stamp on the top pocket part of stack 11 and the operator will always have a stamped pocket part waiting to be matched with a pattern part from bunch 10 and her rhythm of operation will not be hampered by the stamping function.

By the time tray 15 returns to the edge of work table 16, the operator will have already started the sewing process for the next pocket part and pattern part, so that the stacker returns just in time to form an extension of working table 16 to retrieve the leading edge of the garment portion. When the operator finishes the stitching of the matched garment parts, she is ready to begin another cycle of operation of the stamper and stacker.

It should be noted that stamper 26 is maintained about two cycles ahead of stacker 14; that is, when the first pair of garment parts have been dropped onto platform 25 by stacker 14, the movement of stacker 14 toward work table 16 will cause the third sequence number to be applied to the third pocket part, and the second pocket part and pattern part will be at the needle of sewing machine 12 as the operator begins to stitch the parts together.

The garment portions stacked on platform 25 can be allowed to accumulate for an extended time until the stack is large enough to interfere with the movement of stacker 14 whereupon the stack can be moved to the next sewing station in a processing line. Since the bunch and sequence numbers are applied to the pocket parts, the pattern parts from bunch 10 sewn to the pocket parts will be properly identified and the bunch which should be matched with the garment portions from bunch 10 can be easily identified at the next sewing station for proper color coordination. Thus, all that is necessary to coordinate the colors of the finished garment is to prop-

erly match together the bunch numbers and to retrieve the pattern parts in order from the top of the bunches and match them with the proper sequence numbers of the garment portions received from the previous sewing station.

While the term "numbers" has been used to describe the bunch and sequence markings of the garment parts, it should be understood that this term has been used in its broadest sense to include other markings, such as letters, symbols, and combinations of different types of marks; and while this invention has been described in detail with particular reference to preferred embodiments thereof, it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinbefore and as defined in the appended claims.

What is claimed is:

1. A method of assembling pants or the like comprising:
 - cutting a pattern in a plurality of layers of cloth to form bunches of pattern parts,
 - tagging each bunch of pattern parts with an identifying bunch number to indicate the layers of cloth from which the bunch was made,
 - delivering the bunches of pattern parts to various sewing stations in at least one processing line,
 - sequentially removing the pattern parts from a bunch at the first sewing station in each processing line,
 - applying a bunch number and sequence numbers to the pattern parts at the first sewing station of each processing line,
 - sequentially connecting the pattern parts together at the first sewing station of each processing line, and
 - passing the connected pattern parts to the subsequent sewing stations in each processing line for the connection thereto of additional pattern parts.
2. A method of manufacturing garments comprising, retrieving the top garment part from a stack of first garment parts,
 - matching the first garment part with a second garment part,
 - sewing the first and second garment parts together with a sewing machine and grasping the garment parts with a stacking member,
 - moving the stacking member and the sewn garment parts away from the sewing machine and releasing the garment parts,

returning the stacking member to the vicinity of the sewing machine, and
stamping the now top garment part in the stack of first garment parts with an identifying number.

3. A method of assembling pants or the like comprising:

- cutting a pants pattern from a plurality of plies of material to form bunches of stacked pattern parts,
- applying similar bunch numbers to each bunch of stacked pattern parts and,
- sequentially marking a plurality of non-color coordinated garment parts simultaneously with a bunch number corresponding to the bunch number of a pattern part and with a sequence number just prior to matching a garment part with a pattern part, and sewing the garment part to the pattern part.

4. A method of forming color coordinated pants or the like comprising forming a plurality of plies of pants material,

- cutting a pants pattern simultaneously in the plurality of plies of material to form stacked bunches of pattern parts,
- applying similar bunch numbers to all of the stacked bunches of pattern parts,
- sequentially removing the individual pattern parts from a stacked bunch and connecting each part to another garment part, and
- applying a bunch number and sequence numbers to the individual pattern parts as the pattern parts are sequentially removed from a stacked bunch and connected to another garment part.

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JAMES R. BOLER, Primary Examiner

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101—287; 112—121.29; 271—1