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[21] Appl. No. **871,575**
[22] Filed **Nov. 5, 1969**
[45] Patented **June 8, 1971**
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Greensboro, N.C.
Continuation of application Ser. No.
601,142, Dec. 12, 1966, now abandoned.

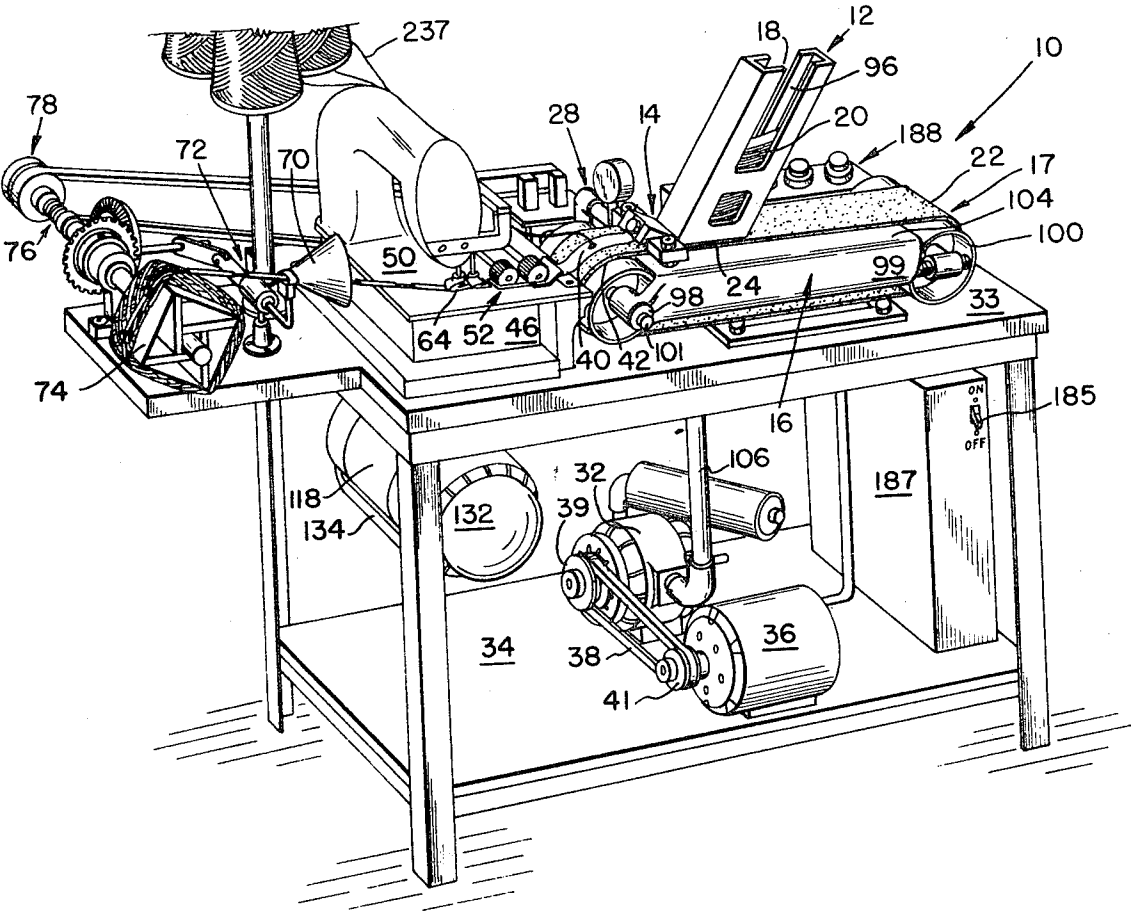
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[54] **CLOTH-SORTING AND GARMENT-FORMING**
APPARATUS
10 Claims, 12 Drawing Figs.

[52] U.S. Cl. 112/121.29,
112/121.27, 112/203, 271/35
[51] Int. Cl. D05b 27/00,
D05b 33/02
[50] Field of Search 112/2,
121.11, 121.27, 121.29, 203, 10, 104; 271/32, 33,
35, 29, 41, 11, 12; 221/210, 211, 217, 218, 253,
259

ABSTRACT: An apparatus for feeding and handling a plurality of fabric segments wherein a suction device is employed to dispense singularly and continuously a plurality of fabric segments from a storage location to a work area where the segments may subsequently be folded, sewn and collected in some form of fabricated garment component.



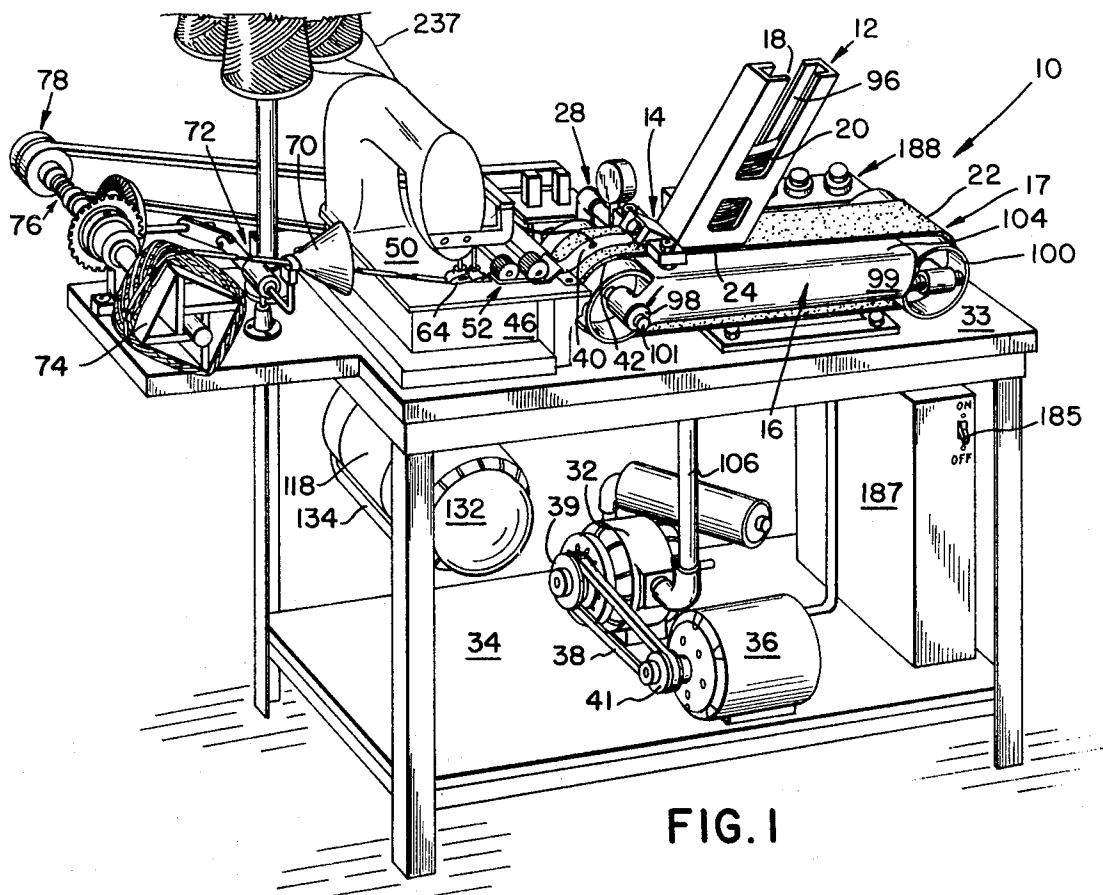


FIG. 1

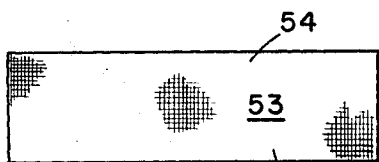


FIG. 2

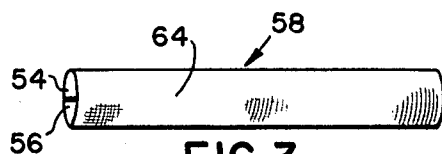


FIG. 3

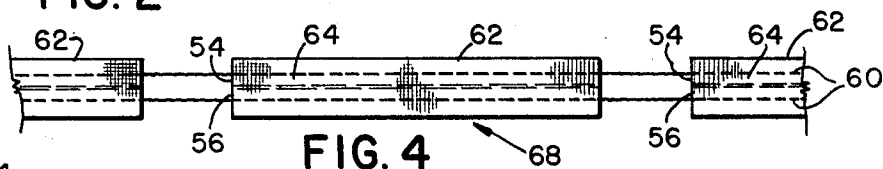


FIG. 4

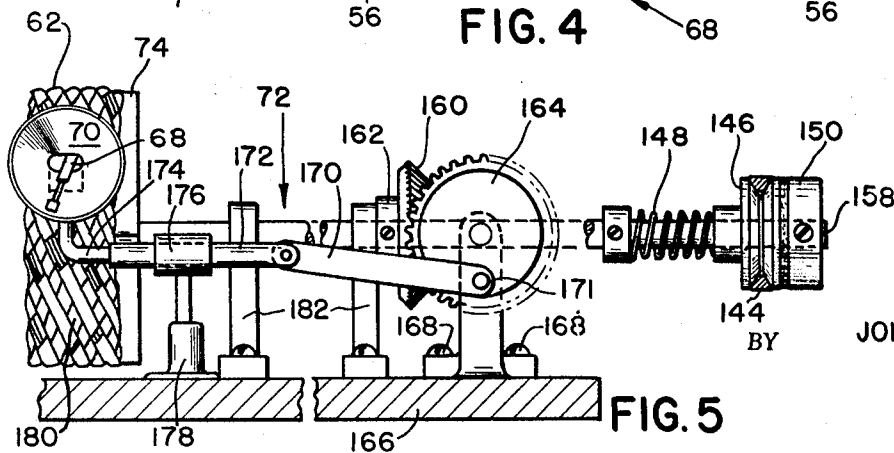


FIG. 5

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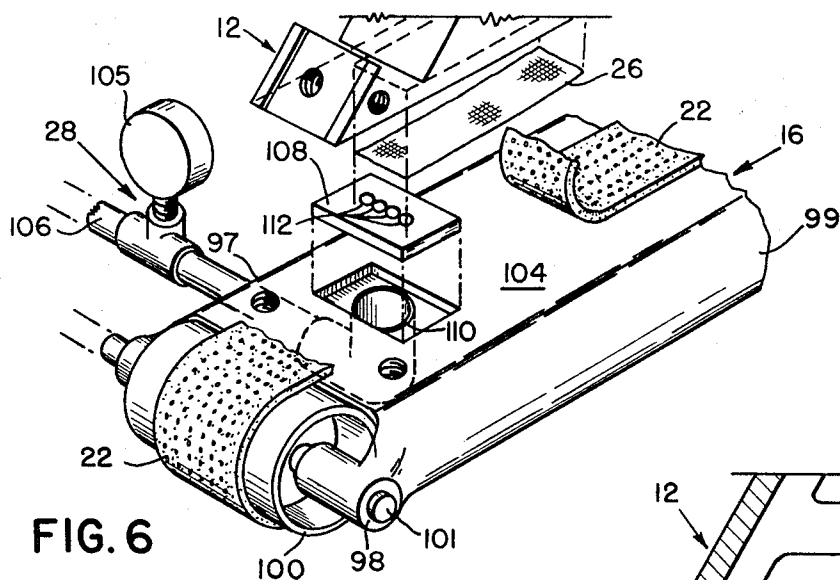


FIG. 6

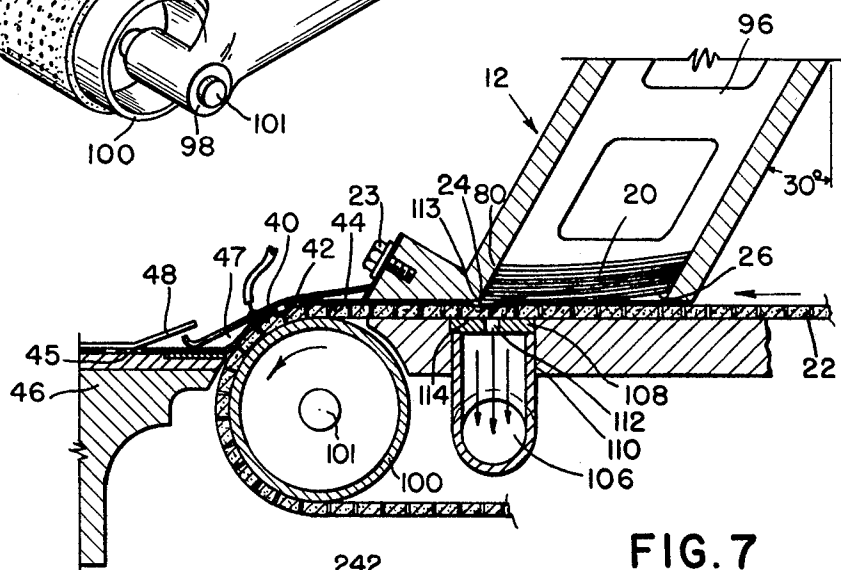


FIG. 7

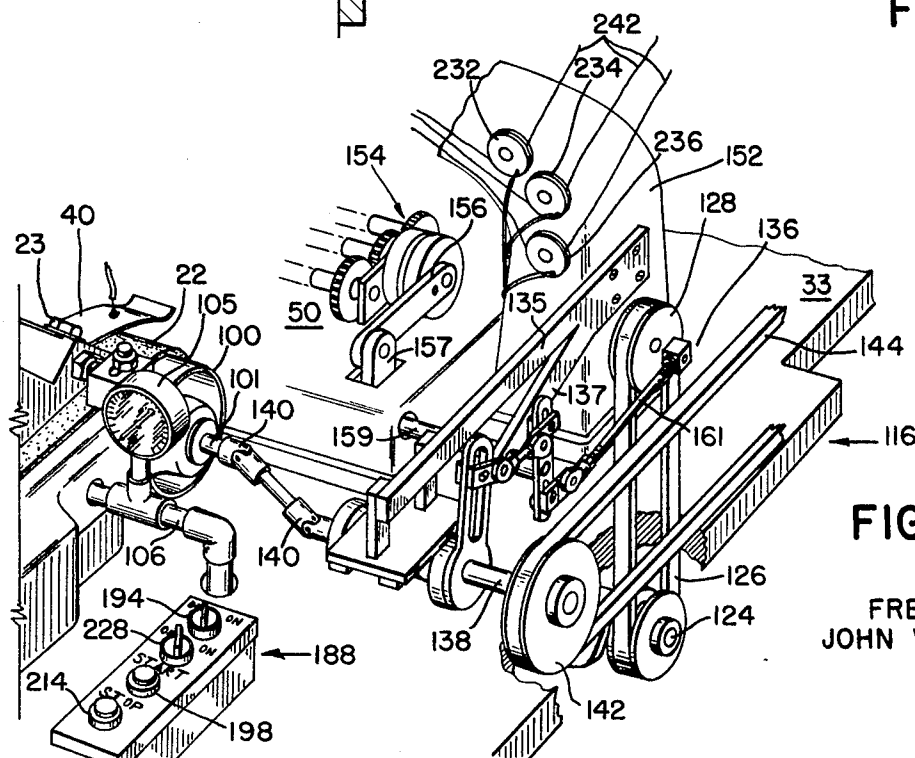


FIG. 8

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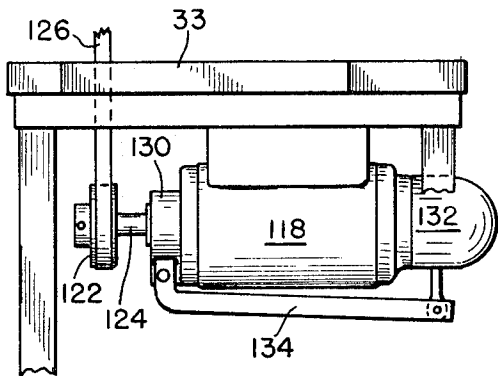


FIG. 9

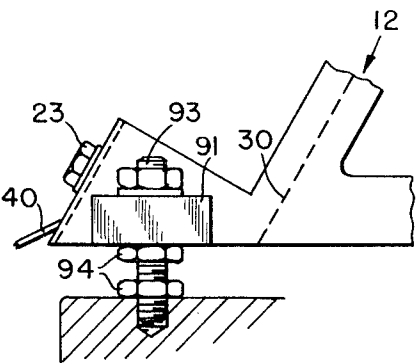


FIG. 10

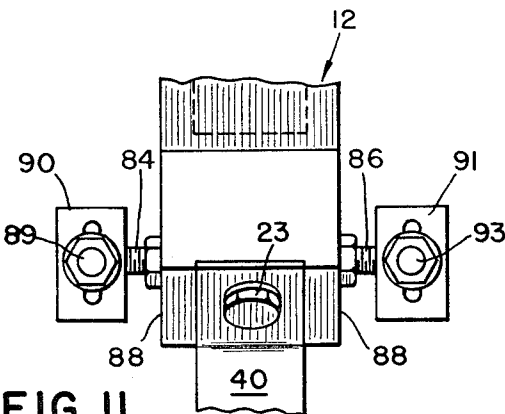


FIG. 11

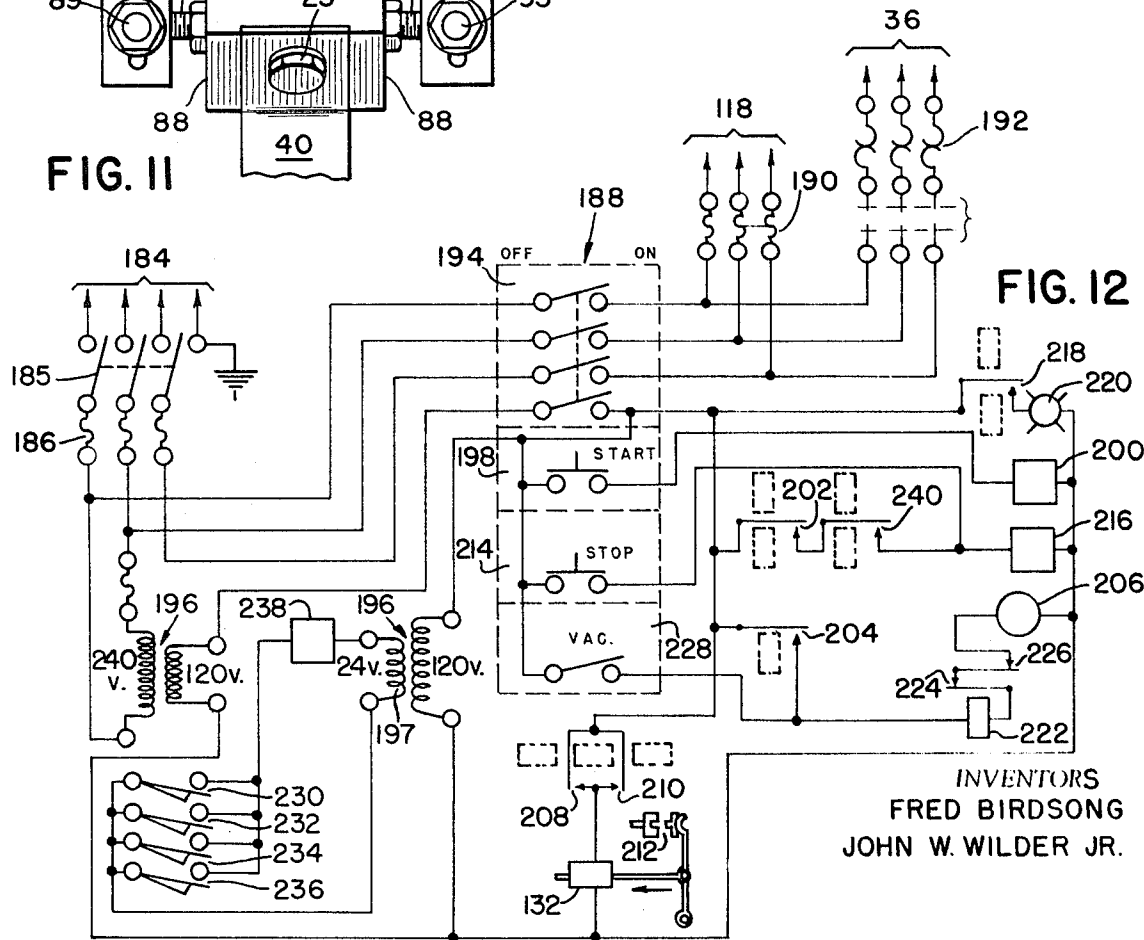


FIG. 12

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CLOTH-SORTING AND GARMENT-FORMING APPARATUS

This is a continuation of Application Ser. No. 601,142, filed Dec. 12, 1966, now abandoned.

BACKGROUND OF THE INVENTION

A long-existing and perplexing problem in the garment-manufacturing industry has been the handling and sorting of a supply of identical fabric segments placed in a stacked, parallel relationship when these segments are ultimately to be used or needed unitarily or sequentially for a continuous period of time during the fabrication of a particular garment or garment component. The problem conventionally has been met by employing an operator who, by using rubber gloves or fingers, manipulates each fabric segment individually and places it, after folding, creasing or the like, beneath a sewing head or other device for the subsequent steps needed to form the desired garment component. While such an operation is adequate to maintain a sustained minimum production or output of garment components, its weaknesses are obvious in that the process is essentially tedious, boring and costly since a number of fabric segment-handling operators are usually needed and employed who work in predetermined shifts of shorter than normal duration. Aside from these physical and economic factors, operators have a tendency to overlook defects in the precut fabric segments and the folding and sewing operation thus causing the finished fabricated garment component to be improperly made and eventually resulting in the final garment being classified as a "second."

A great deal of study and research has been directed to the problem of automatically and continuously removing fabric segments from a stack or prearranged plurality which are held in a parallel, fabric-to-fabric relationship. Heretofore efforts were directed at removing these materials sequentially from the top of a prepared stack, but little success has been experienced because of the inherent characteristics of fabric that causes such segments to adhere to each other. An attempted separation of one fabric segment from the other by slidably advancing these segments sequentially from their contiguous companions usually results in two, three or more of the segments moving in unison and subsequently clogging the sewing, folding or other step mechanism which is required to form the garment or garment component from the fabric segment. The practical result of such operations is an enormous waste of time due to these interruptions occurring when undesired segments are advanced because of a faulty feed mechanism. Important production time is thus used to unclog the apparatus handling these segments. It is not unusual, under these circumstances, to avoid the use of machines for automatically and sequentially feeding segments of stacked material as previous attempts have been unsuccessful in producing a reliable operation. Therefore, the possibility of successfully selecting and sorting fabric segments unitarily and sequentially by automatic means has been heretofore remote, primarily because efforts have been directed at removing segments unitarily from the top of a prearranged stack, and rather than risk faulty operation, garment manufacturers have been forced to maintain operators for manually feeding these segments to the necessary sewing, folding or fabricating apparatus.

After investigating numerous characteristics of a variety of fabrics including the adherence or cohesive quality that fabric segments in a parallel, fabric-to-fabric relationship display and the feasibility of dispensing segments from the bottom of a prearranged supply, the shortcomings of the prior art were overcome and the present invention was developed.

SUMMARY OF THE INVENTION

This development utilizes a neoprene or rubberized porous conveyor belt preferably coated with SCOTCHLAG material made by the Minnesota Mining and Manufacturing Company so that a single fabric segment at the bottom of the supply stack adheres positively to the moving conveyor belt by the

frictional characteristics of the material coating the belt, and, if needed, an applied suction or vacuum caused by creating a suction current from beneath that belt. Additionally, a novel hopper and gate design insures segment separation and reliable unitary and continuous dispensation of stacked fabric segments. By feeding from the bottom of the supply stack, the segments may be replenished without operation interruption. The present invention has resulted in high operating efficiency and low-cost production since operators are no longer necessary to handle the fabric segments. Additionally, by incorporation within the total apparatus of a plurality of stop motion safety devices, an outage caused by some malfunction is immediately indicated and serviced so that production schedules are continuously met and expensive shutdowns are held to a minimum.

It is, therefore, an object of the present invention to provide an apparatus for dispensing and subsequently sewing, folding or otherwise handling a plurality of fabric segments into garment components that will increase the production rate for these components to a level not heretofore achieved in the garment-making industry.

Another object of this invention is to provide a cooperating conveyor assembly that will unitarily select and advance a single segment of fabric from a stacked plurality of such segments which are maintained in a fabric-to-fabric relationship for subsequent dispensation.

Yet still another object of this invention is to provide a novel dispensation principle in conjunction with appropriate apparatus embodying the continuous dispensing of fabric from the bottom of a prearranged supply stack so that the supply may be replenished without interrupting the operation of the machine.

Still another object of the present invention is to provide an automatic fabric segment sorter that will eliminate the need for manually selecting and orienting these segments as has been heretofore required in garment or garment component fabrication.

Yet another object of the present invention is to provide an apparatus for continuously dispensing fabric segments from stacked arrangements to subsequent sewing, folding or handling operations.

A further object of this invention is to provide a dispensing apparatus for stacked fabric segments that operates at an extremely high rate of efficiency because of strategically positioned stop motion devices which terminates machine operation upon first indication of malfunction and thus obviates costly breakdowns.

Yet another object of this invention is the provision of a guide apparatus for orienting and aligning fabric segments as they are unitarily removed from a prearranged and stacked supply so that these segments might be automatically introduced in a proper position to a folding, sewing or other handling means for subsequent and expeditious garment or garment component fabrication.

Yet still a further object of this invention is to provide an electrically powered apparatus for sorting and sewing fabric segments into fabricated garment components that can be selectively operated for testing and inspecting without a complete shutdown or wiring change.

Still other objects of this invention are to provide relatively inexpensive machine or apparatus components that require a minimum of maintenance and that are simple and economical in construction and operation.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and many of the attendant advantages of this novel sorting and sewing apparatus will become more readily apparent from the following detailed description taken in conjunction with the accompanying drawings in which like characters of reference designate corresponding parts throughout the several views, and wherein:

FIG. 1 is a generally front perspective view of a sewing and sorting apparatus for forming garment components particularly illustrating the hopper and fabric dispensing apparatus of the present invention along with a guide and folding means cooperating with the sewing machine and a collecting or takeup device;

FIG. 2 is an enlarged plan view of a fabric segment in its relaxed or unfolded state that is to be fed from a hopper by a segment-dispensing device disclosed herein and subsequently folded and sewn into a finished belt loop;

FIG. 3 is an enlarged plan view of the fabric segment of FIG. 2 after it has been prefolded for subsequent sewing to form a fabric tube;

FIG. 4 is an enlarged plan view of a continuous line of folded and sewn belt loops as they emerge from the sewing head, these loops being formed from the folded tube fabric of FIG. 3 and joined together by continuously sewn seams;

FIG. 5 is a fragmentary, side elevational view of the takeup or collector assembly and its related drive linkages which may be used in conjunction with the present fabric segment dispensing invention illustrating particularly a spring biased friction clutch that allows the takeup device to synchronously rotate with the sewing speed of a sewing machine and wind the sewn and joined garment components as shown in FIG. 4 as they emerge therefrom;

FIG. 6 is a fragmentary, enlarged, exploded, perspective view of the conveyor, hopper and suction assemblies comprising the present fabric dispensing apparatus showing the precise positioning of the suction tube with respect to fabric segments disposed within the hopper and above the conveyor for subsequent and unitary removal;

FIG. 7 is an enlarged, fragmentary, sectional, side elevational view of the hopper, conveyor, suction assemblies and segment guide of the present invention showing the positioning of a plurality of prestacked fabric segments disposed within the hopper for subsequent removal onto the conveyor belt and eventual passage through the guide;

FIG. 8 is an enlarged, fragmentary, perspective view of the drive assembly and various stop motion devices attached to the base of a sewing machine associated therewith, all of which may be used with the dispensing apparatus of the present invention in the seaming and fabricating of garment components;

FIG. 9 is a fragmentary, side elevational view of the machine main drive motor showing the activating lever engaging the mechanical clutch which is in juxtaposition with the motor rotor and controls the apparatus of FIG. 1 which embodies the fabric segment dispensing of the present invention;

FIG. 10 is an enlarged, fragmentary, sectional, side elevational view of the hopper mounting assembly which assists in segment separation showing the attachment of a stop motion control guide thereto;

FIG. 11 is an enlarged, fragmentary, plan view of the hopper mounting assembly of FIG. 10 also showing the attachment to the hopper of the stop motion control guide; and

FIG. 12 is an electrical wiring diagram illustrating the electrical circuits which control the operation of the segment dispensing and sewing apparatus of FIG. 1 and its auxiliary components.

DESCRIPTION OF PREFERRED EMBODIMENT

In the following, the fabric segment dispensing apparatus will be generally described to provide an understanding of the device's basic operation after which a representative application of the apparatus with a folding, sewing and collecting machine for making belt loops will be described in connection with a detailed explanation of the mechanisms employed and an explanation of the circuit diagram, at which time the manner in which the various components are controlled to perform their functions will be given.

GENERAL ARRANGEMENT AND DESCRIPTION OF FABRIC SEGMENT DISPENSER

Referring now to the drawings and particularly to FIG. 1, there is shown a fabric segment dispensing apparatus generally designated 10 having a hopper assembly generally shown as 12 angularly joined by a securing assembly 14 to the conveyor frame 16 of conveyor assembly 17 with the interior 18 of hopper 12 defined to accommodate a plurality of prearranged or stacked fabric segments 20. The hopper assembly 12 is retained slightly above conveyor frame 16 to allow conveyor belt 22 to move directly under the hopper-feeding gate 24 and therefore make contact with the lowermost positioned fabric segment 26 (FIG. 7) which will initiate that segment's removal from the interior 18 of hopper 12, an operation which will be described in detail subsequently.

A suction assembly 28 is positioned beneath conveyor frame 16 and in alignment with gate 24 of hopper 12. The assembly 28 is operated by a conventional vacuum pump 32 conveniently positioned beneath the working surface of a supporting medium 33 of the dispensing apparatus on a shelf of ledge 34 provided for that purpose. Pump 32 is driven by a conventional electric motor 36, preferably of a 240-volt three-phase variety, by means of a belt 38 driven by pump- and motor-carried pulleys 39 and 41.

A segment guide plate 40 is bolted to the leading edge of hopper 12 by a conventional screw 23 and arcuately shrouds the forward end 42 of conveyor belt 22 to receive an advancing fabric segment 44 in a completely flat and wrinkleless manner as that segment is removed from hopper 12 through gate 24 advanced by the conveyor belt 22 and transferred onto an adjacent machine supporting base 46 for subsequent treatment and processing.

A cooperating segment shielding member 48 is positioned slightly above guide 40, this guide being relatively flexible in construction so as to be easily elevated to make contact with member 48 in the event an introduced fabric segment 44 should become wrinkled or wadded within the passageway 47 and raise guide 40 until it is in direct contact physically and electrically with member 48. The exact circuit operation occurring when guide 40 contacts member 48 will be explained in detail subsequently, though generally these contacting members 40 and 48 constitute a stop motion device which will effect the main drive motor (later to be described) to halt the operation of the entire mechanism.

APPLICATION OF DISPENSING DEVICE WITH BELT LOOP FABRICATOR

As an illustration of the practical application of the dispensing apparatus described, a segment-folding mechanism generally designated 52 is mounted along the surface 50 of a supporting structure 46. This mechanism is well known and conventionally used by machine operators to fold and subsequently sew an introduced fabric segment such as that shown in FIG. 2 and designated 53. The fabric segment that is introduced into the folding assembly 52 has been held in registry and alignment by guide 40 directing a segment 45 onto surface 50 such as shown in FIG. 7. The folding assembly 52 acts as an additional guide and orienting means or device and in the particular embodiment shown herein for fabricating belt loops, the folding assembly 52 will automatically tuck both edges 54 and 56 to form a tubularly shaped fabric segment generally designated 58 (FIG. 3) that can be sewn subsequently with a double seam 60 to produce a finished belt loop 62. As the tucked edge fabric segment leaves the folding assembly 52, it is immediately introduced to the sewing machine head or means 64 where the double seams 60 are introduced and positioned to retain the tucked edges 54 and 56 beneath the exterior or upper portion 64 of the loop. Since a thread severing mechanism is purposely omitted from this sewing means or machine, the resulting fabricated loop components 62 emerge from the sewing means 64 as a continuous

string 68 of joined finished belt loops though obviously the fabricated components may be separated and collected individually if that be desired.

As the continuous string of loops 68 or the like is emitted or discharged from the sewing means 64, a trumpet 70 accommodates the passage of this continuous string and, by an oscillating linkage mechanism 72, causes this string to be cross wound on a takeup package 74. This package is rotated by means of a driving assembly 76 that is actuated by a spring biased frictional clutch 78 thus causing the continuous string of loops 68 to collect around package 74 for storage and subsequent use.

The sewing and collecting apparatus has been generally described so as to give a basic and fundamental summary of the application of the dispensing apparatus of the present invention in a representative application during an operating cycle. In the following paragraphs, the several component units of the machine will be separately and particularly described.

SPECIFIC DESCRIPTION OF APPARATUS COMPONENTS

Hopper assembly 12, conveyor assembly 17 and suction assembly 28 make up the component parts of the mechanism that continuously and unitarily removes fabric segments placed in a parallel relationship with a plurality of stacked similar segments, an operation not heretofore achieved automatically with any appreciable degree of success since earlier efforts were primarily directed at removing segments from the top of a stacked arrangement.

The segment-retaining hopper assembly 12 is angularly positioned at about a thirty degree angle from a line perpendicular to the path of conveyor belt 22 (FIG. 7) so as to allow a hopper-carried stack of fabric segments 20 to spread in a manner so that the lowermost or bottom fabric segment 26 extends forwardly for responsive removal from assembly 12 upon the actuation of conveyor assembly 17 and suction assembly 28. Hopper assembly 12 is maintained in alignment on the conveyor assembly 17 by the securing assembly 14 which includes threaded studs 84 and 86 that extend outwardly from the sides 88 of the hopper 12 into support chucks 90 and 91. Additional threaded vertical studs 89 and 93 then extend downwardly into the conveyor frame 16 in a spaced apart relation on each side of conveyor belt 22 so as to preclude any interference by these studs 89 and 93 with the movement of that belt. Stud 89 and 93 are provided with adjustable threaded means 94 that will allow the hopper 12 to be positioned a predetermined distance above the surface of belt 22, a characteristic considered necessary because of the composition and dimensions of the fabric that may be used within the hopper assembly.

Hopper assembly 12 has partially exposed side walls 96 that make possible the expeditious insertion or removal of a stack of fabric segments 20 within the hopper and additionally afford an immediate indication of the current supply of segments therein along with the estimated time of continued machine operation based on those contained segments.

The conveyor assembly 17 is preferably comprised of a unitary frame 16 that is formed by turning the opposite edges 97 and 99 of a flat planar surface downwardly and forming pulley-retaining hubs 98 on both ends of these edges. The hubs 98 receive axles 101 that carry revoluble wide-track pulleys 100 at either end of frame 16, these pulleys stretchably and adjustably maintaining and selectively driving belt 22 (see arrow in FIG. 7) as a fabric segment 26 is removed from hopper 12 to the belt for subsequent conveyance to the folding and seaming or sewing means. It has been found advantageous to coat belt 12 with SCOTCHLAG as previously mentioned and then perforate the coated belt to create pores or apertures through which the suction currents may freely pass. Thus the coated belt is sufficiently porous to offer no noticeable resistance to the vacuum created by the pneumatic suction means 32.

The suction assembly 28 includes a vacuum pump 32 driven by a conventional three-phase electric motor 36 by means of a connecting belt 38 carried by pulleys 39 and 41. A suction tube 106 extends from pump 32 upwardly for positioning beneath planar surface 104 of conveyor assembly 80 in alignment with gate 24 of hopper assembly 12, and tube 106 has an indicating gauge 105 positioned therein. It has been found desirable to include a filter (not shown) within tube 106 because of lint collected from the fabric used. A removable plate 108 within planar surface 104 allows convenient access to the connector 110 of suction pipe 106. Additionally, plate 108 has a plurality of small perforations or apertures 112 through which the generated suction currents pass when the suction system is in operation. These apertures are in direct alignment with the leading edge 113 of the lowermost fabric segment 26 disposed within hopper 12 and as shown in FIG. 7, apertures 112, as the suction currents are passed through, cause the lowermost fabric segment 26 to be held by a partial vacuum so as to depress and constrict the thickness of belt 22 at that location 114. Since the fabric segment 26 is not substantially porous, no noticeable amount of air is passed therethrough and thus the lowermost segment 26 is held firmly against belt 22 directly above apertures 112 as the belt advances and slides the segment forward and from beneath the stack.

A drive linkage and assembly generally designated 116 directly controls all moving parts of the entire folding, sewing and collecting apparatus except for the pneumatically generated suction currents resulting from the operation of motor 36 and pump 32 and will be fully described as a preferred application of the present invention. A machine motor 118 (FIG. 9) is mounted directly beneath the working surface 33 of the apparatus 10 and is supported in alignment with the surface-carried drive assembly 116 so that a pulley 122 driven by motor shaft 124 belt-drives 126 machine pulley 128, this pulley operating as a main drive pulley from which auxiliary drives and drive linkages operationally depend. Motor 118 is provided with a mechanical clutch which is retained within housing 130, this clutch being slidably engageable with the motor drive shaft 124 upon energization of a machine motor solenoid carried within casing 132 whose operation will be later described in greater detail. A clutch linkage 134 actually disposes motor shaft 124 for rotation with the clutch by the operation of the motor solenoid 132. Motor 118 is normally maintained in an energized state with the clutch in an unengaged position, and the machine operating components then selectively activate the motor solenoid 132 whenever machine operation is desired.

The auxiliary linkages of drive assembly 116 comprise a conveyor assembly drive 136 which in turn consists of a series of cantilevered supported linkages 135 and 137 that ultimately rotate shaft 138 which is movable segmented 140 to drive the front or leading conveyor pulley 100 by connecting to its axle 101. The auxiliary conveyor assembly drive 136 is designed to rotate the conveyor pulley 100 at an appropriate speed to be operative with the various other driving assemblies that will be described more particularly. Shaft 138 additionally supports a takeup mechanism drive pulley movably which in turn is provided with a belt 144 extending from the drive pulley to the takeup device receiving pulley 146 (FIG. 5) which is spring biased 148 against a rigidly secured driving disc 150 to function as a mechanical frictional clutch for synchronously operating the takeup or collector assembly. Additionally, the sewing machine 152 has a fabric guiding and moving drive assembly 154 constructed along its base or operating surface 50 to advance a fabric segment along the surface 50 of the sewing machine to subsequently engage the folding and sewing means of that machine. This drive assembly is driven and controlled by linkages 156 and 157 which are directly driven through connections to shaft 159 operating from linkage 161 driven by motor shaft 124.

A conventional sewing machine 163 supports and operates the sewing head 64, and it has been found to be advantageous

to purchase the machine and head as a unit such as a particular Union Special one-half horsepower sewing machine converted by the Joseph Galkin Company of New York. Obviously, any reliably operating head carrying sewing machine can be used in the particular configuration of the present invention and such substitutions and alterations are contemplated.

The takeup or collector assembly generally designated 72 is comprised of a trumpet 70 movably positioned to receive a continuous string 68 of folded and sewn fabricated loops 62, trumpet 70 being controlled directly through meshing gears 160 and 164 and the rotation of shaft 158 which supports the frictional clutch made up of members 146 and 150 earlier described. A bevel gear 160 is rigidly secured to shaft 158 by a screw set hub 162. As shaft 158 is rotated by the movement of belt 144, gear 160 is also revolved since it is positively mounted to the shaft. A second and intermeshing bevel gear 164 is anchored to the collector-supporting surface 166 by convenient securing means such as bolts 168 illustrated in FIG. 5. Additionally, a pivotally movable linkage 170 is affixed to the periphery 171 of bevel gear 164 and also secured to a horizontally reciprocable linkage 172 to which is also secured trumpet 70 elevated in a loop string-receiving position by an angular support 174. A linkage-receiving sleeve 176 which is formed generally of a hollow tubular member is supported above surface 166 by a pedestal or stanchion 178 anchored on that surface. As bevel gear 160 engages gear 164, gear 164 is rotated and thus linkage 170 causes reciprocating member 172 to oscillate bidirectionally along a horizontal plane to move trumpet 70 first to the left and then to the right and then back again to repeat the cycle. A loop or component-retaining package 74 is rotatably secured to shaft 158 directly behind and within the movable limits of trumpet 70 so that an endless supply of belt loops 68 is continuously wound on retainer 74 as trumpet 70 oscillates or reciprocates from one end of the container 74 to the other thus disposing the endless supply of loops 68 on the container in a neat, cross-wound manner 180. A sufficient number of shaft supports 182 are provided to retain shaft 158 in accurate alignment during its operation.

CIRCUIT DIAGRAM AND OPERATION

The operation of the circuitry will now be explained with occasional reference to a representative example so that the functioning and control of the machine components when actuated by a moving fabric segment can be fully understood in connection with the wiring diagram of FIG. 12.

A three-phase power source 184 having a Delta or Wye connected 240-volt phase-to-phase voltage may be used for the operation of the dispensing apparatus in conjunction with the representative folding, sewing and collecting apparatus. An off-on switch 185 is mounted on the side of panel 187 and is wired in series with the line circuit to source 184. The three-phase source is appropriately fused 186 to provide maximum protection for machine operation and the main line then extends directly through a control panel or box generally designated 188 and then to the machine motor 118 and vacuum motor 36. Each of the motors 118 and 36 are protectively fused 190 and 192. The voltage off-on control switch 194 controls the voltage supply directly to the machine motor 118 and vacuum motor 36 by its rotational operation. Since the phase-to-phase voltage relationship is approximately 240 volts, a 2:1 stepdown transformer 196 provides a secondary voltage of 120 volts which will be utilized to control the various relays within the machine control circuits. Additionally, an auxiliary secondary winding 197 provides an additional secondary voltage of 24 volts to operate the variety of stop motion devices which will be discussed subsequently in greater detail.

Under ordinary operating conditions, engaging the start button or switch 198 energizes relay 200 and therefore closes contacts 202 and 204 and additionally energizes the electri-

cally operated vacuum motor starter 206 which will in turn cause the vacuum motor 36 to commence operating. Contacts 208 and 210 are also closed by the energization of relay 200, thus closing the circuit that will energize solenoid 132 which in turn engages the magnetic clutch of motor 118. Note that motor 118 is energized immediately upon the closing of switch 194, but only when "START" switch 198 is engaged will the mechanical clutch be activated so as to cause motor 118 to drive the mechanism 116 and its auxiliary and depending drive units.

When the stop switch 214 is actuated, relay 216 is energized thus closing contacts 218 and opening contacts 202, 204, 208 and 210. Relays 200 and 216 are oppositely positioned for controlled contact so that when one is energized it causes all the contacts made by the other oppositely positioned relay to be released and either opened or closed depending upon their state prior to the second relay's energization. The closing of contact 218 by the energization of relay 216 causes a red indicating light 220 to burn thus apprising a troubleshooter or inspector that the machine is no longer operating. The use of this indicating light 220 in conjunction with the stop motion devices will be explained in detail subsequently. An overload relay 222 is placed in series in the start circuit control by switch 198 and controls contacts 224 and 226 which are also in series with the vacuum motor starter 206, and excessive current in this circuit due to overloading the starter 206 will cause relay 222 to become fully energized and therefore open those contacts 224 and 226 disposed thereagainst. The actuation of switch 214 also causes contacts 208 and 210 to become open thus deenergizing solenoid 132 and disengaging clutch 212.

Vacuum switch 228 is used only to operate the vacuum pump 31 and drive motor 36 when the apparatus 10 is not operating through machine control switch 194. Oftentimes it is desirable to experiment and adjust the fabric segment-retaining hopper 12 to accommodate segments of varying thickness, and this will necessitate repetitive experimentation using only the suction means of the apparatus without operating the entire machine 10. Switch 228 thus separately energizes the vacuum motor starter 206 as an isolated component from the remainder of the circuitry to cause the vacuum means to commence operating without the accompanying movement of conveyor belt 22 and all other related components.

A series of stop motion devices 230, 232, 234, and 236 are strategically positioned throughout the entire operating mechanism of the various components of apparatus 10 and may be illustrated by the guide 40 and cooperating member 48 shown in FIG. 7. Contact 230 is represented by the separation between member 48 and guide cover 40, and when a folded or matted fabric segment 26, 44 causes cover 40 to be elevated and contact member 48 thus essentially closing the contact 230 of FIG. 12, relay 238 thus becomes energized and consequently causes contact 240 to close which will in turn energize relay 216, which, in turn, controls the contacts for the stop circuit. These various contacts are then operated and opened to deenergize the machine and cease its operation until it is reenergized by correcting the closed contact 230 and energizing relay 200 through the start circuit. Contact 48 is connected to an electrical ground as is base 46 so that the entire machine may be deenergized as just described when no segment passes beneath guide 40 and that member contacts base 46.

Contacts 232, 234 and 236 represent similar stop motion devices that are strategically attached to the endless supply of sewing thread 237 used by the sewing machine head 64 for seaming continuously the fabricated loops 62 shown in FIG. 4. Other stop motion devices for thread controls are easily visualized and these are representatively shown in FIG. 9 as being affixed to the machine base 152 and controlling a plurality of sewing threads 242 therethrough. Note that when close circuit controlling relay 216 is energized, either by way of switch 214 or any of the stop motion devices 230, 232, 234

or 236, light 220 glows and is therefore usually positioned high above the operating machine so as to be immediately noticeable to responsible personnel who oversee the operation of these machines. This will apprise the troubleshooter or overseer that the machine has ceased operating for one of a number of reasons, and that it should be immediately inspected to determine the cause of the shutdown.

CONCLUSION

The operation of the dispensing apparatus with associated equipment such as that described is readily adjustable to fabrics of different composition and dimensions, and thus the device is characterized by an extremely high degree of flexibility for operation employing a wide range of materials and components. It is apparent that the hopper 12 can be changed in shape and configuration to accommodate fabric segments of a radically different precut pattern so that the resulting product will be a garment component decidedly different from the belt loop illustrated herein.

Any number of fabric-handling devices may be used with the present dispensing apparatus with equal effectiveness as that described and illustrated herein which constitutes a preferred and acceptable way of operating one of a number of auxiliary components with the present invention.

Obviously, many modifications and variations may be made in the construction and arrangements of the conveyor, the hopper assembly and gate configuration as well as other phases of the present inventive concept in the light of the above teachings without departing from the real spirit and purpose of this invention. Such modifications of parts and alternatives as well as the use of mechanical and electrical equivalents to those herein illustrated and described are reasonably included and contemplated.

What we claim is:

1. An apparatus for dispensing preshaped, stacked, relatively limp, flat cloth segments for subsequent fabrication into garment components comprising: means retaining said segments in a stacked, parallel relationship; porous means traveling beneath said segment retaining means; means positioned below said segment-retaining means for applying a pressure differential to a leading edge portion of the bottom segment of said stacked segments and for continuously applying a pressure differential to said porous means immediately adjacent thereto to initiate sliding movement of said bottom segment beneath the segments stacked in said retaining means; said segment-retaining means being angularly disposed with respect to a vertical plane extending transversely of said traveling porous means for maintaining the segments in an offset, vertical relationship such that said bottom segment leading edge extends forwardly of the other stacked segments in the direction of travel of said porous means; said bottom segment cooperating with said pressure differential applying means to preclude a pressure differential being applied to another of the stacked segments until said bottom segment is substantially dispensed from said retaining means for sequentially dispensing cloth segments singularly from the stacked parallel segments and means receiving the segments advanced by said porous means for forming a garment component.

2. An apparatus for dispensing cloth segments as claimed in claim 1, said retaining means including a segment hopper as-

sembly, and a gate communicating with said assembly passing at least one cloth segment therethrough.

3. An apparatus for dispensing cloth segments as claimed in claim 1, said means for continuously applying a pressure differential comprising vacuum means operative with said engaging and dispensing means for engaging and urging said segments singularly and continuously along a directed path of travel.

4. An apparatus for dispensing cloth segments as claimed in claim 2, said means for continuously applying a pressure differential comprising vacuum means proximate said gate and operative with said engaging and dispensing means for engaging and urging said segments singularly and continuously along a directed path of travel.

5. An apparatus for dispensing cloth segments as claimed in claim 1, said porous means including a conveyor movably positioned adjacent said segment retaining means contacting the stacked segments sequentially and continuously and moving the segments selectively along a predetermined path of travel.

6. An apparatus for dispensing cloth segments as claimed in claim 2, said porous means including a conveyor movably positioned adjacent said segment retaining means contacting the stacked segments sequentially and continuously and moving the segments selectively along a directed path of travel.

7. An apparatus for dispensing cloth segments as claimed in claim 4, said porous means including a conveyor movably positioned adjacent said segment retaining means contacting the stacked segments sequentially and continuously and moving the segments selectively along a directed path of travel.

8. An apparatus for dispensing cloth segments as claimed in claim 1 wherein said means for forming a garment component includes guide means receiving the segments from said porous means and orienting the segments in registry and alignment for subsequent seaming and sewing means receiving the segments in continuous sequence and in registry, said sewing means selectively folding and seaming the segments to form a folded and sewn finished garment component.

9. An apparatus for dispensing cloth segments as claimed in claim 2, wherein said means for forming a garment component includes guide means proximate said hopper assembly receiving the segments from said porous means and orienting the segments in registry and alignment for subsequent seaming and sewing means receiving the segments in continuous sequence and in registry, said sewing means selectively folding and seaming the segments to form a folded and sewn finished garment component; and further comprising collecting means operative with said sewing means gathering the segment-formed components for storage. C

10. An apparatus for dispensing cloth segments as claimed in claim 4 wherein said means for forming a garment component includes guide means proximate said hopper assembly receiving the segments from said porous means and orienting the segments in registry and alignment for subsequent seaming and sewing means receiving the segments in continuous sequence and in registry, said sewing means selectively folding and seaming the segments to form a folded and sewn finished garment component; and further comprising collecting means operative with said sewing means gathering the segment-formed components for storage.