

June 14, 1960

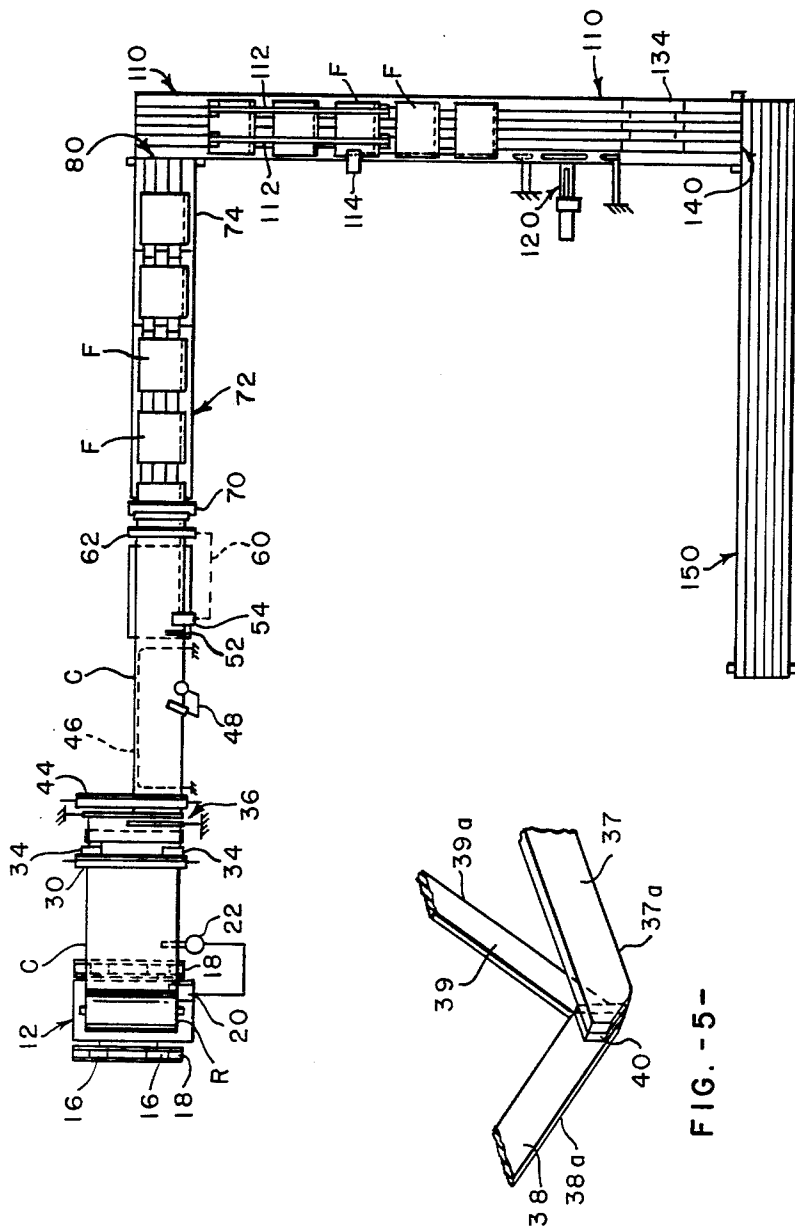
A. D. DAMON

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PILLOW CASE MANUFACTURING APPARATUS

Filed May 17, 1956

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INVENTOR.
ABRAM DURFEE DAMON

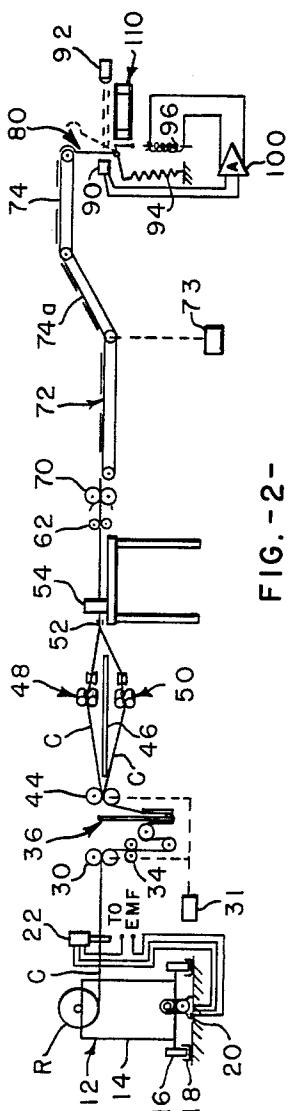
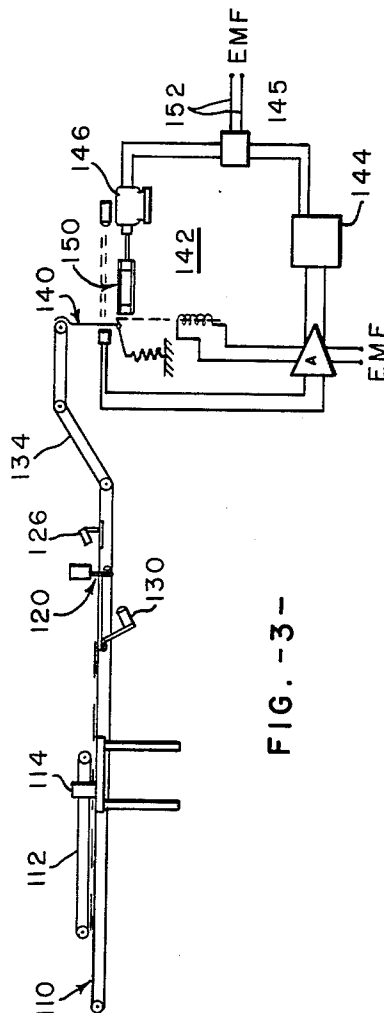
BY *Walter E. Mueller*

ATTORNEY

Filed May 17, 1956

PILLOW CASE MANUFACTURING APPARATUS

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Walter E. Mueller

June 14, 1960

A. D. DAMON

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PILLOW CASE MANUFACTURING APPARATUS

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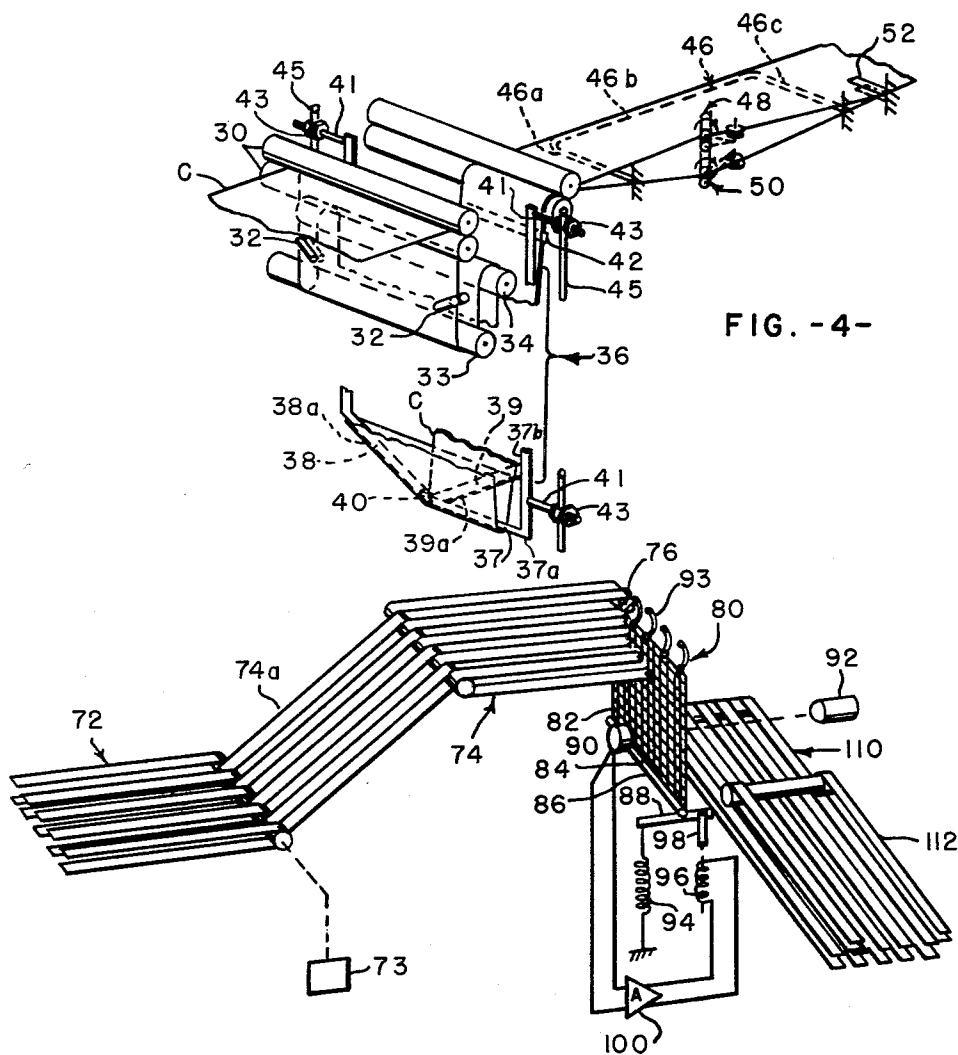


FIG. -6-

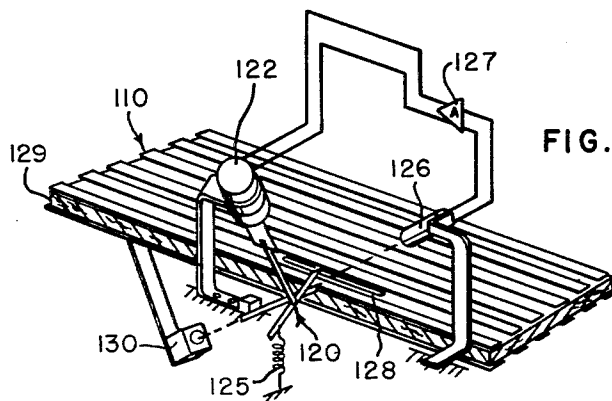


FIG. -7-

INVENTOR.
ABRAM DURFEE DAMON
BY *Walter E. Mueller*
ATTORNEY

1

2,940,404

PILLOW CASE MANUFACTURING APPARATUS

Abram Durfee Damon, Wappingers Falls, N.Y., assignor to Deering Milliken Research Corporation, Pendleton, S.C., a corporation of Delaware

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8 Claims. (Cl. 112—10)

This invention relates to textile material handling apparatus, and more particularly to a substantially automatic apparatus for forming pillow cases or bags from open width web material.

In the manufacture of pillow cases and the like, it has been the previous practice to carry out a series of many separate steps by separate operators, either manually or on various separate machines. As a consequence, a large number of operators of sewing machines and the like were necessary to carry out the various operations involved in the various steps of manufacture of pillow cases with resultant inefficiency, time consumption and costliness. Furthermore, by virtue of the human element involved in utilization of the various operators carrying out these operations, the final product achieved in this manner has not always been reliably uniform.

It is therefore an object of this invention to provide an apparatus and method for substantially automatically carrying out the various steps in the formation of pillow cases, bags and the like from full width textile web material, thereby eliminating the necessity for a large amount of human effort.

It is a further object to provide an apparatus for manufacturing pillow cases, bags and the like which is capable of running substantially continuously and carrying out all operations from the introduction of full width textile web material through the steps of doubling, side seaming and bottom seaming of the pillow cases, as well as the stacking of the thus semi-completed pillow case forms into neat bundles.

It is still a further object to provide a transfer mechanism for the transfer of items from one conveyor running in one direction to a second conveyor running in a direction normal to the direction of the first conveyor, and which is particularly adapted to the transfer of forms in the manufacture of pillow cases, bags and the like, for joinder of the individual juxtapositioned form edges which are parallel to the direction of form movement.

A further object is the provision of a doffing transfer for two conveyors running at 90° to each other, the doffing end of one of the conveyors being positioned above the adjacent portion of the other conveyor, with special provision being made for doffing action from the one conveyor to the other to take place in response to the passage of objects to be transferred over the doffing end of one conveyor.

A still further object is the provision of an apparatus for doubling flat open width web material or for opening doubled material, during passage through a 180° reverse flow tortuous path which is substantially normal to the general flow of the web material, whereby the general flow of material may be maintained in substantially the same direction both into and proceeding from the doubler arrangement.

Still other objects and many attendant advantages of the invention will become apparent to one skilled in the art from the following detailed description of one physi-

2

cal embodiment taken in conjunction with the accompanying drawing wherein:

Figure 1 is a schematic plan view of a pillow case forming machine in accordance with the invention;

Figure 2 is a schematic side elevation of the initial portion of the arrangement illustrated in Figure 1;

Figure 3 is a schematic side elevation of the remaining portion of the arrangement shown in Figure 1;

Figure 4 is a schematic illustration in perspective of the doubler arrangement, including also the selvage guide arrangement preceding the first sewing operation, the doubler arrangement being sectionally broken and exploded vertically for purposes of clarity.

Figure 5 is a fragmentary view in perspective of a portion of the doubler arrangement with the cloth omitted for the purpose of clarity of illustration.

Figure 6 is a schematic view in perspective of the doffing transfer arrangement;

Figure 7 is a schematic illustration of the thread severing arrangement subsequent to the second sewing operation.

Briefly, in carrying out the foregoing objects, the invention generally comprises a method and apparatus whereby cloth or other web material is advanced in open width relation, aligned, and single-doubled, after which the juxtapositioned selvage edges are aligned and sewn together while progressing the cloth in substantially the same general direction as originally, thus forming a continuous side-seamed tube which is then chopped into individual tube forms of desired length, and then sequentially performing the interrelated steps of advancing the separate tube forms in spaced apart relation and with their chopped open ends parallel to the direction of travel (particularly by changing the direction of travel of the tubes 90° without changing their general lateral relation), continuously sewing together the open ends of the successive tube forms to thereby close them at one end and tie the successive tubes together through an interconnecting thread, successively severing the interconnecting thread between the successive tube forms, and stacking the thus formed individual pillow case forms or bags into stacks of preselected number.

Briefly, the illustrated embodiment whereby the invention is carried out comprises in sequentially arranged relation a series of interrelated functional elements including a laterally movable roll carriage for supporting a roll of full width pillow case cloth, a selvage feeler at the output side of the roll carriage and which senses misalignment of the cloth as it leaves the roll carriage and causes the roll carriage drive motor to realign the carriage and roll; a doubler arrangement comprising parallel guide rolls and an intermediate differential cloth guide system; a selvage aligning guide arrangement, including a horizontal U-bar for holding the double web in distended relation, and selvage guides for aligning the selvage edges of the double web as it passes over the horizontal U-bar; a sewing machine for side-seaming the doubled web and including a web-advancing head; a rotary cutter for cutting the side-seamed web into desired lengths for tubular form; a tape conveyor for conveying the cut lengths of tubing continuously from the rotary cutter and in separate spaced apart relation one from the other; a doffing transfer mechanism and a second conveyor running in a direction normal to that of the first conveyor, whereby the cut tubular lengths of "forms" are transferred from the first conveyor to the second conveyor with the open ends thereof being thus progressed along parallel to the lateral edges and direction of movement of the second conveyor; a second sewing machine arranged along the second conveyor at a point adjacent the lateral edge of the second conveyor for continuously overlock-sewing the end of each of the successively pass-

ing cut tubular forms; photoelectrically controlled severing means for severing the connecting thread between the individual tubes; a second doffing arrangement for transferring the separate individual pillow case forms, or bags onto a third conveyor; and a third conveyor which is operative to move after the doffing of a predetermined number of sewn pillow case forms, or bags into a stacked bundle thereon.

Referring more specifically to the figures of the drawing, a roll R of cloth C is supported on a roll carriage 12 which consists of a steel frame 14 having wheels 16 which ride on a steel track 18 transverse to the direction in which the cloth is unrolled. Carriage 12 supports the roll R of full width cloth C, as by a mandrel, for unwinding and movement through the subsequent cloth processing apparatus as will be later described. In order to provide for proper alignment of the cloth C as it enters the subsequent stages of processing, a reversible motor 20 is mounted on the floor beneath the carriage frame 14 (or may be mounted on the carriage frame 14, if desired) and is suitably connected in drive relation, as through a chain and worm-screw arrangement of conventional construction to the carriage frame 14 for driving the carriage back and forth along the track 18.

The cloth C passes from the roll carriage 12 through a double-contact feeler guide switch 22 which is arranged in circuit-controlling relation with the reversible motor 20. Feeler guide switch 22 serves to sense the position of the selvage edge of the cloth as it passes thereby and to actuate the motor 20 in order to move the roll carriage 12 to correct any misalignment of the cloth as it passes this point.

The cloth next passes through a first set of nip rolls 30, which may be suitably driven as by a motor 31, and which serves to pull the cloth from the roll R. From the nip rolls 30, the cloth C proceeds past two air selvage guide arrangements 32 of conventional construction which serve to further maintain the alignment of the cloth, the cloth then passing in engagement with a pair of idler rolls 33, 34, and thence under and in contact with a plicator guide bar arrangement 36 from which it proceeds upwardly in single-doubled relation through a pair of finger guides 42 to a second set of driven nip rolls 44, thereby completing a 180° reverse flow path which is normal to the general forward travel of the cloth. Nip rolls 44 may be driven in any suitable manner, as for example by common connection to the drive motor 31. The plicator guide bar arrangement 36 comprises three downwardly facing guide surfaces 37a, 38a, 39a. The members 37, 38, and 39 forming these guide surfaces are preferably interconnected, as shown in Figure 4, at a point corresponding to the centerline of the cloth C as it passes thereby, the member 39 being also connected at its upper outer end to the vertical leg 37b of member 37. The guide surface 37a is parallel to the axis of nip rolls 30 and 44 as well as idler rolls 33 and 34. Guide surfaces 38a and 39a meet at right angles to each other and are spaced from the member 37 forming guide surface 37a by a spacer member 40, the spacing being of the order of approximately 1/4" or otherwise approximately equal to the double fabric thickness to accommodate the passage of cloth C in in-folded doubled relation therebetween. Preferably the spacer member 40 has a smooth beveled or rounded bottom edge, as shown, with the right hand side thereof closely aligned with the intersection point of the guide surfaces 38a and 39a, in order to provide for passage of the cloth C with a minimum of strain thereof in this area. The guide members 38 and 39 are disposed rearwardly of guide member 37 as viewed in Figure 5, with the guide surfaces 38a and 39a forming an included angle of approximately 90° and each forming approximately at 45° angle with respect to the horizontal and thus with respect to guide surface 37. The symmetrical 45°-45° angle arrangement for the guide surfaces 38a and 39a is by far the

most advantageous arrangement since unbalanced forces on the web material (i.e. cloth C) are minimized; however, as long as an included angle of approximately 90° is formed between these guide surfaces, they may in some instances be disposed asymmetrically one way or the other with respect to the horizontal or the line extending coextensive with guide surface 37a, if desired. The entire plicator guide bar arrangement 36 is adjustably supported by any suitable means such as fixed frame members 45, as through the medium of threaded bolts 41 and nuts 43, for selective traverse positioning of the center thereof to accommodate varied widths of cloth. As will be seen from Figure 5, the cloth passes first under and in engagement with guide surfaces 37a and 38a, the left-hand selvage edge (as viewed in Figure 4) then passing transversely behind guide members 38 and 39 and then under surface 39a, thence between the spaced apart guide members 39 and 37, with the right-hand half of the cloth C passing under guide surface 37a and thence upwardly between guide member 37 and guide member 39. At this point, the cloth C will then be in single-doubled relation, and with the intersecting point of the guide surfaces 37a, 38a and 39a disposed at the center line (i.e., open width center line) of travel of the cloth the selvage edges of the single-doubled cloth will be approximately in juxtapositioned alignment. Disposed above the guide member 39 is a finger guide 42 which extends from the right-hand edge of the doubled cloth to the fold thereof, the cloth C passing in guided relation over this finger guide 42 after it leaves guide surfaces 37 and 39, with this guide 42 being disposed within the fold of the doubled cloth C.

As will be noted from the foregoing description of the plicator bar arrangement, the geometry of the guide surfaces 37a, 38a, and 39a, as well as the nip roll and idler roll arrangements preceding and subsequent thereto, is such that the left half of the cloth C as viewed in Figure 4 passes through a shorter path under guide surface 38 than does the right-hand edge of the cloth which passes under horizontal guide surface 37. By this differential progression of the left-hand half of the cloth, and the further differential progression as the left half of the cloth is led under and about and in-folded upwardly around guide surface 39 permits the left-hand half of the cloth C to be folded over onto the right-hand half thereof in perfect alignment and without wrinkles or bulges appearing either at the edges or at any other point in the thus folded cloth, particularly in the region of the fold. Thus, it will be seen that the flat open width cloth passes through driven nip rolls 30 in the general direction of cloth progression, thence downwardly through air selvage guides 32 (where any misalignment is corrected), about idler rolls 33-34, under and through plicator guide bar arrangement 36, upwardly through guide fingers 42, and thence through nip rolls 44, thereby completing a 180° reverse flow path such that the cloth C may continue along its original general longitudinal path in single-doubled relation.

An added advantage of the plicator guide bar arrangement 36 according to this invention is that it may readily be employed for opening single-doubled web material by feeding the doubled web material through the plicator 36 in reverse direction to that for doubling. The thread up is the same as illustrated with only the reversal of cloth movement being required to achieve the opening function.

The single-doubled cloth C passes immediately from the nip rolls 44 to and about a U-shaped bar 46 horizontally mounted in any suitable manner as by securing to the supporting frame, not shown, and having one of its legs 46a disposed very near the nip of the rolls 44. The base 46b of the U-bar extends parallel with the longitudinal path of the cloth and lies in substantially the same vertical plane as the junction of guide surface portions 37a and 38a of guide bar 36, whereby

5

the fold of the cloth as it passes from the nip roll 44 is guided in distended relation over the base 46b as the cloth passes the U-bar 46.

The selvage edges of the single-doubled cloth C are engaged by conventional pivotally mounted mechanical selvage guiders 48 and 50 which are disposed in folded-over position for alignment of the selvage edges of the cloth. Other than being disposed in folded-over spaced apart relation for engagement with the substantially horizontally extending selvage edges, these selvage guiders are of conventional construction and operation, as stated above, and will therefore not be further described in detail.

A sewing machine 54 is disposed adjacent the forward leg 46c of U-bar 46 for the purpose of stitching together the aligned selvage edges of the single-doubled cloth C as it passes thereby. To this end, an input guide 52 guides the spaced apart parallel selvage edges toward each other for passing through the sewing machine 54. The sewing machine is preferably of the side-seaming doubled-needle type having two needles, one leading the other, so as to provide an extremely high speed sewing operation. At such high speeds as are attained with the machine in this embodiment (e.g., approximately 9,600 stitches per minute), the needles tend to become overheated and, in order to minimize this condition, twin air-cooling nozzles (not shown) are provided in adjacent relation thereto, these nozzles being fed from any suitable source such as a blower fan (not shown). To provide for continuous uniform flow of cloth C through the sewing machine 54, a puller head 62 is provided therefor, which is suitably connected in synchronous relation with the stitching mechanism thereof, as indicated schematically at 60.

The cloth C emerges from the sewing machine 54 in side-seamed tubular form. From the puller head 62 of the sewing machine, this tubular material passes through a rotary cutter 70, of any conventional type, in which it is cut into individual tubular forms of suitable length for individual pillow cases, bags or the like, as may be desired. From the rotary cutter 70 the individual tubular forms F are carried on a conveyor 72, which is preferably of the multiple continuous tape or belt type as shown, for further processing thereof. The conveyor 72 may be driven from any suitable source such as motor 73, and is suitably synchronized with the preceding drive arrangements as described above, including the drive means (not shown) for the rotary cutter 70, such that the individual tubular forms F are conveyed away from the rotary cutter 70 at a faster rate than the input rate of tubular material into the cutter in order to arrange the tubular forms F in suitable spaced apart relation (i.e., of the order of several inches or more apart) for subsequent transfer to a second conveyor arrangement, next to be described.

A second multiple tape conveyor 110 is disposed at the output end of the first tape conveyor 72 for the purpose of transporting the individual tubular forms F through a second sewing operation as will be subsequently described. This second conveyor 110 is arranged with its flow path at right angles to the flow path of conveyor 72, in order to conveniently provide for the sewing of the ends of the individual tubular forms F with a minimum of difficulty, and to provide for ease of automatic transfer and arrangement of forms F thereon for the sewing operation.

The conveyor 72 is provided with an extension 74 having an inclined section 74a, the end of the extension 74 being adjacent to and above the lateral edge of conveyor 110. This height differential is provided in order to accommodate the transfer mechanism which doffs the individual tubular forms one by one from the output end of conveyor extension 74 onto the adjacent upper surface of conveyor 110. The doffing transfer mechanism, generally indicated by the numeral 80, includes a steel framed gate 82 having a wire face 84. Gate 82 is pivot-

6

ally mounted as by being secured to an oscillatably mounted cross bar 86 to which is secured an actuating lever 88, the gate 82 being normally held in upstanding relation with its upper end disposed beneath the output end of conveyor extension 74 as by a counterspring 94 connected between a fixed support and one end of actuating lever 88. A series of fingers 93 on the free upper end of gate 82 rest on the tape idler shaft 76 while the gate is in inactive up position, the fingers resting between the tapes and serving together with the idler shaft 76 to form an effective rear stop for the gate against the action of spring 94. A photoelectric control circuit is provided for actuating the gate 82 to cause it to pivot downwardly toward the second conveyor 110 for the transfer of individual tubular forms from conveyor extension 74. In the illustrated embodiment, this photoelectric circuit comprises a photo-cell 90 disposed beneath conveyor extension 74 and behind the wire face 84 of gate 82 near the pivot end of the gate. A light source 92 is suitably mounted on the opposite side of wire face 84 at a point which will not interfere with the pivotal doffing action of gate 82, the light source having means for directing a concentrated light beam through the wire face 84 and onto the photo-cell 90. The photo-cell 90 may be connected, as through an amplifier 100, in circuit controlling relation with a heavy-duty solenoid 96, the armature of which is suitably connected through suitable linkage 98 to the actuating lever 88 in opposed relation to the counterspring 94.

The suitably spaced apart tubular forms F thus pass over the end of conveyor extension 74 and begin a gravitational fall downwardly and in front of the gate 82. Upon interrupting the light beam from the light source 92 to the photo-cell 90, the photo-cell initiates a signal which causes the amplifier 100 to actuate solenoid 96. The position of photo-cell 90 is selected such that the forward end of each successive pillow case form F will be suitably disposed adjacent the front face of the wire face 84 of the doffing gate at the instant that solenoid 96 begins its pivotal movement of gate 82 so as to position this open edge in proper transverse seated relation on conveyor 110 for passage through the subsequent edge (bottom) sewing machine adjacent the edge of conveyor 110, as later described. The doffing gate 82 is pivoted at a relatively fast rate and by virtue of the considerable air resistance to the movement of the flat tubular form F, the form will be securely held in frictional engagement with the wire face 84 of the gate during the entire pivotal transfer movement. At the end of the pivotal movement of gate 82 the tubular form F lies on the upper surface of continuously moving tape conveyor 100 with its unsewn open end parallel to the direction of movement of conveyor 110 and aligned for subsequent bottom edge sewing thereof as the conveyor 110 moves the forms forward through a second sewing machine.

It will be apparent that upon the cessation of interruption of the light beam to the photo-cell 90, by virtue of the downward pivotal movement of gate 82, the solenoid 96 will be deactuated and the counterspring 94 will cause the fast return of gate 82 to its normal upright position, whereupon it is in readiness to doff the next succeeding tubular form F as it leaves the conveyor extension 74. It is to be noted that this entire doffing operation is quite fast compared to the speed of conveyor 72, and therefore only a small spacing between forms F is necessary to accommodate the doffing transfer mechanism. Also, by pulling the forms F off the end of conveyor extension 74 before the trailing end thereof falls off, as shown in Figure 2, the spacing between forms F may be reduced to a minimum. The continuously moving second tape conveyor 110 is provided with over-rider tapes 112 for gripping and holding securely the individual tubular forms F as they proceed from the doffing area to and through a second sewing operation. These over-rider tapes not only serve to securely hold the

forms F while their bottom ends or edges are being sewn closed, but also serve to prevent the displacement thereof by the air turbulence created during subsequent doffing of the succeeding forms F. Disposed near the output end of the over-rider tapes 112 and adjacent the longitudinal edge of conveyor 110 is provided a bottom-overlock sewing machine 114 which may be of any suitable conventional construction. This machine 114 runs continuously during the operation of the overall apparatus and serves to close the adjacent bottom end of each of the tubular forms F. Due to the continuous running of sewing machine 114, the sequence of pillow case forms passing through it are all connected together by the sewing thread chain-off formed thereby.

To automatically separate the sewn together pillow case forms F, a photoelectrically controlled thread severing arrangement is provided in subsequent relation to the sewing machine 114. This severing arrangement in the instant embodiment takes the form of a pair of photo-cell-solenoid-operated scissors 120, as more clearly shown in Figure 6, which are suitably mounted adjacent the longitudinal edge of conveyor 110, and are connected through a suitable linkage 104 to a solenoid 122. Solenoid 122 is connected in circuit-controlled relation with a conventional photo-cell and amplifier arrangement 126, 127 such that solenoid 122 is energized to close the scissors 120 upon each establishment of a light beam on the photo-cell 126. During interruption of the light beam to the photo-cell 126, the solenoid 122 is deactivated and scissors 120 are opened as by a return spring 125 connected thereto, in order to permit the passage of material through the bite of the scissors at this time. In order to provide for proper cutting and opening action of the scissors 120, a slot 128 is provided in the surface of the supporting table 129 for conveyor 110 adjacent the scissors 120. Photo-cell 126 is suitably mounted at an angle above and ahead of this slot 128, and below and behind this slot there is suitably mounted a light source 130 which directs a light beam through slot 128 and onto the photo-cell 126. Thus it can be seen that passage of the trailing edge of each successive pillow case form F being conveyed from the overlock sewing machine 114 will permit establishment of the light beam to photo-cell 126, whereupon the solenoid 122 will be actuated to thereby close the scissors 120 and sever the connecting sewing thread. Upon interruption of the light beam by the next succeeding pillow case form F the solenoid 122 will be deactivated and the return spring 125 will open the scissors, which are then in readiness for the next cutting operation which will occur after the passage of the trailing edge of the pillow case form which is at that time serving to interrupt the light beam to the photo-cell 126.

The pillow case forms F, which have been sewn along their doubled edge and the cut bottom edge thereof to form an open-ended bag, are now separate non-connected items which proceed along the tape conveyor 110 to a second inclined extension 134 forming a continuation of conveyor 110, similar to conveyor 72 and inclined extension 74, for the purpose of being doffed onto a third conveyor where they are stacked into neat bundles. To this end a second doffing gate arrangement 140 of generally similar construction to that of doffing gate transfer arrangement 80, previously described, is provided adjacent the output end of inclined conveyor extension 134 and adjacent the longitudinal edge of a third normally stationary continuous tape conveyor 150. The doffing gate control circuit 142 for doffing gate 140 is similar to that provided for doffing gate 82 with the exception that upon each doffing action of gate 140, the doffing gate control circuit provides a signal which is transmitted to a counter and timer circuit arrangement 144, 145. Counter 144 and timer 145 may be of any suitable conventional or desired design and construction, and are arranged in power-circuit controlling relation

with the drive motor 146 for conveyor 150. Upon actuation of the counter 144, a predetermined number of times by the individual doffing actions of gate 140, the timer 145 will be actuated and motor 150 will be energized for a predetermined short length of time, as from a source of E.M.F. connected to leads 152, to move the conveyor a predetermined distance. The normally stationary and periodic moving action of conveyor 150 is such that a predetermined number of individual tubular forms F are doffed and stacked in a neat bundle on conveyor 150, whereupon the conveyor moves a short distance between doffing actions of doffing gate arrangement 140 to move one stack from the doffing area and permit the beginning of a new stack of the same predetermined number on an adjacent section of the conveyor. The completed stack of pillow case forms may then be removed by an operator and further processed by subsequent operations such as sewing of a hem in each form and placing of labels therein, folding, packaging, and the like.

It will be apparent that many modifications of this invention may be made without departing from the spirit or scope thereof, and it is therefore to be understood that the invention is only to be limited as defined by the scope of the appended claims.

I claim:

1. Web handling apparatus including a doubler apparatus comprising first, second and fifth spaced apart parallel guide surfaces, said second guide surface and a third and a fourth guide surface being disposed between said first and fifth guide surfaces, said third and fourth guide surfaces being interconnected and canted at an angle with respect to one another and directed away from said first and fifth guide surfaces, said second guide surface being laterally spaced from said third and fourth guide surfaces in the general direction of said first guide surface and lying in a substantially horizontal plane including the point of intersection of said third and fourth guide surfaces, a U-shaped guide bar, said bar being disposed with its legs and web portion lying in substantially the same plane as said fifth guide surface, the guide surface formed by the web of said U-bar being in a plane which substantially intersects the point of intersection of said third and fourth guide surfaces, selvage aligning means disposed adjacent the end of said leg portions of said U-bar and one each side of the plane of said U-bar for aligning the selvage edges of doubled webbing as it leaves said fifth guide surface and passes over said U-shaped guide bar, edge-sewing means disposed adjacent the leg of said U-bar which is furthest disposed from said first and fifth guide surfaces, a rotary cutter adjacent the output side of said sewing means for cutting a tube formed by doubled web material passed through said sewing means into short lengths of tubular material, means for conveying and transferring said tube lengths one-by-one onto a conveyor disposed for movement substantially normal to the direction of movement through said sewing means, and a second sewing means disposed adjacent a lateral edge of said last mentioned conveyor and adapted to run continuously during advancement of tube lengths thereby, thread severing means disposed in flow relation subsequent to said second sewing means, and photoelectric control means operatively connected to said severing means, said photoelectric control means being operatively responsive to passage of said tube lengths thereby and adapted to intermittently actuate said severing means to sever interconnecting thread between said tube lengths, a second tube element transfer means disposed at the discharge end of said last mentioned conveyor, and a third conveyor disposed at right angles to and beneath the discharge end of said last mentioned conveyor for reception of material from said transfer means, said third conveyor being normally stationary and operable to advance in response to trans-

fer of a predetermined number of tubular elements by said second transfer means.

2. Automatic pillow case forming apparatus comprising web doubler means, means for feeding full width web material in aligned relation into said doubler for aligning the edges of the doubled web as it passes from said doubler, edge sewing means disposed in material flow relation subsequent to and adjacent said edge guiding and aligning means, web advancing means operatively connected in synchronous relation to said sewing machine and arranged to pull folded web material through said sewing means in timed relation to the stitching rate, cutter means disposed adjacent the output end of said web advancing means and adapted to cut web tubing passing therethrough into predetermined lengths, first conveyor means disposed adjacent the output of said cutter for advancing the cut web tubing lengths in spaced apart relation, second conveyor means disposed at right angles to said first conveyor means and adjacent the output end of said first conveyor means, transfer means for transferring each individual length of web tubing from said first conveyor onto said second conveyor with the open unsewn ends of each cut web tube parallel to the direction of movement of said second conveyor, second edge-sewing means adjacent a lateral edge of said second conveyor and adapted to continuously sew the edges of said tubes adjacent thereto, said second conveyor including web hold-down means adapted to securely hold each cut web tube as it leaves the point of placement onto said conveyor and is advanced through said second edge-sewing means, severing means arranged adjacent the output end of said sewing means and operatively responsive to passage of each separate cut tube whereby the sewn together tubes are severed from each other, and means for stacking the sewn and severed tubes in bundles of selected number.

3. Apparatus according to claim 2 wherein said doubler comprises a 180° reverse-flow guide arrangement, said arrangement comprising first, second, and third guide means defining a 180 degree tortuous course directed substantially normal to the general path of web material preceding and subsequent thereto.

4. Apparatus according to claim 3 wherein said second guide means comprises a first guide surface parallel to said first and third guide means, second and third guide surfaces canted with respect to said first guide surface at equal angles thereto and intersecting one another at right angles, said first guide surface being at its inner end spaced from the intersection of said second and third guide surfaces and longitudinally aligned therewith, the spacing between said first guide surface and said intersection of said second and third guide surfaces being such as to permit a double fold of cloth to be passed in flow relation therebetween.

5. Apparatus according to claim 2 wherein at least one of said transfer means, comprises a pivoted gate, and photoelectrically responsive control means operatively connected to said gate.

6. Apparatus according to claim 2 wherein said severing means comprises a cutter, and photoelectric control means operatively connected to said last mentioned cutter.

7. Apparatus for conveying and handling individual items, comprising first and second belt conveyors arranged in flow relation normal to one another, the output end of said first conveyor being disposed above and adjacent a lateral edge of said second conveyor, a normally substantially vertically extending gate pivotally mounted adjacent said output end and between said output end and said lateral edge, and photoelectric control means for pivotally moving said gate, said control means including a solenoid having an armature, said armature being directly coupled to said gate for direct movement of said gate upon energization of said solenoid, said first conveyor output end being disposed above said lateral edge of said second conveyor and separated therefrom by a distance substantially equal to the length of said gate from its pivot point to its free end.

8. Web handling apparatus comprising a doubler apparatus, edge-sewing means disposed adjacent the output end of said doubler and adapted to sew together the adjacent selvage edges of a web doubled by said doubler apparatus, a cutter adjacent the output side of said sewing means for cutting a tube formed by doubled material passed through said sewing means into short lengths of tubular material, first and second conveyor means, said first conveyor means being adapted to convey and transfer said tube lengths sequentially onto said second conveyor means, said second conveyor means being disposed for movement substantially normal to the direction of movement through said sewing means, a second sewing means disposed adjacent a lateral edge of said last mentioned conveyor and adapted to run continuously during advancement of tube lengths therepast, thread severing means being disposed in subsequent flow relation to said second sewing means, and photoelectric control means operatively connected to said severing means, said photoelectric control means being operatively responsive to passage of said tube lengths therepast and adapted to intermittently actuate said severing means to sever interconnecting thread between said tube lengths, a second tube element transfer means disposed at the discharge end of said last mentioned conveyor, and a third conveyor disposed at right angles to and beneath the discharge end of said last mentioned conveyor for reception of material from said transfer means.

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