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MECHANISM FOR AUTOMATICALLY CONVEYING, BAR TACKING AND
STACKING INDIVIDUAL FLAT FLEXIBLE WORKPIECES

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Sheet 1 of 3

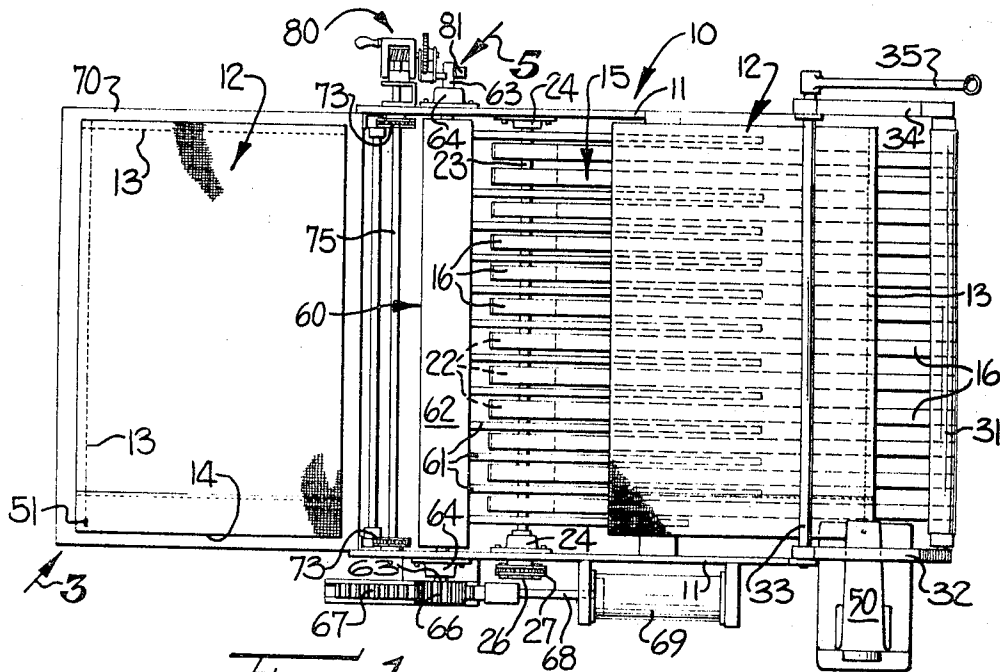


Fig-1

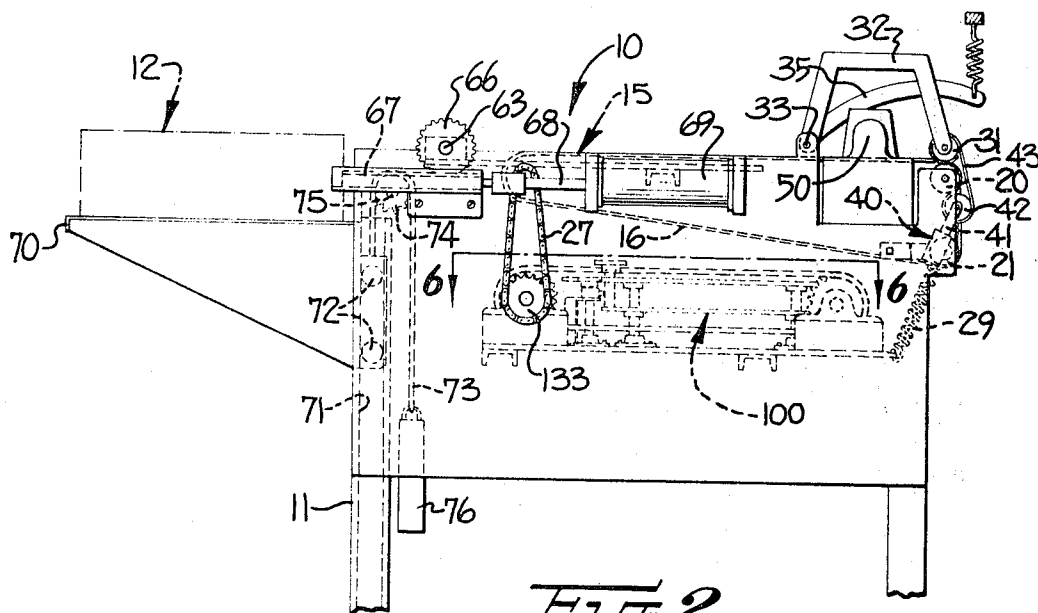


Fig-2

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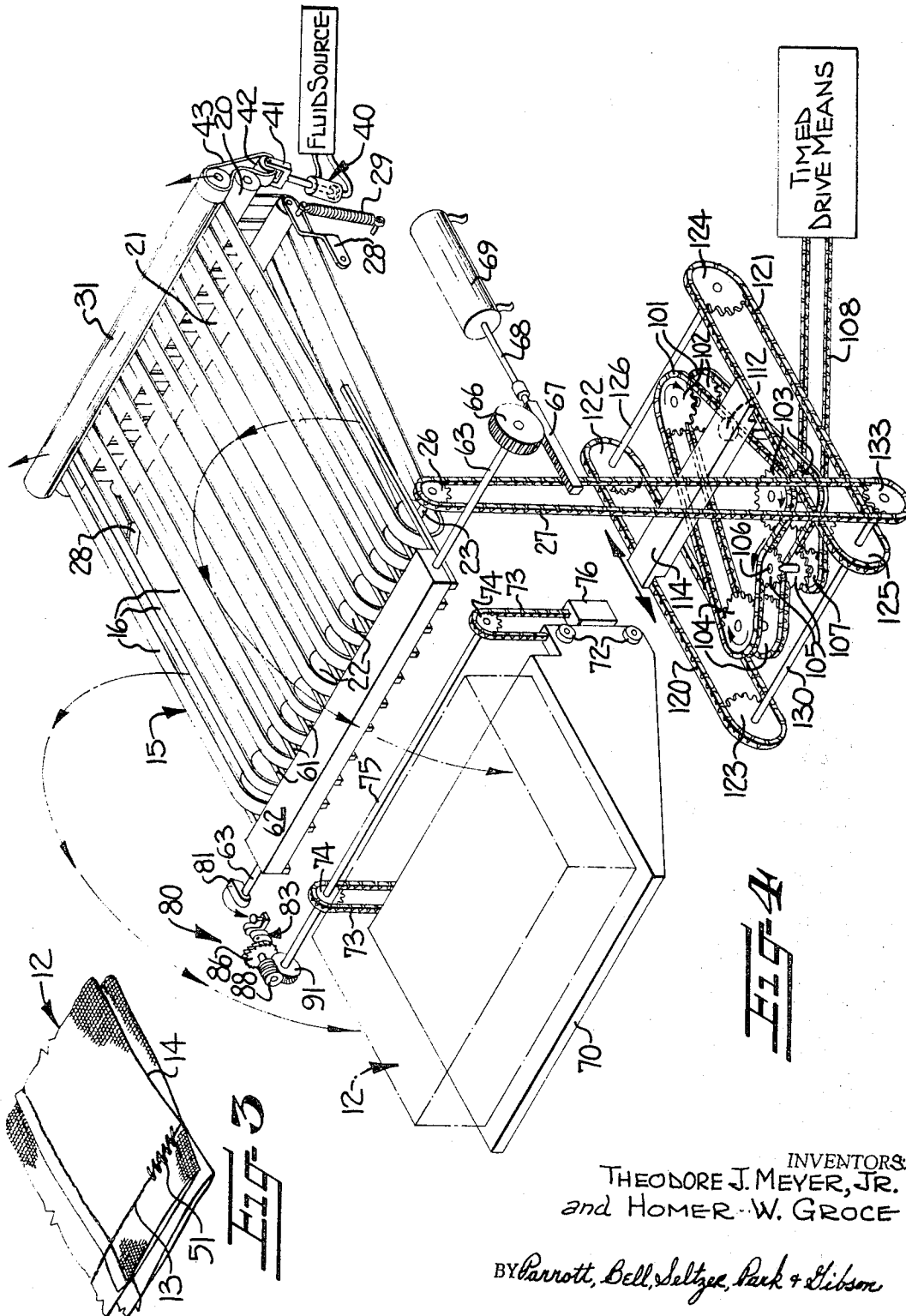
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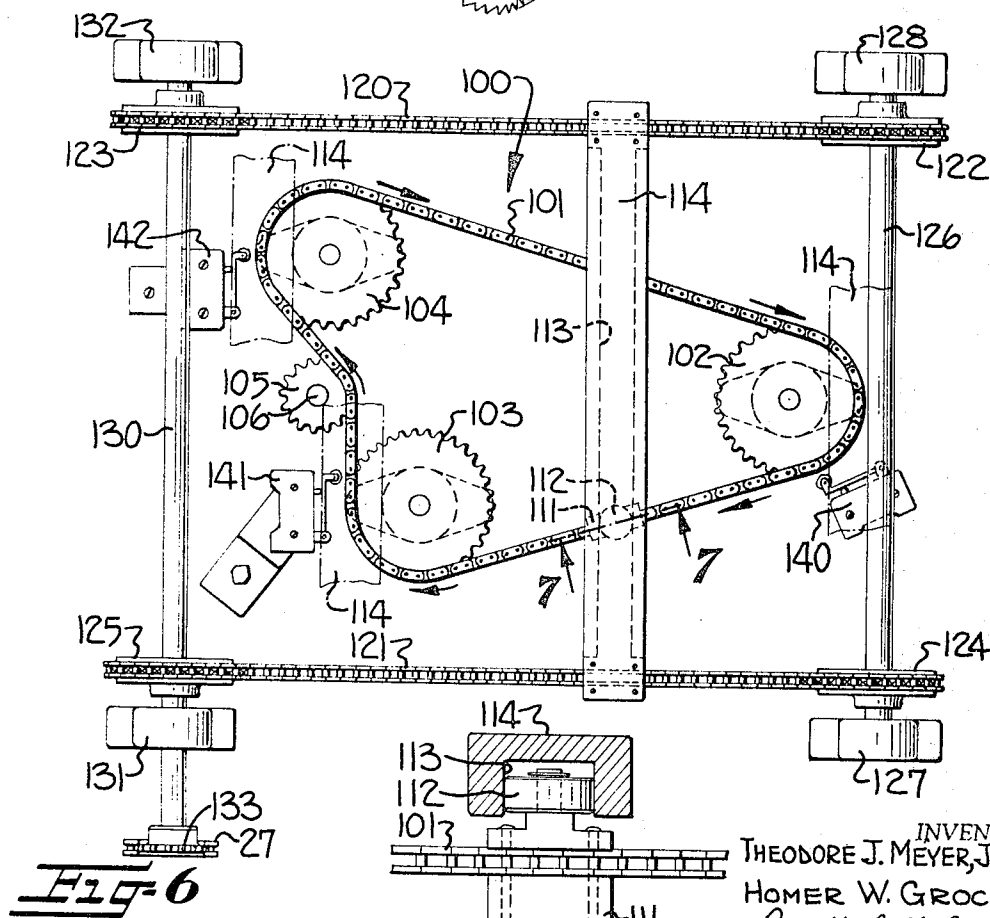
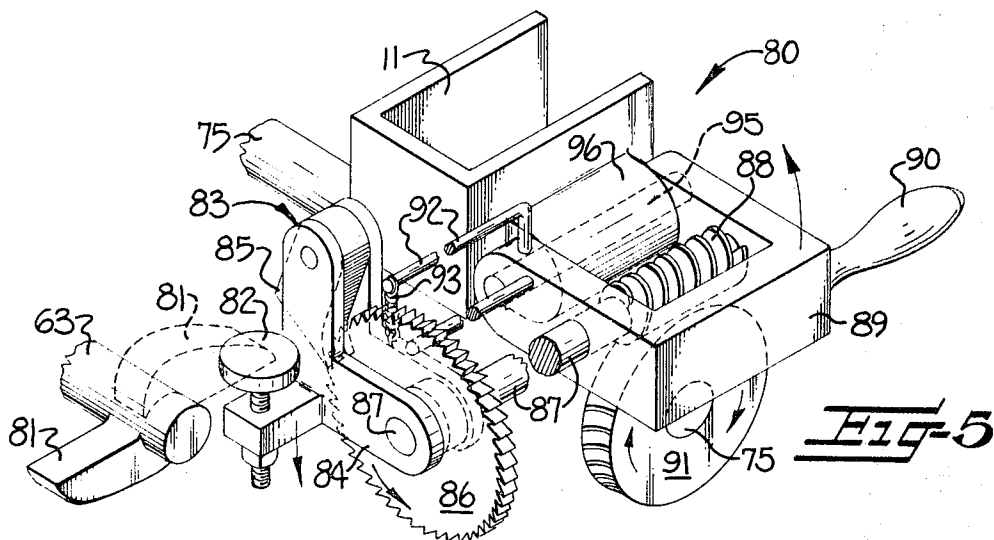
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Sheet 3 of 3



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MECHANISM FOR AUTOMATICALLY CONVEYING, BAR TACKING AND STACKING INDIVIDUAL FLAT FLEXIBLE WORKPIECES

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ABSTRACT OF THE DISCLOSURE

Apparatus for automatically conveying, bar tacking and stacking individual flat workpieces comprising conveying means sequentially operated for receiving the individual workpieces and sequentially conveying each individual workpiece to a first position, maintaining each individual workpiece in the first position for a predetermined period of time and conveying each individual workpiece to a second position, bar tacking means adapted to apply a line of bar tacking to each individual workpiece when located and maintained in the first position, stacking means adapted to move and stack each individual workpiece when located in the second position, and unitary control and drive means adapted for independently controlling, timing and coordinating the operation of the conveying means, bar tacking and stacking means.

This invention relates to apparatus for automatically conveying, bar tacking and stacking individual flat flexible workpieces.

Heretofore, in the manufacture of flat flexible articles, such as pillowcases, bags, or other articles which require a short line of stitching or bar tacking for reinforcing certain portions thereof and which require handling and stacking thereof before and after the bar tacking operation, it was necessary to carry out a series of separate steps by a series of separate operators, either manually or with separate machines. This necessarily involved the disadvantages of a large number of operators, time consumption, inefficiency and costliness. Other disadvantages of this type of manufacturing operation were the amount of space necessary to hold these separate machines and operators and the human element involved in the separate operations by separate operators which produced a tendency toward non-uniformity in the finished product.

Bar tacking is particularly important in connection with pillowcases or bags wherein three sides of the article or workpiece are closed and the fourth side is left open. Normally, this is accomplished by folding an open individually cut article or workpiece and then stitching the article or workpiece along two of the remaining sides. The stitched side forming the open mouth of the pillowcase or bag is often subjected to high stresses and strains which cause the stitching to be pulled out therefrom and results in an unacceptable product. Therefore, it is often necessary to insert a short line of stitching or bar tacking on top or closely adjacent to the already formed stitching at the mouth of the article for reinforcement purposes.

It is therefore an object of this invention to provide a mechanism for receiving individual flat flexible workpieces, which require bar tacking and stacking, and automatically performing the required operations thereon to eliminate the necessity of various operators, cut down on time consumption, increase efficiency, reduce cost, conserve space and increase uniformity in the finished product.

In accordance with this invention and to accomplish the above object, an apparatus is provided which will auto-

matically convey, bar tack and stack individually flat workpieces. The apparatus comprises conveying means sequentially operated for receiving the individual workpieces and sequentially conveying each individual workpiece to a first position, maintaining each individual workpiece in the first position for a predetermined period of time and conveying each individual workpiece to a second position. Also included is a bar tacking means disposed in cooperative relationship with said conveying means and adapted to apply a line of bar tacking to each individual workpiece when located and maintained in the first position. A stacking means is disposed in cooperative relationship with the conveying means and is adapted to remove and stack each of the individual workpieces when located in the second position. The apparatus further includes unitary control and drive means operatively associated with the conveying means, the bar tacking means and the stacking means for automatically and independently controlling, timing and coordinating the operation of same for sequential conveying, bar tacking and stacking operations.

This apparatus has been and will be described specifically hereinafter in terms of a pillowcase or bag formed from textile material; however, it is to be understood that this invention is equally as well adapted for other types of individual flat flexible workpieces wherein bar tacking conveying and stacking might be desired and this invention is not intended to be otherwise limited.

Some of the objects and advantages of the invention having been stated, other objects and advantages will appear as the description proceeds when taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a top plan view of the mechanism of this invention;

FIGURE 2 is a side elevational view of the mechanism of this invention;

FIGURE 3 is a partial perspective view of a workpiece illustrating the bar tacking applied thereto;

FIGURE 4 is a partial schematic perspective view of portions of the mechanism of FIGURES 1 and 2 illustrating particularly the drive and control means therefor;

FIGURE 5 is a partial perspective view of a portion of the mechanism of FIGURE 1 taken at the arrow 5 of FIGURE 1 and illustrating the means for lowering the stacking table a predetermined distance upon stacking of each workpiece;

FIGURE 6 is a top plan view of a portion of the control and drive means of the mechanism of this invention and taken along the line 6—6 of FIGURE 2; and

FIGURE 7 is a side elevational view of a portion of the control and drive means of FIGURE 6 and taken along the line 7—7 of FIGURE 6.

Referring now to the drawings, the apparatus for automatically bar tacking, conveying and stacking individual flat workpieces is shown particularly in FIGURES 1 and 2 and is broadly designated by the reference numeral 10. This apparatus comprises a frame portion, broadly indicated at 11, including side plates and leg members.

The apparatus 10 is particularly adapted for use with workpieces, such as a pillowcase, shown in FIGURES 1 and 3 and broadly indicated by the reference numeral 12, which has been folded over along one of its edges and stitched along two of its edges by stitching 13 so as to form an open mouth therein, indicated at 14. The sides of the pillowcase forming the open mouth 14 comprise a folded over side and a stitched side. It is axiomatic that upon opening and closing of the pillowcase for insertion of a pillow or otherwise, the stitched side of the open mouth will be subjected to the greatest strains and will tend to cause weakening or tearing of the stitching 13 along that side. Therefore, it is desirable to reinforce

the stitching 13 communicating with the open mouth of the pillowcase.

The apparatus 10 of this invention comprises conveying means, broadly indicated at 15, including a plurality of spaced-apart, movable, endless belts 16 forming a substantially smooth upper surface for receiving and conveying the individual workpieces 12 thereon. The conveying means 15 is adapted to sequentially convey each individual workpiece in a linear path of travel to a first position (as indicated at the right in FIGURE 1), maintain each individual workpiece in the first position for a predetermined period of time and convey each individual workpiece to a second position, as will be pointed out more fully hereinafter.

The endless conveyor belts 16 are mounted on first rotatable rolls 20 and 21 which are superimposed and vertically spaced from each other and are respectively mounted in suitable bearings in the apparatus frame 11 for rotation. The conveyor belts 16 are also mounted on suitable pulleys 22 carried by a driven shaft 23 which is mounted in suitable bearings 24 on the apparatus frame 11. As may be seen particularly in FIGURE 4, the roll 21 is mounted for pivotal movement by arms 28 (only one of which is shown) secured to the frame 11 and biased toward a downward position by a spring 29 or other suitable means for properly tensioning the belts 16 for their rotary driven motion.

The driven shaft 23 includes a sprocket 26 on one of the ends thereof which receives a drive chain 27 for driving the shaft 23 and the endless conveyor belts 16 in a manner to be described hereinafter.

The apparatus 10 further includes a nip roll 31 adapted to move from a non-nipping position to a nipping position in cooperation with roll 20 to form a pair of nip rolls to nip the individual workpieces 12 therebetween and feed them onto the conveyor belts 16. The nip roll 31 is movably carried by a first arm 32 which is carried by a bar 33 pivotally mounted on the apparatus frame 11. The other end of the nip roll 31 is carried by an arm 34 which is also secured to the bar 33. The bar 33 includes on the outermost end thereof an arm 35 which is normally biased in the upward direction by a spring or any suitable means, so that when it moves upwardly under the bias, the bar 33 will rotate carrying the nip roll 31 from a nipping position to a non-nipping position above the roll 20.

For controlling the nip roll 31 and for bringing it into nipping position with the roll 20, there is provided a pneumatically or hydraulically operated double-acting cylinder and piston mechanism 40 suitably mounted on the apparatus frame 11 and carrying on the forward end of the piston shaft a collar 41. The collar 41 rotatably carries a roll 42 around which is disposed a belt 43. The other end of the belt 43 is disposed around nip roll 31 and one side of the belt 43 passes around roll 20. In operation, when the piston and cylinder mechanism 40 is retracted to the position shown in FIGURES 2 and 4, the belt 43 will be pulled into tight engagement with the rolls 31, 20 and 42 such that rotation of the roll 20 will frictionally drive the belt 43 to also drive the roll 31. When the piston and cylinder mechanism 40 is extended or the piston and piston rod are forced outwardly from the cylinder, the tension on the belt 43 will be relieved and the bias on arm 35 will move the arm upwardly pivoting the arms 32 and 34 to move the roll 31 out of nipping engagement with the roll 20. Actuation of the double-acting cylinder and piston mechanism 40 will be explained hereinafter.

The apparatus 10 further includes a bar tacking means comprising a bar tacking sewing machine 50 suitably mounted on the apparatus frame 11 adjacent one side of the endless conveyor belts 16 and is so located that a line of bar tacking, indicated at 51 in FIGURE 3, will be applied to the workpiece 12 when located in the first position, illustrated in FIGURE 1. The line of bar tacking

will be applied to the workpiece 12 in a direction transverse to the path of travel thereof on the conveyor belts 16. The operation of the bar tacking sewing machine 50 is well understood by those with ordinary skill in the art and further details thereof are not considered necessary herein.

The apparatus 10 further comprises a stacking means, broadly indicated at 60, disposed in cooperative relationship with the conveyor means 15 and adapted to remove and stack the individual workpieces 12 when located in the second position by the conveyor means. The stacking means 60 includes a flier means comprising a plurality of spaced-apart flier arms 61, reciprocatingly mounted on a bar 62 to be disposed between conveyor belts 16 and normally underlie a workpiece 12 when in the second position on the conveyor belts 16. The bar 62 includes rotatable shaft portions 63 on each end thereof which are suitably mounted in bearings 64 on apparatus frame 11. On one end of the bar 62, the shaft 63 extends through the bearing 64 and includes a rotatable gear 66 on the outer end thereof. This gear 66 meshes with a gear rack 67 on the end of a shaft 68 carried by a pneumatic or hydraulic double-acting piston and cylinder mechanism 69 which is suitably carried on one side of the apparatus frame 11.

When the piston and cylinder mechanism 69 is retracted, the gear 66 will be rotated by the gear 67 to in turn rotate the bar 62 to move the flier arms from their normal position underlying a workpiece on the conveyor belts 16 to lift the workpiece therefrom and carry the workpiece through an angle of approximately 180° to be received on a stacking table 70. The piston and cylinder mechanism 69 is then extended to the position indicated in FIGURES 1 and 4 to again position the flier arms 61 in their normal position between the conveyor belts 16.

The stacking table 70 is suitably mounted by bearings 72 in slides 71 on each side of the apparatus frame 11 for upward and downward movement therein. Attached to each side of the stacking table 70 are chains 73 which extend upwardly and loop over sprockets 74 which are secured to a rotatable shaft 75 suitably mounted for rotation in bearings on the apparatus frame 11. The chains 73 extend downwardly on the other side of shaft 75 and have suitable weights 76 disposed on the ends thereof which are of sufficient weight to bias the table 70 in the uppermost position in the slides 71.

For lowering the stacking table 70 a predetermined distance or increment each time a workpiece is placed thereon by the flier means, there is provided an indexing means, broadly indicated at 80 and particularly shown in FIGURE 5. This indexing means comprises a lug 81 secured to the end of reciprocating shaft portion 63 and adapted to reciprocate therewith during movement of the flier arms 61 through their reciprocating movement of 180°, as described above. During this reciprocating movement, the lug 81 engages a knob 82 secured to a pawl means 83 which comprises an angled collar 84 having a pawl 85 pivotally mounted therein. The pawl 85 engages a ratchet wheel 86 which is disposed within the collar 84 and is secured on a shaft 87 having one end rotatably mounted in the collar 84 and carrying a worm 88 on the other end thereof which is suitably mounted in a carriage 89. The carriage 89 is pivotally mounted by a shaft 95 for upward arcuate movement on a boss 96 extending from the apparatus frame 11 and includes a handle member 90 for manual movement thereof for purposes to be described below. The worm 88 is normally in engagement with a worm gear 91 disposed on one end of the shaft 75. The carriage 89 includes an arm 92 having a spring 93 on one end thereof extending to the collar 84 of the pawl means 83 for normally biasing the same together. A stop arm extends outwardly from one side of the carriage 89 and is adapted to contact the top of the pawl means 83 for properly positioning the same.

In operation, as the flier arms **61** reciprocate through their path of approximately 180° for removal of a workpiece from the conveyor belts **16** and placing of the same on stacking table **70**, the arm **81** will engage the knob **82** to pivot the pawl means **83** downwardly which will rotate the ratchet wheel **86** a predetermined distance, usually one notch or tooth thereon. The rotation of the ratchet wheel **86** will cause rotation of the worm **88** to rotate the worm gear **91** and, therefore, rotate the shaft **75** to lower the stacking table **70** a predetermined distance against the bias of weights **76**.

After the stacking table has received a predetermined number of workpieces thereon and it is desired to remove this stack and again raise the stacking table to the uppermost position in the slides **71**, the worm **88**, carriage **89** and ratchet and pawl means **83**, **86** may be raised or pivoted upwardly by manually lifting the handle **90**, thus releasing the worm gear **91** for free rotation. When this lifting occurs, the weights **76** will cause rotation of the shaft **75** to allow the table to rise to the uppermost position within the slides **71**. The above-described apparatus may then be manually lowered such that the worm **88** again contacts the worm gear **91** which locks the stacking table in position inasmuch as the worm **88** and worm gear **91** are nonreversible.

For automatically and independently controlling, timing and coordinating the operation of the conveying means **15**, the bar tacking means **50** and the stacking means **60**, for sequentially conveying, bar tacking and stacking the individual workpieces **12**, there is provided a unitary control and drive means, broadly indicated at **100**. This control and drive means comprises a pair of endless timing chains **101** superimposed and spaced apart from each other and passing around and carried by superimposed pairs of idler sprockets **102**, **103** and **104** for a substantially triangular path of rotary motion in the direction of the arrows shown in FIGURE 6. For driving these timing chains **101**, there is provided a pair of superimposed driving sprockets **105** disposed on a shaft **106** which carries another sprocket **107** on the other end thereof around which is disposed a drive chain **108**. The drive chain **108** is operatively connected with any suitable drive motor or drive means, schematically indicated in FIGURE 4, for driving the same to rotate the timing chains **101** in the direction of the arrows of FIGURE 6.

Secured to the driving chains **101** is a block member **111** which rotatably carries on the upper end thereof a roller **112** which is adapted to be disposed inside a channel or slide **113** on a bar member **114**. The bar member **114** is carried at each end thereof on chains **120** and **121**. The chain **120** is carried by sprockets **122** and **123** and the chain **121** is carried by sprockets **124** and **125**. The sprockets **122** and **124** are carried on a rotatable shaft **126** suitably mounted in bearings **127** and **128** on the apparatus frame **11**. The sprockets **123** and **125** are also suitably carried on a rotatable shaft **130** mounted in suitable bearings **131** and **132** on the apparatus frame **11**. The shaft **130** has one end thereof extending through the bearing **131** and carries a sprocket **133** thereon around which is disposed a drive chain **27** which also passes around and drives sprocket **26** and shaft **23** for driving endless conveyor belts **16** in the manner described above.

In operation, the chain **108** is rotated by the drive motor to rotate sprocket **105** for driving the timing chains **101** in the substantially triangular path of movement in the direction of the arrows indicated in the drawings. This rotary movement of the timing chains **101** will carry the bar **114** in a linear path of travel, as may be seen in FIGURES 5 and 6. As the bar **114** moves forwardly or to the left, as viewed in FIGURE 6, it will move along a linear path of travel until the roller **112** reaches the forward end of the sprocket **103**. At this point, the roller **112** will not drive the bar **114** forwardly, but will move along the slide **113** allowing the bar **114** to remain in the same position for the period of time required for the

block **111** and the roller **112** to move to a position close to the sprocket **104**. The bar **114** will then again move forwardly a short distance until the block **111** and roller **112** reach the forward portion of the sprocket **104**, at which time the bar **114** will again momentarily stop its forward motion.

The block **111** and roller **112** will then pass around the sprocket **104** and begin a reversing movement, or a movement to the right as indicated in FIGURE 6, which will move the bar **114** linearly to the right, as viewed in FIGURE 6, in a constant path of travel until the block **111** and the roller **112** reach the forward end of the sprocket **102**, at which time the bar **114** will again momentarily be stopped until the block **111** and the roller **112** pass around the sprocket **102** and start a forward path of motion, or movement to the left as viewed in FIGURE 6.

This sequential forward and backward movement of the bar **114** with periods of rest therein will also cause similar sequential linear reciprocating movement of the chains **120** and **121** which will transfer the sequential linear movement to the endless conveyor belts **16** through the above-described connections.

Therefore, the belts **16** will move during a single cycle of conveying operation from a position when the bar **114** is in the rearmost or far right position, as viewed in FIGURE 6, forwardly a predetermined distance until the bar **114** has reached a position adjacent the forward end of sprocket **103**. At this point, the conveyor belts **16** will stop a predetermined period of time necessary for the block **111** and the roller **112** to move to a position where they start their movement around the sprocket **104**.

When a workpiece is fed onto the conveyor belts **16** by the nip rolls **31** and **20** during the start of the cycle of movement of the conveyor belts **16**, a workpiece will be positioned in the above-described first position and be maintained therefor a predetermined period of time, as may be seen from the above description. The conveyor belts **16** and workpiece will then be moved forwardly a small distance as the bar **114** moves to the forward end of the sprocket **104**, which will position the workpiece over the flier arms **61** for a stacking operation. After the workpiece is removed from the conveyor belts by the stacking means, the conveyor belts will return to their original position as the bar **114** moves rearwardly until it is located and momentarily stopped in the area of sprocket **102**.

For controlling the nip rolls, the bar tacking and the stacking means, there is provided a first switch **140**, shown schematically in FIGURE 6, positioned in the vicinity of the sprocket **102** and adapted to cooperate with the block **111** to be actuated thereby as the block **111** passes around the sprocket **102**. This switch **140** is suitably electrically connected to the double-acting piston and cylinder mechanism **40** so as to retract the same into the position illustrated in FIGURES 2 and 4 for a predetermined period of time, which may be controlled by any suitable timing means. A second switch **141** is disposed in the vicinity of the sprocket **103** in such a position as to be actuated by the block **111** as it passes around the sprocket **103** and begins its sliding movement in the slide **113** to hold the bar **114** and the conveyor belts **16** in a position of non-movement for maintaining a workpiece in the first above-described position. This switch **141** is suitably electrically connected to the bar tacking sewing machine **50** to actuate the same for a predetermined period of time to insert the line of bar tacking **51** in the workpiece **12** while the same is maintained in a position of non-movement in the above-described first position. A third switch **142** is positioned in the vicinity of the sprocket **104** and is adapted to be actuated by the block **111** as it passes around the forward end of sprocket **104** after moving the bar **114** and the conveyor belts **16** forwardly a short distance to position the workpiece in the above-described second position, in which the workpiece overlies the flier arms **61**. This switch **142** is suitably electrically connected to

the double-acting piston and cylinder mechanism 69 such as to actuate a reciprocating cycle therein which will cause movement of the flier arms through an angle of 180°, as described above, for removing a workpiece from the conveyor belts 16 and placing the same on the stacking table 70.

The above nip roll switch 140 may be placed and operated as described, or it may be in the form of a foot treadle on the floor to be manually operated by an operator during insertion of a workpiece into the mechanism of this invention, or the switch may be associated with another machine from which workpieces are received by the apparatus of this invention.

Thus, it may be seen that apparatus is provided which will automatically receive individual flat flexible workpieces, sequentially convey the same to a first position, maintain the same in the first position for a predetermined period of time and convey the same to a second position. A line of bar tacking will be applied to the workpieces while maintained in the first position and the workpieces will be removed and stacked when received in the second position. This apparatus includes a unitary control and drive means which is associated with all of the above mechanisms for controlling, timing and coordinating the operation of same for the desired functions.

In the drawings and specifications, there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the appended claims.

What is claimed is:

1. Apparatus for automatically conveying, bar tacking, and stacking individual flat flexible workpieces, said apparatus comprising in combination:

- (a) conveying means sequentially operated for receiving the individual workpieces and sequentially conveying each individual workpiece to a first position, maintaining each individual workpiece stationary in the first position for a predetermined period of time and conveying each individual workpiece to a second position;
- (b) bar tacking means disposed in cooperative relationship with said conveying means and adapted to apply a short line of bar tacking to each of the individual workpieces when located and maintained in the first position;
- (c) stacking means disposed in cooperative relationship with said conveying means and adapted to remove and stack each of the individual workpieces when located in the second position; and
- (d) unitary control and drive means operatively associated with said conveying means, said bar tacking means and said stacking means for automatically and independently controlling, timing and coordinating the operation of same for the sequential conveying, bar tacking, conveying and stacking operations.

2. Apparatus, as set forth in claim 1, including a pair of driven nip roll feed means disposed forwardly of said conveying means and in close proximity thereto and including means for moving same from a non-nipping position to a nipping position, said nip roll means being adapted to receive the individual workpieces therebetween when in non-nipping position and be moved to a nipping position for engaging the workpiece received therein and feed same onto said conveying means.

3. Apparatus, as set forth in claim 1, in which said conveying means comprises a plurality of spaced-apart, movable, endless belts forming a substantially flat upper surface for receiving and conveying the individual workpieces thereon, a first rotatable idler roll means carrying one end of each of said belts, and a second rotatable driven shaft means carrying the other end of each of said belts and adapted to be driven sequentially for moving said belts sequentially in a reciprocating path of travel.

4. Apparatus, as set forth in claim 3, in which said bar tacking means comprises a bar tacking sewing machine mounted adjacent one side of said belts intermediate the ends thereof and being actuated by said control means when a workpiece is in the first position to insert a short line of stitching in the workpiece transversely to the path of travel of the workpiece.

5. Apparatus, as set forth in claim 1, in which said stacking means comprises a flier means including a plurality of spaced-apart flier arms commonly, reciprocatingly mounted to normally underlie a workpiece when in the second position and actuated by said control means when the workpiece reaches the second position to lift the workpiece from said conveyor means and carry same through an angle of approximately 180° and return to its initial position, a movable table means mounted in the continuation of the path of travel of said flier arms and adapted to receive each workpiece thereon in a stack after they are removed from said conveyor means by said flier means, and means responsive to and actuated by movement of said flier means for indexing said table means to a lower position upon reception of each workpiece.

6. Apparatus, as set forth in claim 1, in which said drive and control means comprises endless timing chain means, a plurality of idler sprockets rotatably mounted and carrying said timing chain means for a substantially triangular path of rotary motion, a continuously driven sprocket means mounted for engagement with and driving said timing chain means, a movable control bar means connected to said timing chain means and being driven thereby in a reciprocating linear path of travel having at least one period of non-movement as said timing chain means travels in its substantially triangular path of rotary movement, means connecting said control bar means to and adapted to drive said conveying means, switch means operatively associated with said control bar means and adapted to be sequentially actuated by said control bar means at predetermined points of travel of said control bar means for sequentially actuating said bar tacking means and said stacking means.

7. Apparatus for automatically conveying, bar tacking and stacking individual flat flexible workpieces, said apparatus comprising in combination:

- (a) conveying means sequentially operated for receiving the individual workpieces and sequentially conveying each individual workpiece to a first position, maintaining each individual workpiece stationary in the first position for a predetermined period of time and conveying each individual workpiece to a second position, said conveying means comprising a plurality of spaced-apart, movable, endless belts forming a substantially flat upper surface for receiving and conveying the individual workpieces thereon, a first rotatable idler roll means carrying one end of each of said belts and a second rotatable driven shaft means carrying the other end of each of said belts and adapted to be driven sequentially for moving said belts sequentially in a reciprocating path of travel;
- (b) bar tacking means comprising a bar tacking sewing machine mounted adjacent one side of said belts intermediate the ends thereof in cooperative relationship with said conveying means and adapted to apply a short line of stitching in the workpiece transversely to the path of travel of the workpiece when the workpiece is located and maintained in the first position;
- (c) stacking means comprising a flier means including a plurality of spaced-apart flier arms commonly, reciprocatingly mounted to normally underlie a workpiece when located in the second position and adapted to lift and remove the workpiece from said conveyor means and carry same through an angle of 180° and return to its initial position, a movable table means mounted in the continuation of the path of travel of

said flier arms and adapted to receive each workpiece thereon in a stack after they are removed from said conveyor means by said flier means, and means responsive to and actuated by said flier means for indexing said table means to a lower position upon reception of each workpiece; and

- (d) unitary control and drive means operatively associated with said conveying means, said bar tacking means and said stacking means for automatically and independently controlling, timing and coordinating the operation of same for the sequential conveying, bar tacking, conveying and stacking operations, said driving and control means comprising endless timing chain means, a plurality of idler sprockets rotatably mounted and carrying said timing chain means for a substantially triangular path of rotary motion, a continuously driven sprocket means mounted for engagement with and driving said timing chain means, a movable control bar means connected to said timing chain means and being driven thereby in a reciprocating linear path of travel having at least one period of non-movement as said timing

chain means travels in its substantially triangular path of movement, means connecting said control bar means to and adapted to drive said conveying means, switch means operatively associated with said control bar means, and adapted to be sequentially actuated by said control bar means at predetermined points of travel of said control bar means for sequentially actuating said bar tacking means and said stacking means.

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U.S. Cl. X.R.

112—2