July 16, 1940. C. J. DAVIES ET AL 2,207,973

FEED CONTROL FOR SEWING MECHANISM

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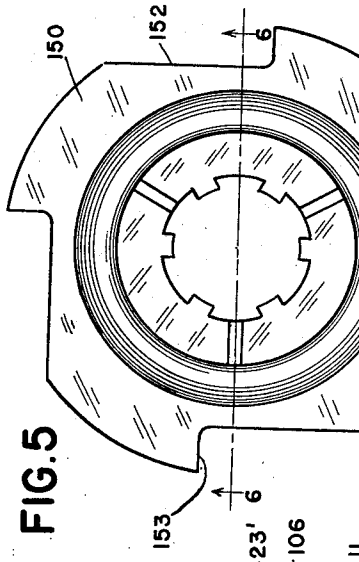

FIG.5

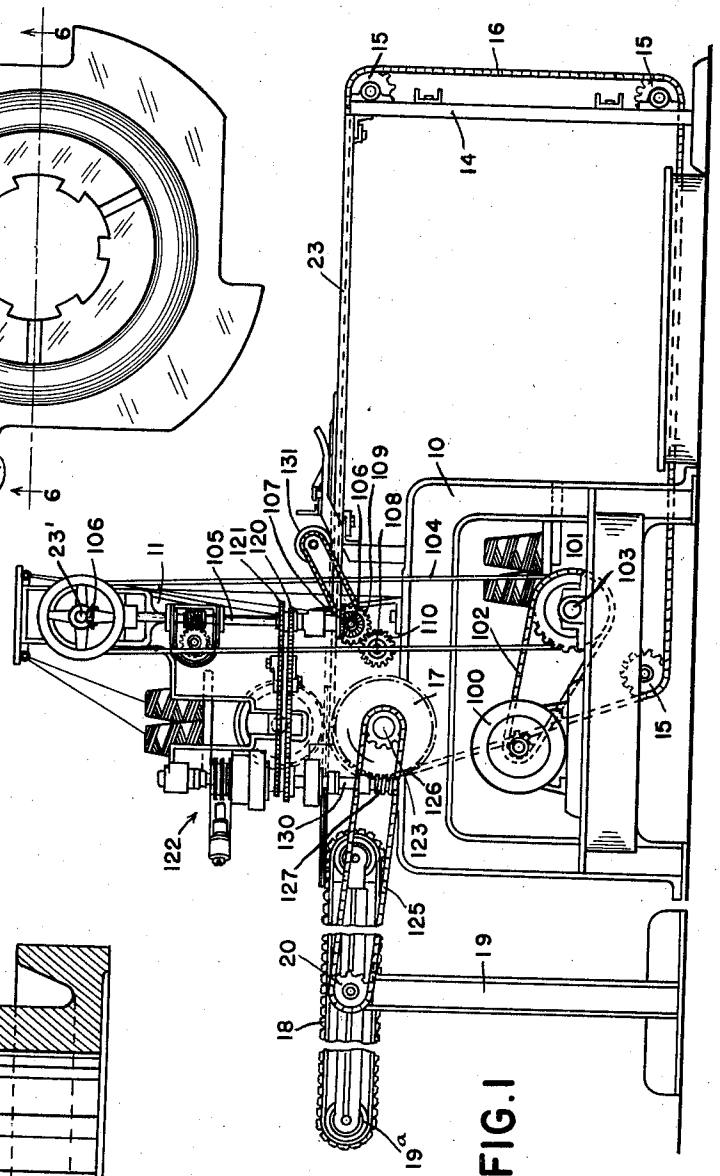

FIG.1

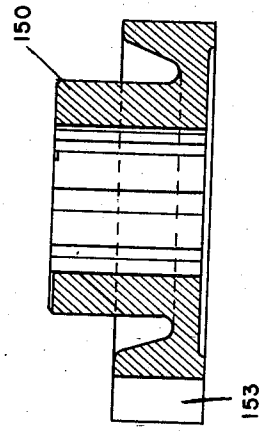

FIG.6

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FEED CONTROL FOR SEWING MECHANISM

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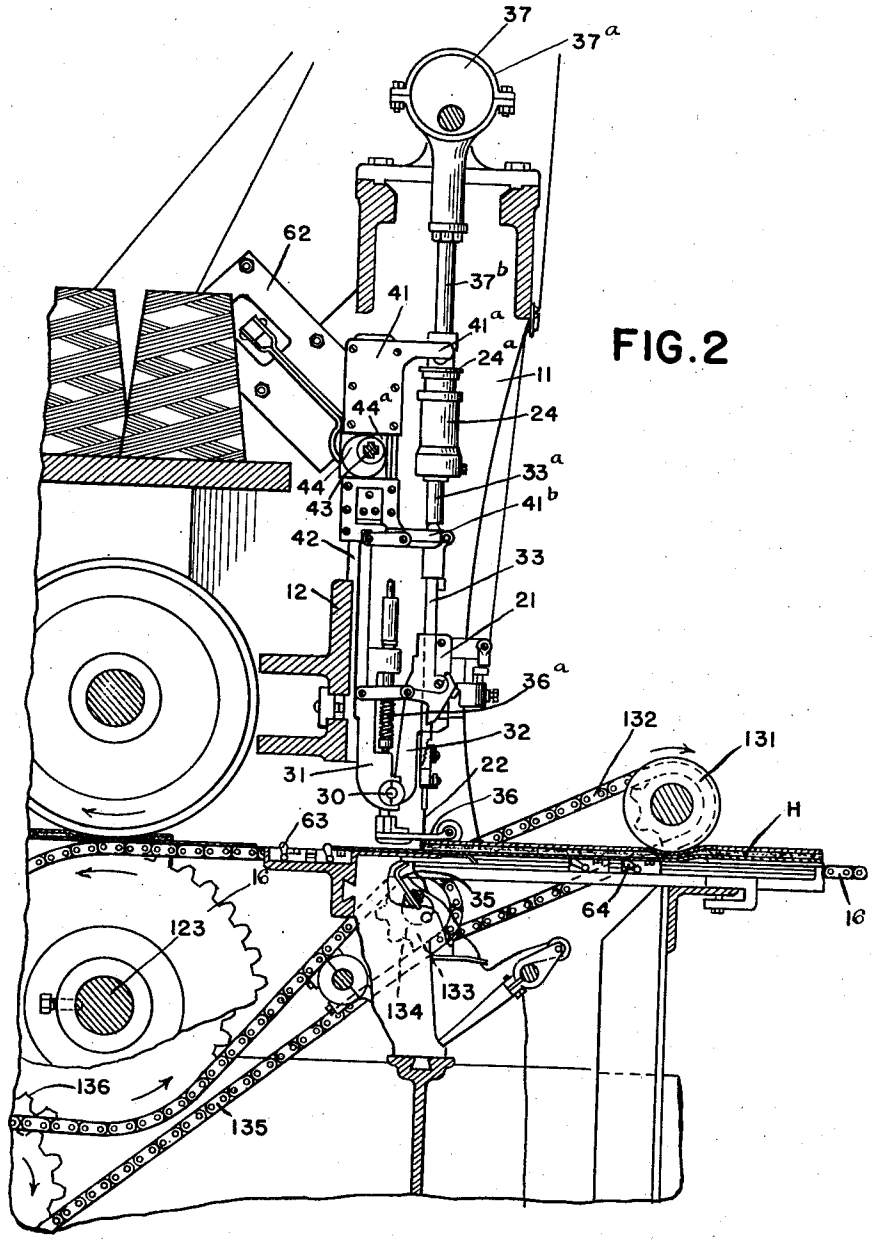

FIG.2

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FEED CONTROL FOR SEWING MECHANISM

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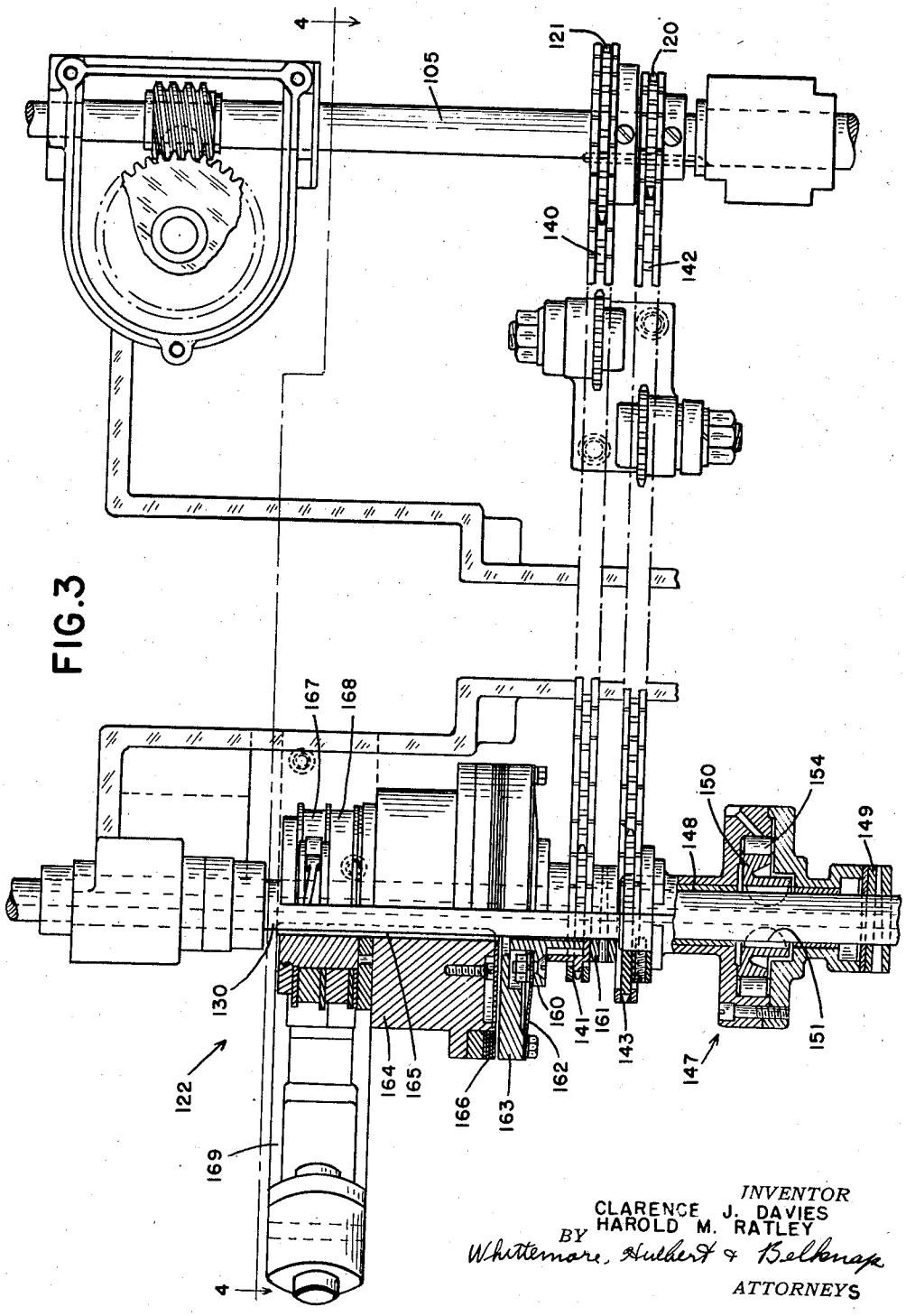

FIG.3

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FEED CONTROL FOR SEWING MECHANISM

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FIG. 4

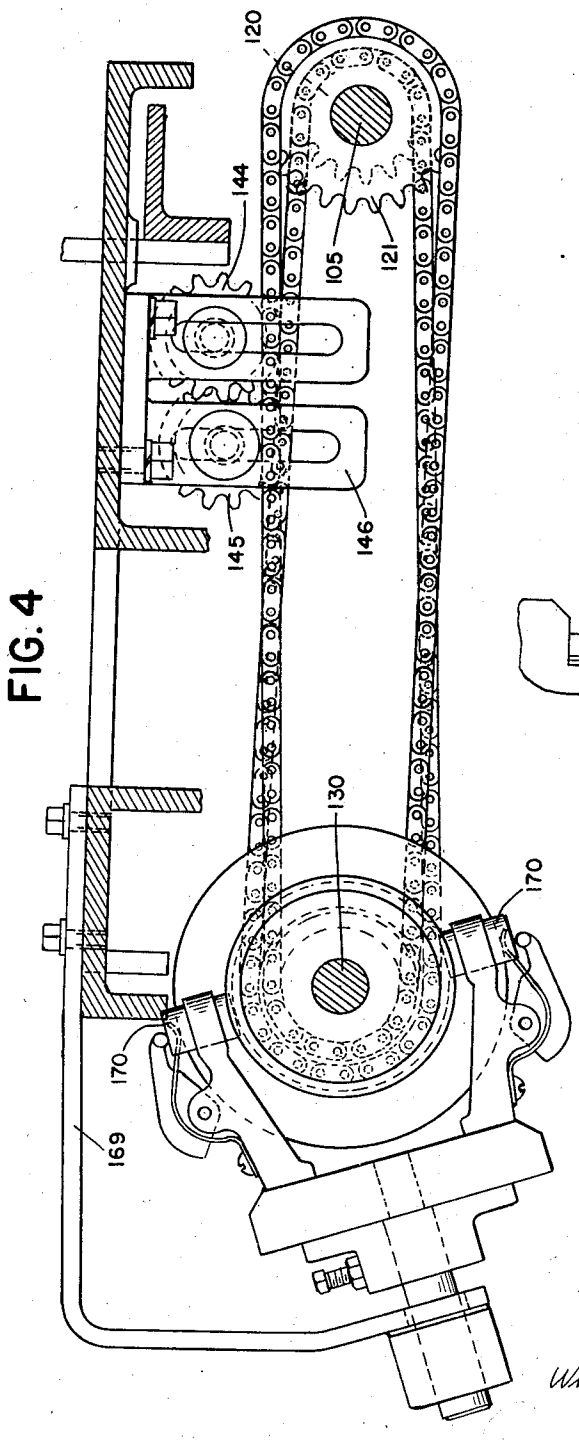
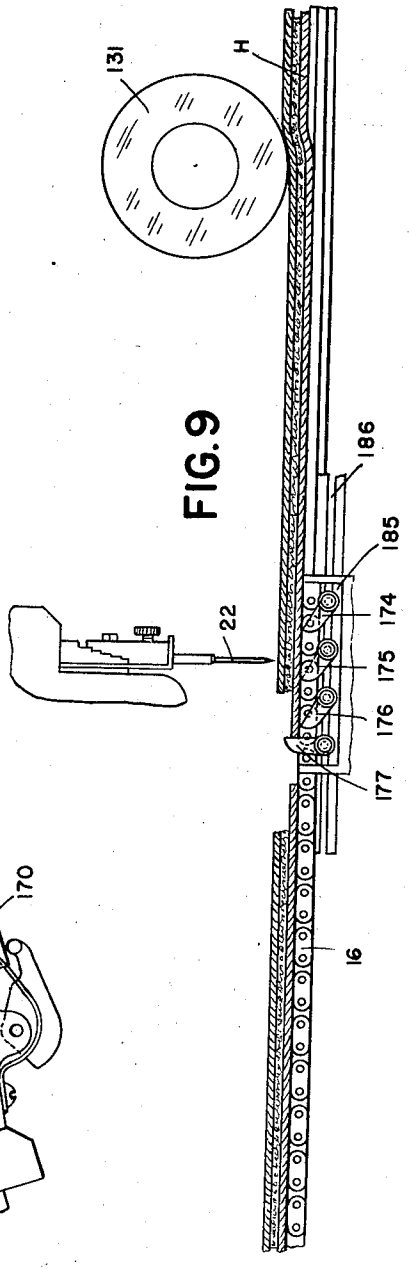


FIG. 9



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FEED CONTROL FOR SEWING MECHANISM

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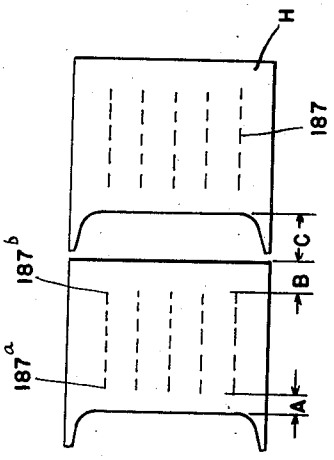
FIG.8



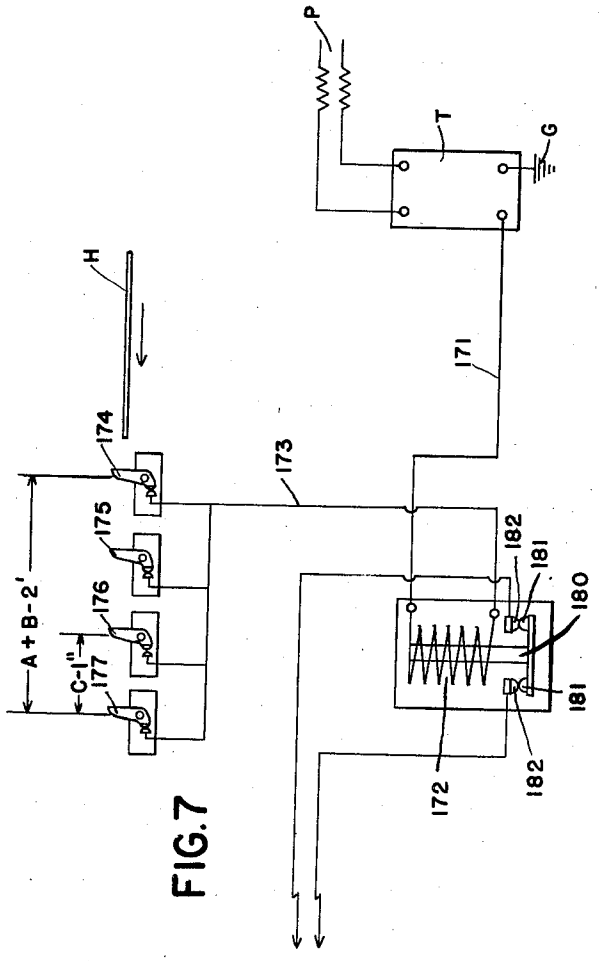


FIG.7

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FEED CONTROL FOR SEWING MECHANISM

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FIG.10.

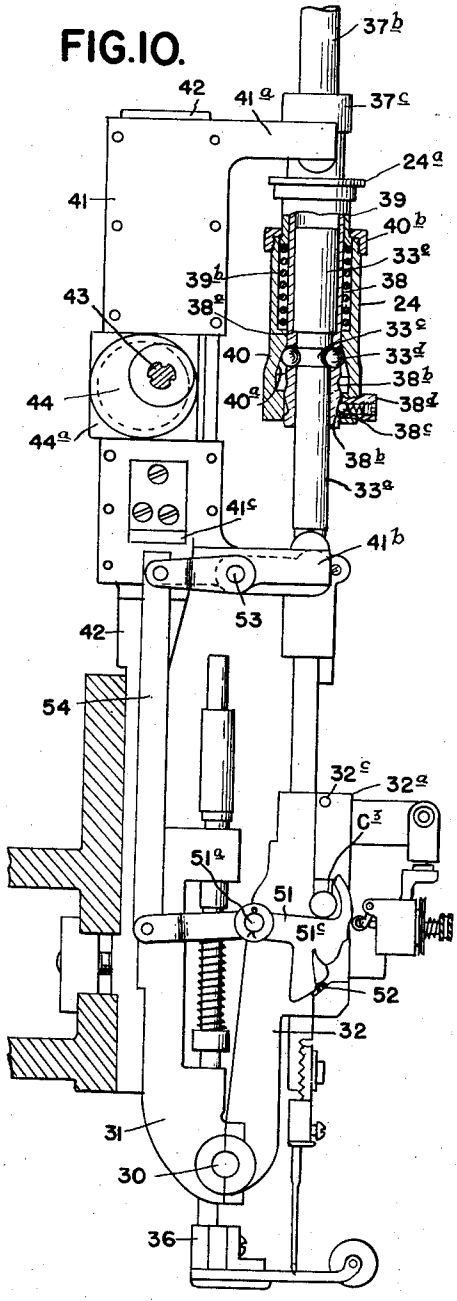


FIG.11.

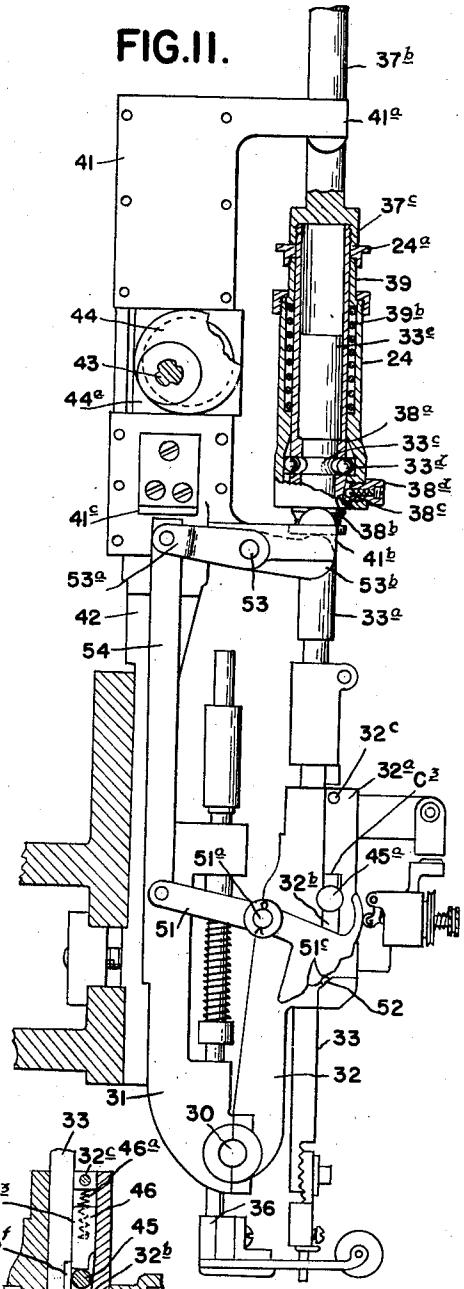
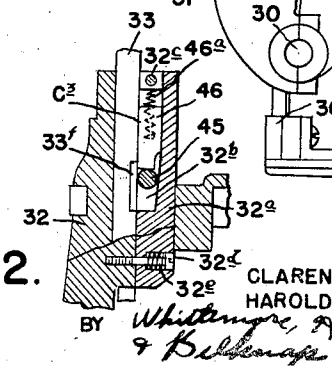


FIG.12.



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Patented July 16, 1940 2,207,973

UNITED STATES PATENT OFFICE

2,207,973

FEED CONTROL FOR SEWING MECHANISM

Clarence J. Davies and Harold M. Ratley, Detroit, Mich., assignors to National Automotive Fibres, Inc., Detroit, Mich., a corporation of Delaware

Application March 7, 1938, Serial No. 194,460

3 Claims. (Cl. 112—2)

This invention relates to a method and apparatus for controlling the feeding of articles to a sewing machine.

In sewing machines of the type disclosed herein it is necessary to have a definitely predetermined relation between the sewing speed of the mechanism and the rate at which articles being sewed are fed during the sewing operation. The sewing machine forming the subject matter of the present invention is intended in one of its applications to sew door panels which are formed from relatively stiff board material. For this reason it is necessary to provide a so-called "walking" attachment to the sewing head so that the needles will move in the direction of feed while the needles are engaged with the panels. It will be obvious that if there is any substantial difference between the controlled "walking" movement of the needles and the rate of speed of feed, there is a possibility of breaking the needles or otherwise damaging the mechanism.

The door panels, which are to be provided with a plurality of parallel seams by the sewing machine disclosed herein, are of generally rectangular shape but each door panel has extending therefrom a pair of ears or horns. This necessitates the door panels being positioned on the conveyor with a substantial space between adjacent door panels at the central portion thereof. Moreover, it is desirable to position the panels on a conveyor with a slight separation between adjacent panels.

The sewing machine disclosed herein is further adapted to sew seams which are of less extent than the cross section of the door panels. Suitable mechanism is provided for retaining the sewing needles disengaged from the panel until a predetermined portion of the panel has been fed past the needles. At this time the needles are lowered into operative sewing position and sew a plurality of seams for a predetermined distance which distance is such that the needles are disengaged from the panels before the panels have been fed completely past the needles.

Due to the combination of circumstances just indicated, it will be apparent that the sewing needles are disengaged from the panels for a substantial interval between adjacent panels. Since as before stated, it is necessary to provide for a relatively slow feed of the panels in timed relation to the sewing operation while the needles are engaged in sewing the panels, it will be apparent that a substantial saving in time may be obtained by increasing the rate of feed during the interval in which the needles are disengaged from the sewing panels.

Accordingly it is an object of the present invention to feed a succession of panels past a sewing mechanism at differential speeds.

It is a further object of the invention to feed a succession of panels toward a sewing mechanism at a substantial rate of speed and to reduce the speed just prior to engagement of the needles with the panels.

It is a further object of the invention to feed a succession of panels past a sewing mechanism at a speed definitely related to the sewing speed of the sewing mechanism while the sewing operation is taking place and to substantially increase the speed of feed of said panels during intervals when no sewing operation is taking place.

It is a further object of the invention to provide a sewing mechanism and a conveyor for feeding panels past said sewing mechanism in operative relation thereto in combination with automatically controlled means for increasing the speed of travel of said conveyors while the sewing needles are not engaged in the sewing operation.

It is a further object of the invention to provide a sewing machine, a conveyor and automatic means controlled by an article on the conveyor for elevating the sewing needles to inoperative sewing position and to lower the sewing needles into operative position so as to sew seams of predetermined length less than the length of the article, in combination with means controlled by said article to operate the conveyor at a relatively high speed while said needles are in inoperative position and to operate said conveyor at a substantially lower speed while said needles are in operative position.

It is a further object of the invention to provide a two-speed feed for a conveyor with control mechanism for said two-speed feed, operated by an article on the conveyor.

It is a further object of the invention to provide two-speed feed mechanism for a conveyor, an electrically operated control means for said mechanism, and a switch actuating said control mechanism and positioned in the path of an article on said conveyor.

Other objects of the invention will be apparent as the description proceeds and when taken in conjunction with the accompanying drawings, wherein

Fig. 1 is a broken side elevational view of a machine embodying the invention;

Fig. 2 is a broken longitudinal sectional view;

Fig. 3 is a side elevation of the two-speed conveyor feed control mechanism with parts in section;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a plan view of a clutch element included in the speed control mechanism;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a wiring diagram showing the circuit for the electro-magnetic clutch;

Fig. 8 is a diagram indicating the relationship between the adjacent panels on the conveyor;

Fig. 9 is a diagram indicating the relationship between the switches controlling the conveyor speed, the panels and sewing units;

Fig. 10 is a fragmentary elevational view, partly in section, showing a portion of the sewing mechanism in sewing position;

Fig. 11 is a view similar to Fig. 12, but showing the mechanism in collapsed position, wherein the needle bar is disconnected from driving engagement with the operating plunger; and

Fig. 12 is a fragmentary sectional view of the roller-wedge mechanism for locking the needle bar in retracted position.

As indicated in Figs. 1 and 2, the sewing machine comprises a main frame 10 provided with vertical standards 11 and cross bars 12. In order to feed the panels to the sewing mechanism, a chain conveyor is provided which includes a frame portion 14, idle sprockets 15, a chain 16 and a driving sprocket 17. The chains 16 are received within guide channels 23, the channels 23 being of reduced height adjacent the sewing machine so that panels placed on the channels and fed toward the machine will be engaged by the chains at their forward ends. Suitable positive panel gripping means such for example as pins carried by the chains may be provided to feed the panels positively through the sewing mechanism. A second conveyor 18 is carried by the frame portion 19 at the opposite side of the sewing machine and is adapted to receive the panels as they are fed past the sewing mechanism. The conveyor 18 is carried by suitable rollers 19^a and is positively driven by a sprocket 20.

Sewing mechanism, best seen in Fig. 2, comprises sewing heads 21, which carry sewing needles 22. The sewing heads are supported at their lower end on a shaft 30 which is mounted in a bracket 31 secured to the cross bar 12. Each head is provided with a rocking guide member 32 in which is slidably mounted a needle bar 33 having one or more vertically adjustable sewing needles 22. The sewing needle is adapted to pierce the trim panel H and cooperate with an oscillating looper needle 35 disposed beneath the bed plate to form a stitch in the well known manner. A presser foot 36 is slidably mounted in the bracket 31 and is provided with a spring 35^a to enable it to compress the fabrics passed beneath the reciprocating sewing needle. The needle bar 33 is reciprocated by means of an eccentric 37 on the shaft 23 and the eccentric also causes a slight rocking movement about the shaft 30 which provides the "walking" movement referred to. As shown in Fig. 2, the eccentric is surrounded by a yoke 37^a to which is connected a rod 37^b. To the upper end of the needle bar 33 is adjustably connected a plunger 33^a, by means of a clamp 33^b.

Releasable driving connections between the members 33^a and the rods 37^b are provided by the coupler 24. The construction of the coupler 24 is such that upon mechanical movement of the sewing heads upwardly, the driving connection between the rod 37^b and the rod 33^a is broken, and the sewing heads are retained in elevated position out of engagement with the work.

Releasable driving connections between the members 33^a and 37^b are provided by the coupler 24. As shown in Figs. 10 and 11, the plunger 33^a is provided with an annular groove 33^c into which may be thrust balls 33^d. A cylinder like member 38 is provided at its lower end with a shoulder 38^a adapted to engage the enlarged piston like head 33^c and limit its downward travel. The member 38 is threaded to the socket 37^c at its upper end and its lower end is provided with a plurality of apertures for the balls 33^d. The lower end of the member 38 is provided with two vertically spaced annular grooves 38^b which are adapted to be engaged by a spring-pressed ball 38^c provided in a hollow stud 38^d. A sleeve 39 provided at its upper end with a flange member 24^a is slidably mounted on the member 38 and is urged upwardly thereon by means of a compression spring 39^b. Another sleeve member 40 provided with an internally tapered groove 40^a is slidably mounted on the member 38 and the sleeve member 39, and its downward travel on the member 39 is limited by a flange 40^b. The tapered groove enables the member 40 when moved to the position shown in Fig. 10, to force the balls 33^d into engagement with the groove 33^c so that the rods 33^a and 37^b are locked together. However, if the member 40 is moved upwardly on the member 38, the balls are free to move outwardly and the head 33^c is free to reciprocate within the cylinder 38. The spring-pressed ball 38^c is carried by the member 40 and serves to hold the member 40 yieldingly in either the locking or unlocking position. The member 39 and the spring 39^b serve as impact members so that when it is desired to lock the coupler from the position shown in Fig. 11 to that shown in Fig. 10, it is merely necessary to depress the flange 24^a which will urge the sleeve 40 downwardly to the lower notch 38^b as soon as the groove 33^c arrives at a position to receive the balls 33^d. On the other hand, to unlock the device, it is merely necessary to strike the lower end of the sleeve 40 to move it into its upper position where the balls will be free to move outwardly and unlock the device.

The coupler is moved from locked to unlocked position and back again by means of a yoke 41 which has upper arms 41^a and lower arms 41^b to engage flange 24^a and the lower end of the cylinder 40, respectively. The yoke is slidably mounted on an upright 42 which serves as a bearing for eccentric shaft 43 on which is fixedly mounted eccentrics 44 which rotate within slide blocks 44^a and thereby raise or lower the yoke when the shaft 43 is rotated.

A roller wedge device C^3 is provided to hold the needle-bar 33 in its upper position as shown in Figs. 10–12. A cover like member 32^a is provided on the guide block 32 and is provided with a wedge-shaped slot 32^b, in which is mounted a roller 45 provided with a head 45^a. A slide block 46 is yieldingly urged downwardly by a spring 46^a against the roller 45 urging the latter to locking position.

The upper end of the cover member 32^a is pivotally connected to the guide block 32, as indicated at 32^c, and its lower end is yieldingly held against the guide-block by means of a cap screw 32^d provided with a compression spring 32^e so that the locking engagement is somewhat yielding. As shown in Fig. 12, the needle-bar is pro-

vided with a hard steel insert 33f to reduce the amount of wear. In operation the needle-bar is drawn to its uppermost position by the shoulder 38a pulling up the head 33e. During this movement, the roller 45 is urged downwardly by the block 46 and the bar is thereby locked in retracted position. This happens immediately after the driving mechanism has been disconnected by the coupler so that the wedge device merely supports the needle-bar assembly.

The roller wedge device C^3 is operated by means of a pair of lever arms 51 which are pivotally mounted on guide block 32 by means of a pivot 51a. The front end of each lever is provided with a pair of notches 51c which are adapted to be engaged alternately by a spring-pressed plunger 52 so that the levers will rest in either locking or unlocking position. The front upper edges of the levers 51 are adapted to engage the heads 45a and unlock the needle-bar when the levers are rocked to the position shown in Fig. 10. Movement of the levers 51 is controlled by a rock shaft 53 which is journalled in the yoke 41 and has a pair of rearwardly extending arms 53a which are connected to the rear ends of the levers 51 by means of links 54. As best shown in Fig. 11, the rock shaft is further provided with forwardly extending arms 53b disposed between the yoke arms 41b and are adapted to engage the lower end of the member 38 of the rod 37b when the yoke 41 is in proper position. The yoke 41 is further provided with laterally extending stop arms 41c which are adapted to engage the ends of the links 54 and rock the levers 51 to the position in Fig. 10 when the yoke 41 is moved to its lowermost position. The stop arms 41c are fixed to the yoke 41 so that in the collapsed position illustrated in Fig. 11 there will be about five thirty seconds of an inch clearance between the top of the links 54 and said arms. This clearance is taken up during the first downward movement of the yoke as the links 54 are held in position through the action of plungers 52 on the levers 51. However, as the yoke continues to move downwardly the links 54 are forced down and the levers 51 are pressed into the position shown in Fig. 10, causing the roller-wedge 45 to be raised to release the needle-bar.

A solenoid 62 is provided and through suitable mechanism (not shown) is adapted to rotate the shaft 43 through 180° upon actuation. The solenoid 62 is in an electric circuit controlled by a plurality of switches 63, 64, which are adjustably positioned in the path of the panels H as they are fed past the sewing mechanism. The switches are positioned and connected so that after a predetermined portion of the panel H has passed the sewing needles the solenoid 62 is operated to rotate the shaft 43 through 180° to lower the coupler 24 which will have the effect of lowering the needles 22 into operative position and to interlock the rods 33a and 37b so as to drive the sewing needles. At a predetermined point in the travel of the panel H past the sewing needles, switches 64 are released to again operate the solenoid 62 to rotate the shaft 43 through 180° to elevate the coupler 24 to disconnect the rods 33a and 37b and to retain the needles 22 in elevated inoperative position.

The arrangement just described is fully shown and claimed in application Ser. No. 123,538, of Allister S. Mitchell, Clarence J. Davies and Harold M. Ratley, filed February 1, 1937, and has resulted in Patent No. 2,186,838.

From the foregoing brief description it will be apparent that the rate at which the sewing mechanism operates depends upon the rate of rotation of the shaft 23'. A motor 100 is carried by the frame 10 and is adapted to drive a sprocket wheel 101 through the interconnection of a suitable chain 102. The sprocket wheel 101 is supported by a shaft 103 which also carries in rigid relation a pulley which drives a belt 104 operatively connected to a second pulley on the shaft 23'. The vertical shaft 105 is supported by the frame and is driven through a bevel gear connection indicated at 106 from the shaft 23'. The shaft 105 is adapted to rotate a shaft 106 through bevel gears 107 and shaft 108 is also driven in timed relation to the shaft 105, 106, through the intermeshing engagement of the gear 109 carried by shaft 106 and the gear 110 carried by shaft 108. Shafts 105 and 108 are adapted to operate parts of the sewing mechanism in timed relation to the reciprocation of the sewing needles as controlled by rotation of the shaft 23'. A pair of sprocket wheels 120 and 121 are keyed or otherwise rigidly secured to the shaft 105 and are adapted to rotate parts of the two speed feed control mechanism generally indicated at 122 in Fig. 1 and shown in detail in Figs. 3 and 4.

The conveyor feed is controlled by a shaft 123 which carries the sprocket wheel 17 previously referred to and in addition a second sprocket wheel 124 which drives the sprocket wheel 20 through the chain 125. The shaft 123 carries a worm gear 126 which meshes with a worm 127 carried by a shaft 130.

From the foregoing it will be apparent that the shaft 23' will be driven at a speed dependent upon the speed of rotation of the motor 100, and the shaft 130 will be driven at a speed dependent upon the relationship of the speed control mechanism 122. The feed roller 131 is driven by a chain 132 which engages a sprocket wheel on shaft 134. Shaft 134 also carries a second sprocket wheel 133 which is in operative engagement with a second chain 135 which is driven from a sprocket wheel 136 keyed to shaft 123. Therefore the speed of the conveyors and the associated panel feeding means depends upon the speed of rotation of the shaft 123, and hence on the speed of rotation of shaft 130.

Referring more particularly to Figs. 3 and 4, the shaft 105 has keyed or otherwise secured thereto sprockets 120 and 121. It will be noted that the sprocket 121 is of substantially larger diameter than the sprocket 120. Chain 140 operatively connects sprocket 121 and a second sprocket 141 which is rotatably mounted on shaft 130. A second chain 142 is driven by sprocket 120 and operatively engages a second sprocket 143 which is rotatably carried on shaft 130. Suitable adjustable idle sprockets 144 and 145 are carried in slotted brackets 146 for the purpose of adjusting the tension of the chains 140 and 142. Since the sprocket 121 is of larger diameter than the sprocket 120 and since the sprocket 141 is of smaller diameter than the sprocket 143, it will be evident that sprockets 141 and 143 are driven at substantially different speeds. It has been found that satisfactory results are obtained when the relationship between sprockets is such that sprocket 141 is driven at substantially twice the speed of sprocket 143. The sprocket 143 is secured in non-rotatable relation to the housing 147 of a one-way clutch mechanism. This clutch housing is mounted for free rotation on the shaft 130, suitable bushings 148 being provided therefor, and rests on a collar 149 which is keyed

or otherwise secured to the shaft 130. Within the two-piece housing 147 is a one-way thrust ring 150 shown in detail in Figs. 5 and 6. The thrust ring 150 is keyed to the shaft 130 as indicated at 151. The thrust ring 150, as best indicated in Fig. 5, has a plurality of peripheral recesses 152 shaped as shown in Fig. 5. Thrust ring 150 is received within the housing 147 in closely embraced relationship so that the recesses 152 form chambers provided at one end with an abrupt shoulder 153 and which chambers taper in the opposite direction. Received within the recesses thus formed are a plurality of cylindrical thrust rollers 154. The thrust rollers are freely retained within the chamber referred to and as will be apparent, rotation of the housing 147 in a counter-clockwise direction relative to ring 150, as seen in Fig. 5, will cause the thrust rollers to become wedged in the tapered ends of the recesses and thus to transmit the thrust between the housing and the thrust ring 150.

From the foregoing it will be apparent that rotation of the shaft 105 results in a corresponding timed rotation of the shaft 130 through the agency of the sprocket 120, chain 142, sprocket 143, housing 147, thrust rollers 154, thrust ring 150 and keys 151.

At the same time the chain 140 is rotating the sprocket 141 at a substantially higher speed than the rotation of the sprocket 143. The sprocket 141 is rigidly secured to an annular member 160 which is mounted for free rotation on the shaft 130 and is supported by a collar 161 keyed to the shaft. Annular member 160 is bolted or otherwise secured to a flexible annular metal diaphragm 162 at the inner edge thereof. The outer edge of the diaphragm is bolted or otherwise secured to a magnetizable annular block 163 also carried by the shaft 130 for free rotation. It will be apparent that the flexible diaphragm 162 permits relative axial movement between block 163 and the annular member 160. A second block 164 which includes solenoid windings (not shown) is keyed to the shaft 130 as indicated at 165. The block 164 is provided at its outer periphery with friction material 166 which is adapted to engage the block 163 upon energization of the solenoid. The solenoid is connected to a pair of conducting rings 167 and 168 and a bracket 169 carries a pair of spring pressed brushes 170 engaging the conductor rings 167 and 168 and a bracket 169 carries a pair of spring pressed brushes 170 engaging the conductor rings. The circuit to the solenoid is controlled by a set of switches which will be subsequently described.

It will be apparent from the construction just described that upon energization of the solenoid contained within the block 164 that the magnetizable block 163 will be drawn upwardly. This motion will be permitted due to the flexible diaphragm 162 and will not cause corresponding upward movement of the annular member 160 or the sprocket 141. Upward motion of the block 163 causes frictional engagement between the block and the friction material 166. Since the sprocket 141 is driven at substantially higher speed than the shaft 130, the frictional engagement between the parts just mentioned will cause the block 164 to be brought up to the speed with the block 163 and through the key 165 the speed of rotation of the shaft 130 will be correspondingly increased. Due to the one-way action of the thrust mechanism which includes the housing 147, thrust rollers 154 and thrust ring 150, this increased speed of rotation of the shaft 130 is permitted without affecting the speed of rotation of the housing 147 and interconnected sprocket 143.

As best seen in Fig. 7, the wiring for the solenoid includes a transformer T connected to primary circuit P and a secondary circuit grounded at G. The other branch of the secondary circuit includes a conductor 171, a solenoid winding 172, a conductor 173 which leads to a group of four normally closed switches 174, 175, 176 and 177. These switches are arranged in parallel and are all grounded. From the foregoing it will be apparent that when any one of the switches 174 to 177 are closed the circuit is completed through the solenoid 172. The solenoid 172 includes a plunger 180 which carries a pair of interconnected contacts 181. The circuit for the speed control solenoid included in the block 164 includes a pair of spaced contacts 182 adapted to be bridged by contacts 181. These contacts are normally open but are retained closed as long as any of the switches 174 to 177 are in closed position.

Since as previously described, the shaft 130 is driven at relatively slow speeds while the solenoid in block 164 is de-energized, it will be apparent that the arrangement just described provides a safety feature. Upon failure of the current either to the solenoid in block 164 or to the relay solenoid 172, the solenoid in block 164 will be de-energized and the shaft 130 will be driven at a slower speed through the medium of the one-way clutch mechanism 147.

As indicated in Fig. 9, the switches 174 to 177 are individually adjusted, being mounted on adjustable slide blocks 185. For this purpose the blocks 185 are slidable in ways indicated at 186. The proper setting of the switches 174 to 177 is indicated by the diagrams shown in Figs. 7 and 8. If it is desired to sew a plurality of parallel seams 187 on the panels H, these seams to commence at point 187^a and to terminate at point 187^b, the switches 63 and 64 are adjusted so as to control the raising and lowering of the sewing heads at the proper time through mechanism previously referred to. The panels may be of any dimension, the critical dimensions which control the setting of the switches 174 to 177 being indicated by the letters A, B and C in Fig. 8. The distance A is the distance from the leading edge of a panel to the point on the panel where it is desired to commence the seam. The distance B is the distance from the termination of the seam to the trailing edge of the panel. The distance C is the distance from the trailing edge of one panel to the leading edge of the next succeeding panel.

The switches 174 to 177 are adjusted along the ways 186, so as to be spaced apart the distances shown in Fig. 7. Switch 174 is separated from switch 177 by a distance equal to A plus B, minus approximately two inches. The switches are set two inches closer together than the distance A plus B so as to permit the conveyor mechanism to slow down prior to actuation of the sewing mechanism and to allow a reasonable factor of safety. As seen in Fig. 7, the advancing panel H successively actuates switches 174, 175 and 176 to open the circuit. The opening of these three switches has no effect on the relay solenoid 172, since the circuit is completed through this solenoid through any one of the switches 174 to 177 which remain closed. Immediately upon opening of the switch 177, however, all of the switches 174 to 177 will be retained in open position by

the panel H. This results in interruption of the circuit through the relay solenoid 172 which opens the switch controlling the speed control relay in the block 164 at the contacts 182. De-energization of the solenoid in the block 164 permits the magnetizable block 163 to drop away from the friction material 166, due to its weight and the resiliency of the annular diaphragm 162. At this time while the sprocket 141 continues to be driven at relatively high speed, the shaft 130 slows down until it is rotating at a somewhat lesser speed than the one-way clutch housing 147. Since the one-way clutch housing is at this time rotating slightly faster than the shaft 130, the thrust rollers 154 will be carrying toward the tapered edge of their recesses and will cause driving engagement between the clutch housing 147 and the shaft 130.

The switch 177 is accurately positioned, so that shortly after its actuation by the panel H the panels are in position for the actuation of the sewing needles to commence. The panel is advanced at sewing speed and the sewing continues until the trailing edge of the panel H passes over the switch 174 and permits the same to close. This again energizes relay solenoid 172 and as previously described, causes acceleration of the conveyor to its rapid feeding speed. Switches 174 and 177 are all that would be necessary to provide for slowing the conveyor down during the passage of a single panel. However, when, as contemplated, a succession of closely spaced panels is placed on the conveyor, it is necessary to provide intermediate switches 175 and 176. These switches are spaced apart and are spaced from switches 174 and 177 respectively a distance somewhat less, as for example, one inch, than the dimension C shown in Fig. 8. Thus as the space between succeeding panels passes over the switches, each switch is permitted to close its circuit for a short interval of time and to remain closed until the next succeeding switch is permitted to close by the passage of said space. This will result in the panels being fed at slow sewing speed while the needles are engaged in sewing and for a small interval immediately before and after sewing and at a substantially increased speed for the major portion of the interval that the needles are inoperative.

As indicated in Fig. 8, the sewing mechanism will be operative for only about half the time, although this of course may vary with different dimensions of panels and different lengths of seams. However, by increasing the feeding speed during the interval when no sewing is occurring, ti is possible to increase the output of a sewing machine of this nature by a substantial amount. We have illustrated our feed control in connection with a particular type of sewing mechanism. It will be appreciated, however, that it need not be so limited, and will be equally useful in feeding articles past any treating mechanism or treating station where it is necessary to limit the speed of the articles as fed past said mechanism or station, and where a substantial interval exists between the adjacent articles or the portions of adjacent articles which are to be treated.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What we claim as our invention is:

1. The method of forming seams in a plurality of articles fed past a sewing mechanism having needles normally in operative juxtaposition thereto which comprises placing said articles in series on a conveyor, moving said conveyor at a definite speed to advance said articles toward said sewing mechanism, positioning the needles of said sewing mechanism in inoperative position, while a portion of one of said articles passes said mechanism, reducing the speed of said conveyor, moving said needles into sewing position and forming seams, moving said needles to inoperative position and increasing the speed of said conveyor.

2. Sewing apparatus for sewing seams along only the mid portion of articles, comprising a conveyor, a sewing mechanism having needles movable to and from article engaging position, a two speed drive for said conveyor, control means for said conveyor comprising means actuated by an article on said conveyor to reduce the speed of said conveyor to a sewing speed after a predetermined portion of an article has passed said sewing mechanism, other means effective thereafter for moving said needles to sewing position, and for subsequently raising said needles to inoperative position before said article has passed said mechanism, said control means being effective thereafter to increase the speed of said conveyor, said means actuated by an article on the conveyor comprising a plurality of switches effective to decrease conveyor speed when all are engaged by an article, and effective to increase conveyor speed thereafter when one of said switches is released by an article.

3. Sewing apparatus for sewing seams along only the mid portion of articles, comprising a conveyor, a sewing mechanism having needles movable to and from article engaging position, a two speed drive for said conveyor, control means for said conveyor comprising means actuated by an article on said conveyor to reduce the speed of said conveyor to a sewing speed after a predetermined portion of an article has passed said sewing mechanism, other means effective thereafter for moving said needles to sewing position, and for subsequently raising said needles to inoperative position before said article has passed said mechanism, said control means being effective thereafter to increase the speed of said conveyor, said means actuated by an article on the conveyor comprising a plurality of more than two switches effective to decrease conveyor speed when all are engaged by an article, and effective to increase conveyor speed when one of said switches is not engaged, whereby conveyor speed is shifted during the interval when no article is passing said mechanism even though the first and last of said switches are engaged by different articles.

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