Sept. 20, 1966 G. T. GORE ETAL 3,273,522

MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

Filed Aug. 24, 1964 8 Sheets-Sheet 1

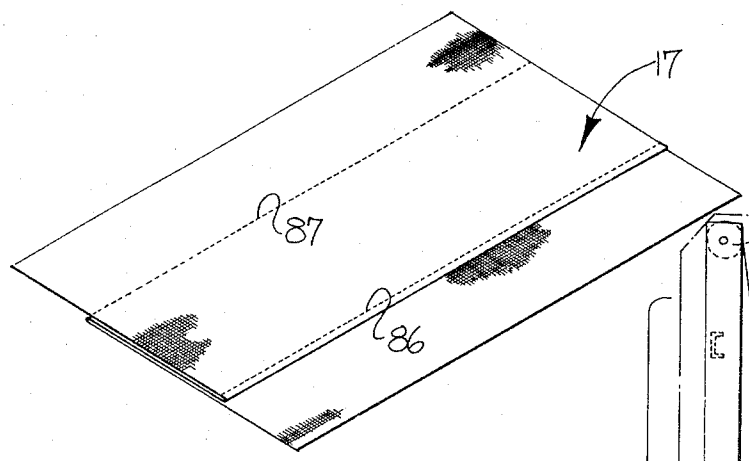


Fig-2

Fig-1

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MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

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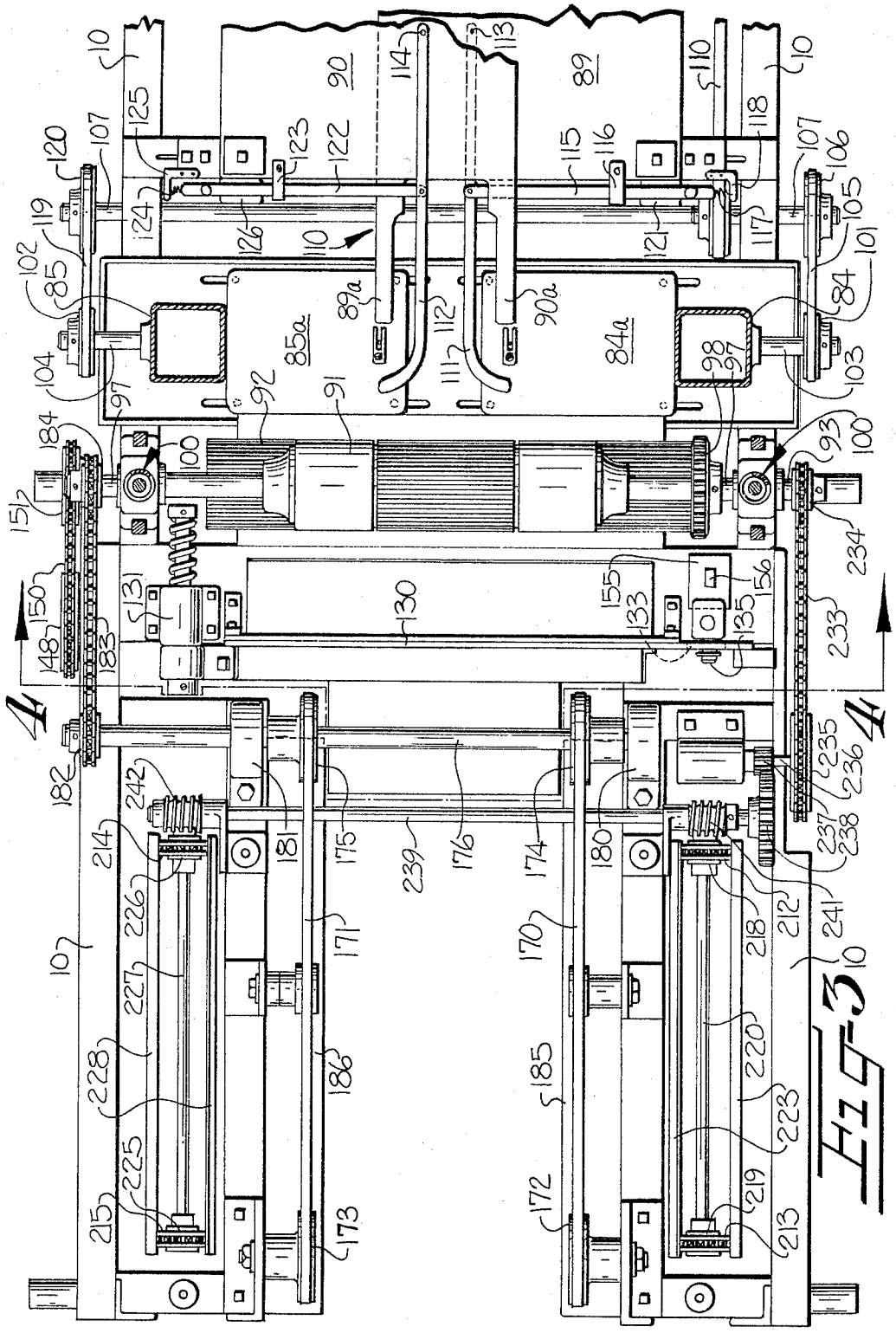


Fig. 3

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MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

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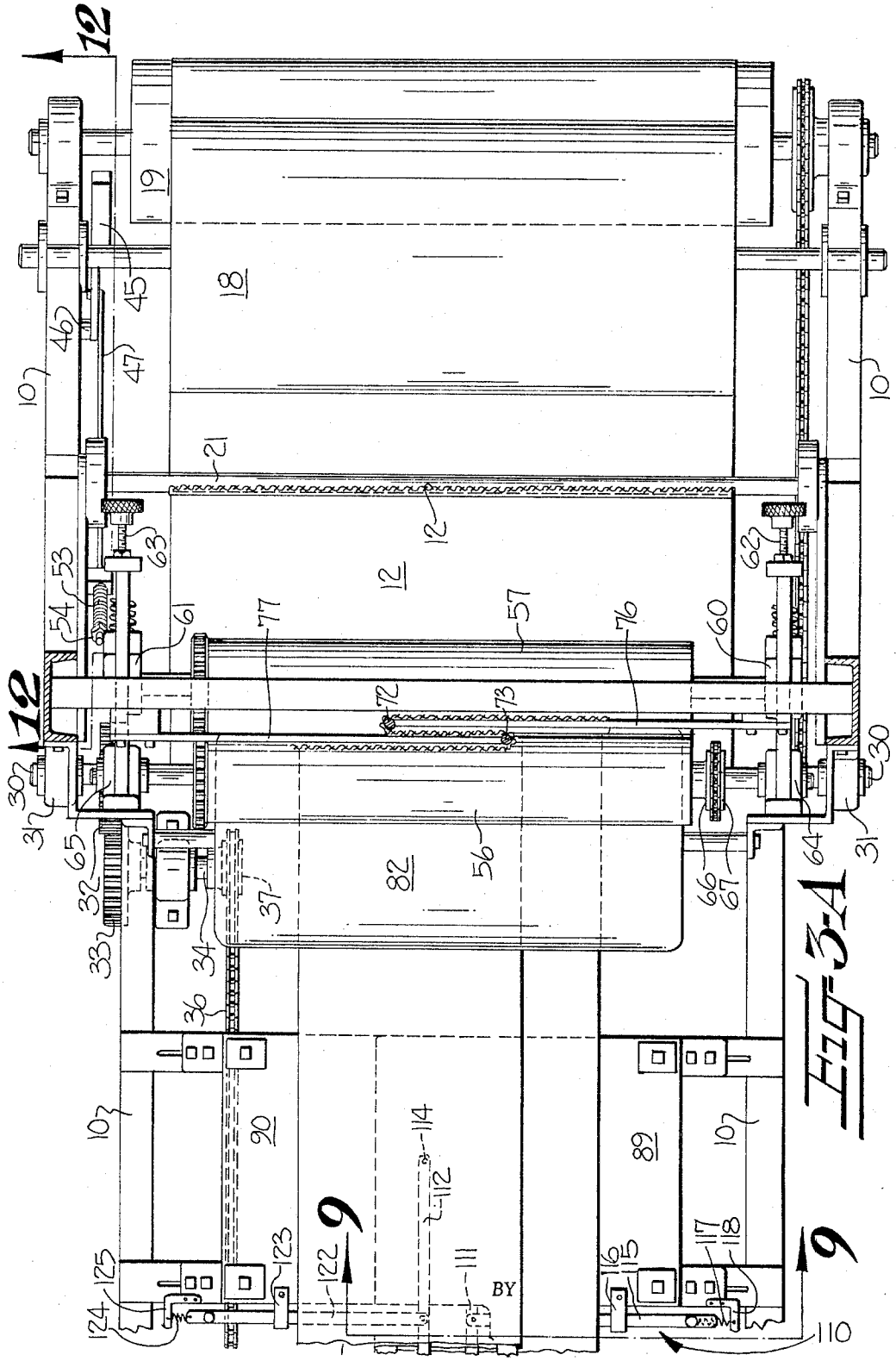


FIG-3A

Sept. 20, 1966 G. T. GORE ETAL 3,273,522

MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

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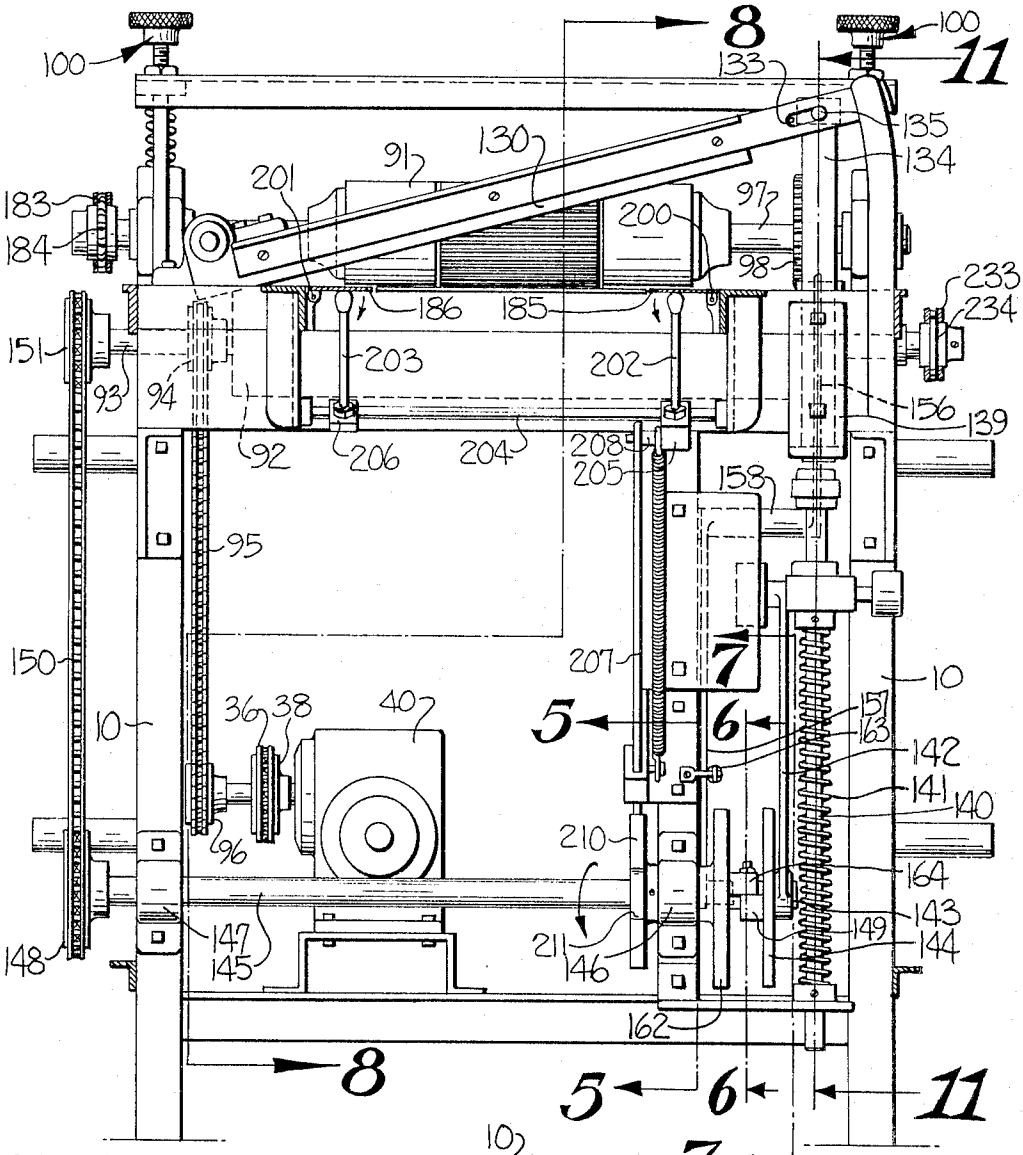


Fig-4

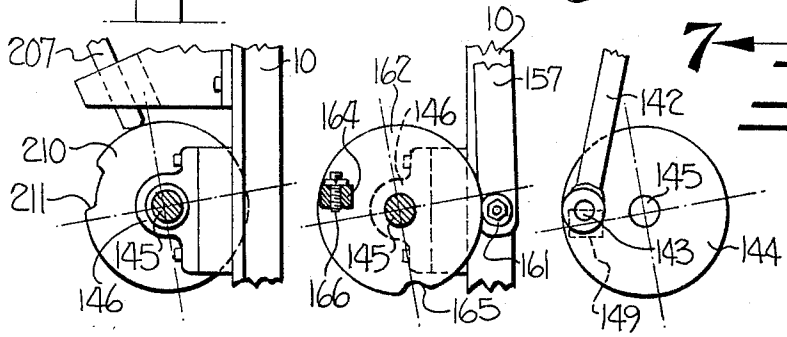


Fig-5

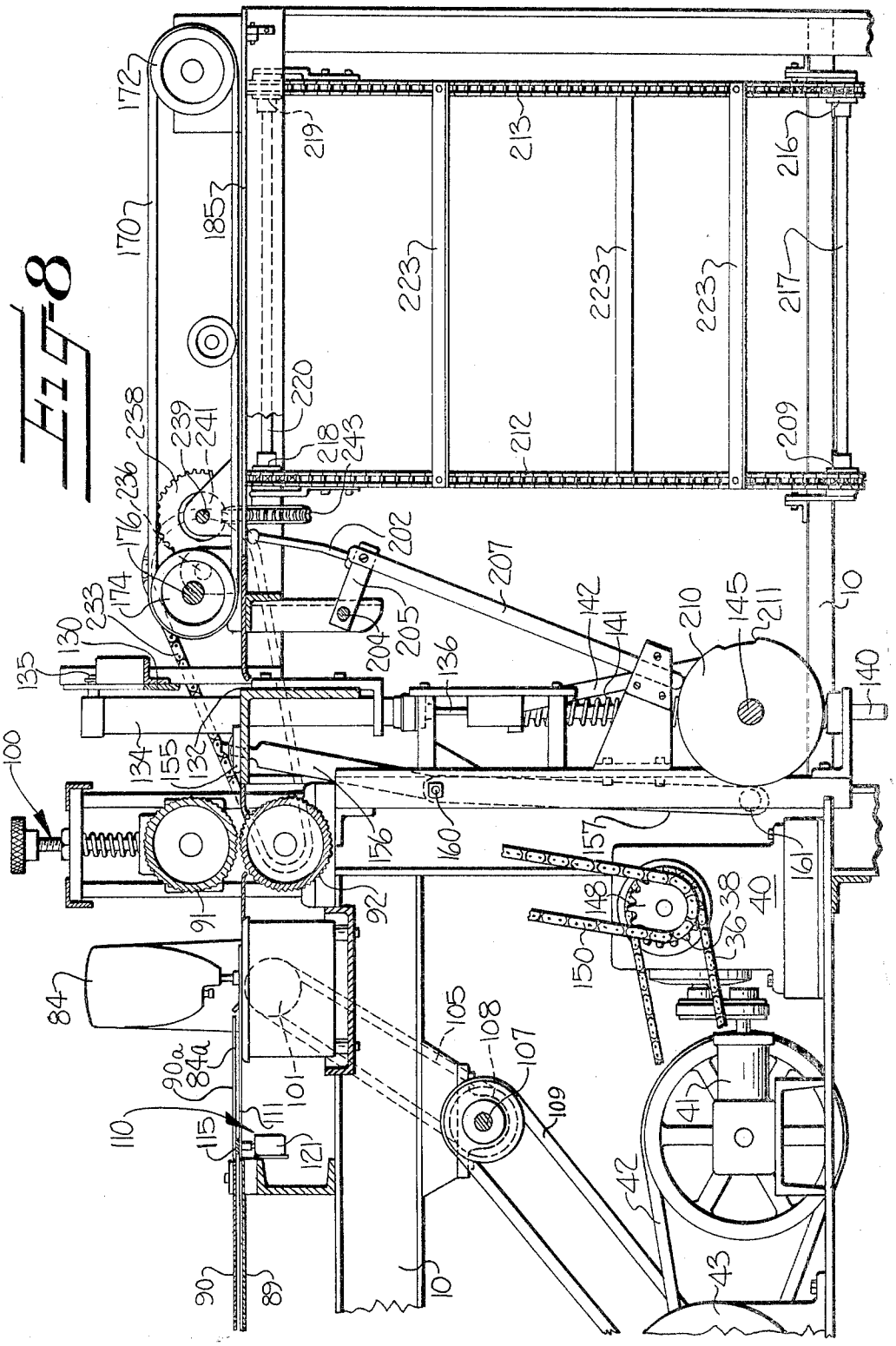
Fig-6

Fig-7

MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

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FIG-8



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MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

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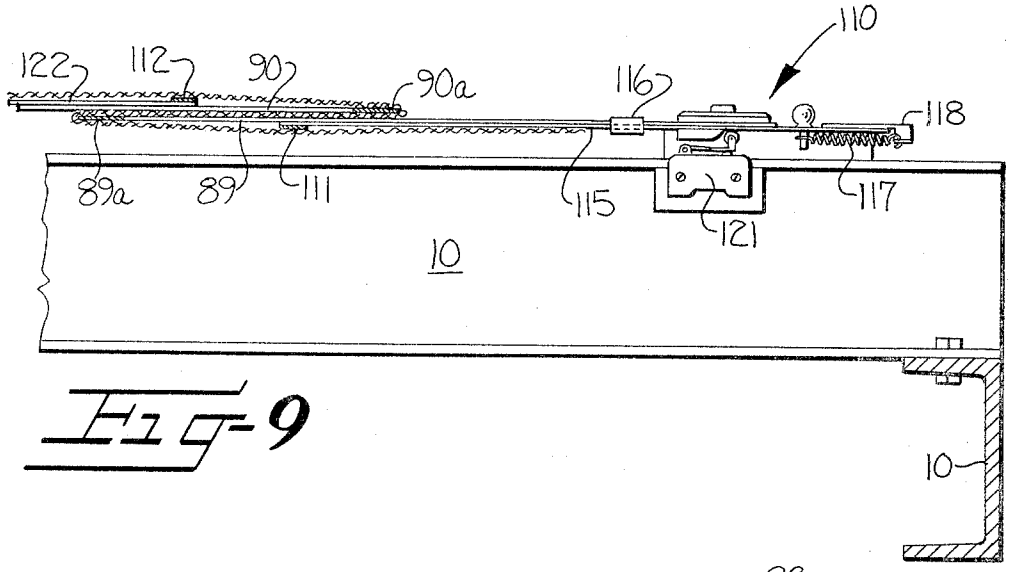


Fig-9

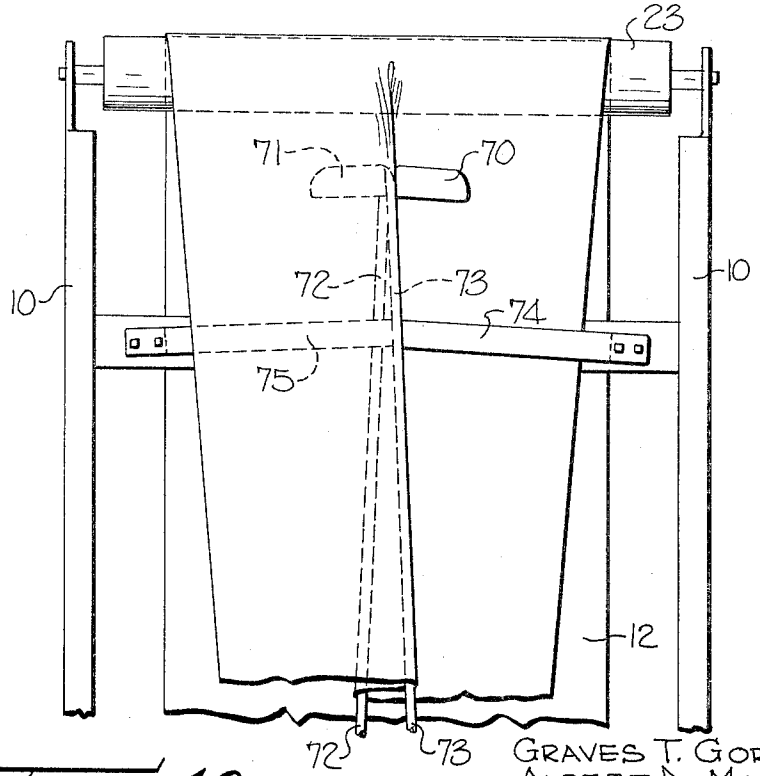


Fig-10

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MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

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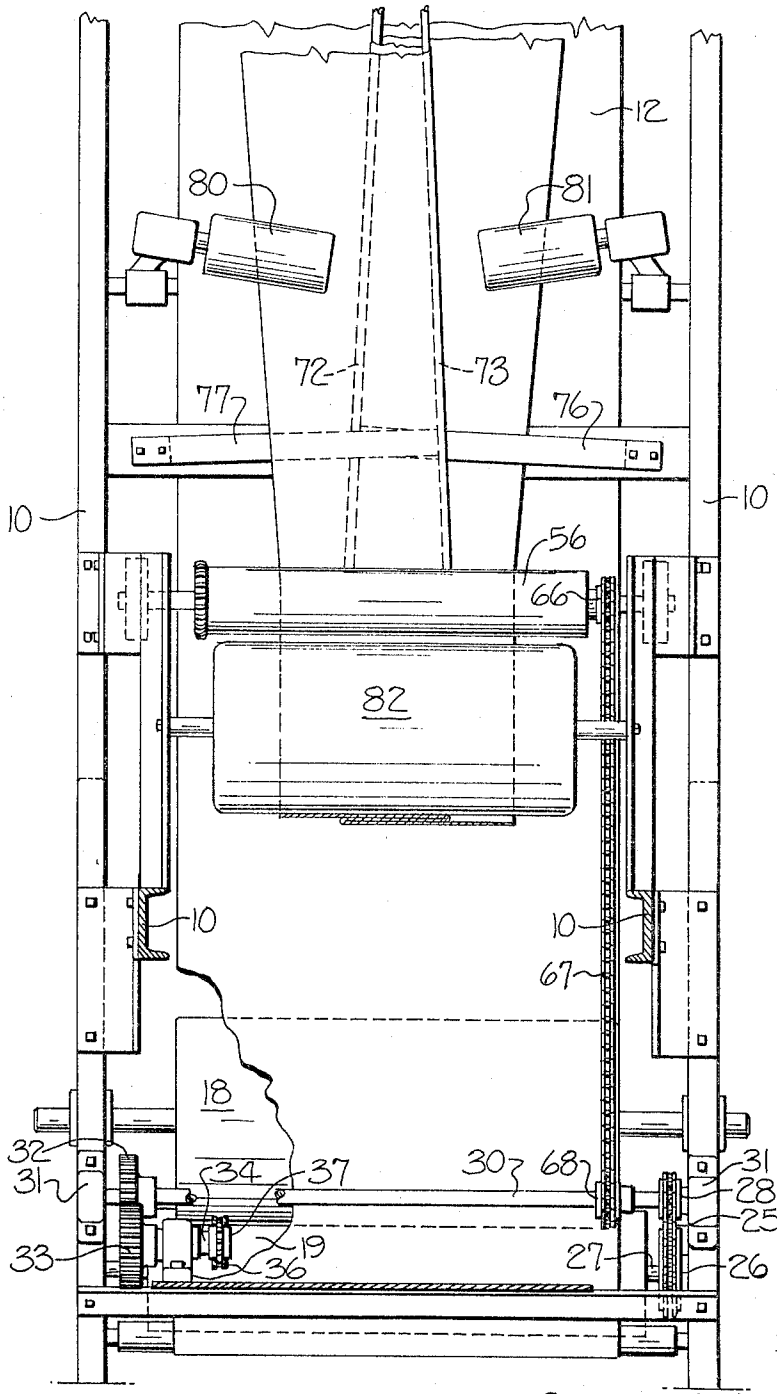


FIG-10-A

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MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

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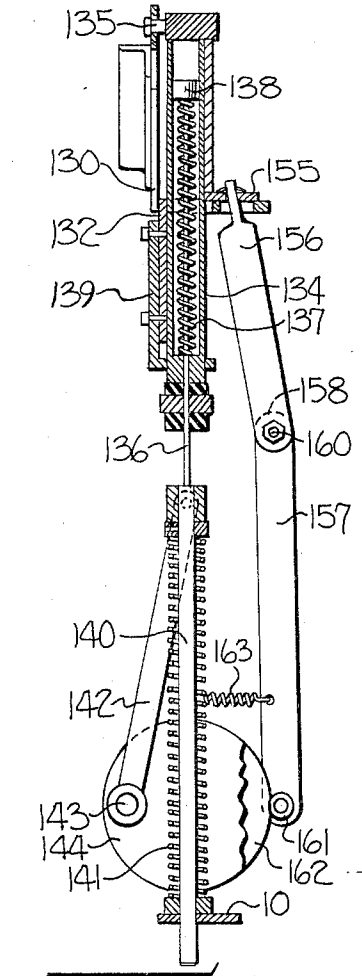


Fig-11

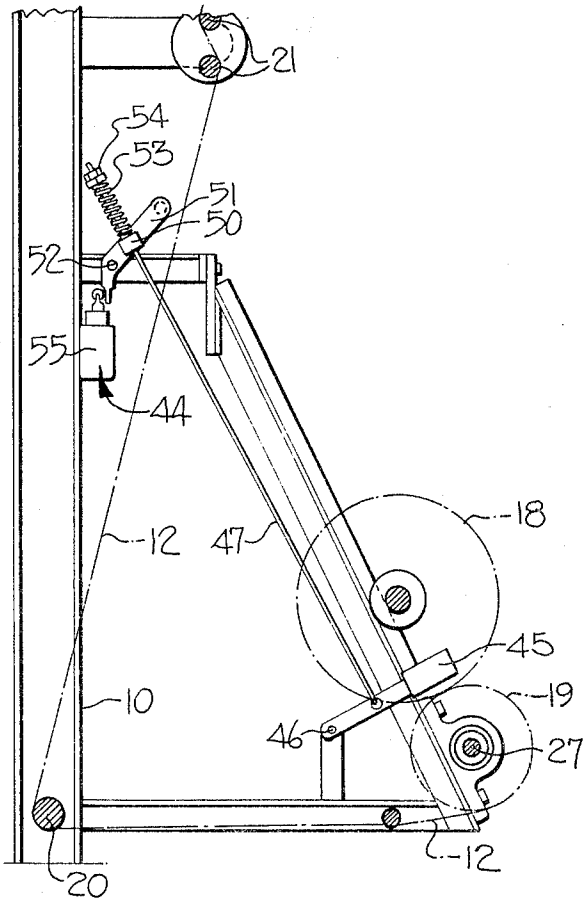


Fig-12

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United States Patent Office 3,273,522 Patented Sept. 20, 1966

3,273,522

MECHANISM FOR AUTOMATICALLY PRODUCING PREFOLDED DIAPERS

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Filed Aug. 24, 1964, Ser. No. 391,691
9 Claims. (Cl. 112—2)

This invention relates to a mechanism for automatically producing prefolded diapers and more particularly to a mechanism for automatically forming prefolded diapers from an open width, continous web of diaper material.

In order to provide better diapering, handling and laundering by consumers and diaper services, diapers are often folded and sewn or otherwise secured in the folded position by the diaper manufacturers to provide a prefolded diaper pad which is ready for use.

In the prior manufacture of prefolded diapers, it was necessary to carry out a series of steps by a series of separate operators, either manually or with separate machines, This necessarily involed a large number of operators, time consumption, inefficiency, and costliness. Another disadvantage of this type of manufacture was the amount of space necessary to hold these separate operators and machines. Also, the human element involved in these seperate operations by seperate operators produced a tendency toward nonunifomity in the finished products.

It is therefor an object of this invention to provide a mechanism and method for automatically carrying out the various steps in the manufacturing of prefolded diapers which will eliminate the 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 a mechanism is provided whereby a continuous, open width web of diaper material is fed from a supply roll. The continuous web is automatically folded in the desired prefold. The folded continuous web is then led through a sewing station where longitudinal lines of stitching are inserted adjacent to the fold lines in the folded material. The folded and sewn diaper material is then led forward through the machine to a cutting station where the material is cut transversely into individually cut pieces of predetermined lengths. The thus formed prefolded and sewn diapers are then moved into a stacking station where the diapers are stacked into stacks of a predetermined number for removal by an operator. This mechanism makes it possible to automatically produce a prefolded diaper without the necessity of utilizing individual operators to preform the various steps necessary to form this product.

Further features of the invention will be understood from a consideration of the following more detailed description taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a side elevational view of the mechanism of this invention;

FIGURE 2 is a perspective view of a prefolded diaper produced by the mechanism of this invention;

FIGURES 3 and 3*a* are top plan views of the mechanism of this invention and are continuations of each other;

FIGURE 4 is a view taken substantially along the line **4**—**4** of FIGURE 3 and illustrates the cutting means of the mechanism;

FIGURE 5 is a view taken substantially along the line **5**—**5** of FIGURE 4 and illustrates the cam for operating the stacking means;

FIGURE 6 is a view taken substantially along the line **6**—**6** of FIGURE 4 and illustrates one of the cams for operating the cutting means;

FIGURE 7 is a view taken substantially along the line **7**—**7** of FIGURE 4 and illustrates another cam for operating the cutting means;

FIGURE 8 is a view taken substantially along the line **8**—**8** of FIGURE 4 and illustrates apparatus in the sewing station, cutting station and stacking station of the mechanism;

FIGURE 9 is a view taken substantially along the line **9**—**9** of FIGURES 3 and 3*a* and illustrates the stop motion apparatus contained in the sewing station of the mechanism;

FIGURES 10 and 10*a* are views taken substantially along the line **10** and **10***a* of FIGURE 1 and illustrate the folding station of the mechanism and are continuations of each other;

FIGURE 11 is a view taken substantially along the line **11**—**11** of FIGURE 4 and illustrates the cutting means of the mechanism; and

FIGURE 12 is a view taken substantially along the line **12**—**12** of FIGURE 3*a* and illustrates the stop motion apparatus contained in the supply station of the mechanism.

Referring now to the drawings, it may be seen in FIGURE 1 that the mechanism for automatically producing prefolded diapers comprises a stationary frame **10**, a supply means or station **11** carried by the frame **10** for supplying an open width continuous web of diaper material **12**, folding means or station **13** carried by the frame **10** and disposed adjacent the supply means **11** for folding the traveling continuous web of diaper material **12** in the desired prefold, securing means or station **14** carried by the frame **10** and disposed adjacent the folding means **13** for securing the traveling folded continuous web of diaper material **12** in the desired prefolded condition, cutting means or station **15** carried by the frame **10** and disposed adjacent the securing means **14** for transversely cutting the traveling folded and secured continuous web of diaper material **12** into individual diapers **17** of a predetermined length, and a stacking means or station **16** carried by the frame **10** and disposed adjacent the cutting means **15** and adapted to receive and stack the individually cut prefolded and secured diapers **17**.

As may be seen in FIGURES 1, 3*a* and 12, the open width continuous web of diaper material **12** is fed to the mechanism from a supply roll **18**. The supply roll **18** is supported on a part of the stationary frame **10** and on a feed roll **19**. The continuous web of diaper material **12** is fed from the supply roll **18** around feed roll **19** and around guide rolls **20**, **21**, **22**, **23** to the folding means or station **13** of the mechanism. The guide rolls **20**, **21**, **22** and **23** are carried by the stationary machine frame **10**, as shown in FIGURES 1 and 12.

The feed roll **19** is rotatably carried in bearings **24** secured to the stationary frame **10** and is driven by a chain **25** and sprocket **26** secured to the shaft **27** of the feed roll **19**. The chain **25** is driven by a sprocket **28** carried on one end of a shaft **30** which is disposed in bearings **31** mounted on the machine frame **10**. The other end of the shaft **30** has a gear **32** secured thereto which meshes with and is driven by a gear **33** carried on a stud shaft **34** secured in a bearing **35** mounted on the machine frame **10**. The gear **33** is driven by a chain **36** and sprocket **37** mounted on the other end of stud shaft **34**. The chain **36** is also supported and driven by a sprocket **38** on a speed reduction unit **40**. The speed reduction unit **40**, as may be seen in FIGURES 1 and 8, is driven by a right angle drive **41** which is in turn driven by belt **42** from the motor **43**. Thus it may be seen, that the

feed roll **19** is continuously driven by the motor **43** through right angle drive **41**, through speed reduction gear **40**, through chain **36**, through gears **32**, **33** and through chain **25** and sprockets **26** and **28**.

A stop motion means, generally referred to by the reference numeral **44**, is disposed within the web supply station. This stop motion means **44** comprises a supply roll actuating lever **45** pivoted to the stationary frame at **46** and extending into the path of travel of the end of the supply roll **18**. A rod **47** has one end thereof connected to the lever **45** and the other end thereof passes through a sleeve **50** of a switch actuating lever **51**. The switch actuating lever **51** is also pivoted to the stationary machine frame at **52**. A spring **53** is disposed around the end of rod **47** which extends through the sleeve **50** and extends between the sleeve **50** and a retaining bolt **54** on the end of rod **47**. The free end of lever **51** is in contact with an electrical switch **55** which is carried by the stationary frame **10** and is electrically connected to the motor **43** of the mechanism to stop operation of the motor when the switch is actuated.

In operation, as the supply roll **18** is being used up and reducing in diameter the end thereof or shaft upon which the material is wound is moving closer to the lever **45**. When the material on the supply roll **18** is exhausted the end of the supply roll will contact the lever **45** and push the lever **45** downwardly, as viewed in FIGURES 1 and 12, which will pull the rod **47** downwardly to pivot the lever **51** against the switch **55** to actuate the switch **55** and thereby stop operation of the motor **43** to stop operation of the mechanism. This stop motion provides a convenient means for stopping operation of the diaper producing mechanism when the supply roll has been exhausted and thus eliminates constant observation of the mechanism by an operator. When a new supply roll is furnished to the mechanism the above described stop motion **44** will resume its nonactuated position, illustrated in FIGURES 1 and 12, by the action of spring **53**. It is also noted that the stop motion means **44** may be manually operated, if desired, by merely depressing the lever **51** against the switch **55**.

Following the web supply means or station **11** the open width continuous web of material **12** is led to the folding means or folding station **13**. As may be seen in FIGURES 1, 3*a*, 10 and 10*a*, the web **12** is fed from roller **23** forward through the mechanism by feed rolls **56** and **57**. Feed roll **57** is an idler roll carried in bearings **60** and **61** adjustably mounted on the stationary machine frame **10**. Adjustment mechanisms **62** and **63** are provided for moving feed roll **57** toward and away from feed roll **56** to insure the proper pressure between fed rolls **56** and **57** for feeding the web **12**. The feed roll **56** is mounted in bearings **64** and **65** on the stationary machine frame **10**. As may be seen in FIGURE 10*a*, the feed roll **56** is driven by a sprocket **66** and chain **67**. The chain **67** is driven by a sprocket **68** fixed to the shaft **30**. The shaft is driven from the machine motor **43** in the manner described above.

The folding means **13** further includes folding swords secured to a vertically extending portion of the stationary machine frame **10**. The folding swords are spaced from each other vertically and are arranged to fold the open width continuous web of material **12** into the desired prefolded condition. The folding swords include a first pair of short swords **70** and **71** secured to the ends of a pair of rods **72** and **73**, respectively. The rods **72** and **73** are downwardly extending in the vertical direction and are secured to the ends of a second pair of longer swords **74** and **75**, respectively. The swords **74** and **75** are mounted on the stationary machine frame **10**. As may be seen in FIGURES 10 and 10*a*, the rods **72** and **73** are also secured to the ends of a third pair of longer swords **76** and **77**, respectively which are secured to the stationary machine frame **10**. The three pairs of folding swords **70**, **71** and **76**, **77** and **74**, **75** are spaced vertically from each other and along the direction of travel of the web **12** as it travels in a vertical plane in the folding station **13**.

In operation, the open width continuous web of diaper material **12** is threaded between the folding swords **70**, **71**, **74**, **75**, **76** and **77** and the folding rods **72** and **73**, in the manner illustrated in FIGURES 10 and 10*a*. The web **12** is pulled through these folding swords and folding rods by feed rolls **56** and **57**, in the manner described above, and the open width continuous web of diaper material **12** is folded in the desired prefolded condition, illustrated in those figures and shown in the finished diaper of FIGURE 2.

Also included within the folding means or station **13**, are two pairs of guide rolls **80** and **81** mounted on the stationary frame **10**, which perform in the conventional manner to insure that the web **12** is traveling in a straight path. The folding means or station **13** further includes a fabric covered guide roll **82** carried by the stationary machine frame **10** and adapted to transform the path of travel of the folded web **12** from a vertical to a horizontal path, as may be seen in FIGURE 1. The guide roll **82** is covered with fabric to prevent slippage of the folded web **12** and possible unfolding of the web from its prefolded condition.

From the folding means or station **13** the folded continuous web of diaper material **12** is fed to the securing means or station **14** of the mechanism. The securing means or station **14** includes a pair of sewing machines **84**, **85** mounted on the stationary frame **10** and adapted to apply longitudinal lines of stitching **86**, **87** along the fold lines of the web **12** to secure the web **12** in the prefolded condition. The prefolded web **12** is led from the guide roll **82** along a pair of horizontally disposed and vertically spaced guide plates **89** and **90** to the sewing machines **84** and **85**.

As may be seen in FIGURE 9, the prefolded web **12** is threaded through the plates **89** and **90** in such a manner that the fold is preserved in the web as it is led to the sewing machines **84** and **85**. The plates **89** and **90** have forwardly extending portions **89***a* and **90***a* resting on the bed plates **84***a* and **85***a* of the sewing machines.

The prefolded web **12** is fed through the securing means or station **14** by the conventional feed dogs of the sewing machines **84** and **85** and by fluted feed rolls **91** and **92**. The feed roll **92** includes a shaft **93** which is driven by a sprocket **94** secured to one end thereof and by chain **95** which is driven by a sprocket **96** secured to the shaft of the speed reduction gear **40**. The speed reduction gear **40** is driven in the manner described hereinbefore. The feed roll **91** includes a shaft **97** which has a gear **98** secured to one end thereof which meshes with a gear **99** on the other end of feed roll shaft **93** so that feed roll **92** is driven by feed roll **91**.

The feed roll **91** includes adjustment mechanisms, generally referred to by reference numeral **100**, by which the feed roll **91** may be adjusted toward and away from feed roll **92** to insure the proper feeding of the folded web **12**.

The sewing machines **84** and **85** are driven directly from the motor **43** by pulleys **101** and **102** secured to the main drive shafts **103** and **104** of the sewing machines **84** and **85**, respectively. The pulley **101** is driven by belt **105** which is driven by pulley **106** secured to one end of an idler shaft **107**. The idler shaft **107** is carried by a pair of bearings **108** secured to the stationary machine frame **10**. The pulley **106** is driven by a belt **109** which is driven by a pulley **119** secured to the main shaft of the motor **43**. The sewing machine **85** has a similar arrangement of a belt **119** driving pulley **102** which is driven by a pulley **120** on the other end of idler shaft **107**. It is noted that the sewing machines **84** and **85** are driven directly from the mechanism motor **43** rather than the speed reduction gear **40** inasmuch as it is necessary to rotate the main shafts of the sewing machines at a higher rate of speed than the travel of the web **12**.

The securing means or station 14 further includes a stop motion means, generally indicated by the reference numeral 110. The stop motion means 110 comprises a pair of generally L-shaped levers 111 and 112 pivoted to the guide plate 89 and 90, respectively, at 113 and 114, respectively. The levers 111 and 112 are generally disposed in the longitudinal direction of the path of travel of the folded web 12 and extend generally outwardly at the forward ends thereof.

The lever 111 is pivoted midway thereof to one end of a lever 115 which extends transversely of the path of travel of the folded web 12 and is slidably held in position by a bracket 116 mounted on the guide plate 89. The other end of the lever 115 is connected to a compression spring 117 which in turn is connected to a bracket 118 mounted on the stationary machine frame 10. The switch 121 is electrically connected to the motor 43 of the mechanism and is adapted to stop operation of the motor and the mechanism when the switch is actuated.

Similarly, the lever 112 is pivoted midway thereof, to one of a lever 122 which extends transversely of the path of travel of the folded web 12 and is slidably held in position by a bracket 123 mounted on the guide plate 90. The other end of the lever 122 is connected to a compression spring 124 which is connected to a bracket 125 mounted on the stationary frame 10. The lever 122 also has a switch actuating cam disposed on the underside thereof (not shown) which is adapted to contact and actuate a switch 126 which is mounted on the stationary frame 10 and is electrically connected to the mechanism motor 43 to stop operation of the motor when the switch is actuated. Thus, it may be seen that the levers 111 and 112 are spring biased outwardly in the transverse direction of travel of the folded web 12 by the springs 117 and 124.

In operation, the forward outwardly extending ends of the levers 111 and 112 are adapted to contact and ride against the lines of stitching inserted in the folded web 12 by the sewing machines 84 and 85 inasmuch as the forward ends of these levers are generally outwardly extending in the transverse direction of travel of the web 12 and extend forwardly of the stitching instrumentalities of the sewing machines 84 and 85 and are spring biased by springs 117 and 124 into contact with the line of stitching. If one or both of the lines of stitching have been broken, such as by a breakage of thread in the sewing machines etc., one or both of the levers 111 and 112 will move outwardly in the transverse direction of the path of travel of the web 12 since the line or lines of stitching will not be present to hold the levers 111 and 112 against the bias of springs 117 and 124. When this occurs, one or both of the levers 111, 112 will move outwardly under the action of these springs which will also move one or both of the levers 115, 122 outwardly to cause one or both of the switch actuating cams to actuate one or both of the switches 121, 126 to stop operation of the mechanism. Thus, it may be seen that if for some reason the lines of stitching being produced by the sewing machines 84, 85 are broken or otherwise discontinued, the stop motion means 110 will stop operation of the mechanism so that the malfunction may be corrected. This also eliminates constant observation by an operator of the lines of stitching being inserted in the folded diaper web 12.

Following the securing of the folded web of diaper material 12 in the securing station 14, the folded and secured continuous web of material 12 is led forward through the cutting means or station 15 of the mechanism. The cutting means 15 comprises a guillotine type cutting mechanism including a blade 130 having one end thereof carried by a bearing 131 mounted on the stationary frame 10. The blade 130 cooperates with the corner of an angle bracket 132 secured to the stationary frame 10 to effect intermittent cutting of the folded end secured web 12. The other end of the blade 130 has a slot 133 therein.

For actuating the cutter means to move the blade 130 into contact with the prefolded and secured web 12, there is provided a tubular member 134 which has a stud 135 secured thereto and extending into the slot 133 for intermittently moving the blade 130. The tubular member 134 extends through an aperture in the bracket 132 and through an aperture in another bracket 139, as may be seen in FIGURE 11. The brackets 132 and 139 provide bearing surfaces to allow the tubular member 134 to move relatively thereto.

Disposed within the tubular member 134 is a downwardly extending rod 136 which extends below the lower end of the tubular member 134. A tension spring 137 is also disposed within the tubular member 134 and surrounds rod 136 and bears against a retaining bolt 138 on the upper end of rod 136 and against the lower end of tubular member 134, as may be seen in FIGURE 11.

The lower end of the rod 138 is connected to an enlarged end of a second rod 140 which is also downwardly extending, as viewed in FIGURE 11, and extends through an aperture in the stationary frame 10 which serves as a bearing surface for the rod 140. A second spring 141 is disposed around the rod 140 and bears against the stationary frame 10 and the enlarged upper end portion of the rod 140 to bias the rod 140 and rod 136 in the upward direction.

One end of a crank arm 142 is pivotally connected to the enlarged end of rod 140 and has a crank pin 143 disposed on the other end thereof. The crank pin 143 is eccentrically mounted on a crank plate 144 which is rotatably mounted in bearings on one end of a shaft 145 which is rotatably mounted in bearings 146, 147 on the stationary frame 10. The crank plate 144 is freely rotatable on shaft 145 and includes a lug 149 for rotating the crank plate, as described hereinafter. The shaft 145 is driven by a sprocket 148 mounted on one end thereof and a chain 150 which is driven by a sprocket 151 mounted on the shaft 93. The shaft 93 is driven in the manner described above.

The actuating means for the cutting blade 30 further comprises a latch member 155 attached to one end of a first lever 156. The lever 156 is fixedly secured to a second lever 157 by a connecting member 158, as shown in FIGURES 4 and 11. The connecting member 158 is pivoted to the stationary frame 10 at 160 and it may be seen that the levers 156, 157, connecting member 158 and latch member 159 will move as a unit about pivot point 160. On the free end of lever 157 there is disposed a cam follower 161 which is spring biased into engagement with a cam 162 by a spring 163, attached to the lever 157 and the stationary frame 10, as may be seen in FIGURES 6 and 11. The cam 162 is rotatably carried by and keyed on the shaft 145, which is driven in the manner described above. The latch member 155 is resting on one arm of the bracket 132 and, as shown in FIGURE 11, is in latching engagement with the tubular member 134. The cam 162 includes an adjustable lug 164 mounted thereon by and adjustment screw 166 and adapted to contact lug 149 on crank plate 144 for rotating the crank plate.

In operation, the cutting means is biased into the raised or non-cutting position, illustrated in FIGURE 4, by the spring 141. The crank plate 144 and cam 162 are in the positions, illustrated in FIGURES 6 and 7, when the cutter blade 130 is in the raised position of FIGURE 4. Since the shaft 145 and cam 162 are continually rotating, the crank plate 144 will be rotated by the contact of lug 164 with lug 149 in the direction of the arrow, indicated in FIGURE 7, which will act as a crank to lower lever 142 by the connection of eccentrically mounted crank pin 143. This lowering of lever 142 will in turn lower rods 136 and 140 against the bias of spring 141. Since the spring 136 extends between the retaining bolt 138 and the lower end of tubular member 134, the lowering of rod 136 would normally carry the tubular member 134 therewith. However, since the latch 155 is in engagement with the tubular member 134, the tubular member 134 cannot be lowered with the rod 136. Therefore, the lowering of

the rod 136 is against the bias of spring 137 and will load spring 137 against tubular member 134. When the crank pin 143 has lowered the rods 140 and 136 to their lowermost positions which fully loads spring 136, the cam follower 161 on lever 157 will drop into detent 165 on cam 162. This movement of cam follower 161 into detent 165 will pivot levers 157, 156 and connecting member 158 about pivot point 160 to thereby move latch member 155 out of engagement with the tubular member 134. When this occurs, the member 134 will move rapidly downward under the action of loaded spring 136 to carry with it the cutting blade 130 to effect cutting of the prefolded and secured continuous web of diaper material 12. As crank pin 143 passes bottom dead center, crank plate 144 rotates forward under the action of loaded spring 141. This raises all the movable cutting components to the upper positions. This occurs very rapidly under the action of spring 141. At this point crank plate 144 remains stationary with pin 143 at top position until lug 164 on cam 162 again communicates with lug 149 on crank plate 144. While the cutter mechanism is held in the upper position by spring 141, cam 162 engages latch 155 into tubular member 135. The cutter mechanism is now ready for the next cycle. The lug 164 on cam 162 is in timed relation with detent 165. The adjustment screw 166 effects the proper timed relation of the crank pin 143 passing bottom dead center.

Thus it may be seen, that the cutting means of this invention is so adapted to intermittently cut the prefolded and secured continuous web of diaper material 12 into individually cut diapers 17 of predetermined lengths. The length of the diaper 17 will be determined by the speed of travel of the material through the cutting means and the size and speed of rotation of the cams 144 and 162.

From the cutting means of station 15, the individually cut diapers 17 are led to a stacking means or station 16. The stacking means 16 comprises a pair of conveyor belts 170 and 171, as shown in FIGURE 3. These conveyor belts 170 and 171 extend in the longitudinal direction of the travel of the diapers 17 and are disposed around a first pair of idler pulleys 172 and 173 mounted on the stationary frame 10. The other ends of the belts 170 and 171 are mounted on driven pulleys 174 and 175. The driven pulleys 174 and 175 are carried by a driven shaft 176 which is mounted in bearings 180 and 181 secured to the stationary frame 10. On one end of the shaft 176 is mounted a sprocket 182 which is driven by a chain 183. The chain 183 is disposed around and driven by a sprocket 184 disposed on the shaft 97, which is driven in the manner described above. The conveyor belts 170 and 171 are disposed against pivotally mounted plates 185 and 186. The plates 185 and 186 are pivotally mounted on the stationary frame 10 at pivot points 200 and 201, as shown in FIGURE 4. The conveyor belts 170 and 171 are adapted to squeeze the longitudinal edges of the diapers 17 between these belts and the pivoted plates 185 and 186, respectively, to convey the diaper 17 forwardly from the cutting means 15.

The pivotally mounted plates 185 and 186 are held in their upward position, as illustrated in FIGURE 4, by rod members 202 and 203. These rod members 202 and 203 are fixedly carried by a connecting shaft 204 which are pivotally mounted to the stationary frame 10 by levers 205 and 206, as shown in FIGURES 4 and 8. The above assembly of levers 202, 203, connecting rod 204 and levers 205, 206 are mounted to a cam actuated lever 207 by a connecting member 208. The cam actuated lever 207 is guided into contact with a cam 210 through an aperture in an extension of the stationary frame 10, as may be seen in FIGURE 8. The cam 210 includes a detent 211 therein and is carried by and driven by the shaft 145 in the manner described above.

The stacking means 16 further includes a means for receiving the diaper 17 comprising downwardly extending chains 212, 213, 214 and 215. The chains 212 and 213, as shown in FIGURE 8, are disposed around a pair of idler sprockets 209, 216, respectively, which are carried by an idler shaft 217 mounted on the stationary frame 10. The other ends of the chains 212 and 213 are disposed around driven sprockets 218, 219, respectively, which are carried on a driven shaft 220 mounted in bearings on the stationary frame 10. The chains 212 and 213 carry a plurality of angle members 223 therebetween, as shown in FIGURE 8.

The chains 214 and 215 are also disposed around idler sprockets (not shown) and around driven sprockets 225 and 226, as shown in FIGURE 3, which are disposed on a driven shaft 227 secured in bearings on the stationary frame 10. The chains 214 and 215 also have a plurality of angle members 228 extending therebetween.

The angle members 223 and 228 are adapted to hold a shelf member 230, as shown in FIGURE 1, which is adapted to receive a plurality of prefolded diapers 17.

In operation, the cut diapers 17 are led forwardly in the stacking means by conveyor belts 170 and 171 which squeeze the longitudinal edges of the diaper 17 between the belts and the pivotally mounted plates 185 and 186, respectively. When an individually cut diaper reaches the forward end of the mechanism, the detent 211 in cam 210 has rotated in the direction of the arrow in FIGURE 5 to such a point that the lever 207 will drop therein. When this action occurs, the lever 207 will move downwardly which will also lower the levers 202 and 203. This lowering of the levers 202 and 203 will allow the pivotally mounted plates 185 and 186 to move downwardly by the force of gravity and thereby release the individually cut diaper 17 which has been held between the plates and the conveyor belts. The diaper will then fall onto the shelf member 230.

The shelf member 230 is being lowered so that a plurality of diapers 17 may be stacked one on top of each other, as shown in FIGURE 1, as the chains 212, 213, 214 and 215 are driven by their respective sprockets and drive shafts. This downward movement of the shelf 230 is accomplished by a chain 233 which is driven by sprocket 234 disposed on the shaft 93, which shaft is driven in the manner described above. The chain 233 in turn drives a sprocket 235 mounted on a stud shaft 236. The stud shaft 236 has a gear 237 thereon which meshes with a gear 238 disposed on a driven shaft 239. The driven shaft 239 has a pair of worm gears 241 and 242 disposed on each end thereof. The worm gear 241 drives gear 243 (FIGURE 8) disposed on the end of driven shaft 220 and thus the shaft 220 is driven to rotate chains 212 and 213 to lower and raise the shelf member 230. Likewise the worm gear 242 meshes with a gear (not shown) mounted on the end of driven shaft 227 (FIGURE 3) to rotate chains 214 and 215 to cooperate with the above described action to raise and lower the shelf member 230.

From the above description, it may be seen that this invention has provided an automatic mechanism which will take an open width continuous web of diaper material from a supply roll, fold the diaper material into the desired prefold, secure the folded diaper material in the prefolded condition, cut the folded and secured diaper material into individually cut diapers, and stack the individually cut diapers into stacks for removal by an operator. This automatic machine eliminates many manual operations which require a number of operators and thus furnishes a method of automatic diaper production which saves time and expense to the manufacturer.

This invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

What is claimed is:

1. A mechanism for automatically producing prefolded diapers comprising a frame portion, driven feeding means carried by said frame and adapted to feed the continuous web of diaper material through said mechanism, a sup-

ply means carried by said frame for supplying an open width continuous web of diaper material to said mechanism, folding means carried by said frame and disposed adjacent said supply means and adapted to fold the traveling continuous web of diaper material in the desired prefold along at least two fold lines to define a longitudinally extending multiple layer center panel and two side panels in the folded material, securing means carried by said frame and disposed adjacent said folding means comprising a pair of sewing means adapted to apply longitudinal lines of stitches through the multiple layer center panel of the folded diaper material for securing the traveling folded continuous web of diaper material in the desired prefolded condition, and cutting means carried by said frame and disposed adjacent said securing means for transversely cutting the traveling folded and secured continuous web of diaper material into individual diapers of a predetermined length.

2. A mechanism for automatically producing prefolded diapers, as set forth in claim 1, including a stacking means carried by said frame and disposed adjacent said cutting means and adapted to receive and stack the individually cut prefolded and secured diapers.

3. A mechanism for automatically producing prefolded diapers, as set forth in claim 1, in which said supply means includes a supply roll of open width diaper material carried by said frame for supplying a continuous web of diaper material to said mechanism, means carried by said frame for rotating said supply roll, and stop motion means carried by said frame and adapted to stop operation of said mechanism when said supply roll is exhausted.

4. A mechanism for automatically producing prefolded diapers, as set forth in claim 1, in which said folding means comprises a plurality of pairs of folding swords spaced from each other in the direction of travel of the web and mounted on said frame for folding the open width continuous web into the desired prefold.

5. A mechanism for automatically producing prefolded diapers, as set forth in claim 1, in which said securing means comprises a pair of sewing machines mounted on said frame and adapted to apply longitudinal lines of stitching in said folded diaper material adjacent the fold lines in the folded diaper material.

6. A mechanism for automatically producing prefolded diapers, as set forth in claim 5, in which said securing means further includes stop motion means mounted on said frame and adapted to stop operation of said mechanism when the lines of stitching have broken.

7. A mechanism for automatically producing prefolded diapers, as set forth in claim 1, in which said cutting means comprises a spring loaded, cam operated, guillotine-type cutting mechanism carried by said frame for intermittently cutting the traveling folded and secured continuous web of diaper material into individual diapers of a predetermined length.

8. A mechanism for automatically producing prefolded diapers comprising a frame portion, driven feeding means carried by said frame and adapted to feed the continuous web of diaper material through said mechanism, supply means comprising a supply roll of open width diaper material carried by said frame for supplying a continuous web of diaper material to said mechanism and means carried by said frame for rotating said supply roll, folding means disposed adjacent said supply means comprising a plurality of pairs of folding swords spaced from each other in the direction of travel of the web and mounted on said frame and adapted to fold the open width continuous web into the desired prefold along at least two fold lines to define a longitudinally extending multiple layer center panel and two side panels in the folded material, securing means disposed adjacent said folding means comprising a pair of sewing machines mounted on said frame and adapted to apply longitudinal lines of stitches through the multiple layer center panel in the folded diaper material, cutting means disposed adjacent said securing means comprising a spring loaded, cam operated, guillotine-type cutting mechanism carried by said frame for intermittently cutting the traveling, folded and secured continuous web of diaper material into individual diapers of a predetermined length, and stacking means carried by said frame and disposed adjacent said cutting means and adapted to receive and stack the individually cut prefolded and secured diapers.

9. A mechanism for automatically producing prefolded diapers, as set forth in claim 8, including first stop motion means carried by said frame and adapted to stop operation of said mechanism when said supply roll is exhausted, and second stop motion means carried by said frame and adapted to stop operation of said mechanism when the lines of stitching have broken.

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