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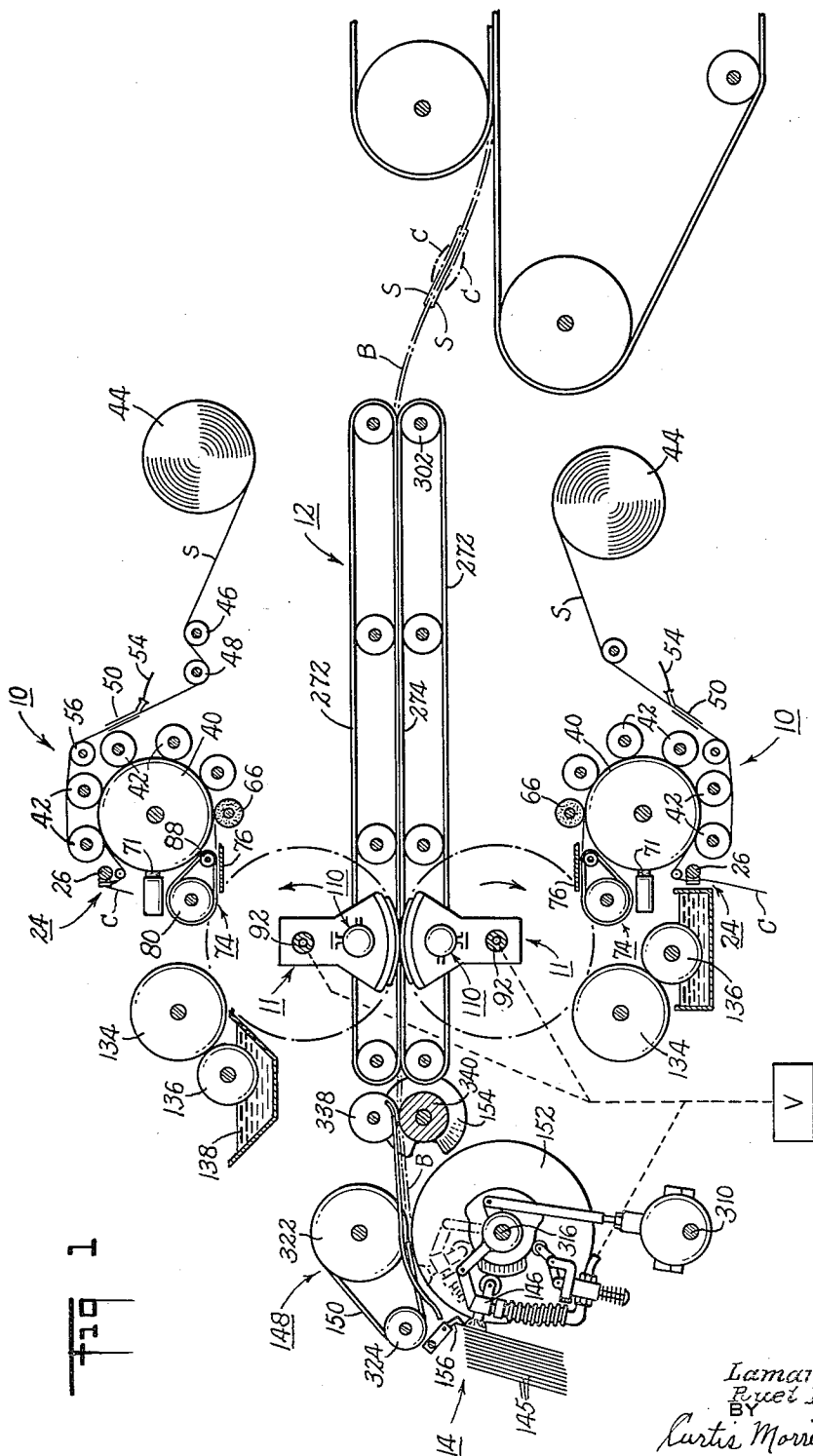
L. T. ATWOOD ETAL

3,054,442

BAG HANDLE MACHINE

Filed Sept. 16, 1959

9 Sheets-Sheet 1



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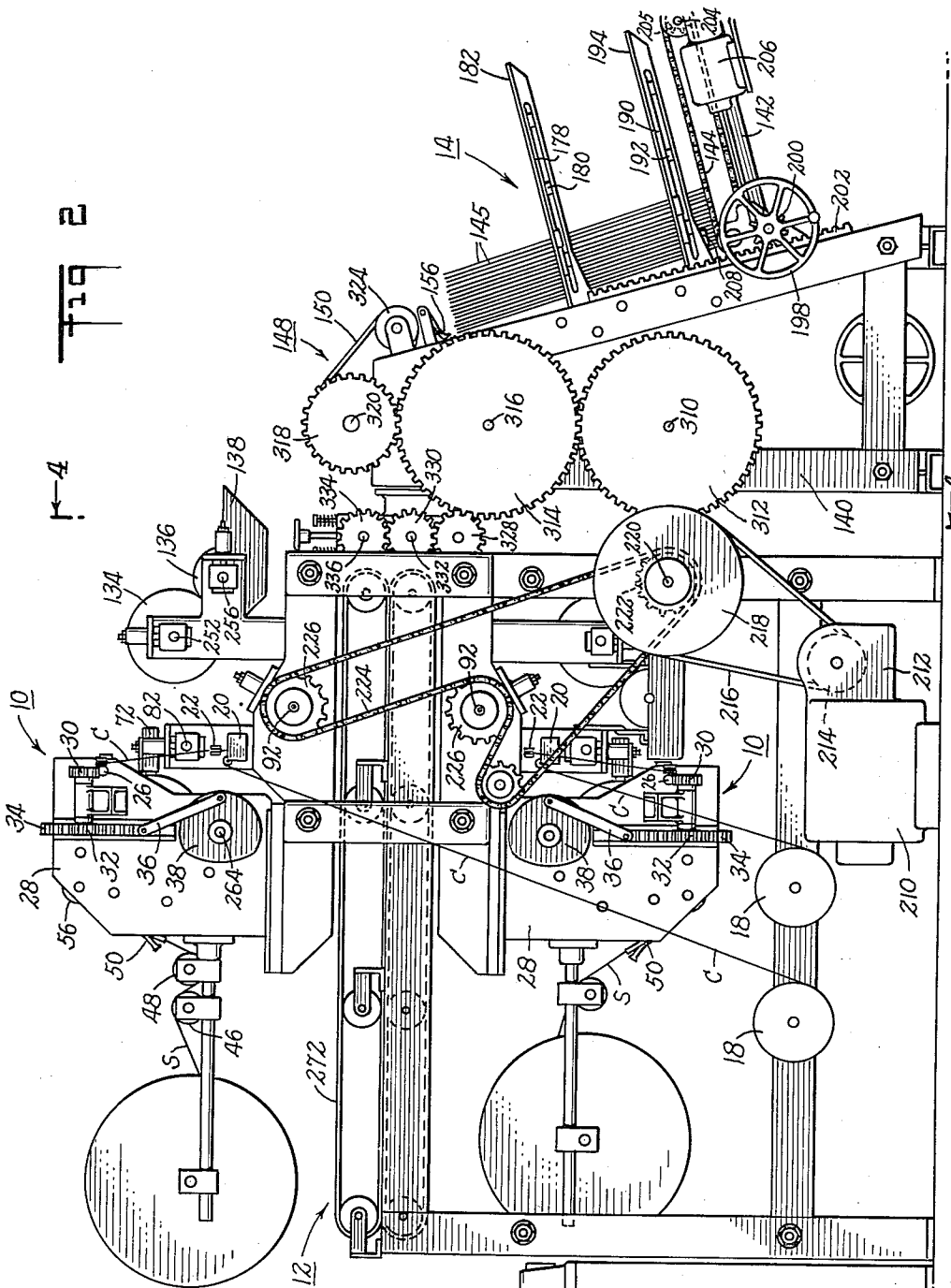
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9 Sheets-Sheet 2



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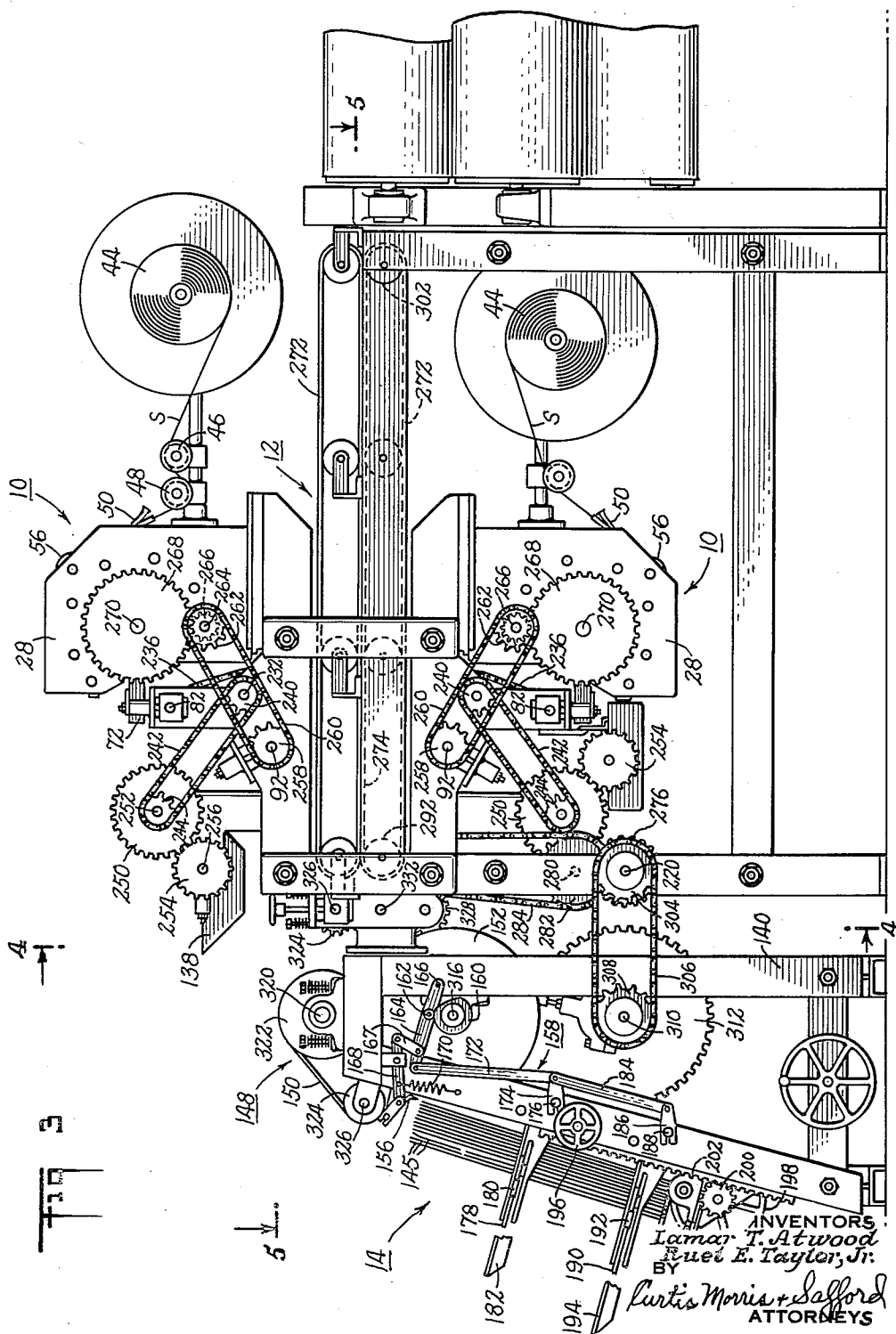
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BAG HANDLE MACHINE

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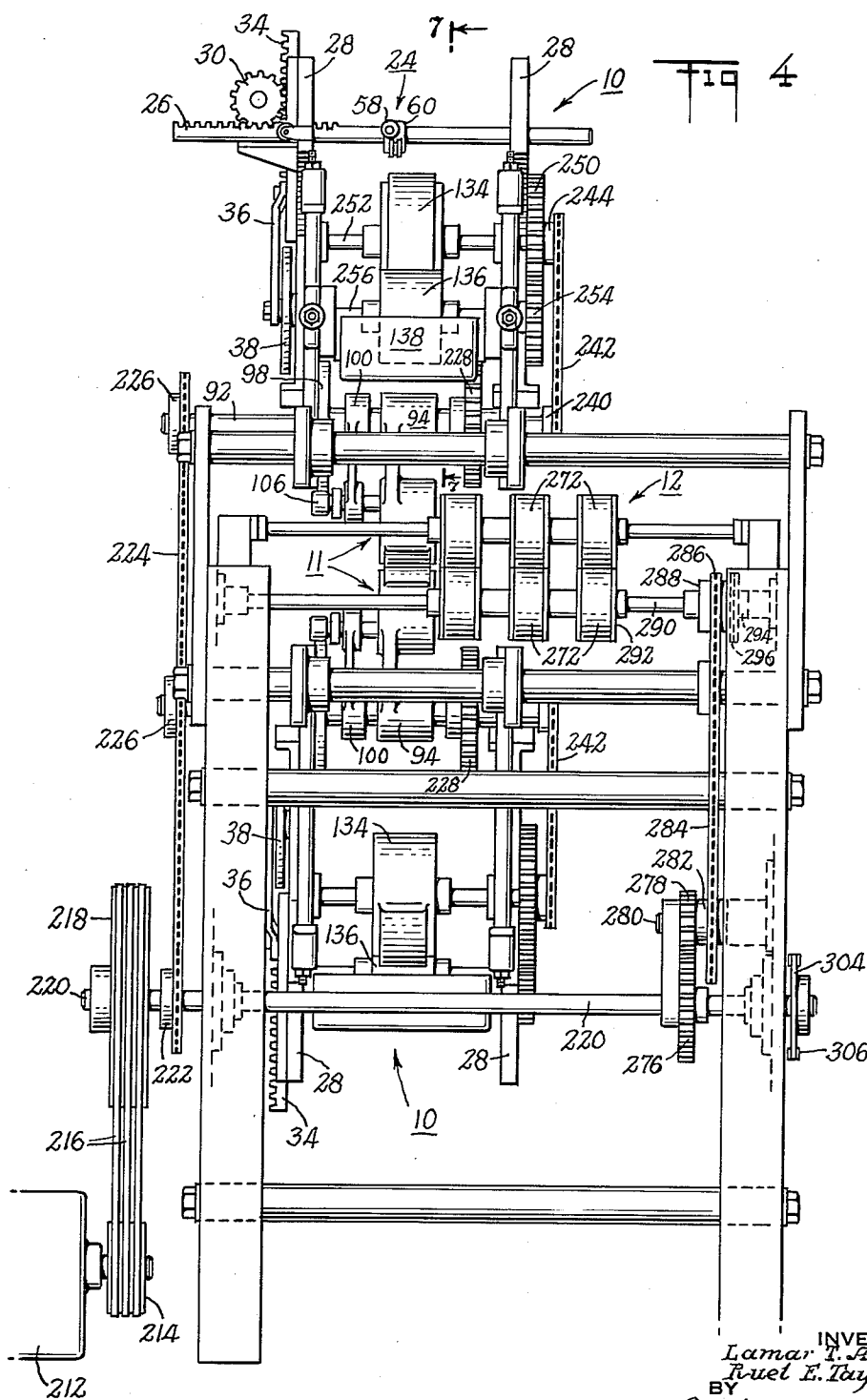
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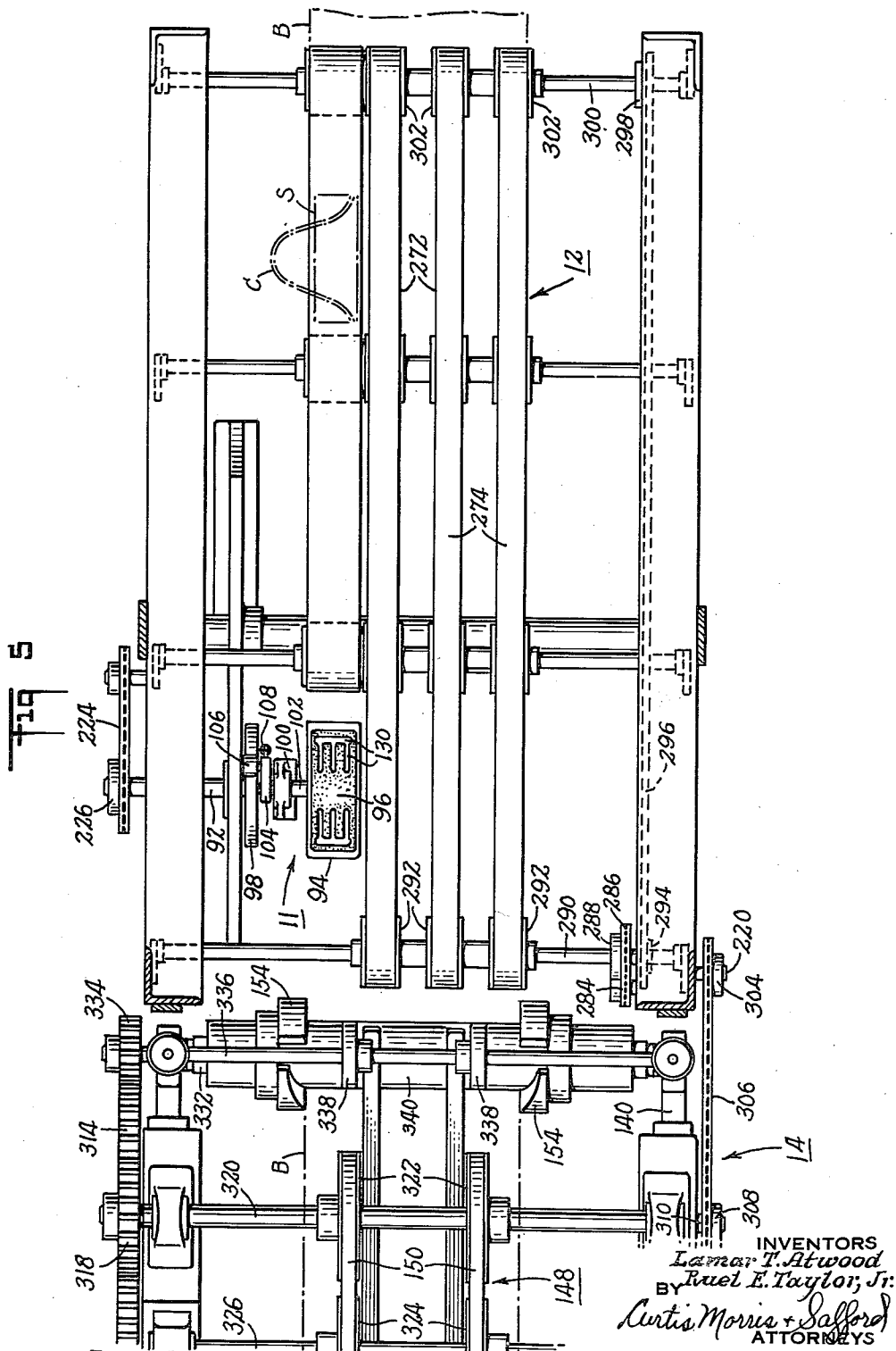
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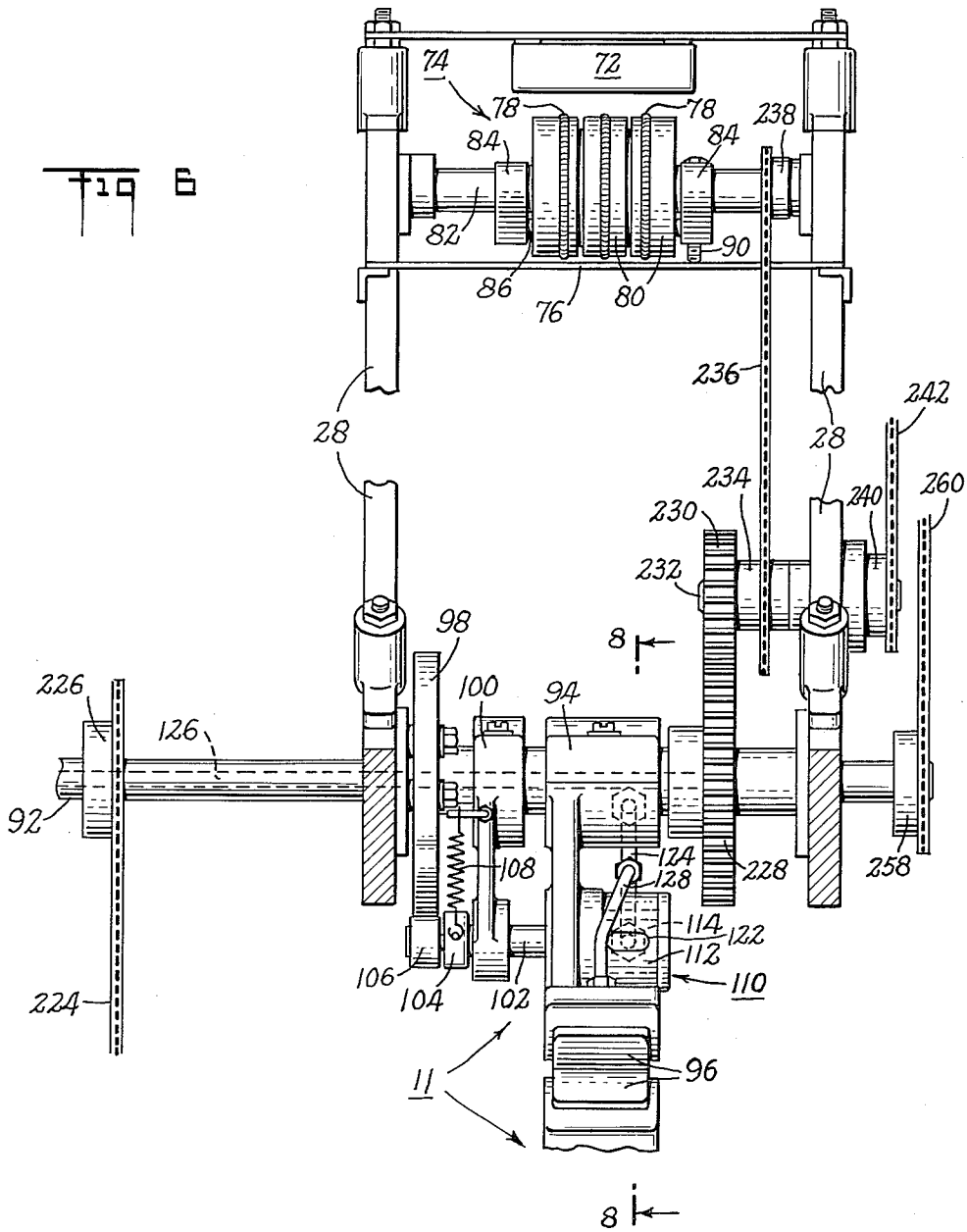
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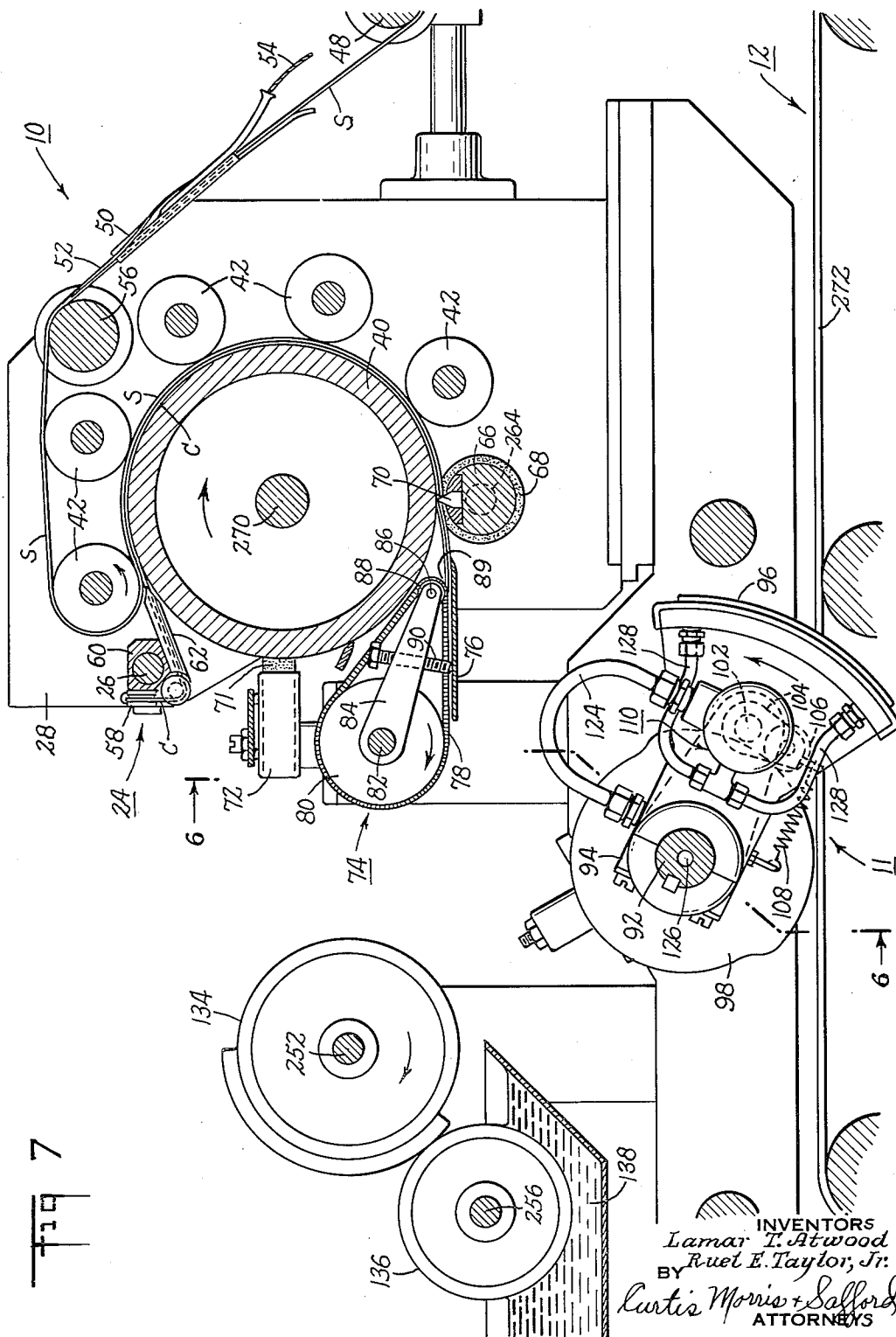
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BAG HANDLE MACHINE

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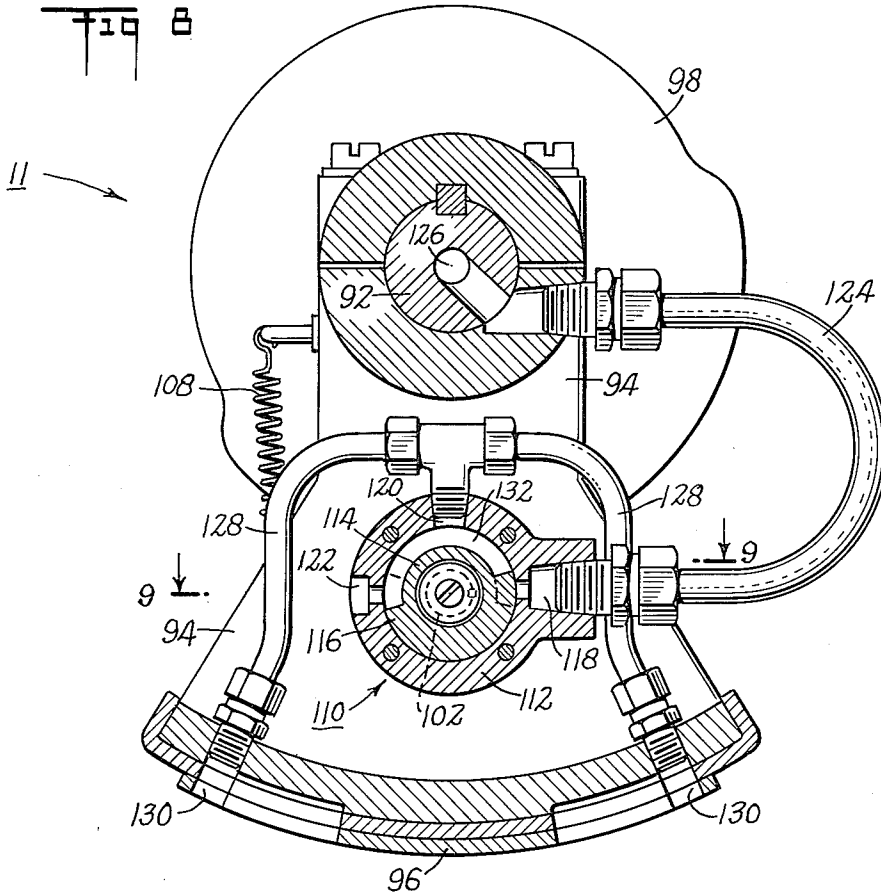
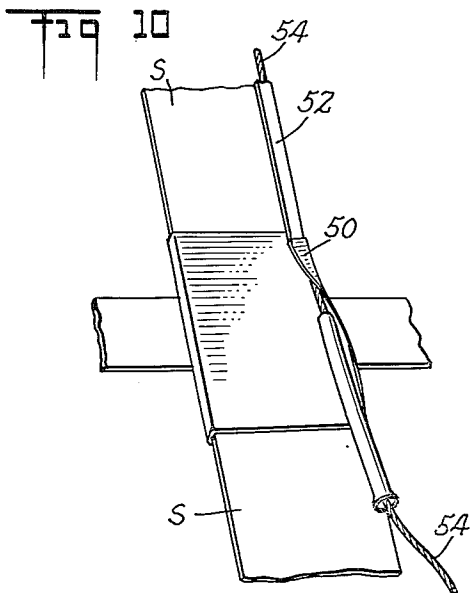
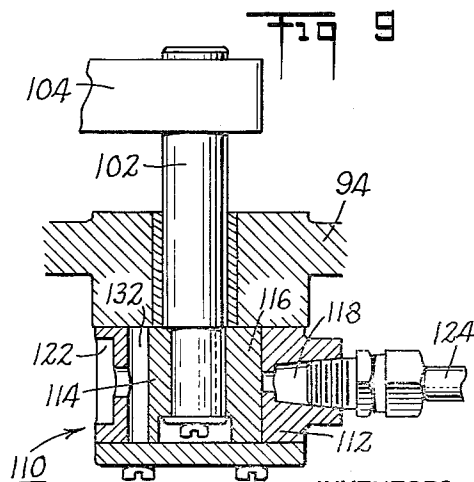
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9 Sheets-Sheet 8



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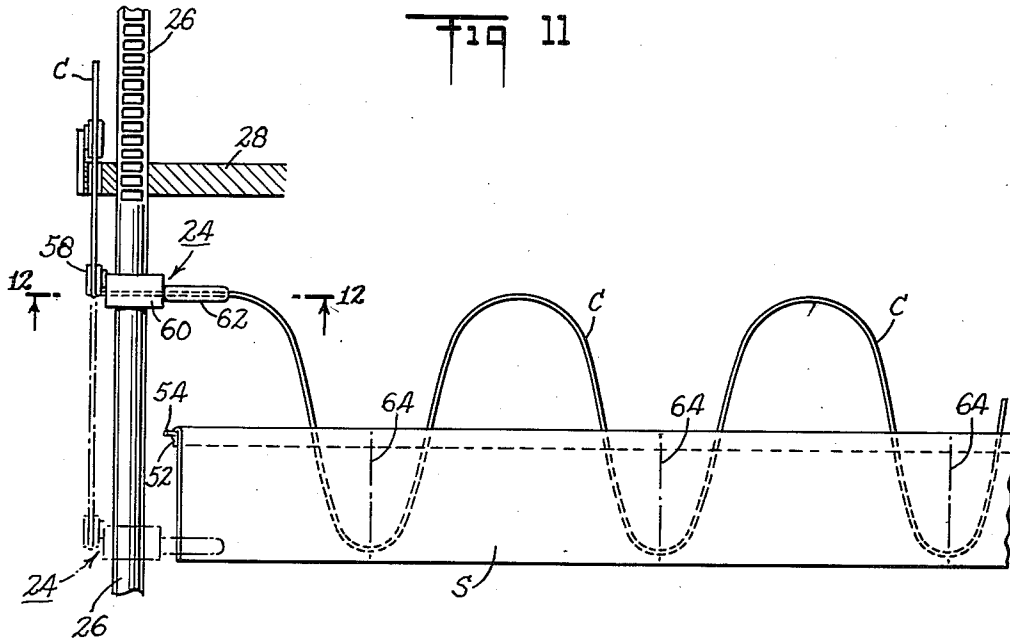
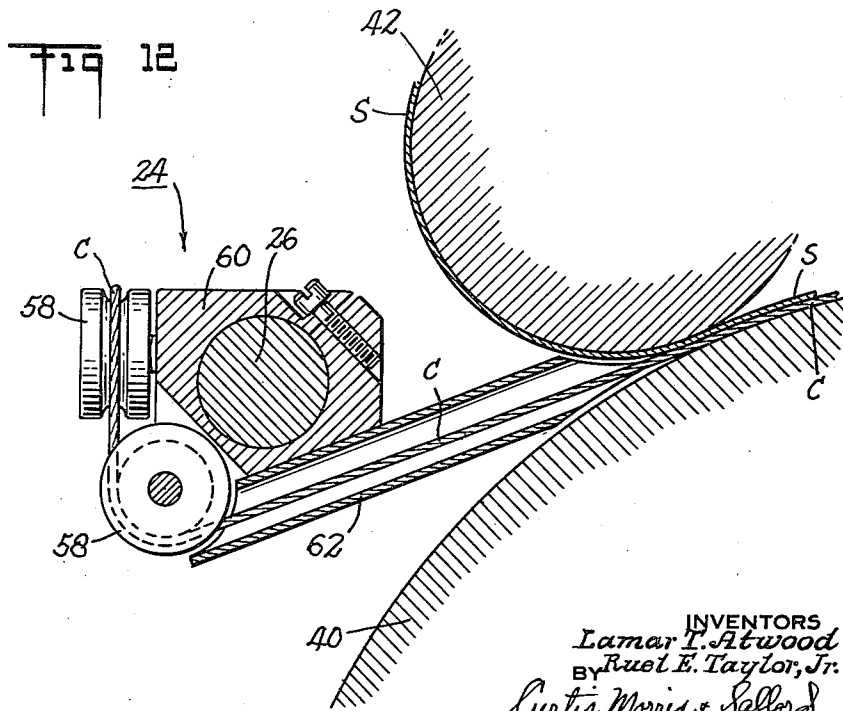
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BAG HANDLE MACHINE

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9 Sheets-Sheet 9



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3,054,442

BAG HANDLE MACHINE

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12 Claims. (Cl. 156—551)

This invention relates to the manufacture of handles for bags and, more particularly, to machines for manufacturing and applying bag handles.

It is well known to apply handles in the form of loops to bags in order to facilitate the carrying of the bags. Heretofore, such handles were not strong and their use had been primarily limited to open-top bags which are commonly called "shopping bags" or "shoppers." However, a unique bag handle with an applying patch has now been invented and is more fully disclosed and claimed in Lamar T. Atwood's copending application, Serial No. 755,164, filed August 15, 1958. This handle is particularly well adapted for use with multi-wall bags and the like and, as far as it is known, this is the first handle which is entirely suited for this purpose.

These bags or sacks are extensively used for packaging and shipping bulk products, such as pelletized, powdered or pulverized material and, when filled, these bags are rather bulky and heavy. Many of the filled bags weigh in the order of fifty to one hundred pounds. It will be appreciated that prior to the invention of the handle disclosed in the above-identified application, the carrying and handling of such heavy and bulky bags has been generally quite difficult and slow. However, with the introduction of this new handle, such handling has been made more convenient and less tiring. At the same time, the rate of manual handling of the bulky bags has been increased due to the convenience of the handle.

Handles of the type disclosed in the above-identified copending application are most satisfactory from all standpoints when they are automatically manufactured and in a subsequent but continuous series of operations, all manual labor in affixing the handle patch to the bag is eliminated.

Such automatic and continuous operations are most useful in plants where there is a constant demand for multi-wall bags with handles. Accordingly, the present invention may advantageously be incorporated into an overall production line which further includes the subsequent operations of automatically filling, sealing and stacking bags. But use of these handles is not limited to such a plant. In cases where only a few bags with handles are required at any one time, it may be desirable to have the handle patches made up on a continuous roll of patch material. These rolls may be stored until the handles are required, at which time the handle patches are cut off the storage roll and applied to the bags.

The handle manufactured and applied by the present invention and described, and claimed in the above-mentioned copending application, comprises a loop of cord, or other suitable handle material, which is automatically attached to a strip of paper or similar backing. This composite handle patch is adhesively coated, and is applied to a bag.

In the automatic application of these handles, the formed handle patches are applied to bags which are moved in timed relation with the patches being formed, so that each patch is formed and transferred just as a moving bag becomes available to receive it.

It is an object of the present invention to provide automatic apparatus for making and applying the handles to bags. It is another object of the present invention to provide apparatus which continuously feeds formed multi-

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wall bags or sacks into a zone where handles are applied in accurate registry with the moving bags. It is a further object of the present invention to provide apparatus which may be adjusted to provide handle patches on a continuous storage roll. It is a still further object of the present invention to provide apparatus for economically manufacturing and applying handle patches to bags. Still another object of the present invention is to provide apparatus which is economical to construct and operate, adaptable to varying demands and conditions of use, and dependable in use.

Although in the accompanying drawings a preferred embodiment of the apparatus of the present invention is shown and the same is described in detail in the specification, it is to be understood that this embodiment is not intended to be either exhaustive or limiting of the present invention, but, on the contrary, it is chosen for the purpose of illustrating the invention in order that others skilled in the art may so fully understand the invention, its principles and the application thereof, that they may embody it and adapt it in numerous forms, each as may be best suited to the requirements of its particular use.

In the drawings:

FIGURE 1 is a schematic view showing the operation and the interrelation of the various components of apparatus for making and applying bag handles;

FIGURE 2 is a side view of apparatus for manufacturing and applying handles to bags in accordance with the present invention, this view being from the driving motor side of the apparatus;

FIGURE 3 is a side view of the apparatus of FIGURE 2 from the side opposite from the driving motor;

FIGURE 4 is a sectional view of the apparatus shown in FIGURES 2 and 3, along the lines 4—4;

FIGURE 5 is a sectional plan view along the lines 5—5 of FIGURE 2;

FIGURE 6 is a fragmentary plan view of the patch transfer and applicator unit and the suction control valve mechanism of the present invention;

FIGURE 7 is a fragmentary sectional view of one of the units for manufacturing and applying handle patches to the present invention;

FIGURE 8 is an enlarged sectional view of the suction control valve mechanism and the handle applying apparatus of the present invention;

FIGURE 9 is a fragmentary sectional view of the valve mechanism shown in FIGURE 8;

FIGURE 10 is a perspective view of the folding apparatus and reinforcing cord applicator of the present invention;

FIGURE 11 is a fragmentary plan view of the handle applying apparatus of the present invention, including a continuous strip of formed handle patches; and

FIGURE 12 is a sectional view of the shifting arm for applying the cord to the handle patch taken along lines 12—12 of FIGURE 11.

In manufacturing handle patches and applying them to bags to form handles thereon, in accordance with the present invention, a new method is utilized whereby a continuous cord is attached to a continuous sheet of patch material to form a series of cord loops on the sheet; handle patches, each with an attached loop, are then severed from the sheet and the individual patches are transferred and applied to bags which are introduced into a mating position with the patches in accurate registry.

Before describing the illustrated apparatus in detail, a brief description of the overall invention will be given. This is best accomplished by first referring to FIGURE 1. In FIGURE 1 a general schematic layout is shown whereby the handle patches are made in accordance with the present invention in a continuous operation and then ap-

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plied to bags which are moved in timed relation with the manufactured handle patches to provide a continuous supply of bags with attached handles. As shown in FIGURE 1, a continuous cord "C" is fed into a mechanism which lays the cord on to a large rotating drum. The drum carries the cord "C" under a series of smaller rolls which are in pressure contact with the drum. Simultaneously a continuous strip of patch material "S" is also fed between the rolls and the drum and on top of the cord.

The cord is preferably premoistened and, therefore, when it is pressed against the strip of patch material as they pass together into a pressing zone formed by the drum and the rolls, the cord adheres to the patch material. After passing through this zone, the combined strip and cord now form a continuous length of handle patches. This continuous strip may be cut into individual handle patches by means of a suitable cutter which is in contact with the drum.

After the patches are severed they are positioned and guided away from the cutter to a transfer mechanism which carries the patch past an adhesive moistening roll which applies an adhesive coating to each patch. This patch is then applied to a bag "B" which has been moved into a registered position with the handle patch.

The bags "B" are moved into registry with the adhesively coated patches by means of a suitable bag feeding device and a conveyor.

A second handle patch forming mechanism is preferably used in connection with the above discussed operation so that a handle patch may be applied to each side of the bag. The operation of this second mechanism is similar to that of the first and therefore need not be discussed.

The bag "B" with its attached handles is finally carried through a series of pressing conveyors which form a press zone. To insure good adhesion between the bags and the patches the completed bags may be sent through another press zone formed by a second set of conveyors before being carried to a suitable stacking and storage place.

Apparatus for carrying out the present invention is set forth in detail in the remaining drawings. Referring now to FIGURES 1, 2, 3 and 4, illustrated apparatus for carrying out the present invention is shown. This apparatus comprises a pair of handle patch manufacturing mechanisms 10, patch transfer means 11, a conveyor 12 and a bag feed mechanism 14. So that the operation and structure may best be understood the major components of the apparatus will be described separately.

Handle Manufacturing Mechanism

The two handle manufacturing mechanisms 10 provide a handle for each side of the preformed bag "B" which is moved through the conveyor 12. Since the handle manufacturing mechanisms 10 are similar in operation only one of the mechanisms 10 shown in the accompanying drawings will be described in detail and the lower mechanism 10 will only be described to such extent as it is necessary to point out any major details of that mechanism which are substantially different from the upper mechanism.

The function of the handle manufacturing mechanism 10 is to provide a handle in the form of a handle patch from a supply of cord, twisted paper, or any other desirable material and a supply of a patch material such as a strip of paper.

A cord "C" is fed from a supply roll or reel 18 through a wetting bath 20 where it is saturated with water. The cord is then passed through a wiper 22 which is set above the bath and any excess water is removed from the cord by the wiper 22. As shown more particularly in FIGURES 4, 7, 11 and 12 the cord "C" is continued on to a carriage 24 which is mounted on a shaft 26. The shaft 26 is slidably mounted between a pair of frames 28 which act as the main supporting members for the handle

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manufacturing mechanism 10. Reciprocal motion is imparted to the shaft 26 by means of a driving gear 30 which engages a rack portion of the shaft 26 that extends outwardly through the adjacent frame 28. Gear 30 (FIGURE 12) is connected by a fixed shaft to a second gear 32 and gear 32 is driven by a reciprocally driven rack 34. The rack 34, which is mounted on the outside of one of the frames 28, is moved by means of a connecting rod 36 which in turn is pivotally attached to a driven cam 38. As the cam 38 rotates, the rack 34 moves up and down and imparts reciprocal motion to the gear 32 and consequently to the gear 30 and gear 30 shifts the shaft 26 back and forth between the frames 28 in reciprocal motion. Therefore, the carriage 24, which is fixed on the shaft 26 and between the frames 28, is carried back and forth between the frames as the shaft 26 is shifted as described above.

A large steel drum roll 40 (FIGURE 7) and a series of smaller pressure rolls 42 are also rotatably mounted between the frames 28. The smaller rolls 42 are arranged in pressure contact about approximately half the periphery of the large drum 40. Drum 40 is driven by a direct drive connection with the main driving system of the apparatus as will be discussed hereinafter. The small pressure rolls 42 are free turning and obtain all their motion from contact with the roll 40.

In manufacturing a handle patch, the patch material, such as a continuous strip of gum coated paper, is stored on a reel 44. The paper strip "S" is passed over and under a pair of idler rolls 46 and 48 and then through a folder 50; the folder 50 being shown in greater detail in FIGURE 10. The function of the folder 50 is to provide a reinforcing cuff 52 on the strip "S." If it is desired, the cuff may be omitted and, thus, the folder 50 will also be eliminated. However, if the cuff 52 is used, a reinforcing fiber or cord 54 is advantageously positioned in the fold of the cuff 52 to add greater strength to the final handle patch.

After passing through the folder 50 the strip is continued over another idler roll 56 and then over the first of the small pressure rolls 42. The strip "S" is next passed under the first roll 42 and between it and the large drum 40. The strip is continued around the drum 40 and between it and the remaining contact pressure rolls 42.

As the strip "S" is drawn through the mechanism 10 by the contact between the drum 40 and the pressure rolls 42, the cord "C" is simultaneously fed into the nip between the drum roll 40 and the first roll 42 so that the cord "C" and the strip "S" are both pulled around the drum 40 and pressed together.

As shown in FIGURE 12, in particular, the carriage 24 is comprised of a pair of pulley rolls 58, a carriage frame 60 and a cord guide 62 and, as previously described, this assembly is fixedly mounted on the shaft 26. The carriage frame 60 is fixed on to the shaft 26 and the pulley rolls 58 and the cord guide 62 are in turn mounted on the frame 60. The cord "C" is fed past the pulley rolls 58 and these rolls serve to orientate the cord in the direction of the cord guide 62. The cord guide 62 is an extended tube which extends up to the nip between the drum 40 and the first contact pressure roll 42. Before the handle manufacturing mechanism 10 is placed in continuous operation the cord "C" is threaded through the carriage 24 and placed in the nip between the drum 40 and the roll 42 so that the cord is beneath the strip "S" which is also fed into the nip between the drum 40 and the roll 42. As the drum 40 turns it pulls the strip "S" and the cord "C" with it into the roll and drum nip.

As the cord and the strip are pulled into the nip, shaft 26 with the cord carriage 24 on it is driven reciprocally. As a result of the shifting motion of the carriage the cord is laid in loop fashion partially on the strip "S" and partially off of it as shown in FIGURE 11. The portion of the sinusoidal like loops which are not on the strip "S" serve as the handle portion for the handle patch.

After being drawn into the nip the strip of formed handle patches is continued between the remaining pressure rolls 42 and the drum 40. It has been found that good adhesion between the cord "C" and the strip "S" is obtained with rolls 42 which are made of a hard elastomeric material such as neoprene. However, to improve the adhesion, one of the rolls 42 is preferably made of steel so that there is a tight nip between this roll 42 and the drum 40. After the strip of formed handles has passed beyond the rolls 42 it is severed into individual handle patches along the lines 64 of FIGURE 11. The strip is severed into individual patches by a cutter or knife roll 66 which is in touching contact with the back up roll 40. As shown in FIGURE 7 this knife roll 66 has a compressible peripheral covering 68 and a replaceable knife edge 70.

The cutter roll 66 and the drum 40 are driven in such timed relation that the knife edge 70 does not strike the same portion of the drum 40 more than once in several thousand revolutions of the drum 40. Thus, the drum 40 will wear evenly and not develop a ridge or groove as would be the case if the knife edge 70 struck the same spot each time.

When the apparatus is continuously operated some water may be left on the drum 40 by the compressed cord as it passes between the drum 40 and the rolls 42. To insure easy removal of the formed handle patch drum 40 is wiped with a block of wax or other suitable material 71 which is placed in a holder 72. By wiping the surface of the drum 40 continuously, the surface of the drum is kept free of water and the hydrophobic coating of wax permits easy and quick removal of the severed handle patches after they pass the knife edge 70.

Patch Transfer Means

After the individual handle patches have been formed, they are transferred to a position so that they may be applied to a bag which is moved in timed relation into registry with the transferred formed handle patch. Referring to FIGURE 7 the severed handle patch is removed from the handle manufacturing mechanism 10 by means of a guide unit 74. This guide unit 74 comprises a flat plate 76 which is positioned horizontally and adjacent to the knife roll 66. Overlying the plate 76 are a pair of endless wire belts 78 which are passed over a grooved roll 80 that is fixed on to a shaft 82. A pair of arms 84 are rotatably mounted on shaft 82 and attached to the end of these arms 84 is another shaft 86. A small grooved roll 88 is mounted on shaft 86 and the wire belts 78 are passed over the grooves in the rolls 80 and 88.

The endless belts 78 are drawn over the flat plate 76 by the rotation of the roll 80 which is driven by the shaft 82 so that the belts 78 and the plate 76 form a guideway 89 for the handle patches severed by the cutter roll 66. The freely mounted arms 84 can move away from plate 76 if there is a jam-up of patches between the plate 76 and the wire belts 78. In addition an adjustment bolt 90 permits the guideway passage between the plate and the belts to be varied.

After the severed handle patches are moved through the guideway 89 formed by the plate 76 and the belt 78 they are picked up and transferred to a point adjacent to a bag moved by the conveyor 12. As shown more particularly in FIGURES 5-9, a hollow shaft 92 is positioned horizontally below the handle manufacturing mechanism 10 and above the conveyor 12. This shaft 92, which is constantly driven, has an arm 94 mounted on one end and a sector face plate 96 is attached to the arm 94. Also on shaft 92 is a fixed position cam 98 which is placed so that cam 98 remains stationary as the shaft 92 rotates. Fixedly mounted on the shaft 92 and immediately adjacent to the cam 98 is an arm 100. A rotatable shaft 102 extends through the arm 100 and also through the sector arm 94. A portion of the shaft 102 extends through the arm 100 and a lever arm 104 is

fixed on the shaft. A cam follower 106 rides on the fixed cam 98 as the hollow shaft 92 is rotated. The shaft 92 also swings the arms 94 and 100 and the shaft 102 as it rotates.

A spring 108 is provided to hold the lever arm 104 in position and insure that the follower 106 will constantly ride on the fixed position cam 98.

As shown in FIGURE 8, the shaft 102 also serves the additional function of forming a part of a valve mechanism 110. The valve 110 comprises a housing 112 into which the end of shaft 102 extends and attached to this end of shaft 102 is a valve block 114 which has a semi-circular outer periphery 116. The housing 112 is provided with three ports 118, 120 and 122 which permit the flow of air through the valve 110; the direction of the air being dependent on the position of the block 114. A tubing 124 is fitted into port 118 and this tubing 124 is in turn connected to an opening 126 which runs through the hollow shaft 92. The second port 120 in the housing 112 is connected to a pair of tubes 128 and these tubes communicate with a series of openings 130 in the sector face plate 96. The third port 122 is opened to the atmosphere.

The opening 126 through shaft 92 is connected to a vacuum source generally designated as "V" which may be of any of the well-known types.

When the cam follower 106 rides on the high side of the fixed cam 98 the block 114 is in the position shown in FIGURE 8. In this position, port 118 is closed off and there is communication between ports 122 and 120 by means of the semi-annular opening 132 within the valve housing 112. With the block 114 in this position the openings 130 in the sector face plate 96 are exposed to atmospheric pressure.

When the cam follower 106 rides on the low side of the fixed position cam 98, the shaft 102 is slightly rotated and the valve block 114 is rocked into a second position indicated by the phantom lines in FIGURE 8. In this second position the atmospheric port 122 is closed off and there is communication between the ports 118 and 120 through the semi-annular opening 132. A constant vacuum is maintained through the opening 126 in shaft 92, and therefore, when the valve block 114 is in this phantom line position, reduced pressure through the openings 130 in the sector face plate 96 and a suction or holding force is created on the plate 96.

The shaft 92 is rotated at a speed whereby the face plate 96 arrives adjacent to the guide unit 74 in timed relation with a severed handle patch being moved through the guide unit. Just prior to the rotation of the face plate 96 to this pickup position, the cam follower 106 rides down to the low side of the fixed position cam 98 and reduced pressure is applied to the openings 130 in sufficient time to permit the suction effect on plate 96 to be applied to the handle patch being passed through guide unit 74. This suction effect is maintained at the face plate 96 while the shaft 92 continues to rotate and swing the face plate 92 with a handle patch held thereon away from the guide unit 72 and past an adhesive roll 134. This adhesive roll 134 is coated with adhesive by a coating roll 136 which is rotated in a bath of adhesive 138 and the handle patch being moved passes over the roll 134 to receive an adhesive coating.

The shaft 92 continues to rotate and the attached handle patch is carried beyond the roll 134 to a position between the belts of the conveyor 12. As will be described more fully hereinafter, a bag "B" is fed into the conveyor 12 and drawn therethrough in timed relation so that the bag is adjacent to the arc of the face plate 96 just as the face plate is swung through the conveyor 12. Just before the rotating face plate 96 comes adjacent to the bag being passed through the conveyor, the cam follower 106 rides on to the high side of the fixed cam 98. With the follower 106 in this position the suction effect at the openings 130 in the face plate 96 is cut off and the carried handle patch is released. The released handle patch is pressed tightly

against the moving bag by the face plate 96 which continues its swinging arc to pick up the next handle patch.

At the same time another handle patch is applied to the opposite side of the bag by the lower or second patch transfer mechanism. Thus, the two patches being pressed simultaneously on to the bag provide mutual backup surfaces for each other and assure that there will be good adhesion between the adhesive coated patches and the bag.

Bag Feed and Alignment

Bags are fed into the conveyor 12 by means of the bag feed mechanism 14. As shown in FIGURES 1, 2, 3 and 5 in particular, the bag feed mechanism 14 generally comprises a frame 140 having a tray like bag support 142 mounted thereon and means for removing a bag from the support 142 and delivering it to the conveyor 12.

Positioned along the top of the support 142 are a series of sprocket driven chains 144. A stack of bags 145 is placed on top of the chains 144 and in a generally upright position. The innermost bag on the stack, as shown in FIGURE 1, is adjacent to a pickup arm 146 which is of the suction type. This pickup arm 146 is intermittently rocked up and down so that during the up stroke the suction effect on the arm is operative and the innermost bag is held by the arm 146 until the bag is delivered to a guide and transfer means 148.

The guide and transfer means 148 comprises a pair of constantly driven and endless belts 150 and a pair of rotating discs 152. The endless belts 150 are positioned above the rotating discs 152 and together these form a guide means for the bag picked up by the arm 146. After the bag has been carried into the nip between the belts 150 and the discs 152 the suction effect of the pickup arm is cut off and primary movement of the bag is taken over by the transfer means 148. The pickup arm 146 is then returned to its lower position and the suction effect becomes operative once more so that the arm may pick up the next bag.

In order to insure that the bag "B" which is moved through the transfer means 148 is in proper alignment with the conveyor 12, a pair of rotating guides 154 are positioned between the transfer means 148 and the conveyor 12. These guides 154 positively position any bag which is not in proper orientation with the conveyor 12. Thus, the guides 154 help to insure that bags moved by the conveyor are in proper registry with the handle patches which are moved by the rotating sector arm 94.

To assist the pickup arm 146 in raising a bag into engagement with the transfer means 148, a retaining system is utilized. Positioned above the stack of bags 143 is a finger member 156 with a downwardly projecting lip portion. This finger 156 is intermittently rocked back and forth so that a portion of the stack of bags 143 is lifted away from the bag being picked up by the arm 146. By this means the static load pressing against the bag being moved is reduced and its removal is eased.

Finger 156 is rocked back and forth by means of a linkage system 158 which is activated by a rotating cam 160. A follower 162 is located on link 164 of the system 158 and one end of this link 164 is fixedly pivoted at 166 to the frame 140. Attached to link 164 is a short connecting link 167 which also is pivoted to an intermediate link 168 of the linkage system 158. Attached to the link 168 and the frame 140 is a spring 170. When the follower 162 rides on to the low side of the rotating cam 160, the spring 170 pulls the intermediate link 168 downwardly so that the finger 156 is rocked downwardly and outwardly from the position shown in FIGURE 3 so that its tip portion engages all but a small portion of the stack of bags resting on the tray 142 and thus lifts the outer portion of the stack of bags away from the inner portion of the frame 140.

Also attached to link 164 is a vertical link member 172. This link 172 is pivotally connected to a clevis member 172 which is fixed on to a shaft 176. Attached to the

shaft 176 is a linkage 178 which is connected to a set of fingers 180 mounted on a side bag guard 182. As the shaft 176 is rocked by the movement of the link 172 the fingers 180 are actuated so that they operate in co-operation with the upper bag retainer 156 and the fingers 180 assist in holding back a portion of the stack of bags 143. Pivotally connected to the clevis 174 is a link 184 which is in turn pivoted to a second clevis 186. The clevis 186 is fixed on to a shaft 188. Attached to a shaft 188 is a linkage connection 190 which is similar to the linkage connection 178. Fingers 192 are mounted on a second set of side bag guards 194. The operation of the combination of link 184, clevis 186, shaft 188, linkage 190, fingers 192 is similar to that previously described for the components 172-182.

The side guards 182 and 194 may be adjustably positioned by means of a wheel and shaft 196 and the position of the support 142 may be adjusted by means of a wheel 198 which moves a gear 200 along a rack 202.

The sprocket driven chains 144 on which the stack of bags rests are used to advance the stack of bags towards the pickup arm 146. The chains are turned by a shaft 204 on which are mounted the sprocket wheels 205 for driving the chains. The shaft 204 is turned by an electric motor 206 and this motor is made operative by a limit switch 208 which is mounted on the lower side bag guards 194. When a sufficient number of bags have been withdrawn from the stack 143 which rests on the chains 144 the limit switch 208 activates the driving motor 206 and the chains are driven forward. The limit switch is completely moved aside at which time power to the motor 206 is shut off and the drive of the chains 144 halted.

Driving Mechanism

Moving power for driving the various components of the bag handle machine is furnished by an electric motor 210 as shown in FIGURE 2. The various drive connections are shown particularly in FIGURES 2-6. Referring to FIGURE 2, a speed reducer 212 is connected to the electric motor 210. A driven shaft extends from the speed reducer 212 and a pulley wheel 214 is mounted thereon. A series of V-belts 216 are driven by the wheel 214 and these V-belts 216 in turn drive a large pulley wheel 218 which is mounted on a shaft 220. As shown in FIGURES 2 and 4, a sprocket gear 222 is fixed on shaft 220 and this gear drives a chain 224 which in turn drives a pair of gears 226. Gears 226 are similar and each drives one of the transfer mechanisms 11. Therefore the operation of only one of the gears will be described.

Gear 226 is mounted on the shaft 92 which rotates the sector arm as hereinbefore discussed. Mounted on the shaft 92 and adjacent to the sector arm, as shown in FIGURE 6, is a gear 228. This gear 228 drives a second gear 230 which in turn drives a stub shaft 232 on which the gear 230 is mounted. Also mounted on the stub shaft 232 is a gear 234 which drives a chain 236. Chain 236 turns a sprocket gear 238 that is mounted on shaft 82 and thus drives the wire belts 78 which are used to pull the finished handle patch through guide unit 74. Also mounted on the shaft 232 is another gear 240. Gear 240 is connected by a chain 242 which drives a gear 244 which is mounted on a shaft 252 which carries the adhesive roll 134. Also mounted on shaft 252 is a gear 250 which meshes with a gear 254. Gear 254 is mounted on shaft 256 which also carries the coating roll 136. Thus, the coating roll 136 and the adhesive roll 134 are turned together and a fresh coating of adhesive is continuously applied by the roll 136 to the adhesive roll 134.

Also mounted on the shaft 92 is a gear 258. Gear 258 is connected by a chain 260 which is in turn connected to a gear 262 which is mounted on a shaft 264 and this shaft 264 carries the knife roll 66. Also mounted on shaft 264 is a second gear 266 which meshes with a large gear 268 mounted on the shaft 270, which shaft carrying the back

up drum 40. The pitch of the gears 266 and 268 is such that the knife edge 70 carried by the cutter roll 66 strikes the same point on the back up roll or drum 40 only once in about every 3000 revolutions.

The conveyor 12 is comprised of a series of belts 272 which are drive so that the lower set of belts has tension on its upper run 274 and, thus, insures a good friction drive between the upper and lower belts. Because of the good friction drive between the upper and lower belts the bags are surely and quickly pulled through the conveyor 12. Drive for the belts 272 is furnished by a gear 276 which is mounted on the main drive shaft 220, as shown in FIGURE 4. The gear 276 mates with another gear 278 which is mounted on a stub shaft 280. Also mounted on shaft 280 is a gear 282. Gear 282 is connected by a chain 284 to a gear 286 which is mounted on a hub 288. The hub 288 is free turning and mounted on a shaft 290. Also mounted on the shaft 290 are rolls 292 for the lower belts 272. As shown in FIGURE 5, a gear 294 is mounted on the hub 288 beside the gear 286. This gear 294 is connected by a long chain 296 to a gear 298 which is located near the opposite end of the conveyor 12. Gear 298 is fixed on a shaft 300 and also fixed on the shaft 300 are rollers 302 for the lower set of belts 272. The rollers 302 are driven by the rotation of the shaft 300 and the rotation of the rollers 300, as shown in FIGURE 3 is clockwise. As a result of this clockwise rotation of rollers 302 tension is provided in the upper run 274 of the lower set of belts 272. This keeps the upper run 274 taut and insures that there will be a good friction contact between the sets of belts 272 as discussed hereinbefore.

The bag feed means is driven by a gear and chain arrangement which is connected to a gear 304 which is mounted on the main drive shaft 220. A chain 306 is connected between gear 304 and a gear 308 which is mounted on the main shaft 310 for the bag feed mechanism, as shown in FIGURE 3. Also mounted on the shaft 310 is a large gear 312 which rotates a mating gear 314. Gear 314 is mounted on a shaft 316 and it is this shaft 316 which carries the rotating cam 160 for activating the linkage system 158 for the bag retainers 156 as hereinbefore described. Also mounted on the shaft 316 are the large rotating discs 152 which cooperate with the endless belts 150 to form the guide and transfer means 148. A smaller gear 318 which meshes with gear 314 is mounted on a shaft 320. Fixed on the shaft 320 are two large pulley wheels 322 and the endless belts 150 run over these wheels 322. As shown in FIGURES 2 and 3, a smaller set of wheels 324 are mounted on a shaft 326 which is free turning and positioned forwardly of the shaft 320. The belts 150 also turn over the small wheels 324.

Gear 314 also meshes with a smaller gear 328 as shown in FIGURE 2. This gear 328 in turn drives a mating gear 330 which is mounted on a shaft 332. The rotating guides 154 which help to position the bag being fed by the bag feed to the conveyor 12 are fixed on this shaft 332. As shown in FIGURES 2 and 4 a third small gear 334 meshes with gear 330. Gear 334 is mounted on a shaft 336 and this shaft 336 has two discs 338 mounted thereon and positioned adjacent to the thickened center portion 340 of shaft 330. It will thus be seen that the bags which are guided by the rotating guides 154 are firmly positioned by the discs 338 pressing against the thickened portion 340 of the shaft 330. As a result, the bag is moved into proper longitudinal orientation with the belts 272 of the conveyor 12.

From the foregoing it will be seen that the present apparatus permits controlled motion and relation between the various components of the present apparatus inasmuch as one driving means is used to furnish the initial prime power from which all the interrelated moving units are driven.

What is claimed is:

1. Apparatus for forming handle patches of the type adapted to be applied to multi-wall bags and the like, said apparatus comprising a supply of patch material in strip form, a supply of handle cord or the like, press means including a drum with a press roll adjacent thereto forming a nip therebetween, a mechanism for continuously disposing said cord in loop fashion adjacent to said nip and to said patch material, said drum and roll comprising rotating press means whereby said cord and patch material may be drawn therethrough to form a composite handle patch strip.

2. Apparatus as defined in claim 1 and further including a cutter positioned adjacent to said drum whereby the composite handle patch strip passed between said drum and roll may be severed into individual handle patches.

3. Apparatus as defined in claim 1 and further including a plurality of press rolls adjacent to and about the periphery of said drum.

4. Apparatus as defined in claim 1 and further including a plurality of rolls arranged in series adjacent to and about a substantial portion of the periphery of said drum and a cutter roll also adjacent to and at the periphery of said drum, said cutter being positioned after the series of rolls in the direction of rotation of said drum.

5. Apparatus as defined in claim 4 wherein said cutter roll has a knife edge projecting therefrom and positioned lengthwise of said drum, the rotation of said drum and said cutter roll being in timed relation whereby said knife edge contacts the same portion of said drum only once in a plurality of revolutions of said drum.

6. Apparatus for forming handle patches and applying said handle patches to multi-wall bags and the like, said apparatus comprising a rotary handle patch forming mechanism, central drive means interconnecting said mechanism with a conveyor for moving a line of bags and with transfer means for positioning a formed handle patch in timed relation to a bag moved by said conveyor, said transfer means including a guideway for orienting the direction of a formed handle patch, adhesive coating means, a transfer arm for holding said patch and moving same into contact with the adhesive coating means and thereafter applying said coated patch to a moving bag on said conveyor, and means for moving said arm.

7. Apparatus as defined in claim 6 and including a suction source, and said gripping means including a face plate mounted on said transfer arm, openings in said face plate, connection means between said suction source and said openings whereby a suction effect is applied at said openings to hold a handle patch in contact with said face plate.

8. Apparatus as defined in claim 7 and further including a cutoff means for controlling the suction source, said cutoff means being operative to cut off said suction effect at the holes in the face plate at a preselected time whereby said suction is effective at said openings when the face plate is adjacent to the guideway and becomes ineffective when said face plate is adjacent to said conveyor so that a handle patch is transferred from said guideway to a bag moved in timed relation therewith through said conveyor.

9. In a bag handle patch forming and applying machine, the combination comprising a supply of strip material, a supply of handle cord or the like, a variable position feeding device for continuously disposing the cord in looped handle fashion onto said strip material, a rotatable and driven back-up roll and a rotatable roll of smaller diameter in frictional contact therewith forming a pair of press rolls, said press rolls adjacent to the feeding device whereby said strip and cord enter between said rolls for pressing after the cord has been placed on the strip in handle fashion, a cutter located relative to the press rolls and selectively engaging the pressed strip and cord to sever said strip and cord into handle patches, adhesive applying means, transfer and press

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means to transfer each patch past the adhesive means for coating and to a position opposite a bag carried by a bag transfer device whereby the adhesive coated patch is applied to and pressed onto said bag.

10. In a bag handle patch forming and applying machine, the combination as defined in claim 9 wherein the cutter includes a driven roll having a knife edge axially oriented on the periphery thereof, said knife edge being located in touching contact with the back-up roll.

11. In a bag handle patch forming and applying machine, the combination as defined in claim 10, and including drive means for rotating the back-up roll and the cutter roll in timed relation wherein the knife edge contacts the same portion of the back-up roll only once in a plurality of revolutions of the back-up roll.

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12. In a bag handle patch forming and applying machine, the combination as defined in claim 9, wherein at least one additional roll of smaller diameter is in contact with the back-up roll and positioned between the cutter and the first roll of smaller diameter whereby the formed cord and strip material is further pressed before being severed.

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