June 14, 1960 J. D. CONTI 2,940,236

SEMI-AUTOMATIC WRAPPING MACHINE

Filed Sept. 17, 1956 6 Sheets-Sheet 1

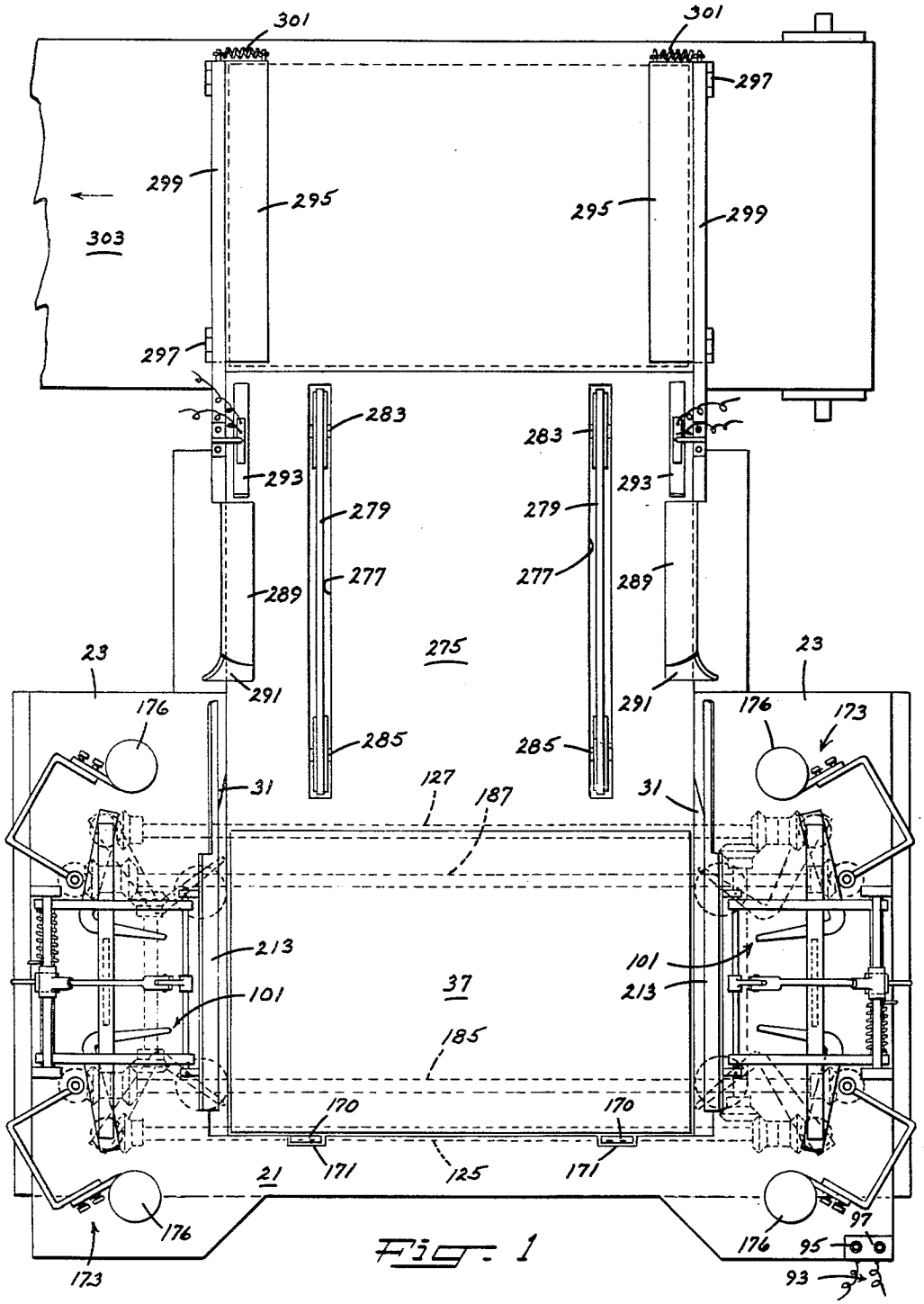


Fig. 1

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SEMI-AUTOMATIC WRAPPING MACHINE

Filed Sept. 17, 1956 6 Sheets-Sheet 2

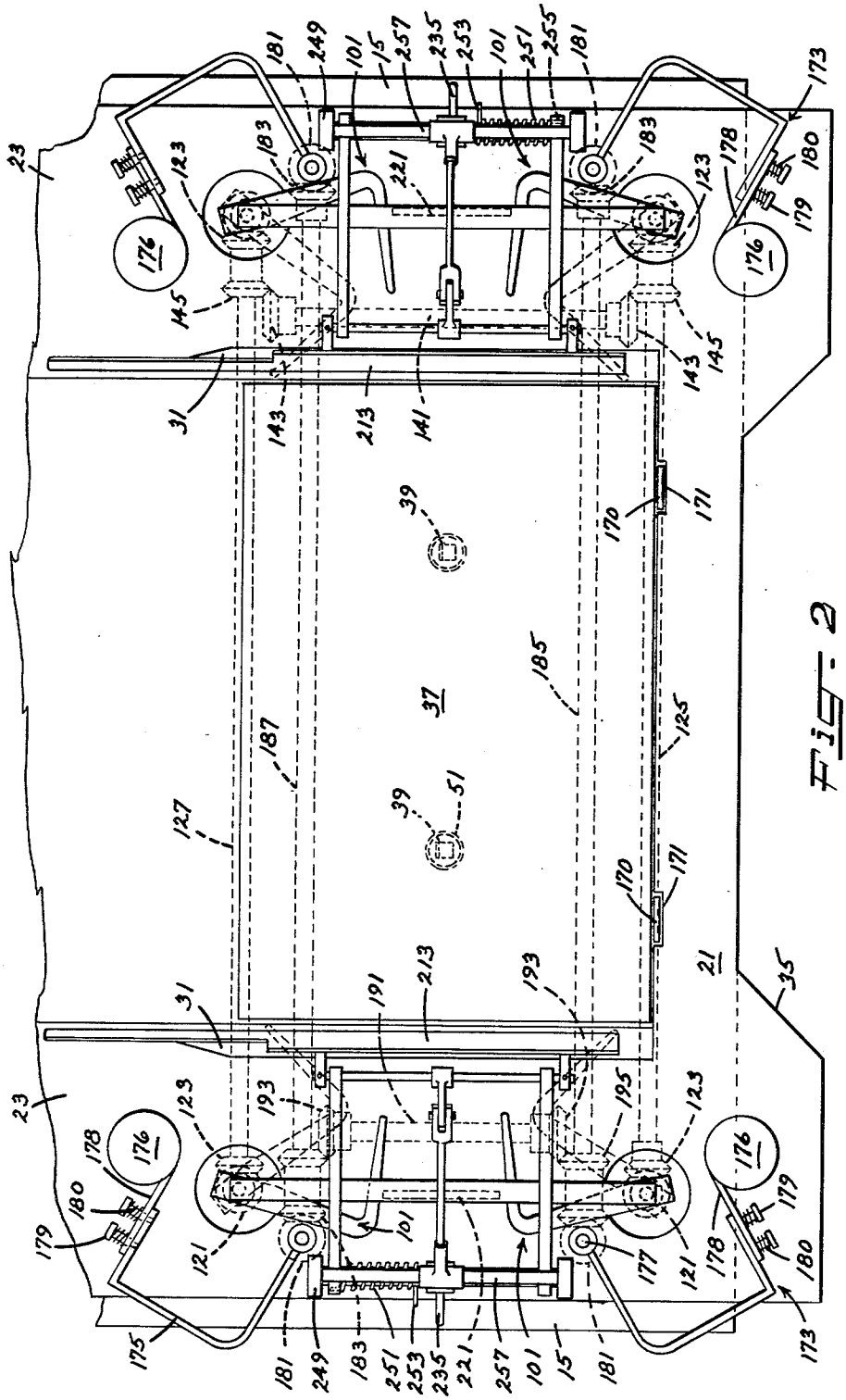


Fig. 2

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SEMI-AUTOMATIC WRAPPING MACHINE

Filed Sept. 17, 1956 6 Sheets-Sheet 3

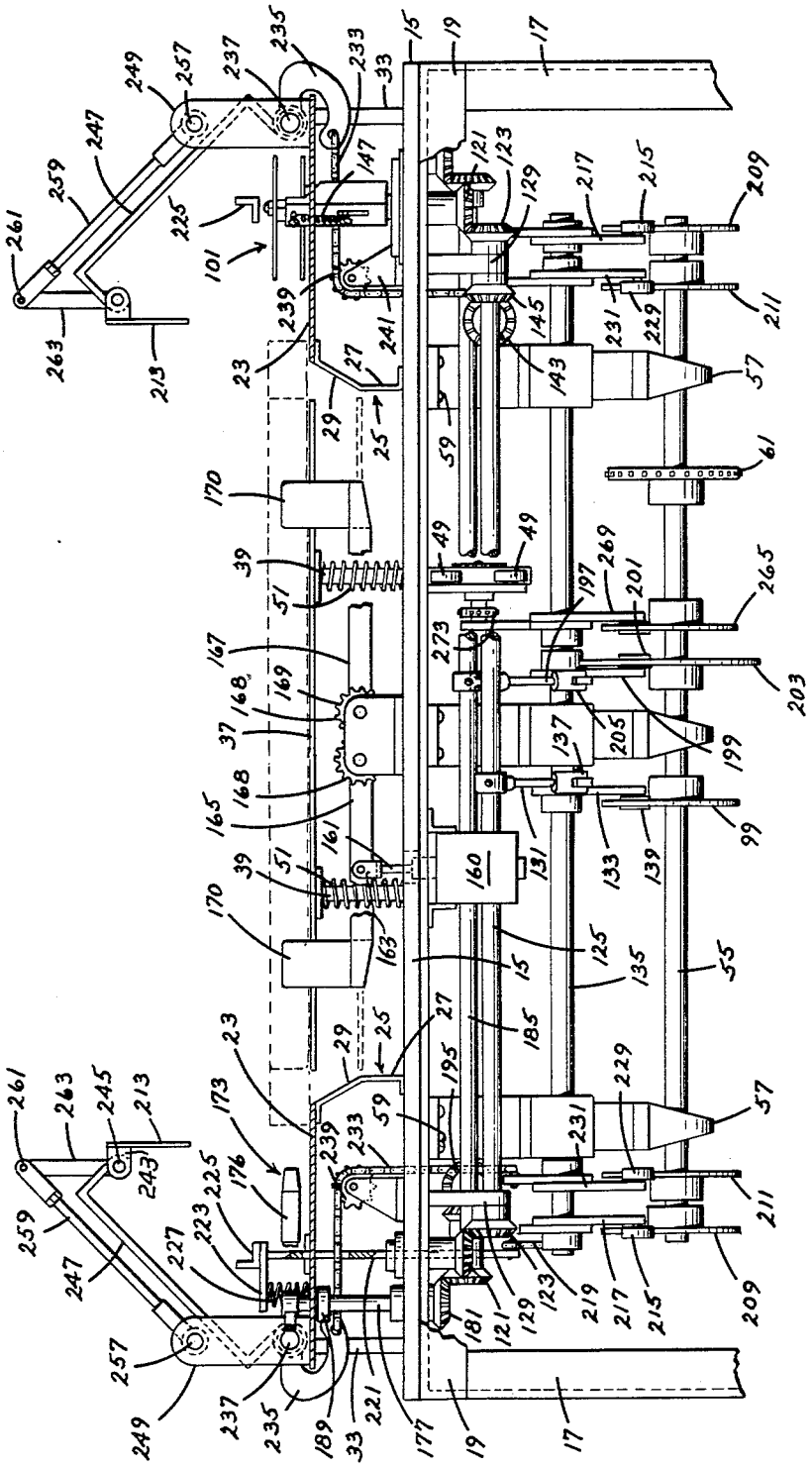


Fig. 3

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SEMI-AUTOMATIC WRAPPING MACHINE

Filed Sept. 17, 1956 6 Sheets-Sheet 4

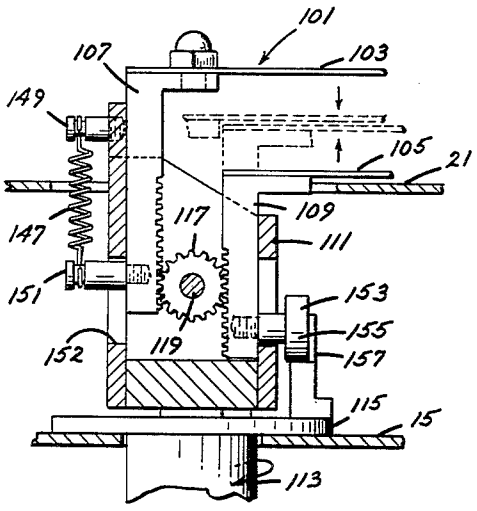


Fig. 6

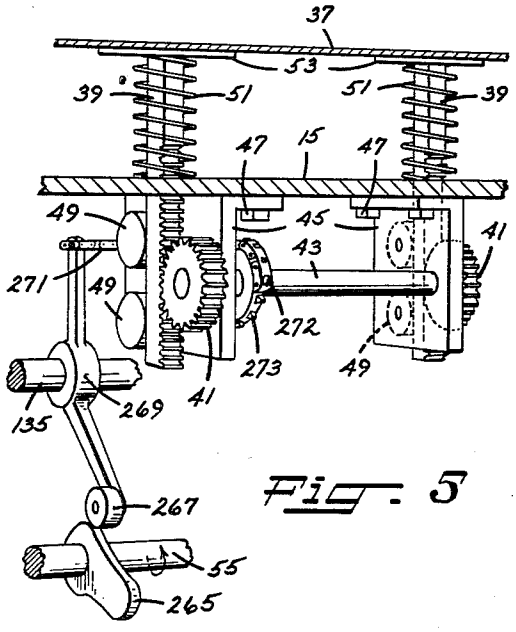


Fig. 5

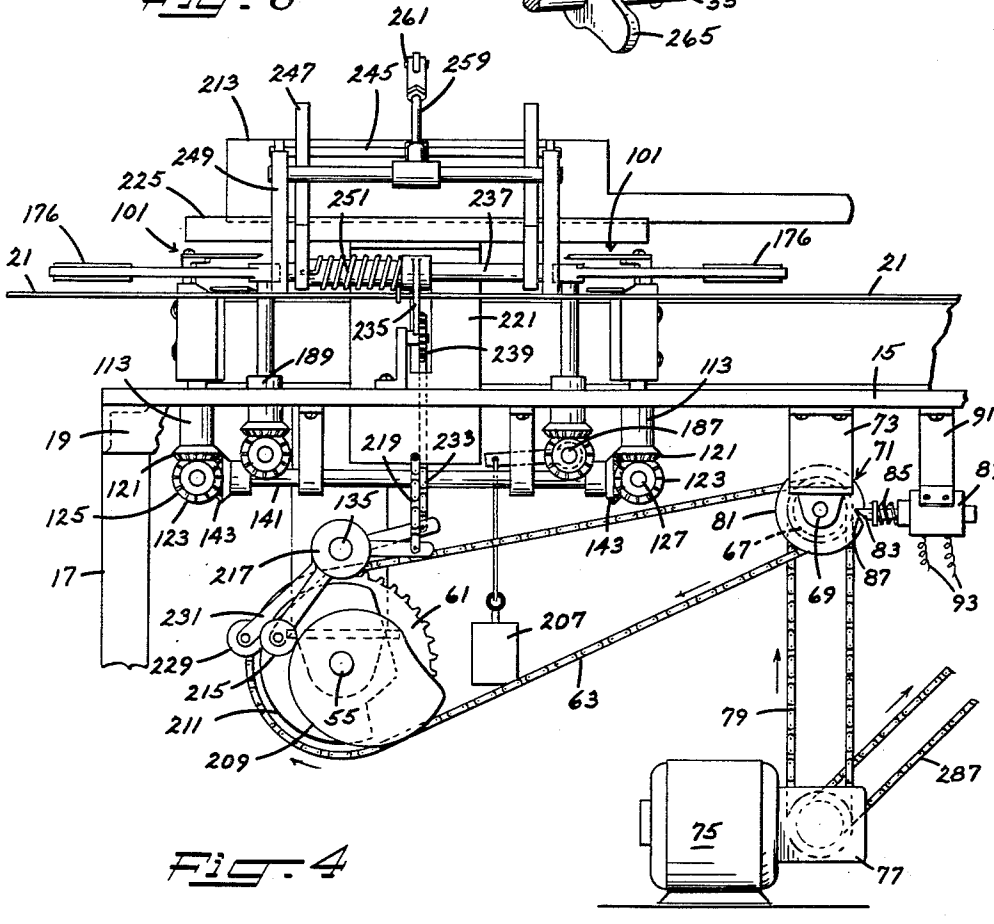


Fig. 4

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SEMI-AUTOMATIC WRAPPING MACHINE

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Fig. 7

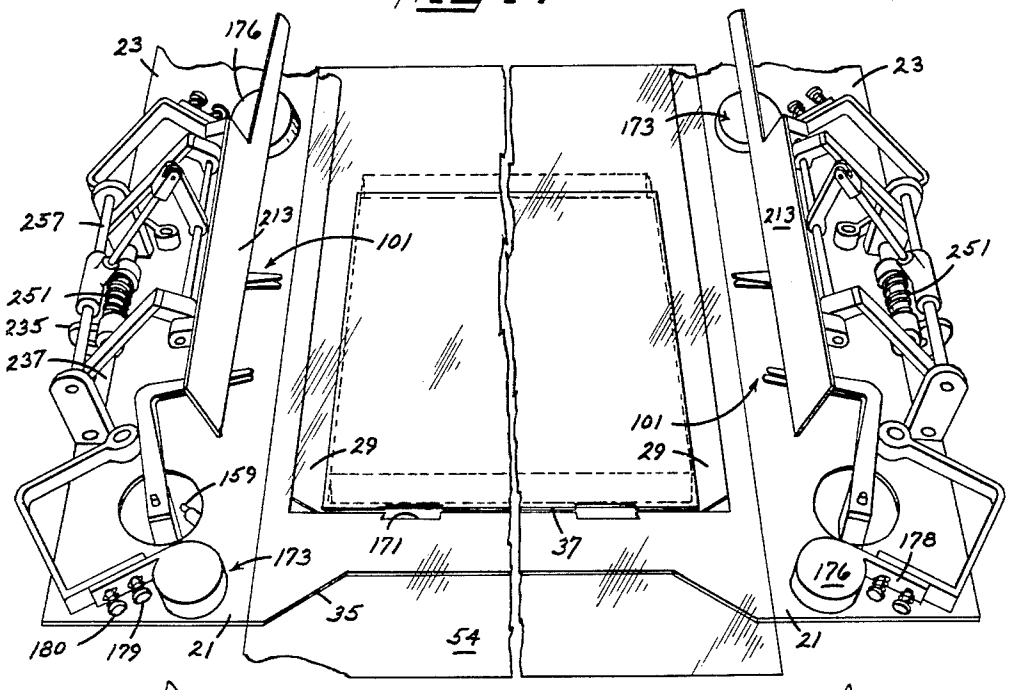
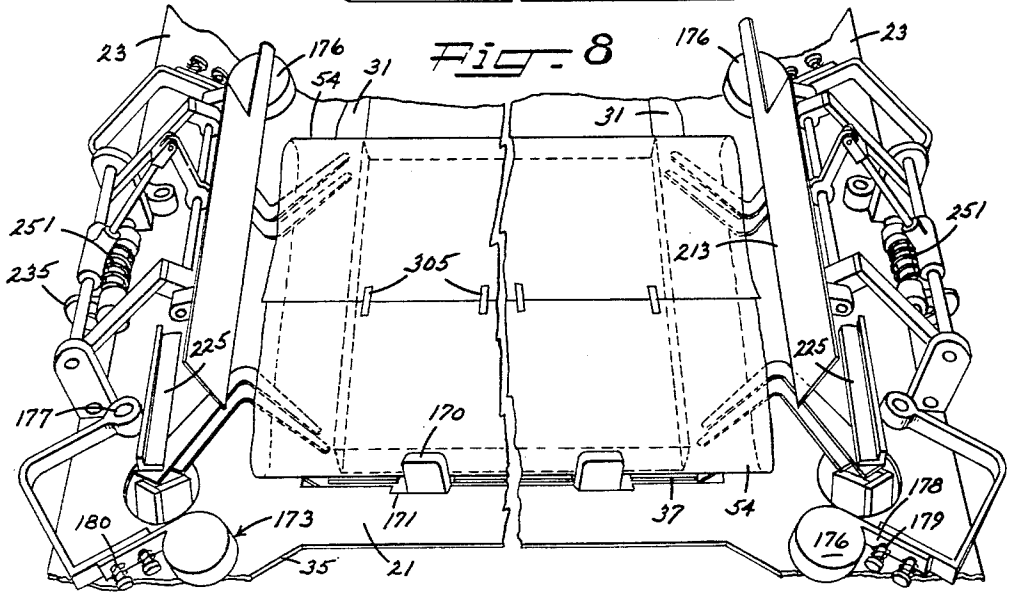


Fig. 8



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SEMI-AUTOMATIC WRAPPING MACHINE

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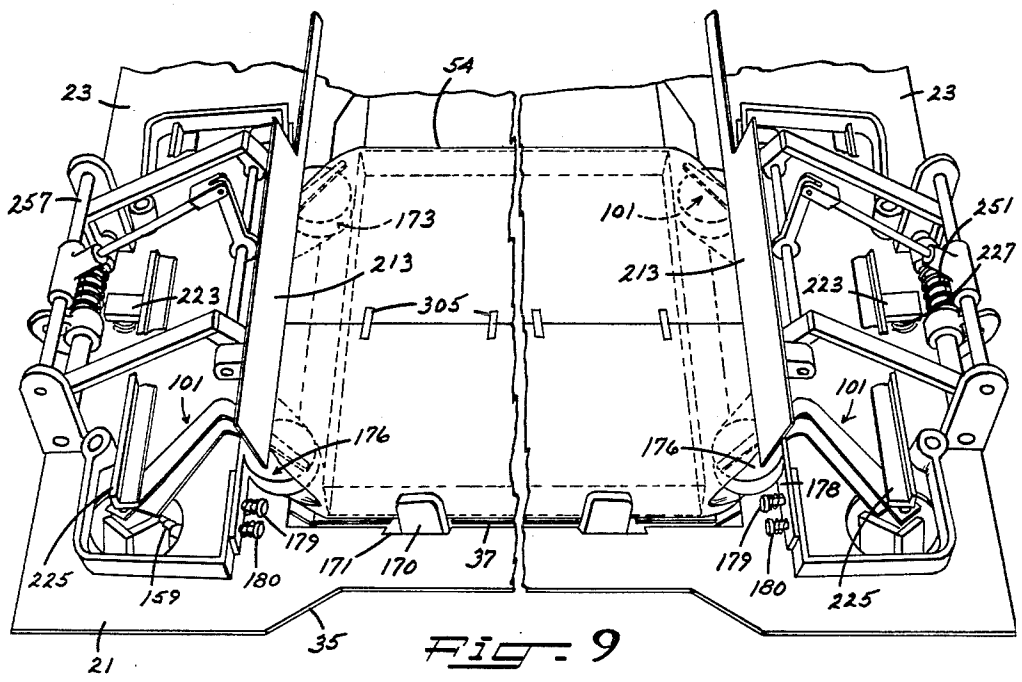


Fig. 9

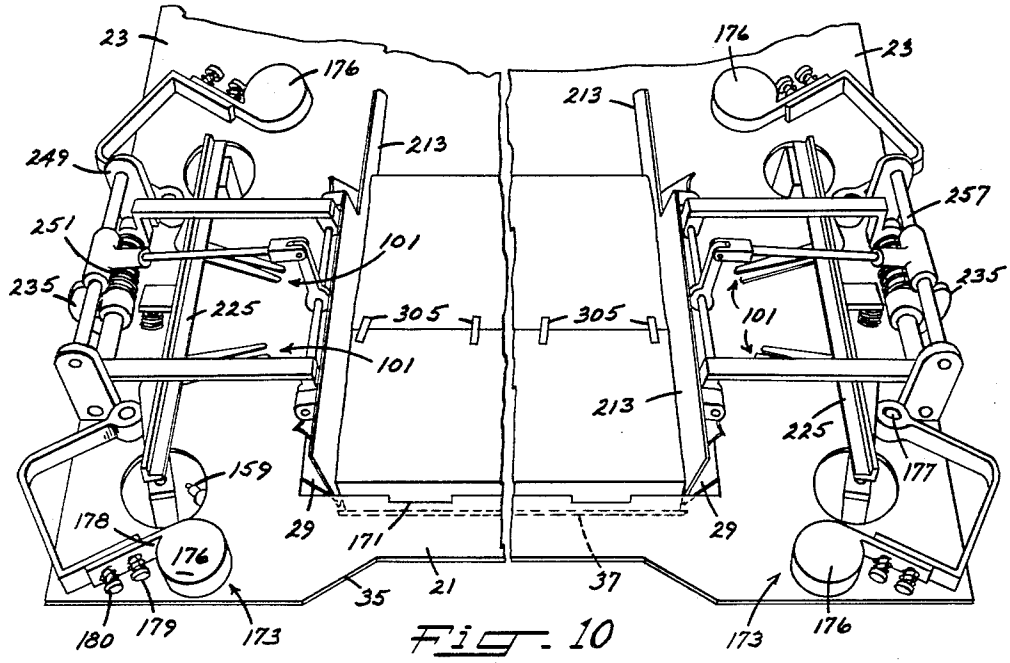


Fig. 10

United States Patent Office

2,940,236

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2,940,236

SEMI-AUTOMATIC WRAPPING MACHINE

John D. Conti, Elkins Park, Pa., assignor to American Viscose Corporation, Philadelphia, Pa., a corporation of Delaware

Filed Sept. 17, 1956, Ser. No. 610,350

16 Claims. (Cl. 53—379)

The invention relates to package wrapping, and particularly to wrapping of irregular shaped articles or packages.

In wrapping articles with sheet materials, efforts have been primarily directed to the wrapping of articles or packages which are somewhat flexible or plastic and can be easily made to conform to a desired shape, or to articles each having a definite and fixed regular shape. In the first instance, it can be considered that the article or package is deformed or molded by the wrapper material into a desired configuration, while in the latter case the sheet material wrapper actually assumes the shape of the article being wrapped. Thus, the known and conventional equipment utilized to accomplish the above noted wrapping procedures are designed, in general, to provide a series of wrapped packages having the same shape, either by deforming the article or by starting with a package having a fixed regular shape. In view of the intended functions of these conventional wrapping systems, their use has not been satisfactory with articles having shapes which are not adapted nor intended to be deformed, since considerable and frequent individual adjustment would be involved for each wrapping operation. Furthermore, with the conventional machines, the wrapper would more than likely assume the appearance of a loose fitting bag around an irregular article rather than a snug fitting cover which presents a neat appearance. It is therefore a primary object of the present invention to provide a new or generally improved and more satisfactory article wrapping apparatus.

Another object is to provide an apparatus capable of applying a sheet material wrapper snugly about an irregular shaped article, with the wrapper end portions neatly folded to substantially conform with article itself.

Still another object is the provision of a wrapping apparatus in which a sheet material is disposed about an irregularly shaped article, tucked at its ends to form pleats which are gripped and made to snugly conform with the article itself, folded, and sealed.

A further object is to provide a wrapping apparatus having improved package end folding means in which the end portions of a sheet material disposed about an irregularly shaped package are pleated, made to snugly embrace the package, folded, and sealed.

A still further object is to provide an article wrapping apparatus which is relatively simple in construction, can be easily and safely operated, and perform its package wrapping and delivery functions in a rapid and substantially automatic manner.

These and other objects and advantages of the invention will be apparent from the following description and accompanying drawing in which:

Figure 1 is a plan view of the apparatus of the present invention;

Figure 2 is a view similar to Figure 1 illustrating a portion of the apparatus on an enlarged scale;

Figure 3 is a front view of a portion of the apparatus shown in Figure 1;

Figure 4 is a right side view of the structure shown in Figure 2;

Figure 5 is a perspective view of the table elevating mechanism of the present invention;

Figure 6 is a detail section illustrating the wrapper gripping means;

Figure 7 is a perspective view of a portion of the apparatus showing the relative locations of the various parts at the start of operation;

Figure 8 is a view similar to Figure 7 showing the first wrapping stage with the wrapper grippers advanced into an inward position after which the wrapper itself is manually placed about the package as shown;

Figure 9 is a view similar to Figures 7 and 8 showing the second wrapping stage with the tuckers pleating the wrapper material at the package corners; and

Figure 10 is a view similar to Figures 7–9 showing the folder plates depressed against the pleated end portions of the wrapper material.

Generally, the invention relates to an apparatus for wrapping articles or packages either of regular or irregular shape. The article is first placed on a sheet of wrapping material, the front and rear ends of which are subsequently overlapped manually to form a flattened tube about the article. The remainder of the article wrapping is accomplished in a substantially automatic manner by passing the same through three wrapping stages. During the first stage, a pair of gripping fingers are swung inwardly toward the article adjacent each of its corners, with the fingers assuming a spaced apart position after moving beyond the ends of the wrapper. At this point, the wrapping material is shaped into a tube as noted above. The second wrapping stage, effects the pleating of the wrapper at the article corners by snap acting tuckers, each of which swing inwardly between each pair of gripping fingers. As the tuckers return toward their rest position, the gripping fingers are all urged toward each other to pinch the pleated portions of the wrapper therebetween, and folder plates are urged downwardly, toward the end portions of the package. Just prior to engagement of the end folder plates with the package wrapper, the gripping fingers are removed to their rest position, and at the instant that the folder plates engage the wrapper, the wrapping table, on which the article is disposed, is rapidly lowered to provide a neat crease along the package sides. The final stage of wrapping merely requires the operator to slide the package off the wrapping table onto a conveying means where wrapper sealing is accomplished, and to actuate the apparatus to return the parts thereof to their initial position.

With reference to the drawings, the apparatus is provided with a main or supporting framework including a horizontally disposed panel **15** supported in an elevated position by legs **17**, with suitable reinforcing members, such as indicated at **19** being provided to form a rigid structure. At the forward end of the apparatus, a U-shaped platform **21**, having laterally spaced legs **23** (see Figures 1 and 2), is disposed above the panel **15** and is supported in an elevated position by a pair of laterally spaced angulated members **25** each having a vertical wall **27** and an inclined wall **29**, the latter of which merges with the vertical wall as shown at **31**. Additional struts, such as shown at **33**, may be employed to rigidly secure the platform **21** in position. Preferably, the platform **21** is located at approximately a waist high position and is shaped at its forward end as shown at **35** to enable the operator to observe and perform the necessary operations with ease, as hereinafter described.

A wrapping table **37** (see Figure 5) is disposed be-

tween the legs 23 of the platform 21 and is provided on its undersurface with a pair of laterally spaced rack bars 39 which project downwardly through suitable openings in the panel 15 and mesh with the pinion gears 41 fixed to the opposite ends of a shaft 43. The shaft 43 is rotatably supported below the panel 15 by angle brackets 45 fixed, as by screws 47, to the underside of the panel. Guide rollers 49 are rotatably mounted on the angle brackets 45 for maintaining the rack bars 39 engaged with their respective pinions 41, and in addition serve to guide the rack bars along their vertical travel. In the starting or normal position, the wrapping table 37 lies in the horizontal plane of the platform 21 under the action of coiled compression springs 51 which encircle the rack bars 39 and are interposed between the panel 15 and load distributing plates 53.

In wrapping articles with the apparatus of the present invention, the article is first placed upon a sheet of wrapping material 54, such as cellophane, laid flat on the table 37. The opposite ends of the wrapper are then overlapped and sealed to form a flattened tube about the article as seen in Figure 8. The side portions of the wrapping material are then manipulated by a pair of tuckers, grippers, and folder plates to complete the article wrapping.

The operation of the tuckers, grippers, and folder plates is accomplished automatically and in a desired sequence by a series of plate cams fixed to a shaft 55 which is rotatably supported at its opposite ends by brackets 57, secured at 59 to the panel 15. A sprocket 61 is fixed to the shaft 55 and is driven by a link chain 63, which in turn engages over a sprocket 67 of a conventional one-revolution clutch carried by a shaft 69, and generally indicated by the reference numeral 71. The shaft 69 is suspended from the panel 15 by brackets 73 and, during operation of the apparatus, is continuously rotated by a motor 75 acting through a speed reducer 77 and a link chain 79. The sprocket 67 is formed as an integral part of a clutch plate 81 which is freely rotatable on a shaft 69 and is normally maintained in a stationary position by a plunger 83. As shown in Figure 4, a spring 85 resiliently urges the plunger 83 into a notch 87 formed in the periphery of the clutch plate 81. A solenoid 89, supported from the underside of the panel 15 by the bracket 91, serves to retract the plunger 83 when energized through wires 93, which are electrically connected to a suitable electrical source and a switch 95 (see Figure 1). A second switch 97 is provided for starting the motor 75.

As more fully explained hereinafter, the clutch plate 81 is caused to rotate through three complete revolutions during the wrapping of each article, with the revolutions each taking a place at selected intervals as determined by the operator. Since the rotary movement of the clutch plate 81 is transmitted directly to the shaft 55, a 1 to 3 ratio is provided between the sprockets 61 and 67 so that the shaft 55 moves through one-third of a revolution with each rotation of the clutch plate 81 and at all times assumes the same starting position after the wrapping of each article.

During the first one-third revolution of the shaft 55, a plate cam 99 affixed thereto causes the grippers, generally indicated at 101, to rotate from their position shown in Figure 7 to a position between the edge portions of the wrapper 54 as shown in Figure 8. Each of the grippers 101 includes a pair of sheet metal fingers or finger elements 103 and 105, each being secured at one end to the upper ends of rack bars 107 and 109, respectively. The rack bars 107 and 109 of each of the grippers project downwardly through suitable openings in the platform 21 and are received within tubular housings 111, which in turn are rotatable with stub shafts 113 passing through the panel 15 and engaging with fixed bearing plates 115. As more fully described hereinafter, the rack bars 107 and 109 of each of the grippers mesh with a pinion gear 117 rotatably mounted on a shaft 119 in the housing 111. To permit the finger elements 103 and 105 to reciprocate relative to each other, the lower element 105 of each of the grippers 101 is preferably bonded to its rack bar 109 to avoid any projections above the upper surface of the element 105. Bevel gears 121 are fixed to the lower ends of the shafts 113 and mesh with similar bevel gears 123 secured to the outer ends of the shafts 125 and 127, rotatably supported below the panel 15 by the bearing blocks 129.

As best seen in Figure 3, rotary movement is imparted to the shaft 125 through a link 131 and a bell crank lever 133, the latter of which is fixed to a shaft 135 rotatably supported by brackets 57. One arm of the bell crank lever 133 is pivotally connected at 137 to the bifurcated end of the link 131 which has its opposite end fixed to the shaft 125, while the other arm of the lever 133 carries a roller 139 which rides along the eccentric periphery of the plate cam 99. The shafts 125 and 127 are interconnected by a shaft 141 and meshing bevel gears 143 and 145 (see Figure 2), and thus the grippers 101 all move in unison toward and away from their positions shown in Figure 8 in accordance with the rocking movement of the bell crank lever 133.

In Figure 6, there is disclosed one of the grippers 101, which at the start of its operation has its fingers 103 and 105 in positions as shown by broken lines. A spring 147 constantly urges the finger 103 in an upward direction, and is connected at one end to the pin 149 fixed to the housing 111 while its opposite end engages over a pin 151 passing through an elongated slot 152 in the housing 111 and fixed to the rack bar 107. As the shaft 113 is rotated in the direction of the arrow in Figure 6, a roller 153, rotatably carried by a pin 155, rides along an annular cam surface 157, thereby causing the rack bar 109 to move into its lowermost position. This movement of the rack bar 109, rotates the pinion 117 which in turn elevates the rack bar 107. Since the edge portions of the wrapping material 54 may at times develop a curl, the cam surface 157 is so designed that the fingers 103 and 105 separate only after their leading ends have passed over the edge portions of the wrapping material, and in this manner prevents any tendency for the lower finger 105 to engage with the wrapper edge. While the above description has been limited to one of the grippers 101, it will be understood that the remaining grippers are actuated in a similar manner by structure corresponding to that described.

As the grippers 101 approach the terminal portion of their inward swing, one of the grippers, as for example the forward gripper, shown at the left side of Figure 7, engages with a microswitch 159 which is electrically connected to a solenoid 160 suspended from the panel 15. The plunger 161 of the solenoid 160 is pivotally connected at 163 to one arm 165 of a pair of cooperating arms 165 and 167. At their adjacent ends, the arms 165 and 167 are provided with meshing pinion gears 168, which in turn are rotatably mounted between the brackets 169 supported on the panel 15. The free ends of the arms 165 and 167 carry stop plates 170 which are adapted to be projected upwardly through the notches 171 formed in the platform 21 adjacent the wrapping table 37. Thus, as the solenoid 160 is energized the plunger 161 is elevated causing the arms 165 and 167 to pivot upwardly and urge the stop plates 170 above the surfaces of the table 37. In their elevated position, the stop plates 170 raise the wrapper material 45 above the surface of the platform 21 to enable the operator to more easily grasp the same, and also serve as abutments against which the package may be pressed during the initial manual wrapping step.

At this point in the wrapping procedure, the various parts of the apparatus have assumed positions as shown in Figure 8. The second phase of the wrapping procedure is initiated by the operator depressing the switch 95, thereby energizing the solenoid 89 and allowing the

clutch plate **81** to make one complete revolution after which it is stopped by the plunger **83**. As heretofore explained, the single revolution of the clutch plate **81** causes the shaft **55** to move through one-third of a revolution, which in turn actuates tuckers **173** to pleat the package at its corners.

The tuckers each included a U-shaped member **175** carrying a weight **176** at one end, while its opposite end is secured to a shaft **177** passing through suitable openings in the platform **21** and the panel **15**. As shown in Figures 1 and 2, the weight **176** of each tucker **173** is fixed to one end of an arm **178** which is connected to the member **175** by a pair of bolts **179**. Springs **180** are interposed between the arms **178** and the heads of the bolts **179** to allow the weights to move relative to their respective member **175** with a resilient action for purposes as hereinafter described. The lower ends of the shafts **177** are provided with bevel gears **181** which mesh with similar bevel gears **183** fixed to the ends of the shafts **185** and **187**. As seen in Figures 1 and 2, the shafts **185** and **187** extend transversely of the apparatus and are rotatably supported below the panel **15** by suitable bearing blocks. Thrust bearings **189**, see Figure 2, are secured to each of the shafts **177** and restrict their movement in an axial direction. In a manner similar to the shafts **125** and **127**, the shafts **185** and **187** are interconnected by a shaft **191** and the cooperating bevel gears **193** and **195**.

Movement is imparted to the shaft **185** by a link **197** and a bell crank lever **199**, the latter of which is rotatably carried on the shaft **135**. One arm of the lever **199** carries a roller **201** which rides along the eccentric periphery of a plate cam **203** fixed to the shaft **55**, while the other end of the lever **199** is pivotally secured at **205** to the bifurcated end of the link **197**. The opposite end of the link **197** is fixed to the shaft **185**, and thus the rocking movement of the bell crank lever **199**, as determined by the cam **203**, is simultaneously transmitted to the tuckers urging the same between the fingers **103** and **105** to effect the wrapper pleating as shown in Figure 9. The cam **203** is so designed as to cause the tuckers to swing inwardly between the fingers **103** and **105** and return to their initial starting position with a snap action. To assist in accomplishing this result, the shaft **187** is weighted, as shown at **207**, to urge the same in a counterclockwise direction as viewed in Figure 4.

Simultaneously with the movement of the tuckers **173** to their initial starting position, plate cams **209** cause the cooperating fingers **103** and **105** of each of the grippers to move toward the wrapper pleats and grip the same therebetween, while plate cams **211** initiate a downward movement of end folder plates **213**. The cams **209** are fixed to the opposite ends of the shaft **55** with their eccentric peripheries being engaged by rollers **215**, each carried by one arm of the bell crank levers **217**. The levers **217**, as shown in Figure 4, are rotatably mounted on the shaft **135** and have their other arms each secured to the ends of link chains **219**, which in turn are connected at their opposite ends to pull plates **221** slidably mounted within suitable aligned slots formed in the panel **15** and platform **21**. The pull plates **221** project above the platform **21** and are each provided at their upper ends with an abutment plate **223** and a depresser bar **225**, the latter of which overlies a pair of grippers **101** at each side of the apparatus. A compression spring **227** is interposed between each abutment plate **223** and the platform **21** and thus, when not acted upon by the cams **209**, the pull plates **221** and their depresser bars **225** remain in an elevated or inactive position. In a similar fashion and as shown in Figure 3, the plate cams **211** are fixed to the shaft **55** and are each engaged along their eccentric peripheries by rollers **229**, each of which is carried by one arm of bell crank levers **231**. The levers **231** are rotatably mounted on the shaft **135** and have their other arms each secured to the ends of the link chains **233** which in turn are connected at their opposite ends to the cranks **235** fixed to the shaft **237**. Sprockets **239**, rotatably mounted on bearing plates **241**, engage with the link chains **233** to effect their change in direction, as shown in Figure 3.

Since the folder plates and the portion of their actuating means located above the platform **21** are the same in both structure and function, the following description will be limited to one of such folder plate arrangements for the sake of clarity. As seen in Figures 2–4, the end folder plate **213** is formed with a pair of spaced bosses **243** between which is fixed a shaft **245**. A pair of link arms **247** are pivotally connected at one end to the shaft **245** and have their opposite ends fixed to the shaft **237**, which is free to rotate relative to bearing plates **249** projecting upwardly from the platform **21**. A coiled spring **251** encircles the shafts **237**, with one of its ends **253** hooked over the edge of the platform **21** while its opposite end **255** is fixed to the end of one of the link arms **247**, as best shown in Figures 1, 2 and 4. A second shaft **257** is mounted between the bearing plates **249** and is interconnected with the shaft **245** by a link **259**. One end of the link **259** is rotatably mounted on the shaft **257** while its opposite end is pivotally connected at **261** to the arm **263** fixed to the shaft **245**.

As the cams **211** allow the rollers **229** to move inwardly toward the shaft **55**, the link chains **233** become slack and both the weight of the end folder plates and their supporting structure and the resilient action of the coiled springs **251** urge the plates **213** into engagement with the wrapper **54**. However, just prior to the engagement between the end folder plates with the wrapper, the plate cam **99** withdraws the grippers **101** from the paths of the folder plates **213** and returns the same to their original starting positions. It will be understood that the withdrawal action of the grippers causes its fingers **103** and **105** to merely slide off the wrapper material engaged therebetween and thus in no way disturb the pleats.

Concomitantly with the downward movement of the folder plates **213**, and preferably at the instant that the folder plates contact with the wrapper, the wrapping table **37** is depressed between the members **25** as shown in Figure 10. This simultaneous downward movement of the folder plates **213** and the wrapping table **37** effects a neat crease along both sides of the package as the side or edge portions of the wrapper are forced into a substantially vertical position by the inclined walls **27** of the members **25**. Movement of the table **37** in a downward direction is accomplished rapidly or with a snap action by a plate cam **265** fixed to the shaft **55** (see Figure 5) and reacting against a roller **267** mounted on one arm of a bell crank lever **269**. The lever **269** is rotatably mounted on the shaft **135** and has its other arm connected to one end of a link chain **271**, which in turn is trained over and secured at **272** to a sprocket **273** fixed to the shaft **43**. Thus, the rocking movement of the bell crank lever **269**, as determined by the plate cam **265**, is transmitted to the pinions **41** through the link chain **271** and the shaft **43** to cause the rack bars **39** to move downwardly against the resilient action of the springs **51**.

In its lowered position, the table **37** lies substantially in the plane of a conveyor table **275** suitably supported above the panel **15** and having a pair of elongated slots **277** through which endless belts **279** project. The belts **279** are trained over the pulleys **281** fixed to shafts **283** and **285**, the latter of which is continuously driven by the motor **75** through a link chain **287** passing over suitable sprockets on the gear reducer **77** and the shaft **285**. Fixed above the conveyor table **275** are a pair of angle bars **289**, the horizontally disposed flanges of which are flared upwardly and outwardly at their forward ends as shown at **291** in Figure 1.

Once the package has been manipulated into its position shown in Figure 10, the operator merely slides the

package from the table 37 onto the continuously moving conveyor belts 279. During the sliding movement the side or edge portions of the folded wrapper are gradually urged inwardly to a position over the package itself by the inclined walls 31 of the members 25 and the flared portions 291 of the angle bars 289. To insure that the end portions of the wrapper remain creased as they are pushed onto the belts 279, the rear ends of the folder plates 213 extend beyond the inclined walls 31 of the members 25 and are gradually arched toward each other to permit the same move into their lowermost positions without obstruction. When employing a wrapper formed of heat sealable material, heating elements 293 are provided for sealing the side portions of the wrapper as the package is carried therebeneath. If desired, an adhesive may be applied to the edge portions of the wrapper before the package is moved onto the conveyor belt or the side portions may be sealed with pressure sensitive tape after they leave the conveyor table. After leaving the conveyor belts 279, the package is received on plates 295, each hinged at 297 to its respective support bar 299 and resiliently urged into a horizontal position by a tension spring 301. An attendant at the rear end of the apparatus needs merely to push the package downwardly to move the plates 295 into a vertical position and allow the wrapped package to drop into a carton ready for shipment or onto a belt 303 and be conveyed to a collection station. The plates 295 may of course be eliminated without departing from the scope or spirit of the invention.

After sliding the package onto the conveyor belts 279, the operator merely actuates the switch 95 causing the one-revolution clutch to rotate the shaft 55 through its last one-third of a revolution. With the final movement of the shaft 55, the plate cam 265 is turned to a position in which the springs 51 are allowed to return the table 37 to its elevated position while the cams 211 act to raise the folder plates 213 into their rest positions shown in Figure 3.

Briefly, in operating the apparatus described above, the operator first lays a sheet of wrapping material 54 on the table 37, after which the article to be wrapped is placed on the wrapping material as shown by broken lines in Figure 7. While the apparatus described has particular utility in wrapping irregular shaped articles, such as folded wearing apparel, it can of course be employed with regular shaped articles with squally satisfactory results. With the motor 75 in operation, the operator actuates the switch 95 which in turn energizes the solenoid 89 to retract the plunger 83 and allow the motor to rotate the clutch plate 81 through one complete revolution before it is again stopped by the plunger 83. The movement of the clutch plate 81 in transmitted by the link chain 63 to the shaft 55 which moves through one-third of a revolution in view of the size ratio between the sprockets 61 and 67 heretofore described.

The initial movement of the shaft 55 causes the plate cam 99 to rock the lower arm of the bell crank lever 133 rearwardly, as seen in Figure 3, which movement is transmitted through the link 131, shafts 125, 141, 127 and 113 to the grippers 101. At the start of their movement from their solid line positions to their broken line positions shown in Figure 2, the fingers 103 and 105 of each of the grippers are in contact with each other as shown by broken lines in Figure 6. Continued rotation of the stub shafts 113 causes the rollers 153 to ride along the eccentric surfaces 157 of the housings 111 thereby urging the fingers 103 and 105 into spaced apart relationship after they have moved past the edges of the wrapping material. The opposite ends of the wrapping material are then overlapped by the operator and secured, as shown at 305, with pressure sensitive tape or an adhesive to form a flattened tube about the article, as shown in Figure 8. At this point, the parts are in positions as shown in Figure 8, and the operator again actuates the switch 95 to commence the second stage of the wrapping procedure.

As with the first actuation of the switch 95, the one-revolution clutch 71 causes the shaft 55 to rotate through the second one-third revolution of its movement. During an early phase of this movement, the plate cam 203, acting through the bell crank lever 199, link 197, and shafts 185, 191, 187 and 177, simultaneously swings the tuckers 173 inwardly between the fingers 103 and 105 of the grippers 101 to pleat the wrapper as shown in Figure 9. As heretofore mentioned, the tuckers move into and out from their positions shown in Figure 9 with a snap action, with both the shape of the cam 203 and the weight 207 cooperating to achieve this desired movement. In view of the resilient connection between the member 175 and the arm 178 of each of the tuckers 173, any obstructions in the paths of the weights, such as an irregularity in the shape of the article itself, merely stops the movement of the particular weight while the arm 175 of the tucker continues its inward swing. With this arrangement, tearing of the wrapper or damage to the article or apparatus is avoided.

As the tuckers 173 move toward their outermost positions, the cams 209 cause the link chains 219 to draw the pull plates 221 downwardly thereby engaging the abutment bars 225 against the upper finger 103 of each of the grippers 101. This movement of the abutment bars 225 forces the fingers 103 and 105 of the grippers 101 toward each other with their free ends pinching the pleated portions of the wrapper therebetween.

Near the terminal portion of the second one-third revolution of the shaft 55, the plate cams 211 allow the link chains 233 to become slack, thereby causing the folder plates 213 to move downwardly under their own weight and the resilient force exerted by the springs 251. Just prior to engagement of the folder plates 213 with the wrapping material, the plate cam 99 imparts a turning movement to the stub shafts 113 for swinging the grippers 101 out of the path of the folder plates 213 and to their outermost or rest position. At the instant of contact of the folder plates 213 with the pleated wrapper, the cam 265, acting through the chain 271 and pinions 41, causes the wrapping table 37 to drop rapidly and simultaneously with the downward movement of the end folder plates 213. At this stage, the parts are in positions as shown in Figure 10, with the end portions of the wrapper kept neatly creased by the folder plates 213. It will be noted that the springs 251 allow the folder plates 213 to resiliently yield in the event they encounter an obstruction or irregularity in the package. This feature not only prevents damage to the wrapper, article and apparatus, but in addition serves to protect the operator from accidental injury.

The operator now merely slides the package rearwardly onto the belts 279 with the inclined walls 31 of the member 25 and the flared portions 291 of the angle bars 289 serving to gradually fold the wrapper end portions over the package itself. Actual sealing of the wrapper end portions may be accomplished either by the heating element 293 when heat sealable wrapping material is used or by pressure sensitive tape as heretofore mentioned. The wrapped packages may be collected in cartons ready for shipment or may be delivered by the conveyor 303 to a separate collection station.

To return the parts of the apparatus into their initial starting position, the switch 95 is again actuated causing the shaft 55 to move through its final one-third revolution during which the cams 211 elevate the folder plates onto their uppermost position, while the cam 265 rotates into an ineffective position and allows the springs 51 to raise the wrapping table 37. It will be noted that the upward movement of the end folder plates 213 also causes the springs 251 to become tensioned. The parts once again in their positions as shown in Figure 7 and

the above procedure is again repeated during the wrapping of subsequent articles.

From the above description, it is seen that the apparatus provides a wrapped package neat in appearance regardless of the irregular shape of the article itself. Furthermore, the three actuations of the switch 95 to effect the various wrapper manipulations described offer the operator full control of the wrapping procedure and thus insure that the manual steps can be carried out with ease and with dispatch.

It is seen from the above description that the objects of the invention are well fulfilled by the apparatus described. The description is intended to be illustrative only and it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. Article wrapping apparatus including a movable table on which a sheet of wrapping material is adapted to be disposed and manually manipulated to form a tube about an article to be wrapped, means for pleating the end portions of the wrapper material adjacent the article corners after the wrapper material has been manually shaped into a tube about the article, means for gripping the individual wrapper pleats, a pair of folder plates movable against the pleated portions of the wrapper material, stationary members disposed at opposite sides of said wrapping table, means for engaging said folder plates against said pleated portions of the wrapper material, means for lowering said table between said stationary members, said folder plates and stationary members cooperating to crease the wrapping material along the end portions of the article as said table is lowered, and means for folding the end portions of the wrapper material over the article itself.

2. Apparatus as defined in claim 1 wherein said folding means includes a pair of laterally spaced angle members between which said wrapped article is adapted to travel, said angle members being flared in an outward direction at their leading ends to cause the wrapper end portions to be gradually and progressively folded to a position over the article as the article is moved therebetween.

3. Apparatus as defined in claim 1 further including a conveyor disposed in substantially coplanar relationship with the surface of said table in its lowermost position and adapted to receive the articles therefrom.

4. Apparatus as defined in claim 3 further including means for heat sealing the folded portions of the wrapper material in place.

5. Article wrapping apparatus including a table on which a sheet of wrapping material and an article to be wrapped are adapted to be disposed, pairs of gripping fingers, means for moving said pairs of gripping fingers between a rest position to a position over said table and adjacent to the article to be wrapped, means for moving the fingers of each pair of fingers into spaced apart relationship as they approach the terminal portion of their movement over said table, a tucker adapted to enter between each pair of spaced apart fingers for pleating the wrapping material therebetween after the same has been manipulated to form a tube about the article to be wrapped, means for moving said tuckers to and from said pleating position, means for moving the fingers of each pair of fingers toward each other concomitantly with the movement of said tuckers from their pleating position to grip the individual pleats therebetween, folder plates movable into engagement with the pleated portions of said wrapping material for creasing the same along each side of the article, and means for folding the end portions of the wrapping material over the article itself.

6. Apparatus as defined in claim 5 further including a pair of stop plates disposed adjacent to one side of said table and adapted to be projected above the surface thereof, said stop plates providing abutments against which the article may be engaged as the wrapper material is manipulated to form a tube about the article, and means actuated by said gripping fingers for projecting said stop plates.

7. Apparatus as defined in claim 5 wherein said gripping fingers are mounted for rotary movement from and toward said rest position, and said second-mentioned means including a cam surface adapted to urge the fingers of each pair of fingers into spaced apart relationship as they rotate away from their rest position.

8. Apparatus as defined in claim 5 wherein said means for moving the fingers of each pair of fingers toward each other to grip the pleats therebetween includes a pair of depressor bars, each positioned at opposite sides of said table, and means for urging said depressor bars into engagement with the respective gripping fingers.

9. Apparatus as defined in claim 8 further including an operating shaft, means for intermittently moving said shaft through individual arcuate movements, and cams carried by said shaft and operatively connected with said gripping fingers, tuckers, depressor bars, and folder plates for sequentially actuating the same.

10. Apparatus as defined in claim 5 further including link means supporting each of said folder plates and adapted to maintain the folder plates in planes disposed at substantially right angles to the plane of the wrapping material.

11. Apparatus as defined in claim 10 wherein said link means and folder plates are urged into engagement with the article wrapper by resilient means which permit the plates and link means to yieldably adjust themselves to irregularities in the wrapped article.

12. Apparatus as defined in claim 5 further including stationary members disposed along opposite sides of said table, and means for lowering said table between said stationary members concomitantly with the movement of said folder plates against the pleated portions of the package wrapper, said stationary members and folder plates together cooperating to crease the pleated portions of the wrapper material and partially fold the end portions of the same over the article itself.

13. Article wrapping apparatus including a reciprocable table on which a sheet material is adapted to be disposed and manually manipulated to form a tube about an article to be wrapped, a plurality of pairs of fingers, means for moving said pairs of fingers toward and away from an operative position above said table and adjacent the article corners, means for moving the fingers of each pair of fingers into spaced apart relationship as they approach their operative position, a plurality of tuckers, means for moving said tuckers toward and away from an operative position between said spaced fingers for pleating the article wrapper adjacent the article corners after the wrapper has been formed into a tube about said article, means for moving the fingers of each pair of fingers toward each other for gripping the pleated portions of the wrapper therebetween as said tuckers move away from their operative position, a pair of folder plates, means for moving said folder plates into engagement with the pleated portions of the article wrapper as said fingers are moved away from their operative position, a pair of stationary members disposed at opposite sides of said table, means for lowering said table between said stationary members concomitantly with the movement of said folder plates to effect a creasing of the pleated portions of the article wrapper at opposite ends thereof, a conveyor disposed in coplanar relationship with said table in its lowermost position for receiving the article thereon, and means positioned adjacent said table and above said conveyor for urging the pleated end portions of the article wrapper over the article itself.

14. Apparatus as defined in claim 13 further including means for sealing the pleated end portions of the wrapper in their positions over the article.

15. Article wrapping apparatus including a reciprocable table on which a sheet material is adapted to be disposed and manually manipulated to form a tube about an article to be wrapped, a plurality of pairs of fingers, means for swinging said pairs of fingers toward and away from an operative position above said table and adjacent the article corners, means including a cam for moving the fingers of each pair of fingers into spaced apart relationship as they approach their operative position, a plurality of tuckers, means for swinging said tuckers toward and away from an operative position between said spaced fingers for pleating the article wrapper adjacent the article corners after the wrapper has been formed into a tube about the article, a bar disposed at opposite sides of said table, means for moving said bars into engagement with the adjacent pairs of fingers to cause the fingers of each pair of fingers to move toward each other and grip the pleated portions of the wrapper therebetween as said tuckers move away from their operative position, a pair of folder plates, means for moving said folder plates into engagement with the pleated portions of the article wrapper as the fingers are moved away from their operative position, a pair of stationary members disposed at opposite sides of said table, means for lowering said table between said stationary members concomitantly with the movement of said folder plates to effect a creasing of the pleated portions of the article wrapper at opposite ends thereof, a conveyor disposed in coplanar relationship with said table in its lowermost position for receiving

the article thereon, and a pair of laterally spaced angle members between which said wrapped article is adapted to travel, said angle members being disposed above said conveyor and having their leading ends flared in an outward direction so as to cause the wrapper end portions to be gradually and progressively folded to a position over the article as the article is moved therebetween.

16. Apparatus for wrapping articles about which a tubular shaped wrapper is disposed including a table for supporting the article to be wrapped, means for pleating the end portions of the wrapper adjacent to the article corners, a pair of folder plates, means for moving the folder plates against the wrapper adjacent to the pleated end portions thereof, stationary members disposed along opposite sides of said table and extending substantially parallel to said folder plates, means for lowering said table between said stationary members, said folder plates and stationary members cooperating to crease the wrapper along the end portions of the article as said table is lowered, and means for folding the end portions of the wrapper over the article itself.

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