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[33] **Great Britain**
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188, 189, 190, 252, 258; 198/34, 102, 173, 179

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[54] **UNIVERSAL BAGGER**
4 Claims, 8 Drawing Figs.
[52] U.S. Cl. **53/258,**
53/187
[51] Int. Cl. **B65b 5/06,**
B65b 39/02

ABSTRACT: Apparatus for packaging articles, comprising a flighted infeed conveyor for transporting articles to a predetermined position, means for providing an inflated bag at a position spaced from the predetermined position, means for engaging an article at said predetermined position and inserting it into said inflated bag and means extending exterior of the infeed conveyor for changing the size of the flights thereof.

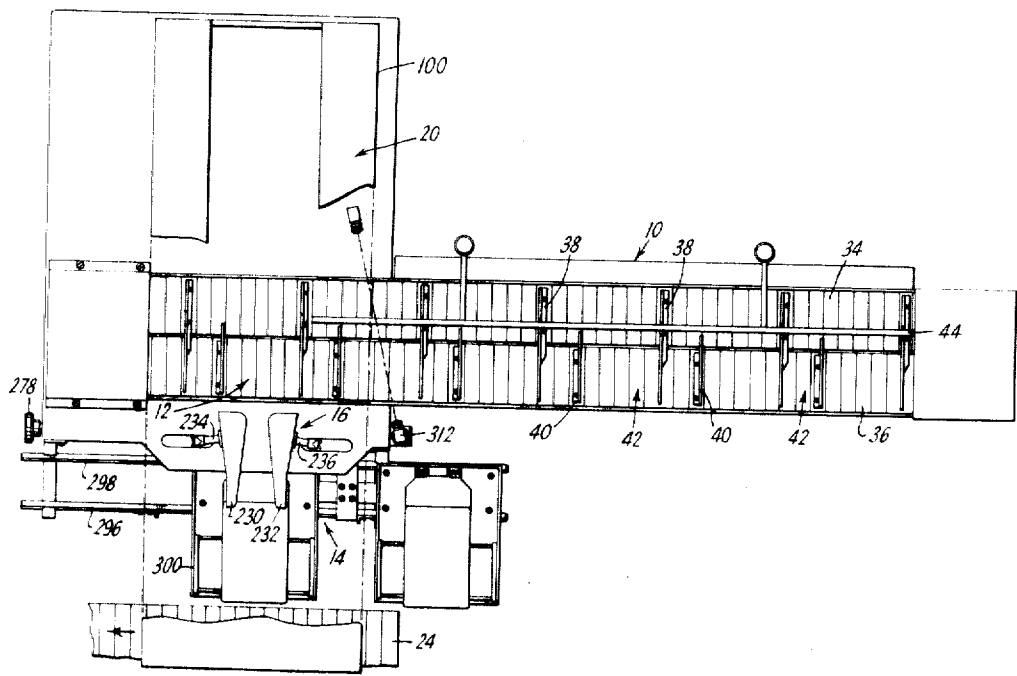
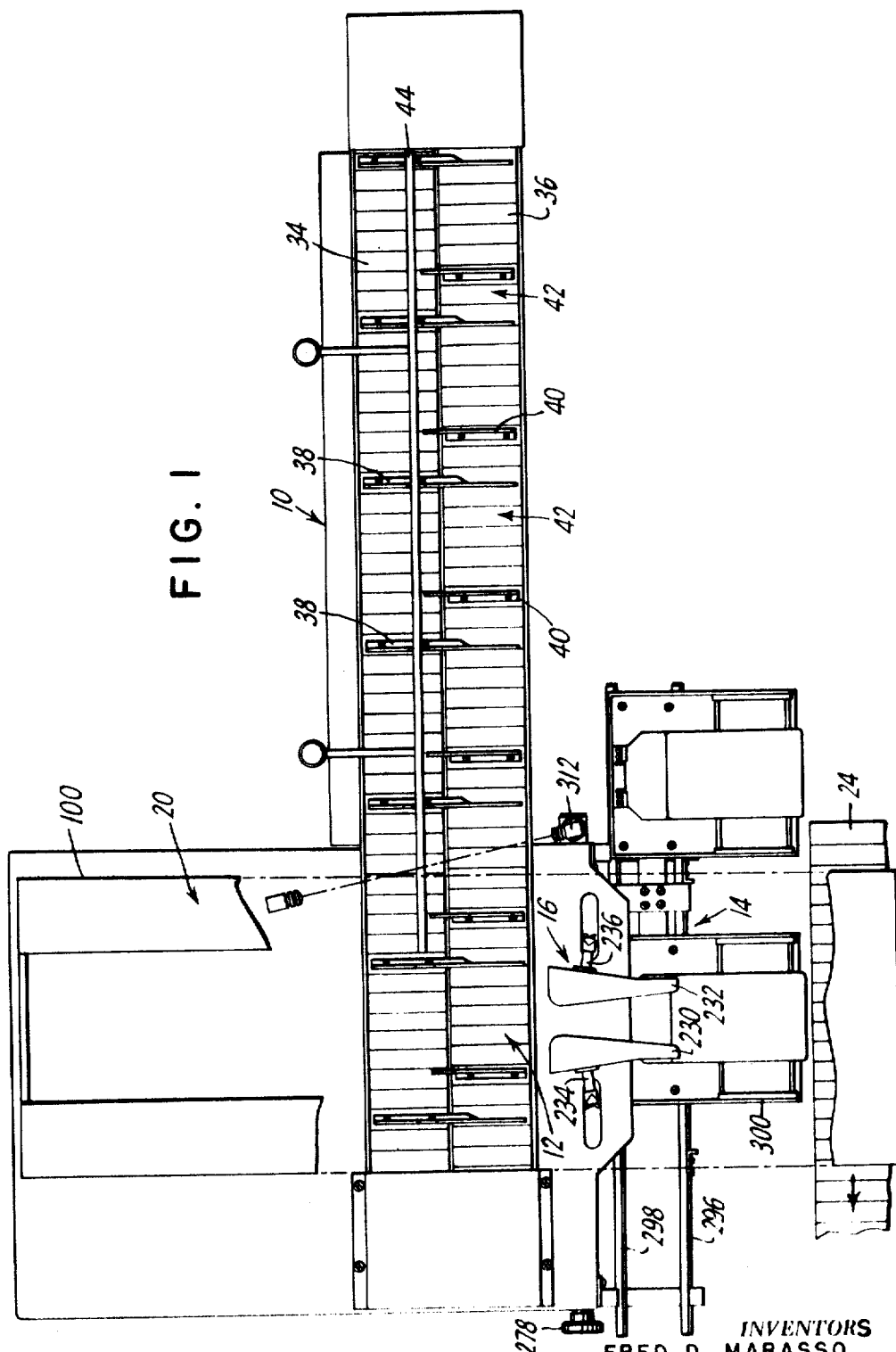
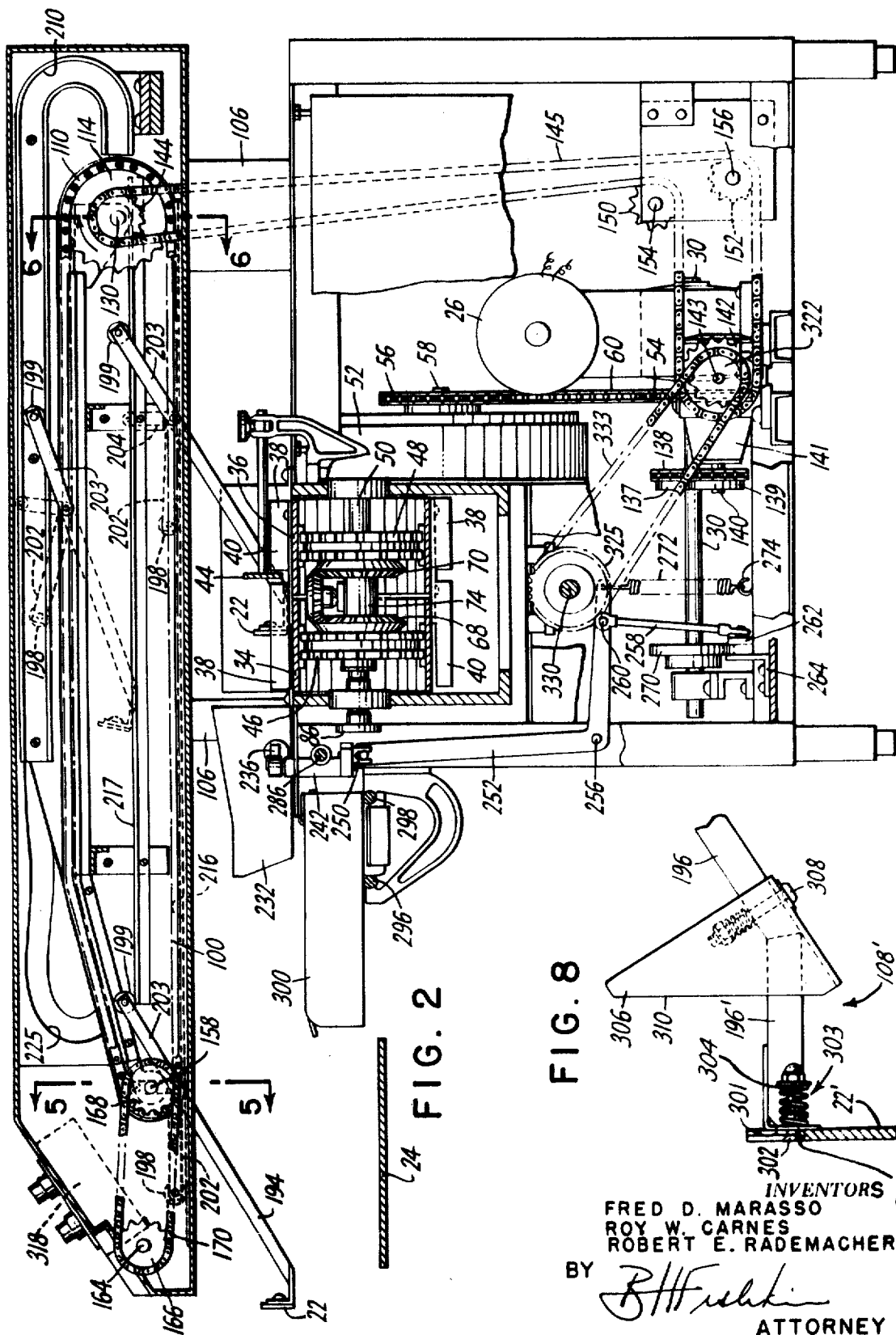


FIG. 1



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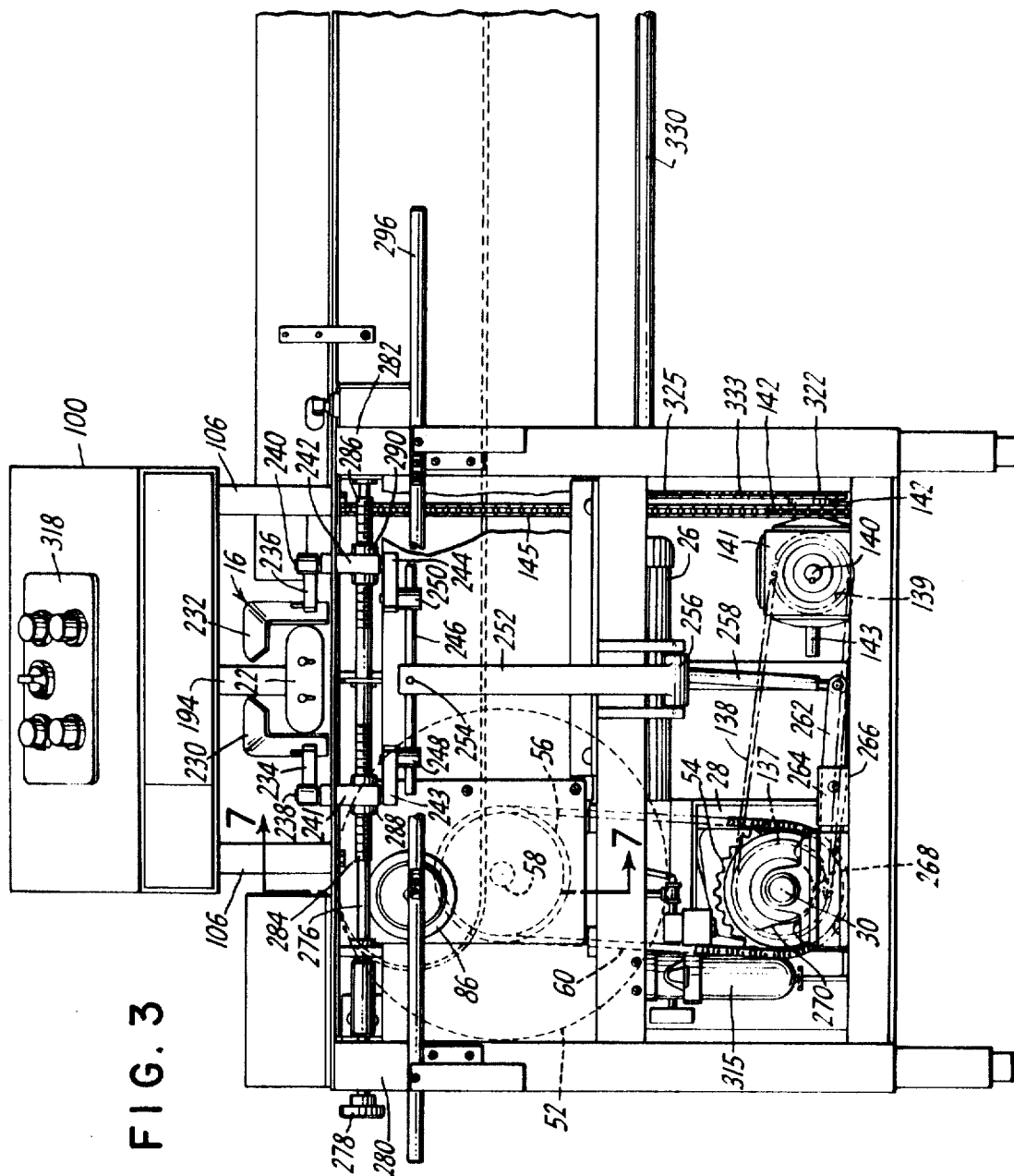
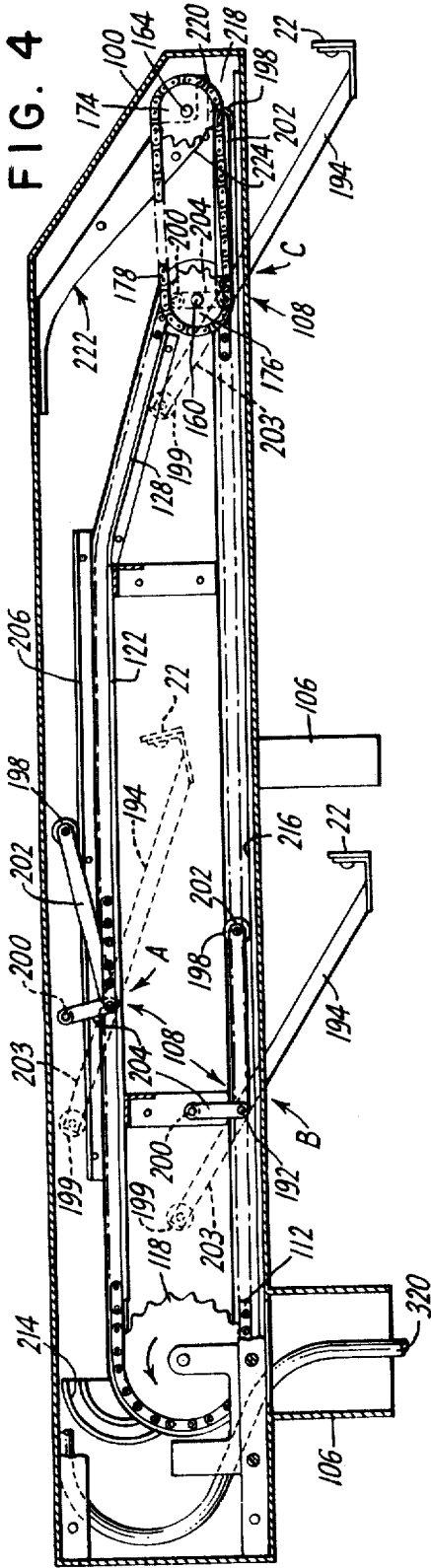
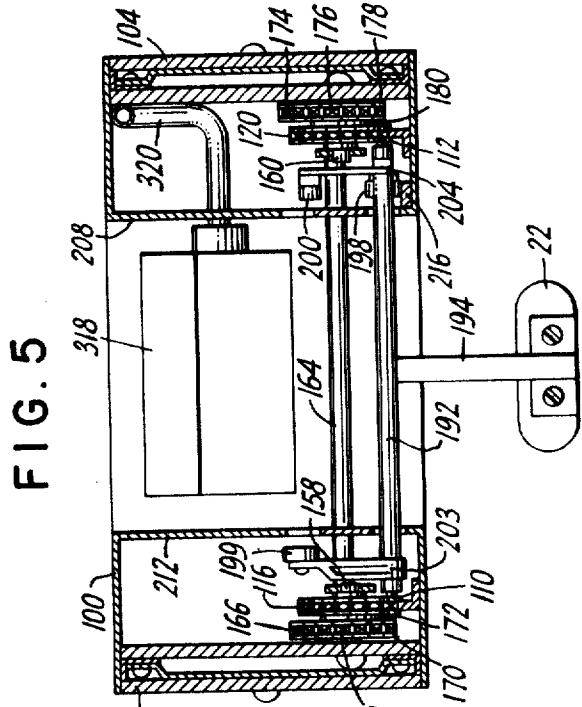
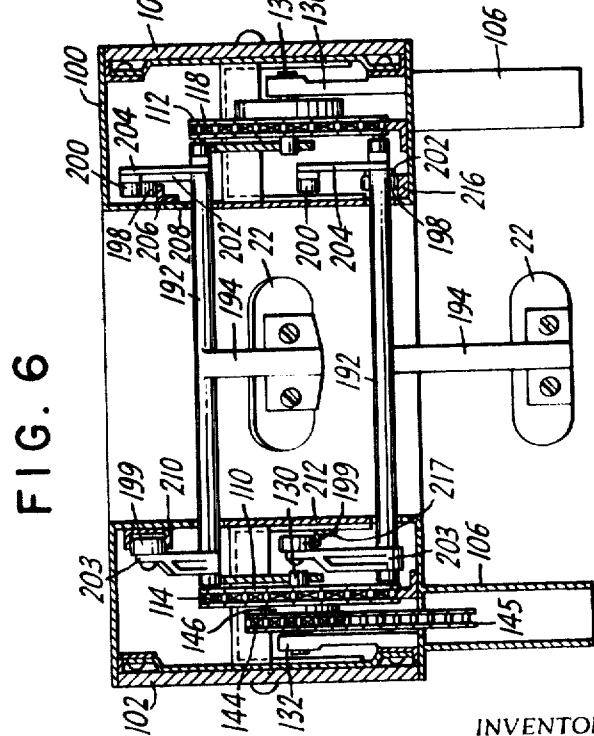


FIG. 3

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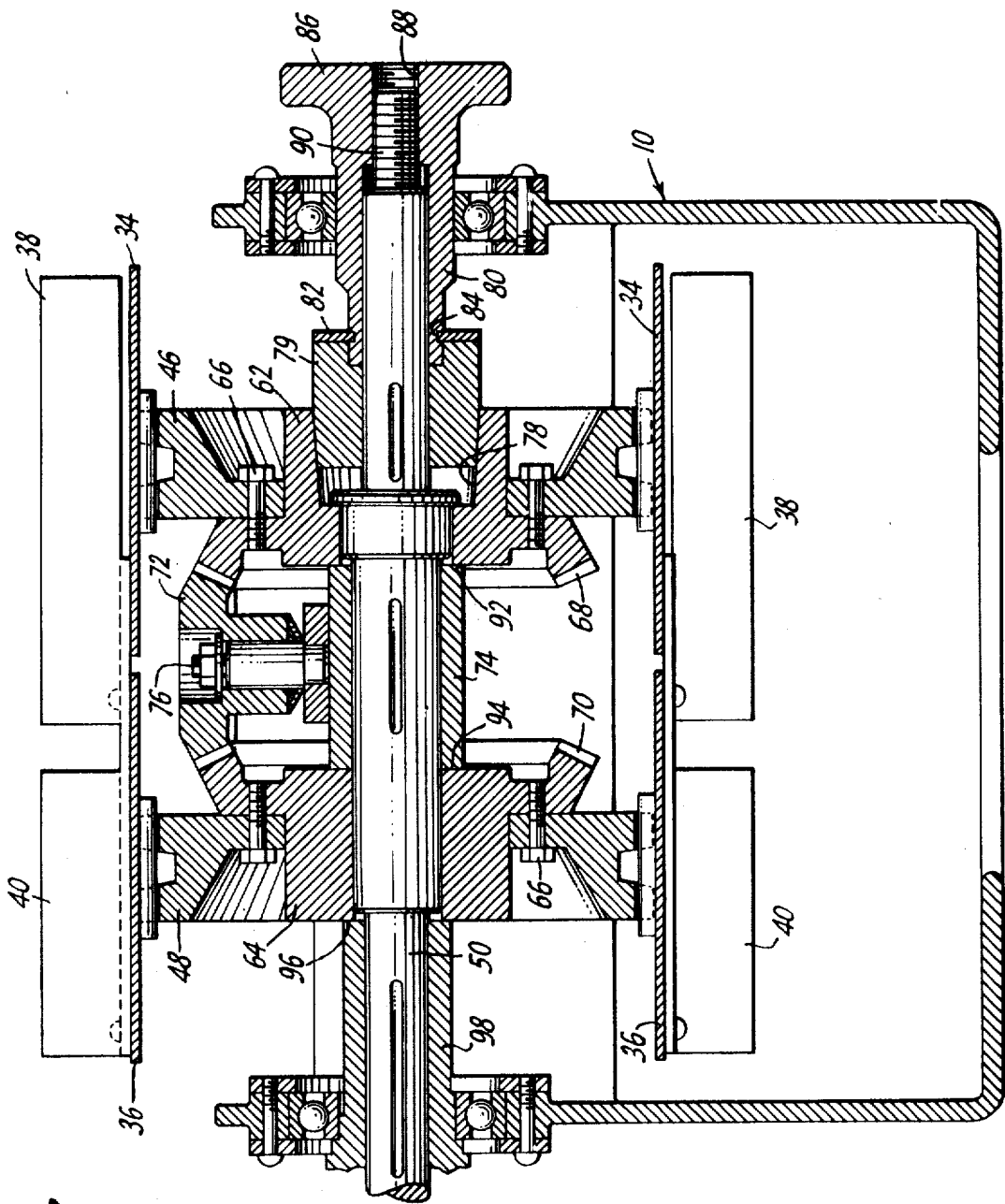


FIG. 7

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UNIVERSAL BAGGER

BACKGROUND

This invention relates to the packaging art and more particularly to bagging apparatus operable to bag a broad spectrum of different types of goods.

In the packaging field there is a wide variety of apparatus on the market that is adaptable to effect the rapid and efficient bagging of a succession of like articles. Typical of said apparatus is that disclosed in the Assignee's U.S. Pat. No. 3,451,192 issued June 24, 1969 which is designed to package in particular loaves of bread. As stated above, there is a wide variety of apparatus of this type available, each of which is particularly suitably to a certain type of goods to be packaged.

However, in many instances it is desirable to have one machine that is readily adaptable to package different types of articles. The prior art apparatus does not meet this standard because either they cannot be adjusted to handle different types of goods or the alterations to the machine to adapt it to different goods involves a sufficiently large amount of time and/or adjustment to render the adaptation impractical.

Furthermore, difficulty has been encountered in the packaging art in the actual placement of the articles into the bags because the bag inserting member has not been provided with a positive capability to be inserted into the bag. This problem is particularly acute because in many instances it is the action of the articles on the back of the bag that causes the bagged article to be removed from the apparatus.

SUMMARY

It is, therefore, an object of the invention to provide bagging apparatus adaptable to handle the packaging of a wide assortment of goods.

It is a further object of the invention to provide apparatus having an article insertion means adapted to extend substantially within a bag.

It is another object of the invention to provide a bagging apparatus with an infeed conveyor with adjustable flights that can be adjusted rapidly without taking apart the apparatus.

In accordance with these and other objects, apparatus according to the invention may comprise a flighted infeed conveyor for advancing an article to a predetermined position, a bag supply mounted in spaced relationship with the predetermined position, means for engaging and opening the topmost bag of the bag supply, means for engaging the article at said predetermined position and inserting it into said topmost bag and means for adjusting the size of the pockets formed by the flighted infeed conveyor.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the apparatus with portions thereof broken away.

FIG. 2 is a side elevation view of the apparatus.

FIG. 3 is a front elevation view of the apparatus with portions thereof broken away.

FIG. 4 is a sectional view of the pusher bar mechanism viewed from the other side from that of Fig. 2.

FIG. 5 is a sectional view of the apparatus taken along line 5—5 of Fig. 2.

FIG. 6 is a sectional view of the apparatus taken along line 6—6 of Fig. 2.

FIG. 7 is a sectional view of the apparatus taken along line 7—7 of Fig. 3.

FIG. 8 is a partial view of an alternative embodiment of a pusher bar.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings, a preferred embodiment of the apparatus may comprise a flighted infeed conveyor assembly 10 operable to intermittently advance a supply of articles to a bagging position 12, a bag supply assembly 14

adapted to support a supply of bags 16 such that the topmost bag is supported opposite the bagging position 12, a scoop-jaw assembly 16 operable to be inserted into the topmost bag of the bag supply and hold it open, an overhead pusher bar assembly 20 having a plurality of pusher bars 22 mounted thereon that are operable to engage an article at bagging position 12, advance it through the scoop-jaw assembly into the bag and push it against the back of the bag so as to cause the removal of the bagged article from the bag supply 14 and an outfeed conveyor 24 adaptable to receive the bagged article and convey it to the collection area.

With reference to Figs. 2 and 3 the various elements and assemblies of the apparatus are driven, as will be described in detail hereinbelow, by a motor 26 through a gear reduction and gear assembly 28 having an output shaft 30.

Referring now in particular to Fig. 1, the infeed conveyor assembly 10 includes a pair of spaced conveyor belts 34 and 36, a plurality of flight bars 38 mounted on conveyor 34 and a plurality of flight bars 40 mounted on conveyor 36.

Each set of flight bars 38 and 40 form a pocket 42 adaptable to receive an article from any suitable loading apparatus such as that disclosed in the Assignee's Copending application, Ser. No. 763,101, filed Sept. 27, 1968, for Pan Feeding Apparatus. An adjustable bar 44 is mounted to extend into the pockets 42 to form a backstop for the articles therein.

With reference to Fig. 2, conveyors 34 and 36 are each mounted over a driven sprocket, 46 and 48 respectively, and an idling sprocket (not shown). Sprockets 46 and 48 are driven by a shaft 50 which is rotated intermittently by a conventional drive cam arrangement 52 such as that shown in Arelt U.S. Pat. 2,385,675, which in turn is driven from output shaft 30 by a sprocket 54 on shaft 30, a sprocket 56 mounted on the cam arrangement drive shaft 58 and a chain 60 mounted over sprockets 54 and 56. With this arrangement, conveyors 34 and 36 are advanced intermittently to the left as seen in Fig. 1.

The change in the size of the pockets is effected by moving the conveyors with respect to each other. Since flight bars 38 are all mounted on conveyor 34 and flight bars 40 are all mounted on conveyor 36, moving one conveyor with respect to the other will change the spacing between each set of flight bars 38 and 40 the same amount.

This is made possible by the arrangement shown in Fig. 7. Sprockets 46 and 48, which power the conveyors 34 and 36 are mounted on hub members 62 and 64 respectively by bolts 66. The hub members each include an annular gear ring, 68 and 70 respectively, facing inwardly to mesh with a bevel gear 72. The bevel gear 72 is mounted on a spacer member 74 by a connector 76. Hub member 62 includes a frustoconical recess 78 therein. A correspondingly shaped frustoconical member 79 is slidably mounted on shaft 50. Frustoconical member 79 is moved on shaft 50 by an actuating member 80 slidably mounted on shaft 50 and affixed to the member 79 by the engagement of a collar 82 on the latter with an annular recess 84 in the actuating member. The actuating member moves on shaft 50 by turning a handle portion 86 thereon. This causes lateral movement of the actuating member on the shaft 50 by the action of a threaded bore 88 in the actuating member on the threaded end 90 of shaft 50.

Rotary power is transmitted from shaft 50 to hub members 62 and 64 by a series of frictional interfaces. When actuating member 80 is moved to its leftmost position as seen in Fig. 7, it exerts a force on the hub member 62 through the interface between frustoconical member 79 and recess 78. This applies a frictional force to the interface 92 between hub member 62 and spacer 74, the interface 94 between the spacer 74 and the hub member 64 and the interface 96 between hub member 62 and a collar 98 fixedly mounted to shaft 50. With this arrangement, when actuating member 80 is adjusted to move frustoconical member 79 to its leftmost position as seen in Fig. 7, pressing the entire arrangement against collar 98, the rotary movement of shaft 50 is transmitted to hub members 62 and 64 and therefore conveyors 34 and 36 by the frictional engagements at interfaces 96, 94 and 92.

When these frictional engagements are released by moving actuating member 80 to the right by manipulation of handle 86, hub members 62 and 64 and therefore sprockets 46 and 48 "float" on shaft 50 and can be rotated with respect thereto. Thus, by grasping a flight bar 38 and moving it longitudinally with respect to the direction of conveyor 34 travel, the conveyor will be moved longitudinally, thus rotating sprocket 46 and hub member 62 with respect to the shaft. This will cause an equal amount of rotation of sprocket 48 and hub member 64 by the action of gear 68, bevel gear 72 and gear 70, resulting in a change in the size of each pocket 44 by the moving of each flight bar 38 and 40 an equal distance with respect to the center line of each pocket. When the pockets 44 have been adjusted in this manner to a desired size for a desired article or group of articles, handle 86 is manipulated again to reestablish the frictional connections at interfaces 96, 94 and 92 and the conveyors 34 and 36 will again advance together in response to rotation of shaft 50.

Overhead pusher bar assembly 20 is mounted in a housing 100 including spaced sidewalls 102 and 104, the housing 100 being supported on the machine frame by plurality of struts 106. A plurality of pusher bar subassemblies 108 are mounted in housing 100 between a pair of opposed endless chains, 110 and 112.

With reference to Figs. 2, 4, 5 and 6, endless chain 110 is mounted over a pair of sprockets 114 and 116 and endless chain 112 is mounted over a pair of sprockets 118 and 120. The upper passes of chains 110 and 112 are supported by longitudinally extending horizontal support members 122 and 124 respectively, and downwardly extending support members 126 and 128 respectively.

Referring now to Fig. 6, sprocket 114 is mounted on a shaft 130 which is rotatably mounted in a support 132. Sprocket 118 is mounted in a like manner on a shaft 134 rotatably mounted in a support 136. Endless chain 110 is driven from motor 26 by a sprocket 137 mounted on output shaft 30, a chain 138 mounted on sprocket 137 and a sprocket 139 mounted on an input shaft 140 of a bevel gear assembly 141, a sprocket 142 mounted on the output shaft 143 of the bevel gear assembly 141, a sprocket 144 mounted on shaft 130 and a chain 145 mounted over sprockets 142 and 144. A spacer member 146 is mounted on shaft 130 to separate sprockets 114 and 144. Endless chain 145 is diverted 90 degrees by a pair of idler sprockets 150 and 152 mounted on spur shafts 154 and 156 respectively mounted to the side of the machine frame as shown in Fig. 2. Sprockets 116 and 120 are idler sprockets mounted on spur shafts 158 and 160 respectively, each mounted to the side of housing 100.

Power is transmitted from endless chain 110 across housing 100 to the endless chain 112 by a jack-shaft 164 mounted across the forward end of housing 100. A sprocket 166 is mounted on jack-shaft 164 in spaced relationship with a sprocket 168 mounted on shaft 158, with the jack-shaft being driven from shaft 158 by a chain 170 mounted over sprockets 166 and 168. A sprocket 172 is mounted on shaft 158 to separate sprockets 116 and 168. A sprocket 174 is mounted on the other end of jack-shaft 164 in spaced relationship with a sprocket 176 mounted on shaft 160. Power is transmitted to shaft 160 by a chain 178 mounted over sprockets 174 and 176 and rotation of shaft 160 drives endless chain 112 through sprocket 120. A spacer 180 is mounted on shaft 160 to separate sprockets 120 and 176.

The plurality of pusher bar assemblies 108 are mounted between endless chains 110 and 112. More specifically, each pusher bar assembly includes a shaft 192 mounted between and driven by endless chains 110 and 112.

A strut 194 is mounted on shaft 192 and the pusher bar 22 is mounted on strut 194. The path of movement of the pusher bars is controlled by rollers 198, 199 and 200, mounted on shaft 192 by arms 202, 203 and 204 respectively. Arms 202 and 204 are mounted on one end of shaft 112 and arm 203 is mounted on the opposite end of shaft 192.

The rollers 198, 199 and 200 follow precisely shaped tracks mounted in housing 100, the path of these tracks being par-

ticularly important at the forward end of housing 100 since the forward thrust of the pusher bars 22 into a bag and the withdrawal of the pusher bar from the bag is controlled thereat.

Referring to the pusher bar assembly at position A (Fig. 4), in the upper pass of the endless chains 110 and 112, roller 198 runs in a track 206 mounted to a wall 208 of the housing and roller 200 passes through track 206 since it is in the same plane as roller 198 and smaller. Roller 199 runs in a track 210 mounted in another wall 212 of the housing. As the chains drive the pusher bar at position A to the left as seen in Fig. 4, the turn of the pusher bar assembly as the connections thereof to chains 110 and 112 pass around sprockets 114 and 118 is controlled by the riding of roller 200 in a curved track 214 spaced from track 206 and the riding of roller 199 in track 210. At this point roller 198 is in free space, but after the turn around sprockets 114 and 118 when the pusher bar assembly is traversing the lower pass of chains 110 and 112, roller 200 is in free space while roller 198 rides on a track 216 mounted on wall 208 (see the pusher bar assembly in position B) and roller 199 is riding in a track 217.

During this portion of the cycle the pusher bar 22 engages the article at position 12 and pushes it off the infed conveyor, through scoop-jaw assembly 16 and into a bag held therein. The action of the article against the back of the bag aids in the removal of the bag from the bag supply so it is important that the pusher bar be inserted deeply in the bag and then be withdrawn therefrom. This is best accomplished by having a rearward movement immediately after the end of the forward movement of the pusher bar.

Referring again to Fig. 4, as chains 110 and 112 drive the pusher bar assembly to the right as seen in that Fig. 4, roller 198 is moved down track 216 to a position designated 218 near the end of track 216 where it is guided along track 216 by the beginning 220 of a track 222 (position C). As the chains 110 and 112 move the shaft 192 around sprockets 116 and 120, tracks 216 and 220 guide roller 198, and thus pusher bar 22, first forward, then rearward since the pusher bar assembly 108 pivots around roller 198 as the shaft 192 rides around sprockets 116 and 120. As the shaft 192 continues around the sprockets 116 and 120 roller 198 engages portion 224 of track 222 and roller 199 moves into track 225 and the bar now withdrawn from the bag rises toward position A. As roller 198 rides off track 222, the assembly 108 is guided by roller 199 in track 225. As the shaft 192 proceeds toward position A from sprockets 116 and 120 the assembly 108 is first guided by roller 199 in track 225 and roller 198 in track 222. When roller 198 rides off track 228, the assembly 108 is guided only by roller 199 in track 225. When track 225 ends, roller 198 again enters track 206 and the cycle repeats.

Referring now to Figs. 2 and 3, the scoop-jaw assembly 16 includes a pair of opposed scoop-jaws 230 and 232, one mounted on each side of the path of the pusher bars 22. Scoop-jaw 230 is mounted for pivotal movement on an arm 234 and scoop-jaw 232 is mounted for complementary pivotal movement on an arm 236. Arms 234 and 236 are mounted on vertically extending shafts 238 and 240 respectively that are rotatably supported in sleeve members 241 and 242 respectively. The lower ends of shafts 238 and 240 are connected to levers 243 and 244 respectively, which are connected to an actuating bar 246 by fork shaped connectors 248 and 250 respectively. The forward ends of the scoop-jaws 230 and 232 are pivoted inwardly by forward movement of actuating bar 246. This is effected by a bell crank 252 connected to the actuating bar at 254 and pivotally mounted to the frame at 256. The bell crank is rocked by a rod 258 connected at one end thereof to the bell crank at 260 and at the other end thereof to a cam follower 262. The cam follower 262 is pivotally mounted at the center thereof to a bracket 264 by a pin 266 and includes a cam follower wheel 268 that rides on a cam 270 mounted on output shaft 30.

A spring 272 connected at one end thereof to bell crank 252 and at the other end thereof to the frame at 274 assists in the

turning of the scoop-jaw to the inward position. In operation as cam 270 allows cam follower wheel 268 to be pulled upward and thus causes rod 258 to pivot bell crank 252 in a clockwise direction as seen in Fig. 2, the forward end of the scoop-jaws 230 and 232 are pivoted inwardly to a position where the forward ends thereof are behind the front of plate 275. This permits the topmost bag of the bag supply, when inflated by a jet of air, to be blown up to its full height since the bottom of the scoops will not block it. And, this in turn permits the forward end of the scoop-jaws to enter the inflated bag on its outward pivot to engage and hold the sides of the bag open to receive an article pushed therein by pusher bar 22. The outward pivot is caused when cam follower wheel 268 rides up on cam 270, causing cam follower 262 to pull rod 258 up and thereby pivot bell crank member 252 in a counter-clockwise direction.

The scoop-jaw assembly 16 is also adjustable to adapt the machine to different size products. With reference to Fig. 3, a shaft 276 having a handle 278 at one end thereof is mounted across the frame of the machine between spaced frame members 280 and 282. Shaft 276 includes two threaded portions 284 and 286 respectively. A pair of sleeve members 288 and 290 having threaded interiors complementary to threaded portions 284 and 286 of shaft 276 are mounted to sleeve members 241 and 242 respectively. Threaded portions 284 and 286 of shaft 276 have opposite pitches such that when shaft 276 is rotated by handle 278 the sleeve members 288 and 290 and therefore sleeve members 241 and 242 will either be moved toward each other or away from each other depending upon the direction of rotation of handle 278 to thereby adjust the space between the scoop-jaws 230 and 232. Since levers 243 and 244 are connected to actuating bar 248 by the fork shaped connectors 248 and 250 as sleeve members 288 and 290 are moved on shaft 276 the fork shaped connectors will slide along actuating bar 246 therewith.

The bag supply assembly 14 is disclosed in detail in the assignee's copending application, Ser. No. 620,387 filed Mar. 3, 1967, for Quick Change Supply System and new U.S. Pat. No. 3,458,614. Broadly speaking, the supply assembly 14 includes a pair of spaced rails 296 and 298 adapted to slidably receive one or more trays 300 thereon. Means (not shown) are provided to locate one of the trays 300 in spaced relationship with the path of the pusher bar 22 and scoop-jaw assembly 16. The trays 300 are adapted to receive a wicket of bags (not shown) each held therein at its extending lip as disclosed in detail in the aforesaid application, Ser. No. 620,387. Means (not shown) are provided to direct a jet of air into the topmost bag to inflate it, such that the scoop-jaw assembly on its outward pivot may engage the interior thereof to hold it open for the reception of an article therein.

The action of the pusher bar 22 pushing an article against the back of the bag strips the bag off the scoop-jaw assembly and tears the bag from the wicket of the bag supply. The bagged article then drops into outfeed conveyor 24 which transports the bagged article to a collection area.

At this time, the scoop-jaws are pivoted inwardly and another bag is inflated to prepare for the next cycle. If it is desired to mount a bag tying mechanism adjacent the outfeed conveyor, the outfeed conveyor may be the dead plate type with driven flights to sweep the bagged articles therealong. In this instance, the flights may be driven in a fast-slow cycle, fast to remove the bagged article from the position in line with the pusher bars and scoop-jaw assemblies and slow when the bagged article is being received on the conveyor and when the bagged article is being tied by the tying mechanism.

With reference to Fig. 8, an alternative embodiment of pusher bar assembly 108 is generally designated 108' and includes a horizontally extending extension 196' on strut 196. A downwardly extending bracket 301 having spaced collars 302 thereon is mounted on strut 196'. A pair of spaced spring biased plunger assemblies 303 are mounted in collars 302 with a screw 304 thereof normally extending past bracket 301 as shown in Fig. 8. The pusher bars 22' are provided with slots

305 therein spaced apart a distance equal to the spacing of plunger assemblies 303. With this arrangement, different shapes and sizes of pusher bars may be rapidly interchanged by pressing in plunger assemblies 303 to advance screws 304 to the left as seen in Fig. 8, mounting the pusher bars thereon by inserted the slots thereof on the shaft of the screws and releasing the pressure on the plunger, the spring then urging the head of the screws against the pusher bar 22' to hold the latter between the bracket 301 and the heads of screws 304.

A bag stripping member 306 is adjustably mounted to strut 196 by a bolt 308. As the pusher bar is inserting an article into the bag held by the scoop-jaws the leading edges 310 of the bag stripping member engages the edge of the bag and as the pusher bar assembly advances, removes the bag from the scoop jaws. The position of member 306 is adjustable so that it can be mounted on strut 196 to start stripping the bag off the scoop-jaws and removing the bag from the wicket in tray 300 just as the article reaches the back of the bag. This precludes the crushing of soft products by relying only on the action of the pusher bar pressing the article against the back of the bag to remove the bag from the wicket of the tray.

A photocell means 312 is mounted across the infeed conveyor assembly 10 as shown in Fig. 1 to detect whether an article is in the pockets 44 being advanced to the bagging position 12. If there is no article in the pocket the jet of air is turned off to preclude a stoppage in the machine by the engaging of the bag on the scoop-jaw assembly that would not be removed by the insertion of an article in the back of the bag. A valve 315 is provided to operate the air jet.

A control unit 318 is mounted adjacent the forward end of housing 100 and a cable 320 connects the wiring thereto from motor 26.

A sprocket 322 is mounted on output shaft 143 and a sprocket 325 is mounted on shaft 330 in a spaced relationship thereto. Shaft 330 is driven by shaft 143 by an endless chain 333. Shaft 330 is an output jack-shaft that extends to the exterior of the subject apparatus and may be used to supply power to an adjacent machine such as the Automatic Infeed Loader disclosed in assignee's copending application, Ser. No. 763,101, filed Sept. 27, 1968 for Pan Feeding Apparatus.

We Claim:

1. Apparatus for inserting a succession of articles into bags, which comprises:

a flighted infeed conveyor for transporting a succession of articles to predetermined position,

means for supplying a succession of inflated bags at a position in spaced relationship with the predetermined position,

a scoop mechanism for engaging the inside of the inflated bag and guiding articles therein,

a pusher bar assembly operable to engage an article at the predetermined position, push it through the scoop mechanism into the inflated bag, remove the bagged article from the bag supply and to be withdrawn from the interior of the bag,

said infeed conveyor comprising two side by side conveyor belts,

means forming flights for the infeed conveyor belts, and means for permitting the adjustment of the size of the pockets formed by the flights.

2. Apparatus for packaging articles according to claim 1, wherein said scoop mechanism comprises:

a pair of scoops pivotally mounted between the bag supply and the predetermined position,

mechanical means for closing the scoops to insert them into said inflated bag and opening them to engage and hold the inflated bag, and

means for varying the spacing between the scoops to adjust the mechanism for different sized articles and bags.

3. Apparatus according to claim 2, wherein the assembly includes:

a frame having tracks therein, spaced, driven endless chains.

at least one pusher bar subassembly mounted between said endless chains and including means for engaging said tracks, and
said chains and said tracks being shaped so as to insert the pusher bar into said inflated bag and withdraw it therefrom.
4. Apparatus for packaging articles, which comprises:
a flighted infeed conveyor for transporting articles to a predetermined position,
means for providing an inflated bag at a position spaced from the predetermined position,
means for engaging an article at said predetermined position and inserting it into said inflated bag, and
means extending exterior of the infeed conveyor for changing the size of the pockets formed by the flights thereof, and
wherein said flighted infeed conveyor includes a pair of endless conveyor belts mounted in a side by side relationship, each conveyor belt being mounted over a driven

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sprocket means and an idler sprocket means and each of said drive sprocket means including a gear ring,
a drive shaft for rotatably mounting said driven sprocket means, said drive shaft including a collar thereon engaging the side of one of said driven sprocket means,
a bevel gear mounted on said shaft and operable to engage the gear rings of each of the driven sprocket means,
means slidably mounted on the shaft operable to engage the side of the sprocket means opposite the sprocket means being engaged by the collar,
said slidable means, when engaged with the sprocket means, being operable to cause the sprocket means to be driven by the shaft through a frictional drive path between said collar and said slidable means, and
means for sliding said slidable means out of engagement with the side of said sprocket means to permit the sprocket means to be rotated with respect to the shaft.