

June 11, 1957

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2,795,264

APPARATUS FOR APPLYING TAPE TO CONTAINERS

Filed May 8, 1956

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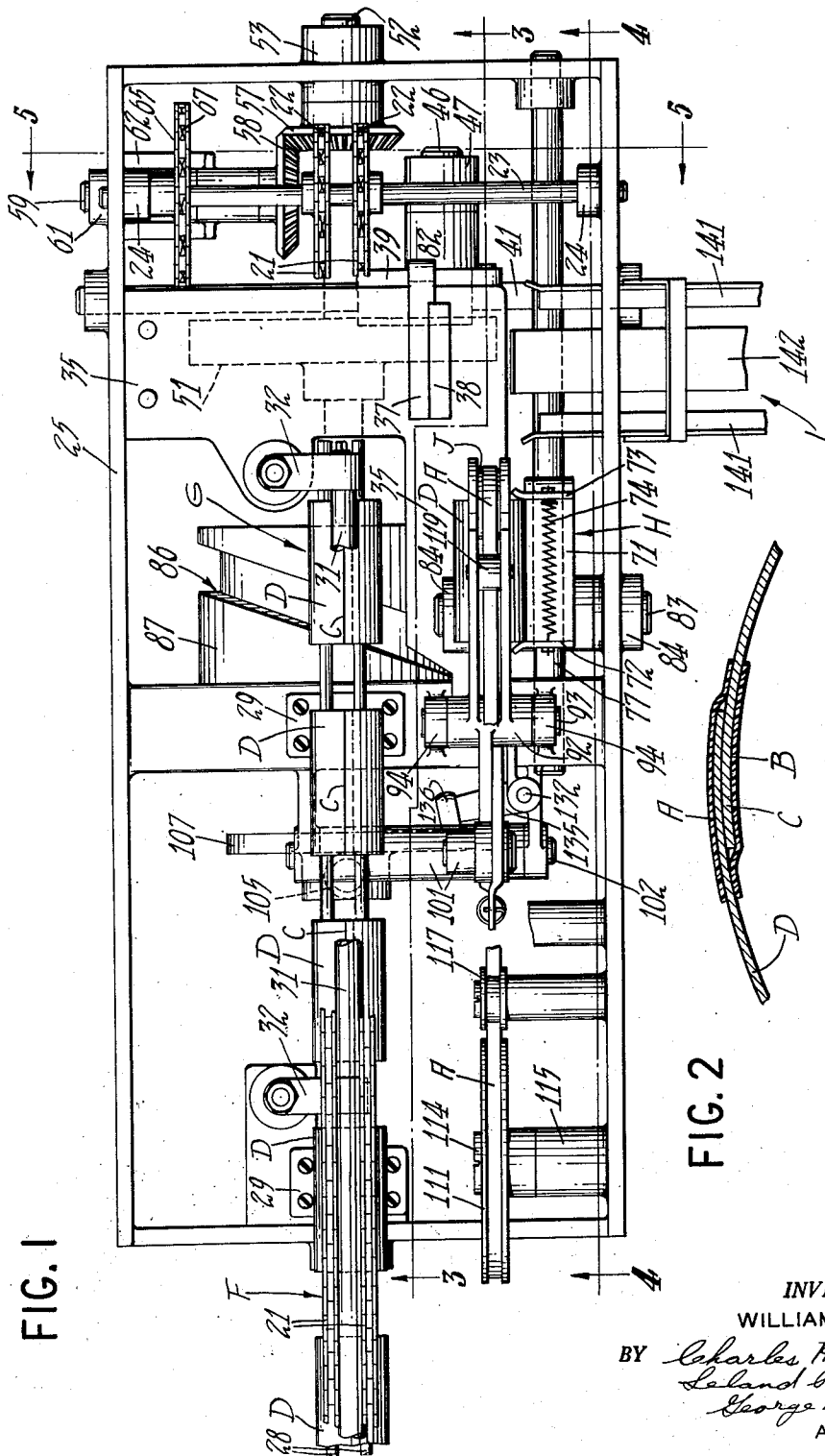


FIG. 2

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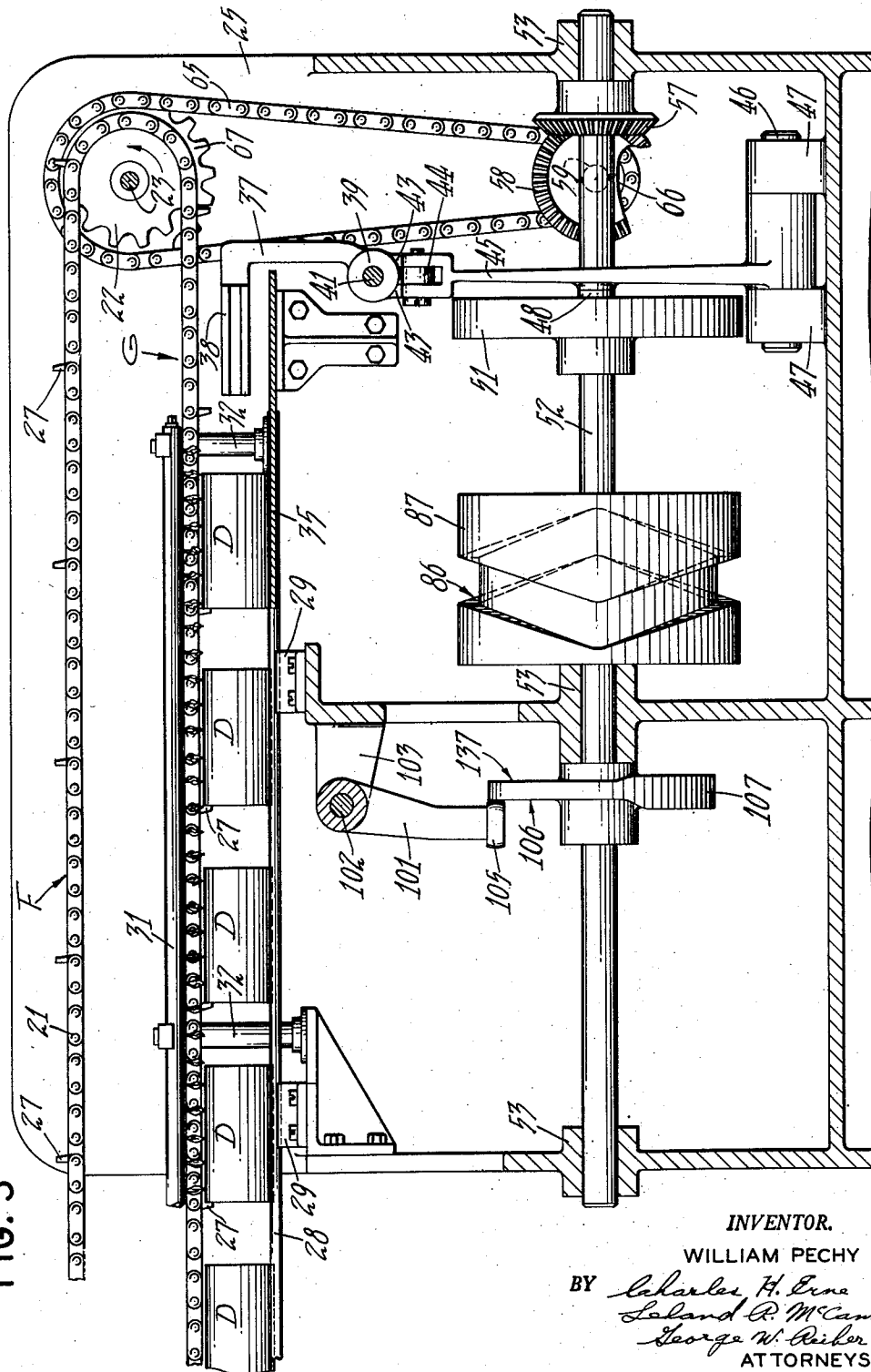
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FIG. 3



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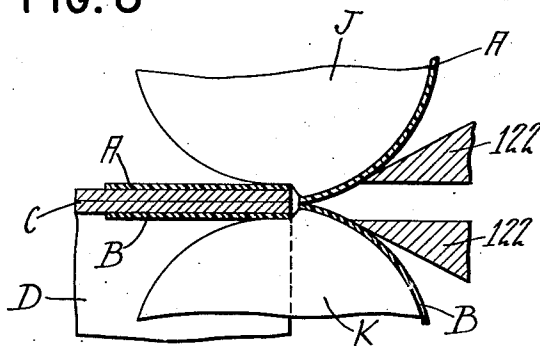
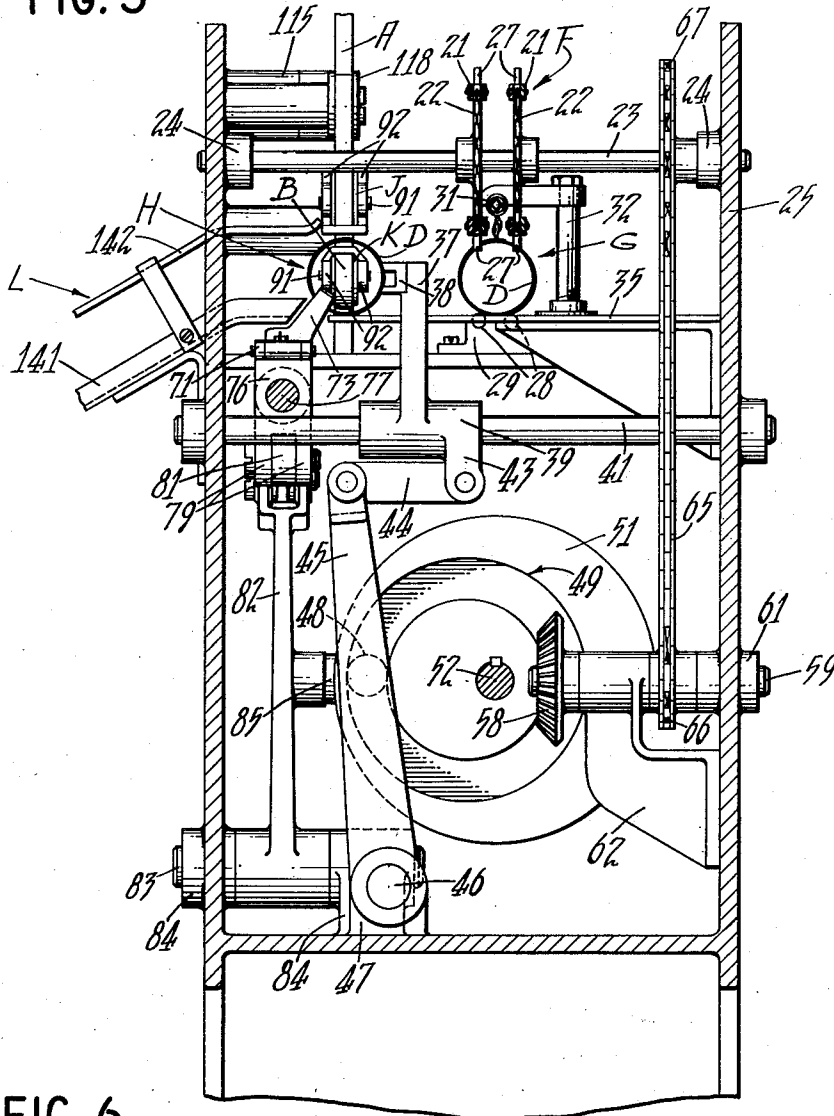
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FIG. 7

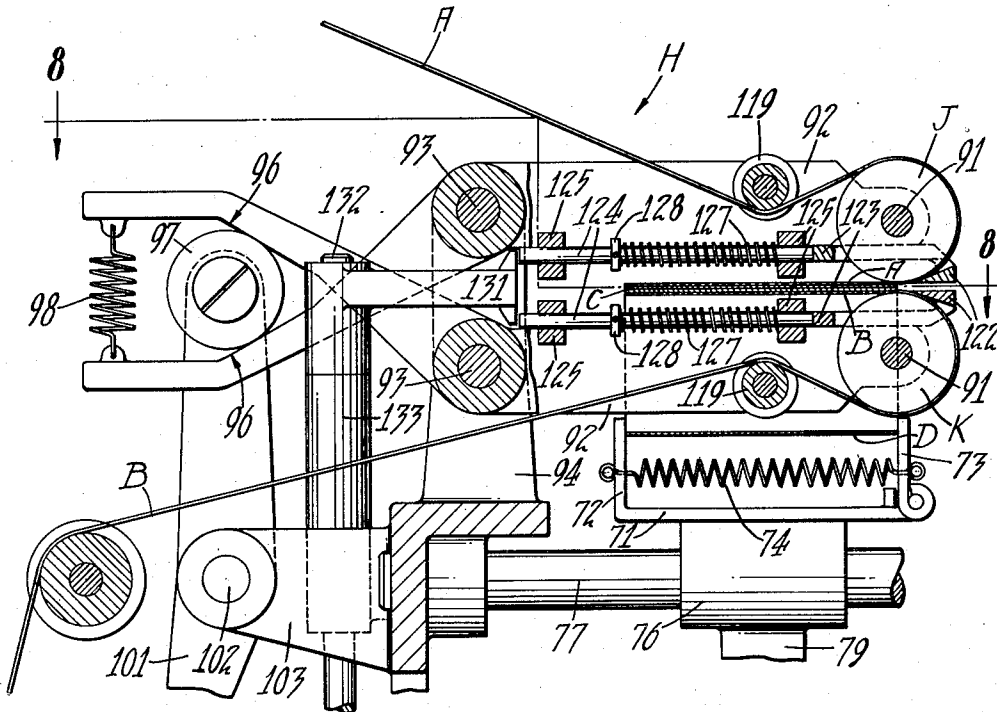
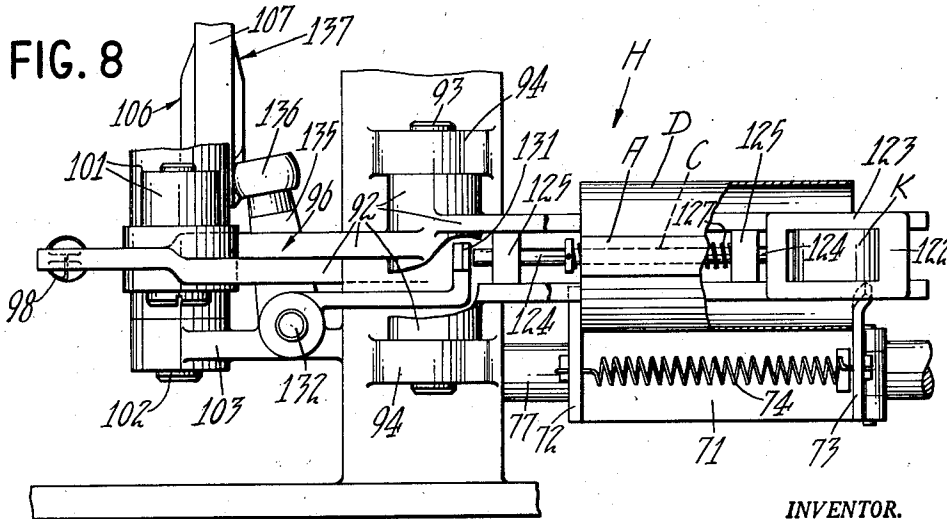


FIG. 8



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APPARATUS FOR APPLYING TAPE TO CONTAINERS

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15 Claims. (Cl. 154—42.3)

The present invention relates to apparatus for applying tape to the side seam of a can body and has particular reference to devices for applying the tape to opposed faces of the seam.

An object of the invention is the provision of an apparatus for applying tape to the outer and inner faces of the side seam of a can body for the full length of the seam.

Another object is to effect such an application of tape to can body side seam from two separate sources of substantially continuous webs of tape so that one tape can be applied to the outer face of the seam and the other to the inner face within the body.

Another object is to provide for shifting of the tape into and out of contact with the can body side seam so that the tape can be applied during movement of the can body in one direction and the body returned in an opposite direction without interfering with the tape applying device.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a top plan view of an apparatus embodying the instant invention, with parts broken away;

Fig. 2 is an enlarged transverse section of the side seam portion of a can body showing the tape applied to the opposed faces of the seam;

Figs. 3, 4 and 5 are sectional views of the apparatus as taken substantially along the respective lines 3—3, 4—4, 5—5 in Fig. 1, parts being broken away;

Fig. 6 is an enlarged schematic view of the tape applying elements of the apparatus, showing how the tape is cut off at the end of the seam;

Fig. 7 is an enlarged view of the tape applying elements and adjacent parts as shown in Fig. 4, parts being broken away; and

Fig. 8 is a plan view taken substantially along the broken line 8—8 in Fig. 7.

As a preferred or exemplary embodiment of the instant invention the drawings illustrate an apparatus for applying substantially continuous webs A, B (Fig. 4) of tape, preferably of substantially solid, preformed, natural or synthetic thermoplastic material, to the outer and inner opposed faces of a lapped side seam C (Fig. 2) of a sheet metal tubular can body D preferably made of tin plate, black iron or other suitable can or container body material.

In the apparatus the can bodies D enter in spaced and timed, end-to-end processional order with their side seams facing up and in longitudinally aligned relation. In this arrangement, the bodies are advanced along a straight line path of travel by a conveyor F (Figs. 1 and 3). At a transfer station G the can bodies D are picked-off individually and moved laterally into endwise alignment with a tape applying station H (Figs. 1, 4 and 5) disposed ad-

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jacent to and parallel with the conveyor F. The applying station H contains a pair of opposed tape applying elements, preferably rollers J, K which carry and apply the tapes A, B to the body.

While in endwise alignment with the applying station H, the body is reciprocated into and out of the station. As the body moves into the station H, the side seam C of the body is passed between the rollers J, K and receives the tape on its outer and inner faces. A pressure sensitive coating on the tapes causes them to cling to the seam faces. As the trailing edge of the body passes beyond the rollers, the tapes A, B are cut free from the body as will be hereinafter more fully explained. As the body moves out of the station H, on its return travel, the applicator elements J, K spread apart to prevent interference with the tape applied to the side seam.

When the body is fully out of the applying station H and again in lateral alignment with the transfer station G, the next incoming can body being pushed laterally through the transfer station engages the taped can body and pushes it into a discharge device L which removes the taped can body from the machine for further treatment. This completes the travel of the body through the machine.

The conveyor F which propels the can bodies D through the machine up to the transfer station G, preferably is composed of a pair of spaced and parallel horizontally disposed endless chains 21 (Figs. 1 and 3) which extend from a suitable source of supply of the can bodies D and which in the apparatus operate over a pair of transversely spaced drive sprockets 22 located at the transfer end of the machine. The sprockets 22 are mounted on a rotatable cross-shaft 23 (see also Figs. 4 and 5) which is journaled in a pair of spaced bearings 24 formed in a frame 25 which constitutes the main frame of the apparatus. The sprocket shaft 23 may be rotated in any suitable manner.

The endless conveyor chains 21 carry spring pressed feed dogs 27 which are secured to the chains at spaced intervals therealong for engagement behind the trailing edges of can bodies D moving in a straight line under the lower horizontal runs of the chains. During advancement by the feed dogs 27, the can bodies D are supported on and travel along a pair of longitudinally disposed, spaced and parallel, horizontal support bars 28 which extend up to the transfer station G. These support bars 28 are held in place by brackets 29 secured to the machine frame 25.

In order to facilitate cutting of the tapes A, B from the can bodies D as will hereinafter be explained, the side seams C of the bodies preferably are subjected to a heat treatment. This is effected by a heating element, preferably an electric element or gas burner 31 (Figs. 1, 3 and 5) which is disposed above and along the path of travel of the side seams of the bodies moving along the support bars 28. This burner 31 extends between the lower runs of the conveyor chains 21 and is supported on brackets 32 attached to the machine frame 25.

At the transfer station G, the advancing can bodies D ride off the support bars 28 and onto a transverse horizontal table 35 secured to the machine frame 25. This table 35 extends across the machine and under the tape applying station H as shown in Fig. 1. As a can body D rides onto the table 35 at the transfer station G, it is engaged by a transfer element or finger 37 which is movable transversely of the apparatus to shift the can body laterally from the transfer station G to a position in front of the tape applying station H as shown in Fig. 5. This finger 37 preferably is fitted with a magnetic head 38, preferably a permanent magnet, which grips the can body so as to retain its side seam in its prelocated position during transfer of the body.

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The transfer finger 37 is an inverted L-shaped member which extends over the table 35 and projects up from a hub 39 which is slidably mounted on a slide bar 41 which extends transversely of the apparatus and is secured at its ends in the main frame 25. The hub 39 is reciprocated through a transfer stroke, toward the left from the transfer station G as viewed in Fig. 5 and thence through a return stroke to a position at the right of the transfer station, in time with the advancement of the can bodies D into the transfer station. This is effected by cam action. For this purpose the hub 39 is formed with a pair of spaced depending lugs 43 which are connected by a link 44 to the upper end of an upright actuating arm 45.

At its lower end, the actuating arm 45 is mounted on a pivot pin 46 which is carried in a pair of spaced bearings 47 formed on the machine frame 25. Intermediate its length the arm 45 carries a cam roller 48 which operates in a cam groove 49 of a rotatable face cam 51 mounted on and rotating with a cam shaft 52 which extends longitudinally of the apparatus. The shaft 52 is journaled in a plurality of spaced bearings 53 disposed along its length and formed in parts of the machine frame 25.

The cam shaft 52 is rotated continuously and in timed relation with the can body feed conveyor F, through connection with the conveyor. For this purpose the cam shaft 52 carries a bevel gear 57 which meshes with a driving bevel gear 58 carried on a stub shaft 59 journaled in a bearing 61 on the machine frame 25 and in a bearing bracket 62 secured to the frame. The stub shaft 59 is rotated by an endless chain 65 which operates over a sprocket 66 on the shaft 59 and over a driving sprocket 67 carried on and rotating with the conveyor drive shaft 23.

When the transfer finger 37, transfers a can body laterally from the transfer station G into position in front of the tape applying station H, it momentarily holds the can body in this latter position before returning to the transfer station for a repeat operation. In approaching this position, near the end of the transfer stroke, the can body is pushed, by the transfer finger 37, into a longitudinally movable carriage 71 (Figs. 1, 4, 5, 7 and 8) for movement into and out of the applying station H. The carriage 71 at one end is provided with a fixed jaw 72 and at the other end with a hinged jaw 73 between which jaws the can body is received with the side seam exposed and in the clear, the body being clamped by the jaws against movement relative to the carriage. A spring 74 stretched between the jaws 72, 73 yieldably urges the hinged jaw 73 toward the fixed jaw 72 to hold the can body in this endwise clamped position. The jaws 72, 73 project inwardly from the carriage to permit supporting of the can body by the table 35.

As soon as the can body D is received between the clamping jaws 72, 73 of the carriage 71, the carriage is moved toward the tape applying station H for the application of the tapes A, B to the body side seam. This forward movement, strips the can body endwise off the magnet head 38 of the transfer finger 37 and thereby unloads the finger. While the body continues on into the applying station H, the transfer finger 37 moves back into position beyond the entrance conveyor F to receive and transfer the next can body in line on the conveyor.

Reciprocation of the carriage 71 into and out of the applying station H preferably is effected by cam action in time with the other moving parts of the apparatus. For this purpose, the carriage 71 is formed with a depending longitudinal hub 76 which is slidably mounted on a slide bar 77 (Figs. 1, 4 and 5) disposed below the path of travel of the can body longitudinally of the apparatus and having its ends secured in parts of the machine frame 25. The hub 76 is formed with a pair of depending lugs 79 which are connected by a link 81 to the upper end of an upright actuating arm 82. At its lower end, the arm 82 is mounted on a pivot pin 83 carried in a pair of spaced

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bearings 84 in the frame 25. Intermediate its length, the arm 82 carries a cam roller 85 which operates in a cam groove 86 of a barrel cam 87 mounted on and rotating with the cam shaft 52.

In a cycle of operation of the machine, the barrel cam 87 makes one revolution and reciprocates the carriage 71 through a taping stroke, toward the left in the position shown in Fig. 4 and thence through a return stroke toward the right from the position shown in Fig. 4 while the transfer finger 37 returns to the conveyor F for the next can body.

On the taping stroke of the carriage 71, the side seam C of the can body carried thereon, is passed between the applicator rollers J, K located at the tape applying station H. These applicator rollers J, K are disposed vertically one above the other and in peripheral engagement, their point of tangency being disposed in the plane of the path of travel of the side seam C. The rollers J, K preferably are made of resilient material or made with a resilient outer face to facilitate cut off of the tape as will be described hereinafter.

The applicator rollers J, K are mounted, for frictional rotation through engagement against the moving body side seam C, on pins 91 (Figs. 4, 5 and 7) carried in a pair of scissor shaped arms 92 so that the lower roller K can enter and pass through the can body. These arms 92 are mounted intermediate their lengths on a pair of pivot pins 93 secured in bearing brackets 94 on the machine frame 25 (see also Fig. 8). Beyond the pivot pin 93, (toward the left as viewed in Fig. 4) the arms 92 cross each other and provide a pair of inclined or tapered converging cam faces 96 (Fig. 7) for the operation thereagainst of a spreader roll 97 for spreading apart the arms and the applicator rollers J, K for the return travel of the can body as will be later explained. The outer ends of the scissor arms 92, adjacent the tapered faces 96 are tied together by a tension spring 98 to yieldably urge the applicator rollers J, K toward each other.

The spreader roll 97 is carried on the upper end of an upright cam arm 101 which intermediate its length is mounted on a pivot pin 102 journaled in a bearing bracket 103 on the machine frame 25. At its lower end, the cam arm 101 carries a cam roller 105 which operates against one face 106 (at the left as viewed in Fig. 4) of a double face cam 107 mounted on and rotating with the cam shaft 52.

The tapes A, B to be applied to the outer and inner faces of the body side seam C are supplied from a pair of supply reels 111, 112 (Figs. 1 and 4) of such tape in substantially continuous webs. The reels are freely mounted on studs 114 secured into bosses 115 on the machine frame 25. The two reels 111, 112 are mounted one above the other in vertical relation and in alignment with the applicator rollers J, K on the scissor arms 92. The tapes A, B from these supply reels 111, 112 are threaded over a plurality of tension rollers 117, 118 attached to the machine frame 25 and a tension roller 119 in each of the scissor arms 92 and finally pass around the applicator rollers to their point of tangency as best shown in Fig. 7.

At the point of tangency of the applicator rollers J, K the ends of the tapes A, B are held releasably clamped against the rollers by a pair of wedge shaped clamps 122 (Fig. 7). There is one clamp 122 for each roller. These clamps 122 are formed on the outer ends of hollow rectangular frames 123 (see Fig. 8) which surround the applicator rollers J, K and which slidably engage against the scissor arms 92 in the space between the arms. The frames 123 are attached to pair of clamping rods 124 (Figs. 7 and 8) which extend back toward the scissor arm pivot pins 93 and which are slidable in pairs of spaced bearings 125 in the scissor arms. Between the bearings 125 of each rod, the rod carries a compression spring 127 which is interposed between the outer bearing 125 (at the right in Figs. 7 and 8) and a collar 128 carried on

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the rod. The springs 127 draw the clamps 122 inwardly against the applicator rollers J, K.

At the beginning of a tape applying operation, the clamps 122 are released from the applicator rollers J, K by cam action. For this purpose the inner ends of the two clamp rods 124, adjacent the scissor arm pivot pins 93, terminate just short of an actuating lever 131 (Figs. 7 and 8) which is mounted on a vertical pivot shaft 132 journaled in a pair of spaced bearings 133 (see Fig. 4) on the machine frame 25. The pivot shaft 132 extends down adjacent the cam shaft 52 and carries at its lower end a cam lever 135 having a cam roller 136 which operates against a cam face 137 of the face cam 107 on the cam shaft 52.

In the taping operation, the applicator rollers J, K are in contact with each other, with the terminal ends of their respective tapes A, B between them and clamped by the clamps 122, when a can body D on the carriage 71 moves toward them for the operation. As the leading edge of the side seam C of the advancing can body enters between the applicator rollers J, K the terminal ends of the tapes A, B on the respective rollers are disposed adjacent the opposed outer and inner faces of the side seam at its leading edge and are pressed against these faces by the applicator rollers. At this time in the cycle of operation the clamps 122 are released from the tapes A, B by being shifted away from the rollers through action of the cam face 137 of cam 107 and the parts controlled thereby. This releases the clamping pressure on the tapes A, B with the result that as the can body D continues to advance with the carriage 71, the side seam C advances between the rollers J, K for its full length, with the lower roller K entering into and being surrounded by the can body and through frictional contact with tapes A, B on the rollers, rotates the rollers and thereby unwinds the tapes from their reels 111, 112 and causes the rollers to lay and tightly press the tapes on and against the outer and inner faces of the seam in a permanent attachment thereto for its full length.

As the trailing edge of the side seam leaves the applicator rollers J, K with the lower roller K all the way through the can body as shown in Fig. 6, the resiliency of the peripheral faces of the rollers causes them to press the tapes under pressure against the trailing edge of the seam adjacent each outer and inner face. This pressure causes the seam edges to cut through the tapes A, B and thereby sever the tapes applied to the seam from the substantially continuous webs carried on the rollers and extending back to the supply reels 111, 112. The preheating treatment of the side seam affected by the heaters 31 hereinbefore mentioned facilitates the severing action.

With this severance of the tapes A, B, the clamps 122 immediately return to clamping position to tightly clamp the severed terminal ends of the tapes A, B to their respective applicator rollers J, K.

As soon as the tapes A, B are severed and their terminal ends clamped against the applicator rollers J, K, the can body D with its freely taped side seam C, ceases further advancement and the rollers J, K are moved apart to create a wide space between their normally contacting peripheries. This separating action separates the terminal ends of the tapes if they stuck together during the severing operation. The can body D is then moved back through its return travel between the separated rollers J, K to withdraw the lower roller K from within the can body and to return the body to its original position as received in the carriage 71 from the transfer finger 37.

In this returned position the fully taped can body D is disposed directly opposite the entrance of a discharge chute of the discharge device L. This chute comprises a pair of spaced and parallel partly inclined angle iron support tracks 141 (Figs. 1, 4 and 5) and an overhead guide 142, which extend through an opening in the side of the machine frame 25. The fully taped can body D arrives at this device L just as the transfer finger 37, after

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receiving the next in line untaped can body from the conveyor F, is transferring the untaped can body into position in endwise alignment with the tape applying station H, which position is now occupied by the fully taped can body just returned from the applying station. As a result the untaped can body moving into position, collides with the fully taped can body already in position, and forces the fully taped body out of the carriages 71 and into the directly opposite discharge chute of the discharge device L. The discharged can body thereby rolls down the chute to any suitable place of deposit while the untaped new can body is positioned in the carriage 71 for its taping operation. This completes the cycle of operation of the apparatus.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. Apparatus for applying tape to opposed inner and outer faces of said seams of tubular can bodies, comprising in combination a pair of oppositely disposed applicator elements with each of said elements carrying a separate tape, and means for advancing the side seam of a said can body between said elements to effect application of the tape on one of said elements to the outer face of said side seam and to effect application of the tape on said other of said elements to the inner face of said side seam.

2. Apparatus of the character defined in claim 1 wherein said tapes are substantially continuous webs wound on separate supply reels and are unwound from said reels by said applicator elements.

3. Apparatus of the character defined in claim 1 wherein said applicator elements are rollers.

4. Apparatus of the character defined in claim 3 wherein said rollers are at least partially resilient to provide for severing said tapes against an edge of said side seam.

5. Apparatus of the character defined in claim 1 wherein said side seam advancing means reciprocates said seam between said applicator means in one direction for the application of said tapes thereto and in a reverse direction to return said seam to a position clear of said applicator elements for further advancement.

6. Apparatus of the character defined in claim 5 wherein there is provided means for separating said applicator elements from said seam after a tape applying operation to facilitate return of said seam without interference with said applicator elements.

7. Apparatus of the character defined in claim 1 wherein said seam advancing means is a reciprocable carriage for carrying a can body and wherein means are included for reciprocating said carriage relative to said applicator elements for the advancement of said body side seam therebetween.

8. Apparatus of the character defined in claim 7 wherein said carriage is provided with means for holding said can body stationary in said carriage.

9. Apparatus of the character defined in claim 7 wherein there is provided means for feeding and discharging can bodies into and out of said carriage.

10. Apparatus of the character defined in claim 7 wherein there is provided conveyor means for advancing can bodies endwise along a path of travel adjacent said carriage, and transfer means movable between said path of travel and said carriage for transferring can bodies laterally from said line of travel and into said carriage.

11. Apparatus of the character defined in claim 10 wherein the side seams of the can bodies advanced by said conveyor means are located in a predetermined posi-

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tion and wherein means are provided on said transfer means for retaining said side seams in said predetermined position during transfer of said bodies.

12. Apparatus of the character defined in claim 1 wherein said applicator elements are rollers and wherein said rollers are mounted on pivot arms, one of which is insertable into a can body for the application of said tape to said inner face of said body side seam.

13. Apparatus of the character defined in claim 12 wherein means are provided to yieldably urge said arms toward each other to retain said applicator rollers in peripheral engagement for the passage of said body side seam therebetween and wherein there is provided means for separating said arms to separate said rollers upon completion of the passage of said seam therebetween.

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14. Apparatus of the character defined in claim 1 wherein said applicator elements are rollers and wherein clamp means are provided and are operable against the tapes on said rollers to retain said tapes in position thereon.

15. Apparatus of the character defined in claim 14 wherein said clamps are yieldably held against said rollers and wherein means are provided to release said clamps and to hold them in released relation to said rollers during the application of said tapes to said side seam.

No references cited.