Dec. 30, 1952

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ASSEMBLY AND DELIVERY DEVICE FOR BULK LOADING CONTAINERS

2,623,628

Filed April 2, 1947

4 Sheets-Sheet 1

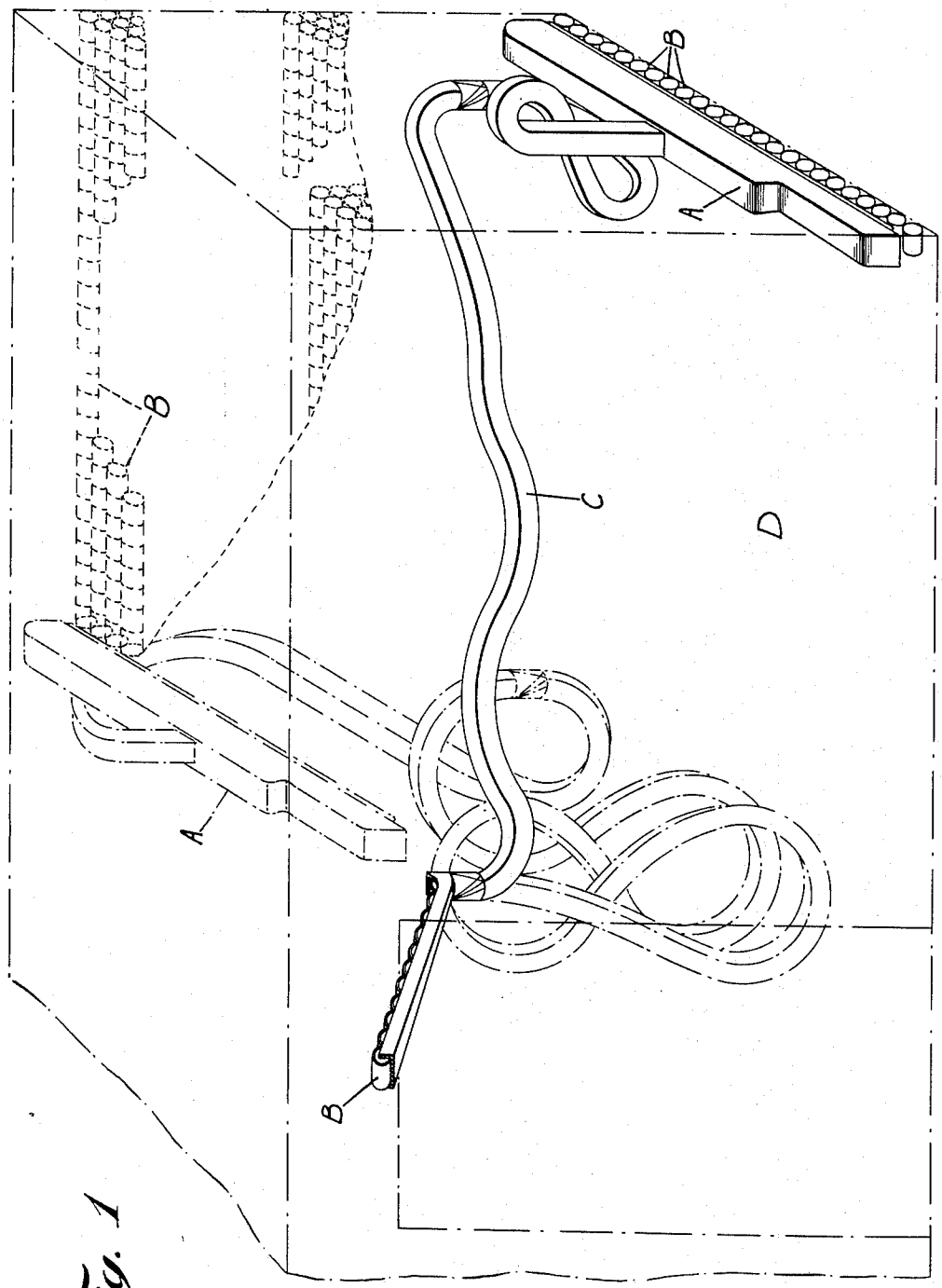


Fig. 1

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4 Sheets-Sheet 2

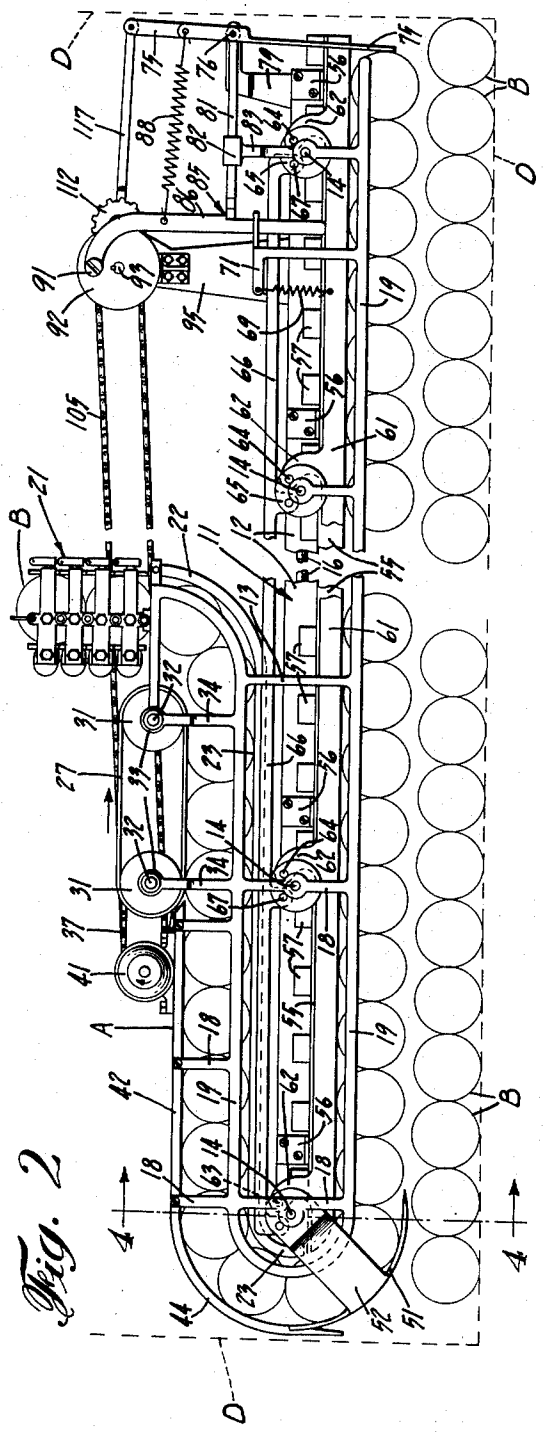


Fig. 2

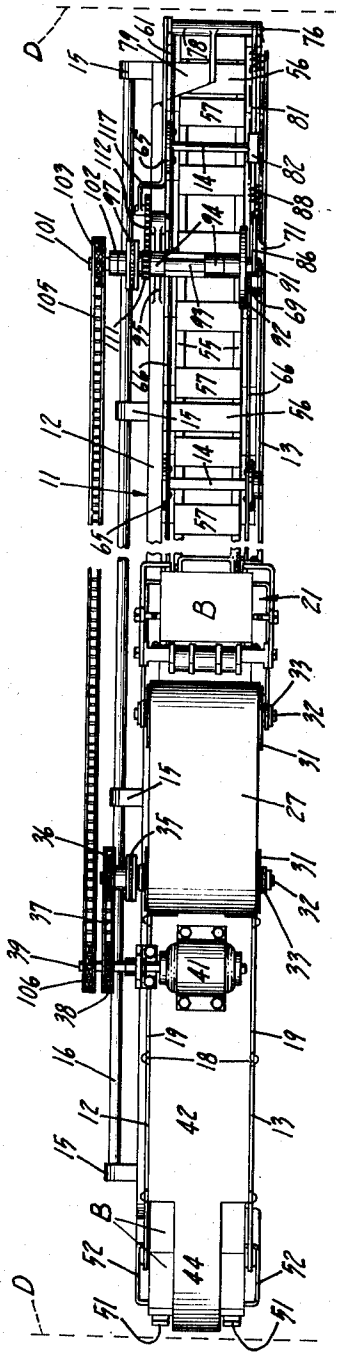


Fig. 3

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ASSEMBLY AND DELIVERY DEVICE FOR BULK LOADING CONTAINERS

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Fig. 4

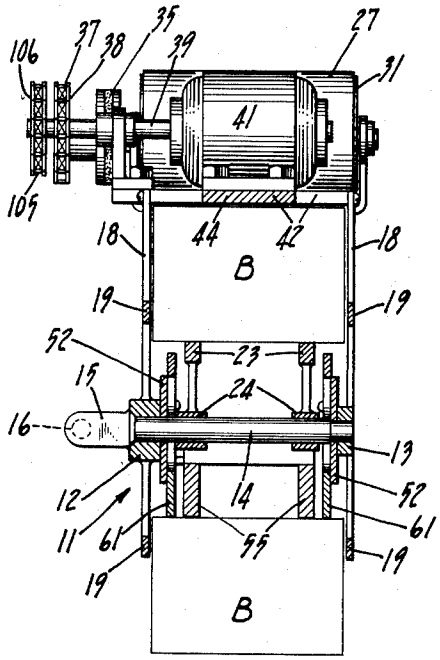


Fig. 5

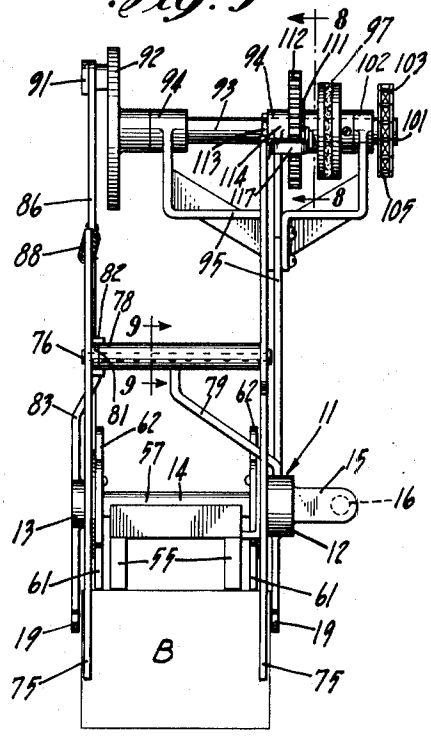
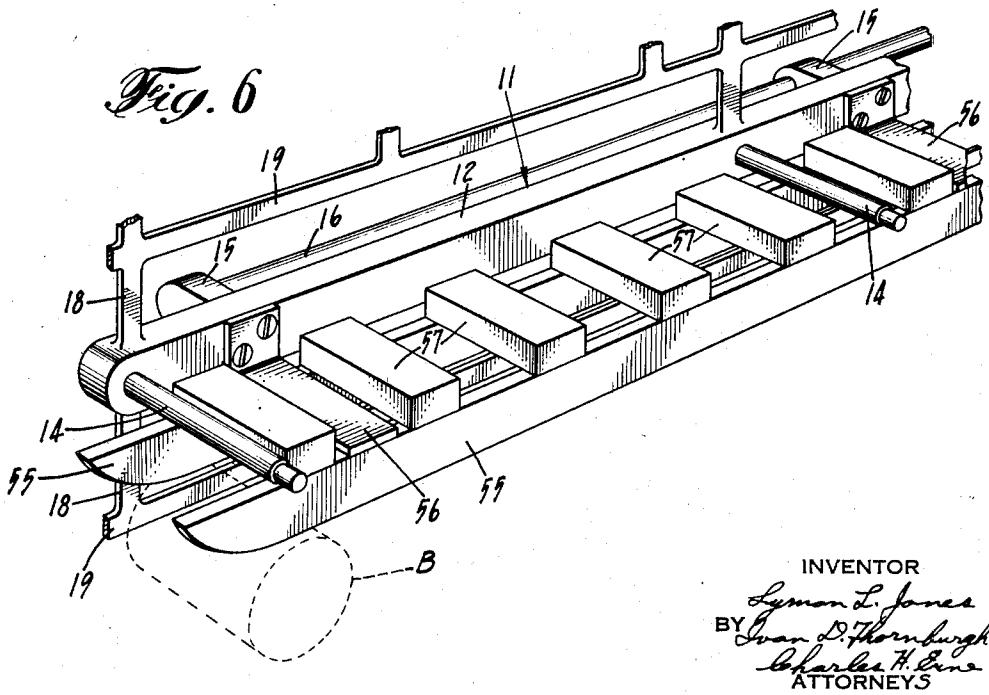


Fig. 6



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Fig. 7

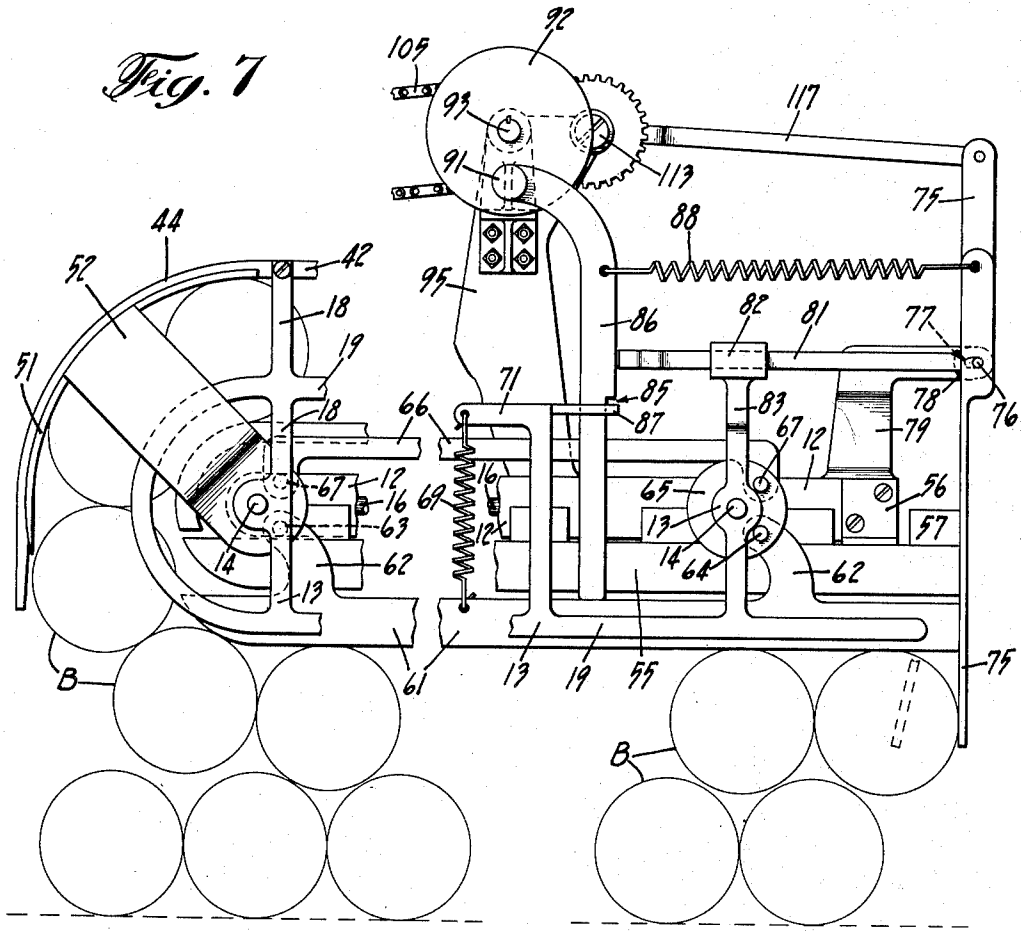


Fig. 8

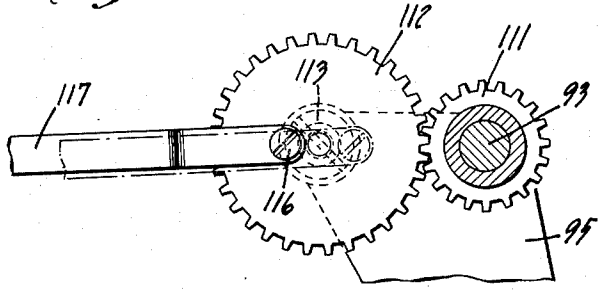
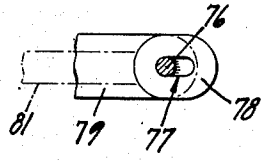


Fig. 9



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UNITED STATES PATENT OFFICE

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ASSEMBLY AND DELIVERY DEVICE FOR BULK LOADING CONTAINERS

Lyman L. Jones, Seattle, Wash., assignor to American Can Company, New York, N. Y., a corporation of New Jersey

Application April 2, 1947, Serial No. 738,890

8 Claims. (Cl. 198—41)

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The present invention relates to an assembly and delivery device for bulk loading sheet metal cans or containers into railroad cars or storage bins or the like and has particular reference to a device for assembling cans in a row and for delivering the assembled row as a unit so that the rows of cans may be conveniently piled one on top of the other to form an orderly arranged stack.

An object of the invention is the provision of a device for assembling and delivering cans in rows wherein the device is movable from one place to another for the convenient depositing of the rows of cans in an orderly arranged stack.

Another object is the provision of such a device wherein a row of assembled cans may be quickly and easily delivered as a unit row from the device for the convenient stacking of the cans one row upon another and additional rows and stacks adjacent thereto so that a solid orderly arranged mass of cans may be placed in bulk form within a compartment to be loaded or filled.

Another object is the provision of such a device wherein the device is self-contained as to all its operating parts and is of such proportions as to permit the substantially complete filling of a compartment with cans from bottom to top and from end to end.

Another object is the provision of such a device wherein the cans as they are received are positively rolled into assembled position and pressed into a compact row before delivery as a unit to insure against spaces between the cans.

Another object is the provision of such a device wherein the cans themselves upon being assembled in a complete compact row, effect a release of the row as a unit for delivery from the 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 schematic perspective view of a flexible runway having an assembly and delivery device embodying the instant invention, the device being shown in different positions incidental to bulk loading cans into a railroad car or bin, with parts broken away;

Fig. 2 is an enlarged side view of the assembly and delivery device in loading position within a compartment to be filled with cans, the view

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showing a row of cans already loaded and a row in position to be delivered from the device, parts being broken away;

Fig. 3 is a top plan view of the device shown in Fig. 2, with parts broken away;

Fig. 4 is an enlarged sectional view taken substantially along the line 4—4 in Fig. 2;

Fig. 5 is an enlarged end elevation of the device as viewed from the right in Fig. 2;

Fig. 6 is an enlarged perspective view showing a constructional detail of the device, with parts broken away and with a can shown in dotted lines;

Fig. 7 is an enlarged side elevation of the end portions of the device, with parts broken away, and cans shown in place; and

Figs. 8 and 9 are sectional details taken substantially along the respective lines 8—8, 9—9 in Fig. 5.

As a preferred embodiment of the instant invention the drawings illustrate an assembly and delivery device A (Fig. 1) for receiving sheet metal cans B from any suitable source of supply such as a flexible runway or conveyor C and for assembling and delivering the received cans in unitary rows for bulk loading the cans into a railroad car D for transportation or into a bin, room or other compartment for storage.

In operation the device A receives the cans in a horizontal position, the cans rolling on their sides. The cans as they are received are assembled into a compact row without any intervening spaces between them and are held in suspension on the bottom of the device. When a complete row of cans is assembled, the cans themselves operate a release mechanism which releases the entire assembled row as a unit and permits the row to fall into place in the compartment D to be filled.

The assembly and delivery device A is of such a construction as to permit its manual or otherwise movement, vertically and horizontally in time with the delivery of the rows of cans so as to deposit the rows one on top of the other and alongside each other to form stacks extending from the bottom of the compartment to its top and from end to end of the compartment. The parts of the mechanism as nearly as possible are constructed of light metals such as aluminum alloys so that one person can load the cans without fatigue. The cans being empty are bulky but not heavy, being filled merely with air. Thus by merely moving the device into and out of selected positions the compartment may be completely filled with a solid mass of cans in bulk

form and in an orderly stacked arrangement for safe transportation or for storage.

In construction, the device A includes a long narrow frame 11 (Figs. 2, 3 and 6) which carries the various parts of the device and which in length is substantially equal to the width of the compartment to be filled with cans. This frame 11 comprises a pair of spaced and parallel longitudinal side members 12, 13 which are tied together adjacent their ends and at intervals between their ends by a plurality of cross rods 14. The side member 12 is formed with outwardly projecting lugs 15 which carry a long handle bar 16 for manually or otherwise carrying and manipulating the device.

Both of the side members 12, 13 are formed with radiating arms 18 which carry spaced and parallel side guides 19 for guiding the cans B through the device. These guides extend along the bottom of the device for its full length, and curve upwardly around one end of the device, at the left as viewed in Fig. 2, and thence continue along the top of the device. Near the top middle of the device the guides 19 curve upwardly and are joined to a flexible runway 21 (Fig. 2) of any suitable type for conveying cans in a rolling position to the device. The flexible runway 21 is more specifically described in my copending application Serial Number 738,883, filed simultaneously with the present application and issued as Patent No. 2,561,377 on July 24, 1951.

Cans B entering the assembly and delivery device by way of the runway 21 roll along a curved entrance section 22 (Fig. 2) of a pair of spaced and parallel tracks or support rails 23 (see also Fig. 4) which are disposed between the top runs of the guides 19. These support rails are formed with hubs 24 which are carried on the frame cross rods 14. The support rails extend along the top of the device and curve around the end, at the left in Fig. 2, terminating a short distance below the cross rod 14 disposed at this end of the device.

As the cans B enter the device from the runway 21, they roll under and into engagement with an endless propelling or pressure belt 27 disposed on top of the device and immediately adjacent the exit end of the runway 21. The belt operates over a pair of spaced pulleys 31 (Figs. 2 and 3) carried on shafts 32 journaled in bearings 33 formed on side arms 34 of the frame side members 12, 13. One of the shafts 32 is a drive shaft and is rotated continuously through a slip or friction clutch 35 (Fig. 3) carried on the shaft. The clutch is formed with a sprocket 36 which is driven by an endless chain 37 actuated by a drive sprocket 38 mounted on a rotor shaft 39 of an electric motor 41. The motor is bolted to a retainer plate 42 (see also Figs. 2 and 4) which is secured to the upper ends of the upper arms 18 of the frame side members 12, 13.

Hence as the cans B roll out of the flexible runway 21, they are immediately engaged by the belt 27 and are rolled under control along the support tracks 23. Upon leaving engagement with the belt, the cans still under the belt push the others along the tracks. These cans travel under the retainer plate 42 and are retained in place thereby against the tracks. For this purpose the retainer plate is disposed in spaced relation to the tracks 23. A reduced width curved section 44 of the plate extends substantially half way around the end of the device in parallelism with the curved ends of the tracks and guides

the cans around the end of the device. This end of the device will be hereinafter referred to as the curved end of the device.

As the cans roll around the curved end of the device they engage against and are guided into a position under the device by a pair of curved movable guide rails 51 (Figs. 2 and 3). These guide rails form a continuation of the curved section 44 of the retainer plate 42 and are located one on each side of this section of the plate. The rails are formed on the outer ends of swing arms 52, the inner ends of which are loosely mounted on the frame cross rod 14 adjacent the curved end of the device (at the left as viewed in Figs. 2 and 3), and are disposed between the frame side members 12, 13 and the hubs 24 of the support tracks 23.

The guide rails 51 guide the rolling cans B into engagement with a pair of spaced and parallel suspension tracks 55 (Figs. 2 and 6) which extend along the bottom of the device for its full length and which form continuations of the support tracks 23. These tracks are secured to support brackets 59 bolted to the side member 12 of the frame 11 and preferably are made of magnetizable material. The suspension tracks 55 carry a plurality of permanent magnets 57 disposed transversely of the tracks with all of the north poles of the magnets connected with one track and all of the south poles connected with the other track. These magnets set up a magnetic flux in and between the suspension tracks

Hence the cans B guided by the curved guide rails 51 into engagement with the suspension tracks 55, cling to the tracks by magnetic attraction and are thus held in suspension on the bottom of the device. There are no bottom support bars along this portion of the device to hold the cans against the suspension tracks, the entire bottom of the device being free of any obstruction, except the curved guide rails 51, to permit delivery of the cans at the proper time. The crowding of the cans along the upper support tracks 23 by the propelling belt 27 rolls the suspended cans in a continuous and contiguous row along the suspension tracks 55, the cans being guided and maintained in a straight line by the lower side guides 19 of the frame side members 12, 13.

When a full row of cans B is assembled on the suspension tracks 55, the row of depending cans extending along the bottom of the device from one end to the other, the entire row of cans as a unit is stripped off the suspension tracks and is permitted to fall into place as a row in a stack being built up in the compartment D to be filled with the cans as shown in Fig. 1. Simultaneously with this stripping action the curved guide rails 51 are elevated to permit the cans retained thereby to fall into place at the end of the device to complete the row so that the entire width of the compartment will be filled with cans.

The stripping of the depending cans B from the suspension tracks 55 is effected by a pair of spaced and parallel stripper shoes 61 (Figs. 2, 4 and 7) which are disposed adjacent the tracks and which extend the full length of the tracks. Normally, the bottom edges of the stripper shoes are flush with or slightly above the lower edges of the suspension tracks.

The stripper shoes 61 are formed with upwardly projecting lugs 62. The upper end of the lugs 62 at the curved end of the device, at the left as viewed in Figs. 2 and 7, are mounted on pivot pins 63 secured in the hubs of the swing

arms 52 of the curved guide rails 51. The other lugs 62 of the stripper shoes are carried on pivot pins 64 secured in rotatable discs 65 mounted on the cross rods 14 of the frame 11.

The discs 65 and the hub of the swing arms 52 are tied together by longitudinal connecting rods 66. These rods are carried on pivot pins 67 secured in the discs and in the swing arm hub. The swing arm hub, the discs, the connecting rods, and the stripper shoes thus form a parallelogram unit which permits of vertical movement of the stripper shoes while maintaining the lower stripper edges of the shoes parallel with the lower edges of the suspension tracks 55.

Hence when a row of cans B is assembled on the suspension tracks 55 and is ready for delivery, the stripper shoes 61 are pressed down against the cans and are moved a sufficient distance below the lower edges of the tracks to disengage the cans from the tracks against the attraction of the permanent magnets 57 and thereby strip the row of cans as a unit from the device. The stripper shoes 61 preferably are made of a non-magnetic material so that the cans will not adhere to them.

During this depression of the stripper shoes 61, their supporting discs 65 rock on the frame cross rods 14 and thus shift the connecting rods 66 longitudinally of the device. It is this movement of the stripper shoes and the connecting rods that swing the curved guide rails 51 upwardly out of the way to permit the adjacent end can in the row to fall into place with the others when they drop as a unit. This elevated position of the curved guide rails is clearly shown in Fig. 7 of the drawings. A tension spring 69 (Figs. 2 and 7) returns the stripper shoes 61 and the curved guide rails 51 to their normal position. One end of this spring is hooked into an opening in one of the stripper shoes. The other end is secured in a bracket 71 formed on the lower guide 19 of the frame side member 13. The depression of the stripper shoes 61 and the swinging of the curved guide rails 51 into raised position are only momentary. The spring 69 raises the stripper shoes without delay following this depression and the spring 88 pulls over the plunger into its normally latched position. Accordingly the guide rails 51 catch the next descending can above the end can being discharged and direct it in its curved path under the suspension tracks 55. There is no interruption in the magnetic forces exerted on the cans by the magnets and by the time the following can, that is the can traversing the curved path of the guide rails, has reached its horizontal path below the suspension tracks, the stripper shoes are in raised position above the top of the magnetic trackway.

Actuation of the stripper shoes 61 is brought about by the cans themselves when a complete row is assembled on the suspension tracks 55. For this purpose a pair of vertically disposed spaced and parallel shoe actuating levers 75 are provided at the terminal end (at the right as viewed in Figs. 2 and 7) of the device (see also Fig. 5). These actuating levers are secured to the respective outer ends of a horizontal cross-shaft 76 which is loosely carried in a horizontally elongated slot 77 (see also Fig. 9) formed in a transverse long bearing 78 of a bracket 79 extending upwardly from the frame side member 12. The lower ends of the actuating levers hang down into the path of travel of the cans rolling along the suspension tracks 55.

The levers 75 determine the forward end position of each row of cans when the row is completed and when it is in proper condition for release from the suspension tracks 55 by the stripper shoes 61. The actuating levers 75 therefore may be considered as locating means for locating the longitudinal position of each single row of cans after the row has been built up along the suspension tracks 55. Such a locating means performs a double purpose. First it locates the entire row of cans in the desired position relative to the end wall of the compartment D and secondly it insures that the right number of cans are in each row, since the can diameters are the same.

The cross-shaft 76, adjacent one of the actuating levers 75 carries a reciprocable latch element or rod 81 (Figs. 2, 5 and 7) which is slidably mounted in a bearing block 82 of a bracket 83 formed on the frame side member 13. The inner end of the latch rod 81 engages under a latch step or notch 85, as best shown in Fig. 2, formed in a vertically disposed plunger 86 which extends through a loose fitting slot in a guide plate 87 formed on the adjacent spring bracket 71. The inner end of the latch rod 81 is normally retained in engaged position with the notch 85 of the plunger 86 by a tension spring 88 which is stretched between the plunger and the upper end of one of the actuating levers 75.

The lower end of the plunger 86 engages loosely against the upper edge of one of the stripper shoes 61. The upper end of the plunger is mounted on a pivot stud 91 secured in a rotatable eccentric disc 92. The pivot stud is located in an eccentric position on the disc so that the plunger is raised and lowered with the rotation of the disc.

The eccentric disc 92 is mounted on one end of a transverse shaft 93 carried in a pair of spaced bearings 94 (see Figures 3 and 5) formed on a bracket assembly 95 extending up from the frame side member 12. The other end of the shaft carries a driven plate of a friction or slip clutch 97. The driving plate of the clutch is mounted on one end of a short stub shaft 101 journaled in a bearing bracket 102 bolted to the outer side of the bracket assembly 95.

The stub shaft 101 is rotated continuously by a sprocket 103 carried on the outer end of the shaft. The sprocket in turn is rotated by an endless driving chain 105 which is driven by a sprocket 106 mounted on the rotor shaft 39 of the electric motor 41.

Hence under normal operating conditions, the eccentric disc 92 and the plunger 86 connected therewith are held stationary through the slipping action of the friction clutch 97 and the holding action of the inner end of the latch rod 81 against the plunger notch 85. However, when a full row of cans B is assembled on the suspension tracks 55, the first can in the row, i. e. the can nearest the terminal end of the device, engages against the lower ends of the actuating levers 75 and pushes them outwardly. This movement of the levers withdraws the latch rod 81 from its notch 85 in the plunger 86 and thus releases the plunger for movement.

With the release of the plunger 86, the eccentric disc 92 rotates freely with the driving plate of the friction clutch 97. The disc makes one complete rotation. During the first half of this rotation, the disc pushes the plunger down against the stripper shoes 61 as shown in Fig. 7 and thus strips the row of cans from the device as explained above. As soon as the row of cans

has been delivered, the actuating levers 75 are drawn back into their normal position by the spring 88 and this brings the inner end of the latch rod 81 into engagement with the plunger 86. Hence, when the plunger moves up to its normal position, during the second half of the rotation of the eccentric disc 82, the notch 85 of the plunger rises to a position in alignment with the latch rod 81. The spring 88 thereupon draws the rod into engagement with the notch and thus locks the plunger against further movement until a new row of cans is assembled on the device.

This assemblage of a new row of cans takes place immediately upon delivery of an already assembled row, the cans rolling into place under the propelling action of the belt 27 as soon as space is provided for them to travel along the suspension tracks 55. Thus a stack of rows of cans may be rapidly built up by a mere shifting of the device to the proper place of deposit for the cans.

When it is desired to stack the cans in a staggered relation provision is made for shifting the actuating levers 75 into positions differing in location by a distance equal to one half the diameter of the cans, for each row of cans assembled on the suspension tracks 55. In other words for one row of cans, the actuating levers will be in the full line position shown in Fig. 7 and for the next row of cans, the lever will be in the dot and dash line position in the same figure. Thus in alternately shifting the position of the levers, one row of cans will be stopped short of the terminal end of the device by a distance equal to one half the diameter of the cans. Hence by merely elevating the discharge device in a straight vertical line as the rows of cans are released for stacking, they may be readily stacked in a staggered relation.

This alternate shifting of the actuating levers 75 is brought about through a gear connection with the eccentric disc shaft 83. For this purpose the disc shaft 83 carries a pinion 111 (Figs. 3 and 8) which meshes with a gear 112 mounted on a stud 113 (see Figs. 5 and 7) secured in a boss 114 formed on the bracket assembly 95. The gear 112 is twice the diameter of the pinion 111 and hence makes only one half revolution each time the pinion makes one full revolution. The gear carries a pivot stud 116 which is eccentrically located relative to the gear stud 113 and this pivot stud connects one end of a link 117 to the gear. The opposite end of the link is pivotally connected with the upper end of one of the actuating levers 75.

Hence each time the eccentric disc 82 makes one revolution for releasing or stripping a row of cans from the discharge device, its shaft 83 rotates the pinion 111 through one revolution and this in turn rotates the gear 112 through one half a revolution. Thus with each half revolution of the gear the actuating levers 75 are rocked on their pivot shaft 76 into alternating positions as explained above. This rocking of the levers is effected simultaneously with the release of the cans from the suspension tracks 55 so that the levers will be in their adjusted position before a new row of cans is assembled. It is this timed rocking of the actuating levers that sets the levers in the proper position for locating the cans while in the device for staggered stacking upon release from the device.

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. An assembly and delivery device for bulk loading sheet metal cans into a compartment and the like, comprising in combination a magnetic track for holding a plurality of cans in suspension, said track being movable into different loading positions, means for feeding cans to said track for assembling a row of cans thereon, stripper means disposed above said track and extending the length of the row of assembled cans to strip them as a unit from said track, actuating means engaging said stripper means and operating to depress the same for the stripping action, and latch means for preventing operation of said actuating means during assembly of the cans into the row, said latch means being tripped by the assembled row of cans whereupon said actuating means operates through the stripper means to strip the row of cans from said track.

2. An assembly and delivery device for bulk loading sheet metal cans into a compartment and the like, comprising in combination a magnetic track for holding a plurality of cans in suspension, said track being movable into different loading positions, means for feeding cans to said track for assembling a plurality of cans thereon, a stripper shoe extending adjacent and along said track for its full length and in parallelism therewith for stripping the assembled cans as a unit from said track for stacking them in an orderly formation within a compartment, a plunger for pressing said stripper shoe against said assembled cans, means for actuating said plunger, latch means engageable with said plunger for normally holding it against movement in an inoperative position, and an actuating lever connecting with said latch means and extending into the path of travel of the cans on said track, said actuating lever being engageable by the cans assembled on said track and operable by said cans when a predetermined quantity has been assembled for disengaging said latch means from said plunger to make effective said plunger actuating means for activating said plunger.

3. An assembly and delivery device for bulk loading sheet metal cans into a compartment and the like, comprising in combination a magnetic track for holding a plurality of cans in suspension, said track being movable into different loading positions, means for feeding cans to said track for assembling a plurality of cans thereon, a stripper shoe extending adjacent and along said track for its full length and in parallelism therewith for stripping the assembled cans as a unit from said track for stacking them in an orderly formation within a compartment, a plunger for pressing said stripper shoe against said assembled cans, means for actuating said plunger, latch means engageable with said plunger for normally holding it against movement in an inoperative position, an actuating lever connecting with said latch means and extending into the path of travel of the cans on said track, said actuating lever being engageable by the cans assembled on said track and operable by said cans when a predetermined quantity has been assembled for disengaging said latch means from said plunger to make effective said plunger actuating means for activating said plunger, and means for reengag-

ing said latch means with said plunger for locking said plunger in an inoperative position after a stripping cycle.

4. An assembly and delivery device for bulk loading sheet metal cans into a compartment and the like, comprising in combination a magnetic track for holding a plurality of cans in suspension, said track being movable into different loading positions, a movable guide rail disposed adjacent said track and having one position for guiding cans into engagement with said track, means for feeding cans along said guide rail for assembling a plurality of the cans on said track, means for shifting said guide rail away from its can guiding position, and stripper means for simultaneously releasing the assembled cans as a unit from said track for stacking them in an orderly formation within a compartment.

5. An assembly and delivery device for bulk loading sheet metal cans into a compartment and the like, comprising in combination a magnetic track for holding a row of cans in suspension, said track being movable into different loading positions, means for feeding cans to said track for assembling the row of cans thereon, stripper means operable in opposition to the magnetic forces in said track for releasing the assembled row of cans as a unit from said track, and tripping means operable by the cans on said track when a predetermined quantity of cans has completed the row for setting said stripper means into operation.

6. An assembly and delivery device for bulk loading sheet metal cans into a compartment and the like, comprising in combination a frame movable into different loading positions, a pair of support tracks mounted on said frame and extending along one side thereof and around one end thereof, a runway connecting with said frame for conveying cans in a rolling position to said tracks, a continuously moving belt disposed adjacent said support tracks for engaging and propelling the cans therealong in a continuous procession, a pair of suspension tracks mounted on said frame below said support tracks and forming a continuation of the support tracks for receiving cans therefrom, permanent magnets mounted above said suspension tracks for holding the cans in suspension against said tracks, a pair of stripper shoes disposed above said suspension tracks, a plunger for engaging and moving said stripper shoes against said cans and for stripping the cans from said suspension tracks, and latch means including a shoe lever for blocking said plunger and for preventing movement of said stripper shoes until the foremost can in a procession of cans on said suspension tracks engages and moves said shoe lever to release said plunger thereby insuring only stripping of a desired predetermined number of cans.

7. An assembly and delivery device for bulk loading sheet metal cans into a compartment and the like, comprising in combination a magnetic track for holding a plurality of cans in suspension, said track being movable into different loading positions, feeding means for rolling cans along said track for assembling a row of cans thereon, locating and tripping means positioned at one end of said track and engageable and operable by the forward can in the row for insuring assembly of a full row of cans in a predetermined position on said track, and stripper means made effective by said locating and tripping means when so operated by the forward can in the row for releasing the assembled row of cans as a unit from said track for stacking them in an orderly formation within a compartment.

8. An assembly and delivery device for bulk loading sheet metal cans into a compartment and the like, comprising in combination a magnetic track for holding a plurality of cans in suspension, said track being movable into different loading positions, means for feeding cans to one end of said track for assembling a row of cans thereon, locating means at the opposite end of said track and engageable by the forward can for locating the forward end of an assembled row of cans in a predetermined position on the track, means for changing the position of said locating means relative to the end of said track to locate the next succeeding assembled row of cans in a different position on said track, and means operable by said engaged locating means for releasing each assembled row of cans as a unit from said track for stacking the various rows of cans in an orderly staggered formation within a compartment.

LYMAN L. JONES.

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