

926,302.

A. SWAHN.
CARRIER SYSTEM.
APPLICATION FILED NOV. 2, 1908.

Patented June 29, 1909.

3 SHEETS—SHEET 1.

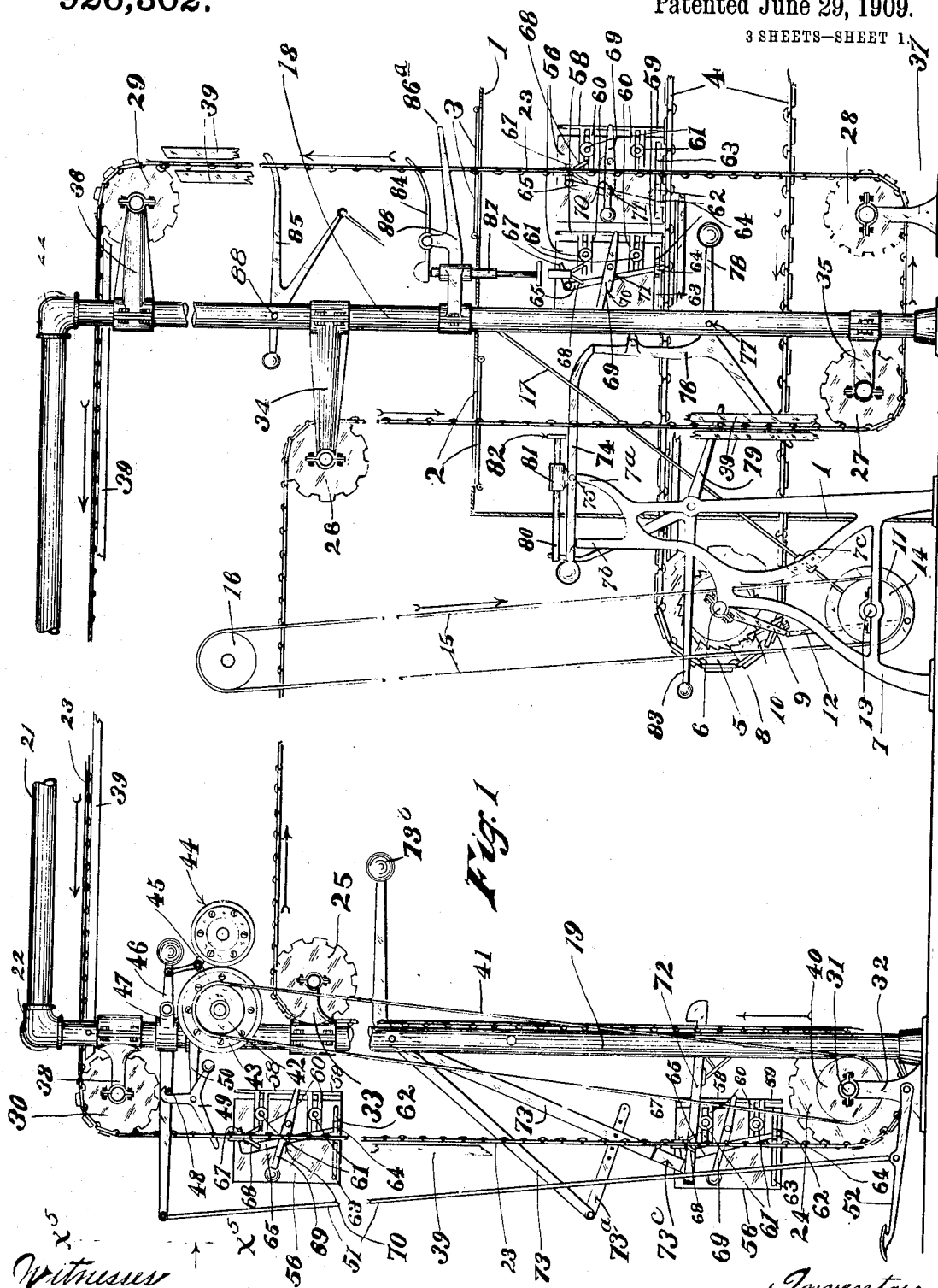


Fig. 1

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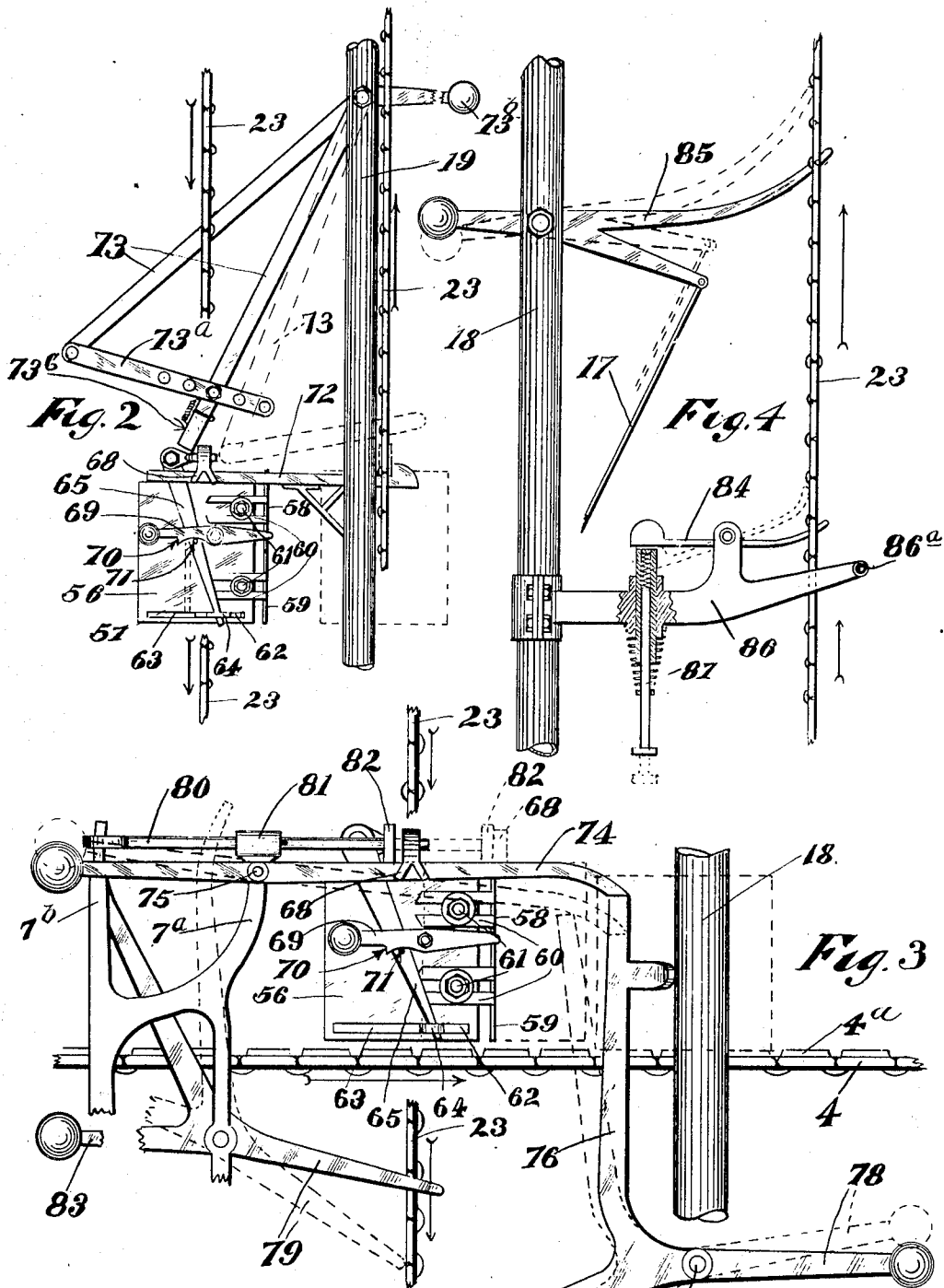
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3 SHEETS—SHEET 2.



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3 SHEETS-SHEET 3.

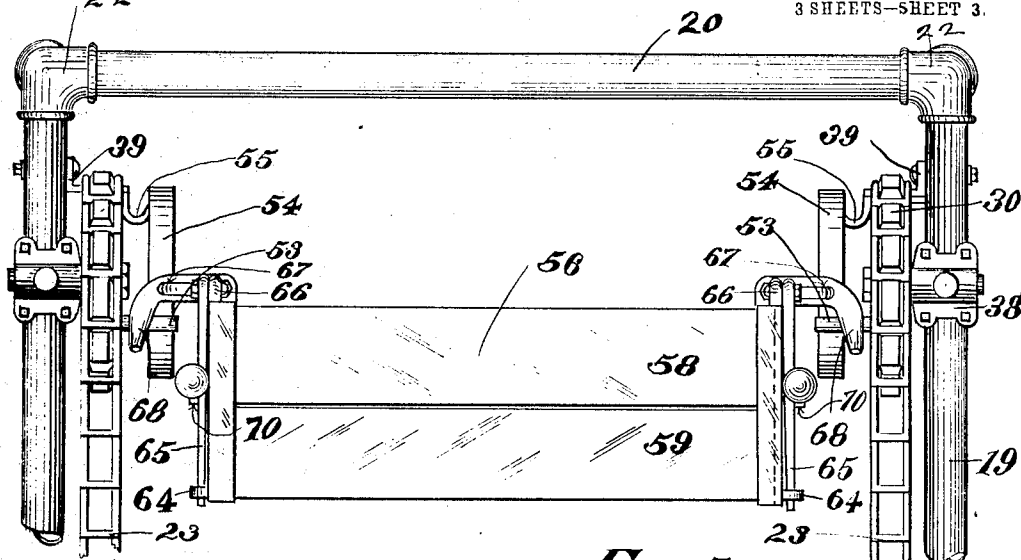


Fig. 5.

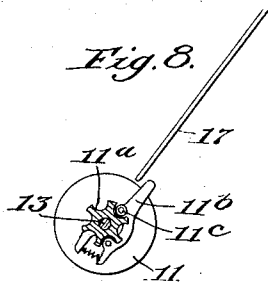


Fig. 8.

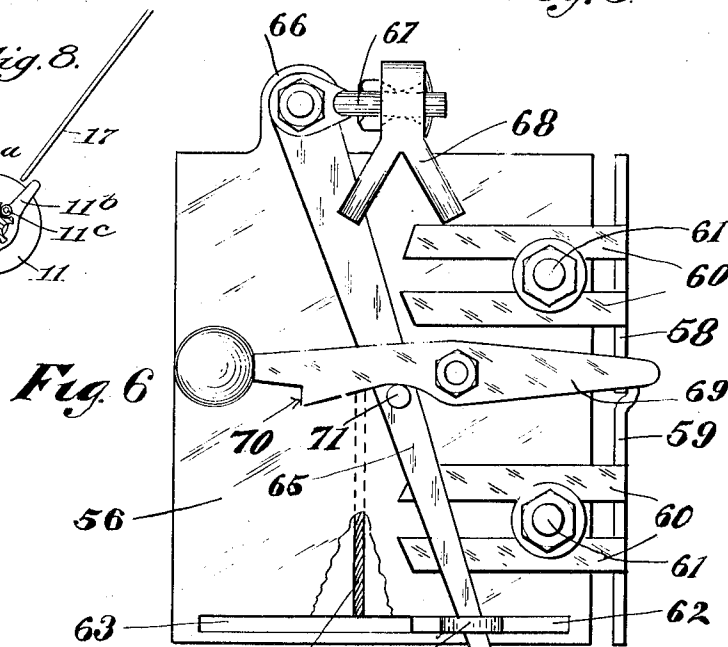


Fig. 6.

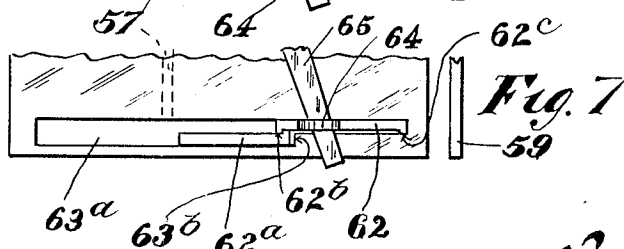


Fig. 7.

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UNITED STATES PATENT OFFICE.

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CARRIER SYSTEM.

No. 926,302.

Specification of Letters Patent.

Patented June 29, 1909.

Application filed November 2, 1903. Serial No. 460,571.

To all whom it may concern:

Be it known that I, ADOLPH SWAHN, a citizen of the United States, residing at Ellsworth, in the county of Pierce and State of Wisconsin, have invented certain new and useful Improvements in Carrier Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved carrying mechanism, especially adapted for use in glass factories, to carry bottles and other glass articles from the places where such articles are made, to the leers or annealing ovens.

The invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a view in elevation, showing the complete carrying mechanism, some parts being broken away; Fig. 2 is a detail view in elevation, showing one of the carrier boxes held by the carrying mechanism in position for loading; Fig. 3 is a detail view in elevation, showing the carrier box after it has been located within the annealing oven; Fig. 4 is a detail view in elevation, showing the mechanism upon which the carrier boxes and the box carrying chains operate when a box is being moved upward out of the annealing oven; Fig. 5 is a view in front elevation, looking at parts that are in the vicinity of the line marked x^x on Fig. 1; Fig. 6 is a view in side elevation on an enlarged scale, showing in detail one of the carrier boxes and attached mechanism. Fig. 7 is a view corresponding to Fig. 6, but with some parts broken away and with the bottom of the box shown in modified form; and Fig. 8 is a detail view of the one revolution clutch.

The numeral 1 indicates forwardly extended walls of an annealing oven, the same, as shown, having in its top automatically closing trap doors 2 and 3, the former of which is adapted to be opened by downward pressure, and the latter of which is adapted to be opened by upward pressure. In this mechanism, as in the ordinary annealing oven, a long endless carrier 4 of the link belt type, is arranged to carry the articles to be

tempered into, and horizontally through the said oven. The outer and receiving portion of this carrier 4 is arranged to run over sprockets 5, secured to a shaft 6 journaled in laterally spaced bearing frames 7, portions of which, as shown, extend into the oven 1. The front wall of said oven is, of course, cut away to afford passages through which the carrier 4 may freely run.

Hitherto, it has been customary to impart intermittent movement to the carrier 4 by a hand operated crank and suitable driving connections thereto. To adapt this carrier for properly timing the cooperation with other parts of my improved mechanism, I provide automatically actuated means for imparting the intermittent movement to said carrier. As shown, this means comprises a ratchet wheel 8 secured to the shaft 6, a pawl equipped lever 9 pivoted on said shaft 6, provided with a driving pawl 10, and a crank disk 11 that is connected by a link 12 to the free end of the lever 9. The crank disk 11 is secured to the shaft 13, journaled in the lower outer portions of the bearing frames 7, and provided with a loose pulley 14. A belt 15 runs over the pulley 14 and over a power driven pulley 16, which latter is mounted in a manner, not illustrated, and not necessary for the purposes of this case to consider, it being sufficient to state that the said pulley 16 is constantly driven. The continuously driven pulley 14, is adapted to be intermittently coupled to the shaft 13, by a one-revolution gear or clutch, which clutch is in the form of a star wheel 11^a preferably cast integral with a pulley 14. A dog 11^b is pivoted and spring connected to the disk 11 out of the plane of the star wheel 11^a. The dog 11^b is provided with a roller equipped pin 11^c which pin projects in the same plane and engages the star wheel 11^a to complete the connection between the shaft 13 and pulley 14. A stop rod 17 is slidably mounted near its lower end in a suitable bearing 7^c on the frame 7. The upper end of the rod 17 is connected to a lever for raising and lowering the rod 17, the operation of which will presently be described. Normally the lower free end of the rod 17 projects in the path of the dog 11^b and acts as a stop to hold the roller equipped pin 11^c out of engagement with the star wheel 11^a, at which time the pulley 14 continues to rotate and the disk 11 and shaft 13 stand still. As soon as the rod 17 is moved out of the path of the dog 11^b, the

- roller equipped pin 11^a, under the action of the spring connecting the disk 11 and dog 11^b, will engage the star wheel 11^a, thus connecting the shaft 13 and pulley 14 together and giving one complete revolution. By the time the shaft 13 has completed its revolution, the rod 17 will have again been moved into the path of the dog 11^b to operate the clutch mechanism as before described.
- Extended vertically upward through the receiving portion of the oven 1, between the trap doors 2 and 3, is a pair of laterally spaced posts 18, preferably afforded by heavy iron pipes. Corresponding posts 19 are secured close to the furnace where the bottles or other glass articles are made. The upper ends of the posts 19 and also of the posts 18 are connected by transverse pipe sections 20, and the upper ends of corresponding rods 18 and 19, are likewise connected by long pipes 21 or other suitable tie-members. As shown, the adjoining ends of the pipes 18, 19, 20 and 21 are directly connected by coupling brackets or elbows 22.
- Usually, the distance between the posts 18 and 19 will be very considerable, say for instance, forty or fifty feet. The endless carrier for conveying the filled boxes from the receiving point to the annealing oven, and for carrying the emptied boxes back from the annealing oven to the furnace or filling position, is made up of a pair of heavy laterally spaced sprocket-chains 23, which should have the same number of links. Each of these chains 23 runs over sprocket wheels 24, 25, 26, 27, 28, 29 and 30, which sprockets are arranged in transversely spaced axially aligned pairs. The sprockets 24 are both rigidly secured to a transverse shaft 31, mounted in suitable bearings secured at the base of the post 19. The sprocket wheels 25 are independently mounted on brackets 33 secured on the posts 19. The sprocket wheels 26 are independently mounted on brackets 34, the sprocket wheels 27 are independently mounted on brackets 35 and the sprockets 29 are independently mounted on brackets 36, all of which brackets are secured on the posts 18. The sprockets 28 are independently mounted on brackets 37 secured to the floor of the oven 1. The sprockets 30 are independently mounted on brackets 38 secured to the upper portions of the posts 19.
- By reference to Fig. 1, it will be noted that the sprocket wheels above described, are so arranged that they guide the end portions of the carrier chains 23 for approximately vertical movements, and guide the intermediate portions thereof for approximately horizontal movements. For holding the chains 23 for straight aligned movements between the sprockets, suitable supported guide bars 39 are arranged adjacent thereto.
- For imparting rotary motion to the shaft 31 and, through the sprockets 24, to chains 23, I preferably provide the following mechanism. A pulley 40 is secured to the shaft 31, and a belt 41 runs over this pulley and over a pulley 42, journaled in a suitable bearing on the upper portion of one of the posts 19, and provided with a friction wheel 43. A constantly driven friction wheel 44 coöperates with the friction wheel 43 and is adapted to be moved into and out of engagement therewith, by a toggle 45 that is connected to the weighted end of a lever 46, which lever is intermediately pivoted to a bearing 47 on the said post 19. On its forwardly projecting end, the lever 46 is provided with a laterally projecting pin 48, that is normally engaged by the hooked arm of a three-armed lever 49, which as shown, is pivoted to an arm 50 on the said post 19. When the lever 46 is held by the engagement of the hooked end of the latch lever 49 with its pin 48, the weighted end of said lever 46 will be held upward and the toggle 45 will be buckled, thereby holding the friction wheels 43 and 44 engaged, so that motion will then be imparted to the carrier chains 23. As a convenient means for thus engaging the lever 46 with the lever 49, the former is connected by a long rod 51 to a foot lever 52, which as shown, is pivoted to the bearing 32. A transversely opposite pair of the links of the chains 23 are provided with inwardly projecting studs 53, best shown in Fig. 5. In the apparatus illustrated, each chain 23 is provided with but one stud 53, and the outer ends of these studs, in passing over the upper sprockets 25, 26, 29 and 30, are arranged to travel frictionally over fixed supporting disks 54, see Fig. 5, that are rigidly connected by short crooked arms 55 to the adjacent guide bars 39. These guide disks 54, as will hereinafter appear, hold the free ends of the studs 53 against downward tilting movements under the weight of the boxes which are carried by the carrier chains 23.
- The carrying boxes 56 are preferably rectangular in form made of sheet metal. Each box is provided with an internal partition plate 57 and with an adjustable side made of two plates 58 and 59. These plates, at their ends, are provided with bifurcated straps 60, which by means of nutted bolts 61, are adjustably secured to the ends of the box. The bottom of the box is afforded by a plate 62, mounted to slide in slots 63 in the ends of the box. The projecting ends of the said sliding bottom, are provided with ears 64, that are engaged by the lower end of shifting levers 65, that are pivoted at their upper ends to upwardly projecting ears 66 on the ends of the box. At their pivoted upper ends, the levers 65 are provided with radially projecting arms 67, to which inverted crotches 68 are rigidly secured, as best shown in Figs. 5 and 6. These inverted crotches 68, when

placed on the axially alined studs 53 of the chains 23, serve to support the box from the said chains, and the weight of the box, acting through the levers 65, will tend to hold the sliding bottom 62 in an operative position at the right of the partition 57, as best shown in Fig. 5.

To lock the levers 65 in positions to hold the sliding bottom 62 in an inoperative position at the left of the partition 57, a pair of pivoted lock levers 69 are applied to the ends of the box, and are provided at their weighted ends, with shoulders 70 that are engageable with studs 71 on the said levers 65.

In the modified construction, shown in Fig. 7, the sliding bottom of the box is made up of over-lapped sections 62 and 62^a, having coöperating shoulders 62^b and 62^c, and the slots 63^a in which the said plates work, are provided with slot shoulders 63^b. This sectional sliding bottom is especially adapted for use when the boxes are to carry small bottles and other small articles, but generally stated, its operation will be substantially like that of the sliding bottom 62, illustrated in Fig. 5.

The boxes, when in position for filling, rest upon slightly inclined rails 72, which as shown, are rigidly secured to the posts 19, and at such time, the stem portions of the inverted crotches 68 rest directly upon these rails 72. By reference to Figs. 1 and 2, it will be noted, that these rails 72 extend crosswise of both of the upright left hand portions of the carrying chain 23.

To each post 19, above the rails 72, oscillatory box-shifting frames 73 are pivotally connected at their upper ends. These frames are each made up of a pair of bars adjustably connected by metal straps 73^a, and one of which bars is provided with a weighted upper end 73^b and with a spring held hinged lower end 73^c. The outer bars of the frames 73 are adapted to be engaged by the shanks of the crotches 68, when a box is moved downward from the upper position shown at the left, in Fig. 1; and when this takes place, the two frames 73 will be simultaneously moved inward or toward the right, and the hinged ends 73^c will engage the shanks of the crotches 68 of the box that is supported by the rails 72, and will move the said box on said rail, toward the right, into the position indicated by the dotted lines in Fig. 2, in which position the crotches 68 thereof, will stand in position to be again engaged by the studs 53. The box, should, of course, be filled while in the position indicated by the full lines in Fig. 2, and when it is crowded inward on the rails, and is again picked up by the chain 23 and elevated, another box, as is evident, has then taken its place on the receiving ends of the said rails. When the downwardly moving box clears the outer bars of the shifting frames 73, the weighted ends 73^b throw the said

frames back or outward to normal positions, and the hinged ends 73^c, under such movements, turn backward and pass over the shanks of the crotches 68, and hence, assume the operative position, shown in Figs. 1 and 2.

The loaded box picked up as just described, will, by the inner portions of the chains 23, be carried high above the head of workmen, from the sprockets 25 to the sprockets 26, and then will be lowered through the trap doors 2 of the oven 1, until the shanks of its crotches 68 are rested upon a pair of horizontal rest bars 74, that are located mainly within the oven 1, are pivoted at 75 to arms 7^a of the bearing frames 7, and are provided with weighted ends that project through suitable passages in the front end wall of the oven 1 and rest on projections 7^b of the said frames. The free inner ends of the rest bars 74 are downwardly curved, and normally rest upon the upper ends of bell crank lock levers 76, that are pivoted at 77, to the adjacent posts 18. The lower arms of these bell cranks 76, stand in a position to be engaged by downwardly moving studs 53 of the chains 23, and they are provided with weighted arms 78 that tend to hold the levers in the positions indicated by full lines in Figs. 1 and 2. When a box is supported by the bars 74, as shown in Fig. 3, its bottom or lowermost portion stands just above the upper portions of the carrier 4.

Shortly after the chain studs 53 leave the crotches 68 of the box, which has been positioned as just stated, they come into engagement with the lower arms of bell cranks 79, and force the said bell cranks into the positions shown by the dotted lines in Fig. 3. The upper arms of the bell cranks 79 work loosely through the heads of plungers 80, that are mounted to slide through guides 81 on the arms 7^a; and at their inner ends, said plungers are shown as provided with heads 82 that are adapted to engage the shanks of the crotches 68, so that when said plungers are thus moved inward by the bell crank 79, they will force the filled box toward the right on the bars 74 into engagement with the box which is in the intermediate position indicated by dotted lines in Fig. 3. The bell cranks 79 are provided with weighted arms 83, that normally hold the same and the plungers 80, in the position indicated by full lines in Fig. 3.

Shortly after the box has been forced to its intermediate position, just above stated, the two chain studs 53, which have just left contact with the bell cranks 79, come into engagement with the lower arms of the bell cranks 76, thereby moving the same to the position indicated by dotted lines in Fig. 3. When the said bell cranks 76 are thus moved, their upper ends are slid under the downwardly curved ends of the bars 74, thereby permitting the latter to be slowly moved into

the positions indicated by dotted lines in Fig. 3, and thereby depositing the box upon the carrier 4. Immediately after this action takes place, the chain studs 53 engage the 5 crotches 68 of the box which is at the extreme right in Fig. 1, (the bottom of which box is then locked in inoperative or dumping position) and this box, is, by the chains 23, carried upward through the trap doors 3 and the 10 shanks of its crotches 68 are brought first into engagement with bottom tripping levers 84, and a little later into action on the upper arm of weighted clutch actuating bell cranks 85. The levers 84 are intermediately pivoted to supporting arms 86 rigidly secured to the posts 18, and at their inner ends, they 15 engage upwardly spring held telescopically extensible plungers 87 mounted in the said arms 86. When the studs 53 engage the levers 84 and move the same as indicated by dotted lines in Fig. 4, they press the plungers 87 downward, and the lower ends of the latter engage the shanks of the crotches 68 of the box which is then in its intermediate position on the carrier 4. When the crotches 20 68 are thus forced downward, they rock the levers 65 toward the left, and move the box bottom 62 to the left of the partition 57, thus depositing the contents of the box on the flat transverse connecting bars 4^a of the said carrier 4. When the levers 65 are thus forced to the left, the weighted lock levers 69 temporarily secure the same in such positions. At 25 about the same time, the emptied box which is being raised, by the upwardly moving extreme right hand portions of the chains 23, passes the fixed arms 86, and its lock levers 69, are engaged by pins or projections 86^a on the ends of said arms 86, and are thereby released from the studs 71 of the levers 65, and 30 the box bottom 62 is then, by the weight of the box, which is supported by its crotches 68 on the engaged studs 53 of the chains 23, thrown back to its normal or closed position 45 at the right of the partition 57. Immediately after these actions have taken place, the shanks of the crotches 68 of the said upwardly moving emptied box engage the upper arms of the above noted bell crank 85, 50 which bell crank is pivotally connected at 88 to the post 18, and the lower arm of which is connected to the upper end of the rod 17, which as before stated, operates the one-revolution clutch that serves to connect the constantly driven pulley 14 to the shaft 13. 55 This imparts a step of movement to the carrier 4 which is sufficient to move the left hand box on the carrier 4 from its intermediate position above noted, into its extreme right hand position, and to position the same, after 60 its load has been dumped onto the carrier 4, so that it will be picked up by the studs 53, when the latter travel their circuit, under the next movement of the box carrying chains 23.

65 It will, of course, be understood, that the

bell cranks 76 and 79, as soon as released, are returned to their normal positions shown in Fig. 1, respectively by their weighted arms 78 and 83. From the above description, it is evident that there are always at least two 70 of the carrying boxes 56 on the carrier 4, and it is also evident that a third box will be deposited on the said carrier at the left, before the box at the extreme right has been picked up by the chain studs 53. The principal 75 reason for always having one box in an intermediate position on the carrier 4, is to prevent the bottles or other articles which have been deposited on the said carrier from being tipped or displaced so as to interfere, when 80 another box at the left is lowered onto the said carrier 4.

As already stated, the friction wheels 43 and 44 are engaged and the box carrying chains 23 are thrown into action, by stepping 85 upon the foot lever 52. When the said chains 23 are at rest, their studs 53 stand in a position to hold a box 56 in the elevated position shown at the left in Fig. 1. When the friction wheels 43 and 44 are engaged, they 90 remain in action until they have caused the studs 53 of the chains 23 to travel the complete circuit and return to the normal positions just above stated. Approximately at 95 the completion of this movement, one of the said chain studs 53 engages the outwardly projecting arm of the latch lever 49, and forces the same downward, thereby releasing the lever 46 and permitting the weighted end of the latter, acting through the toggle con- 100 nection 45, to move the driving friction wheel 44 from the driven friction wheel 43. It will be noted that the holding capacity of the boxes 56 may be varied by lateral adjustments of their side plates 58 and 59. 105 Such adjustments, will, of course, tend to change the center of gravity of the loaded box, but to effect this and to maintain the center of gravity of the loaded box in vertical line with the axes of the shanks of the 110 crotches 68, suitable counter-weights may be applied in the boxes either to the left hand side or in the spaces at the left of the partitions 57.

From a broad point of view, the endless 115 sprocket chains constitute endless carrier belts and the sprockets which coöperate therewith constitute guiding and driving wheels therefor.

What I claim is:—

1. In a carrier system, the combination with an endless carrier made up of laterally spaced chains and suitable guide and driving sprockets, the said chains having box supporting projections, of a plurality of boxes 125 having crotches with which the projections of said chains are detachably engaged to support said boxes, and which boxes are arranged to be carried from a filling station to a delivery station, and to be deposited and 130

again picked up at both the said stations, substantially as described.

2. In a carrier system, the combination with an endless carrier made up of laterally spaced sprocket chains, and suitable guide and driving sprockets, said chains having box engaging projections, of a plurality of boxes having inverted crotches engageable with the said chain projections to detachably support said boxes, the said boxes having movable bottoms arranged to be operated by the weight of the boxes on their crotches, a chain driving mechanism, means operative, at will, for rendering said chain driving mechanism operative, and an automatic trip for rendering the said drive out of action when said chain has completed its movement, substantially as described.

3. In a carrier system, the combination with an endless box carrier having upright end and approximately horizontal intermediate portions, of box supporting means extending transversely across the upright receiving portions of said box carrier, a receiving carrier extending transversely of the upright delivery portions of said box carrier, a box detachably connected to said box carrier and arranged to be deposited thereby upon said box support in one position, and to be again picked up by said box carrier from another position on said box support, and to be delivered by said box carrier onto said receiving carrier in one position, and to be again picked up from the latter from another position thereon, substantially as described.

4. The combination with a pair of endless box carrying chains and sprockets for guiding and driving the same, of a box support extending transversely of upright portions of said chains, said chains having projecting studs, of a box having inverted crotches for detachably supporting the same on the studs of said chains, and means operated by said chains for shifting the same on said box support, whereby a box deposited by said chains upon said support, will be shifted to another position and again taken up by reengagement of the studs of said chains with the crotches of said box, substantially as described.

5. The combination with a pair of sprocket chains and guide and driving sprockets therefor, said chains having upright portions, of box supporting rails extending transversely of the upright portions of said chains, of said chains having projecting studs, of a box having a sliding bottom, levers pivotally connected to the ends of said box, operative on the bottom thereof and provided with inverted off-set crotches detachably engageable with the studs of said chain, and operative under the weight of the box to hold the bottom thereof in an operative position, shifting levers operated by said

chains and operative to shift said box on said rails from a position where it is deposited by said chains, into another position in which it will be again picked up by said chains, and means located at a distant point, operated by said chain and operative on the crotches of said box to force the bottom thereof into an open position, substantially as described.

6. The combination with a receiving carrier, of a pair of endless carrying chains having upright end and approximately horizontal elevated intermediate portions and provided with projecting box supporting studs, box supporting rails extending transversely of the upright receiving portions of said chains, pivoted box supporting bars overlying said receiving carrier, lock levers normally holding said bars in elevated positions, a box provided with inverted crotches engageable with the studs of said chains to detachably support said box thereon, chain actuated box shifting levers overlying the said rails and operative to shift the box thereon from a deposited position into a position in which it will be again picked up by said chain, the said chains operating to carry the box from the said rails onto the said pivoted supporting bars, then to trip said bar supporting lock levers and thereby lower the box onto said receiving carrier, substantially as described.

7. The combination with a receiving carrier, of a pair of carrier chains and a box detachably supported by said chains, the said chains having upright portions arranged to deliver said box onto said receiving carrier and to again automatically pick up said box from said receiving carrier after it has been moved thereby, substantially as described.

8. The combination with an endless approximately horizontal receiving carrier, of a pair of endless box carrying chains, a box detachably supported at its ends by said chains and provided with a sliding bottom, said chains having upright portions arranged to deliver said boxes onto said receiving carrier at one point and to again pick up the box after the same has been moved to another point by said receiving carrier, and means operating automatically to move the bottom of said box into an open position while the said box is supported on said receiving carrier, substantially as described.

9. The combination with an approximately horizontal endless receiving carrier, of a pair of endless sprocket chains having projecting box supporting studs, of a box having a movable bottom and inverted crotches detachably engageable with the said chain studs, lever connections for moving said box bottom when said crotches are depressed, said chains having upright portions arranged to deliver said box onto said receiving carrier at one point, then to again pick the same up after said box has been

moved to another point by said receiving carrier, means actuated by said chains for depressing the crotches of said box and opening the bottom thereof while said box is supported by said receiving carrier, and means operative subsequently under movement of said chains for intercepting the movements of said chains, substantially as described.

10 10. In a carrier system, the combination with endless carrier chains and a box carried thereby, of a receiving carrier arranged to receive the load from said box, means opera-

tive, at will, for imparting movement to said chains, automatic means for intercepting the movements of said chains, and means actuated by said chains for imparting intermittent movement to said receiving carrier, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ADOLPH SWAHN.

Witnesses:

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F. D. MERCHANT