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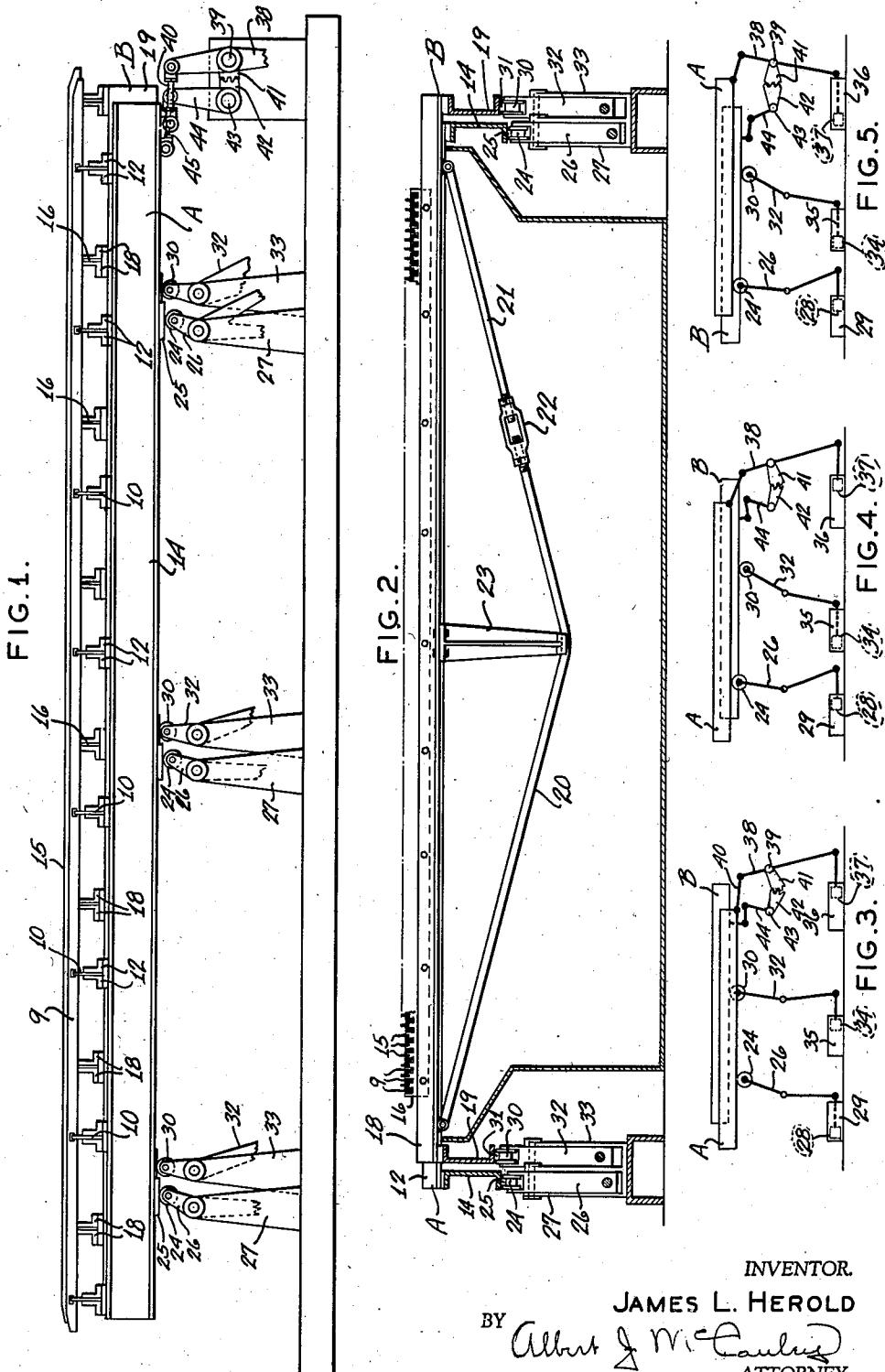
J. L. HEROLD

2,315,205

CONVEYER

Filed Jan. 27, 1941

2 Sheets-Sheet 1



INVENTOR.

JAMES L. HEROLD

BY James L. Herold
Albert J. McCarley
ATTORNEY.

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2 Sheets-Sheet 2

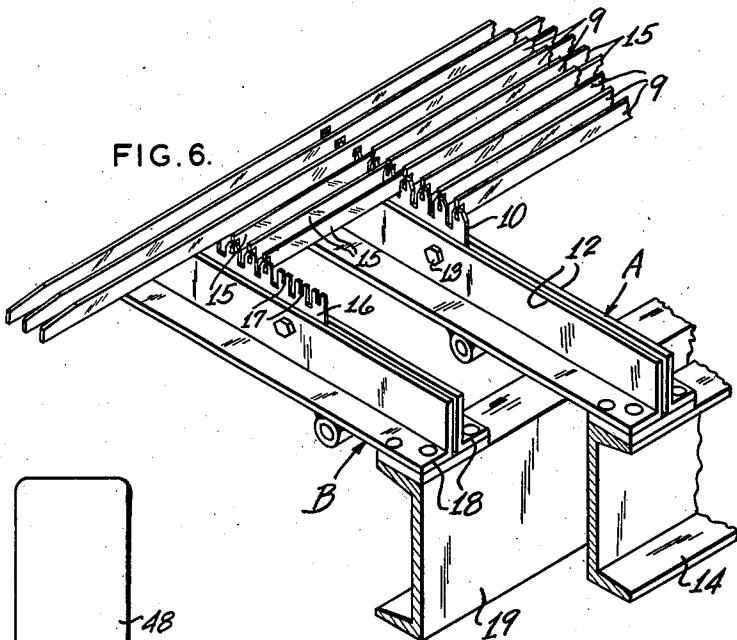


FIG. 6.

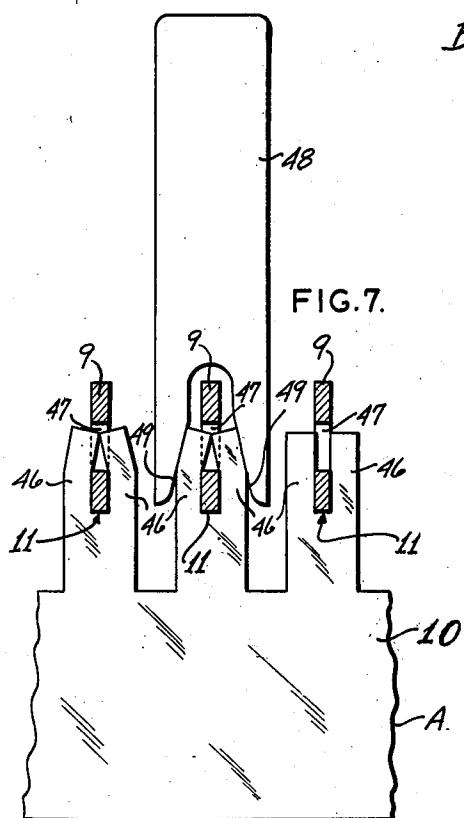


FIG. 7.

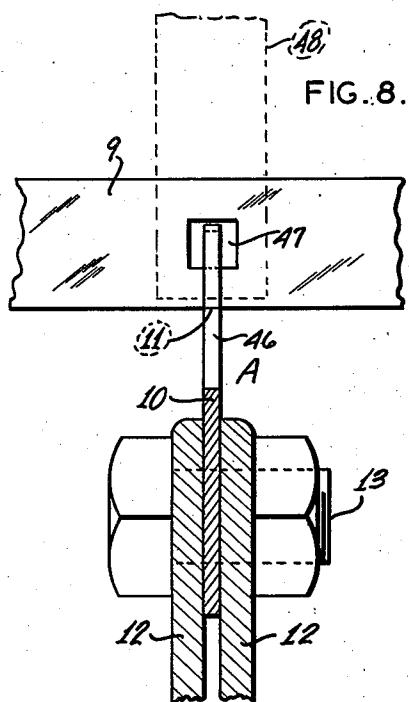


FIG. 8.

INVENTOR
JAMES L. HEROLD

BY *Albert J. McEauley*
ATTORNEY.

UNITED STATES PATENT OFFICE

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CONVEYER

James L. Herold, St. Louis, Mo., assignor to Barry-
Wehmiller Machinery Company, St. Louis, Mo.,
a corporation of Missouri

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6 Claims. (Cl. 198—219)

This invention relates to conveyers, and more particularly to a conveyer comprising one or more movable carriers for alternately supporting and advancing articles. The carrier in this type conveyer includes numerous elongated bars for supporting the articles and a plurality of cross supports having seats alined with each other in the same horizontal plane for the bottom faces of the bars.

Prior to my invention in this art, it has been a problem to quickly and accurately seat the numerous relatively narrow bars on the alined seats of the cross supports and maintain this alinement while the carrier is in operation.

One of the objects of this invention, therefore, is to provide a simple and effective means for securing the numerous elongated bars onto the alined seats on the cross supports.

Another object of this invention is to provide a simple fastening means which positively forces the bars onto their seats and thereafter securely locks the bars on said seats.

Another object is to provide a locking connection between the elongated bars and cross supports which may be easily and rapidly formed with a simple and inexpensive tool.

A further object of this invention is to produce a fastening means for locking the relatively long bars onto the cross supports which provides for expansion and contraction of the bars without objectionable bending of the bars or displacement of the fastening means.

A still further object of this invention is to provide each cross support with a means for maintaining the desired alinement of the seats thereon.

With the foregoing and other objects in view, the invention comprises the novel construction, combination and arrangement of parts herein-after more specifically described and shown in the accompanying drawings, which illustrate only one form of the invention. However, it is to be understood that the invention comprehends changes, variations and modifications within the scope of the terms employed in the claims hereunto appended.

Fig. 1 is a side view of a conveying apparatus embodying the features of this invention.

Fig. 2 is a transverse section through the conveying apparatus.

Figs. 3 to 5 are diagrammatical views illustrating various positions of the carriers which advance the articles step by step.

Fig. 6 is an enlarged fragmentary perspective view of the details of the carriers including the

elongated bars for supporting the articles and the cross supports for said bars.

Fig. 7 is an enlarged fragmentary view partly in section showing the elongated bars on one of the cross supports and a tool for securing the bars to the cross supports.

Fig. 8 is an enlarged transverse section through one of the cross supports.

To illustrate the invention I have shown a conveying apparatus which includes carriers A and B on which articles are alternately supported and advanced step by step in a manner hereafter described.

A carrier A includes numerous spaced elongated bars 9 extending approximately the length of the machine and a plurality of cross supports 10 having seats 11 alined with each other in the same horizontal plane to receive the bottom faces of said numerous elongated bars 9 as shown in Figs. 6, 7, and 8. Each of the cross supports 10 is secured between a pair of angle bars 12 by means of bolts 13, and the end portions of the angle bars 12 are secured to elongated beams 14 as shown in Fig. 2.

The carrier B is similar in construction to the carrier A and comprises numerous spaced elongated bars 15, a plurality of cross supports 16 having seats 17 alined with each other in the same horizontal plane, angle bars 18 secured to opposite sides of the cross supports 16 and a pair of elongated beams 19 (Fig. 2) secured to opposite ends of the angle bars.

Each of the cross supports 10 and 16 is provided with adjustable means for maintaining the seats 11 or 17 thereon in alinement with each other. As shown in Fig. 2, said adjustable means includes truss members 20 and 21 secured to opposite end portions of angle bars 18 which are united with the cross support 16, a turnbuckle 22 connecting the truss members, and a strut 23 interposed between the truss member 20 and the cross support. To avoid numerous duplications of the same structure I have shown the truss members, etc., as applied to only one of the cross supports. However, each of the cross supports may be provided with a similar structure.

As shown in Figs. 2 and 6 the bars 9 of carrier A and bars 15 of carrier B are alternately arranged with respect to each other and have top faces on which the articles are alternately supported. Each of said carriers is movable in an endless cycle upwardly to an article supporting position, forwardly to advance the articles, downwardly out of contact with the articles, and rearwardly to a retracted position.

In Figs. 3 to 5 I have illustrated various positions of the carriers A and B during their movements in said endless cycles. These views are merely diagrammatical illustrations and the details of construction have been omitted to more clearly illustrate the movements of said carriers A and B.

In Fig. 3 the upper carrier B which is in an article supporting position is at the end of its forward stroke and at rest while the lower carrier A is at the end of its rearward stroke. From the position shown in Fig. 3, the carrier A is moved upwardly to an article supporting position flush with the other carrier B. Thereafter, the carrier B is lowered so that the carrier A alone supports the articles.

After the carrier B is lowered to the position shown in Fig. 4, the upper carrier A is driven forwardly to advance the articles and the lower carrier B is simultaneously moved to a retracted position, such as is illustrated in Fig. 5. The lower carrier B is then moved upwardly to an article supporting position flush with the carrier A. Thereafter, the carrier A is lowered to a position where it is out of contact with the articles. The upper carrier B is then moved forwardly to advance the articles while the lower carrier A is moving rearwardly to a retracted position, such as shown in Fig. 3.

The carriers A and B are continuously driven in these endless cycles to alternately advance the articles step by step.

The means for raising and lowering the carrier A comprises a series of rollers 24 located under and supporting each of the beams 14 at opposite sides of the carrier A, as shown in Figs. 1 and 2. The beams 14 are provided with guide plates 25 which are seated in grooves in the rollers 24 to prevent lateral displacement of the beams with respect to the rollers.

The rollers 24 are movable simultaneously in an arcuate course to raise and lower the carrier A. The means for moving the rollers in said arcuate course include a series of levers 26 carrying the rollers under said beams.

The levers 26 are pivotally mounted in supports 27 and adapted to be actuated to swing the rollers 24 in an arcuate course.

All of the levers 26 are simultaneously actuated to raise or lower the rollers 24. Any suitable drive device may be employed to actuate the levers 26, and in Figs. 3 to 5 I have diagrammatically illustrated a piston 28 and cylinder 29 for accomplishing this result.

A series of rollers 30 is located under and supports each of the beams 19 at opposite sides of the carrier B. As shown in Fig. 2, the beams 19 are provided with guide plates 31 which are located in grooves in the rollers 30 to prevent lateral displacement of the beams with respect to the rollers.

The rollers 30 for supporting the beams 19 are rotatably secured to levers 32 which are pivotally mounted in supports 33 and adapted to be actuated to swing the rollers in an arcuate course. All of the levers 32 are simultaneously actuated to swing the rollers in an arcuate course, thereby raising or lowering the carrier B. Any suitable means may be employed to actuate the rollers 30, such as a piston 34 and cylinder 35 diagrammatically illustrated in Figs. 3 to 5.

As an illustration of a suitable means for moving the carrier A forwardly and backwardly, I have diagrammatically shown a cylinder 36 and piston 37 in Figs. 3 to 5 adapted to oscillate a

lever 38 fixed to a shaft 39 (Fig. 1). The upper end of the lever 38 is pivotally connected by a link 40 to the carrier A to impart a forward and backward movement to said carrier.

The carrier B moves simultaneously with the carrier A but in opposite directions. While the carrier A is moving forwardly the carrier B is moving rearwardly, and likewise the carrier A moves rearwardly while the carrier B is moving forwardly.

The means for driving the carrier B simultaneously with the carrier A but in said opposite directions includes a segmental gear 41 fixed to the shaft 39 (Fig. 1), a segmental gear 42 fixed to a shaft 43 and meshing with said gear 41, an arm 44 secured to the shaft 43, and a link 45 connecting the arm 44 to the carrier B.

It will be observed that each of the carriers A and B includes numerous spaced elongated bars 9 or 15. In the operation of a conveyor of the type herein disclosed it is important that the elongated bars be accurately located on the aligned seats on the cross supports and maintained in this position.

I will now refer to the fastening devices for securing the elongated bars on the aligned seats of the cross supports. In Figs. 7 and 8, I have shown the details of the fastening devices for securing the elongated bars 9 onto one of the cross supports 10 of the carrier A. However, it is understood that the bars 9 are likewise secured to the other supports 10 of the carrier A, and the bars 15 are secured to the cross supports 16 of the carrier B in a similar manner, as suggested in Fig. 6.

Each individual fastening device includes a pair of attaching fingers 46 integral with the cross supports 10 or 16, and extending upwardly from opposite sides of one of the seats on the cross supports to prevent lateral displacement of the elongated bar on said seat.

As shown in Figs. 1, 7 and 8 the elongated bars are provided with transverse openings 47 above the seats 11 on the cross supports to receive the upper portions of the attaching fingers 46 which are bent inwardly into the openings so that they engage opposite edges of the bottom walls of said opening as most clearly shown at the left in Fig. 7.

In the manufacture of the carrier A the seats 11 and attaching fingers 46 are formed on the cross supports 10 to provide for the desired spacing of the elongated bars 9, and the cross supports are secured to the elongated beams 14 at predetermined intervals such as shown in Fig. 1.

The openings 47 are formed in the elongated bars at spaced intervals approximately equal to the distances between the longitudinal center lines of the cross supports 10. The elongated bars are then located on the seats 11 on the cross supports so that each opening is above one of the seats and between a pair of attaching fingers 46.

The openings 47 in the bars are preferably larger than the width of the attaching fingers so that regardless of inaccuracies in the spacing of the openings or cross supports, the attaching fingers can be bent into said openings. The relatively large openings 47 also provide for longitudinal expansion and contraction of the bars without imparting objectionable thrusts to the bars or attaching fingers.

After the bars are positioned on the cross supports as shown in Fig. 7, with the openings 47 above the seats 11, the attaching fingers 46 are bent into the openings to positively force the bars onto their seats and lock the bars on said seats.

As an illustration of one manner in which the attaching fingers may be bent to forcibly seat and lock the bars on their seats, I have shown a tool 48 which is provided with diverging faces 49 adapted to be forced downwardly onto a pair of attaching fingers 46 to bend the same from the position shown at the right in Fig. 7 to the position shown at the middle of Fig. 7. The progressive clamping action imparted to the pair of fingers 46 by the diverging faces of the tool 48 will force the bar downwardly until it is firmly seated on its seat 11. The attaching fingers after being bent inwardly as shown at the left in Fig. 7 will engage the opposite edges of the bottom wall of the opening 47 to lock the bar on its seat. 15

All of the attaching fingers 46 may be rapidly bent to the position shown at the left in Fig. 7 by merely forcing the tool 48 downward onto each pair of fingers.

The elongated bars 15 of the carrier B may be secured on their seats on the cross supports in the same manner as described in referring to the bars 9.

I claim:

1. In a conveying apparatus, a carrier comprising numerous spaced elongated bars for supporting and advancing articles, and a plurality of cross supports having seats aligned with each other in the same horizontal plane to receive said numerous elongated bars, said elongated bars being provided with openings adjacent to said seats, and attaching members formed integral with the cross supports and extending into said openings to secure said bars on the aligned seats of the cross supports, said openings in the bars being larger than the width of said attaching members to provide for longitudinal movement of the bars independently of the attaching members.

2. In a conveying apparatus provided with a carrier having spaced elongated bars for supporting and advancing articles and a plurality of cross supports having seats for said elongated bars, a plurality of fastening devices for securing said elongated bars on the seats of the cross supports, each individual fastening device including a pair of attaching fingers extending upwardly from opposite sides of one of said seats to prevent lateral displacement of the bar on said seat, said bar being provided with a transverse opening above said seat to receive the upper portions of the pair of attaching fingers, and said upper portions of the attaching fingers being bent inwardly at said opening to secure the bar on its seat.

3. In a conveying apparatus provided with a carrier having numerous spaced elongated bars for supporting and advancing articles and a plurality of cross supports having seats for said numerous elongated bars, a plurality of fastening devices for securing said elongated bars on the seats of the cross supports, each individual fastening device including a pair of attaching fingers integral with one of the cross supports and extending upwardly from opposite sides of one of said seats to prevent lateral displacement of the bar on said seat, said bar being provided with a transverse opening above said seat to receive the upper portions of the pair of attaching fingers, and the upper portions of said pair of attaching fingers being bent inwardly at said opening to frictionally engage opposite edges of the bottom wall of said opening. 55 60 65 70

4. A conveying apparatus provided with a carrier having numerous spaced elongated bars for supporting and advancing articles, a plurality of cross supports having seats aligned with each other 75

in the same horizontal plane to receive the bottom faces of said numerous elongated bars, and a plurality of fastening devices for securing said elongated bars on the aligned seats of the cross supports, each individual fastening device including a pair of attaching fingers integral with one of the cross supports and extending upwardly from opposite sides of one of said seats to prevent lateral displacement of the bar on said seat, said bar being provided with a transverse opening above said seat to receive the upper portions of the pair of attaching fingers, the upper portions of said pair of attaching fingers being bent inwardly at said opening to frictionally engage opposite edges of the bottom wall of said opening, and said opening in the bar being larger than the width of said fingers to provide for longitudinal movement of the bar independently of the attaching fingers.

5. In a conveying apparatus provided with a carrier having numerous spaced elongated bars for supporting and advancing articles and a plurality of cross supports having seats aligned with each other in the same horizontal plane to receive the bottom faces of said numerous elongated bars, adjustable means for maintaining the seats on the cross supports in alignment with each other, and a plurality of fastening devices for securing said elongated bars on the aligned seats of the cross supports, each individual fastening device including a pair of attaching fingers integral with one of the cross supports and extending upwardly from opposite sides of one of said seats to prevent lateral displacement of the bar on said seat, said bar being provided with a transverse opening above said seat to receive the upper portions of the pair of attaching fingers, the upper portions of said pair of attaching fingers being bent inwardly at said opening to frictionally engage opposite edges of the bottom wall of said opening, and said opening in the bar being larger than the width of said fingers to provide for longitudinal movement of the bar independently of the attaching fingers.

45 6. In a conveying apparatus provided with a pair of carriers each of which includes numerous spaced elongated bars for alternately supporting and advancing articles and a plurality of cross supports having seats alined with each other in the same horizontal plane to receive the bottom faces of said numerous elongated bars, each of said cross supports being provided with means for maintaining the seats thereon in alinement with each other, said means including truss members secured to opposite end portions of one of the cross supports, a turnbuckle connecting said truss members, and a strut interposed between one of said truss members and the cross support, and a plurality of fastening devices for securing said elongated bars on the alined seats of the cross supports, each individual fastening device including a pair of attaching fingers integral with one of the cross supports and extending upwardly from opposite sides of one of said seats to prevent lateral displacement of the bar on said seat, said bar being provided with a transverse opening above said seat to receive the upper portions of the pair of attaching fingers, the upper portions of said pair of attaching fingers being bent inwardly at said opening to frictionally engage opposite edges of the bottom wall of said opening, and said opening in the bar being larger than the width of said fingers to provide for longitudinal movement of the bar independently of the attaching fingers.

JAMES L. HEROLD.