

June 7, 1932.

B. S. HARRISON
CONVEYING SYSTEM

1,861,600

Filed May 27, 1930

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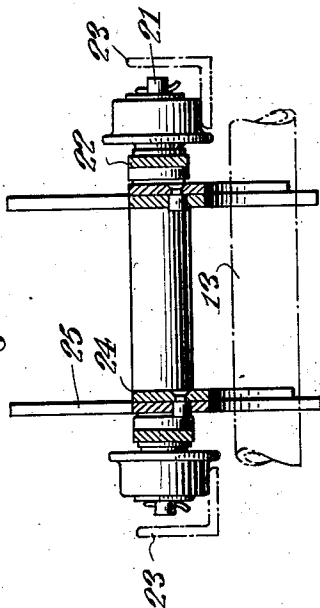
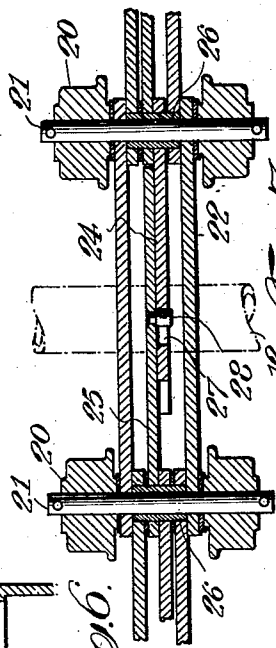
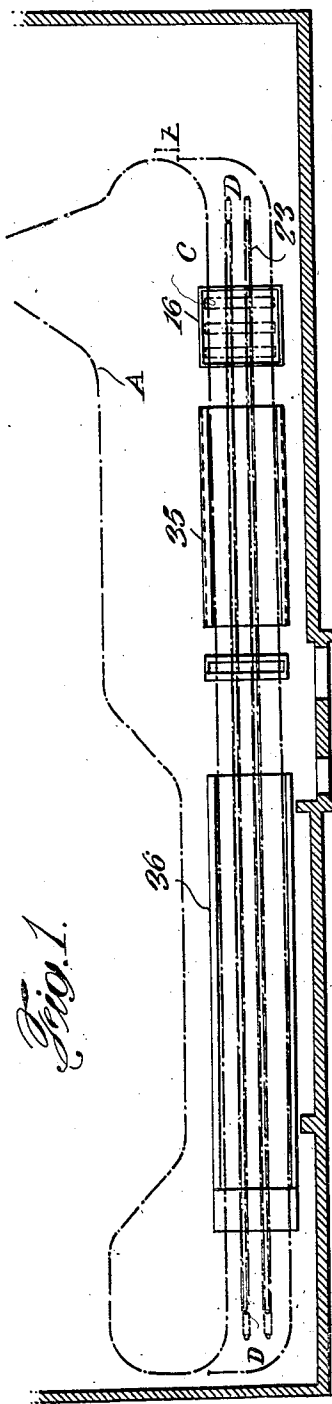
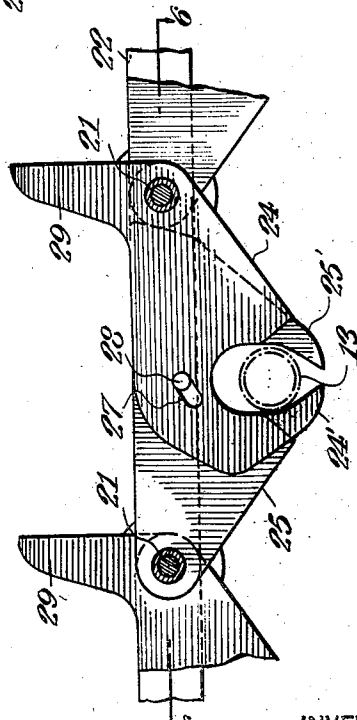


Fig. 5.



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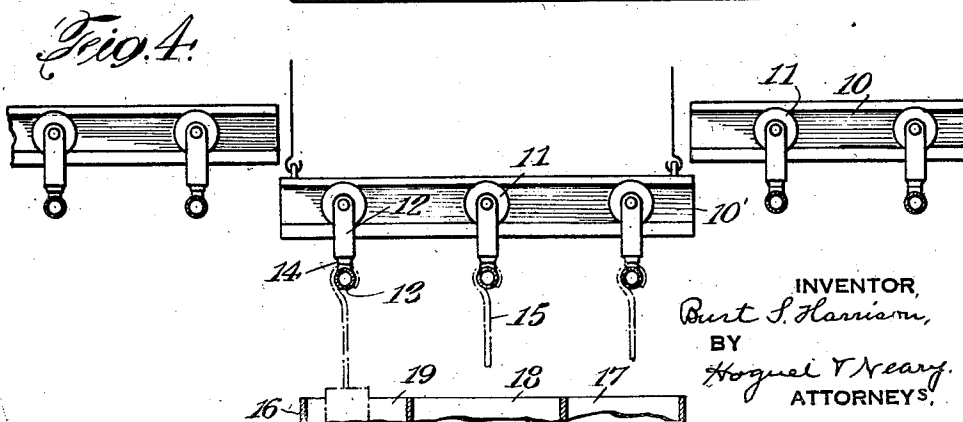
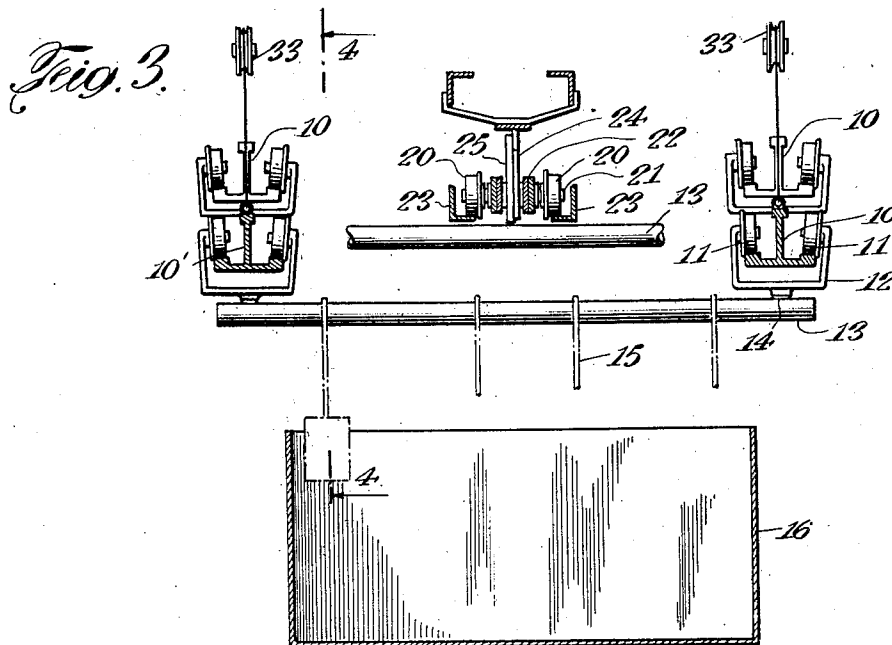
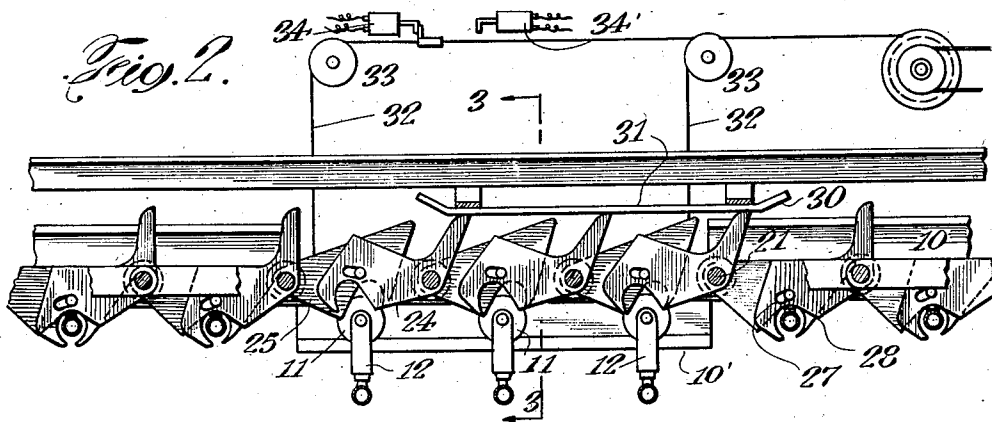
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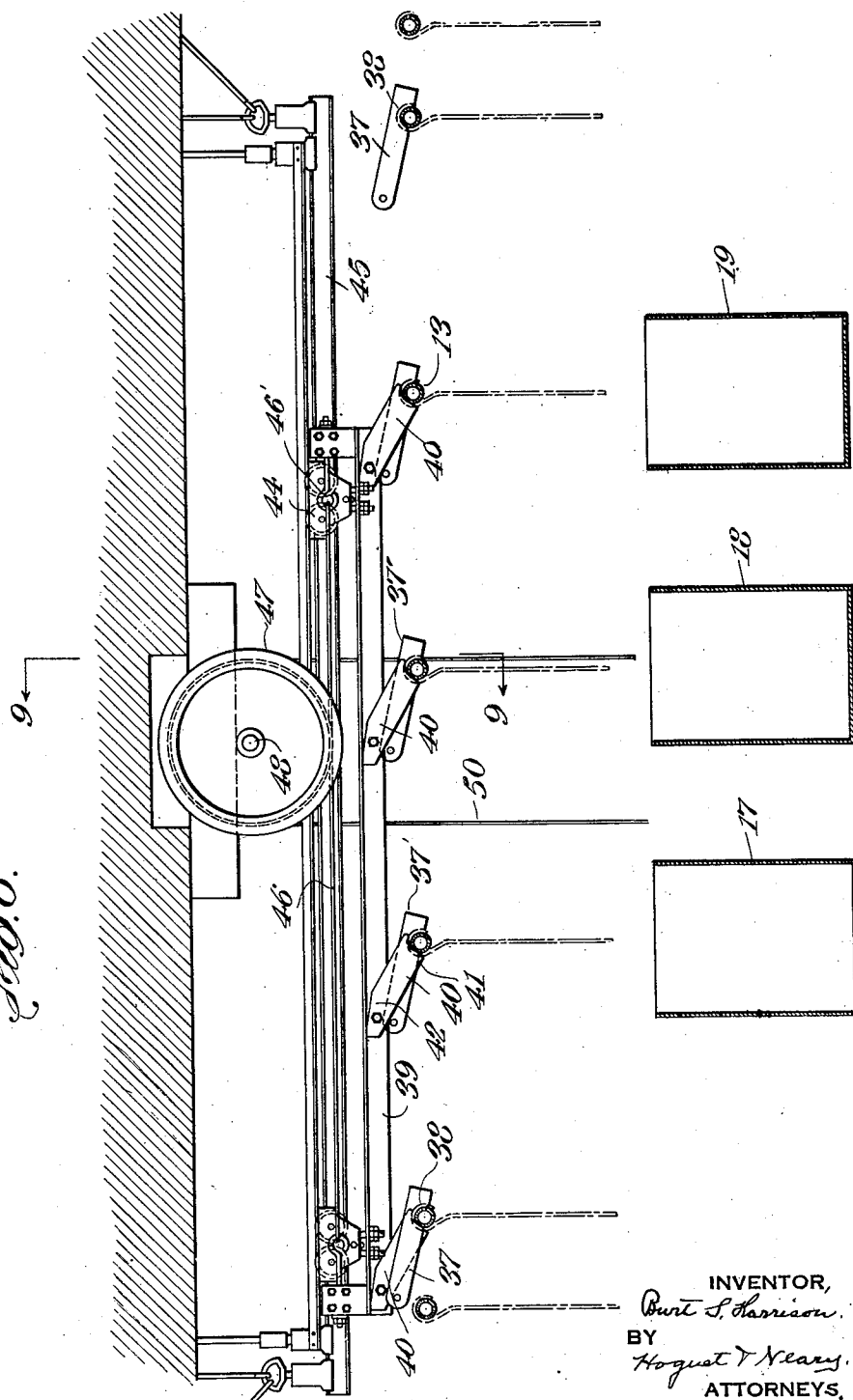
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Fig. 8.



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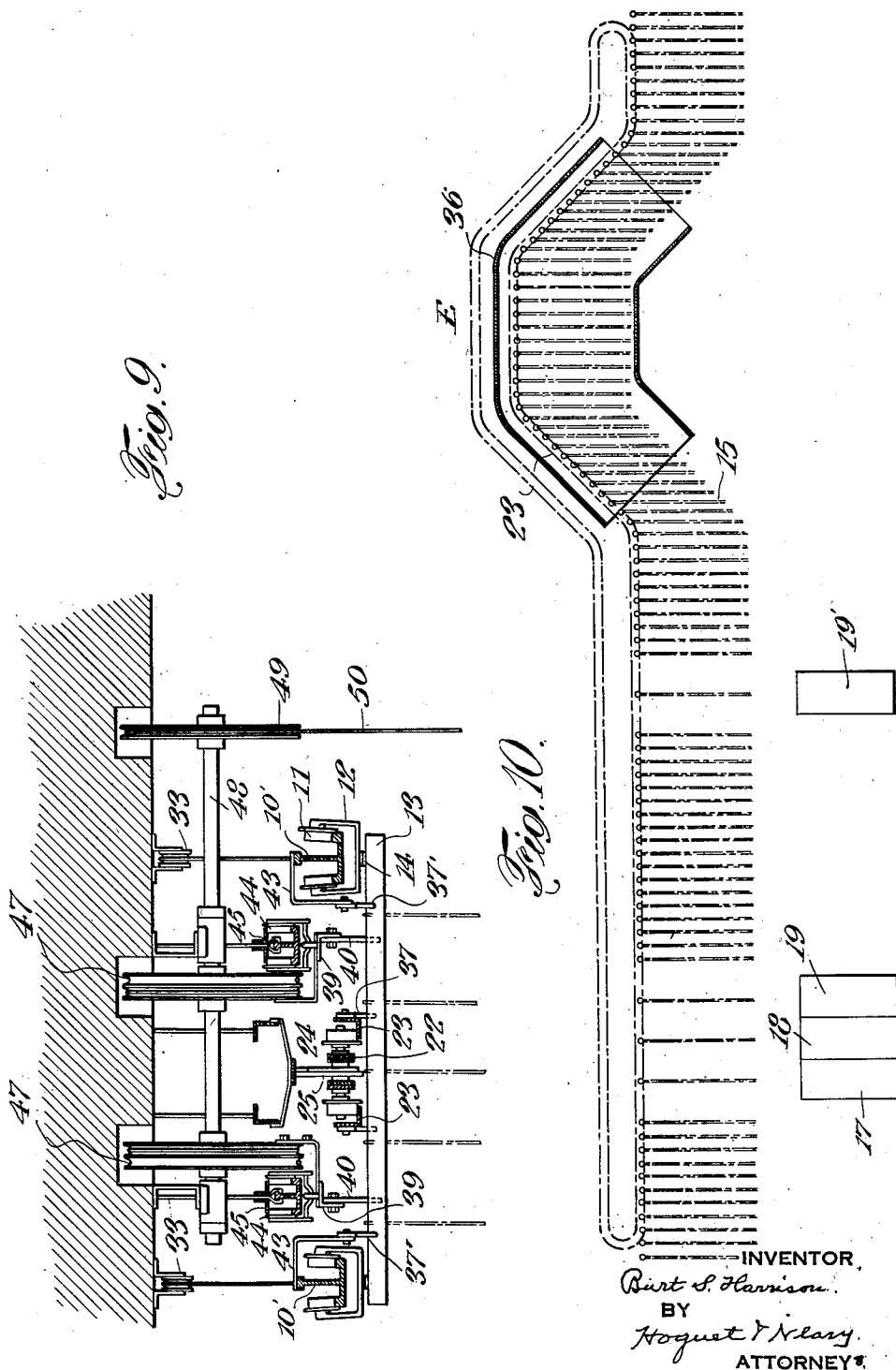
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CONVEYING SYSTEM

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UNITED STATES PATENT OFFICE

BURT S. HARRISON, OF BROOKLYN, NEW YORK

CONVEYING SYSTEM

Application filed May 27, 1930. Serial No. 456,032.

My invention relates to improvements in conveying systems and apparatus and especially to the type of apparatus which is adapted for use in rapidly handling quantities of goods which are dipped in desired tanks for cleaning, painting, drying and other purposes.

The object of my invention is to produce a simple, efficient and highly condensed apparatus which is semi-automatic in function and which will enable the work to be speedily and nicely performed.

In this specification, I have shown enough of a conveying system to make my improvements understood, and the improvements relate particularly to the means for operating the hangers on which goods are placed so that they may be placed conveniently in connection with a drive or pusher chain of the conveying system, automatically released at a definite point and dipped successively in the desired baths, all work being under the accurate control of the operator.

Heretofore, pusher chains or drive chains have been used with a single acting dog to push along the trolleys carrying the goods to be dipped and to move the goods through a dry oven or the like, but such practice has been usually in connection with ovens which are opened and closed as the goods are received or leave the oven, and the action of the pusher chain has been intermittent and of the dogs has been to simply push the trolleys along. But, in more recent developments, what are called bottom entry ovens are used in which the ends of the oven are open and are at lower levels than the upper parts of the oven so that the heated air will stay in the upper part and the goods are, therefore, preferably moved by a constant motion through such oven. It follows that the trolley tracks through such an oven have grades up on one side and down on the other, and my improved double acting dogs or jaws are intended to work in connection with such an oven, although they can work well in other arrangements, but with my invention, the parts which move through the oven are gripped positively so that they are carried over the up-grade, and when the trolleys pass

to the down-grade of the oven, the arrangement of the trolleys and the goods they carry is not disturbed because the double acting dogs or jaws prevent any disarrangement.

My invention is further intended to provide a convenient means for holding the goods in correct position while being dipped, and further to provide a convenient spacing means, which, when the point at which the goods are to be dipped is reached, will quickly space the trolleys and the hangers which they carry further apart to facilitate dipping operations and then permit them to assume their normal position after the dipping.

Other improvements and advantages will appear from the description which follows.

Reference is to be had to the accompanying drawings forming a part of this specification in which similar reference characters refer to similar parts throughout the several views.

Figure 1 is a diagrammatic plan showing the general arrangement of the system.

Figure 2 is a broken longitudinal sectional elevation of a part of the apparatus showing the hanger jaws released to permit the dropping of the hangers to dip the goods.

Figure 3 is a broken cross section on the line 3—3 of Figure 2.

Figure 4 is a broken enlarged detail view illustrating the manner in which the goods are dipped.

Figure 5 is an enlarged detail side elevation of the hanger jaws in connection with the drive chain.

Figure 6 is a section on the line 6—6 of Figure 5.

Figure 7 is a cross section of a slightly different arrangement of the hanger jaws and drive chain.

Figure 8 is an enlarged detail elevation, partly in section, showing the spacing means for adjusting the hangers at the place where the goods are to be dipped.

Figure 9 is a cross section on the line 9—9 of Figure 8, and

Figure 10 is a diagrammatic elevation, partly in section, illustrating a type of oven to which the system is well adapted.

In Figure 1 the general arrangement of the apparatus is shown, and at A is illustrat-

ed how the trolleys and the hangers which they carry are moved along on the monorail with the trolleys following one another, and at B the trolleys are switched so that at the
 5 point C, two trolleys which carry a single bar, as presently described, will be in parallel relation and travel along the course of the conveyor or drive chain D in order that the hanger bars may be engaged and released by
 10 the drive chain, all of which will be hereinafter described in detail. At E is diagrammatically shown a bottom entry oven with the hanger bars passing through it.

Along the course A is a monorail 10 which
 15 can be an inverted T rail of a known type, and at the point D this rail merges into two parallel rails so that two trolleys following one another along the course A will be switched at B to bring them into parallel relation and
 20 to continue along two parallel rails, as shown in Figure 3. This arrangement is not shown or described in detail because it is not new.

Along the rails 10 run trolleys which can conveniently be each in the form of a pair of
 25 wheels 11 connected to a bracket 12 which hangs below the wheels and two adjacent trolleys will support a hanger bar 13, the connection between the bracket 12 and the hanger bar being a swivel connection as shown at 14.
 30 Thus, it will be seen that when a pair of trolleys move from following one another along the line A to the parallel position at C, the swivels will permit the chains and the hanger bar to extend transversely from one trolley to its mate.

The goods to be dipped can be hooked over the hanger bar 13, as shown at 15, and any suitable or approved connection of this character can be used. The goods are to be
 40 dipped in a tank 16, and in Figure 4 I have shown the tank divided into separate compartments 17, 18 and 19 which may contain liquids of a desired character. One may contain a cleaning liquid, for instance, an acid
 45 solution, the next a cold water rinse, and the next a hot water rinse, or it will be understood that they might contain any desired solutions or a greater or less number of baths may be provided. The goods may then be
 50 passed through a dry-off or burn-off oven, and thence to a paint dip tank whence they may be passed through a paint bake oven 36 (Figure 1) of the inclined bottom entry type.

The power driven and constantly moving
 55 conveyor or drive chain is shown diagrammatically at D and in detail in some of the other figures. It can have, and preferably has, at the joints wheels 20 which are arranged in pairs on axles 21 and run on suitably supported tracks 23, the axles of adjacent pairs of wheels being connected by links 22. This part of the drive chain may be, however, of any approved character and it is typical of a drive chain. It carries,
 60 however, gripping jaws 24 and 25 which are

intended to engage the several hanger bars 13 as the latter come in connection with the drive chain so as to carry the bars forward to accomplish the desired work on the goods which they carry. These gripping jaws are
 70 shown in detail in Figures 5 and 6. They are pivoted on the adjacent axles 21, as the drawings show, and the pairs of jaws overlapping and their lower or freer ends formed into hook members 24' and 25' tend to close around
 75 and engage the hanger bar 13. The jaws drop by gravity to a position to engage a hanger bar and they are caused to move in unison and are held in proper relation by a pin 28 of one which enters a slot 27 of the other and thus they are held to move in unison and the limit of movement is fixed by the length of the slot.

At a fixed place in the movement of the bars with the drive chain, the jaws are automatically opened so as to permit a hanger bar or a series of bars to be dropped to carry the goods into the tanks or baths above referred to. This opening is automatic and simply
 80 accomplished by providing one of the jaws of each bath with an upwardly extending arm 29 which projects upward from the pivoted axle 21 and in the path of the several arms is a tripping abutment having upwardly inclined ends 30 and a horizontal body portion
 85 31, see Figure 2, this being arranged above the baths or tanks. At this point, that is at a point coincident with the abutment 31 and with the tanks below, are vertically displaceable sections 10' of the monorails 10 so
 90 that when the jaws are opened to release the hanger bars, the sections 10' of the rails, the trolleys which they carry and the hanger bars and the goods thereon may all be dropped so as to immerse the goods in the respective
 95 tanks.

In the drawings I have shown means for dropping three hanger bars and the goods thereon as this corresponds with the number
 100 of tanks 17, 18 and 19. If it is desired to have a larger number of tanks, then, of course, there would be a longer separable section of the monorail so that a greater number of hanger bars could be dropped.

The raising and lowering of the trolleys
 115 and hangers is done by a suitable elevator which can be controlled by the operator and which is not shown in detail because many kinds of elevators for this work are adapted to the purpose, and no claim is made here
 120 for the construction of the elevator itself. As illustrated, the rail sections 10' are connected by cables 32 with winches 33 which are motor operated and the motor controlled as to stopping, starting and reversing, by
 125 switches 34, 34', see Figure 2, so that the operator can by pressing a button or turning a switch, control these operations. This is referred to simply to make it clear what the operation is and without any idea of lim-

iting the invention to any particular form of elevator.

I have shown and described in Figures 5 and 6 a drive chain and the bar gripping jaws thereon, and here a single pair of jaws is arranged between each pair of drive chain links but if a wider and better gripping surface is desired on the hanger bar, two pairs of these jaws can be used at each link connection and spaced apart as shown in Figure 7. The arrangement otherwise is as already described, but by spacing the jaws in this way, there will be two pairs of jaws engaging the hanger bar 13 at different points, thus making a stronger and more even support.

In Figures 8 and 9 I have shown a practical means of properly spacing the trolleys and the hanger bars they carry when the sections 10' of the trolley rails are reached to provide for spacing and dipping the goods. The arrangement shown works satisfactorily but it will be understood that other means can be used having the same function but of different structure without affecting the invention. As illustrated, pawls 37 which can be conveniently pivoted for example to the track rails 23, are arranged to engage and space the hanger bars 13, and these permit the bars and the trolleys to travel in close connection, each pawl having a notch 38 which rides on the hanger bar and holds it normally in position, but the notches are not deep enough nor sharp enough to prevent the hanger bars from being pushed out of engagement with them. These pawls are arranged so that there will be one just before the dipping point is reached and just after this dipping point is left by the trolleys, and similar pawls 37' are pivotally connected with the rail sections 10' so as to engage the bars and hold them steady while the dipping operation proceeds. These can be connected to the rail sections 10' by brackets 43 or their equivalent. Adjacent these sections 10' of the rails is arranged a slide frame 39 which carries pawls 40, these being pivoted thereon and having their free ends 41 shaped to engage the hanger bars 13 while the upper ends 42 are shaped so as to engage the supporting rail and prevent the pawls from dropping too low. The slide frame 39 is arranged to reciprocate, and as it moves to the right, as shown in Figure 8, it will be seen that the pawls 40 engage a series of hanger bars, and as the frame moves very much faster than does the conveyor, the hanger bars which are engaged by the pawl will be quickly moved forward over the sections 10' and spaced properly so that when the sections 10' are lowered, the goods on the hanger bars will be in proper registry with the tanks 17, 18 and 19. When the slide frame moves forward, the pawls 40 will push the hanger bars out of engagement with the

pawls 37 but the hanger bars will then be engaged by the pawls on the sections 10' above referred to so as to be held steadily during the dipping.

Any convenient means can be used for reciprocating the slide frames 39, but I have shown a means which permits them to be under control and to move quickly. As illustrated, the frames are carried by trolleys 44 which move on guide tracks 45 and the frames connect with cables 46, the connection being near each end of the frame, as shown at 46' in Figure 8, and the cables are wound upon the drums 47 which are shown mounted on a shaft 48 which is supported in suitable bearings. To the shaft 48 is attached a pulley 49 over which runs a rope 50 with the ends hanging down within the reach of the operator. Thus, by pulling on one member of the rope, the slide frame may be moved one way and by pulling on the other member, the frame is returned.

I have shown one dipping arrangement and elevator therefor, but this arrangement may, of course, be duplicated. In Figure 10, for example, I have shown a tank 19' and the arrangement just described can be, of course, used in connection with this or with a greater or less number of tanks.

At E, in Figure 10, I have shown the oven 36 diagrammatically as a bottom entry, and it will be seen how the grade of the conveyor tracks 23 extends first upward and then downward and how the double acting jaws or dogs 24, 25 serve to hold the hanger bars 13 and their trolleys in desired spaced relation while travelling over these grades.

In practice, the hanger bars are loaded at any desired point as they travel lengthwise along the course A and at the switch point B, the trolleys are diverted as already described so that one of each pair will follow its appropriate rail 10, and a pair of trolleys will then be in parallel spaced relation with the hanger bar 13 traversing the course of the drive chain. As the hanger bars come to this position, they are successively placed in engagement with the appropriate jaws of the drive chain and are carried forward to the elevator above the tank 16 in the manner above described. As the tank is reached, the arms 29 of the adjacent gripping jaws strike the abutment 31, opening the jaws and releasing the hanger bars, as shown clearly in Figures 2 and 4. At this point, the elevator is operated to permit the rail sections 10' and the hanger bars carried thereby to drop so that the goods on the hooks 15 will enter the tanks. As the rail sections and their hanger bars drop out of engagement with the jaws on the drive chain, they do not interfere with the progress of the latter. After the sections are raised, another hanger bar and its trolleys are pushed in place on the rail sections 10' by the spacing means

above described at the entrance end of the elevator system, and the spacing means at the exit end of the elevator system moves a hanger bar and its trolleys on the rail sections 10' again into engagement with the gripping jaws and carries them forward one step so that the hanger bar at the left hand in Figures 2 and 4 will move forward on the fixed part of the monorails and at the right hand a new hanger will be advanced to dipping position. The operator then drops the elevator and again submerges the goods but those that have been submerged in the tank 18, for example, will this time be submerged in the tank 19 while the goods previously submerged in the tank 17 will be immersed in the tank 18. This is because the spacing means will have pushed each hanger on the section 10' forward the appropriate distance. This operation is repeated regularly and after being dipped, the goods are carried forward by the drive chain through the drying oven 35 and thence through the priming oven 36. These ovens can be of any conventional or approved kind and obviously they may represent compartments of any character or number through which it is desirable to carry the dipped goods.

I claim:

1. A structure of the kind described, comprising a drive chain, a goods hanger extending transversely of the drive chain, jaws on the drive chain engaging the goods hanger, means for releasing the jaws at a definite point, and an elevator acting at the opening of the jaws to lower the hanger.

2. A structure of the kind described, comprising a drive chain, a goods hanger, hanger engaging jaws carried by the drive chain, means for opening the jaws to release the hanger, and an elevator acting at the opening of the jaws to move the hanger.

3. A structure of the kind described, comprising a drive chain, a goods hanger extending transversely of the drive chain, means for guiding the hanger, jaws on the drive chain engaging the hanger, means for releasing the jaws at a definite point, and an elevator acting at the opening of the jaws to carry the hanger.

4. A structure of the kind described, comprising parallel spaced trolleys, a drive chain continuously moving between the trolleys, a hanger bar connecting the trolleys, jaws on the drive chain to engage the hanger bar, means for releasing the jaws at a definite place, and an elevator acting at the releasing of the jaws to carry the trolleys and hanger bar.

5. A structure of the kind described, comprising spaced parallel trolley tracks having separable sections, hanger bars connected to trolleys running on said tracks, a continuously moving drive chain spaced at a point vertically between the tracks, jaws on the drive

chain to engage the hanger bars, means for releasing the jaws as the trolleys come on to the movable track sections, and elevators for raising and lowering the track sections.

6. A structure of the kind described, comprising a continuously moving drive chain, hanger bars arranged to extend transversely of the drive chain, jaws on the drive chain to engage the hanger bars, a tank spaced below the hanger bars and drive chain, means for releasing the jaws from the hanger bars at a point above the tank, and an elevator acting to lower the hanger bars and raise them between the tank and the drive chain jaws.

7. In a structure of the kind described, a drive chain comprising pivotally connected links, jaws pivoted at the pivotal connection between the links and arranged in pairs to engage an article, one jaw of a pair being pivotally mounted at one end of a link and the other jaw of the pair being pivotally mounted at the other end of the same link, a tripping abutment adjacent the drive chain, and arms connected to the jaws and disposed to engage the tripping abutment to open the jaws.

8. A structure of the kind described, comprising a drive chain, hanger engaging jaws carried by the drive chain, means for opening the jaws to release the hangers, an elevator acting at the opening of the jaws to move the hangers, and spacing means engaging the hangers and acting to change their spaced relation as the hangers are delivered to the elevator.

9. An apparatus of the kind described, comprising a drive chain, goods carrying hangers moved by the drive chain, an elevator acting to lower and raise the goods with respect to the drive chain, and spacing means acting independently of the elevator to change the spaced relation of the hangers as they enter the elevator.

10. In an apparatus of the kind described, comprising a drive chain, goods carrying hangers operated by the drive chain, an elevator to raise and lower the said hangers with respect to the drive chain, a movable slide frame opposite the elevator, and means connected to the slide frame and engaging the aforesaid hangers to change the spaced relation of the hangers as they enter the elevator.

11. A structure of the kind described, comprising a drive chain, goods carrying hangers movable by the drive chain, an elevator to lower and raise the said hangers with respect to the drive chain, pawls acting to steady and normally space the said hangers, a slide frame opposite the elevator, and a second set of pawls carried by the slide frame and acting to engage the hangers and push them from the first mentioned pawls and change their spaced relation as they enter the elevator.

12. An apparatus of the kind described, comprising a drive chain, goods carrying hangers movable by the said drive chain, an elevator to raise and lower the said hangers with respect to the drive chain, a manually controlled spacing means arranged adjacent the elevator and acting to engage the said hangers and change their spaced relation as they enter the elevator.

10 In testimony whereof, I have signed my name to this specification this 24th day of May, 1930.

BURT S. HARRISON.

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