March 10, 1931. S. OLSON 1,796,119

TRAY ELEVATOR

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Fig. 1.

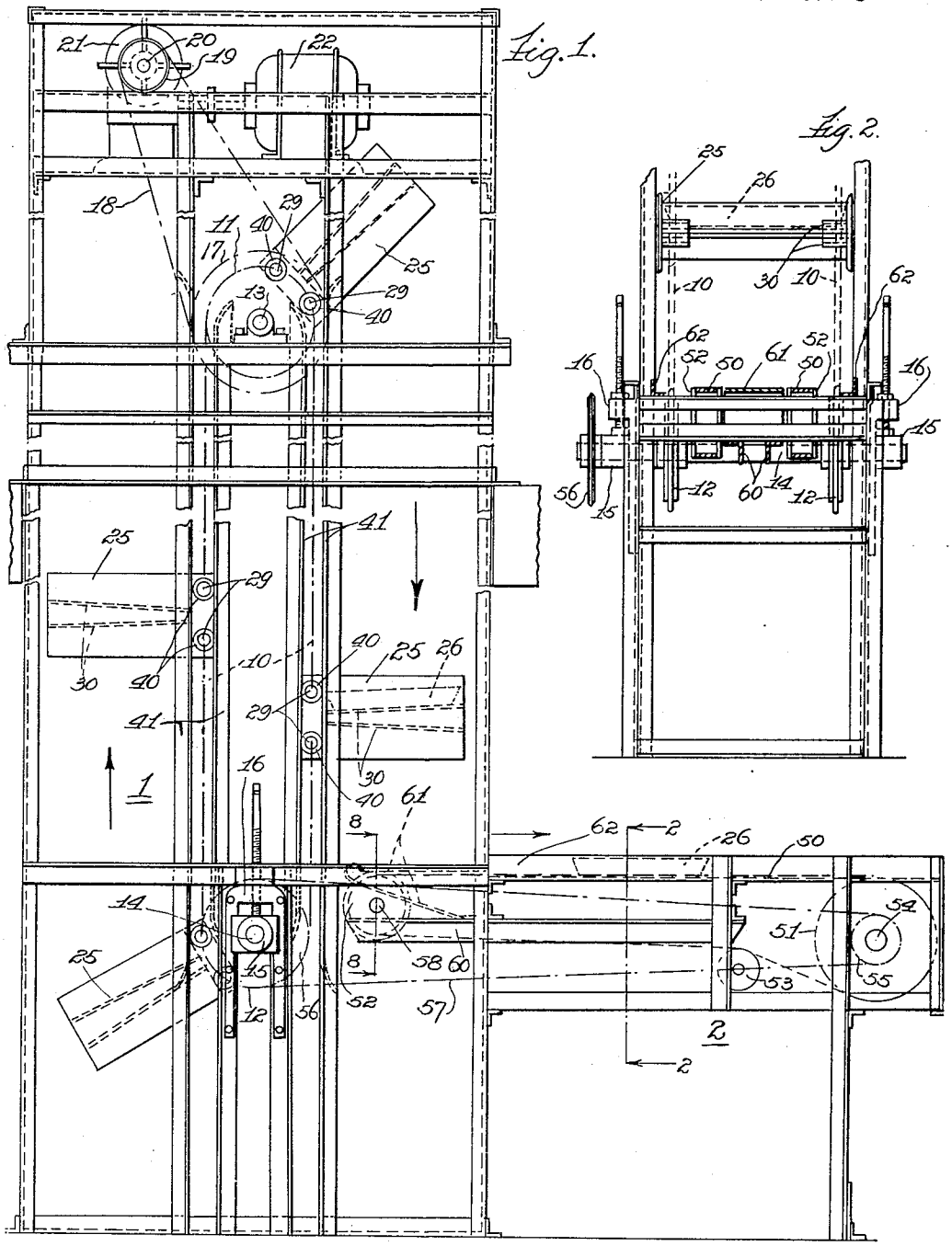


Fig. 2.

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Fig. 3

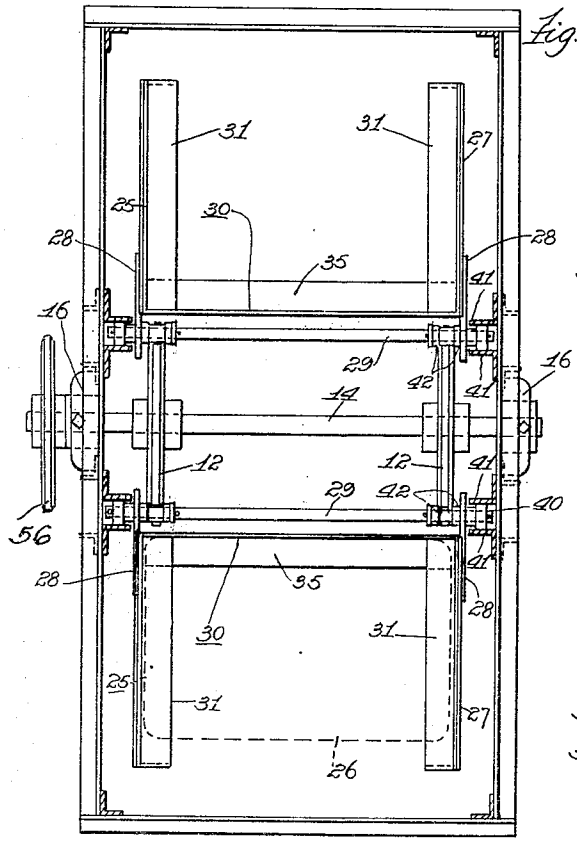


Fig. 8.

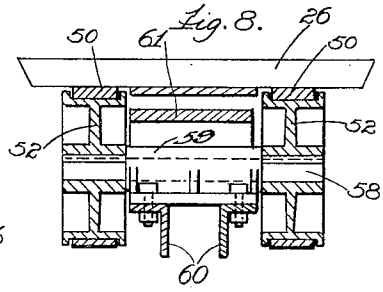


Fig. 7.

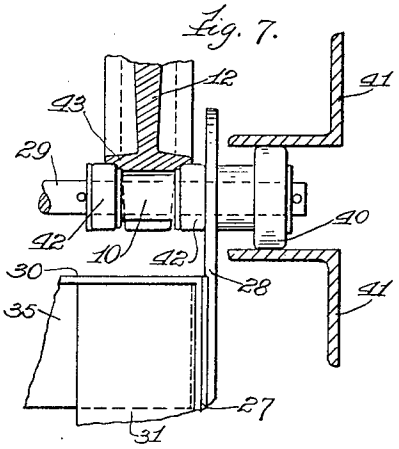


Fig. 4.

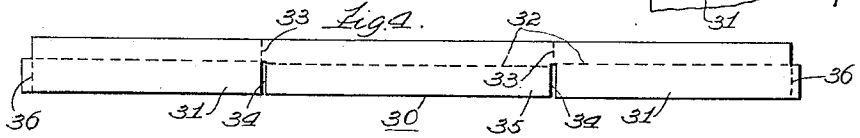


Fig. 5.

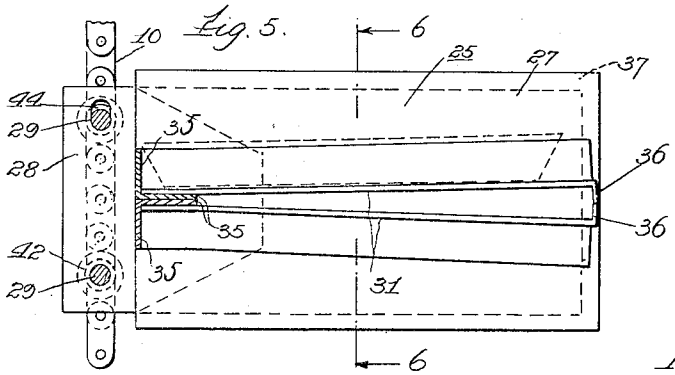
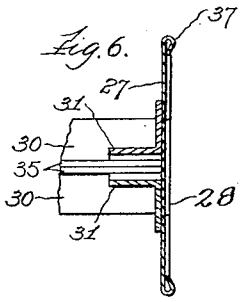


Fig. 6.



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1,796,119

UNITED STATES PATENT OFFICE

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TRAY ELEVATOR

Application filed September 10, 1927. Serial No. 218,779.

This invention relates to tray elevators and has for its object to provide a carrier of improved construction adapted to be used on an elevator for raising and lowering trays and the like simultaneously. A further object is to provide an improved carrier for maintaining trays and the like in safe load carrying position. Another object is to provide a conveyor arranged to co-operate with the carriers of the elevator for automatically transferring trays and the like from the elevator onto the conveyor. The invention consists in certain features and elements of construction, herein shown and described, as indicated by the claims.

In the drawings:

Figure 1 is a somewhat diagrammatic illustration of an elevator using my improved carriers, and showing a transverse conveyor arranged so as to permit automatic discharge thereon of loads from the carriers of the elevator.

Figure 2 is a fragmentary section taken through the conveyor or on line, 2—2, Figure 1.

Figure 3 is a transverse horizontal section through the elevator looking down, showing the carriers in plan view.

Figure 4 is a detail of a blank for one of the supports of the carrier.

Figure 5 is a vertical section through the carrier, showing its connection to the elevator chain.

Figure 6 is a section through an end plate of the carrier as indicated at line, 6—6, Figure 5.

Figure 7 is an enlarged fragmentary detail showing a portion of a carrier and chain connections.

Figure 8 is a vertical axial section through the overhanging end of the transverse conveyor.

In Figure 1 of the drawings, both the elevator 1 and transverse unloading conveyor are illustrated more or less diagrammatically, merely showing the skeleton supporting structure. The elevator comprises a pair of endless chain belts, 10, trained over head and foot wheels, 11 and 12, which are carried on their respective head and foot shafts, 13 and 14. The head shaft is suitably supported on the framing, while the foot shaft is mounted in bearings, 15, of take-ups, 16, secured to the skeleton framing at the bottom and adapted to adjust the slack in the belts, 10. A drive wheel, 17, is rigidly secured to the outer end of the head shaft and is driven by a belt, 18, from a driver wheel, 19, on a reducer shaft, 20, of a worm gear speed reducer, 21, which in turn is driven from an electric motor, 22, mounted on the framing at the top of the elevator. The driving connection to the head shaft as above described includes the usual controlling mechanisms such as clutches, etc., (not shown).

The belts, 10, are provided with horizontally disposed carriers, 25, spaced at suitable intervals. These carriers are so designed that loads such as trays, 26, may be elevated on one side of the elevator, while the opposite side of the carrier may be used to carry trays and the like down on the down run side of the elevator. The carrier proper comprises a pair of spaced, vertically disposed end plates, 27, having their rear end portions mounted on supporting plates, 28, which are carried on a pair of vertically spaced transverse cross rods, 29, connected at opposite ends to the chain belts, 10. A pair of oppositely disposed U-shaped load supporting angle members, 30, are attached to the inner sides of said end plates. These members are each disposed with the closed portion of the U, adjacent the cross rods, 29; and with the leg portions, 31, connected to the end plates and sloping outwardly from each other away from the belts. The lower supporting member of each pair is inclined oppositely, so that when the carrier is reversed in its passage around the head or foot wheels it will still present a load supporting surface sloping downwardly toward the belt.

Figure 4 shows a blank for the supporting member, 30, which, when formed, is bent longitudinally along line, 32, to make an angle member; then it is bent at 33, so that with the clearance afforded by notches, 34, the lower flanges of the leg portions, 31, are lapped on top of the lower flange of the in-

termediate portion, 35, in final form, as shown in Figures, 5 and 6. The extreme ends, 36, of the lower flange of the leg portions are bent so as to close the openings formed at the front ends between the flanges of the leg portions, 31, of each pair of the supporting members, when they are assembled in oppositely inclined relation. The outer ends and both edges of the end plates, 27, are beaded over as indicated at 37, to obviate possible injury to the operators when loading and unloading.

The chain belts, 10, may be of any of the usual types for carrying the cross rods. The outer ends of the cross rods are provided with rollers, 40, outside of the carrier, and engaged between pairs of vertically disposed guides, which include angle members, 41, spaced back to back and secured to the framing. The guidance of the roller permits the carriers to operate in substantially a true vertical direction and prevents swaying of the belts with the loads. A pair of rollers, 42, are mounted on the cross rods, 29, as seen in Figure 7, on opposite sides of each strand of chain adapted to ride on flanges, 43, formed on the sides of the head and foot wheels. The rollers, 42, riding on these flanges tend to remove part of the load and strain of the carrier from the chains, as well as lessen the vibration of these parts. It will be seen that one of the openings in the supporting plates, 28, through which a cross rod, 29, extends, is elongated vertically, as indicated at 44, so as to allow for shortening of the chord between the two openings when the chain passes around the head or foot wheels.

Tray elevators of this type are especially adaptable for use in hotels, restaurants, hospitals, etc., for raising and lowering trays of food or dishes to a desired level. By way of illustration and with reference to Figure 1 it will be understood that trays may be loaded on the up run of the elevator, 1, at a point opposite the transverse conveyor, 2, and may be removed at any point along the path of upward travel. Also on the down run side of the elevator, trays may be loaded at any convenient point and may be automatically discharged adjacent the bottom onto the transverse unloading conveyor, 2. Automatic stops of any of the usual types may be arranged at convenient points along the path of the up run of the elevator for stopping the same at a predetermined point for unloading. This arrangement provides a complete system of handling of trays and the like with a single elevator mechanism.

The carriers, 25, with their load supporting members, 30, carry the load, such as a tray, in a position inclined slightly inward and downward toward the chain belts, 10. If there is any vibration it will tend to work the tray or load nearer the lower end of the inclined load supporting surface, bringing it near the chain belts, thereby obviating the possibility of the tray being jarred outwardly by the vibration with the danger of the tray or its contents striking against obstructions in the shaft. This construction also counteracts the tendency of the weight of the load remote from the chain belts to deflect them and thus tilt the carrier outwardly so as to spill or damage the contents. It will be noted that the end plates, 27, of the carrier are of substantial height, protecting the load from spillage over these end plates in case of sway or vibration of the elevator belts.

Referring now to the transverse unloading conveyor 2, it will be seen from the drawings to have an overhanging end projecting into the path of travel of the carriers on the down run side of the elevator for intercepting the trays from the carriers and transferring them to suitable receiving tables (not shown). This conveyor includes a pair of spaced tapes or narrow belts, 50, trained over a head pulley, 51, and tail pulleys, 52, and tensioned by an idler pulley, 53, which engages the return run of the tapes and which is supported in the structural frame of the conveyor. The head pulley is mounted on a shaft, 54, which has bearing support on the framing; a drive wheel, 55, is carried on one end of said shaft and is driven from a wheel, 56, on the take up shaft, 14, of the elevator, by a belt, 57. The tail pulleys, 52, are secured to the ends of a shaft, 58, which is supported intermediate said pulleys by a relatively long journal bearing, 59, mounted at the end of a pair of longitudinally extending bearing supporting members, 60, which are attached to the framing of the elevator and conveyor. It will be seen from Figure 2 that the overhanging end of the conveyor with the tail pulleys, 52, lies in the space between the paths of the load supporting members, 31, of the carrier as they pass downward, so that the tray or load will be intercepted and removed by the tapes, 50, immediately upon its arrival at this plane. It will be noted that the overhanging end of the conveyor projects inwardly a substantial distance beyond the center of loading of the supporting members to insure proper balance of the load as it is discharged therein, thereby assuring positive and immediate movement of the load by the frictional engagement of the tapes of said conveyor. To partially relieve the impact and jarring when the load or tray is transferred to the tapes, a yielding intercepting table, 61, is provided to engage the load or tray and lower the same in a smooth and easy manner to be engaged by said tapes. This table, 61, comprises a plate, interposed between the tapes and bent rearwardly between the tail pulleys, then back on itself in spaced rela-

tion, forming a springlike member, having a substantially flat table portion extending parallel to and disposed slightly above said tapes. The bottom of this plate, 61, is secured to the bearing support members, 60. Guides, 62, extend parallel to the tapes to assist in steering the trays along them.

I claim:

1. The combination with a vertical conveyor having a pair of endless belts, of carriers on said belts at spaced intervals, said carriers each including a pair of horizontally spaced, laterally extending load-carrying arms, a conveyor co-operating therewith having an overhanging end extending into the path of travel of loads on said carriers, said conveyor comprising a pair of load-carrying tapes, a transverse shaft at said overhanging end, a pair of pulleys mounted at the ends of said shaft with the tapes trained thereover, said pulleys and shaft being positioned to lie between the arms of the carriers in the path of the load, an overhanging arm extending between said pulleys, a journal bearing on said arm for supporting the shaft and pulleys, and yielding means disposed intermediate said tapes and pulleys for engaging loads and yieldingly supporting the same while the tapes of the conveyor acquire their frictional hold for moving said loads.

2. In the combination defined in claim 1, said yielding means comprising a substantially flat load-intercepting table normally disposed slightly above the tapes.

3. In a conveyor, a pair of vertically travelling belts and a load carrier comprising a pair of end plates disposed in vertical planes and attached to said belts and projecting transversely therefrom, members secured to the opposed faces of said end plates with flanges projecting therefrom to serve as load supports, each plate having two such flanges oppositely inclined to a perpendicular to the belt, the upper flange inclining downwardly toward the belt, and stop means to limit movement of a load toward the belt on said flanges.

4. In a conveyor, a pair of vertically travelling belts and a load carrier comprising a pair of end plates disposed in vertical planes and attached to said belts and projecting transversely therefrom, angle members secured by their vertical flanges to the opposed faces of said end plates with their horizontal flanges projecting to serve as load supports and inclined longitudinally toward the belt, the vertical flanges of the angles on the respective plate being connected by a transverse member extending between the plates and serving as the stop means.

5. In an endless belt conveyor, a load carrier comprising an angle member having a middle portion and end portions extending transversely of the middle portion and opposite each other with vertically disposed end plates secured to said end portions and attached to the belt thus forming a carrier adapted to support a load by engaging only its marginal portions.

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