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2,657,786

PORTABLE CONVEYER

Filed Nov. 15, 1948

2 Sheets-Sheet 1

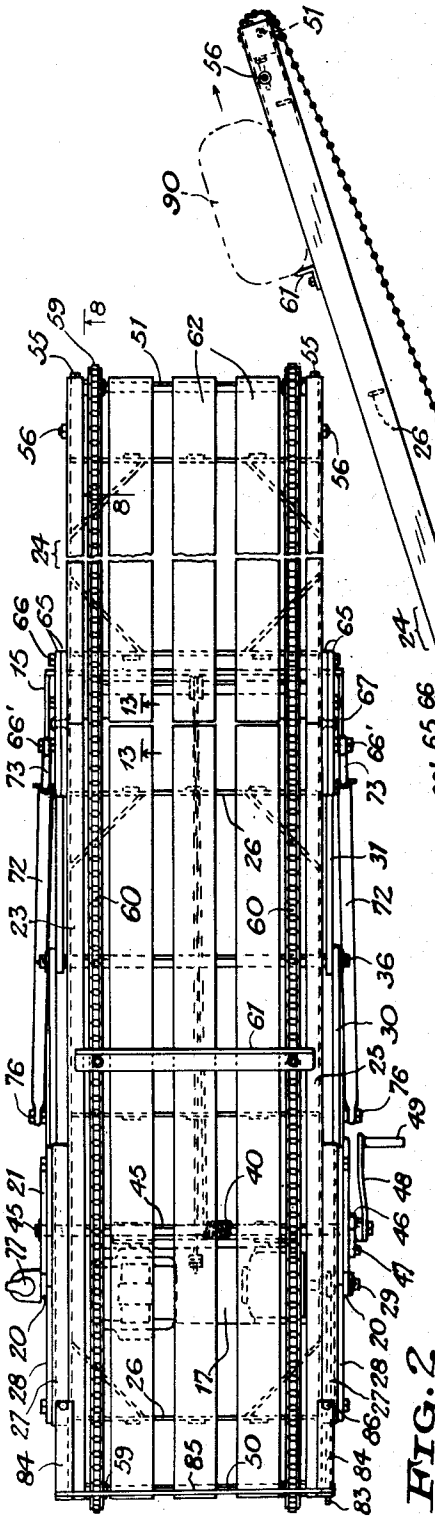


FIG. 2

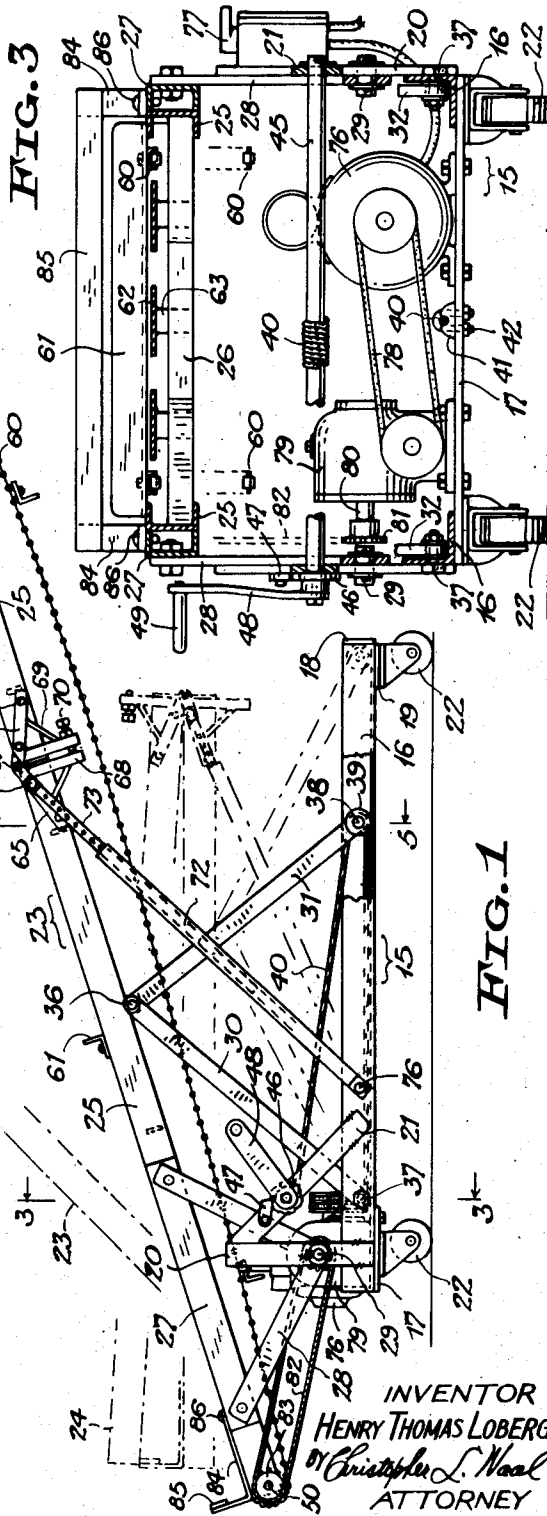


FIG. 1

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2 Sheets-Sheet 2

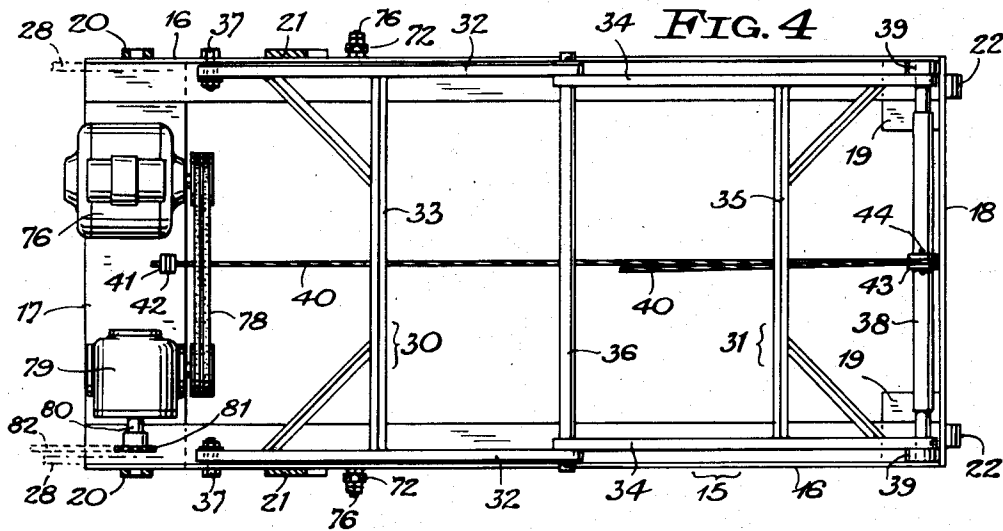


FIG. 5

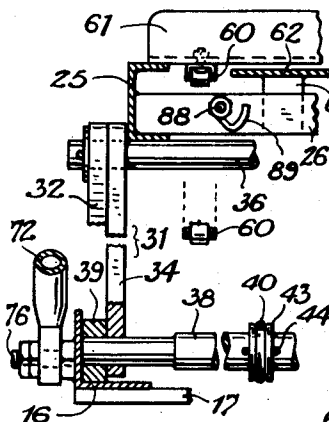


FIG. 6

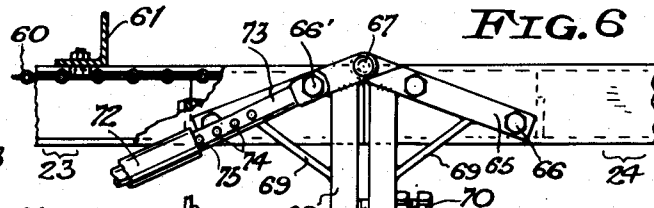


FIG. 7

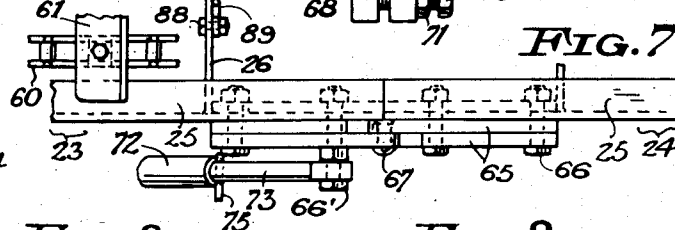


FIG. 9

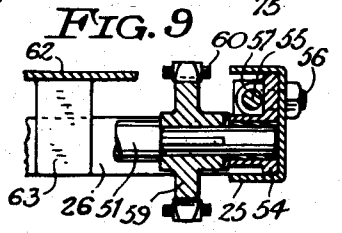


FIG. 8

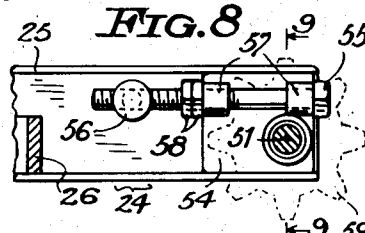


FIG. 12

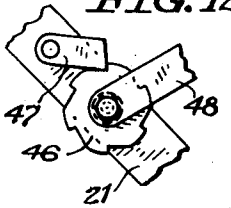


FIG. 10

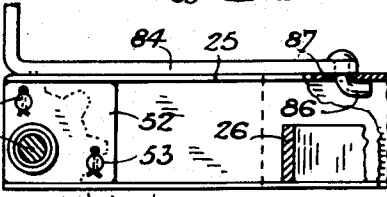


FIG. 11

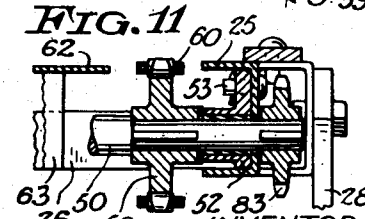
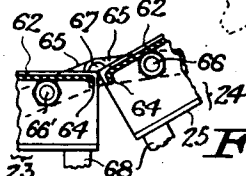


FIG. 13



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PORTABLE CONVEYER

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3 Claims. (Cl. 198—122)

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The present invention relates to conveyers and more particularly to those of the portable elevating type.

An object of the invention is to provide an improved portable conveyer structure including a conveyer leg or boom which is readily adjustable to various inclinations and which is adapted to convey articles in either direction.

Another object is to provide a conveyer structure in which the conveyer leg or boom is foldable to facilitate shipment and storage.

Still another object is to provide a portable conveyer structure which can easily be moved through narrow doorways and passages.

A further object is to provide a conveyer structure which is of simple and durable construction and capable of inexpensive manufacture.

A still further object is to perfect details of construction generally.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawings,

Fig. 1 is a side elevation of a portable conveyer constructed in accordance with the invention, a conveyer leg or boom thereof being raised to an intermediate inclination, and a folded horizontal position of the boom being shown in broken lines;

Fig. 2 is a top view of the conveyer, parts being broken away;

Fig. 3 is a transverse sectional elevational view taken generally on the line 3—3 of Fig. 1;

Fig. 4 is a top view of a wheeled base of the conveyer, the boom being removed and parts being shown in section;

Fig. 5 is a detail sectional elevational view taken generally on the line 5—5 of Fig. 1;

Fig. 6 is a side elevation of the hinged portion of the foldable conveyer boom, parts shown in section;

Fig. 7 is a top view of the hinged portion of the boom;

Fig. 8 is a detail sectional view of the free end of the boom, taken generally on the line 8—8 of Fig. 2;

Fig. 9 is a detail sectional view taken generally on the line 9—9 of Fig. 8;

Fig. 10 is a detail sectional view of the lower end of the boom, taken in the same plane as Fig. 8;

Fig. 11 is a detail transverse sectional view of the lower end of the boom, taken in the plane of a sprocket shaft for the conveyer chains;

Fig. 12 is a detail view of a cable winding device, and

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Fig. 13 is a detail view of the boom joint, the conveyer chains being omitted.

In the drawings, 15 designates an elongated rectangular base frame or dolly frame comprising a pair of parallel side bars 16 of angle cross-section rigidly connected by a horizontal cross plate 17 at one end and a cross bar 18 at the other end, the last-named end also including corner gusset plates 19. Two upright bars 20 are rigidly secured to the outer sides of the side bars 16 near the cross plate 17 and are braced by inclined bars 21. The various parts of the base frame are suitably joined, as by welding. The base frame is supported at its four corners by wheeled casters 22, permitting the frame to be easily moved about to desired locations.

A vertically swingable foldable conveyer frame or boom is carried on the wheeled base frame, as hereinafter described, and comprises a pair of pivotally connected alignable boom sections 23 and 24 each including a pair of parallel side bars 25 of channel cross-section rigidly connected by braced cross bars 26 welded in place. Near its outer end, the boom section 23 has reinforcing channel bars 27 welded to its outer sides, and to these reinforcing bars are rigidly secured respective downwardly converging V-shaped brackets 28, the lower ends of which are disposed at the inner sides of the upright base frame bars 20 and pivotally connected thereto by horizontally aligned pivot pins 29.

The swingable conveyer frame is further supported by an angularly adjustable A-frame comprising a pair of upwardly converging frame members 30 and 31 of generally similar construction, the frame member 30 having side bars 32 joined by a braced cross member 33, and the frame 31 having side bars 34 joined by a braced cross member 35. The upper ends of the frame members 30 and 31 are pivotally connected by a cross-shaft 36 which forms the apex portion of the A-frame and which slidably or rotatably bears on the under sides of the side channel bars 25 of the pivotally supported boom section 23. The lower ends of the side bars 32 of the A-frame member 30 are pivotally secured to the vertical flanges of the base side bars 16 by horizontally aligned pivot members 37 near the base cross plate 17. The lower ends of the side bars 34 of the A-frame member 31 are pivotally mounted on the reduced cylindrical end portions of a cross shaft 38 which is axially confined between the vertical flanges of the base side bars 16. Rollers 39 are mounted on the ends of the cross shaft 38 and are rollable along the horizontal flanges of the base side bars, the latter

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flanges forming horizontal trackways for the rollers. The roller at each end of the cross shaft is axially confined between the adjacent vertical flange of the base side bar and the adjacent lower end of the A-frame bar 34.

A cable 40 is anchored at one end on the middle portion of the frame cross plate 17 by a grooved anchor block 41 and clamping U-bolt 42 and has a bight passing about a pulley 43 rotatably mounted on the middle portion of the cross shaft 38, the pulley being axially confined, as by pins 44 in the shaft. The reversely extending portion of the cable is anchored and wound on a transversely extending shaft 45 which is journaled in the inclined bars 21 of the base frame. At one end the winding shaft 45 is provided with a ratchet wheel 46 which is engageable by a gravity-actuated pawl 47 pivoted on the base frame bar 21 to hold the shaft against rotation in unwinding direction. At the same end the winding shaft has a crank arm 48 with a handle 49, which is preferably detachable. By turning the crank arm the rollably supported lower end of the A-frame member 31 is pulled along the base trackways, thus raising the boom-supporting shaft 36 at the upper end of the A-frame and swinging the conveyer boom upwardly about the pivot members 29 to bring the boom to the desired inclination. By releasing the pawl 47 the boom can be lowered under the control of the crank arm. Preferably, the lowermost position of the boom is approximately horizontal, and is determined by having the rollers engage a stop, such as the base cross bar 18.

Rotatable cross shafts 50 and 51 are mounted at the opposite ends of the boom, the cross shaft 50 at the lower end of the boom having reduced cylindrical end portions which are journaled in bearing members 52 mounted within the channel bars of the boom. Each bearing member is loosely secured by pins 53 so as to avoid binding of the shaft. The cross shaft 51 at the upper end of the boom also has reduced cylindrical end portions which are journaled in bearing members 54 slidably fitting in the channels. A headed adjusting bolt 55 extending longitudinally in each channel is threaded through a block 56 loosely secured to the channel member and is journaled in lugs 57 on the associated bearing member, being confined against relative axial displacement with respect to the bearing member by the head of the bolt and by nuts 58 on the bolt. By turning the bolts 55 the bearing members 54 can be longitudinally adjusted. The reduced ends of each cross shaft 50 and 51 also have sprocket wheels 59 mounted thereon, each sprocket wheel being confined between the adjacent bearing member and an enlarged part of the shaft. A pair of endless conveyer chains 60 are trained over the sprocket wheels 59 and carry a plurality of spaced transversely extending pusher bars 61 of angle cross-section, the opposite ends of which are slidable on the upper flanges of the boom channel bars 25. Each boom section is provided with a plurality of spaced longitudinally extending slat plates 62 which are slightly below the plane of the upper flanges of the channel bars and are carried by supporting members 63 welded to these plates and to the boom cross bars 26. At the pivotally connected ends of the boom sections the slat plates have rounded downturned abutting ends 64, Fig. 13.

Upwardly converging hinge bars 65 are rigidly secured, as by bolts 66, to the outer sides of the

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boom channel bars at the adjacent ends of these channel bars and are connected by horizontally aligned hinge pins 67, the pivotal axes of which lie substantially in the plane of the upper flanges of the channel bars. Downwardly projecting bars 68 are welded to the hinge bars and to brace bars 69. A leveling bolt or screw 70, Fig. 6, is threaded through the lower end of one of each pair of bars 68 and is adapted to abut against the other bar 68 to align the boom sections, the bolt 70 being held in adjusted position by a lock nut 71. The independently adjustable screws 70 at opposite sides of the boom may also serve to hold the outer or upper boom section 24 at a slightly greater angle than the lower boom section 23 so as to reduce the conveyer friction and to compensate for sagging of the outer boom section under load.

Telescoping boom-supporting struts are provided at the sides of the machine, each strut comprising a tube 72 and a rod 73 slidable therein, the rod having a series of transverse openings 74 adapted to receive a detachable pin 75 engageable with the upper end of the tube. The lower ends of the tubes 72 are pivotally carried by horizontally aligned bolts 76 which are welded to the outer sides of the vertical flanges of the base track bars 16 near the inclined frame bars 21. The upper ends of the strut rods 73 are pivotally secured to the upper end portion of the lower boom section 23 by bolts 66' which also clamp the hinge bars for this boom section.

A power unit 76, such as an electric motor, is mounted on the base frame cross plate 17 and is controlled by a reversing switch 77 mounted on one of the base uprights 20. The motor has a multiple V-belt drive connection 78 with a speed reducer 79 the horizontal output shaft 80 of which is axially aligned with the pivot pins 29 for the swingable boom. The reducer output shaft 80 carries a sprocket wheel 81 which is connected by a driving chain 82 to a sprocket wheel 83 on the boom cross shaft 50. The conveyer chains can thus be driven in either direction. Suitable guard means, not shown, may be provided for the driving chain 82. The motor and speed reducer are disposed between the opposite vertical side planes of the boom.

A load support or holder is detachably mounted on the lower end of the boom section 23 and comprises a pair of L-shaped bars or legs 84 having their upper ends connected by a cross bar 85 under which the pusher bars pass. The base or foot portions of the bars 84 rest on the channel bars 25 and 27 and their free ends have hooks 86, Fig. 10, which loosely enter openings or sockets 87 in the channel bars 27 to retain the support in its normal position. The hooks 86 also form pivots permitting the load support to swing upwardly if struck by an obstruction carried along by the conveyor. The load support is readily detached from the boom when the conveyer chains feed toward the pivoted end of the boom.

Near the hinge axis of the boom a cross member 26 of the section 23 is provided with a pair of pivot bolts 88 carrying swingable hooks 89, Figs. 6 and 7, which are engageable with chain links of the upper runs of the conveyer chains, so as to hold the chains in position during folding and unfolding of the boom. These hooks are out of the path of the chains when the conveyer is in operation.

When the conveyer is to be used, it is wheeled about to the desired location, and the boom is adjusted to the desired angle by turning the ele-

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vating crank 48, the maximum boom angle being about 45°. The telescoping struts 72, 73, are adjusted to support the boom in its angular position. With the boom elevated, the conveyer can be used to transport articles, such as bags, bales, or cartons 90 between different elevations, such as between floors or between a truck and floor level, and also for stacking operations. However, for some types of article handling the boom may extend in a generally horizontal direction. The conveyer chains are driven in the desired direction by actuating the reversing switch 77. Assuming an upward conveyer travel, the bags or other articles to be transported are placed on the lower end of the boom where they temporarily rest against the load support 84, 85, until the arrival of a pusher bar 61. The pusher bar slidably moves the article upwardly along the slat plates 62 and the channel bars 25, the article being lifted or pushed off the upper end of the boom. If the article is wider than the boom it will slide over the inclined upper ends of the hinge bars 65 without damage. A bag may sag slightly between the slat plates but will not encounter obstructions. As the angle of the boom is increased the pivoted end of the boom will come closer to the floor, thus facilitating loading. If the articles are to be fed downwardly on the conveyer the load support 84, 85 is removed so as not to obstruct the passage of the articles, and the reversing switch 77 is operated to drive the conveyer in the opposite direction.

When the conveyer is to be stored or shipped, the boom is placed in a generally horizontal direction, and after engaging the conveyer chains on the hooks 88 the outer boom section 24 is folded over onto the boom section 23, as shown by broken lines in Fig. 1. Preferably, the conveyer is also in this folded condition when it is to be moved through doorways and narrow passages. If necessary, the crank handle 49 can be temporarily removed.

What I claim as new and desire to secure by Letters Patent is:

1. A conveyer structure, comprising a base, a vertically swingable boom pivotally mounted on said base, elevating means for said boom including an angularly adjustable A-frame carried by said base and having a boom-supporting apex portion shiftable along said boom, an endless conveyer element movable along said boom, and driving means for said conveyer element, said A-frame including a pair of upwardly converging frame members pivotally connected at their upper ends adjacent to said apex portion, the lower end of one of said frame members having a pivotal connection with said base, and the lower end of the other frame member being shiftable along said base toward and away from said last-named pivotal connection for respectively effecting raising and lowering of said apex portion.

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2. A conveyer structure, comprising a base including parallel side members forming trackways, a vertically swingable boom pivotally mounted on said base, an A-frame including a pair of frame members pivotally connected at their upper ends to form an apex portion of said A-frame and supporting said boom at a distance from the boom pivot, said apex portion being shiftable along said boom, the lower end of one of said frame members being pivotally connected to said base side members on an axis parallel to the pivotal axis of the boom, a cross shaft at the lower end of the other frame member, rollers carried on said cross shaft and rollable along said trackways, means for moving said rollers along said trackways to vary the angle of said A-frame and thereby vary the elevation of the boom, a conveyer element movable along said boom, and driving means for said conveyer element.

3. A conveyer structure, comprising a base having a longitudinal trackway, a boom pivotally mounted on said base to swing in a vertical plane, an A-frame including a pair of frame members pivotally connected at their upper ends to form an apex portion of said A-frame and supporting said boom at a distance from the boom pivot, said apex portion being shiftable along said boom, the lower end of one of said frame members being pivotally connected to said base on an axis parallel to the pivotal axis of the boom, and the lower end of the other frame member being movable along said trackway, means for moving said last-named frame member along said trackway to vary the angle of said A-frame and thereby vary the elevation of the boom, a conveyer element movable along said boom, and driving means for said conveyer element.

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