April 2, 1940. R. B. GLIDDEN ET AL 2,195,567

ELEVATOR

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Fig. 5.

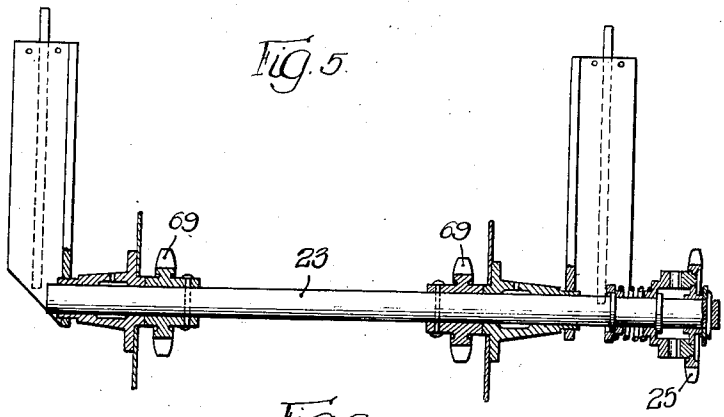


Fig. 7.

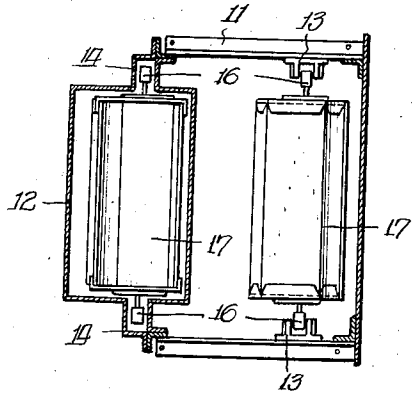


Fig. 1.

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Fig. 2

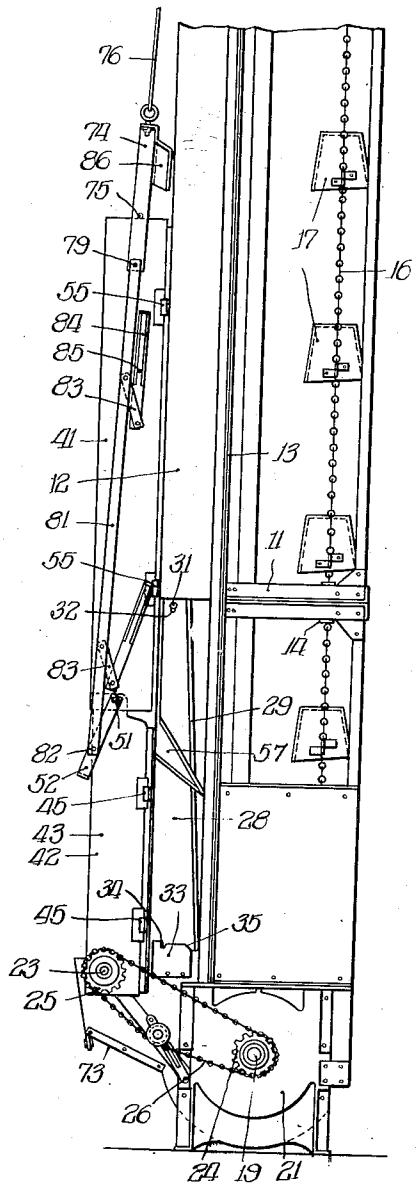


Fig. 3

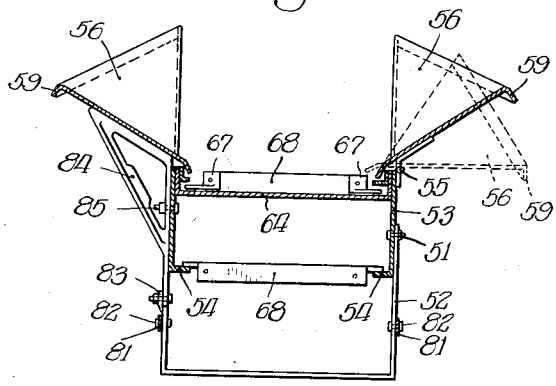


Fig. 4

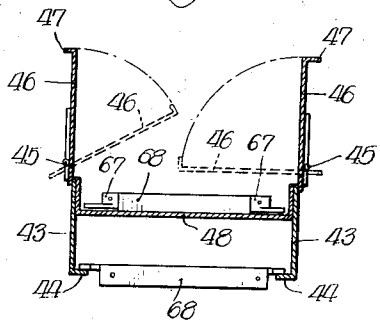
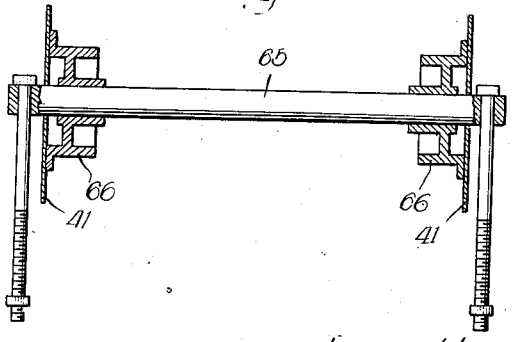


Fig. 6



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UNITED STATES PATENT OFFICE

2,195,567

ELEVATOR

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Application February 3, 1939, Serial No. 254,476

8 Claims. (Cl. 198—87)

The present invention relates to elevators and analogous or comparable structures, and concerns more particularly, but not necessarily restrictedly, that type of elevators for installation in granaries, corn-cribs, or storage-houses for the purpose of elevating corn, either on the ear or shelled, oats, wheat, beans or other grains or feeds from an unloading floor or driveway to a higher point where such material is discharged into a swiveling delivery-spout on the elevator-head and thence conveyed by gravity to bins, cribs, or other points as desired.

A leading object and purpose of the invention is to provide a structure of the specified character which is simple in construction, which is comparatively economical to manufacture, which is efficient in the performance of its functions, which is unlikely to become damaged or injured in ordinary service, and which more especially is foldable or collapsible to occupy but little space when not in use.

The invention concerns more prominently the means employed for permitting the cross-conveyor, which receives the grain or other material from a truck, to be folded up against the main upright conveyor including its casing or housing.

To enable those skilled in this art to understand the present invention, both from structural and functional standpoints, a present preferred embodiment thereof has been illustrated in the accompanying drawings, throughout the several views of which, for simplicity, like reference numerals have been employed to designate the same parts.

In these drawings:

Figure 1 is a side view of the elevator while it is in operative condition;

Figure 2 is a similar view with the elevator in folded or inoperative condition;

Figure 3 is a vertical cross-section on line 3—3 of Figure 1, on an enlarged scale;

Figure 4 is a vertical cross-section on line 4—4 of Figure 1, also on a larger scale;

Figure 5 is a cross-section showing the drive-shaft for the cross-conveyor;

Figure 6 is a horizontal section showing the cross-conveyor take-up shaft, and

Figure 7 is a horizontal section through the upright conveyor on line 7—7 of Figure 1.

Referring to these drawings, it will be perceived that the novel and improved elevator includes an upright conveyor or elevator having a metal framework 11 and a sheet-metal casing or housing 12 with internal, vertical guideways 13, 13 and 14, 14 for the ascending and descending lengths of a pair of chains 16, 16 equipped with suitable buckets 17, 17, such chains at the bottom of the structure passing around the usual, power-driven sprocket-wheels 18 on a shaft 19, the upper end of such elevator having a discharge or delivery head and spout, not shown, but which may be of the usual and common form.

The portion 21 of the frame and casing accommodating such shaft and sprocket-wheels is known in the trade as the boot or foot section.

Just above such boot, the frame, at its two sides, has forward extensions 22 having bearings for a shaft 23 driven from shaft 19 by means of external sprocket-wheels 24 and 25 and their companion sprocket-chain 26.

The lower front portion of the upright casing has an opening fitted with a cover-sheet 27 having side-walls 28 with marginal, outstanding flanges 29, such side-walls externally overlapping the side-walls of the main casing, as shown.

Such cover-sheet at its upper end is loosely hinged to both sides of the casing or housing by means of headed, outstanding pins 31 on the casing occupying upright slots 32 in the side-walls 28, whereby such cover-sheet may be rocked inwardly and outwardly and may be shifted bodily upwardly and downwardly in minor degree.

In order to maintain such cover-sheet in either one of two fixed positions, each outer face of the lower portion of the casing has a block 33 fixed thereto and having a notch 34 in its upper edge, such edge being also bevelled downwardly rearwardly at 35, whereby the lower end of the corresponding marginal flange 29 of the cover-sheet may occupy such notch to hold the cover-sheet in the extended position shown in Figure 1 or may bear on the part 35 to maintain the cover-sheet close against the casing, as presented in Figure 2.

As will be noticed, the cover-sheet 27 terminates short of its side-walls 26, 28 leaving an opening or port below it, the lower edge of sheet 27 having slots 36, 36 for a purpose hereinafter indicated.

The cross-conveyor which receives the grain to be elevated and which delivers it into the ascending buckets of the series comprises two parts, characterized as a whole, 41 and 42, respectively, the outer part 41 being substantially horizontal and resting on the floor when in operative position and the inner part 42 being upwardly rearwardly inclined so that no part of the boot and its mechanism need be below the floor level.

Such cross-conveyor section 42 includes a pair

of spaced-apart, sheet-metal side-walls 43, 43 (Figures 1 and 4) each with a bottom, inwardly-directed flange 44, such members being hinged at their inner ends on shaft 23, thereby allowing the upward swinging of the conveyor-member 42 around such shaft to swing it into inoperative vertical position as shown in Figure 2.

Each side-wall 43 has hinged thereto at 45, 45 an upper inwardly-foldable section 46 having a narrow top marginal flange 47, the slots 36, 36 accommodating the top portions of the parts 46, 46 when the elements are in the operative positions shown in Figure 1, thus precluding the inward swinging of the members 46, 46 as long as the cover-sheet occupies the depicted, cooperative relation.

In addition, the conveyor-member 42 has a metal-sheet 48 joining together the two side-walls 43, 43.

The outer end of conveyor-member 42 has a through-bolt 51 which hinges sections 42 and 43 together, such bolt also hinging a supporting leg-member 52 to the outer-section 41, the latter including spaced-apart, sheet-metal side-walls 53, 53 substantially like the other side-walls 43, 43 and having lower, marginal, inwardly-extended flanges 54, 54.

The top of each such side-wall 53 has hinged thereto at 55, 55 upwardly-flaring sides 56, 56 each with an integral triangular extension 57 strengthened by a bracket 58, both parts 56 and 57 having top marginal flanges 59 and 61, respectively.

The adjacent ends of the rockable walls 46, 46 have flanges 62, 62 which overlap the ends of the parts 57, 57.

Side plates 53, 53 are connected together by a plate 64 as shown in Figure 3 and near their outer ends, they support an adjustable take-up shaft 65 on which two rotatable rollers 66, 66 are mounted (Figures 1 and 6).

A pair of endless sprocket-chains 67, 67, equipped with spaced-apart flights 68, 68, extend around, and are driven by, a pair of sprocket-wheels 69, 69 (Figure 5) on shaft 23 and also pass around the two rollers 66, 66 (Figure 6) on shaft 65, the lower stretches of such chains riding on the flanges 44 and 54, while the upper stretches of the chains travel on the plates 43 and 64 and convey the material there along for delivery into the upright conveyor.

The lower stretches of these two drag-chains 67, 67 pass up over and are held up by guides 71, thus preventing their conflict with a flexible rubber grain-guard 72 bolted to the hopper 13.

The upper stretches of such pair of chains in order to achieve the proper change of direction as the chains leave the conveyor-section 41 and enter the correlated conveyor-section 42 pass under an appropriate guide 70 and then on to their driving sprocket-wheels.

At its extreme end, cross-conveyor section 41 has a bail 74 hinged on each side of it at 75, such bail, by means of a cord or cable 76 and a sheave 77 on the upstanding conveyor-casing over which the cable or cord passes, being connected to a counter-weight 78 which greatly facilitates the upward folding of the cross-conveyor when desired to get it out of the way.

Both sides of the cross-conveyor being alike, the lower end of each such bail-leg is hingedly connected at 79 to a bar 81 hinged at its other end at 82 to the leg-member 52, and, in addition, each such bar 81 by means of links 83, 83 is hinged to the lower ends of a pair of brackets 84, 84 hinged to the side-plate 53 at 85, 85, these brackets when in upright position, as shown in Figure 1, holding the sloping side-walls 56, 56 in position and against outward swinging.

Bail 74 at each side has a curved tongue or wing 86 to assist in bringing the side-wall sections 56, 56 up to operative positions from their rocked or lower inoperative positions.

The elevator is operated substantially as follows, assuming that shaft 19 is being rotated by any suitable source of power, such as an electric-motor, and that the two sets of conveyors, cross and erect, are in action.

The grain, such as ears of corn, dumped into the outer-section 41 of the cross-conveyor, as from a truck, is pushed along by the conveyor-flights into and up through the inner-section 42 into the hopper 73 through the opening in the cover-plate 27, and from the hopper the ears of corn fall into the buckets which carry them up and discharge them from the upper portion (not shown) of the elevator.

Assuming now, that the elevator is to go out of service, at least temporarily, the cross-conveyor would ordinarily be in the way, and it is desirable to move it into inoperative or unserviceable position or condition leaving the floor space which it would otherwise occupy free for other uses.

To accomplish this end, the cover 27, 28, 29 is lifted slightly to release the lower ends of its side-wall flanges 29, 29 from the retaining notches 34 and to free the movable side-walls 46, 46 from the notches or slots in the cover-sheet 27, and then the cover is swung inwardly until it engages the edges of the side-walls of the casing 12 in which position it will be held by reason of the bevels 35.

Thereafter, the side-walls 46, 46 are manually folded down inwardly on top of one another and then the whole cross-conveyor is manually swung up turning around shaft 23 on which its inner end is hung.

During such upward rocking, the bail swings away from the end of the cross-conveyor, thereby removing the tongues or wings 86, 86 from the path of opening turning of the side-walls 56, 56, and, due to the indicated operative connections between such bail and the brackets 84, 84, they too are swung into inoperative positions with the results that the two hinged side-walls swing down ultimately to lie flat against the front of the upright casing 12.

Also, during such upward travel of the parts, the two sections 41 and 42 of the cross-conveyor swing into alignment or register with one another, so that in its inoperative condition, the cross-conveyor and its parts occupy the position and relation clearly indicated in Figure 2, and they are releasably retained in this condition by the action of the counterweight 78.

When it is desired to restore the elevator to normal operative or functioning condition, the cross-conveyor is pulled down against the restraining action of the counterweight, and, when it reaches the floor all parts of the outer section 41 will have automatically assumed their operative condition, whereupon the sides 46, 46 are manually rocked up to vertical position in which relation they will be maintained when the cover-sheet is raised, swung outwardly, and then lowered into notches 34 by which time the slots in plate 27 will have received the upper portion of plates 46, 46 ready to hold them in such operative position.

The invention, as described above, has been set forth and defined in the appended claims and

the structure, herein described by way of example only, is subject to major and minor modifications without departure from the fundamental principles of the invention and without the loss or sacrifice of any of its material benefits and substantial advantages.

We claim:

1. In an elevator, the combination of an upright-conveyor including a travelling-conveyor structure, a cross-conveyor including a travelling conveyor structure adapted to receive material and to deliver it to the lower part of said upright-conveyor, said cross-conveyor including in combination a normally-inclined inner-section hinged to said upright-conveyor and an outer-section hinged to, and normally more nearly horizontal than, said inner-section, means to operate said conveyor structures, and means tending to counterbalance said cross-conveyor, whereby said cross-conveyor may be swung up into inoperative position to said upright conveyor with said inner and outer sections of said cross-conveyor substantially in alignment.

2. The elevator presented in claim 1 in which said upright-conveyor includes a casing having a front normally outwardly-sloping manually-shiftable portion which, when moved from its normal position, permits said upward swinging of said cross-conveyor to said aligned inoperative condition of its sections against the front of said casing.

3. The elevator presented in claim 1 in which said upright-conveyor includes a casing having a front normally outwardly-sloping manually-shiftable portion loosely hinged to the remainder of the casing and which, when moved from its normal position, permits said upright swinging of said cross-conveyor to said aligned inoperative condition of its sections against the front of said casing.

4. The elevator presented in claim 1 in which one of said cross-conveyor sections includes casing side-walls longitudinal portions of which are hinged to the remainder thereof allowing said hinged parts to be swung down inwardly to permit said cross-conveyor to be swung up into said inoperative position.

5. The elevator presented in claim 1 in which said inner cross-conveyor section includes casing side-walls longitudinal portions of which are hinged to the remainder thereof allowing said hinged parts to be swung down inwardly to permit said cross-conveyor to be swung up into said inoperative position.

6. The elevator presented in claim 1 in which one of said cross-conveyor sections has side-walls with the upper longitudinal portions thereof normally outwardly flaring and hinged to the remaining portions of said side-walls, in combination with means to rock said flaring portions outwardly automatically when such cross-conveyor is swung up into the stated inoperative position and to rock said flaring portions back to normal positions when said cross-conveyor is swung down into operative position.

7. The elevator set forth in claim 1 in which said cross-conveyor inner-section has side-walls the top longitudinal portions of which are hinged to their lower portions to permit such top portions to be swung downwardly inwardly, said upright-conveyor including a casing having a front normally outwardly-sloping manually-shiftable portion which, when moved from its normal position, permits said upward swinging of said cross-conveyor to said aligned inoperative condition of its sections against the front of said casing, said casing-portion when in normal position holding said hinged portions of said side-walls in operative position and against inward turning and when moved from said normal position freeing said hinged side-wall portions allowing their inward turning.

8. The elevator presented in claim 1 in which said cross-conveyor inner-section has side-walls the top longitudinal portions of which are hinged to their lower portions to permit such top portions to be swung downwardly inwardly, said upright-conveyor including a casing having a front normally outwardly-sloping manually-shiftable portion which, when moved from its normal position, permits said upward swinging of said cross-conveyor to said aligned inoperative condition of its sections against the front of said casing, said casing-portion when in normal position holding said hinged portions of said side-walls in operative position and against inward turning and when moved from said normal position freeing said hinged side-wall portions allowing their inward turning and in which said cross-conveyor outer-section has side-walls with the upper longitudinal portions thereof normally outwardly flaring and hinged to the remaining portions of said side-walls, in combination with means to rock said flaring portions outwardly automatically when such cross-conveyor is swung up into the stated inoperative position and to rock said flaring portions back to normal positions when said cross-conveyor is swung down into operative position.

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