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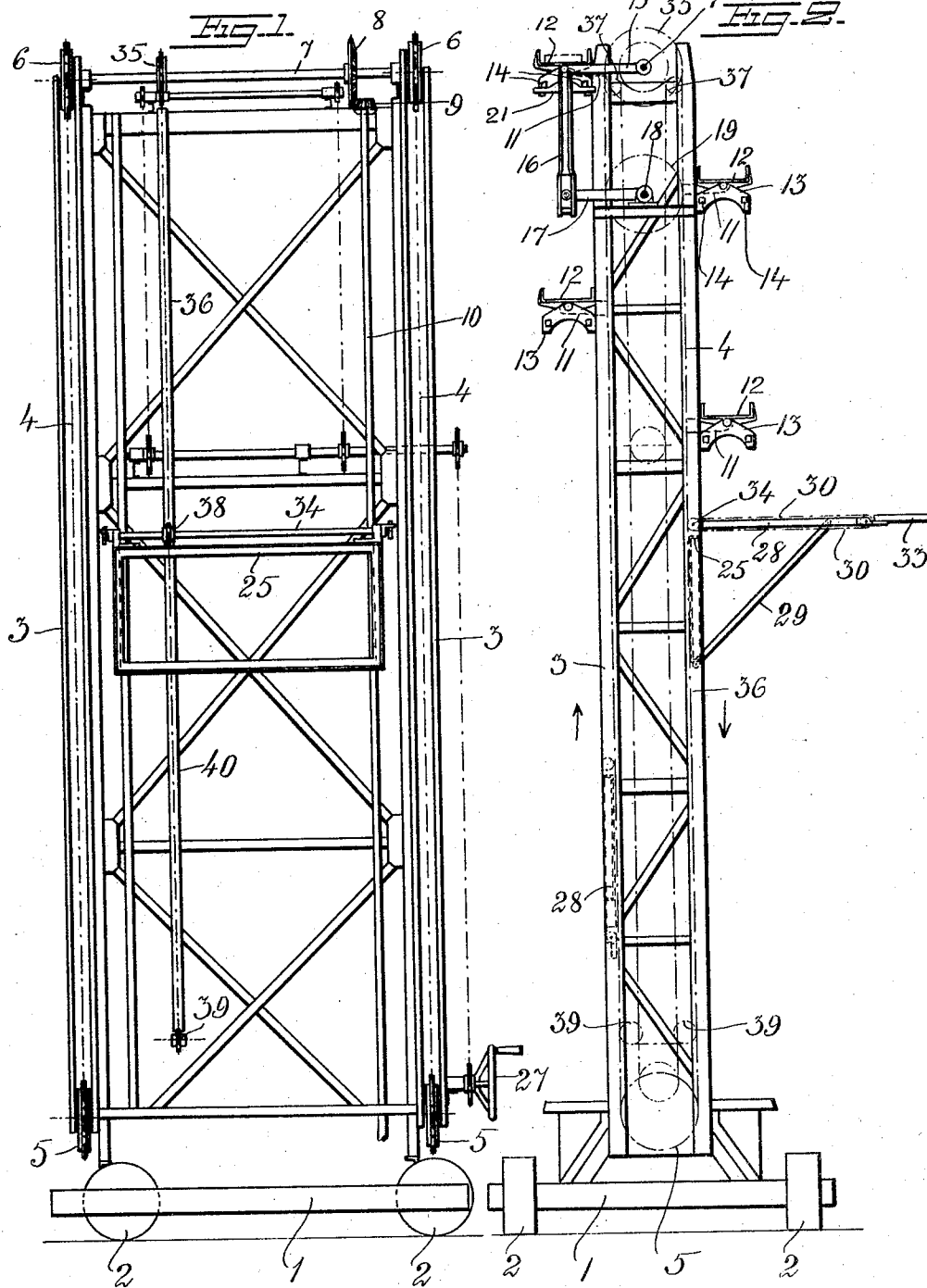
G. L. KJELLANDER

1,890,387

LUMBER ELEVATOR

Filed Aug. 11, 1930

3 Sheets-Sheet 1



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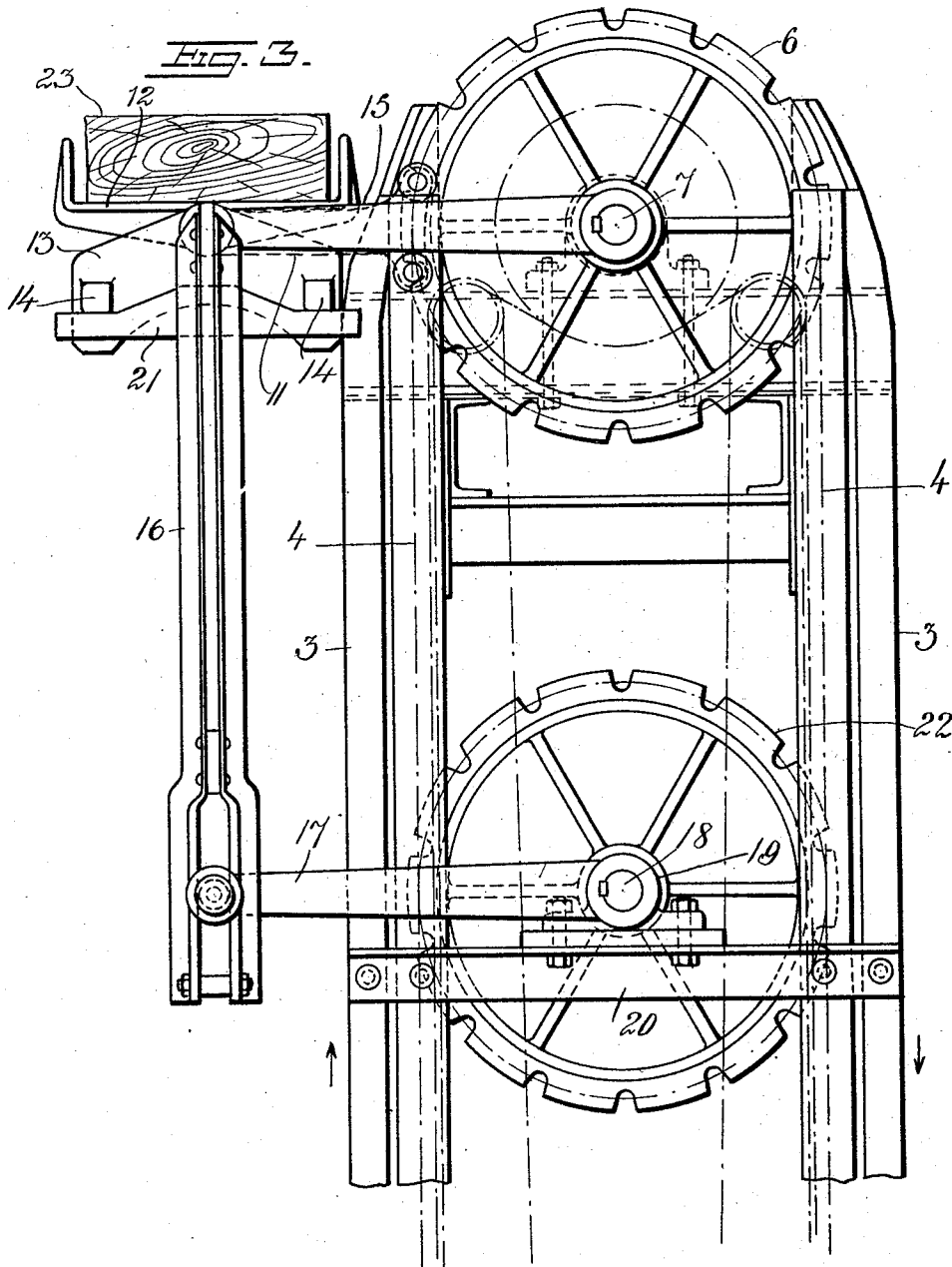
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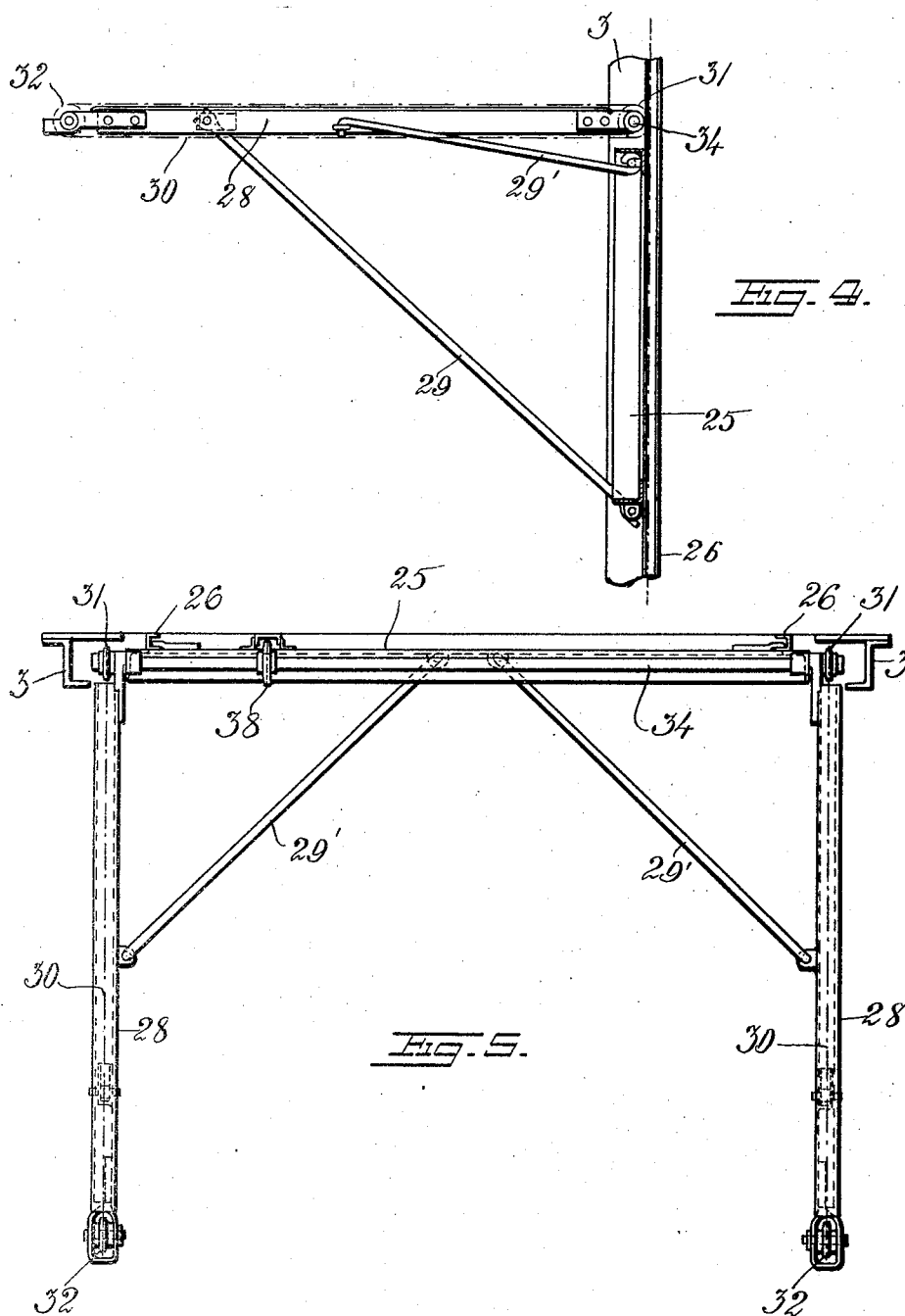
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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LUMBER ELEVATOR

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This invention relates to improvements in lumber elevators especially used in collecting lumber in piles. The invention relates more particularly to that kind of elevators which comprises two or more endless chains provided with carriers by which the lumber will be lifted at the upwardly moving side of the chains, moved around the upper end of the elevator and lowered at the downwardly moving side of the chains.

One object of the invention is to provide improved means to guide the carriers in their movement around the top of the elevator in order to allow them to maintain the lumber in its position relatively to the carriers.

One feature of the invention which has reference to this object involves the provision of a guiding arm carried by the shaft of the uppermost chain wheels of the elevator and connected by a link to a similar arm carried by a shaft which is parallel to said first-mentioned shaft and so positioned relatively thereto that said two arms and said link will form three sides of a linked parallelogram the fourth side of which is represented by the distance between the centres of said shafts, said parallelogram being provided with means to engage the carriers during their movement around the upper half of said uppermost chain wheels.

The invention is illustrated in the accompanying drawings in which,

Fig. 1 is a front elevation of an elevator according to the invention,

Fig. 2 is a side elevation of said elevator,

Fig. 3 is a side elevation of the uppermost portion of the elevator on a larger scale,

Fig. 4 is a side elevation of the conveyor on a larger scale,

Fig. 5 is a top plan view of said conveyor taken on the same scale as in Fig. 4.

With reference to the drawings, the numeral 1 indicates a carriage supported by wheels 2. Mounted on said carriage is an elevator comprising a frame work indicated as a whole by 3 and two endless chains 4, 4 each of which is carried by a lower chain wheel 5 and an upper chain wheel 6 mounted in said frame. The two upper chain wheels 6 are carried by a common shaft 7 which con-

stitutes the driving shaft of the chains. To this end the shaft 7 is connected by bevel gears 8, 9 to a vertical shaft 10 which is driven by a suitable power motor (not shown) provided on the carriage 1.

Each chain 4 is provided with a plurality of spaced members to carry or support the lumber to be lifted by the elevator. Each such members which may be termed carrier comprises an outwardly projecting arm 11 secured to the respective chain 4 in any appropriate way and a fork-shaped member 12 pivoted to said arm 11 and provided with a counterweight 13 preferably shaped as a downwardly opening fork. Thus, the members 12 will hang as pendulums and, consequently, they will tend always to maintain their upper side, which is adapted to support the lumber, in a horizontal position. The arms of the counterweights 13 are provided with abutments 14, 14. The members 12, 13 move with the chains 4 up along one side of the elevator and down along the opposite side, for instance, as indicated by arrows in Fig. 2. They are adapted to be held in correct position in their vertical movement by direct engagement with suitable parts of the frame, as will appear from Fig. 2. To hold the carriers in correct position during their movement over the upper chain wheels 6 the following arrangement is provided.

Attached to the common shaft 7 of said upper chain wheels 6 are two arms 15, one for each chain, though but one of them is shown in the drawings. Each arm 15 is connected by a link 16 to a similar arm 17 carried by a shaft 18 mounted in a bearing 19 which is carried by a transversely extending bar 20 of the frame 3. The shaft 18 is situated vertically below shaft 7 and parallel therewith. The connection between link 16 and arm 17 is adjustable so that the distance between the upper and lower connecting points of link 16 may be made exactly equal to the distance between the centres of the shafts 7 and 18. The link 16 carries near its top a transversely extending arm 21 which is adapted to cooperate with the abutments 14 in a manner to be hereinafter described.

As shown, the arms 15, 17 and the link 16

represent three sides of a linked parallelogram the fourth side of which is represented by the distance between the centres of the shafts 7 and 18. Thus, the link 16 will always hold a vertical position during the rotation of the arms 15 and 17 with their shafts 7 and 18 and, as a result, the arm 21 will always be horizontal in said movement. The shaft 18 is rotated synchronously with the shaft 7 by the respective chain 4 which drives a chain wheel 22 secured to the shaft 18 which is of the same diameter as the wheel 6.

In operation, assuming the chains 4 are moving in the direction indicated by the arrows in Figs. 2 and 3, that is to say, upwards on the left hand side and downwards on the right hand side of the elevator, as shown in said figures, the pieces of lumber to be lifted, as for instance, in order to be collected in a pile, are placed on the carriers 12 at said left hand side of the elevator and will be lifted by said carriers, as the chains move upwards. When a pair of carriers 12 with a piece of lumber 23, Fig. 3, resting thereon approaches the upper chain wheels 6 of the elevator the abutments 14 of the counterweights 13 will be engaged by the transverse arms 21 of the links 16 and caused to remain on a level with each other so that the upper side of the carriers 12 will positively remain in a horizontal position even after the members 12, 13 have come out of engagement with those parts of the frame 3 which guide said members 12, 13 during their vertical movement. The engagement between the bar 21 and the abutments 14 will continue during the movement of the members 12, 13 around the upper half of the chain wheels 6 and will cease when the members 12, 13 come into engagement with the stationary guiding members on the opposite side of the elevator.

On said opposite side of the elevator, that is to say, on the right hand side of the elevator, as illustrated in Figs. 2 and 3, the lumber is adapted to be removed from the carriers 12 and delivered to the pile. To this end a horizontal conveyor is provided which will now be described. A frame 25 is slidably mounted in vertical guide-ways 26 forming part of the elevator frame 3. Said frame 25 may be raised and lowered by suitable means controlled by the hand wheel 27. Pivottally connected to the frame 25 is a pair of arms 28 adapted normally to be held in a horizontal position by means of stays 29, 29' detachably connected to the arms 28 and detachably or pivottally connected to the frame 25 in order to allow the arms 28 to drop down into a vertical position, as shown in respect of the left hand side of the elevator, Fig. 2, a conveyor frame 25 of the kind described being provided at each side of the elevator.

The arms 28, when held in place by the stays 29, 29', form brackets to carry endless conveyor chains 30. Said chains 30 are

driven by chain wheels 31 at the inner end of the arms 28 and engage loose chain wheels 32 at the outer end of said arms, as shown in Figs. 4 and 5. The upper portions of said chains project slightly above the upper surfaces of the arms 28. In the extension of the arms 28 a table 33 may be provided to receive the lumber when delivered from the conveyor chains at the outer end of the arms 28. The driving chain wheels 31 are carried by a common driving shaft 34 mounted in the frame 25. Said driving shaft 34 is rotated from the driving shaft 7 of the elevator chains by means of a chain drive comprising a driving chain wheel 35 on shaft 7, a chain 36 held in engagement with the lower portion of the periphery of said wheel 35 by means of two chain guide pulleys 37, Fig. 2, and a driven chain wheel 38 on shaft 35. At the lower end of the elevator the chain 36 engages sprocket wheels 39. The chain 36 extends substantially along the entire height of frame 3 so that it may engage the wheel 38 irrespective of the vertical position of the conveyor frame 25. The direction of movement of the chain 36 is such as to cause the upper portion of the conveyor chains 30 to move outwardly away from the elevator frame. The vertical portions of the chain 36 are guided by suitable guide-ways 40, Fig. 1, in order always to maintain the chain in engagement with the driven wheel 38.

In operation, the lumber carried by the downwardly moving carriers 12 will be received by the outwardly moving upper portions of the conveyor chains 30 and moved away from the elevator and delivered to the table 33 from which the operators may take the lumber to carry it to its place on the pile. The conveyor situated on that side of the elevator, at which the elevator chains are for the time moving upwardly, should be dropped to vertical position, as shown to the left in Fig. 2 in order not to interfere with the upward movement of the lumber.

What I claim is:—

1. In a lumber elevator, in combination, an upright frame, upper and lower chain wheels mounted with their shafts in said frame, endless chains on said chain wheels, arms secured to said chains, carriers pivoted to said arms to carry the lumber up along one side of the elevator and down along the other side thereof, elongated members rigidly connected with said upper chain wheels, similar members carried by shafts parallel to said chain wheel shafts, links connected with said elongated members to form linked parallelograms, and means carried by said parallelograms adapted to engage said carriers to guide them during their movement around the upper half of said upper chain wheels.

2. In a lumber elevator, in combination, a carriage, an upright frame on said carriage, 12

upper and lower shafts rotatably journaled in said frame, chain wheels on said shafts, endless chains on said chain wheels, a motor operatively connected with one of said shafts to drive the same, arms secured to said chain, carriers pivoted to said arms to carry the lumber up along one side of the elevator and down along the opposite side, elongated members rigidly secured to the shaft of said upper chain wheels, at least one other shaft parallel to said chain wheel shafts, chain wheels equal in diameter to said upper chain wheels rigidly secured to said other shafts and engaged by said chain to be driven at the same rate as said upper chain wheels, elongated members on said other shaft, links pivotally connected with said members to form linked parallelograms, and means carried by said links adapted to engage said carriers to guide them in their movement around the upper half of said upper chain wheels.

3. In a lumber elevator, in combination, an upright frame, upper and lower chain wheels mounted with their shafts in said frame, endless chains on said chain wheels, arms secured to said chains, carriers pivoted to said arms to carry the lumber up along one side of the elevator and down along the opposite side, stationary guides secured to said frame adapted to guide said carriers during their vertical movement, cranks rigidly secured to said upper chain wheel shaft, similar cranks carried by at least one shaft parallel to said chain wheel shafts, links having a pivotal connection with said cranks to form at least one linked parallelogram, and means secured to said links adapted to engage said carriers to guide them in their movement around the upper half of said upper chain wheels.

4. In a lumber elevator, in combination, an upright frame, upper and lower chain wheels having their shafts rotatably journaled in said frame, endless chains on said chain wheels, projections secured to said chains, carriers hinged to said projections to carry the lumber up along one side of the elevator and down along the other side thereof, pins secured to said carriers, elongated members rigidly connected with said upper chain wheels, similar members carried by shafts journaled in said frame and parallel to said chain wheel shafts, links connected with said elongated members to form linked parallelograms having their corresponding elements parallel to each other, and transverse arms on said links, said transverse arms being placed in such a position as to engage said pins for guiding said carriers to a parallel movement around the upper half of said upper chain wheels.

5. In a lumber elevator, in combination, an upright frame, upper and lower chain wheels having their shafts journaled in said frame, endless chains on said chain wheels, arms secured to said chains, carriers pivoted to said

arms to carry the lumber up along one side of the elevator and down along the other side, elongated members rigidly connected with said upper chain wheels, said members being always parallel to each other, links rotatably journaled at their upper ends to said members, said links having fork-shaped lower ends, other elongated members carried by at least one shaft parallel to said chain wheel shafts, journals on said other members to engage the lower, fork-shaped ends of said links, said members and said links forming linked parallelograms, and means secured to said links in such a position as to engage said carriers to guide them positively during their movement around the upper half of said upper chain wheels.

6. In a lumber elevator, in combination, a carriage, an upright frame on said carriage, upper and lower shafts journaled in said frame, chain wheels on said shafts, endless chains on said chain wheels, a motor connected with one of said shafts to drive the same, projecting arms secured to said chains, carriers pivoted to said projecting arms to carry the lumber up along one side of the elevator and down along the opposite side thereof, counter-weights secured to the lower side of said carriers to hang down below said projecting arms, pins on said counter weights, guides secured to said frame in engagement with said carriers to guide them during their vertical movement, cranks rigidly secured to said upper chain wheels and parallel with each other, cranks of equal length carried by at least one shaft parallel to said chain wheel shafts, links pivotally connected with said cranks to form linked parallelograms, and transverse arms on said links, said transverse arms being placed in such positions as to engage said pins for guiding said carriers to a parallel movement around the upper half of said upper chain wheels, when said carriers are out of engagement with said guides.

7. In a lumber elevator, in combination, a carriage on wheels, an upright frame on said carriage, upper and lower and intermediate shafts journaled in said frame and parallel to each other, upper and lower and intermediate chain wheels of the same diameter on said shafts, endless chains on said chain wheels, a motor operatively connected with one of said shafts to drive the same, projecting arms secured to said chains, carriers pivoted to said projecting arms to carry the lumber up along one side of the elevator and down along the opposite side thereof, counter-weights secured to said carriers to hang down below the points of pivotal connection with said projecting arms, studs on said counter-weights, guides secured to said frame adapted to engage said carriers during their vertical movement only, upper cranks rigidly secured to said upper chain wheels and parallel to each other, other cranks of substantially

the same length secured to said intermediate chain wheels, links rotatably journalled at their upper ends to said upper cranks, fork-shaped lower ends on said links, journals on said other cranks to engage the lower, fork-shaped ends of said links, said cranks and said links forming linked parallelograms, and transverse arms on said links to engage said studs for guiding said carriers to a parallel movement around the upper half of said upper chain wheels, when said studs are out of engagement with said guides.

In testimony whereof I have signed my name.

GUSTAF LEONARD KJELLANDER.