FRANK HERBERT BROWN & FRED HAVEL BROWN.

ELEVATING APPARATUS.

APPLICATION FILED MAY 26, 1909.

1,095,077.

Patented Apr. 28, 1914.

5 SHEETS—SHEET 1.

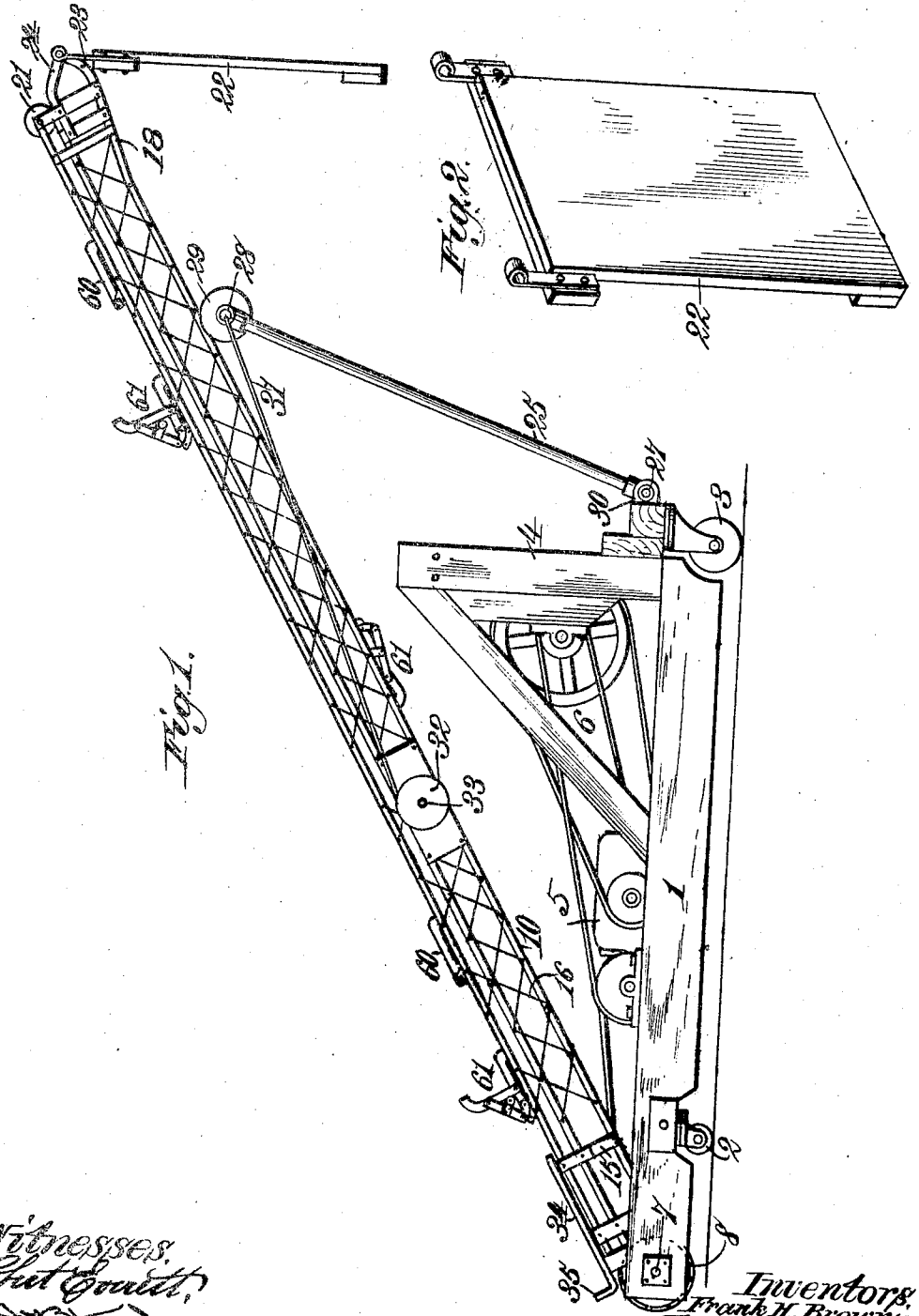


Fig. 1.

Fig. 2.

Witnesses.
Robt Gould.
[illegible]

Inventors.
Frank H. Brown.
Fred H. Brown.
By James L. Norris
Atty.

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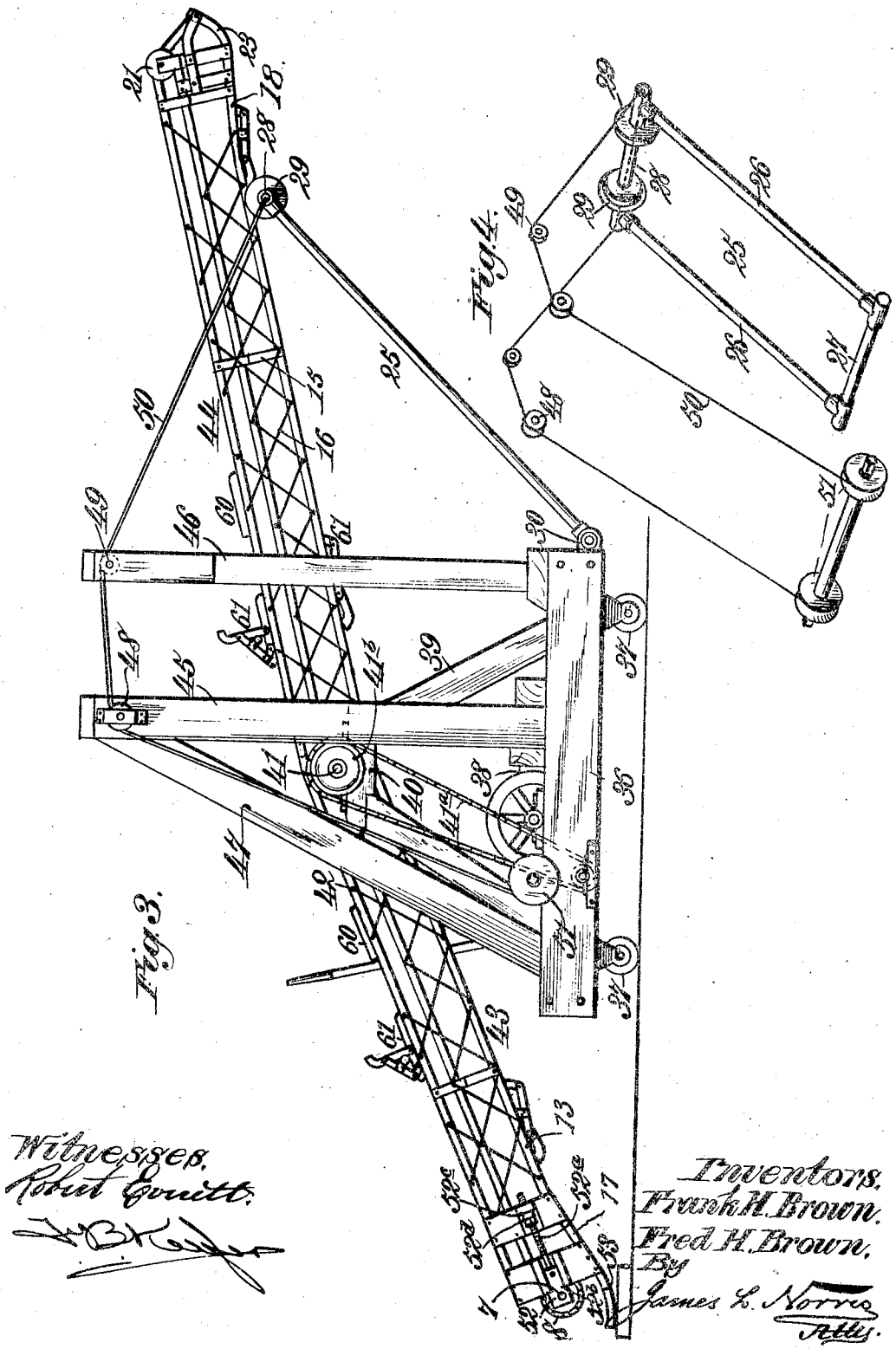


Fig. 3.

Fig. 4.

Witnesses.
Robert Gruitt.
W. B. Kelly

Inventors.
Frank H. Brown.
Fred H. Brown.
By
James L. Norris
Atty.

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Fig. 5.

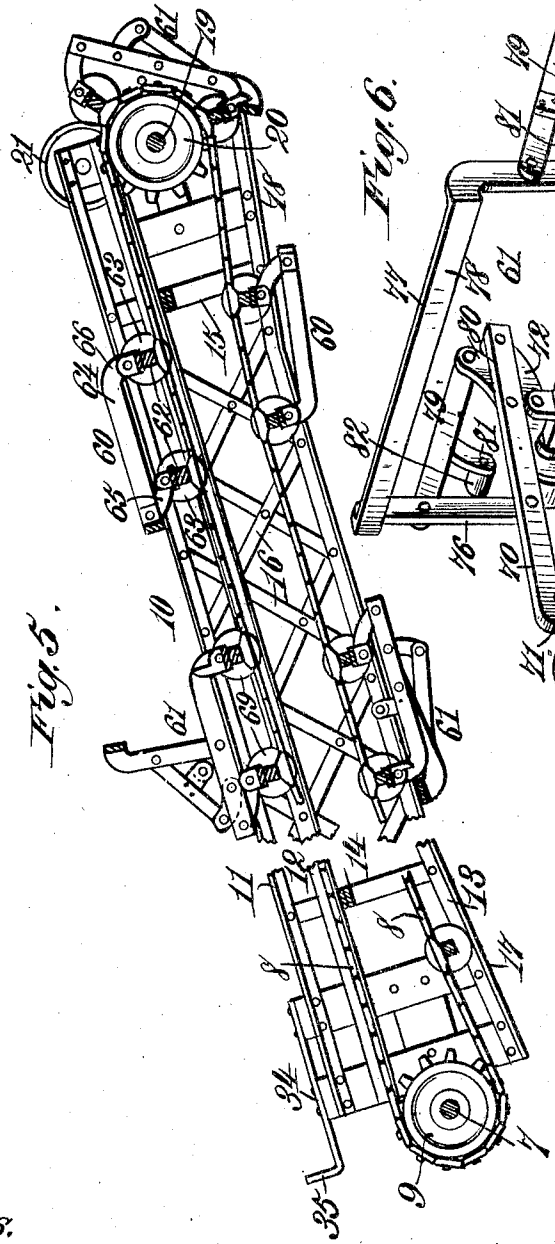
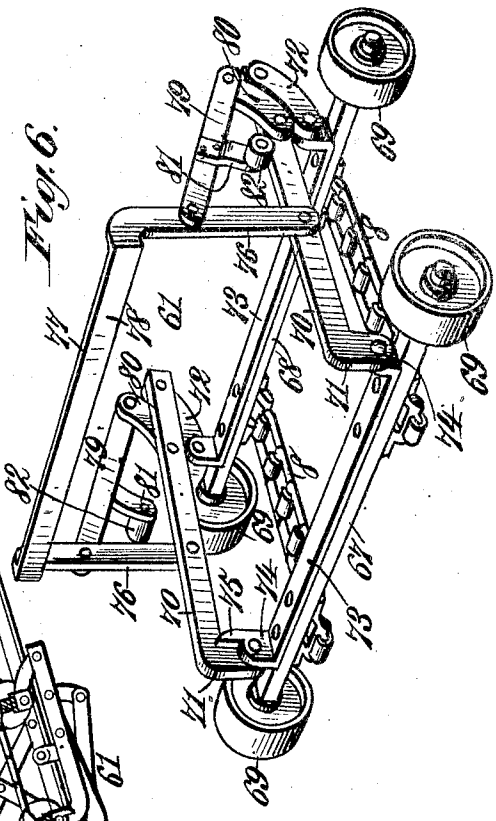


Fig. 6.



Witnesses.
Robt Everett.
H. B. Tedyn

Inventors.
Frank H. Brown.
Fred H. Brown.
By James L. Norris
Atty.

FRANK HERBERT BROWN & FRED HAVEL BROWN.

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5 SHEETS—SHEET 4.

Fig. 7.

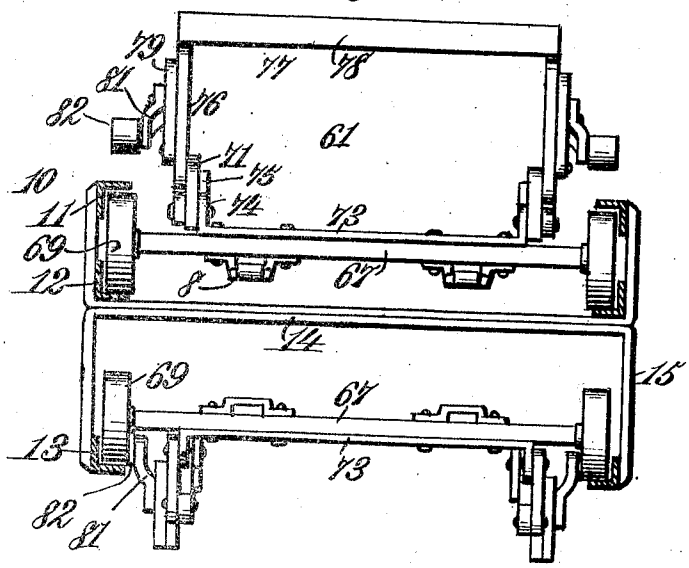
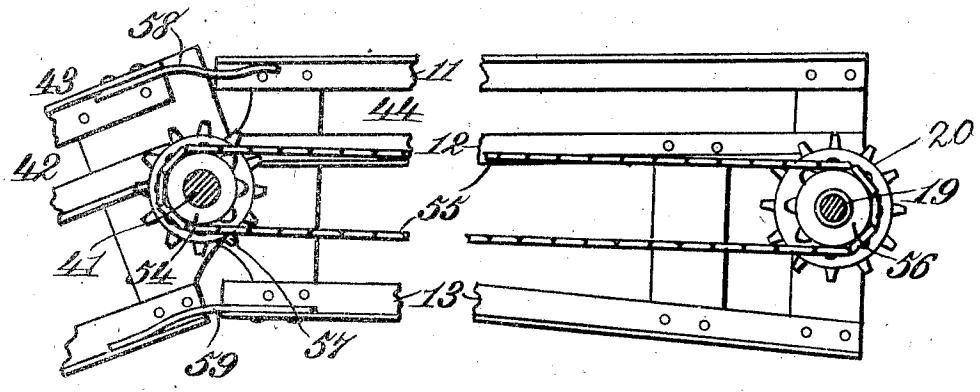


Fig. 8.



Witnesses.
Robert Everett.
H. B. Brady

Inventors.
Frank H. Brown.
Fred H. Brown.
By James L. Norris
Atty.

FRANK HERBERT BROWN & FRED HAVEL BROWN.

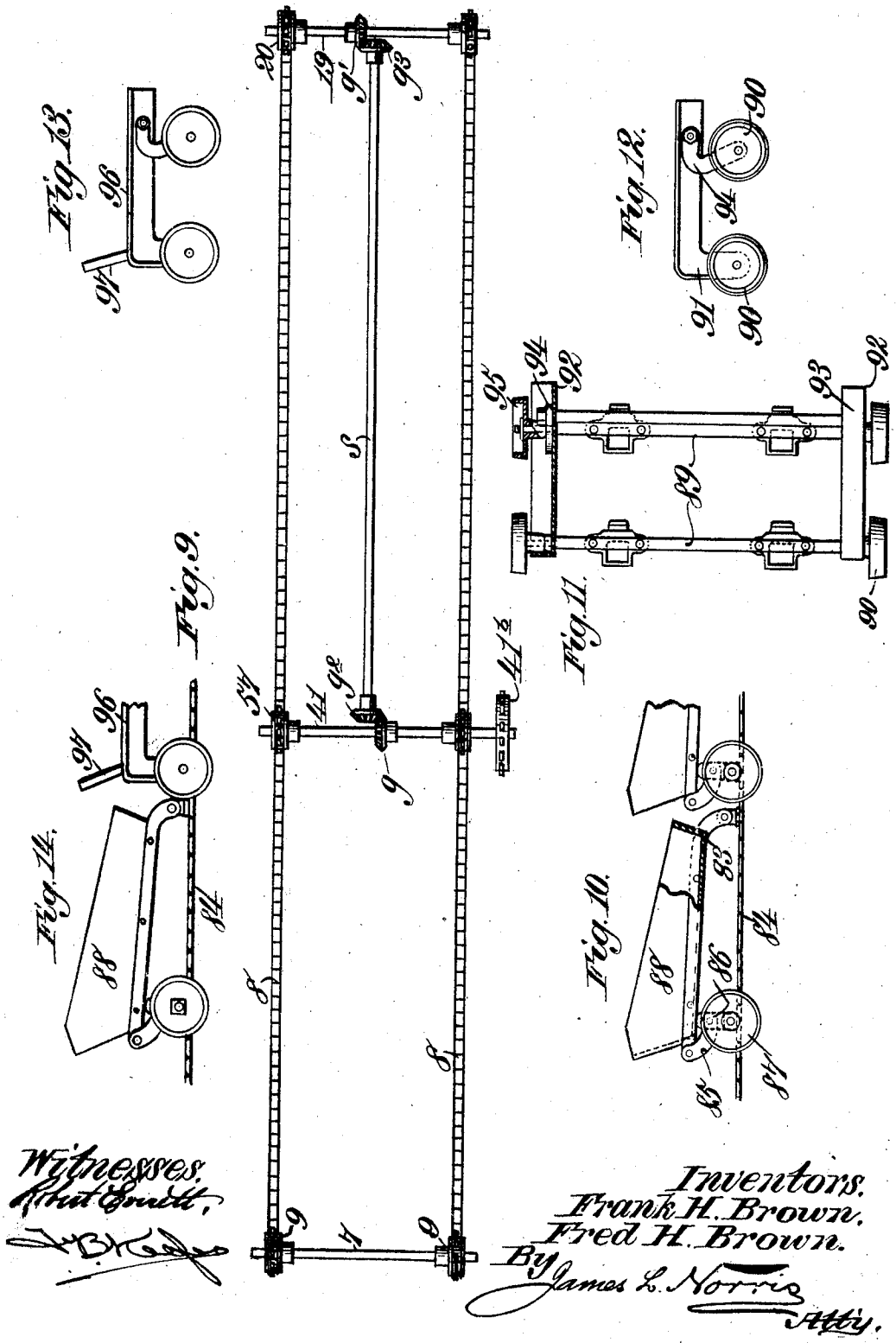
ELEVATING APPARATUS.

APPLICATION FILED MAY 26, 1909.

1,095,077.

Patented Apr. 28, 1914.

5 SHEETS—SHEET 5.



Witnesses.
Robt. Smith,
L. B. Keep

Inventors.
Frank H. Brown.
Fred H. Brown.
By James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

FRANK HERBERT BROWN AND FRED HAVEL BROWN, OF PORTLAND, OREGON.

ELEVATING APPARATUS.

1,095,077. Specification of Letters Patent. Patented Apr. 28, 1914.

Application filed May 26, 1909. Serial No. 498,455.

To all whom it may concern:

Be it known that we, FRANK H. BROWN and FRED H. BROWN, citizens of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented new and useful Improvements in Elevating Apparatus, of which the following is a specification.

This invention relates to ship unloaders of that type embodying an elevating frame adjustable to occupy different elevations and having cars or carriers movable thereover.

The elevating mechanism embodying the features of the invention has been particularly devised for unloading ships and water craft generally, but it is applicable to other uses, such, for instance, as raising dirt from cellars and loading the same on wagons or for piling bags, boxes or parcels in warehouses and may be fixed in one position or shifted from one position to another, as may be desired.

The elevating organization embodying the present features of the invention contemplates the provision of means for rendering the mechanism as a whole convenient in use in elevating sacks, barrels, boxes or any other material from one level to another and to reduce the labor usually involved in elevating operations of this character and also to insure a positive actuation of the several movable elements.

One of the essential features of the invention is an automatically folding and unfolding car or carrier intimately coöperating with the elevator frame and so constructed as to deliver a sack, bag, parcel or other device or material held thereby and to assume and operate as a self-loading means without requiring special attention of an operator or attendant.

Other incidental features of the invention will be hereinafter more fully specified and numerous advantages will also be explained in connection with the several structural features, and any reference hereinafter made to any particular construction will be understood as being a preferred selection of such structure, and the particular mechanisms that will be explained will be understood as being capable of modification within the scope of the invention.

In the drawings: Figure 1 is a side elevation of an unloading or elevating apparatus embodying the features of the invention. Fig. 2 is a detail perspective view of a chute board or guiding element which is applied to the delivery end of the elevating mechanism. Fig. 3 is a side elevation of an unloading or elevating apparatus showing a slight modification in the structure. Fig. 4 is a diagrammatic view in perspective illustrating the arrangement of the adjusting cable with relation to the controller and winding devices therefor. Fig. 5 is a longitudinal section through the elevating frame on an enlarged scale illustrating the operation of the cars or carriers, the elevating frame being broken. Fig. 6 is a detail perspective view of the folding car or carrier. Fig. 7 is a cross section through the delivery end of the elevating frame showing the car or carrier in duplicate and in two positions. Fig. 8 is a detail longitudinal section on an enlarged scale of a portion of the elevating frame shown by Fig. 3. Fig. 9 is a diagrammatic view showing a change in the driving mechanism for the carrier or conveying chains and for drawing the latter upwardly from the upper end of the elevating frame. Fig. 10 is a side elevation of a portion of a conveying means illustrating cars or carriers in the form of buckets for handling loose material, portions of the cars or carriers being broken away. Fig. 11 is a plan view, partially broken away, of another form of car or carrier. Fig. 12 is a side elevation of the car or carrier as shown by Fig. 11. Fig. 13 is a side elevation of a car or carrier showing a fixed back. Fig. 14 is a side elevation of a combination car or carrier of tandem form and illustrating a portion of the same adapted for carrying loose material and boxes, bags, packages and the like.

Similar characters of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates a base frame of any preferred dimensions and preferably rendered portable by the application thereto of rollers 2 and 3, the roller 3 as shown by Fig. 1, being in the position of a trailer and serving as a guiding caster wheel, the frame carrying a motor 5 of any suitable type. Rising from the base frame 1 is an upright frame 4 having thereon driving mechanism 6 which is belted or otherwise operatively connected to a shaft 7 carrying suitable means for actuating the conveying devices or endless chain belts 8 for the cars or

carriers which will be more fully hereinafter explained. As shown by Figs. 5 and 9, the conveying devices or endless chain belts 8 engage sprocket wheels 9 on the shaft 7 and are movable longitudinally in relation to an elevator frame 10 which may be continuous or rigid from end to end as shown by Fig. 1 or intermediately broken and hinged as shown by Figs. 3 and 8. The elevating frame is of open structure and comprises upper angular track rails or guides 11, intermediate bearing rails 12 in parallel relation to the rails or guides 11 and lower bearing rails 13, the several guides and rails being preferably constructed of angle iron of suitable dimensions, and the rails 12 and 13 having flange members thereof in horizontal position to form bottoms therefor and the guide rails 11 having horizontal flange members at their upper portions forming top guards. The elevating frame 10 is of rigid structure and connected at intervals by cross braces 14 intersecting vertical side ties or braces 15, and the side of each frame comprises a plurality of angularly intersecting strips 16 to provide a lattice work which adds materially to the strength of the frame and at the same time reduces its weight as will be obviously apparent. As shown by Fig. 1, the elevating frame 10 has its lower or foot extremity terminating adjacent to the shaft 7 or within the base frame 1 and at opposite ends the lower bearing rail 13 is deflected in a downward direction as at 17 and 18 to respectively accommodate the automatic closing and opening movements of the car or carrier, and to give ample clearance and practical operation to the car or elevator in passing around the driving elements or sprocket wheels at opposite extremities of the elevating frame for the endless chain belts 8. At the upper extremity of the elevating frame, as shown by Figs. 5, 8 and 9, a shaft 19 is mounted and carries sprocket wheels 20 over which the chain belts 8 are trained and have movement. The shaft 19 and sprocket wheels 20 are in such position at the upper end of the elevating frame that the several cars or carriers moving over or around the sprocket wheels 20 may clear the elevating frame, assume a proper load delivering angle, and fold sufficiently and properly prior to a return thereof in engagement with the lower bearing rails 13. The upper extremity of the elevating frame 10 is also provided with upper guiding rollers 21 which facilitate the release of the loads from the cars or carriers, and as shown by Fig. 1 a directing board or chute 22 may be attached to the upper extremity of the elevating frame for guiding the successive loads delivered over the upper extremity of said frame and for preventing the load from falling back under the elevating frame. As shown by Figs. 1 and 3, the upper downwardly deflected extremities 18 of the lower bearing rails 13 have curved extensions 23 coöperating therewith and projected upwardly beyond the upper delivery end of the elevating frame. These extensions 23 serve as auxiliaries in effecting the folding of the several cars or carriers and accurate guidance of the latter to the lower deflected extremities 18 of the bearing rails 13. In Fig. 5 these extensions 23 are omitted, and in some instances it may be considered unnecessary to use the same, as the several cars or carriers will accurately fold and come into proper relation and engage and move over the lower or bearing rails 13 without relying upon the extensions 23 to effect such coöperating relation of the cars or carriers and the lower rails. In other instances it will be preferred to use the extensions 23, and when they are employed they will be braced by tie strips 24 secured thereto and the sides of the elevating frame.

The apparatus as shown by Fig. 1 is provided with a strut 25 particularly shown in detail by Fig. 4 and consisting of tubular side members 26 and upper and lower tubular end members 27 and 28, the upper end member 28 serving as a supporting means or shaft for a pair of flanged rollers 29 which are held in engagement with the outer portions of the bottoms of the lower bearing rails 13. By preference the opposite ends of the upper end member 28 of the strut are fully open, and the lower end member 27 is hinged or fulcrumed as at 30 to the center of the adjacent end of the base frame 1 so that the said strut is free to swing and be adjusted to assume varying elevations or different angles with respect to the base frame. The flanged rollers 29 have their flanges projecting over the outer sides of the bearing rails 13 so as to clear the bottom of the elevating frame for the movement of the cars or carriers thereover, and the dimensions of the rollers 29 will be such as to leave ample space between the upper end member or shaft 28 on which the said rollers are mounted and the bottom of the elevating frame for unrestricted passage or movement of the cars or carriers between the bottom of the elevating frame and the upper end or shaft 28 of the strut.

The strut 25, as shown by Fig. 1, is adjustable to vary its angular position and modify the elevation of the frame 10 through the medium of a cable 31 which is threaded through the upper tubular end or shaft 28 and has its opposite extremity engaging winding drums 32 on opposite sides of the frame 10 and carried by a suitable shaft 33 which is disposed at such elevation in a transverse direction between the rails 12 and 13 as to avoid interfering with the

movement of the cars or carriers. By winding or unwinding the cable 31 the frame 10 may be elevated or depressed as may be desired and the said cable is free to slip through the upper end or shaft 28 of the strut, and by this means the slack will be taken up or equalized and the pulling strain and resistance to weight rendered uniform with respect to the opposite portions of the said cable.

The lower extremity of the elevating frame 10 is provided with upper guard rests 34 having lower angular terminals 35 projecting upwardly for the purpose of receiving boxes, bags, parcels or other devices desired to be elevated and to facilitate the self-loading operation of the cars or carriers which move therebetween. These guard rests 34 prevent the bags, boxes, parcels or other devices disposed thereon from falling into the frame 10 or interfering with the operation of the endless chain belts 8 and sprocket wheels 9.

In the form of the apparatus shown by Fig. 3 the base frame 36 is shorter than the frame 1 shown by Fig. 1, but has rollers 37 thereon to render the same portable. Carried by the base frame 36 is a motor 38 of any suitable type and rising from the said frame is a supporting means 39 for the elevating frame, the said means including upper horizontal supporting members 40 having suitable bearings for an intermediate drive shaft 41 extending transversely through the elevating frame 42 which in the present instance is composed of two sections 43 and 44 hinged by the shaft 41 adjacent to the supporting members 40. Rising from the base frame 36 are uprights 45 and 46 which are disposed on opposite sides of the elevating frame 42 and suitably braced, particularly the uprights 45 which have braces 47 extending from their upper extremities downwardly to the base frame 36. In the upper extremities of the uprights 45 and 46 guide sheaves or pulleys 48 and 49 are respectively mounted and thereover are trained the opposite portions of the strut operating cable 50, the strut in this instance as shown being precisely of the same structure as that disclosed in the organization shown by Fig. 1 and having the cable 50 movable through the upper tubular end or shaft 28. As in the construction shown by Fig. 1, the cable 50 is free to move through the upper tubular end or shaft 28 of the strut and the opposite portions of said cable after leaving the sheaves or pulleys 48 pass downwardly to and engage opposite portions of a winding drum 51 held on the base frame 36 and suitably driven from the motor 38, or the said winding drum may be manually operated if desired and which particular operation may at times be preferred. Aside from the sectional construction of the elevating frame 42, the general track organization thereof is similar to that shown by Figs. 1 and 5, and like reference numerals have been applied to corresponding parts, the track extensions 23 being used at the upper extremity of the frame, as shown, but the chute board is omitted in view of the fact that the latter device is so constructed that it may be applied or detached at will. Likewise the endless chain belts 8 and terminal sprockets and shafts are used in this modified form of the apparatus, the lower shaft 7 being held in adjustable bearing devices 52 to take up slack in the endless chain belts 8. The lower extremity of the section 43 of the elevating frame in this instance is projected beyond the adjacent end of the base frame 36 any suitable distance and the lower bearing rails 13 are continued from the downwardly deflected portion 17 thereof and curved to provide feet or terminal supports 53 adapted to bear upon the ground or other surface adjacent to a platform or other loading means. The drive shaft 41 is actuated by a chain belt 41^a engaging a sprocket 41^b and driven from the motor 38, the said shaft carrying a drive sprocket 54, see Fig. 8, within the elevating frame and over which is trained a chain belt 55 also surrounding a sprocket 56 on the shaft 19 at the upper extremity of the elevating frame and serving to actuate the said shaft 19 and the sprocket wheels 20 carried thereby and operating the chain belts 8. The chain belts 8 also move over intermediate guide sprocket wheels 57 on the shaft 41 outside of the sprocket 54, and by this arrangement the section 44 may be adjusted to varying elevations and be caused to assume different angles with relation to the section 43 without interfering with the operation of the chain belts 8 which form the essential conveying elements of the apparatus. In adjusting the section 44 the strut 25 is moved by the cable 50, and in view of the particular arrangement of the cable on the uprights 45 and 46 an advantageous leverage results which will facilitate the actuation of the strut and the elevation and depression of the section 44, the cable 50 in this instance also having the strain or weight tension imposed uniformly thereon in view of its capability of moving through the upper tubular end or shaft 28.

To assist in the smooth running or travel of the cars or carriers over the separated extremities of the rails at the joint between the sections 43 and 44 of the elevating frame 42, yielding closing means or spring bridges 58 and 59 are applied to the terminals of the upper and lower rails, as shown by Fig. 7, and having reversely secured extremities, the bridges 58 being secured positively to the guide rails 11 of the section 43 and loosely extending over the continuation of

said rails of the section 44, and the bridges 59 are positively secured to the lower bearing rails 13 of the section 44 and loosely extend over corresponding rails of the section 43 so as to accommodate the direction of movement of the cars or carriers in traversing the said rails.

As an obvious modification of the sprocket and chain driving mechanism in operative association with the shafts 41 and 19 as just explained, the said shafts may be respectively provided with bevel gears g and g^1 between the sprocket wheels thereon, and engaged by bevel pinions g^2 and g^3 on the opposite ends of a power transmitting shaft s suitably held within the upper section 44 of the elevating frame, as shown by Fig. 9. By this means the same result will be obtained as by the use of the chain belt 55 and sprockets 54 and 56, and this dual showing is to indicate that various mechanisms may be employed for the purpose of transmitting motion from the shaft 41 to the shaft 19 when a sectional frame structure is adopted similar to that shown by Figs. 3 and 8.

In the organization shown by Fig. 3, the bearing devices or boxes 52 for the lower shaft 7 are exteriorly adjustable through the medium of longitudinal adjusting screw rods 52^a to take up slack in the chain belts or endless conveyers 8. This capability of exteriorly adjusting the bearing devices is a very essential feature of the form of the apparatus shown by Fig. 3 in that the screw rods 52^a may be readily reached, and, further, the inner part of the frame is clearer for the operation of the chain belts 8 and cars than would be the case if this adjusting means was located within the frame. The adjusting screw rods 52^a each engages a slide 52^b connected to each bearing 52 and at its rear extremity engages a boss or seat 52^c, wrench engaging devices 52^d being provided for operating and locking the screw rod.

The top rails, and also at times the other rails of the frame, as shown by Fig. 3, assist in a way as tightening means for the chain belts 8, and, further, the chain belts are always the same length, no matter at what angle the sections 43 may be adjusted.

The car or carrier forming a part of the elevating apparatus is similar in both forms of said apparatus as shown by Figs. 1 and 8. Each car or carrier comprises essentially an advance load bearing pilot 60 and a self-loading trailer 61, the pilot and trailer always remaining in the same spaced relation and both positively connected to the endless conveying means or chain belts 8. In some instances the trailer 61 may be used alone as the car or carrier, particularly when elevating boxes and parcels or devices that will have ample room thereon or be suitably supported thereby. The trailer or self-loading element of the car or carrier is the essential feature of this particular portion of the elevating apparatus, and while a preferred form of the load bearing pilot 60 is shown, it will be understood that it may be modified at will without detracting from the efficiency or requiring a corresponding modification of the trailer or self-loading element 61. The pilot 60 comprises shafts 62 having rollers 63 on opposite ends which are held between the rails 11 and 12 and are adapted to engage the rails 13 in positions reverse to that when in engagement with the rails 11 and 12. The axles or shafts 62 have the chain belts 8 connected thereto and are in the form of supporting axles to which an open bed frame 64 is terminally connected through the medium of rear links 65 movably attached to the rear axle and rear extremity of the frame and by curved extensions 66 also movably connected to the front axle, as clearly shown by Fig. 5.

The trailer or self-loading element 61, as clearly shown by Fig. 6, comprises a pair of shafts or axles 67 and 68 having rollers 69 on their opposite ends to engage the rails 11, 12 and 13. The bed of the trailer consists of a pair of side bars 70 deflected downwardly at their forward extremities as at 71 and pivotally connected to the front axle 67 through particular means which will be presently set forth. The rear extremities of the side bars 70 project over the rear axle 68 and are movably attached to the latter through the medium of connecting links 72. On each axle 67 and 68 a frame attaching member 73 having upstanding angular terminals 74 to which the ends 71 and links 72 are pivotally attached is provided, but it will be understood that this is but one convenient means of connecting the frame of the trailer to the axles and that other analogous devices might be used. The angular terminals 74 of the front attaching member 73 are provided with integral catch projections 75 which cooperate with a portion of the trailer or self-loading element, as will be hereinafter explained. To the outer sides of the bars 70 the opposite end arms 76 of a folding back 77 are movably connected, the end arms 76 being continuous with a cross support 78. Attached to the outer sides of the end arms 76 are operating levers 79, the said levers having their rear ends movably connected to the bars 70 in rear of the points of attachment of the arms 76 by angularly disposed links 80. Depending from or connected to intermediate portions of the levers 79 are hangers or supports 81, the latter being rigid with relation to the levers 79 and normally at right angles to the latter and at their free extremities carry rollers 82, one on each,

which stand outwardly in planes at right angles to the said hangers or supports 81 and serve as means for maintaining the back 77 in folded condition while the car or carrier trailer is moving over the lower track rail 13. The rollers 82, by engagement with the extensions 23 when the latter are employed, also insure a complete fold of the back 77 prior to the movement of the trailer beneath the upper sprocket wheel of the elevating frame and a continuation of the complete folded condition of the trailer when traveling over the downward angularly deflected upper extremities 18 of the track rails 13. The rollers 82 coöperating with the hangers or supports 81 also serve to release the back 77 at the lower extremity of the elevating frame so that said back may assume a normal position automatically by gravitation and be in readiness to engage the load disposed over the said lower extremity of the frame. The chain belts 8 are attached to the axles 67 and 68, as shown by Fig. 6, the same means of attachment with respect to the axle 62 of the pilot being employed.

The car or carrier in moving upwardly over the upper portion of the elevating frame is in the position shown by Fig. 5, and both the pilot and trailer are free to have a slight tilting action within a limited degree, but are restrained from tilting to such extent as to fracture or break the chain belts 8 by the guide rails 11 against which the rollers on the advance axles of the pilot and trailer have antifrictional contact or bearing. This tilting movement of the parts of the car or carrier may ensue for a shifting movement of the load thereon, and by reason of the restraint just explained the load will be maintained in proper supported relation to the parts of the car or carrier without liability of disengagement. When the car or carrier arrives at the upper or delivery end of the elevating frame the pilot will pass around the upper sprocket wheels 20 and assume a proper position or the axles will be caused to travel in radial relation to the said sprocket wheels and the rollers 63 will successively pass out from between the rails 11 and 12 and engage the lower bearing rails 13, and the bed frame 64 will then depend from the axles. In this movement the pilot passes from under the load or the device elevated by the car or carrier and the load is completely cleared when the trailer 61 arrives at the turning point over the sprocket wheels 20, the guide wheels or rollers 21 then coming into play to facilitate the release of the load, and the latter may then fall over the chute board 22, as heretofore intimated, when said chute board is used. As the trailer 61 moves over the upper extremity of the elevating frame and subsequent to the liberation of the load therefrom, the rollers 69 clear the upper track rails 11 and 12 and the back 78 by gravitation falls from its erect position and is caught by the projections 75 which are then so turned as to engage the rear of the cross support 78, the back and the coöperating parts including the lever 79 and hangers or supports 81 and rollers 82 being then drawn inwardly close to the side bars 70 so that the said rollers 82 will either engage the curved extensions 23 when the latter are used, or the terminals of the downwardly deflected extremities 18 of the lower bearing rails 13 and thereby hold the trailer element or load supporting means in folded condition while moving downwardly over the rails 13. When the folded trailer is traveling over the lower bearing rails 13, the bars 70 and parts carried thereby will depend below the elevating frame with the axles 67 and 68 in normal position and the rollers 69 in engagement with the said rails. When the axle 67 assumes its normal position the cross support 78 of the back will be released from the projections 75, but the rollers 82 will then be in engagement with the rails 13 and hold the back in folded condition and prevent it from falling or depending to such extent as to interfere with the parts of the apparatus over which the cars or carriers travel when in engagement with the lower bearing rails 13. As soon as the rollers 82 become disengaged from the lower angularly deflected extremities of the rails 13, the back will be free to assume its normal position and by gravity will straighten out gradually as the trailer moves over the sprocket wheels 9 in an upward direction, and when the load is reached or the bag, parcel or other device which may be held in loading position on the guards 34 it will be dragged upwardly by the back and properly disposed on the complete car or carrier, the pilot 60 moving under the supported load and in position to take its part of the load when the back of the trailer comes into engagement with the object or material to be elevated.

Figs. 10, 11, 12, 13 and 14 show modified forms of the car or carrier adapted to be used with either of the preceding forms of conveying apparatus. The purpose in illustrating these various forms of carriers is to indicate that the conveying apparatus is not limited in its use to any specific form of carrier and also to illustrate that the apparatus as a whole is adapted for conveying boxes, bags, packages and loose material, such as sand, gravel, coal and soil. In the construction of car or carrier shown by Fig. 10, the frame 83 is projected downwardly at its forward extremities and connected to the conveying means 84 which will be in all respects similar to that used in the apparatus shown by Figs. 1, 3, 5 and 9. The rear of

the frame 83 is connected by means of links 85 attached to uprights 86 also secured directly to the conveying means 84, the links being movably attached to the rear extremities of the frame and the front extremities of the frame also movably secured to the conveying means so that each car or carrier in turning the upper extremity of the apparatus will assume a proper angle as explained in connection with the form of apparatus illustrated by Figs. 5 and 6. The form of car shown by Fig. 10 will also have drag wheels 87 similar to those illustrated in connection with the preceding forms of cars or carriers and engage the frame of the apparatus. On the frame 83 a sheet metal bucket 88 is secured and held in place by suitable fastenings, said bucket sloping toward its forward extremity. The cars or carriers as shown by Fig. 10 are closely arranged on the conveying means so that the rear high extremity of one will stand adjacent to the front vertically reduced extremity of another, and in the event of any of the contents of one car or carrier in advance of the other spilling while ascending the inclined frame of the apparatus such material that escapes from one car will be caught by the next succeeding car. This form of car or carrier is very advantageous in elevating loose material, such as sand, gravel, coal or soil. In the form of car or carrier shown by Figs. 11 and 12 the axles 89 of the wheels 90 are connected to the chain belts or conveying means as in the form of car or carrier shown by Fig. 6 and rising from the one axle is the angular extremity 91 of a side member 92 which is preferably formed of stiff sheet metal bent to provide a top rest 93, the two top rests serving as means for supporting boxes, bags or packages. The forward extremities of the side members 92 have bent links 94 movably connected thereto and to the remaining axle 89, the extremity 91 also being movably secured to its axle so that this form of car or carrier will regularly turn over the upper extremity of the conveying apparatus as in the form of car or carrier illustrated by Figs. 5 and 6. The wheels 87 and 90 are so constructed as to cover the ends of the axles or made hollow as at 95, see Fig. 11, and by this means grit or other material that may fall from the cars or carriers is prevented from lodging on the axle extremities and the latter are also prevented from contacting with the sides of the elevating frame so as to avoid the least obstruction in the movement of the cars or carriers. In the form of car or carrier shown by Fig. 13, the frame 96 has a rigid back 97 rising therefrom in contradistinction to the movable back as shown by Fig. 6. This back 97 does not extend far enough above the frame 96 to interfere with the return movement of the cars under the frame of the conveying apparatus, but the frame 96 is in this instance movably connected to the wheel axles so that the car or carrier will turn the upper extremity of the apparatus with ease and facility or without obstructing the operation of the mechanism.

Fig. 14 illustrates a combination tandem car or carrier embodying structures heretofore described and whereby each complete car or carrier may operate to elevate a box, bag, package or the like and loose material, and this illustration is intended to indicate that the carriers are not limited in their service exclusively to the elevation of bags, boxes or packages or loose material, but that both may be elevated simultaneously by a carrier of the form shown by Fig. 14 and which may be required in certain loading and unloading operations.

The elevating apparatus, as hereinbefore explained, may be used for any purpose, and it is intended to employ therewith horizontal conveying means especially in unloading ships and the same structure of cars or carriers may be employed on the horizontal conveying means as explained in connection with the elevating frame shown in the accompanying drawings. This arrangement will be particularly advantageous in unloading ships or in conveying boxes, bags, packages or any other object from a distant point adjacent to a device to be loaded thereby.

It will be understood that changes in the proportions, dimensions and minor details may be resorted to without departing from the spirit of the invention.

Having thus described the invention, what is claimed as new, is:

1. In an apparatus of the class specified, the combination with an elevating frame having tracks and conveying devices, of an automatically folding and unfolding carrier connected to said conveying devices and having wheels to travel on the tracks and also including a folding and unfolding back.

2. In an apparatus of the class specified, the combination of an inclined elevating frame with tracks and also having conveying devices between the tracks, and a folding and unfolding carrier composed of jointed parts including a folding and unfolding back and connected to said devices and automatically collapsing when moving around the delivery extremity of the frame and automatically assuming a normal position when passing around the receptive end of said frame, the carrier having wheels to engage the tracks.

3. In an apparatus of the class specified, the combination of an inclined elevating frame having conveying devices movable thereover and upper and lower track rails, an automatically folding and unfolding carrier having wheels and connected to said

conveying devices and assuming a normal load carrying position when moving over the upper part of the frame, and maintained in a collapsed condition when traveling over the lower portion of the frame by the wheels engaging the lower track.

4. In an apparatus of the class specified, the combination of an inclined elevating frame having conveying means and upper and lower tracks, and a carrier connected to the conveying means and comprising a pilot and a trailer spaced from the pilot and having a normally elevated folding back means and wheels to engage the upper and lower tracks, the folding back having the attaching means therefor below the upper portion of said back when the latter is elevated so as to provide a positive engagement of the back with the devices to be elevated by the conveying means, the wheels holding the trailer folded when engaging the lower track, and the trailer and pilot spaced to permit them to pass around the upper and lower ends of the frame.

5. In an apparatus of the class specified, the combination of an inclined elevating frame having conveying means and upper and lower tracks and a carrier connected to the conveying means and comprising a trailer and a pilot in advance of the trailer to unitedly support the load, the trailer having an automatically folding back means, the folding back having the attaching means therefor below the upper portion of said back when the latter is elevated so as to provide a positive engagement of the back with the devices to be elevated by the conveying means, both the pilot and trailer having wheels to engage the upper and lower tracks, and the pilot and trailer spaced to pass around the upper and lower ends of the frame.

6. In an apparatus of the class specified, the combination of an inclined elevating frame having conveying means and tracks, and a carrier comprising a wheeled trailer with an automatically folding and unfolding back means and a wheeled pilot in advance of the said trailer, the trailer and pilot conjointly supporting the load and moving uniformly and spaced to pass over the opposite ends of the frame.

7. In an apparatus of the class specified, the combination of an inclined elevating frame having conveying means and upper and lower track rails, and an automatically folding and unfolding carrier composed of jointed parts and provided with means for engaging the lower track rails for maintaining the parts in folded condition and also serving to release the said parts at the lower load-receiving end of the frame and permitting the carrier to assume a normal position as it turns the lower end of the frame.

8. In an apparatus of the class specified, the combination of an inclined elevating frame, having conveying devices and upper and lower track rails, and a carrier connected to the conveying devices and provided with rollers to engage the track rails, the lower part of the track rails restricting the tilting movement of the carrier when the rollers are in engagement therewith.

9. In an apparatus of the class specified, the combination with an elevating frame having conveying means, of upper guard and track rails and lower track rails with downwardly deflected extremities, and a carrier having rollers movable on the track rails and comprising foldable parts and means for maintaining the parts in folded condition when the carrier is moving over the lower track rails.

10. In an apparatus of the class specified, the combination with an elevating frame having conveying means and track rails, of curved extensions at the upper extremities of the lower track rails, and a carrier connected to the conveying means and having rollers engaging the track rails and comprising automatically foldable and unfoldable parts including movable devices to engage the said extensions and lower track rails to hold the parts in folded condition and also serving as a liberating means for the said parts when disengaged from the lower track rails.

11. In an apparatus of the class specified, the combination with an elevating frame having conveying means and track rails, of a carrier comprising axles with rollers thereon to engage the track rails, side bars movably connected to the axles, a back movably attached to the side bars, levers connected to the side bars and back and carrying rollers, and catch projections carried by the advance axle to engage a portion of the back.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

FRANK HERBERT BROWN.
FRED HAVEL BROWN.

Witnesses:
R. E. MENEFEE,
CORA J. ANDERSON.