No. 859,588. PATENTED JULY 9, 1907.

S. STEPANIAN.

ELEVATOR AND CONVEYER.

APPLICATION FILED SEPT. 9, 1904. RENEWED OCT. 13, 1906.

3 SHEETS—SHEET 1.

Fig. 1.

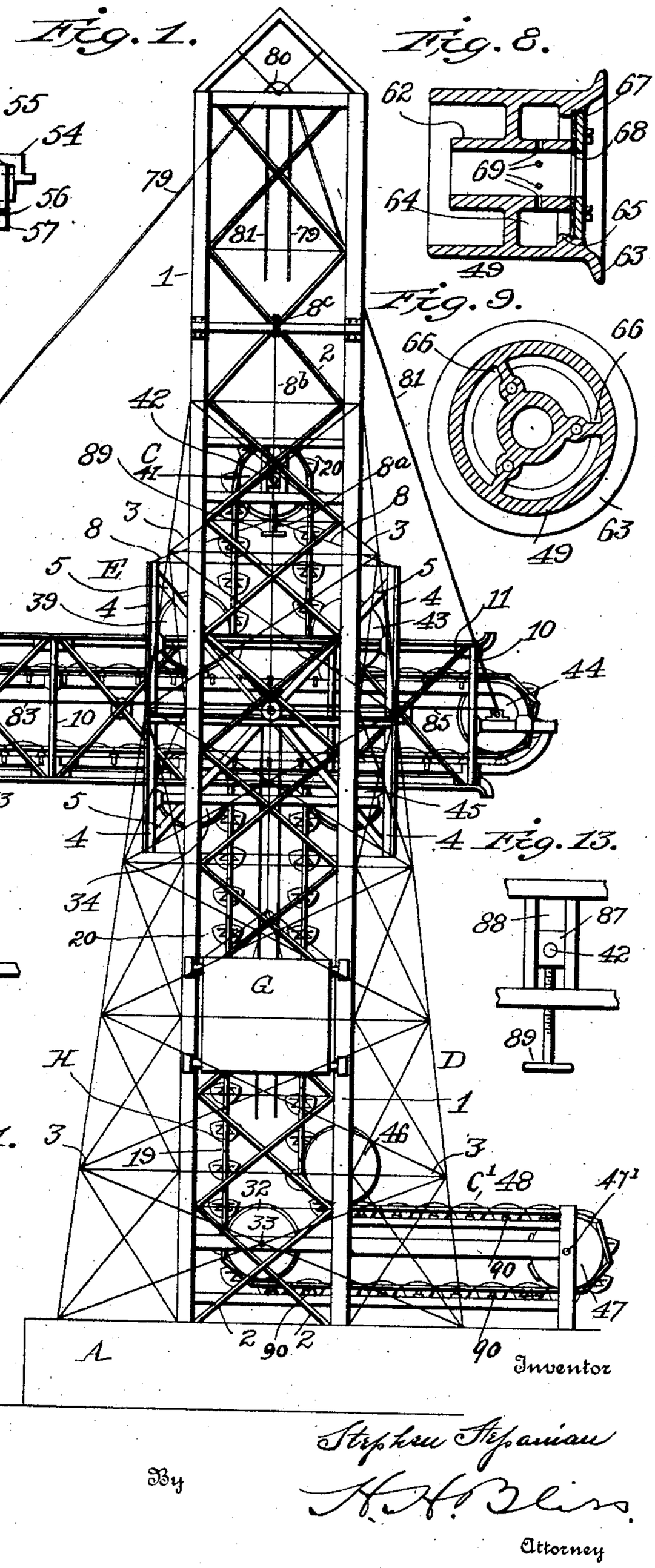


Fig. 7.

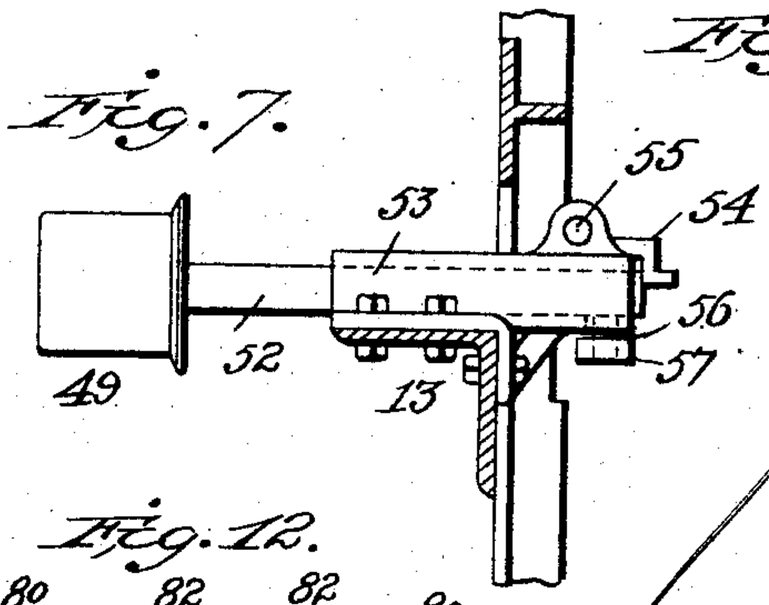


Fig. 8.

Fig. 9.

Fig. 12.

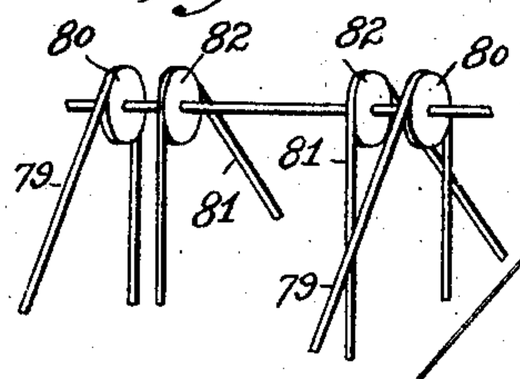


Fig. 10.

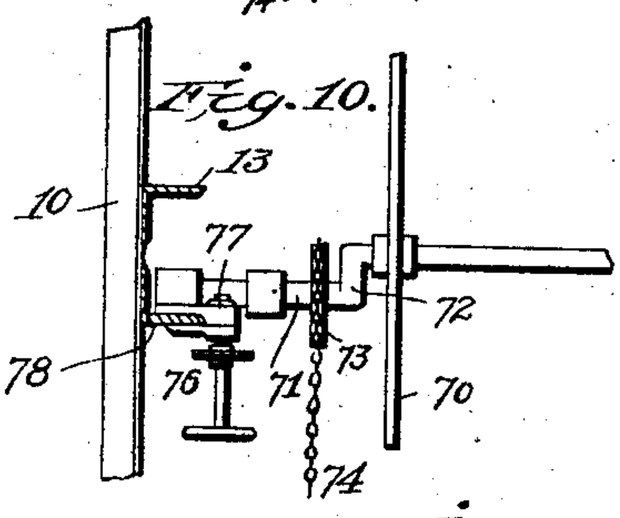


Fig. 11.

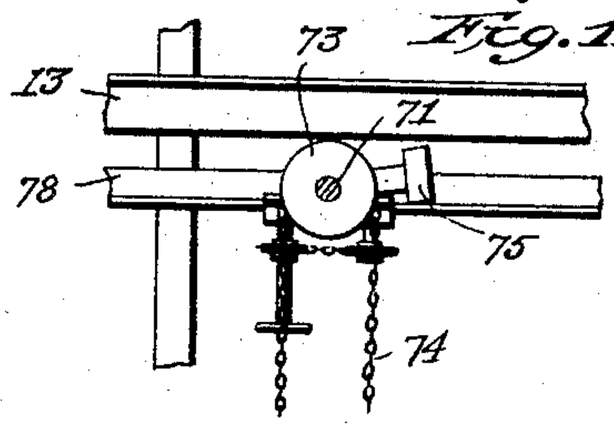


Fig. 13.

Witnesses
Edwin L. Yewell
N. Curtis Lammond

Inventor
Stephen Stepanian
By
H. H. Bliss.
Attorney

No. 859,588. PATENTED JULY 9, 1907.

S. STEPANIAN.

ELEVATOR AND CONVEYER.

APPLICATION FILED SEPT. 9, 1904. RENEWED OCT. 13, 1906.

3 SHEETS—SHEET 2.

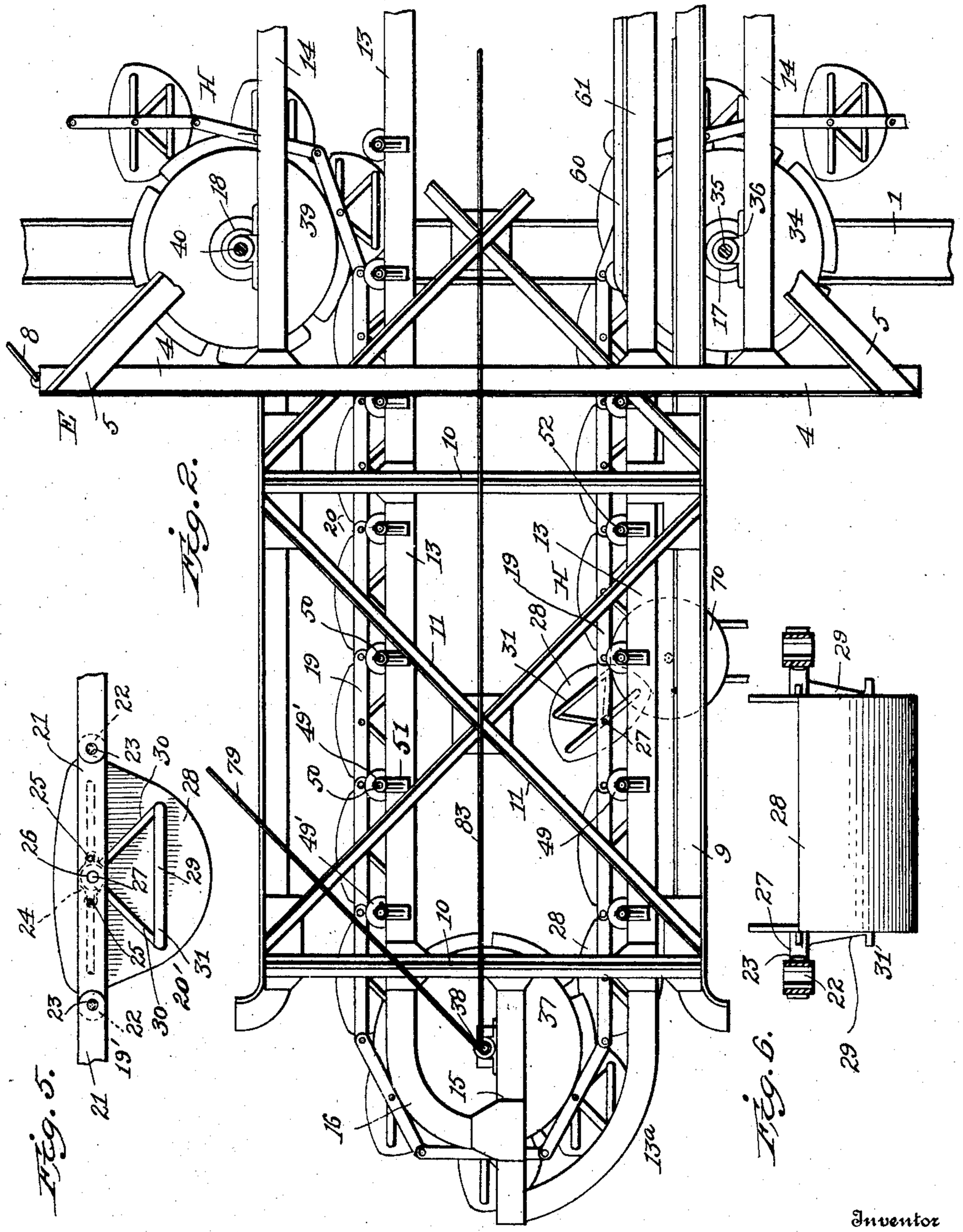


Fig. 2.

Fig. 5.

Fig. 6.

Witnesses
Edwin L. Jewell
N. Curtis Lammond

Inventor
Stephen Stepanian,
By H. H. Bliss
Attorney

No. 859,588. PATENTED JULY 9, 1907.

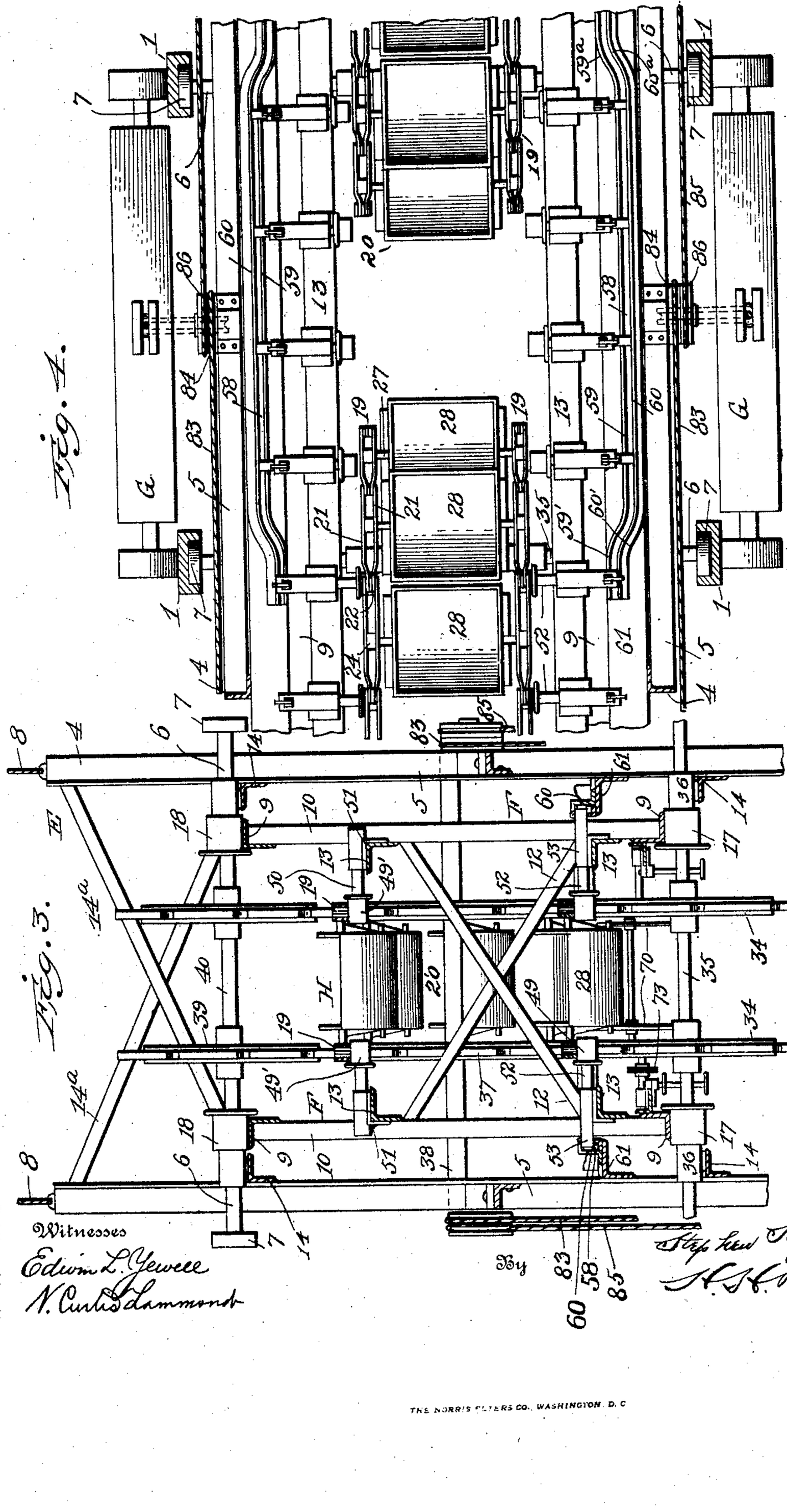
S. STEPANIAN.

ELEVATOR AND CONVEYER.

APPLICATION FILED SEPT. 9, 1904. RENEWED OCT. 13, 1906.

3 SHEETS—SHEET 3.

Fig. 4.



Witnesses
Edwin L. Yewell
N. Curtis Lammond

Inventor
Stephen Stepanian
By H. G. Dyer
Attorney

UNITED STATES PATENT OFFICE.

STEPHEN STEPANIAN, OF COLUMBUS, OHIO, ASSIGNOR TO JOSEPH A. JEFFREY, OF COLUMBUS, OHIO.

ELEVATOR AND CONVEYER.

No. 859,588. Specification of Letters Patent. Patented July 9, 1907.

Application filed September 9, 1904. Renewed October 13, 1906. Serial No. 338,842.

To all whom it may concern:

Be it known that I, STEPHEN STEPANIAN, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Elevators and Conveyers, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in elevating apparatus of the sort in which use is made of an endless carrier provided with buckets or like devices for receiving and sustaining the material which is to be carried from one point to another.

It pertains more particularly to endless elevator mechanism of the sort in which the carrier is adapted to be adjusted bodily in whole or in part. In the present case, provision is made for adjusting the delivery part of the carrier vertically and also horizontally.

The invention also relates to improvements in the devices for supporting, adjusting, loading and unloading an endless carrier in which use is made of freely swinging buckets suspended in the chains.

Figure 1 is a side view of an elevating apparatus embodying my improvements, some of the detail parts being indicated conventionally. Fig. 2 is a side view of part of the horizontal leg of the carrier mechanism on a larger scale. Fig. 3 is a vertical section of a part of the apparatus. Fig. 4 is a horizontal section showing the central parts of the apparatus. Fig. 5 is a side view of a section of the chain and one of the buckets. Fig. 6 is a cross section of the carrier. Fig. 7 shows, detached, one of the carrier-supporting rollers, and its holder, together with the adjacent parts of the framework. Fig. 8 is a central, longitudinal section of one of the supporting rollers. Fig. 9 is a vertical section of the same. Figs. 10 and 11 illustrate details of the unloading apparatus. Fig. 12 is a detail perspective view illustrating the upper supports for the cables or ropes by which the frame F is supported and adjusted. Fig. 13 is a detail view illustrating the means employed for adjusting one of the supporting wheels of the endless conveyer for taking up slack therein.

In the drawings, the apparatus which contains the improvements is represented as mounted on a substructure such as a dock or wharf at A, adjacent to a region B occupied by a body of water, Fig. 1, giving an understanding of how my improved apparatus can be used for the loading of boats. But it will be understood that the parts containing the novel features can be employed under other circumstances and for other purposes.

Upon the sub-structure there is erected a main stationary supporting frame indicated as an entirety by C, the principal bars or beams of which are indicated approximately fully, but this may be reinforced and braced by a downwardly extending frame D, the parts of which are conventionally illustrated, each by a single line, but which parts will be readily understood by builders practically acquainted with structures of this class. Upon the main stationary frame there is supported a vertically adjustable frame indicated as a whole by E, and this in turn carries the frame F which is capable of being raised and lowered with the frame E, and also of being moved longitudinally, horizontally, independently thereof.

The vertical bars or beams of the main frame C are indicated by 1, these being suitably joined and braced by supplemental bars 2, together with such others as may be found necessary. The lines indicating the supplemental expanding bracing base frame D are shown at 3, 3.

The frame E comprises the corner bars or upright beams 4, 4, which are arranged vertically, together with inclined brace bars 5 and horizontal cross bars 14, 14, and transverse brace bars 14^a. With respect to these beams or bars and the cross bars or braces, it will be understood that any suitable selection and arrangement of parts can be made. The frame E is susceptible of adjusting movement vertically along the main frame C, and is steadied and held in place in relation thereto by means of the arms or projections 6, which have rollers 7 which are fitted in the channels in the bars 1, as shown in Fig. 4. This vertically adjustable frame is suspended by means of cables or chains 8. The two cables 8 on each side of the apparatus are brought together at 8^a and secured to a cable 8^b, and the latter is carried up to and around a sheave or guide-wheel 8^c. Thence the cables 8^b may be carried to any suitable winding apparatus if desired; though I prefer to counterbalance the frames E and F by means of weights such as shown at G which are secured to the ropes 8^b at their lower ends and are approximately equal to the weight of the vertically adjustable frames. The means for applying power for lifting the vertically adjustable frames will be described below. The frame F comprises the top and bottom longitudinal bars 9, the vertical connecting bars 10, and inclined brace bars 11, together with the transverse inclined brace bars 12. The top and bottom longitudinal bars 9 are preferably angle bars, the upper ones having their horizontal flanges turned uppermost, and the lower ones having their horizontal flanges turned downward. In the frame thus formed are secured the parallel conveyer-supporting bars 13, 13, the lower of which is at the ends extended somewhat and curved upward as shown at 13^a, and the upper of which is extended and turned downward as shown at 16, these two curved bars together with the adjacent vertical end bar 10 serving as a support for a short bar 15 adapted to hold the bearings for

sprocket wheels. This frame F is fitted to and rests upon four lower rollers 17, 17, which are supported on journal carriers held by the vertically movable frame E, and above the upper frame bars 9 are four supplemental rollers 18. The frame F can slide or travel longitudinally in either direction, while thus supported upon the four lower rollers 17 and braced and properly held by the four upper ones at 18. The endless carrier is indicated as a whole by H. It is composed of two parallel endless chains 19, and an endless series of buckets 20, each freely suspended on a hinging device connected to each of the chains. The carrier or conveyer in this respect belongs to the class known as swinging bucket conveyers, these being in contrast to those which have the buckets rigidly secured to one or more chains and which are consequently necessarily carried bodily one or more times in each transit around a vertical axis; that is to say, when the buckets are rigidly fastened they, at some part of their path, have their open sides or mouths turned downward and at other times turned upward, and at still others, vertically. But if the buckets are hinged, as in the present mechanism, they always occupy the same position with respect to the horizon, their open sides or mouths being upward whether they are empty or loaded, whether they are going downward around the wheel or are moving up on the opposite side thereof, the only point at which they are thrown out of this normally horizontal position being that where they are emptied by means of some tripping device which causes them to be more or less inverted to discharge their contents. It is well known that numerous advantages are incident to these conveyers or elevators having freely swinging buckets, among them being this, that they are at no place called upon to scrape or drag their contents, and this, that they can carry much greater loads than would be the case if they were rigidly secured to their chains. But serious difficulties have been met with in trying to use these swinging bucket conveyers in connection with vertically adjustable or horizontally adjustable frames when any of the earlier methods of construction were followed with which I am acquainted. These difficulties I have overcome, and have succeeded in mounting an endless conveyer of this class in such way that more or less of it can be bodily adjusted vertically or laterally in order to vary the point of delivery to meet any of varying demands.

The chains 19 may be of any suitable sort, there being now known to engineers many forms of chain available for such uses. That which I prefer, and have illustrated, is made up of counterpart links each having counterpart side bars 21, 21, which at one end of the link are relatively far apart, and at the other end are closer together, so that they can be fitted between the ends of the adjacent side bars of the next link. At 22 anti-friction rollers are placed, these being mounted upon the pintles 23 which connect the overlapping ends of the side bars of one link with the ends of the bars of the next. At the central part of each link there is secured a bearing block 24, this being held between the side bars 21 by bolts or rivets 25 and being provided with an aperture 26. Each bucket 20 has at its ends journal-like devices 27 adapted to be respectively fitted in the bearing apertures 26 in the chain link blocks.

The body 28 of the bucket is formed of sheet metal, and at each end of each there is a metallic attachment 29, such as a casting, having formed therewith the aforesaid journal 27, two bracing bars or webs 30, and a bar 31 which is adapted for assisting in tilting the bucket when it is to be emptied in the way below described. This casting 29 having the parts just recited, may be secured by rivets or in any other suitable way to the end of the bucket.

Each of the chains 19 fits or tracks upon one of the driving sprocket wheels 47 at the bottom of the apparatus, these wheels being secured to the shaft 47′ which is connected to an engine or motor in any suitable way to rceive power therefrom. The chains and buckets extend outward horizontally to the sheaves or idlers 32 mounted on shaft 33, and then upwardly and around sheaves or idler wheels 34 which are secured to the shaft 35 arranged transversely in the frame E and mounted in bearings 36 supported on the aforesaid cross bars 14. From the wheels 34, the chains and buckets pass outward along the frame F to and around the wheels 37 secured to the shaft 38 mounted in bearings on the bars 15. From said wheels they travel backward to, partly around, and up from the wheels 39, these being secured to the shaft 40 mounted in bearings on the upper cross bar 14 of the frame E. From the wheels 39 the conveyer moves up to the wheels 41 which are secured to the shaft 42 mounted at a suitable line in the upper part of the main frame C; and thence they travel down to the wheels 43 mounted on the vertically adjustable frame, thence out to the wheels 44 on the opposite end of the frame F, thence back to the wheels 45 mounted on the adjustable frame E, thence downward to the wheels 46 which serve as idler guides mounted on the main frame C, and thence to the power wheels 47.

The wheels 47 are placed at some distance from the wheels 32 and are supported upon a lateral extension C′ of the stationary frame C, this giving a straight line horizontally for the part of the conveyer at 48, which permits the loading of the buckets before they reach the wheels 32. Those sections of the conveyer which are horizontal (that is, those links and buckets which are traveling between the wheels 34 and 37, those between the wheels 37 and 39, those between the wheels 43 and 44, and those between the wheels 44 and 45) require a support against vertical strain. This support is furnished by means of anti-friction rollers 49 and 49′. These are carried by the bars 13, 13, of the frame F. The rollers can be placed at such intervals as are found suitable. I have found it advisable not to support them to a distance greater than the length of one of the chain links. As the chains and buckets travel along, their weight is taken by the rollers. The rollers 49′ are carried by the upper supporting bar 13, and those at 49 are carried by the lower one.

The upper rollers 49′ are mounted on shafts 50 which are formed with or secured to fastening devices shown at 51, which latter are bolted to the bars 13. The rollers of the other series at 49 are supported in such way that they can move longitudinally toward and from the chains and buckets. Each is mounted on the end of a stud shaft 52, which is fitted in a box 53 bolted to the lower frame bar 13. The fitting of the shaft is loose in the box, so that it can slide back and forth therein. Normally it is prevented from such

longitudinal sliding by a latch 54 pivoted at 55, the lip of the latch lying at and against the end of the shaft and locking it in position. The shaft 52 has a projection 56 adapted to be utilized for the moving of the shaft endwise. Preferably it is provided with a roller 57 to relieve it of friction. 58, 58, are cam tracks (see Fig. 4) having guide walls 59, 60, secured to bars 61 fastened to the vertically adjustable frame E. One of these cam tracks is upon one side of the endless conveyer, and the other upon the other. These cam guides have their curved or inclined parts 59′ and 60′ in horizontal lines in vertical planes near the vertical plane of the shaft 35 of the sprocket wheels 34. Consequently, as will be seen, when the frame F is moved inward (say, toward the right as viewed in Fig. 1), the rollers 49 are successively brought toward, to and past the sprocket wheels 34. Before they reach those vertical planes where the chain links begin to pass from vertical lines to horizontal lines, the latches 54 are forced upward by the guide walls 60, and the small cam rollers 57, one on each side, enter the cam guide ways 58 and by bearing against the curved parts 59′ of the guide walls 59, they draw the shafts 52 and the rollers 49 out of the longitudinal planes of the path of the chain links, and the rollers are successively freed from the chains. If the frame F be moved still further toward the right (as seen in Fig. 1), the rollers 49 and the shafts 52 will be again moved inward toward the chains in the buckets by the inclined parts at 59^a and 60^a of the cam tracks. By having the guiding and weight-carrying rollers 49 thus automatically movable into and out from the path of the conveyer chain, I make provision for having the outward traveling and downward traveling parts of the conveyer entirely free, and inasmuch as these parts are suspended entirely from the sprocket wheels, such carrying devices as rollers or tracks are not necessary at this part of the travel of the chains.

The rollers 49 may be constructed in any suitable way. In Figs. 8 and 9 I have shown the way which I prefer. Each wheel is cast with a hub part 62, a flange 63, and an oil chamber 64. This oil chamber upon its outer side has a flange or rim 65 of metal, together with radial webs or walls 66. 67 is a closing plate adapted to be firmly fastened against the parts 65 and 66, there being at 68 a packing introduced to make the joint oil-tight. The oil passes from the chamber 64 to the shaft surface through the ports at 69.

By means of the mechanism above described, it will be seen that the frames E and F can be raised or lowered, and that the frame F can be adjusted longitudinally inward or outward without in any way interfering with the action of the conveyer chains and buckets. Each chain, under all conditions, has a section whose varying length compensates for the varying length of some other section; that is to say, as the chain lengthens in one region, there is a compensating shortening in another region, the total length remaining the same. By having the idler guide-sprockets at 46, the angles of the vertical parts of the conveyer (between said wheels 46 and the wheels 45) with the horizontal parts between the wheels 45 and the wheels 44 remain constant, and hence it is immaterial at what position vertically the frame F be placed, as compensation of the character above described will always be found.

The loaded buckets are tipped and their contents are discharged by the following devices. 70 indicates a tripping disk, and preferably there is one of these on each side of the frame F. Each is mounted in the path of travel of the bars 31 secured to the ends of the buckets. As a bucket approaches the disk 70, its bar 31 impinges upon the periphery of the latter, and the forward movement of the lower part of the bucket is prevented, causing a tilting thereof around its hinge axis 27. The disk 70 is mounted upon a shaft 71, the disk being eccentric to the axis of this shaft. The end desired can be attained by forming a crank bend in the shaft as shown at 72. In consequence, when the disk is impinged upon by one of the bars 31 on the bucket, the disk moves bodily around the axis of the shaft 71 and finally passes entirely out of the path of this bar, and the latter is freed and the bucket is permitted to resume its normal horizontal position as it moves on to the conveyer chain. But during the time that its bar 31 was in engagement with the disk 70, the bucket was tilted up into such position as to quickly discharge its contents.

To throw the tilting device out of action, use is made of a wheel or disk 73 secured to the axial part 71 of the shaft. With this wheel there is combined a chain 74, the ends of which extend down to a point within convenient reach of an operator standing at the lower part of the structure.

75 is a weight secured by a laterally projecting arm to the shaft 71 and so situated as to act to hold the disk 70 normally in its operative position. But by means of the chain or cord as at 74 and the wheel 73, the parts can be so turned that the gravity of the weight shall be overcome and the wheel 70 can be, if desired, fastened in a non-working position.

At 76, a clamping device is illustrated by which the bearing 77 of the shaft 71 can be rigidly held in position on the bar 78 at either of several places, and the point of unloading the buckets can be varied as desired.

79, 79, are cables secured to one of the ends of the frame F, one on one side, and the other on the other side of the conveyer. They extend up to the top of the power frame or main frame C, where they are fitted to and pass over pulleys or sheaves 80, and thence down to any suitable point where winding drums or the like can be mounted for taking up and letting out these cables.

81, 81, are similar cables secured to the other end of the frame F, and extending thence to the top of the main frame, where they pass around sheaves 82 and run thence to winding apparatus at the bottom. These cables and the devices by which they are wound and unwound can be so constructed and related that in whatever position the adjustable frames are placed, they can be moved vertically to any desired point.

For moving the frame F horizontally, longitudinally, the following parts are provided. 83, 83, are cables, one upon one side and the other upon the other side of the conveyer, and both secured to suitable parts at the left hand outer end of the frame F. They pass around sheaves 84 secured to the frame E, and thence down to the bottom of the apparatus where they are connected with a suitable winding mechanism. 85, 85, are similar cables secured to the other end of the frame F, and extending from their fastening points inward to

sheaves 86, and thence down to the winding devices. As the ropes 83 are taken up, those at 85 are let out, and the frame F can be drawn toward the right as looked at in Fig. 1. And by reverse operations with the cables, the frame can be moved outward or toward the left.

Inasmuch as in conveyers of this class, there is a constant tendency for the total length of the chains to increase, it is necessary to provide "take-up" devices. Those which I employ are combined with the upper stationary shaft 42 which is, as above stated, held by the main framework. This shaft has its ends mounted in boxes 87 held in guideways at 88. 89, 89, are vertically arranged screws adapted to press upward against the boxes and to lift them when it is necessary to take up any slack in the chain.

90 are supporting rollers for the horizontal flights of the conveyer on the laterally extending part C′ of the frame structure, these rollers being mounted on the said structure in any suitable manner.

The adjusting ropes 80, 80 and 82, 82 for the front and rear ends of the sliding frame F should have their lower ends secured on separate hoisting drums, so that when the frame F is to be adjusted from one horizontal position to another, the drums controlling the ropes for the front end of the frame will rotate in one direction and those for controlling the rear end of the frame in the other.

What I claim is:

1. In an elevating and conveying apparatus, an endless carrier having in combination with a series of freely swinging hinged buckets, a stationary frame having guides and supporting devices for the said conveyer, and a supplemental frame bodily adjustable vertically, having guides or supporting devices for the said conveyer, and means for tilting the said buckets, substantially as set forth.

2. In an elevating and conveying apparatus, the combination with an endless conveyer having freely swinging hinged buckets, of a stationary frame, conveyer-guiding and supporting devices on said stationary frame, a supplemental frame bodily adjustable horizontally, conveyer guiding and supporting devices on said adjustable frame, and means for tilting the said swinging buckets, substantially as set forth.

3. In an elevating and conveying apparatus, the combination with an endless conveyer having freely swinging hinged buckets, conveyer-guiding and supporting devices on said stationary frame, a supplemental frame bodily adjustable vertically on the stationary frame, and a second supplemental frame horizontally adjustable relatively to the vertically adjustable frame, and conveyer-guiding and supporting devices on the second supplemental frame, substantially as set forth.

4. In an elevating and conveying apparatus, the combination of an endless conveyer having freely swinging hinged buckets, conveyer-guiding and supporting devices on said stationary frame, a supplemental frame bodily adjustable vertically on the stationary frame, conveyer-supporting and guiding devices thereon, and a second supplemental frame adjustable bodily on the vertically sliding frame, and conveyer-supporting and guiding devices on said second supplemental frame, substantially as set forth.

5. In an elevating and conveying apparatus, the combination with an endless conveyer having freely swinging hinged buckets, a main frame having fixed vertical paths for the conveyer, and a horizontally adjustable supplemental frame supported on the main frame and adapted to be adjusted on lines transverse to the said vertical paths, substantially as set forth.

6. In an elevating and conveying apparatus, the combination with an endless conveyer having freely swinging hinged buckets, a horizontally adjustable frame, conveyer-guiding and supporting devices thereon, and a main frame supporting the aforesaid frame, the conveyer-guiding and supporting devices on the main frame arranged to provide fixed vertical paths for the conveyer above the adjustable frame, and fixed vertical paths for the conveyer below the adjustable frame, substantially as set forth.

7. In an elevating and conveying apparatus, the combination with an endless conveyer having freely swinging hinged buckets, of a main frame, conveyer-guiding and supporting devices on the main frame arranged to have the buckets successively travel in an approximately horizontal path for loading them, a vertically adjustable frame and conveyer-guiding and supporting devices on the adjustable frame, substantially as set forth.

8. In a conveying apparatus, the combination of an endless carrier, a stationary frame having upper and lower guiding and supporting devices for the carrier, a frame supported by the stationary frame between the said upper and lower supporting devices and bodily adjustable vertically, guiding and supporting devices for the carrier mounted on the said adjustable frame, and means on the adjustable frame for causing a discharge of the material conveyed by the carrier, substantially as set forth.

9. In a conveying apparatus, the combination of an endless carrier, a stationary frame having upper and lower guiding and supporting devices for the carrier, a frame supported by the stationary frame between the said upper and lower supporting devices and bodily adjustable horizontally, means for adjusting the last said frame horizontally, guiding and supporting devices for the carrier mounted in the said adjustable frame, and means on the latter frame for causing a discharge of the material being conveyed, substantially as set forth.

10. In a conveying apparatus, the combination of an endless carrier, a stationary frame having upper and lower guiding devices for the carrier, a frame supported by the stationary frame between the said upper and lower supporting devices and bodily adjustable both vertically and horizontally, means for effecting adjustment of the last said frame vertically and also horizontally, guides on the said adjustable frame for the carrier, and means on the latter frame for causing a discharge of the material being conveyed, substantially as set forth.

11. In a conveying apparatus, the combination of an endless carrier, a stationary frame having upper and lower supports for the carrier and vertical ways or guides, a vertically adjustable frame mounted in the ways or guides of the stationary frame and provided with horizontal ways or guides, a horizontally adjustable frame mounted in the said ways or guides of the vertically adjustable frame, and supporting devices for directing the conveyer mounted respectively in the said adjustable frames, substantially as set forth.

12. In a conveyer, the combination of an endless carrier, a stationary frame having upper and lower guides and supports for the carrier, a frame supported by the stationary frame and vertically adjustable bodily therein, guides or supports for the carrier mounted on the said adjustable frame, and a counterbalance for the adjustable frame, substantially as set forth.

13. In a conveyer, the combination of an endless carrier, a horizontally disposed frame along which the conveyer travels, upper and lower bars 13 for supporting respectively the upper and lower runs of the horizontal portion of the carrier, the said bars being curved at their ends at 16 and 13^a respectively, a wheel for supporting the conveyer arranged adjacent to the curved ends of said bars, and mountings for the said wheel, substantially as set forth.

14. In a conveyer, the combination of an endless carrier, supports and guides for the carrier including a wheel arranged to change the direction of travel of the carrier, an adjustable frame movable relative to said turning wheel and provided with guiding devices for the carrier, supporting wheels over which the carrier travels mounted in the adjustable frame, and means for moving the said supporting wheels out of the path of the carrier as the latter approaches the said wheel, that changes the direction of travel of the carrier whenever the adjustable frame is moved, substantially as set forth.

15. In a conveyer, the combination of an endless carrier,

supports and guides for the carrier including a wheel arranged to change the direction of travel of the carrier from a substantially horizontal to a different direction, a frame adjustable horizontally relative to said turning wheel and provided with guiding devices for the carrier, supporting wheels over which the carrier travels as it moves substantially horizontally in the said adjustable frame, and means for moving the said supporting wheels out of the path of the carrier adjacent to the said wheel that changes the direction of travel of the carrier in whatever position the said horizontally movable frame be adjusted, substantially as set forth.

16. In a conveyer, the combination of an endless carrier, upper and lower supporting and guiding devices for the carrier mounted in the said stationary frame, a horizontally adjustable frame having guiding devices for the carrier, supported by the stationary frame between the said upper and lower supporting and guiding devices, wheels for changing the direction of the carrier as it enters and leaves the horizontally adjustable frame, the said wheels for directing the carrier being stationary relative to the said adjustable frame, supporting wheels for sustaining the carrier as it moves substantially horizontally in the said adjustable frame, and means stationary relative to the horizontally adjustable frame for moving the said supporting wheels out of the path of the carrier in proximity to the said wheels for directing the carrier, substantially as set forth.

17. In a conveyer, the combination of an endless carrier, an adjustable frame having guiding devices for the carrier, a wheel for directing the carrier to or from the said adjustable frame and stationary relative thereto, supporting rollers over which the carrier travels mounted in the said adjustable frame, the said rollers being adjustable into and out of the path of the carrier, means for moving the said rollers out of the way of the carriers adjacent to the said wheel, for directing the carrier and means for locking or holding the rollers in the path of the carrier when at a distance from the said wheels, substantially as set forth.

18. In a conveyer, the combination of an endless carrier, a series of freely swinging hinged buckets carried thereby, a contact device with which the buckets are adapted to engage arranged to tilt them to discharge material therefrom, a crank shaft upon which the said contact device is mounted, and means for rotating the crank shaft to throw the contact device into and out of operative position, substantially as set forth.

19. In a conveying apparatus, the combination of an endless carrier, a stationary frame, a vertically adjustable substantially horizontally disposed frame mounted in the stationary frame, guiding devices for the carrier arranged in the said frames respectively, steadying cables extending from the opposite ends of the horizontally disposed frame to the stationary frame, and winding devices for the cables, substantially as set forth.

20. In a conveying apparatus, the combination of an endless carrier, a stationary frame, a vertically and horizontally adjustable frame mounted in the stationary frame, guiding devices for the carrier arranged in the said frames respectively, steadying cables extending from the opposite ends of the horizontally disposed frame to the stationary frame, and winding devices for the cables, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

STEPHEN STEPANIAN.

Witnesses:
H. H. PRICE,
H. S. RANSOM.