

(No Model.)

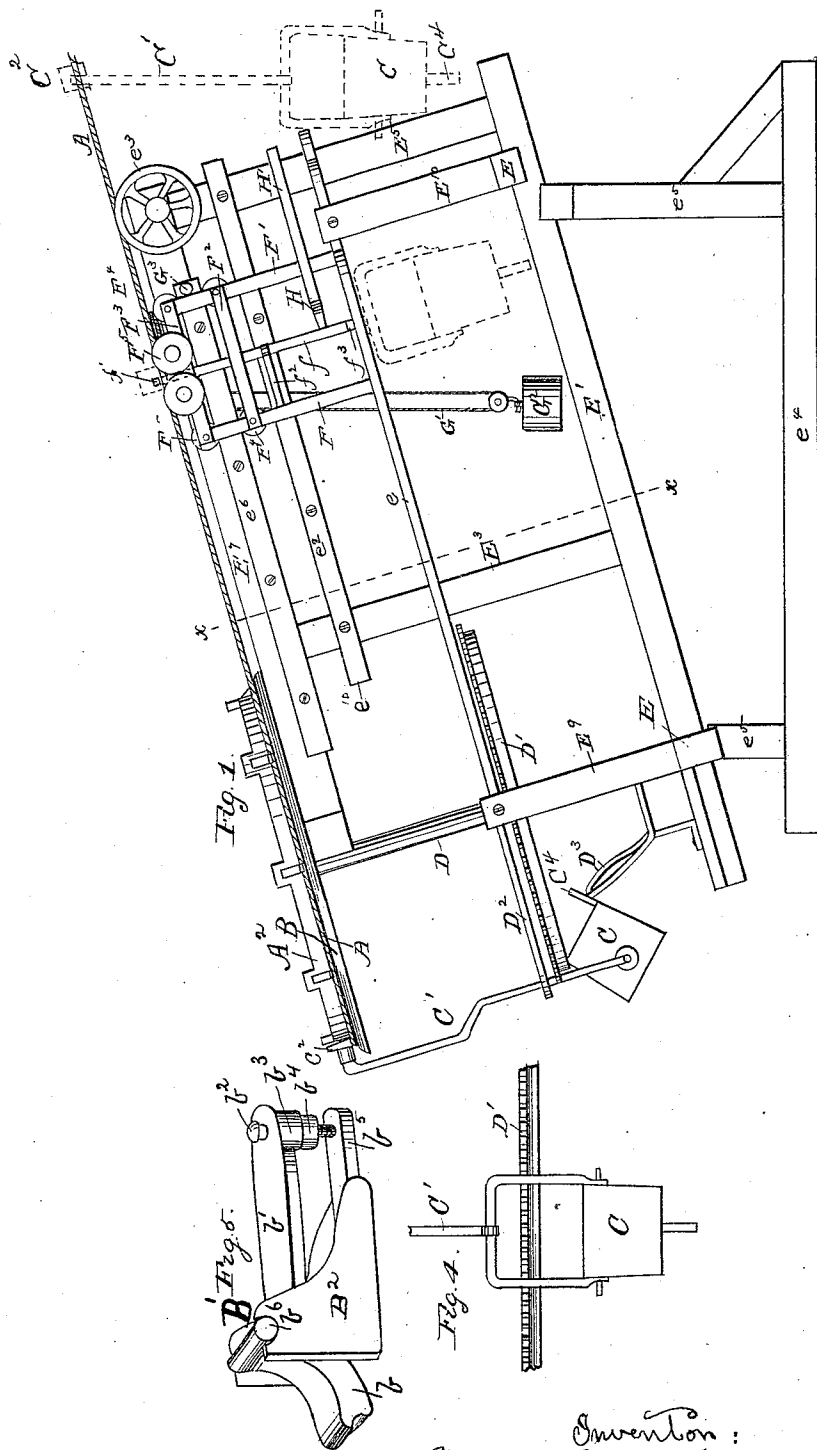
6 Sheets—Sheet 1.

C. M. HUSON.

DEVICE FOR LOADING AND UNLOADING TRAMWAYS.

No. 312,274.

Patented Feb. 17, 1885.



Witnesses:
J. E. Bliss
J. S. Barker

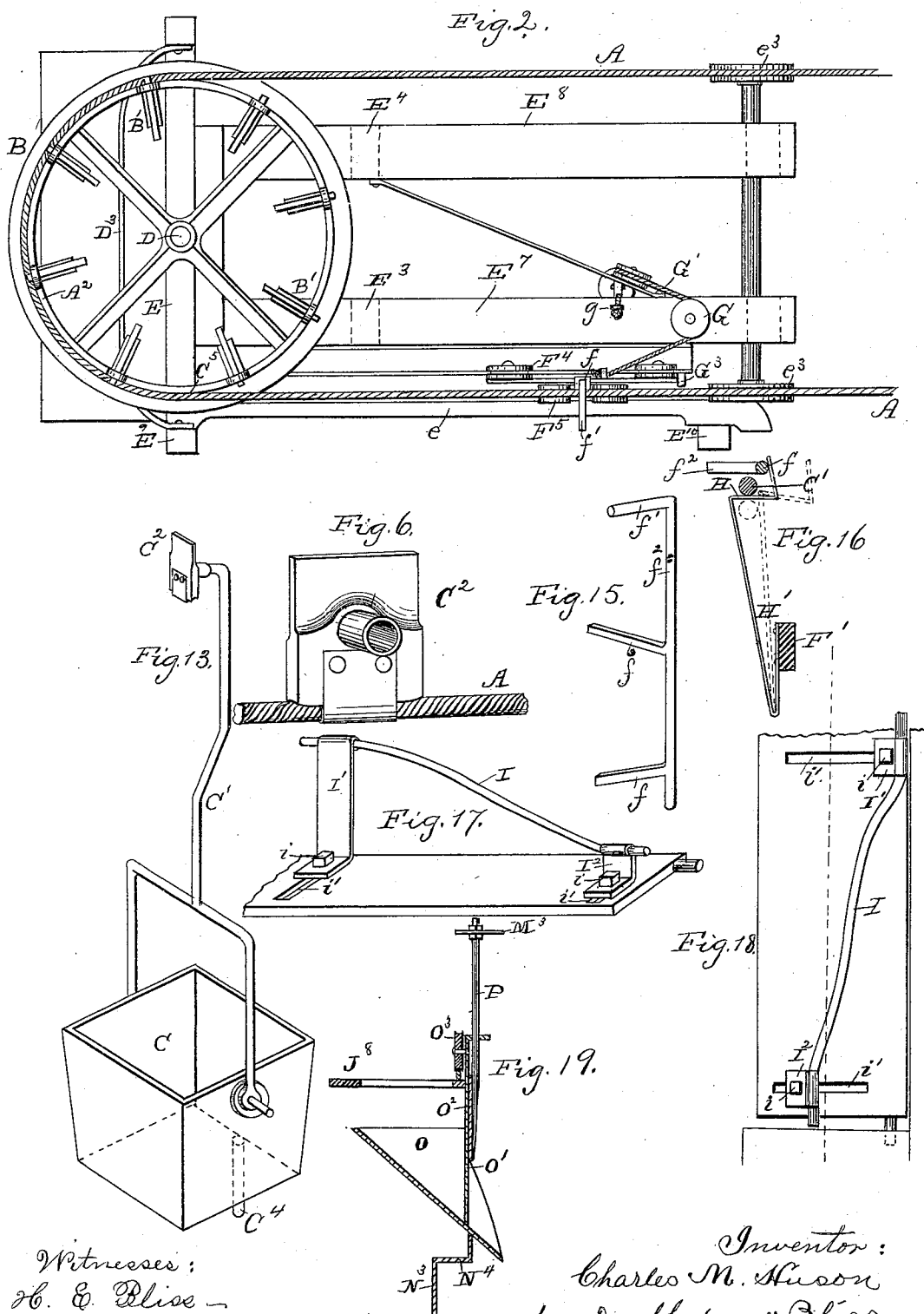
Invention:
Charles M. Huson
by Doubleday & Bliss
attys

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Witnesses:
H. E. Bliss
H. Burke

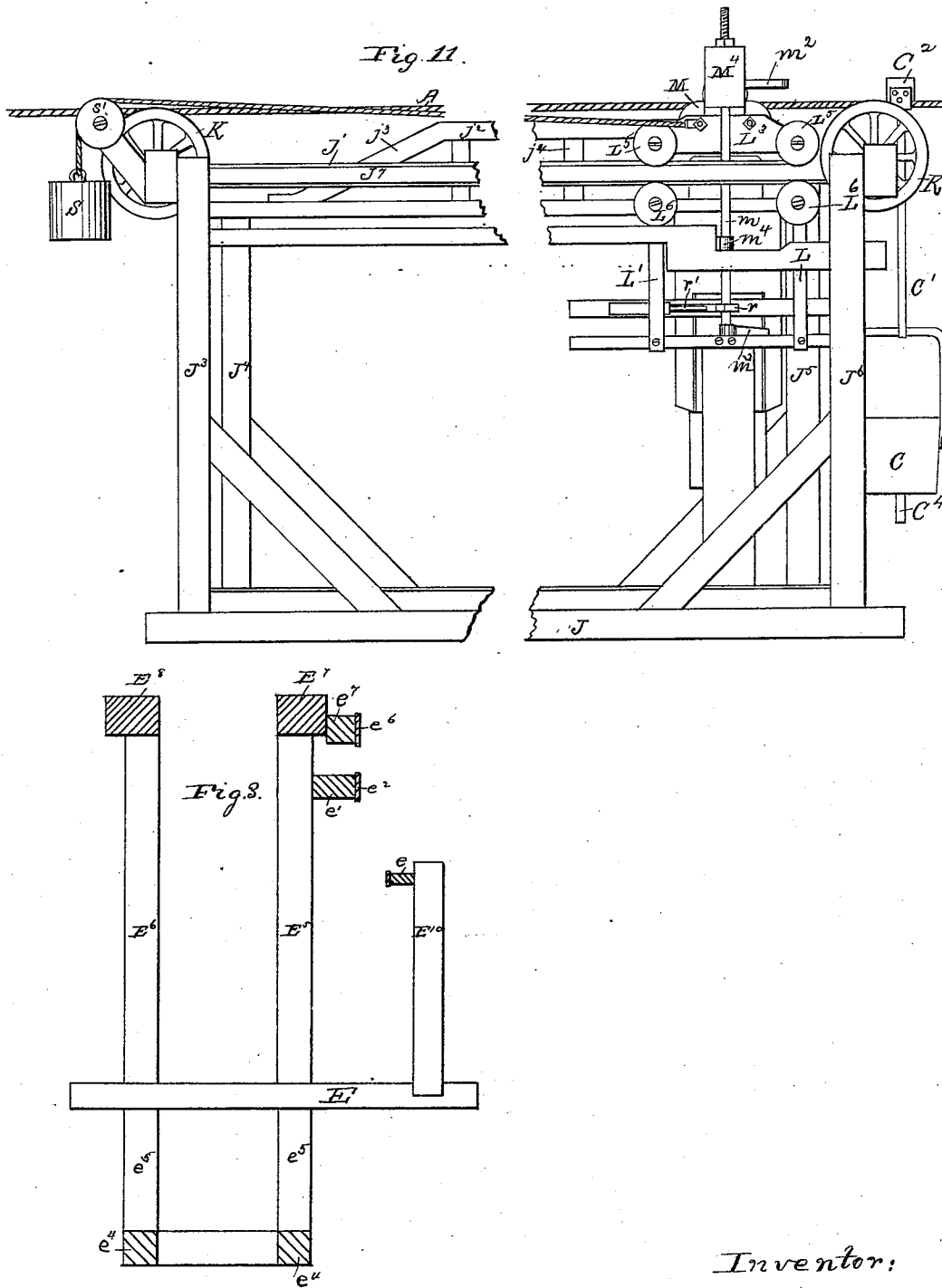
Inventor:
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by Doubleday & Bliss
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6 Sheets—Sheet 4.

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Fig. 14.

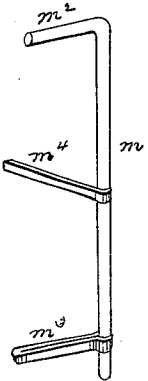


Fig. 12.

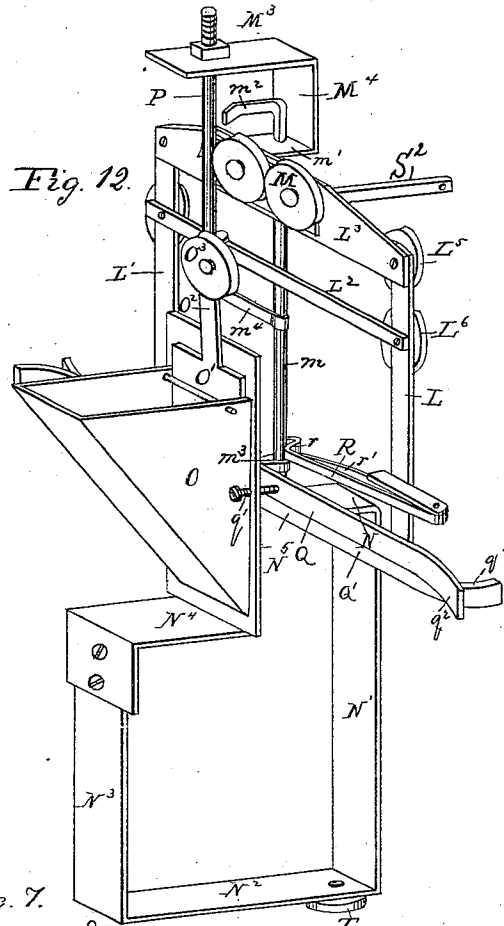
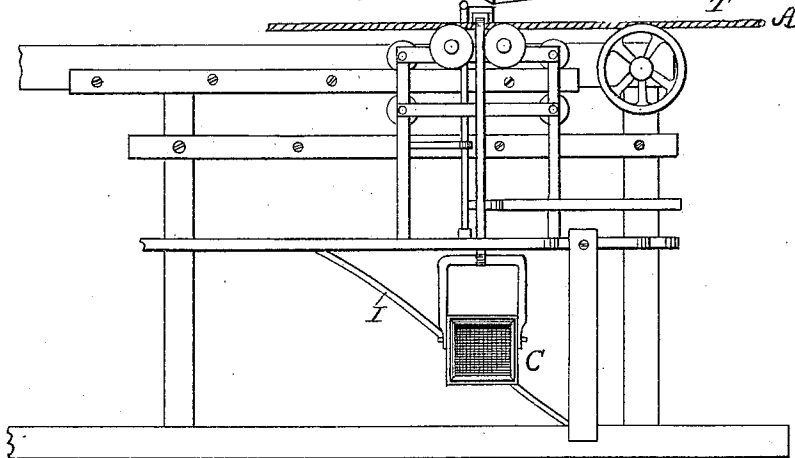


Fig. 7.



Witnesses:
H. E. Bliss:
J. S. Barker.

Inventor:
Charles M. Huson
by Douglas & Bliss
attys

(No Model.)

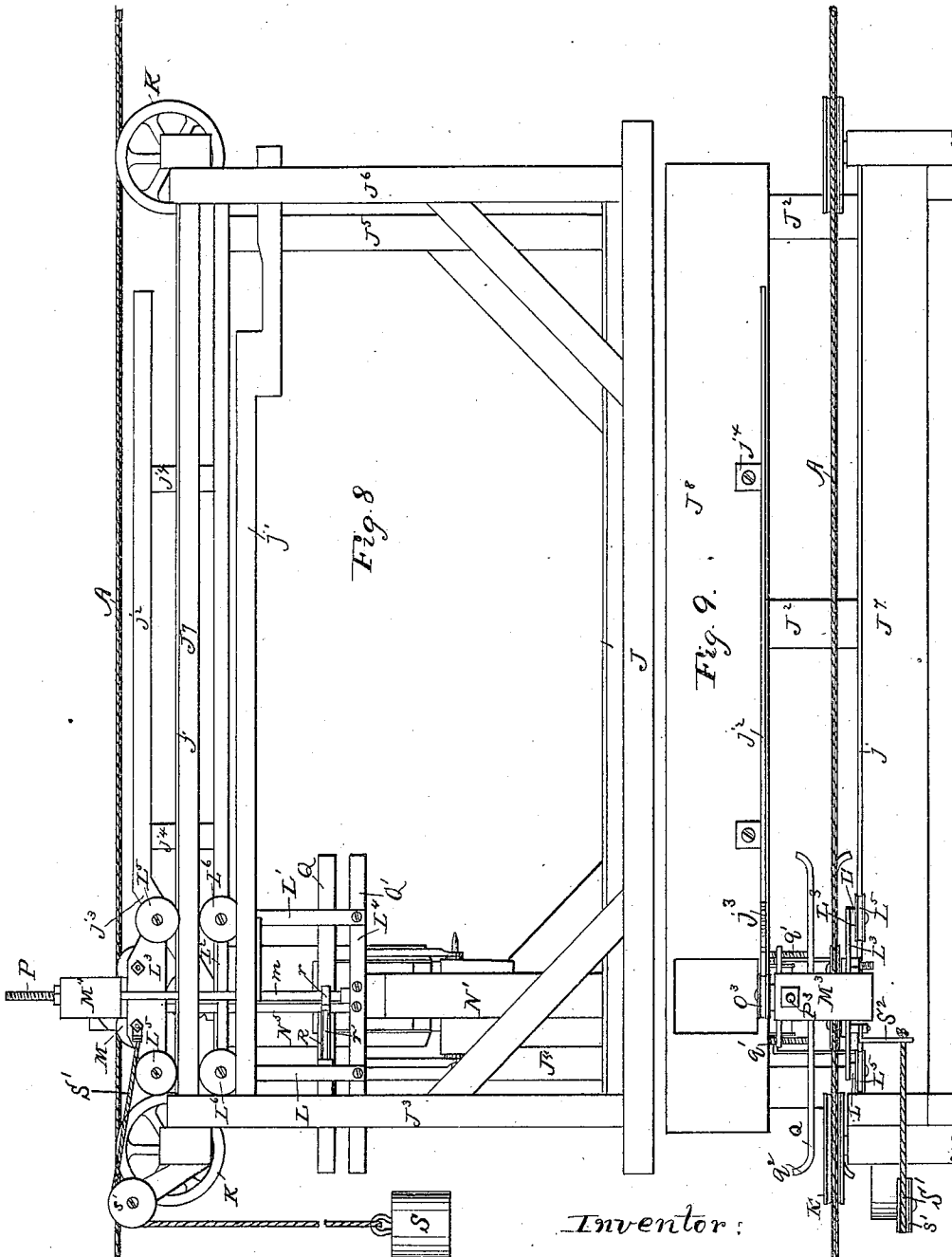
6 Sheets—Sheet 5.

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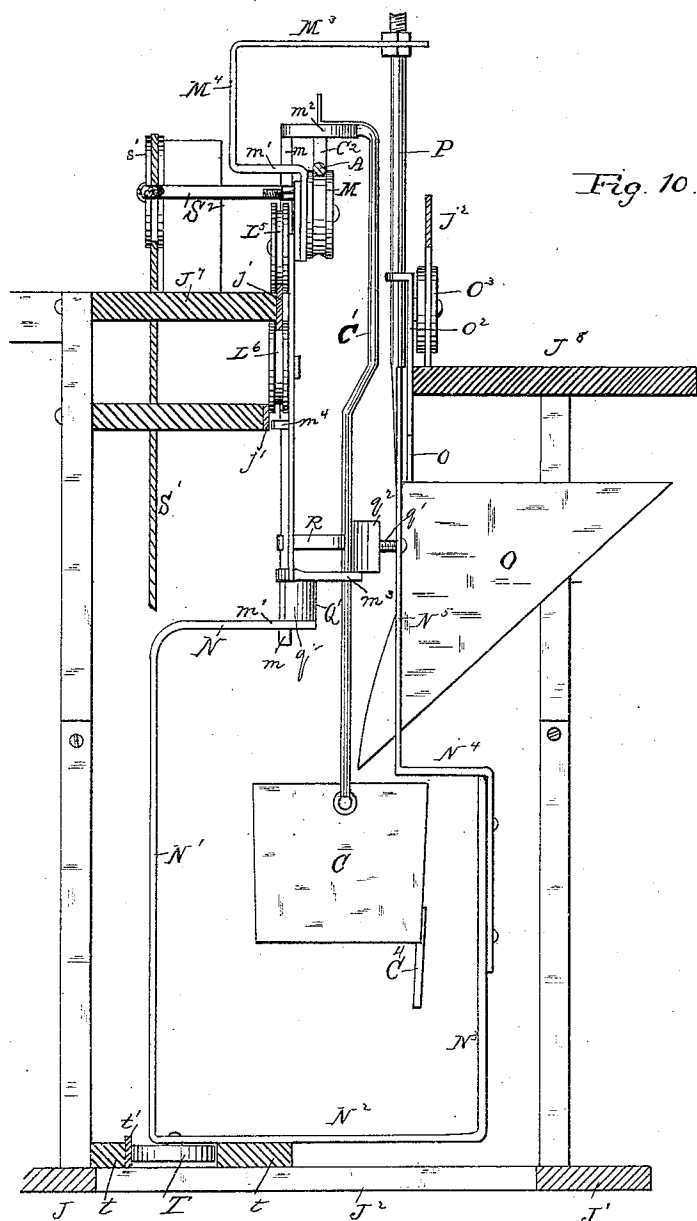
6 Sheets—Sheet 6.

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Charles M. Huson

by Doubleday & Bliss
attys

UNITED STATES PATENT OFFICE.

CHARLES M. HUSON, OF SOUTH PUEBLO, COLORADO.

DEVICE FOR LOADING AND UNLOADING TRAMWAYS.

SPECIFICATION forming part of Letters Patent No. 312,274, dated February 17, 1885.

Application filed April 28, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. HUSON, a citizen of the United States, residing at South Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Devices for Loading and Unloading Tramways, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a side elevation showing the terminal wheel and the devices for unloading the buckets or carriers. Fig. 2 is a top plan view of the same. Fig. 3 is a sectional view of the frame-work on the line *xx*, Fig. 1. Fig. 4 is a view of a portion of the rag or toothed wheel, showing the pendant which carries the bucket, engaging therewith. Fig. 5 is a perspective view of one of the grippers which assists in holding the rope as it passes the terminal wheel. Fig. 6 is a perspective view of the clip by which the pendant of the bucket is secured to the cable. Fig. 7 is a side view showing a modified form of dumping apparatus, the cam or track in this case being stationary. Fig. 8 is a side view of the loading devices, the parts being shown in the position occupied when the carrier or bucket first engages with the sliding carriage. Fig. 9 is a top plan view of the same. Fig. 10 is a cross-section looking toward the carriage, the parts being in the position shown in Fig. 8. Fig. 11 is a side view of the same, showing the parts in the position occupied when the bucket or carrier leaves the sliding carriage. Fig. 12 is a perspective view of the sliding carriage and the hopper carried thereby, used for loading the traveling receptacles or buckets. Fig. 13 is a perspective of the bucket or carrier, its pendant and clip. Fig. 14 is a perspective view of the rocking bar or arm shown in Figs. 10 and 12. Fig. 15 is a perspective view of the rocking bar, combined with the carriage, which is used with the apparatus near the terminal wheel, (shown in Figs. 1 and 2,) this rocking bar, however, being substantially similar to that used with the carriage combined with the loading devices. Fig. 16 shows in top plan the stop which is used to prevent the pendant and carrier from recoiling or swinging backward, said stop being attached to or formed with a yield-

ing spring. Fig. 17 shows in perspective an adjustable track or cam, adapted to engage with the bucket or carrier and tip the same for dumping it, the track or cam in this case being adjustable. Fig. 18 is a top plan view of that shown in Fig. 17. Fig. 19 is a section of the loading-hopper and adjacent parts.

In the drawings, A represents the cable, which may be constructed of any suitable material and in any preferred way, and can be mounted on proper supports between the terminals—as, for instance, in the manner shown in my previous patent, No. 269,525, September 26, 1882.

The terminal wheel is represented, generally, by the letter B, it being secured to a shaft, D, mounted in a suitable framing.

The wheel B may be provided with any preferred means for gripping the cable; or, so far as the other features of this case are concerned, this wheel may be a plain one—that is, may be used without supplemental gripping devices.

I have shown devices which are adapted to grip the plain portions of the cable, and also adapted to yield when the clips which carry the buckets come in contact with them, whereby I insure that said clips and the cable shall not be thrown out of proper place.

The gripping devices shown consist of a series of levers and lever-support of the character of that shown detached in Fig. 5. In said figure, B' represents the shank of a lever, and *b* the toe or upwardly-projecting part. The lever is supported in a frame, B² *b*², by means of a pivot or cushion, as at *b*⁶. To permit the adjustment of the toe of the lever, I combine with it a set-screw, *b*², which passes through a threaded sleeve, *b*³, and bears against the stationary part *b*⁵, it being locked in place by a nut, *b*⁴. Preferably each of these levers projects through an aperture in the upwardly-rising flange A² on the terminal wheel, as will be seen by examining Figs. 1 and 2. The toes project outwardly just above the line of the cable, and there is a tapering space below the outer end of each into which the cable crowds, and therefore the friction upon the cable is increased.

In Figs. 1 and 2 all of the details of these

gripping devices are not shown, there being merely sufficient in said figures to illustrate the general relations of the parts. The shaft carries a wheel, D', below the cable-wheel B, this wheel D' being toothed or recessed in such manner as to be adapted to be engaged with the bail of the bucket C when the latter is passing around the terminal wheel, the bucket being carried by a pendant, C', joined to a clip, C², which is fastened to the cable, the bucket bail or pendant being held properly relatively to the wheel D' by a guide or cam-track, D², which partially surrounds the shaft D, and the tipping of the bucket for emptying it being effected by a second guide or cam-track, D³, adapted to engage with the side of the bucket or an arm projecting downwardly therefrom. However, these parts last above described may be of the character shown in my aforesaid Patent No. 269,525, and therefore need not be dwelt upon here.

In the aforesaid Patent No. 269,525 devices were shown in combination with the terminal wheel whereby the bucket could be emptied when the cable was situated in a substantially horizontal plane, the axis of the terminal wheel being in a corresponding position—that is to say, on a vertical line; but a cable tramway of this character may be available under another set of conditions prevalent in regions where these tramways are often necessary—that is to say, upon the sides of hills or mountains.

A construction and arrangement of parts will be described whereby the cable may be allowed to lie in a plane more or less inclined to the horizon while it passes around the terminal wheel, the said wheel lying in a parallel plane.

The wheel, together with its shaft, and the parts combined therewith are supported upon any suitable frame-work adapted to hold the said parts at an inclination corresponding to the plane in which it is desired that the cable shall move.

In the drawings I have shown a frame-work, but wish it to be understood that I do not limit myself to the details of its construction therein shown, having indicated one which at present I prefer, but which may be more or less varied as circumstances require.

The parts of the frame shown consist of one or more girts similar to that above referred to at E, one or more longitudinal sills, E' E², uprights E³ E⁴, (see Fig. 1 and dotted lines, Fig. 2,) near the terminal wheel, the position of the upright E³ being indicated by dotted lines in Fig. 2, uprights E⁵ E⁶ at a suitable distance therefrom, and top beams, E' E³, joining, respectively, the uprights E³ E⁵ on one side and E⁴ E⁶ on the other. The main frame-work thus constructed has attached to it a guide-rail, e, (see Figs. 1, 2, and 3,) extending from a short upright, E⁹, near the terminal wheel to another short upright, E¹⁰, near the upright E³, this guide-rail e being so related to the track or

guide D² that together they shall form a continuous guide. Another guide-rail, e', (see Fig. 3,) is secured to the main frame, it being fastened to the uprights E³ E⁵, and having, preferably, a metal face-plate, e², and above this a third guide or track is provided, it consisting of a metal bar or plate, e³, secured to the outer face of a bar, e', fastened to the frame.

e² e³ represent guiding sheaves or pulleys, upon which the cable can rest as it moves toward and from the terminal wheel, and of these any suitable number may be employed.

When the means above described are to be employed for supporting the terminal wheel at an inclination to the horizon, and for guiding properly the cable and the buckets to and fro, it (said frame-work) can be supported by a supplemental one below, consisting of any suitable number of sills, as at e⁴, and uprights e⁵ e⁶, (see Figs. 1 and 3,) together with whatever braces and girts are required.

Upon the main frame, still referring to Figs. 1 and 2, there is mounted a traveling carriage, which, also, in its details, may be of various forms, the one shown having two downwardly-extending bars, F F', joined by cross-bars F² F³, the latter being at or nearly at the top, and a third cross-bar at or nearly at the bottom, concealed behind e, Fig. 1. This carriage is held in place upon the guide or track e⁶ by means of anti-friction wheels or rollers F⁴, there being two or more engaging with the upper edge or face of the track e⁶, and two or more with the lower, whereby the whole carriage is held properly in position. The carriage is also provided with two or more grooved sheaves or rollers, F⁵, upon which the cable can rest, so that there shall be no friction exerted upon the carriage by said cable.

f represents a rocking bar, mounted suitably, for instance, in bearings in the upper cross-bar, F³, and in the lower cross-bar. This rocking bar f has a laterally-projecting arm, f', which, when the parts are in the position shown in Figs. 1 and 2, lies somewhat above the cable and across the same in the path of the clips C². It has also an arm, f², in the same plane (transversely of the bar f) as is the bar e', or its metal facing-piece e², the end of this arm f², when the parts are in the position shown in Fig. 1, bearing against the said facing-piece e², so as to prevent the bar f from rocking; but when the parts have moved to the other end of their throw the bar e' or its facing-piece e² no longer engages with the arm f², and therefore the latter does not prevent the bar f from rocking or yielding to a force exerted upon the arm f' at the top.

f³ is a finger attached to the rocking bar f, (see Figs. 1 and 15,) and which, when the parts are in the position shown in Fig. 1, lies in the path of the pendants or of the carriers secured to the cable.

G² is a weight attached to a rope or chain, G', the latter passing over a pulley, G. The weight tends to draw the carriage into the po-

sition shown in Fig. 1, and after the carriage has been drawn down to the terminal wheel in the manner to be described this weight returns it to the position shown in the said Fig.

1. The weight may be arranged in the simplest way—that is to say, the end of the rope may be tied to the carriage, the rope passing over the pulley G down to the weight; or, to make it more effective in a well-known manner, the end of the rope may be secured to the frame, as shown at *g*, and may be attached to the weight by means of a block and pulley.

The operation of the devices above described is as follows: When a bucket approaches, the pendant which carries it is in a vertical position, although the cable is inclined, (see Fig. 1, dotted lines,) the pendant being preferably united to the clip, which is secured to the cable by a hinge-joint. The clip first passes over the sheave or pulley e^2 when the latter is employed, then moves forward over the supporting-sheaves F^5 until the pendant C' strikes the arm f^3 and the clip C^2 strikes the upper arm, f' , the latter action taking place shortly after the pendant strikes the arm f^3 . When these two contacts have been effected, the pendant will be thrust out of the vertical position into one substantially perpendicular to the plane of the cable, (shown in dotted lines, Fig. 1,) in order that the bucket and the pendant may be properly received upon the terminal wheel and upon the rag or toothed wheel D' . The onward movement of the cable after the contacts have been effected causes the carriage to move forward toward the terminal wheel, the escape of the clip from the arm f' and of the pendant from the arm f^3 being prevented by reason of the bar f^2 bearing against the part e^2 , which, as said above, holds the rocking bar f and the arms at $f' f^3$ rigidly relatively to the cable; but when the parts have been advanced sufficiently far the arm f^2 escapes from the part e^2 at the end e^0 , Fig. 1, and therefore the rocking bar f is allowed to turn to yield to the pressure exerted by the clip and the pendant. The parts are so related in size and position that this escape shall be effected at the instant the clip C^2 reaches the point C^5 , (see Fig. 2,) where the rectilinear part of the cable is tangential to the wheel. As the pendant C' has been up to this time held substantially perpendicular to the plane of the cable A, it or the bail which it carries engages with the rag or sprocket wheel D' at a point corresponding to the point C^5 of contact of the clip with the terminal wheel. After the clip and pendant have been released from the carriage the weight G^2 operates to draw the latter back into the position shown in Fig. 1, ready to act in a similar manner relative to the next bucket or carrier. A stop, as at G^3 , may be used, or any other suitable for the purpose of arresting the carriage.

In order to prevent any back movement or rebounding of the pendant after it has come in contact with the arm f^3 , a stop, H, (see

Figs. 1 and 16,) is employed, which is arranged to yield to the pendant as the latter moves inward; but after it has passed the stop H moves outward across its path to prevent its backward motion. As shown, the stop H is formed upon or carried by the end of a flat spring, H' , against which the pendant presses as it moves in, (see dotted lines, Fig. 16,) and which effects the outward movement of the stop after the pendant passes.

I have also shown in the drawings the means which I have devised whereby a bucket may be emptied or not at certain points, so that a separation between the loads dumped by the various buckets may be permanently preserved.

It is well known that it is desirable to keep the ore produced by one miner separate from that produced by another. I accomplish this separation, and preserve it by employing different bins or receptacles and combining therewith devices by means of which certain of the buckets shall be dumped into one bin or receptacle, and another or others shall be dumped into another receptacle.

Referring to Fig. 7, I represents a cam-guide secured to the frame, and which is adapted to engage with the side of the bucket, or with an arm projecting therefrom to a greater or less distance, so as to effect a dumping of the bucket and its contents into a bin or receptacle. Of these dumping cams or tracks as many may be employed as are the separate masses which it is desired to obtain. The dumpers on the one hand, and the buckets or carriers or the pins or projections carried by the latter on the other hand, are so related to each other that some of the carriers shall engage with one cam or dumper and pass all others, while another set of carriers shall engage with another dumper and pass all others, and so on to any extent desired.

The necessary variations of the dumpers relative to each other or of the buckets or pins carried thereby can be readily effected, and to those acquainted with the art various methods will suggest themselves for varying the parts relative to each other to accomplish these ends.

In Figs. 17 and 18 a cam is shown as being movable, the cam being supported in standards $I^1 I^2$ having bolts i in slots i' , though I do not wish to be limited to the devices shown.

In Fig. 18 the dotted line indicates the normal vertical plane of the pin C^4 on bucket C—that is to say, the line on which said pin would move were it not thrown out by the dumper.

The dumping-cam may be supported in any suitable way to accomplish the various ends aimed at. It is shown as mounted upon a frame-piece, but in this respect there is wide range for variation.

In the construction shown each cam engages with certain of the buckets or with the pins carried thereby, the latter being of sufficient

length to engage therewith, and each of the other cams engages with another set of buckets, the engaging portions being related to each other differently from those of the other sets by means of a difference in position or length, &c.

The frame and carriage in Fig. 7 may be the same as in Figs. 1 and 2 and need not be described.

I will now describe the means which I employ to effect the loading of the continually-traveling buckets.

Referring to Figs. 8, 9, 10, 11, and 12, J J' represent the longitudinal sills of a frame provided with suitable cross-girts, J² J², it having also uprights J³ J⁴ at one end and J⁵ J⁶ at the other, and having at the top a longitudinal beam, J⁷, on one side and a platform, J⁸. Upon the general frame-work thus described there are mounted two or more sheaves or pulleys, K K, upon which the cable rests as it moves over the frame.

j represents a track-bar, preferably of metal, secured to the sill or beam J⁷, corresponding to that at e⁶ already set forth.

j² is a track or cam secured to the top of the platform J⁸, it consisting of a metal bar supported in any suitable way upon standards j⁴, it having at one end an inclined part, j³.

Upon the track-bar j there is mounted a traveling carriage having the following parts:

L L' are downwardly-projecting bars, joined by cross-bars L² L³ L⁴, the last two being the one at the top and the one at the bottom.

L⁵ L⁵ are rollers fitting upon the top of the track j, and L⁶ L⁶ rollers fitting upon the under side.

M M are sheaves or rollers, carried by the carriage-frame, and adapted to have the cable pass over them, they preventing frictional engagement between the cable and the carriage.

m is a rocking bar mounted in a plate, m', at the top and in a corresponding plate at the bottom. This rocking bar m has an arm, m², lying in the path of the cable-clips, an arm, m³, lying in the path of the pendants, which support the buckets or carriers, and an arm, m⁴, which, when the parts are in the position shown in Fig. 10, bears against the plate j'.

The parts last above described—to wit, those indicated by L L' L² L³ L⁴ L⁵ L⁶ m m² m³—are analogous in structure and operation to the corresponding parts above described in the construction shown in Figs. 1 and 2.

There is a loop-like frame, Figs. 10 and 12, which surrounds the path of the buckets carried by the cable, and shown as having the parts N N' N² N³ N⁴; but I do not wish to be limited to the exact construction shown, as it may be varied more or less. I prefer to have the part N extend somewhat backward from the bar m, and the part N' project downwardly to a point below the path of the buckets. The part N² lies below and across said path, and is united to the part N³, which rises up on the outside of said path. At N⁴ there is an

offset, or the frame is projected inwardly to or somewhat over the upper or outer edge of the bucket.

N⁵ represents a plate rising from the part N⁴. It carries a bin or hopper, O, of the form shown, the bottom being inclined, so that any material which may move down thereon shall be delivered into the bucket carried by the cable. The bin or hopper is closed by a slide, O'. To this slide there is attached a bar, O², which carries a roller, O³, adapted to ride upon the track j³ j².

P is a bar or rod rising from the plate N⁵, it being fastened to a cross-piece, M', carried by an upwardly-rising support, M⁴, secured to the carriage-frame L L' L³. The bar O' loosely engages with the bar P, so that it can slide up and down relatively to the latter. (See Fig. 10.) An upward movement of the bar O' and of the slide O' is caused by the cam or guide j³ j² when the carriage moves forward.

In order to assist in holding the loop-like frame N N' N² N³ N⁴ steady, I mount a roller or friction-wheel, T, upon the under face of the part N². By preference this wheel or roller T lies horizontally, as shown in Figs. 10 and 12, and travels between guide-rails t t, mounted upon the frame-work, these guide-rails being provided with metallic facing-strips t', when desired.

Q is a guide-piece having an outwardly-curved end, as shown at q². It can be adjusted toward and from the bin or hopper by means of screws or other regulating devices, as shown at q' q', Figs. 10 and 12.

Q' is an opposite guide-piece, having a curved end, q², this curved end, together with the curved end of the other guide, being so arranged as to insure that the pendant of the buckets shall move in the proper path.

R is a stop analogous to the stop above described, it, in this case, however, consisting of a pivoted bar bent to have an angular portion, r, in combination with a spring, r'. It can yield to an incoming pendant, but after the latter has passed the part r said part swings across the path of the pendant and prevents the latter from moving backward.

The operation of the devices constructed and arranged as above described is as follows, it being supposed that the bin or hopper O is loaded with material and situated in the position shown in Fig. 10: Then as the empty bucket approaches, its clip first passes over the sheave K and then over one or more of the sheaves M until it strikes the arm m², the pendant of the bucket at the same time striking the arm m³. As soon as these contacts are effected the carriage is drawn forward by the cable, together with the loop-like frame N N' N² N³ N⁴ N⁵ and the bin or hopper carried by the latter. As the carriage and hopper move forward the slide O' is forced upward by means of the cam j³ j², and after that the material is permitted to drop into the bucket, the latter being held so that it cannot move away from

the bin or hopper, as will be readily seen by examining the drawings. After the transfer of the material has been effected the carriage reaches the end of the bar j' ; whereupon the arm m^4 can swing outwardly, and, as a result, the arms m^2 m^3 are thrust out of the paths of the cable and of the pendant, and the latter pass on disengaged from the carriage. Then the weight S operates to draw the carriage back to its initial position, the weight being connected with the carriage by means of the cord S' , which preferably passes over a pulley, s' , and is connected to an arm, S^2 .

Having thus fully described the specific devices shown, in order that a clear understanding may be had of one form of mechanism embodying my invention, I will say that I do not limit myself to all the details shown and described, for it will be apparent to any one skilled in the art to which the invention appertains that many of the parts may be more or less varied without departing from the spirit of the several parts of the invention. Thus it is not necessary that the devices for unloading the carrier shall be of exactly the form shown, and, in fact, the reciprocating carriage may be used to steady the carriers and hold them in proper place under modified circumstances.

I in the claims appearing below describe the bucket and its support as a carrier, and it will be seen that the particular features in detail of this do not necessarily enter into the invention, as carriers of various sorts may be used, if adapted to intermittingly engage with a carriage which can support them or hold them in a given position relatively to the cable.

Again, it may be remarked that as regards the holding of the carrier properly in a given position the essential feature consists in providing a stop which shall be impinged upon by some portion of the carrier or its support, and which will be adapted to hold the carrier in the desired position, and adapted, under some circumstances, to throw it into a position out of the normal. Thus, the part f^3 acts as a stop temporarily; not that it stops the motion of the cable or the onward movement of the carrier, but it insures that the carrier shall be in the desired position, and in this respect this portion of the device operates similarly in the construction shown in Figs. 1 and 2 for unloading, and in the construction for loading shown in Figs. 8, 9, 10, 11, and 12.

When it is desired to unload a carrier where the cable is inclined, the part acting as a stop may be used to throw the carrier or carrier-support out of the normal position occupied when freely suspended; but, under other circumstances, it need not vary the position of the carrier—as, for instance, in Figs. 7, 8, 9, 10, &c.

In the claims below I refer to the “means for unloading the carrier.” I have shown several forms of devices for effecting this ob-

ject, one form having the toothed wheel on the terminal wheel-shaft, the circular track D^2 , and the cam-track D^3 ; another form (shown in Fig. 7) having a stationary cam-track, I , and another form, Figs. 17 and 18, having an adjustable cam-track; and prior to the date of my patent other means have been known for unloading cable-carriers; and therefore I wish it to be understood that in the combinations set forth in the following claims I mean to include not only the specific devices that I have shown, but also those which are the equivalents thereof.

Again, it will be noticed that I have shown and described (in order to have the apparatus clearly understood) but one form of carrier or receptacle C , it being simple in construction, and I have alluded to this in the claims below as a “carrier or receptacle, C ,” but it will be understood that any equivalent carrying device may be substituted therefor so long as the other features incident to this part of the invention are preserved, for it is well-known at this day that not only may cable-carriers be provided with one pendant, but also that they may be suspended by two, three, four, &c., and with carriers of such species, loading and unloading devices having the characteristics of mine may be readily combined. So, too, it is well known at this day that in many respects tramways in which the cable is stationary and the carrier is movable relatively thereto are similar to tramways of the specific character which I have shown; and therefore I shall also apply to such a stationary cable and movable carrier my devices for loading and unloading and my means for holding the carrier properly relatively to the loading and unloading devices.

I do not in this application claim any of the features relating to the gripping devices which I have shown, or those relating to the clip or clamp for securing the carriers to the cable, as I have made these the subject-matter of other applications for patent; nor do I claim any of the combinations claimed in my application No. 138,584, filed July 23, 1884, or 104,917, filed August 27, 1883.

What I claim is—

1. In a cable tramway, the combination of a cable, a guide-wheel, a reciprocating carriage, and a guide for the reciprocating carriage, arranged substantially as set forth, whereby the carriers attached to the cable are by the carriage delivered to said guiding-wheel, substantially as set forth.

2. In a cable tramway, the combination of a cable, a guiding-wheel, a carrier secured to the cable, means, substantially as set forth, in proximity to said guiding-wheel for unloading said carrier, a reciprocating carriage which can be detachably connected with the carrier, and a guide for said carriage, which is arranged substantially as set forth, whereby the carriage remains connected with the carrier until the latter is brought into engagement with the

devices which unload the carrier, substantially as set forth.

3. In a cable tramway, the combination of a cable, a carrier secured to the cable, means, substantially as set forth, for automatically unloading said carrier, and means, substantially as set forth, for throwing the carrier out of its normal position relatively to the cable immediately before coming into engagement with the devices which unload it, substantially as set forth.

4. In a cable tramway, the combination of a cable, a carrier secured to the cable, mechanism, substantially as set forth, for unloading said carrier, having a wheel revolving about an axis inclined to the horizon, and devices, substantially as set forth, which, before the cable-carrier comes in contact with the mechanism which unloads it, throw said cable-carrier out of its normal position relatively to the cable, substantially as set forth.

5. In a cable tramway, the combination of a cable and guiding devices, substantially as set forth, which hold the cable in a position inclined to the horizon, a carrier secured to the cable, mechanism, substantially as set forth, for unloading the cable-carrier, and devices arranged, substantially as set forth, to throw the cable-carrier out of its normal position relatively to the cable before it is acted upon by the unloading devices, substantially as set forth.

6. In a cable tramway, the combination of the cable, a carrier secured to the cable by a support which can swing into a line inclined to the cable, means, substantially as set forth, for unloading the cable-carrier, and devices, substantially as set forth, which, before the cable-carrier is acted upon by the unloading mechanism, vary the line of inclination of the support of the cable-carrier relatively to the cable, substantially as set forth.

7. In a cable tramway, the combination of the cable, the carrier secured to the cable by a support adapted to move relatively to the cable, means, substantially as set forth, for unloading the cable-carrier, and a traveling carriage in the path of the carrier-support, and arranged substantially as set forth, whereby it temporarily engages with the carrier-support and remains connected therewith until the carrier-support comes into engagement with the unloading devices.

8. The combination of the cable, a carrier secured to the cable, a cam or track which turns the carrier relatively to its support to unload it, and mechanism, substantially as set forth, which throws the cable-carrier out of its normal position relatively to the cable before it is acted upon by the said cam or track of the unloading devices, substantially as set forth.

9. The combination of a cable, a carrier secured to the cable, a support for the cable, which holds it in a line inclined to the horizon, mechanism, substantially as set forth, for

unloading the said carrier, and a movable carriage which travels on lines inclined to the horizon, and adapted, substantially as set forth, to throw the cable-carrier out of its normal position relatively to the cable before it is engaged with the unloading mechanism, substantially as set forth.

10. The combination of a cable, a carrier secured to said cable, mechanism, substantially as set forth, for unloading said carrier, and reciprocating devices, substantially as set forth, which throw the carrier out of its normal position relatively to the cable before coming into engagement with the unloading mechanism, and a weight or its equivalent for moving the said reciprocating devices in one direction, substantially as set forth.

11. The combination, with the cable, its carrier, and unloading devices, substantially as set forth, of a carriage, the anti-friction wheels upon the carriage, for supporting it, and anti-friction wheels for the cable, substantially as set forth.

12. The combination, with the cable, the carrier secured thereto, and mechanism, substantially as set forth, for unloading the carrier, of the carriage which intermittently engages with the carrier, and supporting and guiding devices, substantially as set forth, on the carriage for receiving the cable and holding it properly relatively to the carriage, substantially as set forth.

13. The combination, with the cable, the carrier secured to the cable, and mechanism, substantially as set forth; for unloading said carrier, of the carriage which intermittently engages with the carrier, it being provided with a stop which engages with the carrier, and means, substantially as set forth, for holding said stop across the path of the carrier, and arranged substantially as set forth, whereby said stop-holding devices are permitted to automatically release the carrier.

14. The combination, with the cable, the carrier secured to the cable, and means, substantially as set forth, for unloading the carrier, of the traveling support f' , adapted to lie across the path of the carrier, and devices, substantially as set forth, for automatically throwing said traveling stop out of said path, substantially as set forth.

15. The combination, with a cable, a carrier secured to the cable, and mechanism, substantially as set forth, for unloading said carrier, of a traveling stop, f' , lying across the path of the carrier in front thereof, and a stop adapted to lie across the path of the carrier in rear thereof, whereby it is held firmly in proper position, substantially as set forth.

16. The combination, with a cable, a support which holds the cable in a line inclined to the horizon, a carrier attached to the cable, substantially as set forth, whereby it can swing into several positions relatively thereto, and mechanism, substantially as set forth, for unloading said carrier, of an inclined traveling

support, as at *f*, carrying two stops in different vertical lines, substantially as set forth, whereby the carrier-support can be thrown out of its normal position relatively to the cable.

17. The combination of a cable, a carrier secured to the cable, a traveling support lying across the path of the carrier, a hopper or receptacle moving with said traveling support, a movable holder for retaining material in said hopper or receptacle, and mechanism, substantially as set forth, for moving said holder when the carrier attached to the cable is in conjunction with the hopper or receptacle, substantially as set forth.

18. The combination of a cable, a carrier secured to the cable, a bin or receptacle which travels for a limited distance in proximity to the cable, a holder which prevents the material from escaping from said bin or receptacle, means, substantially as set forth, adapted to be temporarily engaged with the cable for moving the holder, devices for holding the carrier, which is secured to the cable properly relatively to the holder or receptacle, and devices, substantially as set forth, which are temporarily connected with the cable for moving the holder which retains the material in the bin or receptacle, whereby said material can escape therefrom into the carrier that is attached to the cable, substantially as set forth.

19. The combination of the cable, the carrier secured to the cable, a bin or receptacle adapted to be made intermittently stationary, means, substantially as set forth, for automatically delivering the material from said bin or receptacle to the carrier secured to the cable, and a carriage to which said bin or receptacle is secured, said carriage lying partly upon one side of the cable and partly upon the other, substantially as set forth.

20. The combination of the cable, the carrier secured to the cable, a stop adapted to be impinged upon by the carrier secured to the cable, and to be intermittently moved thereby with the speed of the cable, a bin or receptacle which is connected with the said intermittently-traveling stop, and mechanism, substantially as set forth, for automatically releasing the material in the bin or receptacle to permit it to pass to the carrier secured to the cable, substantially as set forth.

21. The combination of the cable, the bin or receptacle which while at rest initially receives the material, a stop connected with the said bin or receptacle and arranged to be impinged upon by the carrier which is secured to the cable, and a second stop which prevents any backward movement of the carrier secured to the cable during the transfer of the load from the bin or receptacle thereto, substantially as set forth.

22. The combination of the cable, the carrier secured to the cable, the bin or receptacle which initially receives the material, means, substantially as set forth, for automatically

engaging said bin or receptacle with the cable, whereby it is compelled to travel with the cable, means, substantially as set forth, for disengaging it, and a weight or its equivalent for returning it to its normal position, substantially as set forth.

23. The combination of the cable, the carrier secured to the cable, a bin or receptacle which receives the material before it is transferred to the cable-carrier, and a frame which supports the said bin or receptacle and is adapted to travel, it having two tracks or two sets of guiding devices, whereby it is held properly in position, substantially as set forth.

24. The combination of the cable, the carrier secured to the cable, a bin or receptacle which receives the material before it is delivered to the carrier, a holder which retains the material in said bin or receptacle, and a cam or track which moves the said holder to release the material from the bin or receptacle, substantially as set forth.

25. The combination of the cable, the carrier secured to the cable, the bin or receptacle which initially receives the material, and which is adapted to travel from a limited distance, and the guiding mechanism for the carrier, which is provided with flaring bars or plates, one upon one side of the carrier and the other upon the other, whereby said carrier is held properly laterally, substantially as set forth.

26. The combination of the cable, the carrier secured to the cable, the guiding-bars, and a stop, *m*, on the front of the carrier, and a stop behind the carrier, substantially as set forth.

27. The combination of the cable, the carrier secured to the cable, a bin or receptacle, and the movable frame which holds the bin or receptacle, said frames surrounding the cable and the carrier secured thereto, substantially as set forth.

28. The combination, with the traveling cable, of the traveling carriage having the bin or receptacle secured thereto, and means, substantially as set forth, operated by the cable, for releasing the material in the bin or receptacle, substantially as set forth.

29. The combination, with the cable and a traveling carrier or receptacle, *C*, of the bar *f*³, arranged to lie across the path of the carrier, substantially as and for the purposes set forth.

30. The combination of the cable, a traveling carrier or receptacle, *C*, the bar *f*³, which lies across the path of the carrier, and the bar *f*¹, substantially as and for the purposes set forth.

31. The combination of the cable, a carrier or receptacle, *C*, the bar *f*³, the bar *f*¹, and an intermediate connecting device which joins said bars together, substantially as set forth.

32. The combination of the cable, a carrier or receptacle, *C*, the bar *f*³, and the lock *f*², which intermittently holds the bar *f*³ in the path of the cable, substantially as set forth.

33. The combination of the cable, a carrier

or receptacle, C, the bar f^3 , which intermit-
tingly lies across the path of the carrier, and
a support for the bar f^3 , which throws it to
one side of the path of the carrier, substan-
tially as set forth.

34. The combination of the cable, a travel-
ing carrier or receptacle, C, the bar f^3 , which
intermittingly lies across the path of the car-
rier, and a stop or bar, H, which intermit-
tingly lies behind the carrier, substantially as
and for the purposes set forth.

35. In an unloading device for a tramway-
cable, the combination of the cable, a travel-
ing carrier or receptacle, C, and the bar f' ,
which intermittingly lies across the path of
the carrier, and which is situated in proximity
to the cable, substantially as and for the pur-
poses set forth.

36. The combination of the cable, a travel-
ing carrier or receptacle, C, a bar, f^3 , which
lies intermittingly in front of the carrier, a
bar, as at e , which lies on one side of the car-
rier and prevents it from moving in that direc-
tion, and a bar, as at e' , upon the other side
of the carrier, which prevents it moving in
the direction of the last said bar, whereby the
carrier can be held properly in position, sub-
stantially as set forth.

37. The combination of the cable, a travel-
ing receptacle or carrier, C, a hopper, O, and
a bar which intermittingly lies in front of
the carrier and is connected with said hopper,
whereby it is adapted to hold the carrier and
the hopper together intermittingly, substan-
tially as set forth.

38. The combination of a cable, a carrier or
receptacle, C, an intermittingly-movable hop-
per, O O', a stop or bar which intermittingly
lies across the path of the carrier and is se-
cured to the said hopper, and an opening and
closing door for the hopper, substantially as
set forth.

39. In a loading device for cable tramways,
the combination of a cable, a traveling car-
rier or receptacle, an intermittingly-movable
frame or carriage provided with a receptacle
to hold the load which is to be transferred to
the carrier, and a bar or stop connected with
the frame or carriage, with which bar or stop
the carrier or a traveling projection engages
to effect a temporary engagement between the
cable and the frame or carriage, substantially
as set forth.

40. The combination, with a series of travel-
ing buckets or carriers, of a series of two or
more dumpers, I, said carriers and dumpers
being constructed and arranged relatively to
each other substantially as set forth, whereby
certain of the carriers are dumped at one
point and certain other carriers at other
points.

41. The combination, with the series of
traveling buckets or carriers, each having one
or more pins or projections, of a series of
dumpers, each having a portion lying in the
path of the pins or projections on certain car-
riers and out of the path or paths of the pro-
jections on certain other carriers, substantially
as set forth.

42. The combination of a dumper, a trav-
eling bucket or carrier pivotally supported
by one or more depending arms, and a bar or
bars, as at e , which steady the said down-
wardly-depending arm while the carrier is
passing the dumper, substantially as set forth.

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

CHAS. M. HUSON.

Witnesses:

JOHN S. CARY,
JOHN F. MCKINLAY.