

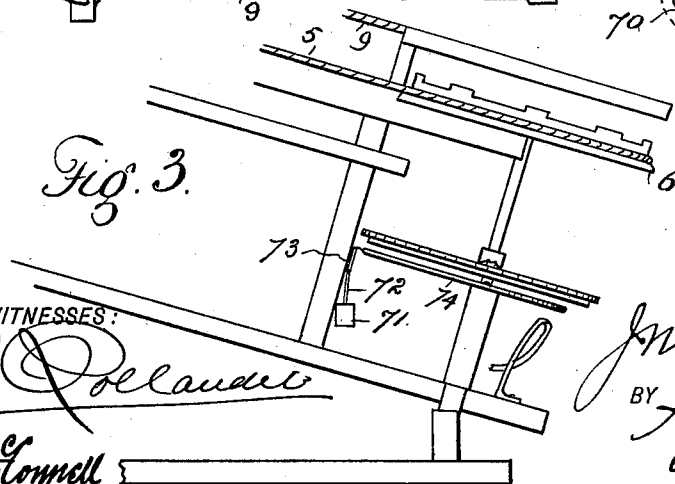
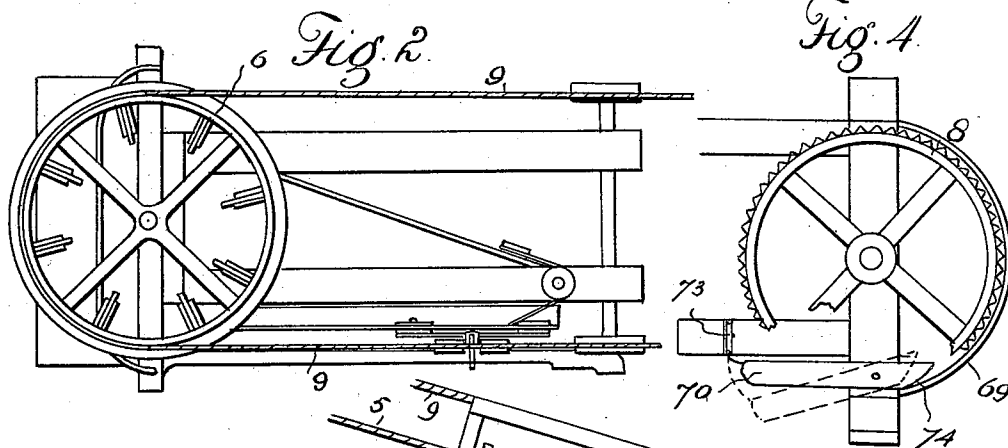
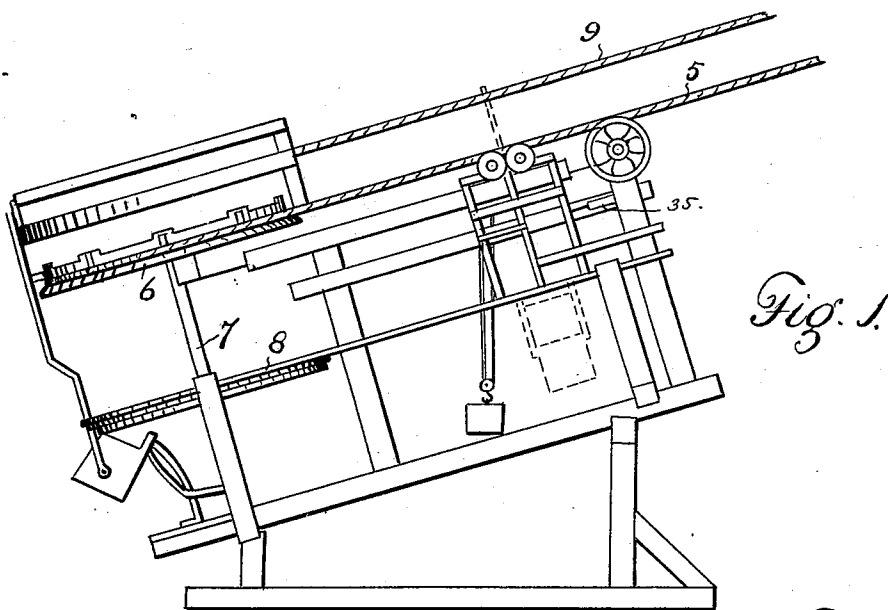
(No Model.)

4 Sheets—Sheet. 1

J. T. HUSON.
WIRE ROPE TRAMWAY.

No. 508,138.

Patented Nov. 7, 1893.



WITNESSES:

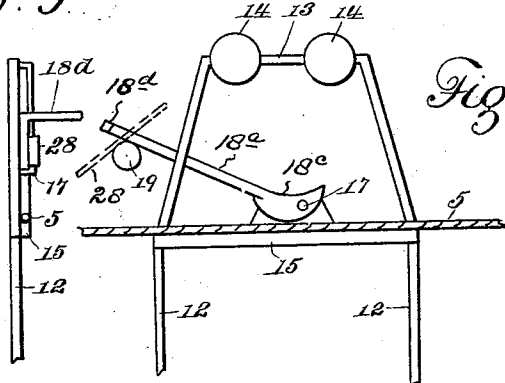
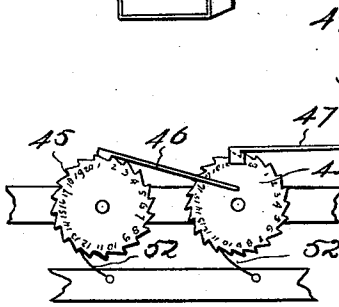
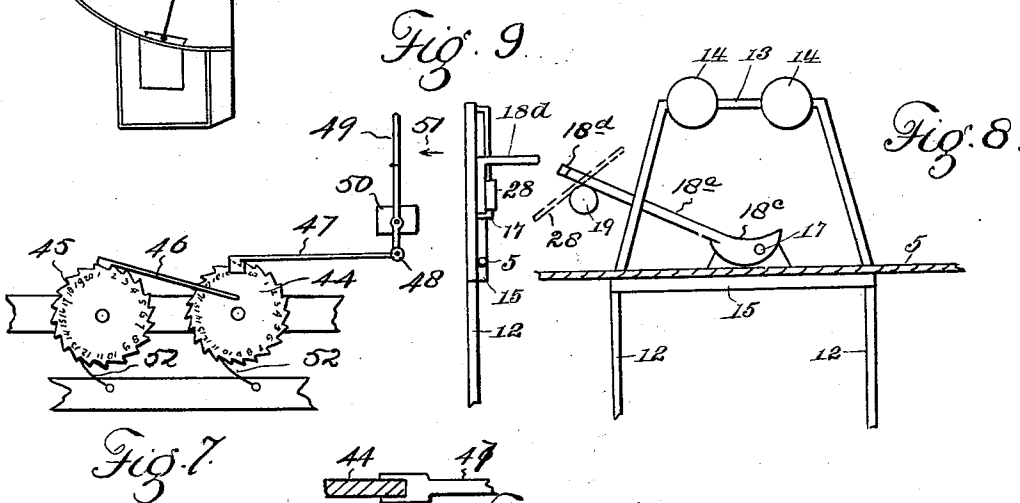
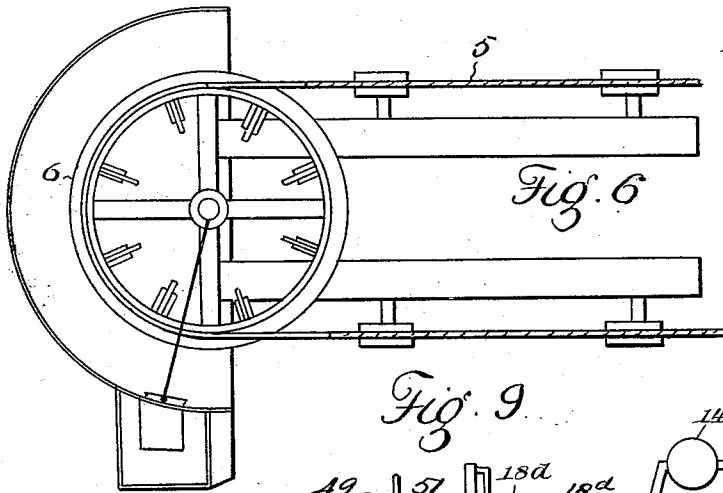
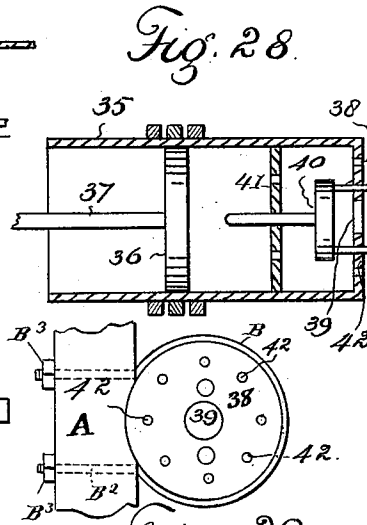
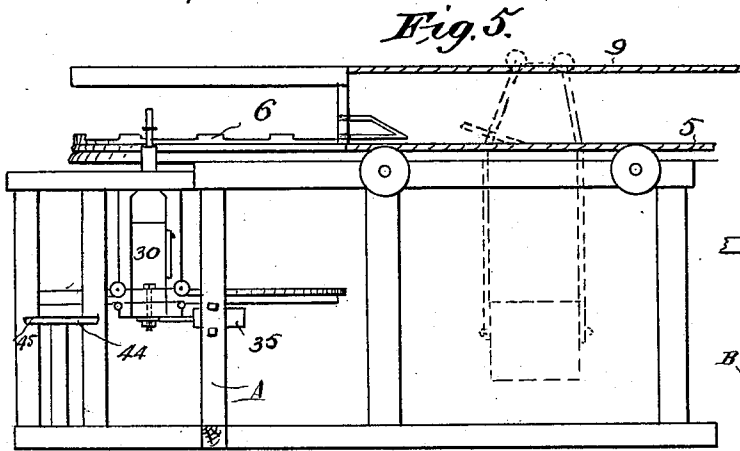
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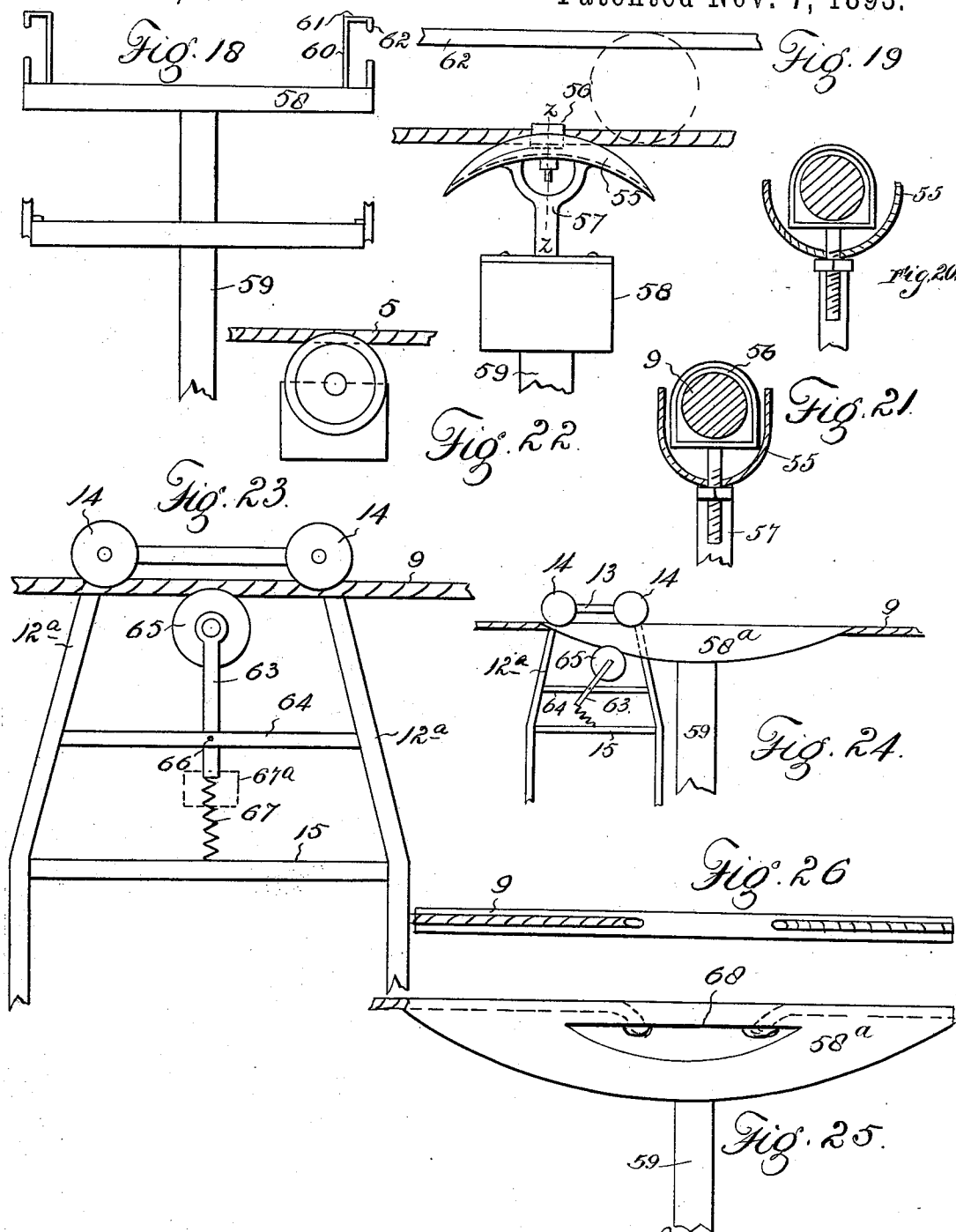
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4 Sheets—Sheet 3.

J. T. HUSON.
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No. 508,138.

Patented Nov. 7, 1893.



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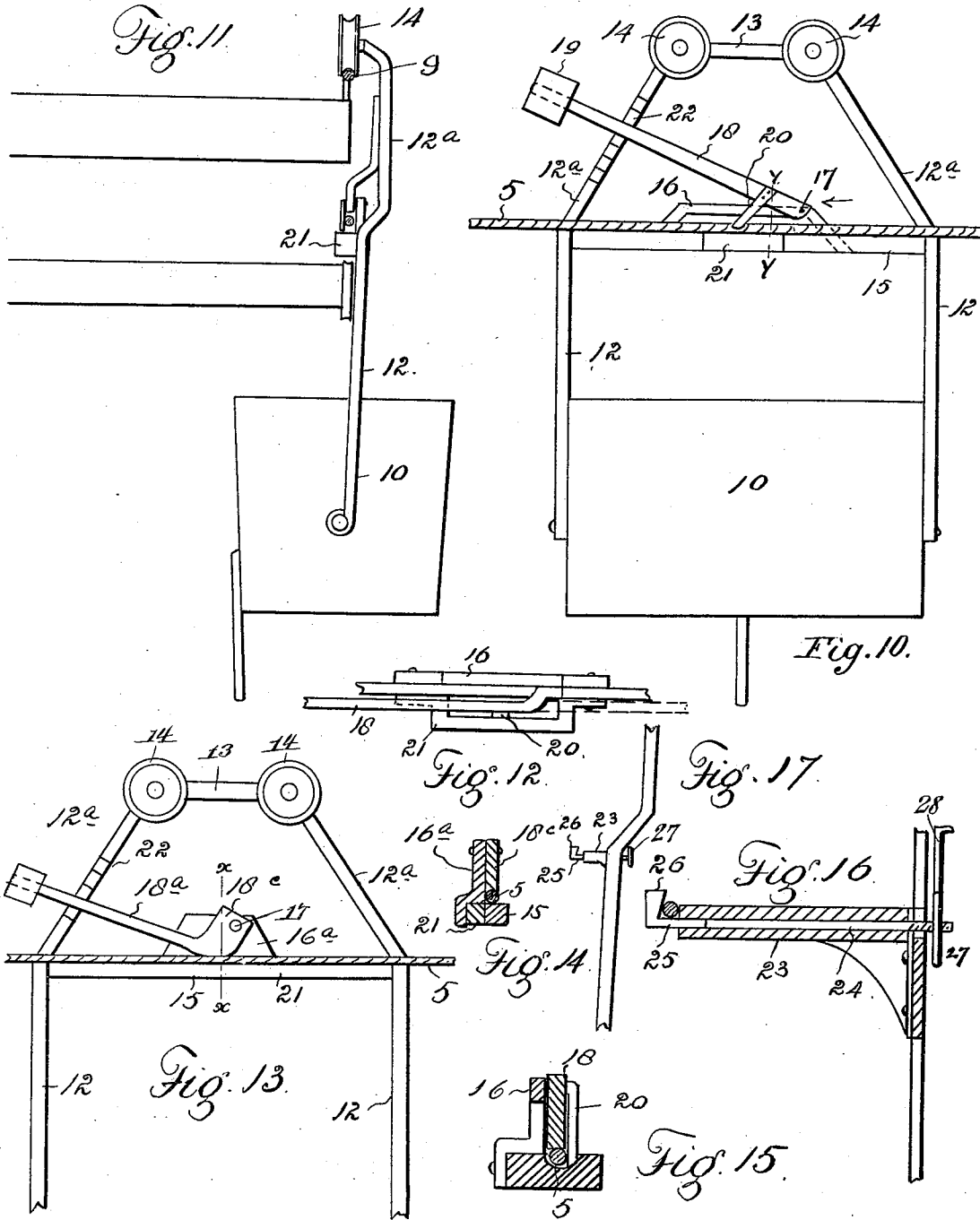
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4 Sheets—Sheet 4.

J. T. HUSON.
WIRE ROPE TRAMWAY.

No. 508,138.

Patented Nov. 7, 1893.



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UNITED STATES PATENT OFFICE.

JOHN T. HUSON, OF DENVER, COLORADO.

WIRE-ROPE TRAMWAY.

SPECIFICATION forming part of Letters Patent No. 508,138, dated November 7, 1893.

Application filed April 11, 1892. Serial No. 428,598. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. HUSON, a citizen of the United States of America, residing at Denver in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Wire-Rope Tramways; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in endless wire-rope tramways and the object of the invention is to provide a device of the class stated which shall be comparatively simple in construction, economical in cost, reliable, durable and efficient in use.

To these ends the invention consists of the features, arrangements and combinations hereinafter described and claimed.

The improvement will be fully understood by reference to the accompanying drawings in which is illustrated an embodiment of the invention.

In the drawings, Figure 1 is a side elevation of the lower terminal of the tramway. Fig. 2 is a top view of the same. Fig. 3 is an elevation of the side opposite that shown in Fig. 1. Fig. 4 is a top view in detail of the sprocket wheel. Fig. 5 is a side elevation of the upper terminal of the tramway. Fig. 6 is a top or plan view of the same. Fig. 7 shows the automatic registering mechanism in detail. Fig. 8 is a side view of the upper part of the bucket showing the manner of automatically releasing the gravity grip lever. Fig. 9 is an edge view of the same. Fig. 10 is a side view of the bucket on an enlarged scale showing another style of grip lever. Fig. 11 is an end view of the same. Fig. 12 is a top view of the bucket grip mechanism. Fig. 13 is a side view of the bucket showing another style of grip lever. Fig. 14 is a section taken on line $x-x$, Fig. 13. Fig. 15 is a similar section taken on line $y-y$, Fig. 10 looking in the direction indicated by the arrow. Fig. 16 illustrates another style of grip mechanism attached to the bucket pendant. Fig. 17 is a view of the same on a reduced scale.

Fig. 18 illustrates the support for the tramway ropes or cables. Fig. 19 is a side view on an enlarged scale of the support for the stationary or upper cable. Figs. 20 and 21 are enlarged sections taken on the line $z-z$, Fig. 19 illustrating the manner of securing the stationary cable to its engaging shoe. In these views two different styles of shoe are shown, one being quite open to receive the pulley, and the other more closed to enter the pulley's groove, the flanges of which run outside thereof. Fig. 22 is an end view of the support for the movable cable. Fig. 23 shows a modified form of bucket pendant in connection with the stationary cable. Fig. 24 is a side elevation of the same on a reduced scale, showing the manner of passing the cross bar secured to the top of the supporting standard. Fig. 25 illustrates the manner of splicing the stationary cable, being a side elevation of the splice bar and the cross bar support. Fig. 26 is a top view of the same. Fig. 27 is a section taken partly through one of the disks of the registering mechanism, showing the manner of supporting the actuating dog in place. Fig. 28 is a longitudinal section taken through an air cushion casing for use in connection with the loader located at the upper terminal. Fig. 29 is an end view of the same.

Similar reference characters indicate corresponding parts or elements in the several views.

Let the numeral 5 designate the movable endless wire rope or cable of the tramway engaging the rotating grip wheels 6, one of which is located at each terminal of the line, supported upon a suitable framework, and journaled on a shaft or supporting standard or post 7. The sprocket wheels 8 which engage the bucket pendant, are mounted or journaled on shaft 7, lying below the grip wheels, and in the same vertical plane. The construction thus far described, that is, the movable cable, the terminal grip wheels, sprocket wheels and the general framework, is substantially the same as that secured by Letters Patent issued to Charles M. Huson, and known as the "Huson tramway." This patent is numbered 269,525, and bears date December 26, 1882. This old construction will therefore not be described in detail.

In my improved tramway system I employ

a stationary cable 9 located above the movable cable and terminating at the extremities of the line in curved or arc shaped metal tracks suitably secured to the framework, 5 This system gives increased capacity, since with it, it becomes practicable to use much larger buckets or cars than can be employed with the single cable line. In this system the bucket pendant is gripped to the movable 10 cable and provided with pulleys engaging the stationary cable or track.

As shown in the drawings the bucket or car 10 is provided with a double pendant pivoted to its sides and composed of arms 12 15 connected at the top by a bar 13 carrying pulleys 14 adapted to engage the stationary cable or track 9. The bars 12 of the bucket pendant are connected below bar 13 with a transverse parallel bar 15 to which is secured 20 a central brace 16 to which is pivoted or fulcrumed at 17 the grip lever 18, weighted at its free extremity as shown at 19, and having a side projection 20. See Fig. 10. The upper portions 12^a of the bucket bail are bent out 25 of the vertical plane of the cables as is also the lever 18. One part 12^a is provided with a ratchet portion 22, the teeth of which engage the lever 18 and hold the same in any position to which it may be adjusted.

30 In Fig. 13 a grip lever is shown of somewhat different construction, and consists of an arm 18^a provided with a grooved cam 18^c pivoted to a block 16^a.

In Figs. 16 and 17 another means for gripping the movable cable is shown, consisting 35 of an interiorly threaded sleeve 23 secured to the bucket pendant, said sleeve receiving a correspondingly threaded bar or rod 24 swiveled to an angular shank 25 terminating in a hook 26 barbed or corrugated on the face 40 engaging the cable. The outer extremity of the rod 24 terminates in a hand wheel 27 which may also be provided with an arm 28 for greater leverage. It will thus be seen 45 that by adjusting bar 24 the cable may be gripped or released as may be desired.

A somewhat modified form of gripping lever is illustrated in Fig. 8. This grip is provided with an arm or handle 18^d projecting 50 at right angles from the outer extremity of the lever arm and adapted to engage an adjustable inclined bar 28 hinged to the terminal frame and made to engage arm 18^d when it is desired to release the grip and stop 55 the bucket.

The loading carriage located at the upper terminal is generally illustrated in Fig. 5 and designated 30. This carriage is shown in the 60 Huson patents, to which reference has been heretofore made. The carriage is engaged by the bucket pendant and carried partially around the terminal wheels. After the bucket is filled the carriage is automatically released from the bucket, which proceeds on its course, 65 while the carriage is drawn backward to its former position by a weight suspended by a rope passing over a pulley on the frame. It

is essential that this carriage should, as soon as released from the bucket, return or make the reverse movement quickly in order to be 70 ready for the next bucket.

Much difficulty has heretofore been experienced by reason of the concussion resulting from the sudden return of the carriage, whereby the carriage or connecting parts 75 have become broken and damaged, necessitating frequent and expensive repairing in order to maintain the mechanism in proper working order. To obviate this difficulty I secure an air cylinder 35 to the framework 80 at the starting point or normal destination of the carriage. The cylinder may be secured to one of the bars A of the terminal frame by a metal band B passing nearly around the cylinder and terminating in bolts B² which 85 pass through apertures formed in the bar, being secured by nuts B³. In this cylinder is located a piston 36 to which is connected a rod 37 having its outer extremity connected with the framework of the carriage. One end 90 38 of this cylinder is provided with a central aperture 39 adapted to be closed by an interiorly sliding valve 40, the stem of which is supported in a perforated partition 41 located in the cylinder for this purpose. As the carriage moves forward the piston is drawn outward, the valve 40 opens and air rushes into the cylinder to fill the partial vacuum produced by the outward movement of the piston. As soon as the carriage begins the return move- 100 ment valve 40 closes and the air cushions within the cylinder, since it cannot escape through apertures 42 fast enough to relieve the chamber in proportion to the backward movement of the cylinder. By this means 105 the carriage may be brought back quickly by increasing the size of the actuating weight without any jar or concussion, which is obviated by the air cushion.

To the framework of the upper terminal is 110 attached a registering mechanism illustrated in Fig. 7 and consisting of the disks 44 and 45 pivoted on the frame and connected by a dog 46 engaging the notched periphery of disk 45 and having an arm pivoted near the 115 center of the disk 44 which is directly acted on by a dog 47 pivoted at 48 to an upright lever 49 fulcrumed at 50 on the frame. The lever 49 projects into the path of the carriage 30 which moves forward in the direction indicated by the arrow 51 and engaging said lever moves disk 44 one notch or tooth, and giving a slight movement to disk 45 which 120 ordinarily, however, would be hardly perceptible, since there is but little movement near the center of the disk 44. In making the reverse movement the carriage engages lever 49 and moves dog 47 back one notch, the disk 125 having no backward movement since it is checked in this direction by the locking dog 130 52, disk 45 being similarly controlled. By this means every bucket load is registered.

The manner of securing and supporting the stationary cable is shown in Figs. 19, 20 and

21 in which 55 is a crescent shaped shoe, concavo-convex in cross section with the concave surface upward for the reception of the cable which is surrounded by a suitable clip 56 securely bolted to the shoe which is provided with a bifurcated or forked support 57 suitably secured to a cross beam 58 made fast to a standard 59. This cross beam is also provided with a fixture 60 secured thereto a short distance from the shoe projecting up above the same and provided with an outwardly projecting arm 61 having a depending metal track 62 to receive the grooved periphery of the pulleys 14 of the bucket. See Fig. 18.

15 The bucket may be provided with an arm 63 pivoted to the cross bar 64 connecting its arms 12^a, arm 63 carrying a groove-faced pulley 65 at its upper extremity adapted to engage the cable underneath as shown in Fig. 23. Arm 63 below its pivot 66 is provided with a coil spring 67, one extremity of which is secured to the arm and the other to the cross bar 15 of the bucket. Or a weight 67^a attached to the lower extremity of the arm may be employed. Where this auxiliary pulley 65 is employed, the cross bars secured to the supporting standard 59, and carrying the stationary cable, are regularly curved on the under side as shown in Figs. 24 and 25 and may be designated 58^a. The position of the pulley 65 while passing one of these bars 58^a is shown in Fig. 24. It often happens in erecting systems of this character that the length of the spans or the distance between the supports or standards is much greater at some parts of the line than at other portions thereof, owing to the peculiar physical conditions of the route. Hence where the spans are short the stationary cable 9 need not be of the same strength or size that will be required where these spans are of greater length. It therefore becomes necessary from a standpoint of economy to splice the cable, so to speak, that is, to join the extremities of two parts of different or of unequal cross sectional area. To accomplish this I attach the extremities of the two sections to a metal bar 68, as shown in Figs. 25 and 26, said bar being bored out or made hollow to receive such extremities.

50 Tramway systems of this character are generally employed in transporting ore from a mine on a mountain to some point below in the valley. Hence it is advantageous and desirable that the framework at the lower terminal should occupy a position inclined to the horizontal to correspond with the general plane of inclination from the starting point above to the destination below. This position of the frame is shown in Fig. 1. As the bucket approaches the lower extremity of the line its pendant is engaged by the sprocket or toothed wheel 8 and held in engagement therewith by an arc-shaped guide rod 69 located sufficiently close to the periphery of the wheel and partly surrounding the same.

65 To prevent the bucket pendant from remaining too long in engagement with the

teeth of the wheel, that is, after the upper extremity of the pendant has reached a point through which if a plane be passed perpendicular to the frame's inclination and at right angles to the cable line, it will pass through the center of the sprocket wheel, a bar is pivoted to the framework as shown in Fig. 4 and normally held in the position shown in full lines in said figure, by a weight 71 supported by a rope 72 connected with the bar and passing over a pulley 73. Just before the bucket pendant leaves the guide rod 69 it engages the outer curved or beveled extremity 74 of bar 70 and first moves said bar to the position shown by dotted lines in Fig. 4, and after passing beyond the guide rod is guided by bar 70 out of the path of the teeth of the sprocket wheel, whereby the difficulties heretofore encountered by reason of the pendant's remaining too long in engagement with these teeth are avoided.

Having thus described my invention, what I claim is—

1. The combination with the bucket pendant of the grip lever fulcrumed thereon and the ratchet bar for retaining the lever in the desired position of adjustment, substantially as described.

2. In a wire rope tramway the combination with the bucket pendant, the terminal sprocket wheels and the frame work supporting the same, of the automatically adjustable guard or shield consisting of a bar pivoted on the framework, substantially as described.

3. The combination in a wire rope tramway of the stationary and movable ropes or cables and the bucket pendant supported thereon, and provided with the adjustable grip lever and the ratchet arm for retaining the lever in the desired position of adjustment, substantially as described.

4. In a wire rope tramway the combination with the bucket pendant and the weighted grip-lever fulcrumed thereon, of a releasing device attached to the terminal frame and consisting of a bar having an inclined surface adapted to engage a projection on the weighted extremity of the lever and unlock the same, substantially as described.

5. In a wire rope tramway the combination with the stationary and movable cables, of the bucket pendant, the weighted grip-lever fulcrumed thereon and adapted to secure the pendant to the movable cable, said lever being provided with a lateral projection, and the inclined arm attached to the terminal frame and adapted to engage said projection and raise the weighted extremity of the lever, substantially as described.

6. In a wire rope tramway the combination with the stationary cable, the supporting arm terminating at its upper extremity in the concavo-convex shoe, and the clip surrounding the cable and bolted to the shoe, substantially as described.

7. In a wire rope tramway the combination

with the stationary cable and a supporting standard having the cross bars to which the cable is secured, of the bucket pendant provided with pulleys engaging the cable both
5 above and below, an arm having the lower pulley pivoted at its upper extremity, said arm being pivoted on the pendant frame and normally held in the vertical position by a spring or weight whereby the pendant frame

is permitted to pass the bars secured to the supporting standard, substantially as described.

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

JOHN T. HUSON.

Witnesses:

HERBERT T. HUSON,
WM. MCCONNELL.