

No. 715,414.

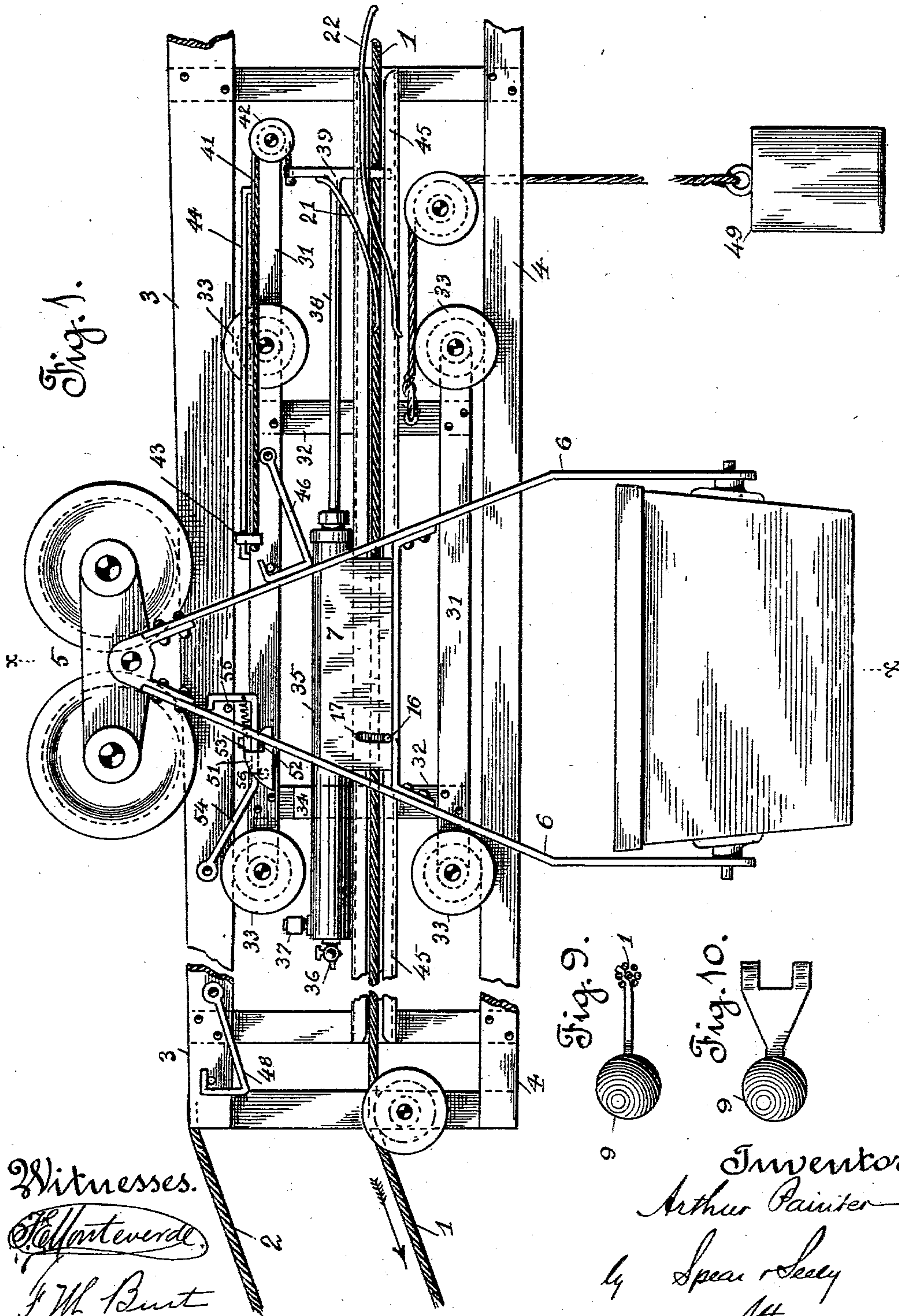
Patented Dec. 9, 1902.

A. PAINTER.
WIRE ROPE TRAMWAY.

(Application filed May 1, 1902.)

(No Model.)

2 Sheets—Sheet 1.

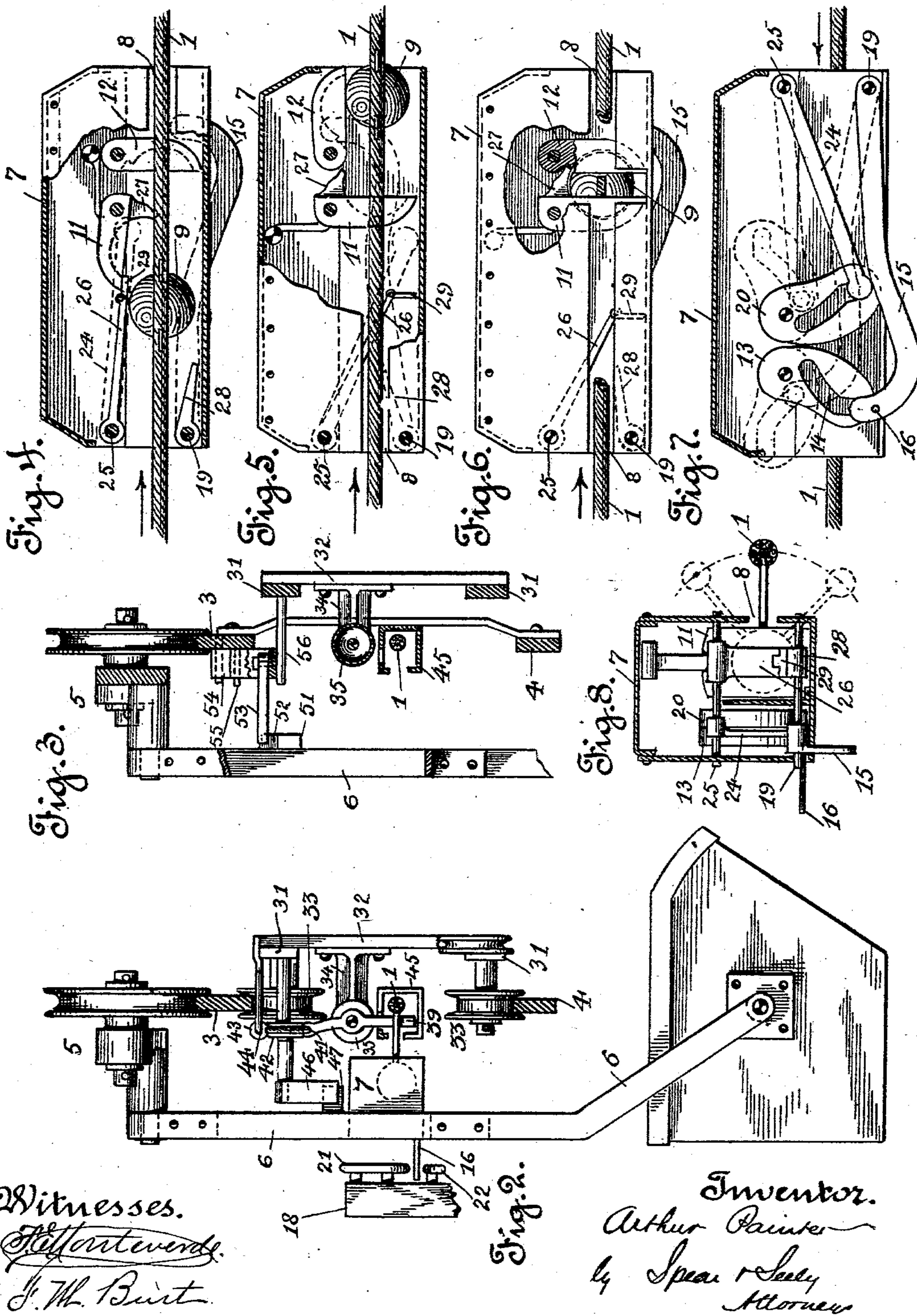


A. PAINTER.
WIRE ROPE TRAMWAY.

(Application filed May 1, 1902.)

(No Model.)

2 Sheets—Sheet 2.



UNITED STATES PATENT OFFICE.

ARTHUR PAINTER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO
HOLLAND M. BARSTOW, OF NAPA, CALIFORNIA.

WIRE-ROPE TRAMWAY.

SPECIFICATION forming part of Letters Patent No. 715,414, dated December 9, 1902.

Application filed May 1, 1902. Serial No. 105,555. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR PAINTER, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Wire-Rope Tramways, of which the following is a specification.

My invention relates to wire-rope-tramway systems, and more particularly to the apparatus employed at loading-stations, whether terminal or intermediate, for detaching the carriers or buckets from the traveling cable while being loaded and for again attaching them to said cable after loading.

It also relates to mechanism at such points for starting the bucket when disconnected independently of the traveling cable and accelerating its speed to approximately that of the said cable when the connection is again made, thus obviating any shock or jar at starting. The construction of such starting and accelerating mechanism is also part of the invention.

Other improvements in details and special features in construction will be hereinafter referred to in connection with an embodiment of the invention shown in the accompanying drawings, in which—

Figure 1 is a front elevation of the mechanism at a loading-station on a line of wire-rope tramway. Fig. 2 is an end elevation of the same looking from the right of Fig. 1. Fig. 3 is a cross-section on $x x$ of Fig. 1 looking in the same direction. Fig. 4 is a longitudinal section of the casing attached to each bucket, showing a clip connected to the traveling cable in the act of entering the casing to engage with devices therein and so become connected to a loaded bucket. Fig. 5 is a similar view showing such a clip leaving the said casing and disengaging itself from an empty bucket arriving at the loading-station. Fig. 6 is a similar view showing a clip in normal relation to the cable when traveling. Fig. 7 is also a longitudinal section of the same casing, but looking in the opposite direction and showing the system of levers by which the engagement and disengagement of the clips is effected. Fig. 8 is a cross-section of the same casing. Fig. 9 is a

side elevation of a rope-clip. Fig. 10 is a plan of the same.

The invention is shown as applied to the well-known type of wire-rope tramway, in which carrying-buckets are connected to an endless moving cable 1 and are guided on a parallel standing cable 2, which is stationary. At each loading-station, whether terminal or intermediate, is located the mechanism shown in the drawings. The bars 3 and 4 are parts of a stationary framework suitably supported. The lower edge of upper bar 3 has a slight inclination upwardly in the direction of travel, Fig. 1, and the upper edge is a guide in line with the standing cable, receiving from said cable the trolley 5, from which the empty bucket is suspended by the hanger or bail 6 and delivering it again to said cable after loading. I refer to loaded and empty buckets as expressing the normal operation of the system. Of course, however, loaded or empty buckets can be sent through the loading-station, their condition in that respect having nothing to do with the operation of the mechanism now being described.

Secured to the bucket-hanger is a casing 7, having a front slot 8, Figs. 6 and 8, through which projects the rope-clip connecting the bucket to the traveling cable. This clip has two or more arms engaging the rope, according to the capacity and weight of the bucket, two being ordinarily sufficient. I prefer to use the clip shown in Letters Patent granted to me October 13, 1896, and numbered 569,228, in which grooved arms are embedded in the cable engaging with different strands thereof and always remaining in engagement; but a strap-clip encircling the rope can be used, if desired. The connection of the clip to the bucket and the construction for effecting such connection is, however, novel, in that the clip proper, as shown in my said patent, is formed with a ball 9. This ball is locked in a sectional spherical socket within the said casing, in which, however, it plays freely, so that the projecting clip can move to any desired angle upward or downward, as indicated in Fig. 8, in passing sheaves, for instance. Using a ball in this way enables me

to obtain a practically unlimited range of movement up and down. The slot through which the clip projects can be made as long as desired, since the ball cannot pass through it. Referring to Figs. 4, 5, and 6, two substantially hemispherical sockets 11 12 are independently pivoted within the casing, so as normally to sufficiently inclose the ball, Fig. 6, and which are operated by the system of levers shown in Fig. 7. Supposing the bucket of Fig. 6 is approaching a loading-station, it is first necessary to open the forward jaw 12, so that the ball of the clip carrying that bucket can escape, leave the bucket at the station, and then carry the preceding bucket away from the station. The shaft on which the jaw 12 is mounted carries a plate 13, which may form part of the jaw, having a slot 14, in which the free end of the lever 15 on rock-shaft 19 is movable. A pin 16 at the same end of the lever projects through a slot 17 in the casing, Figs. 1, 2, and 8. A part of the main frame is the support 18, Fig. 2, to which are attached the guides 21 22, which, however, can be otherwise suitably supported on the main frame. Guide 22 is first inclined upwardly and raises pin 16 and the free end of the lever 15, thereby throwing up plate 13 and jaw 12 to the position of Fig. 5 and permitting the ball to escape. Guides 21 and 22 thereafter are inclined downwardly, so that the reversal of the described motion which, aided by the weight of the jaw and connections, restores jaw 12 to the position of Fig. 4, where it remains until another station is reached. The rear jaw remains in closed position until the succeeding clip comes along, and I now describe its construction, although out of the sequence of operations, in order that the relations of all these parts shall be more fully understood. The pivot of jaw 11 carries also a slotted plate 20, similar to plate 13, with which engages a lever 24, secured to a rock-shaft 25. On the same rock-shaft is an arm 26 in the path of the ball. As the latter enters the open end of the casing arm 26, lever 24, and plate 20 are raised by it, throwing jaw 11 up to position of Fig. 4. This jaw has a projection 27, which when the jaw is opened is in the path of the ball, which strikes it and reverses the movement. Hence from the position of Fig. 4 the parts take the position of Fig. 6, which is the normal position. It will be understood that the ball in Fig. 4 is the one which follows the ball escaping in Fig. 5 and is also the ball in Fig. 6. A dog 28 is secured upon rock-shaft 19 and is in the path of the ball, so as to insure the closing of jaw 12 at the proper time if the other connections fail for any reason—as, for instance, if pin 16 were broken. For the same reason arm 26 has a hinged extension 29, which normally is at an angle, Fig. 6, but which is straightened out by the entering ball and caused to bear positively on jaw 11, as shown in Fig. 4.

The bucket shown in Fig. 1 is stationary, is supposed to have been loaded from a chute,

(not shown,) and is ready to proceed. The devices for engaging the rope-clips with the buckets, as previously described, will automatically take this bucket forward; but their sudden engagement at the speed of the rope would be attended with considerable shock and jar, which would put an unnecessary strain on the sockets, clips, and connections. Consequently a device is interposed for starting the bucket gradually and bringing its speed to about that of the cable before the rope is engaged. This is a carriage composed of longitudinal bars 31 and transverse bars 32 and having rollers 33, which are guided on the main frame, so that the carriage is free to move thereon. Supported on the carriage, as by brackets 34, is a pneumatic cylinder 35, having the petcock 36 and intake-valve 37. The piston-rod 38 has a cross-head 39, to one end of which is secured the rope 41, which passes over guide-pulley 42 and is connected to a lug 43, movable on the guide-rod 44, attached to the carriage, Fig. 1. The cross-head also projects down into the path of the rope-clip, which strikes it, and so operates the piston-rod. The clip detached from the bucket is guided through the mechanism by the long slotted box-guide 45, Figs. 2 and 3, and into a slot in the top of which the lower end of the cross-piece 39 extends. When the air resistance in the cylinder becomes greater than the thrust of the piston, the carriage commences to move. It carries a pivoted latch 46, which bears against a stop 47 on the bucket-hanger, Figs. 1 and 2, and so pushes the bucket forward, so that such bucket is under headway at a speed nearly equal to the clip when overtaken by the latter, which automatically engages with it in the manner before described. As the piston is pushed in the lug 43, to which the rope 41 is attached, is pulled back on its guide-rod and then moves forward with the carriage until it raises, passes under, and is prevented from returning by a pivoted latch 48 on the main frame. The object of this stoppage of the lug 43 is to restore the piston and cross-head to normal position. These parts have been released from engagement with the rope-clip by the carriage traveling up the incline of the rails or in some equivalent manner and raising the cross-head of the piston out of the path of the rope-clip. When the carriage is drawn back by the weight 49, Fig. 1, the moving carriage and immovable rope act as a pulling force on the cross-head. The incline of the lower edge of bar 3 of the main frame permits lug 43 to finally pass under latch 48, and the parts then take the position of Fig. 1.

Referring now to the bucket which is entering the loading-station and which has been disengaged from the rope-clip in the manner before described, such bucket after the disengagement proceeds by its own momentum to the point where the loading-chute is located. On the forward arm of the bucket-hanger is secured a cam 51, having a notch

or recess 52 in its upper edge. The cam 51 lifts a spring-pressed and pivoted bar 53, which is then adapted to fall into the notch 52, and so prevent the bucket from moving backwardly. The bar 53 is formed with the latch 54, pivoted to the main frame and having an incline, as shown, and a stop 55, which prevents it from falling too far. A pin 56, returning with the carriage, raises this latch 54, and so lifts the bar 53 out of the notch in the cam and frees the bucket so far as the forward movement is concerned. This is the position in Fig. 1 with the bucket ready to start. While being loaded it is held immovable either forward or backward. The next rope-clip escaping from the bucket next succeeding will carry out the operation previously described, the first moving the carriage, which in turn starts the bucket and gives it the headway or speed at which it is overtaken by the clip and carried on its journey.

It will be understood that at a terminal station, the framework of which the bars 3 and 4 form a part, will be a structure located adjacent to the terminal pulley for the traveling cable. By this arrangement buckets can be very quickly loaded from a chute and sent on their way, all the operations incident to the disengagement and reengagement of the buckets and rope-clips being automatically accomplished and the start of the loading-bucket being effected without any injurious shake or jar from the rapidly-moving clips.

Particular advantages result from the employment of the air-compression cylinder for communicating the motion of the traveling rope to the carriage, inasmuch as the amount of compression can be accurately regulated by means of the vent or petcock and proportioned to the speed of the cable and the weight of the buckets.

I do not limit myself to the specific constructions and arrangements of mechanism herein described, and shown in the drawings, as within the scope of the following claims I desire to avail myself of such modifications and equivalents as fall properly within the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a wire-rope tramway, a rope-clip provided at one end with a spherical head adapted to be connected to a traveling bucket, and at the other end with means for connecting it to the rope.

2. In a wire-rope tramway, a rope-clip provided with a spherical head and a bucket having a substantially spherical seat for said head.

3. In a wire-rope tramway, a rope-clip having a spherical head and a bucket having a seat for said head composed of two substantially hemispherical sockets.

4. In a wire-rope tramway, the combination with the standing rope and the traveling rope

of a bucket provided with a pair of cooperating pivoted jaws, a rope-clip having a head offset from the traveling rope and adapted to be seated between said jaws, and means for operating said jaws independently for admitting said head between them and permitting it to escape from between them.

5. In a wire-rope tramway, the combination with a bucket and with a traveling rope, of a casing attached to the bucket, a clip connected to the rope and having a spherical head, a pair of jaws pivoted within the casing, and adapted to close to form a spherical socket for said head, a pivoted lever connected to each jaw, and means for automatically operating said levers to effect the movements of the jaws in receiving and releasing the said head.

6. In a wire-rope tramway, the combination with the main frame and with the traveling rope, of the guides 21, 22, a bucket suspended from said frame, a casing on said bucket, pivoted jaws within said casing, a rope-clip having a head offset from the traveling rope and adapted to enter said casing and be received within its jaws, a lever pivoted within said casing and connected to the forward jaw, and a pin projecting from said casing and operated by the said guides, whereby said forward jaw is first opened to release the rope-clip, and is then closed to receive the succeeding rope-clip.

7. In a wire-rope tramway, a casing attached to each traveling bucket, a pair of pivoted jaws within said casing, a lever connected to the rear jaw of the pair, and a projection on said jaw whereby a rope-clip entering said casing is first caused to raise said jaw, and pass beneath it, and then to strike said projection and close said jaw, leaving said clip between the two jaws.

8. In a wire-rope tramway, a main frame, a carriage movable thereon, a traveling rope, rope-clips connected thereto and adapted to be connected to traveling buckets, a pneumatic cylinder on said carriage, and a piston in the path of said rope-clips, whereby a pneumatic resistance is formed, which causes the said carriage to move with each rope-clip and to start the bucket.

9. In a wire-rope tramway, the combination with the main frame, and with traveling buckets suspended therefrom, of a traveling rope, rope-clips carried thereby and adapted to engage and be disengaged from the buckets, a movable carriage on the main frame, and a pneumatic cylinder and piston provided with means for regulating the air resistance and operated by the successive rope-clips, substantially as and for the purposes set forth.

10. In a wire-rope tramway, the combination with the traveling carriage for starting the bucket, of a pneumatic cylinder on said carriage, a piston-rod having a cross-head, a rope connected thereto, means for locking said rope at the end of the forward movement of

said carriage, and a weight for returning the carriage, and thereby withdrawing the piston-rod as the carriage returns.

11. In combination with the main frame, 5 and with a traveling carriage guided thereon, a bucket supported from the main frame, latches on said carriage for holding said bucket stationary relatively to the carriage, and for releasing said bucket, and means for 10 operating said latches.

12. In a wire-rope tramway, the main frame,

the traveling rope, rope-clips adapted to be connected to traveling buckets, and a slotted guide on said main frame for guiding said clips when disconnected from said buckets. 15

In testimony whereof I have affixed my signature, in presence of two witnesses, this 21st day of April, 1901.

ARTHUR PAINTER.

Witnesses:

F. M. BURT,
L. W. SEELY.