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2,591,680

AUTOMATIC CABLE GRIPPER FOR SUSPENDED VEHICLES

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FIG. 1

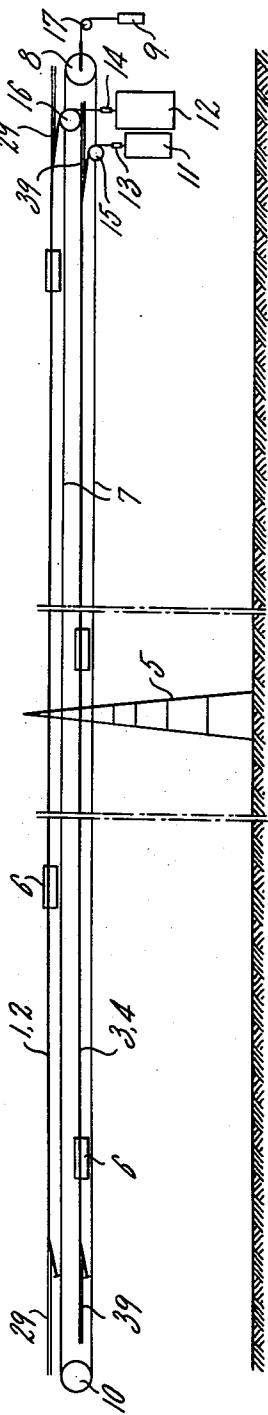
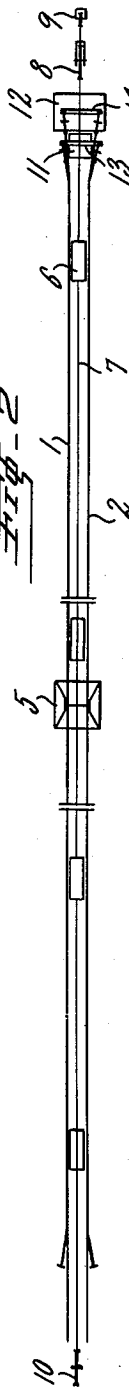
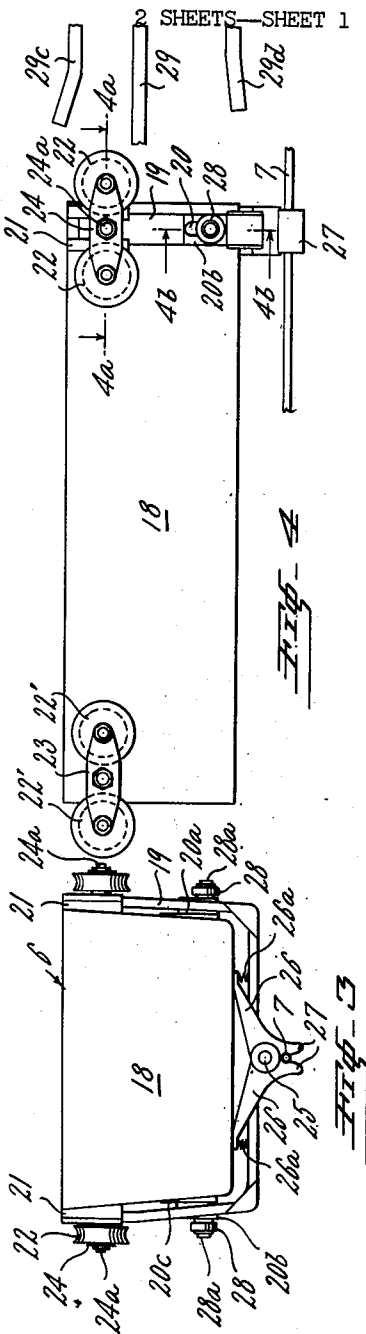


FIG. 2



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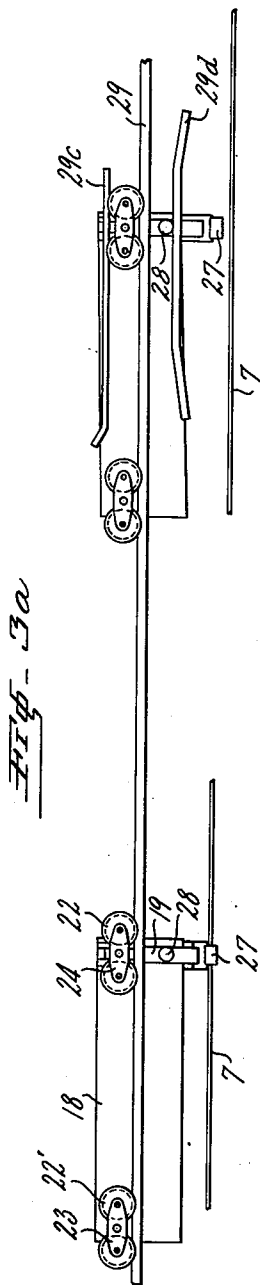
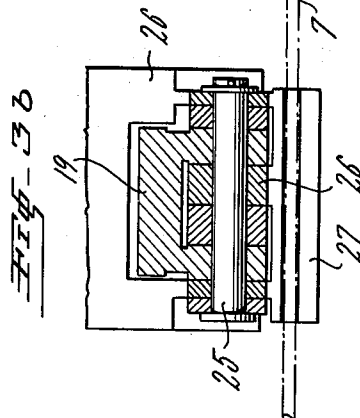
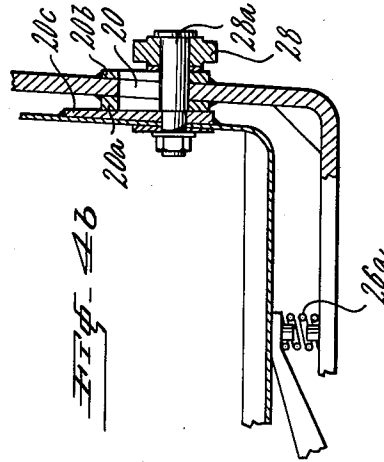
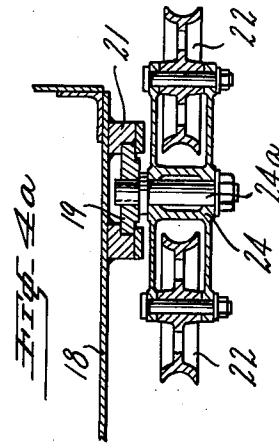
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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AUTOMATIC CABLE GRIPPER FOR
SUSPENDED VEHICLES

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4 Claims. (Cl. 104—208)

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This invention relates generally to an aerial transportation system and more particularly to an automatic cable gripper for suspended vehicles. It is one of the objects of the invention to provide a steel rope railway working in a continuous manner, which enables the transport of 700 to 800 tons of goods per hour by means of machinery as simple as that of known steel rope railways of lesser capacity.

According to a feature of the invention, the wagons of the transporting device are supported by two carrying ropes or cables and are driven by a third one which is the pulling or traction rope.

The conveyors according to this invention may be utilized in all sorts of plants. The system is, however, particularly advantageous in plants where the general slopes are not too steep and where the goods are to be carried for a relatively great distance. In such applications the invention comprises another typical feature, namely that each wagon is directly supported by four bogies the wheels of which roll directly on the two carrying ropes. This arrangement enables replacement of a three-piece assembly, namely the carriage, the suspension and the skip of conventional rope railways, by a single element, namely the wagon. This arrangement simplifies considerably the design of the installation and reduces the dead weight. It has other advantages which will be described below.

Another feature of the invention resides in the fact that one track is above the other, which represents an economy of floor space. The traction rope or cable is preferably located below the corresponding pair of carrying ropes.

The two superposed tracks may be interconnected by any appropriate means. As herein more specifically proposed, however, the two tracks may be connected by a lifting-lowering hoist onto which the wagons are rolled when they reach the end of one track, this hoist performing a vertical movement which takes the wagons from one track to the other. It is also possible to connect the two tracks by inclined planes, preferably subdivided into a part having a gentle slope and another part having a steep slope, in conjunction with a chain device serving to pull the wagons from the bottom track to the top one and, on the other hand, to limit the descending speed of the wagons when they are lowered to the bottom track.

An important object of the present invention is to provide improved means for temporarily disengaging the wagons from the traction cable, thereby facilitating the loading and unloading thereof at desired locations.

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The invention is deemed particularly suitable in installations serving sea ports or other waterways wherein rapid loading and/or unloading of vessels is desired.

Other objects and features of the invention will become apparent from the following detailed description of a representative embodiment, reference being had to the accompanying drawing in which:

Fig. 1 shows schematically a side view of a rope railway embodying features according to the present invention;

Fig. 2 is a plan view of the rope railway shown in Fig. 1;

Fig. 3 is an end view of a wagon forming part of the system of Figs. 1 and 2;

Fig. 3a is a schematic side elevation of part of the rope railway of Figs. 1 and 2, showing one wagon or truck in engagement with and another disengaged from a traction cable;

Fig. 3b is an enlarged sectional elevation of part of the wagon shown in Fig. 3, taken in the plane of the traction cable;

Fig. 4 is a side elevation of the wagon shown in Fig. 3;

Figs. 4a and 4b are sections taken on the lines 4a—4a and 4b—4b, respectively, of Fig. 4, being drawn to a larger scale;

Referring to the drawing, there have been shown at 1 and 2 the two carrying ropes of the top track, supporting the loaded wagons, and at 3 and 4 the two carrying ropes of the bottom track, supporting the returning empty wagons. A steel mast or supporting tower is shown at 5.

The wagons or cars are shown at 6 and have motion imparted thereto by the traction cable 7 the upper run of which pulls the full cars and the lower strand of which pulls the empty cars. The cable or rope 7 passes over tension pulley 8, controlled by the counterweight 9, and over driving pulley 10.

It will be understood that in actual practice the traction cable, before entering onto the pulleys referred to, is deviated sideways to enable the wagons to continue their straight run along the track. At 11 and 12 are shown the counterweights of the carrying cables; 13 and 14 are the swingbars connecting the two counterweights to the corresponding carrying ropes 3, 4. This arrangement equalizes the tensions of the ropes in each of the tracks. The counterweights 9, 10 and 11 are suspended from cable portions passing over deflecting pulleys or rollers 17, 15 and 16, respectively. An upper rigid rail 29 and a lower rigid rail 39 connect with the tracks 1, 2 and 3, 4, respectively, at each of the two terminals of the

system, i. e. at the driving end shown at the left and at the tension end shown at the right in Figs. 1 and 2.

Details of the construction of the wagons 6 are shown in Figs. 3, 3a, 3b, 4, 4a and 4b. In the embodiment illustrated, a container or bucket 18 is movable relative to a frame 19 in which the former is guided in a manner to be described. Wheels 22 and 22', adapted to engage the carrying ropes, are mounted in pairs on bogies 24 and 23, respectively; the bogies 23, one on each side of the wagon, are positioned adjacent one end thereof and fixed to the bucket 18 whereas the bogies 24, likewise one on each side of the wagon, are secured to the frame 19. The frame, in its turn, also bears a stud 25 on which are pivoted two symmetric arms 26, the extremities 27 of these arms constituting tongs by which the wagon or suspended truck may be engaged or disengaged with respect to the traction rope or cable 7 (Figs. 3, 3b).

The frame 19, which is of U-shaped configuration, is formed near the lower end of each of its arms with an inner and an outer reinforcing plate 20a, 20b, respectively, each arm with its plate 20a, 20b being provided with a through-going, elongated slot 20 (see Figs. 4 and 4b). Inner plate 20a slidably abuts a guide plate 20c, secured to the container 18, while a pair of guide rails 21 slidably engage the upper extremity of each arm, each of these upper extremities having pivotally secured thereto, by means of bolts 24a, a respective one of the bogies 24 as best seen in Fig. 4a. A similar bolt 23a, which extends from the guide plate 20c through the aforementioned slot 20, rotatably supports an auxiliary wheel 23, two of these wheels being positioned externally of the frame 19, on opposite sides thereof, as clearly shown in Figs. 3 and 4b. It will thus be seen that the assembly 28, 28a, 20c, 18, 21 is vertically movable with respect to the elements 19, 20a, 20b, 22, 24, 24a.

When the wagon is in the position illustrated in Fig. 3, the tongs 27 are automatically closed on account of the weight of the wagon bucket 18 and the wagon is thus attached to the rope 7. The wagon will, therefore, be propelled by the movement of the traction rope. The disengagement of the wagons from the traction rope will take place automatically at locations along the rope with the aid of suitable release devices; such a device may consist of a portion of two rigid rails 29d of suitable shape, shown in Fig. 4, which the two auxiliary wheels 28 will ascend; this will raise the container or bucket 18 relative to the frame 19. As a result of this operation the bucket 18 no longer bears upon the arms 26 which, under the influence of springs 26a inserted between the arms 26 and the horizontal portion of frame 19, opens the tongs 27 and thus detaches the wagon 6 from the rope 7. In order to prevent the frame from following the movement of the bucket, two counter-rails 29c may be provided against which the wheels 22 of the mobile bogies 24 abut.

When the truck 6 has been moved in some manner past the releasing device comprising the rails 29c and 29d, as by having been pushed forward by the next truck arriving over the track, the wheels 28 descend and the mobile bogies 24 drop back onto the carrying ropes, whereupon the weight of the bucket 18 recloses the tongs 27. By disposing such releasing devices at suitable locations along the tracks, the wagons will be attached to and detached from

the traction rope fully automatically; this has been illustrated in Fig. 3a.

It has been mentioned that the wagons may be dropped from the upper to the lower track or lifted from the lower to the upper track by means of suitable hoists, chains and the like.

Engagement of the wagon 6 with the traction cable 7, at the point where the lower run thereof joins the bottom track 3, 4, may, of course, be conveniently effected with the aid of a suitably positioned release device of the character previously described. In the preceding paragraphs an example of a realization of a rope railway according to the present invention has been briefly described. As already stated, such a system of rope railways may find numerous applications.

The invention makes it possible to unload any cargo directly into the wagons of the rope railway, the considerable extent of the rope railway and the considerable capacity of the wagons (up to 5 tons and more) allowing removal of the goods simultaneously with their unloading from the ships and with such speed that the ship may remain in port only for a very short time as compared with present day practices.

The advantages of the rope or cable railway system may be easily understood when considering the fact that the loading and unloading capacity of a port was heretofore dependent upon the number and capacity of the cranes.

It also may be mentioned that the rope railway may easily pass over and beyond city traffic accumulations, in particular, in the immediate neighborhood of port embankments. Thus, the warehouses for the goods may be located outside these congested areas.

While a preferred embodiment of the invention has been shown and herein described, it will be understood that the same is capable of modifications without departure from the general scope and spirit of the invention as defined in the claims.

I claim:

1. An aerial transportation system comprising, in combination, a suspended track, a truck having wheels in engagement with said track, an endless traction cable, clamping means on said truck adapted to engage said cable, thereby imparting motion to said truck, said truck comprising a frame and a body displaceable relative to said frame between an upper and a lower position, said clamping means comprising a pair of relatively movable jaws operatively connected with said frame and with said body so as to be open in said upper position and closed in said lower position of said body relative to said frame, the weight of said body thus tending to keep said jaws closed about said traction cable, and operating means for disengaging said jaws from said traction cable by raising said body relative to said frame.

2. An aerial transportation system according to claim 1, wherein said relatively movable jaws are pivoted to said frame and provided with extensions upon which said body normally rests by its own weight, said operating means comprising rail means adapted to lift said body from said extensions, thereby allowing said jaws to open.

3. An aerial transportation system according to claim 2, comprising additional rail means for preventing an upward movement of said frame when said body is lifted by said operating means.

4. An aerial transportation system according

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to claim 1, wherein said wheels in engagement with said track include a set of wheels mounted on said frame, said body being provided with additional means mounted thereon in substantial vertical alignment with said set of wheels, 5 said operating means comprising first rail means adapted to engage said additional wheels from below and to lift said body, and second rail means adapted to engage said set of wheels from above, thereby preventing said frame from 10 following said body upwards.

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