(No Model.) 2 Sheets—Sheet 1.

F. H. McDOWELL & S. A. COONEY.

HOISTING AND CONVEYING DEVICE FOR TRAMWAYS.

No. 535,219. Patented Mar. 5, 1895.

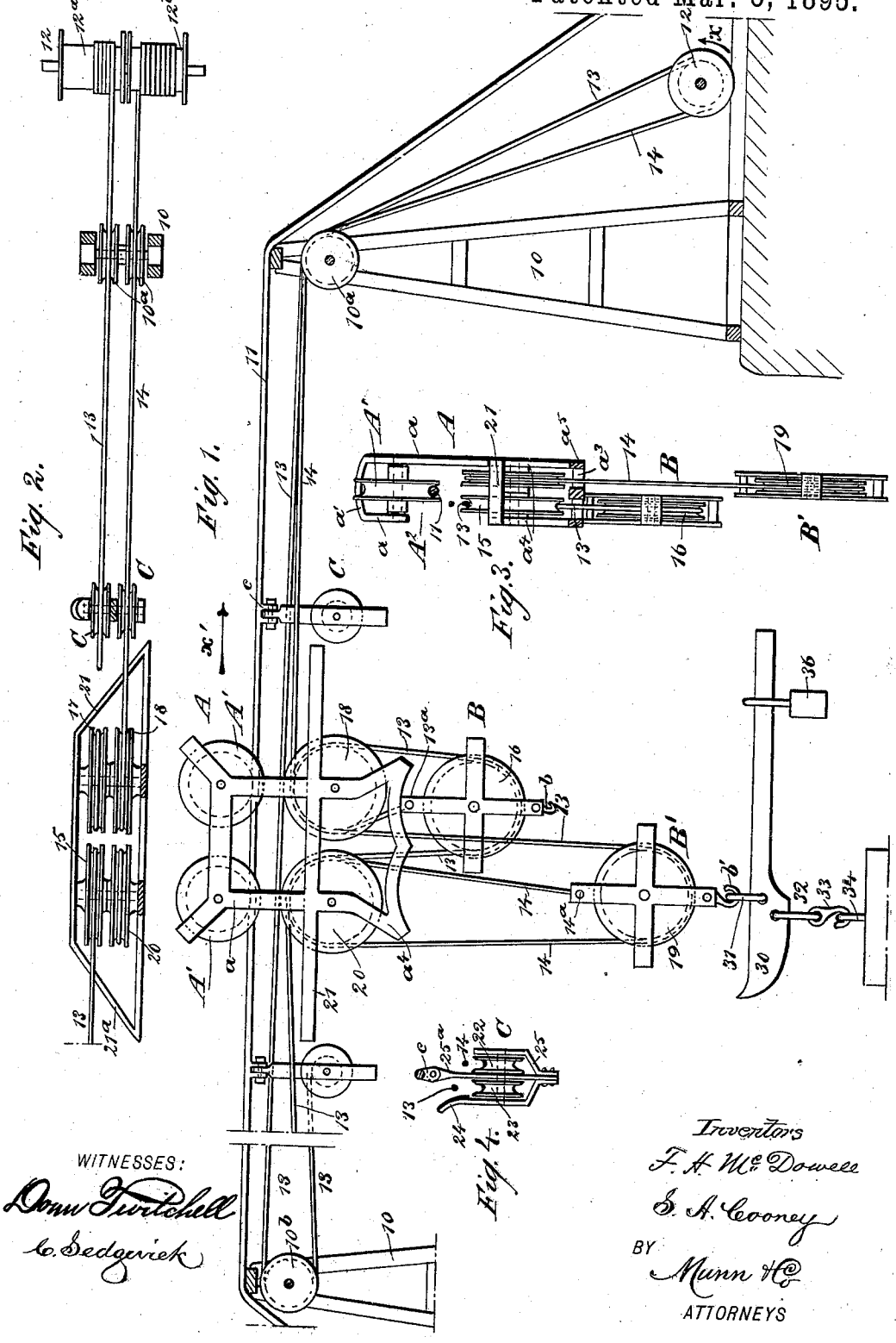

Fig. 2.

Fig. 1.

Fig. 3.

Fig. 4.

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Fig. 5

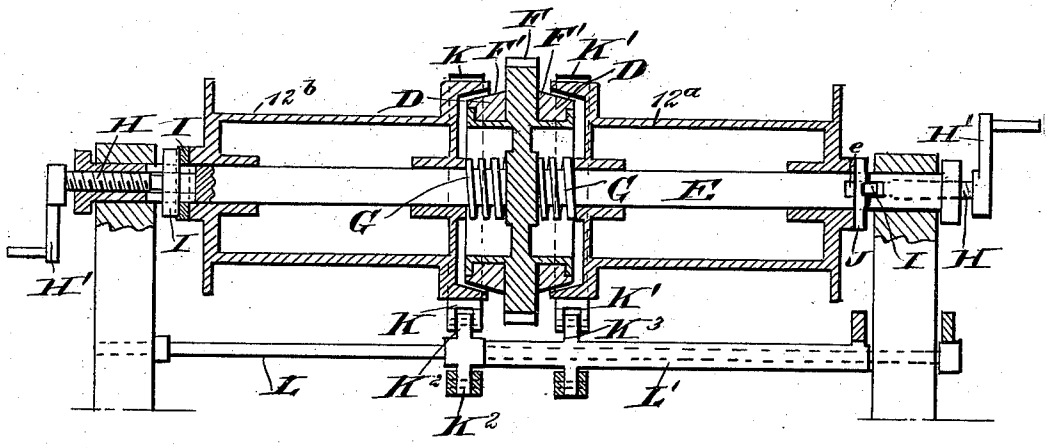
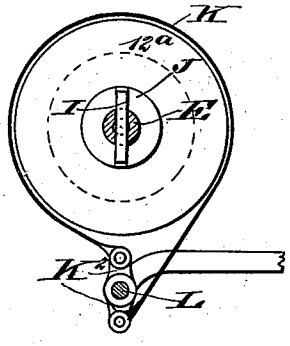


Fig. 6



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UNITED STATES PATENT OFFICE.

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HOISTING AND CONVEYING DEVICE FOR TRAMWAYS.

SPECIFICATION forming part of Letters Patent No. 535,219, dated March 5, 1895.

Application filed April 22, 1891. Renewed January 28, 1895. Serial No. 536,496. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK H. McDOWELL, of Montclair, in the county of Essex and State of New Jersey, and SEBERN A. COONEY, of the city, county, and State of New York, have invented a new and Improved Hoisting and Conveying Mechanism for Tramways, of which the following is a full, clear, and exact description.

The invention relates to tramways and their appurtenances, employed for hoisting material from a quarry, ravine or other cutting or excavation and conveying the material to the terminal of the tramway, and the object of the invention is to improve the construction of such hoisting and conveying mechanisms, increase their efficiency, and promote economy in their construction and operation.

The invention includes duplicate fall ropes, whereby either may be used and the material conveyed to either terminal of the tramway, and whereby either fall rope may be utilized for controlling the travel of the carriage.

The invention further includes an improved system of fall rope carriers, all as hereinafter particularly described and defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar reference characters indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a tramway and its appurtenances embodying our improvements. Fig. 2 is a sectional plan view of a portion thereof. Fig. 3 is an end view of the carriage and fall blocks, the bottom of the carriage frame being in section to show the longitudinal braces. Fig. 4 is an end elevation of one of the fall rope carriers. Fig. 5 is a longitudinal sectional elevation through the winding drums, showing the clutch and brake devices; and Fig. 6 is an end view, partly in section.

In constructing a tramway in accordance with our invention, the usual towers 10 are erected at the terminals, and from the same the cable 11 is stretched, the ends being suitably secured in any approved manner. On the cable 11, the carriage A is arranged to travel, the carriage being suspended by its running wheels A′, A′, and provided with sheaves as hereinafter described, for the fall ropes. The hoisting drum 12, which may be arranged at either terminal, comprises the separate drums 12^a, 12^b, adapted to be operated separately or clutched together to rotate in unison, the clutch devices being of any approved form.

Two separate fall ropes 13, 14, are employed, being connected respectively to the drums 12^a, 12^b, to wind in opposite directions.

The fall rope 13 leaves the drum from the upper side, and passes over a guide sheave 10^a in the adjacent tower 10, and extends to and around a similar guide sheave 10^b on the tower at the opposite terminal, returning thence to the carriage A and passing over a sheave 15, on the said carriage thence downward and around the sheave 16 of the fall block B, from which it passes to and around the sheave 17 on the carriage and downward again to the fall block B, to which it is secured as at 13^a.

The fall rope 14 extends from the drum 12^b over a guide sheave 10^a on the tower 10 and from the latter directly to the carriage A, over the sheave 18, which is mounted side by side with the sheave 17, thence downward and around the sheave 19 of the fall block B′ thence upward to and around the sheave 20 of the carriage, the said fall rope finally passing downward to the fall block B′, and connected therewith as at 14^a.

With a fall rope system arranged as described, it will be seen that if the drums 12^a and 12^b are rotated in unison in the direction of the arrow x shown in connection therewith in Fig. 1, the fall rope 13 will be paid out its drum while the fall rope 14 will be wound in, the result being that the carriage will be moved in the direction of the arrow x', while if the drums are rotated in unison in the inverse direction, the carriage will be caused to travel in the inverse direction of the arrow x'. Thus by rotating the drums in unison, in the proper direction, the carriage can be moved to any desired position along the tramway, it being assumed of course, that both fall blocks are drawn up against the carriage. The carriage having been located at the desired point, one fall rope will serve to retain it in position while the other fall rope is paid out to lower

the fall block and bucket to the pit. Thus in Fig. 1, the fall block B is held in the raised position against the under side of the carriage. If now the drums 12^a and 12^b be unclutched, and the drum 12^b only rotated, in the inverse direction of the arrow x, the fall rope 14 will be unwound and lower its fall block B′ to the pit, the fall rope 13 in the meantime maintaining the carriage in position. The separate drums are controlled by brakes, in practice, after the usual manner of controlling analogous drums. Upon the winding in of the fall rope 14 the fall block will be again raised, and the two drums being clutched and rotated in unison the carriage with its load will be caused to travel.

The carriage A, especially in so far as the details of its frame are concerned, may be of any suitable construction. In the form shown it consists of a skeleton frame a which forms the body or one side of the carriage and at the upper end it is bent or otherwise formed to extend laterally, as at a', and then downwardly as at a^2 (Fig. 3) the frame a and its downwardly extending upper terminal a^2 thus forming bearings for the journals or axles of the running wheels A′. From the bottom of the frame a the opposite side a^4 is supported, the sides being united at the ends by cross bars a^3, and strengthened by longitudinal bars a^5. The side a^4, terminates at its upper end a distance from the downhanging upper terminal a^2 of frame a, and thus the carriage is formed with a side opening A^2. The carriage is thus formed with an open side, in order to clear the fall rope carriers C, next described, and the details shown may be greatly varied in constructing the carriage in practice.

The carriers C, of which there may be any desired number, are stationary, and are suspended at suitable intervals, from the cable 11, or from any other suitable support, the connection with the cable being a pivotal one, indicated by the letter c, for permitting the carriers to be swung by the carriage A, in a direction transverse to the direction of the said cable.

The carriage A is formed with a shifting frame 21, which is secured to or formed on the same and ranges longitudinally of the carriage. The ends 21^a of this shifting frame are inclined from one side of the carriage to the other, so that such inclined ends will successively strike the carriers C, guiding them to the side of the carriage, the open side A^2 of the latter permitting it to clear the upper ends of the carriers.

Each carrier is formed alike and constructed as shown in Fig. 4. The sides 25 of the carrier are united at the bottom, and in the said sides, are journaled the rollers or idlers 22, 23; and one of the sides 25, is continued upward to form a guard 24. The rod or hanger 25^a, by which the carrier is suspended extends vertically from the bottom of the carrier and is secured centrally of the latter. The carrier is open above the idler 22, as clearly shown in Fig. 4.

The fall rope 13, passes through the several carriers C, along the tramway, and its upper line, which extends from the sheave 10^a to the sheave 10^b at the opposite terminal is supported on the idlers 23 and is held against displacement by the guards 24, while the lower line or that portion between the guide sheave 10^b and the carriage A, is supported on the idlers 23 of the carriers. The fall rope 14, also passes through those carriers that intervene the carriage and the guide sheave 10^a, and is supported by the idlers 22 of such carriers.

If the carriage be caused to travel in the direction of the arrow x', its shifting frame 21, will strike the successive carriers C, and swing the latter on their pivots. This swinging movement of the carrier is permitted, by reason of the open sides thereof, and by reason of the tops of the sheaves of the carriage being higher than the idlers 22, the latter feature causes the fall rope 14 to be raised off the said idlers as the carriage approaches each carrier, leaving the latter free to be swung away from the fall rope. The same operation takes place with respect to the lower line of the fall rope 13, when the carriage is moved in the inverse direction of the arrow x'.

The drums and their appurtenances, as shown in Figs. 5 and 6, are of common construction. 12^a, 12^b indicate the drums which are mounted loosely on the shaft E, the latter being driven in any suitable manner. A gear wheel F is keyed on the shaft E, between the adjacent ends of the drums for receiving motion from any convenient power, and there are secured to said gear wheel at the sides, friction clutch disks F′, the same acting in conjunction with the internal friction rings or flanges D on the drums. Springs G, are arranged on the shaft between the ends of the drums and the hub of the gear wheel F, for normally throwing the drums out of contact with the friction disks F′. In the ends of the shafts, in axial bores therein, screw shafts H are provided and formed with crank handles H′ for turning the same. At their inner ends the screw shafts bear against keys I, which are fitted in transverse recesses e, formed in the shaft E to intersect the axial bores thereof. The keys I bear against collars J, which in turn bear against the outer hubs of the drums 12^a, 12^b, the arrangement being such that as the screws H are turned the keys I and collars J, act to force the drums longitudinally into frictional contact with the driving clutch disks F′. The brake bands K, K′, surround the inner ends of the drums, the ends of the bands being connected to lever arms K^2, K^3, secured respectively to the rock shaft L and the hollow rock shaft L′ which surrounds the shaft L, the arrangement being such that either shaft L or L′ may be rocked independently, or both rocked

together to operate the brake bands in the well known manner.

By means of the above described mechanism, either fall rope may be employed for hoisting, or even both. The load may be conveyed to either terminal of the tramway, and the carriage is fully under the control of the operator.

The fall rope carriers may be secured to the cable 11 or to an auxiliary cable or other equivalent support, by any suitable means without departing from the spirit of our invention.

The fall rope blocks B, B′ are provided with the usual hooks *b*, *b′*, for suspending the bucket and wherever it is desirable to know the weight of the load, instead of connecting the bucket directly to the fall rope, we effect such connection through the medium of a weighing mechanism.

In the form shown, the beam 30 is provided with a ring 31, or an equivalent device for engaging the hook *b* or *b′* of the fall blocks, and with a similar ring 32, for carrying a hook 33, that engages the bail 34 of the bucket 35. The bucket is suspended from the scale beam at one side of the point of suspension or pivot point of the beam, and a sliding weight 36 is fitted at the opposite side of such pivot. By this means, when the load in the bucket reaches a predetermined weight, the scale beam will be in equipoise, and the hoisting may proceed without change of the weighing mechanism. Separate weighing of the material is thus avoided, thereby greatly economizing time and labor.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a hoisting and conveying mechanism, the combination of a cable or track, a carriage depending therefrom a fall rope sheave mounted thereon, a fall rope carrier suspended from a point above the level of the fall rope sheave, and means whereby the said carrier is deflected while the carriage passes, substantially as set forth.

2. In a hoisting and conveying mechanism, the combination of a carriage mounted to travel, and a fall rope, fall rope carriers having open sides, and pivoted in the path of the carriage, the carriage having means thereon adapted to engage the carriers and thereby deflect the same out of said path, the carriers being pivoted to move in a lateral and upward direction from the line of travel of the carriage substantially as described.

3. In hoisting and conveying mechanism, the combination, with a carriage mounted to travel, of a fall rope, and a pivoted fall rope carrier arranged in the path of the carriage and means on the carriage adapted to engage the rope carrier and thereby deflect the same out of said path, the carriers being pivoted to move in a lateral and upward direction from the line of travel of the carriage substantially as described.

4. In hoisting and conveying mechanism, the combination, of a carriage mounted to travel, duplicate fall ropes movable independently or in unison, and stationary fall rope carriers pivoted in the path of the carriage, the carriage being formed with a beveled or laterally inclined surface for engaging with and thereby swinging the rope carriers out of said path, the carriers being pivoted to move in a lateral and upward direction from the line of travel of the carriage substantially as described.

5. In a hoisting mechanism, the combination of a carriage mounted to travel, and a fall rope arranged in connection therewith, of fall rope carriers pivoted in the path of the carriage and freely suspended to normally gravitate to the vertical position by their own weight, and a tripping surface on the carriage projected laterally and serving to deflect the carriers in an outward and upward direction, substantially as described.

6. In hoisting and conveying mechanism, the combination, with a carriage mounted to travel, of duplicate fall ropes, and a drum on which said fall ropes are oppositely wound, the one fall rope extending from the drum directly to the carriage, and the other extending to the opposite terminal of the carriage way and returning to the carriage, fall rope carriers pivoted in the path of the carriage, and means on said carriage adapted to deflect the carriers out of said path substantially as described.

7. In a hoisting and conveying mechanism, the combination of a carriage mounted to travel, winding drums at one terminal of the carriage way, the said drums being operative independently or in unison as desired, duplicate fall ropes on said drums, one of which fall ropes leads from its drum directly to the carriage, and the other leading to the opposite terminal of the carriage way and returning to the carriage, separate sets of sheaves and separate fall blocks for each of said fall ropes, forming independent tackle, each fall being operative independently of the other for lowering its block, or for maintaining the carriage in place, and both of said independent fall ropes forming, when in the raised position, a practically endless haul rope, substantially as described.

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