No. 844,291.

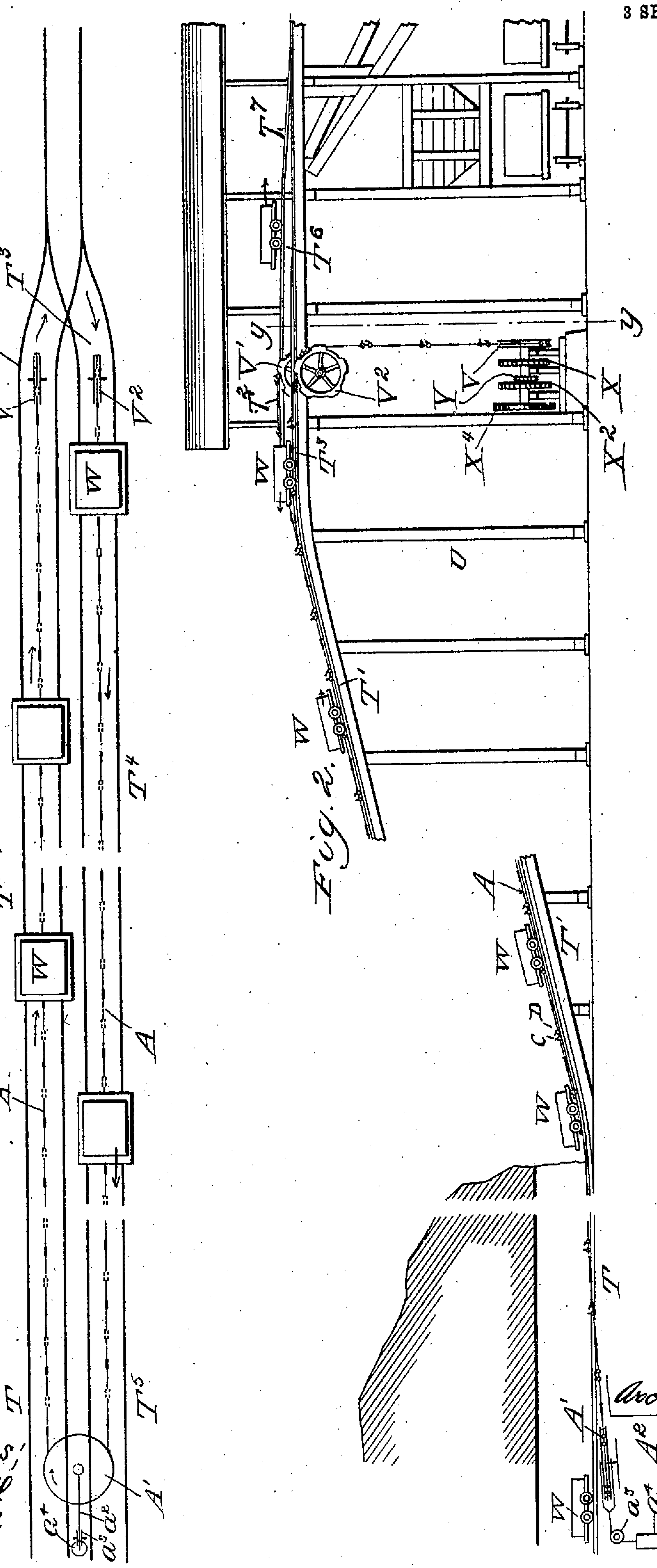
PATENTED FEB. 12, 1907.

A. W. F. STECKEL.

CAR HAUL.

APPLICATION FILED JULY 15, 1905.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 4.

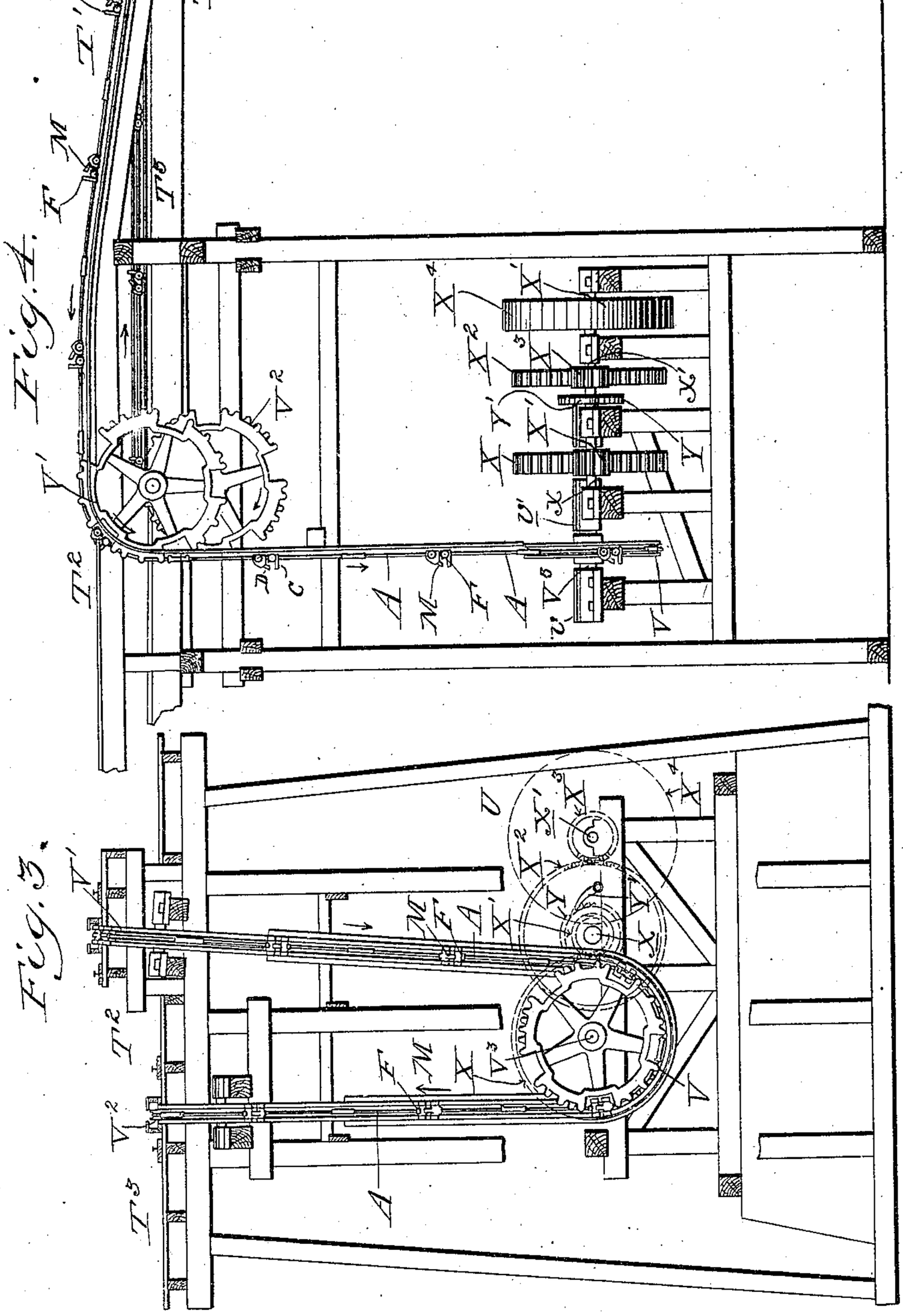

Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 5.

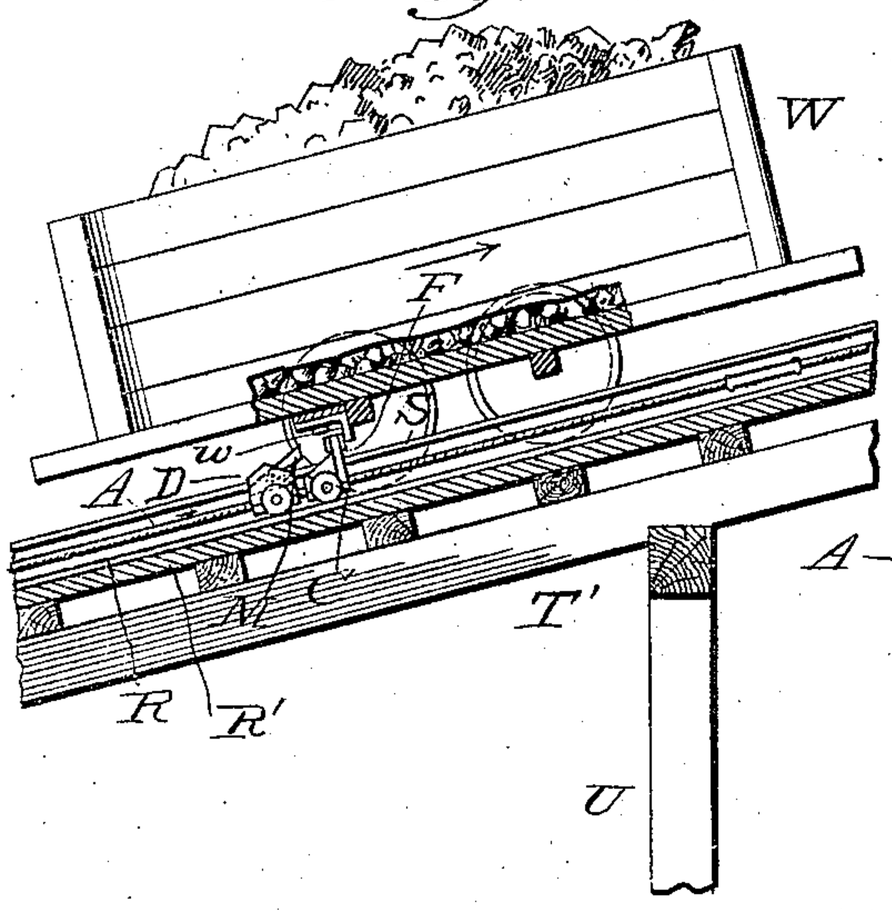


Fig. 6.

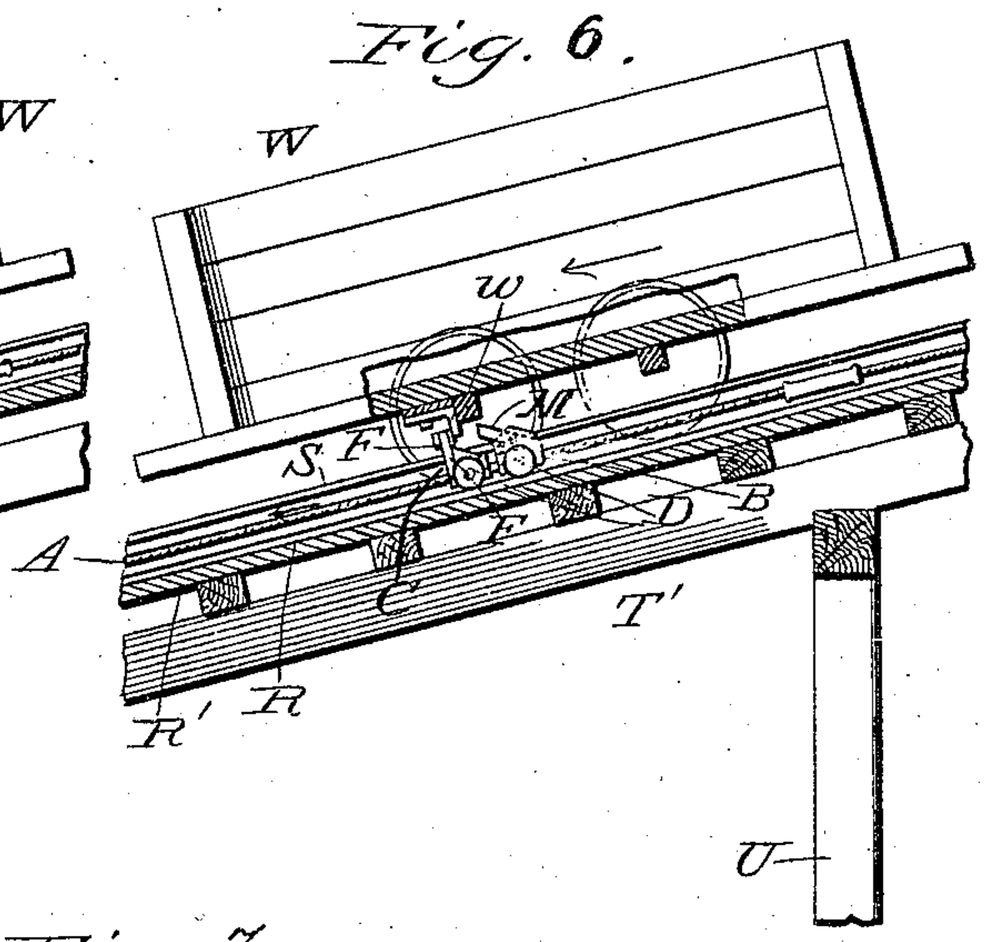


Fig. 7.

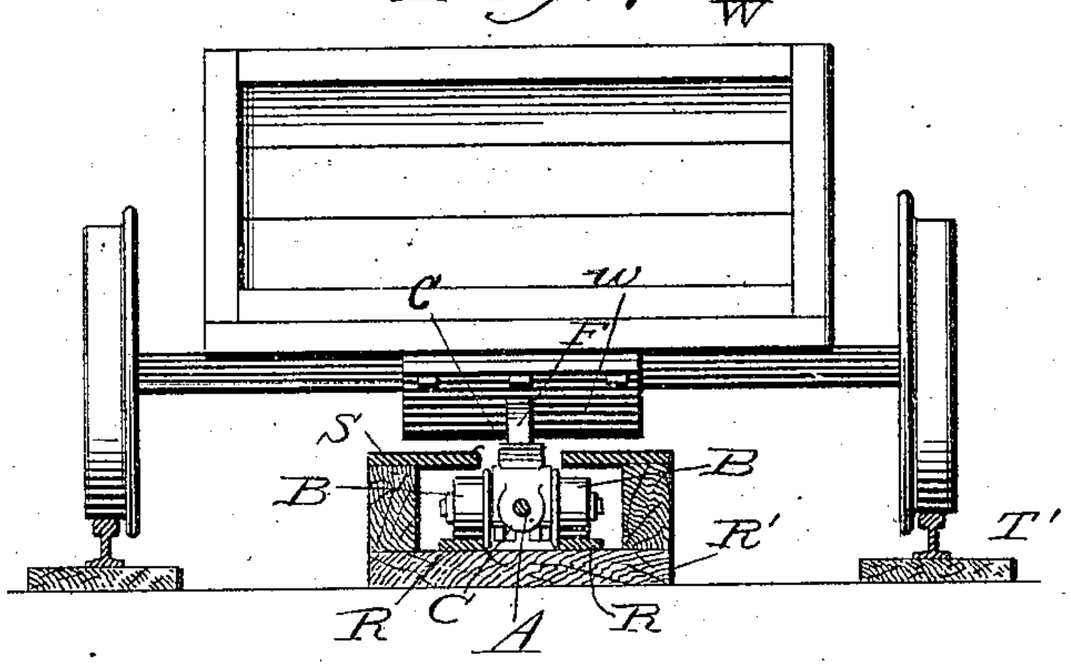
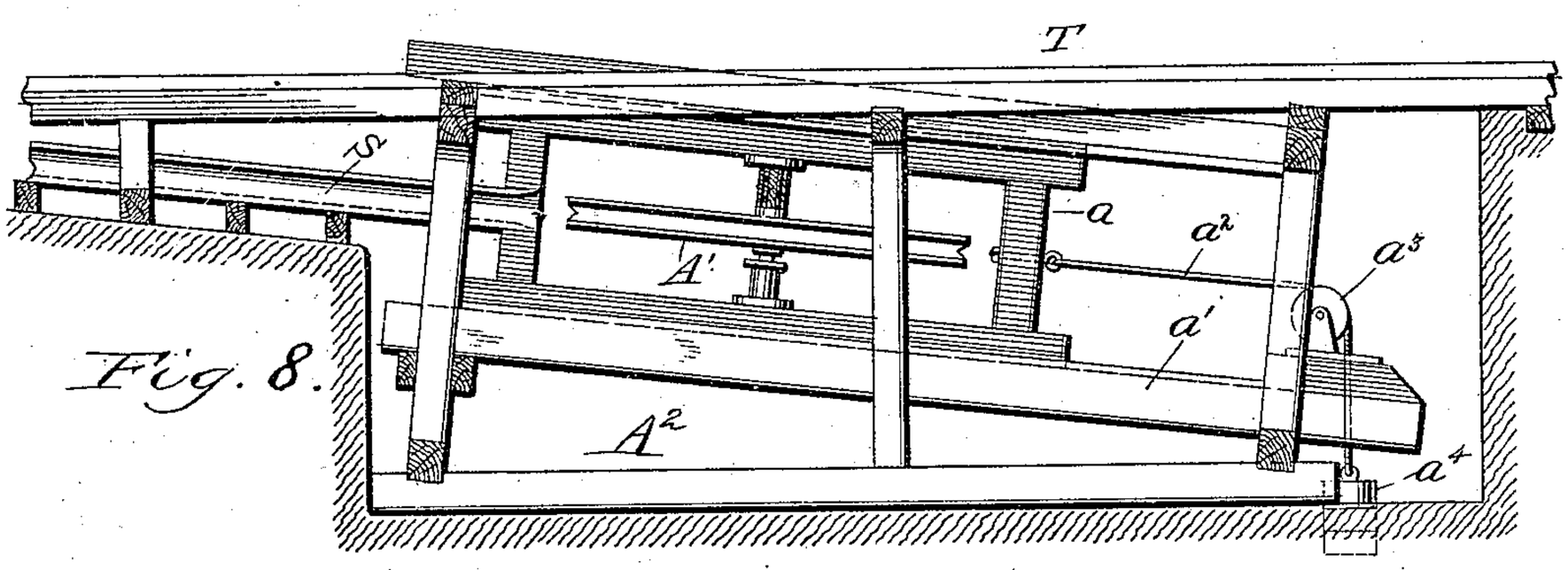


Fig. 8.



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UNITED STATES PATENT OFFICE.

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CAR-HAUL.

No. 844,291. Specification of Letters Patent. Patented Feb. 12, 1907.

Application filed July 15, 1905. Serial No. 269,873.

To all whom it may concern:

Be it known that I, ARCHIBALD W. F. STECKEL, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Car-Hauls, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in hauling apparatus of the sort more or less frequently used for propelling or controlling cars on grades, and comprising chains or cables with car-engaging attachments secured thereto, together with power-transmitting and guiding wheels for the chains or cables, and frequently comprising also structures which support the car-tracks as well as the shafting and wheels of the chains or cables and the guideways for the attachments.

The purposes aimed at and the mode of constructing and operating an apparatus embodying my improvements will be readily understood from the description below, together with the accompanying drawings.

Figure 1 is a plan view of an apparatus embodying my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical transverse section on the line *y y*, Fig. 2. Fig. 4 is a side elevation of the parts shown in Fig. 3, the framework being shown in section. Fig. 5 shows a car on the uphaul. Fig. 6 illustrates a car on the downhaul. Fig. 7 shows a car in end elevation engaged by one of the car-engaging attachments. Fig. 8 is a side elevation of the cable-sheave and the parts associated therewith at the lower end of the haul.

In the drawings, A indicates a cable, this being the power-transmitting device to which the car-hauling attachments are secured. It is mounted upon wheels or sheaves to be described, suitably located in relation to the car-track.

To the cable are secured the car-engaging devices, which may be of any suitable and well-known type. For illustration, I have shown these car-engaging devices arranged in pairs, the devices of each pair being relatively close together. These devices are preferably carried by trucks having wheels B B. These trucks may be secured rigidly and detachably to the cable in any suitable manner. The forward truck C of each pair of car-engaging devices has secured to it or formed integral with the frame thereof a standard or upright F.

The rear truck D of each pair of car-engaging devices has pivotally mounted upon it a dog M, which is normally held in inclined position relative to the cable by means of a spring or any other suitable means and is free to swing downwardly toward the truck C in order to permit the engaging element on the car to enter between it and the standard or upright F of the front car-engaging device.

The upward movement of the pivoted dog M may be limited in any suitable manner so as to determine the normal position of the dog. The standard F extends up to the plane of the top of this dog when it is in its normal position.

As the construction and operation of car-engaging devices of this class is well known and as the details of construction of the same are not a part of this invention, I have simply indicated the devices in the drawings without showing their detail construction.

A track-supporting structure adapted to have my hauling device applied thereto is shown in the drawings.

T indicates a section of track which is approximately horizontal or slightly inclined downward and forward, T′ and upwardly-inclined section of track, and T^2 an upper section which is approximately horizontal, these track-sections at T T′ T^2 being those over which the advancing or loaded cars are taken. The upper section at T^2 may be adjacent to or may lead to a car tippling or emptying place. The empty cars are returned over the track-sections T^3 T^4 T^5, these being, respectively, parallel to those at T^2, T′, and T. The sections T′ T^2 T^3 T^4 are laid upon a supporting structure U, formed of timbers or beams secured together in any suitable way. The cable A travels upward along the sections T′ T^2 on a line between the rails constituting the track and then returns along the sections T^3 T^4 T^5. At the lower end of the system the cable is supported on and runs around an idler-wheel A′. This is mounted in a movable frame *a*, which is fitted to a stationary frame *a′*.

a^2 is a cable or similar flexible device connected to the wheel-frame *a* and passing over

a sheave a^3 and provided with a weight a^4. These latter devices maintain tension yieldingly on the cable. To receive this idler-wheel, the sliding frame, and the stationary frame therefor, a pit or chamber A^2 below the track is provided. This is located at a suitable distance back from the track-supporting structure U U, and both the forward-moving leg of the cable and the returning-leg for a considerable distance in front of the idler-wheel A′ travel on lines inclined to the lines of the track-sections T and T^5, this permitting the cable and its car-engaging attachments or trucks first to gradually approach the line of travel of the cars and afterward to gradually move away from the cars.

V indicates the drive-wheel or power-transmitting wheel which propels the cable.

V′ is a guide-wheel or idler for the cable at the terminal of the uprun. When the cable reaches this wheel, it is turned downward therefrom to the driving-wheel V.

V^2 is a guide-wheel or idler for the cable, over which it travels after leaving the driving-wheel V, and from which it passes to the guideway that follows the downtrack sections T^3 T^4 T^5. Preferably the drive-wheel V is situated relatively to the up going track and to the down going track in the way illustrated—that is, so that its pitch-circle is tangent to the vertical plane of the pitch-circle of the sheave V^2—and to compensate for this the cable-wheel V is mounted at an inclination, as shown.

The cable-wheels are so related to the trackways and to the drive-wheel V that the trucks connected to the cable are in an upright position both while they are traveling up the one track and while they are traveling down the other.

W W indicate cars. With these the cable trucks or attachments can engage either by having the latter contact with the axles or by having the cars specially provided with arms, plates, or projections *w*. As the loaded cars one by one move along the bottom track-section T, each in turn reaches a position where one of the attachments or trucks on the cable moving forward from the idler-wheel A′ will engage it, such engagement occurring when the upright or standard F on one of the trucks contacts with the propelling projection *w* on the car. As soon as such engagement occurs the car is advanced by the cable and the attachment-truck up the inclined track-section T′ until it reaches the upper section at T^2. Here the cable attachment leaves it and the car is free to move forward.

When an apparatus of this sort is employed for tippling or emptying the cars, they are allowed to descend from the point T^2 over a gradually downward inclined track-section T^6 to the tippling device. From that point they may be carried forward by gravity over a more sharply-descending track-section T^7, and then after they are stopped in the usual manner and begin to return they may be switched over to the down going side of the track and guided to sections T^3 T^4 T^5. As the empty cars reach these latter sections they are again engaged with the cable and its attachments, the latter now serving as checking or controlling devices to retard them in their descent.

As above noted, the cable-trucks are still upright and are advancing in the same relative positions which they occupied when moving up on the tracks T′ T^2. Therefore the cars on the downgoing side are stopped by and rest against the rear sides of the standards F. If at any point a car in approaching one of the trucks should be moving with a relatively faster speed, its plate or projection *w* will first impinge upon the hinge-dog M, and the latter will yield under the impact and permit the projection to pass it until it reaches a position between the dog M and the upright or standard F. If this should occur at a point where the car-track is level or is upward inclined forward, the dog M will instantly commence to bear against the rear side of the projection on the car and the latter will be advanced by this part M in such case instead of by the standard F; but if it should occur when the car and the truck are both moving downward, the car under gravity will advance or tend to advance and bear against the rear side of the standard F. Whenever the dog M is thus depressed to permit the passage of the projection on the car which strikes it, the dog M immediately after the passing of the projection is again moved to its uppermost position. When the bottom of the inclined section T^4 is reached, the car would tend to stop on the horizontal track-section T^5; but now the dog M, which is behind the projection *w*, immediately engages with the latter and pushes the car along the horizontal part of the track to the place where the empty cars are to be finally delivered ready to be hauled away to the point to be again loaded.

At the place where the truck disengages from the returning empty car the guideway for the cable and cable-truck diverges downward, as above described, from the lines of the car-track toward the idler-wheel A′, and the dog M is released from the projection *w* and from the car.

The wheels for the trucks or attachments are supported on and guided by a track having rails R R. These may be secured to timbers, as at R′, or may be fastened to or be parts of angle-rails, as shown at S.

It will be seen that the cable is so arranged, supported, and guided that that part which is uppermost when traveling along one of the pathways of the cars is also uppermost while it is traveling along the other pathway, this being in contradistinction from those construc-

tions heretofore used or proposed which had endless draft devices traveling first along one car pathway and then along the other, together with car-engaging devices projecting therefrom, but which latter devices were either, as in some instances, so arranged as to be idle during one part of the travel of the draft device or idle in another part, or arranged, as in other instances, so as to swing on pivots from one operative position to another, so that they could engage with a car traveling first in one direction and then with a car traveling in the opposite direction.

The features of improvement in hauling apparatus which I have devised can be employed in mechanisms where bodies or articles other than cars are to be propelled or controlled.

The power for actuating the sheave V may be applied in any suitable manner. I have shown the said sheave rigidly secured to a horizontal shaft V^3, mounted on bearings $v\,v'$, the said shaft having secured to its inner end the spur-gear X.

x is a counter-shaft mounted in suitable bearings and having near one end the pinion X′ in mesh with the gear-wheel X and near the other end of the gear-wheel X^2. x' is another counter-shaft mounted in suitable bearings and having near one end a pinion X^3, arranged to mesh with the gear-wheel X^2 and having rigidly secured to it near its other end a belt-wheel X^4, to which power may be applied from any suitable source. In order to prevent this power-transmitting mechanism from reversing, and thereby permitting a reversal of the direction of travel of the cable A, I have provided on the shaft x a ratchet-wheel Y, with the teeth of which engages a pawl Y′, mounted on the framework of the system.

It will be noted that I have mounted the sheave V in such manner that power may be easily applied thereto and that the power-transmitting mechanism may be relatively close to the ground, avoiding expensive framework construction and allowing that a simple system of power-transmitting mechanism may be employed. Furthermore, this arrangement of the sheave admits of a simple manner of directing the cable from the sheave V′ to the sheave V^2, the axis of the latter being in a horizontal plane somewhat beneath the axis of the former. The construction possesses many advantages over those in which the cable is directed at its upper end by guiding devices in substantially a horizontal plane, as much more complicated power-transmitting mechanism is required in order to actuate such systems, and the horizontal or substantially horizontal mounting of all of the shafts in my construction furnishes a much simpler and considerably more durable mechanism than is obtainable in those systems in which a number of vertically-arranged shafts have to be used in order to transmit the power.

It will furthermore be noted that I have done away with bevel-gears in the power-transmitting system, using only spur-gears, which, as is well known, is of considerable advantage in a power-transmission system in which the gearing is subjected to great and uneven strains and shocks. Furthermore, by directing the cable downward from the upper end of the tippling structure to a point near the ground the cable attachments are caused to pass every so often down about the sheave V near the ground, where they may be advantageously inspected by the operator and replaced when necessary.

Each of the cable attachments or car-engaging devices is separate from the other one of each coöperating pair of car-engaging devices and is detachable independently of the other one, so that in case one of the car-engaging devices wears more rapidly than the other it may be detached and replaced without discarding the other one.

Where the car-engaging elements are thus arranged in pairs, each pair may be considered as constituting a single traveling device for engaging a car and controlling its movements along both its forward and return paths of travel. It will be understood, however, that any well-known kind of car-engaging attachments may be employed suitable to an endless draft device arranged as herein shown and described.

What I claim is—

1. In a car-haul system, the combination of an endless draft device arranged to travel around a circuit having a run for propelling forward-moving cars, a run for controlling the travel of return or backward-moving cars, a downward run leading from said forward run, and an upward run leading from said downward run to said run for backward-moving cars, supporting and guiding devices for said endless draft device arranged at the points at which it is deflected from one of said runs to the other, power-transmitting mechanism connected with said endless draft device between said downward and upward runs for actuating it, and a traveling device for engaging and propelling a car connected to said endless traveling device.

2. In a car-haul system, the combination of an endless draft device arranged to travel around a circuit having a run for propelling forward-moving cars, a run for controlling the travel of return or backward-moving cars, a downward run leading from said forward run and an upward run leading from said downward run to said return run, power-transmitting mechanism connected with said endless draft device at the point where it is deflected from its said downward run to its said upward run, and a traveling device for

engaging and propelling a car connected to said endless draft device.

3. In a car-haul system having a pathway for forward-moving cars, and a supplemental pathway for return or backward-moving cars, the combination of a traveling device for engaging a car and controlling its movements along both of said pathways, an endless draft device for said traveling device adapted to move it along said pathways and to hold it in the same position relative to the horizontal when in either pathway, said endless draft device having a downward-extending loop between said forward and said return pathways, and a power-transmitting mechanism arranged beneath said pathways and connected with said endless draft device at a point on said downward-extending loop.

4. In a car-haul system having a pathway for forward-moving cars, and a supplemental pathway for return or backward-moving cars, the combination of a traveling device for engaging a car and controlling its movements along both of said pathways, an endless draft device for said car-engaging element adapted to move it along said pathways and to hold it normally in car-engaging position when in either pathway, said endless draft device having a downward-extending loop between said forward and return pathways, for the moving cars, and a power-transmitting mechanism arranged beneath said pathways and connected with said endless draft device at the lower end of said downward-extending loop.

5. In a car-haul system, the combination of an endless draft device arranged to travel around a circuit having a run for forward-moving cars, a run for controlling the travel of return or backward-moving cars, a run leading downward from the front end of said forward run, a run leading upward from the lower end of said downward run to the front end of said return run, supporting and guiding devices for deflecting said endless draft device from said forward to said downward run and from said upward to said return run, respectively, power-transmitting mechanism arranged beneath the front ends of the said runs for forward and backward moving cars connected with said endless draft device for actuating it at the point where it is deflected from said downward to said upward run, and a traveling car-engaging device connected to said endless draft device.

6. In a car-haul system, the combination of an endless draft device arranged to travel around a circuit having a run for forward-moving cars, a run for return or backward-moving cars, a downward run leading from said forward run and an upward run leading from said downward run to said return run, supporting and guiding devices for said endless draft device at the points where it is deflected from said forward to said downward run and from said upward to said return run respectively, a vertically-arranged driving-sheave for deflecting said endless draft device from said downward run to said upward run, and for applying power thereto, means for actuating said vertically-arranged sheave, and a traveling device for engaging and propelling a car connected to said endless draft device.

7. In a car-haul system, the combination of an endless draft device arranged to travel around a circuit having a run for forward-moving cars, a run for return or backward-moving cars, a downward pathway leading from the front end of said forward run, and an upward run leading from said downward run to the front end of said return run, a sheave inclined to the horizontal and adapted to deflect said endless draft device from said forward run to said downward run, a vertically-arranged sheave adapted to deflect said endless draft device from said downward run to said upward run, a sheave adapted to direct said endless draft device from said upward run to said return run, and a traveling device for engaging and propelling a car connected to said endless draft device.

8. In a car-haul system having an inclined pathway for forward-moving cars, and a supplemental inclined pathway for return or backward-moving cars, the combination of car-engaging elements arranged to travel along both of said pathways and to propel a car up the forward one thereof and to control its travel under the action of gravity along the return pathway, an endless draft device for said car-engaging elements arranged to cause them to travel along said pathways, suitable guiding mechanism for said endless draft device at the lower ends of said runs, vertically-disposed deflecting and guiding devices for said endless draft device at the upper end of each of said runs, having the axes of their deflecting curves arranged transverse to the longitudinal lines of the said runs, and a suitable driving mechanism for said endless draft device arranged beneath said vertically-disposed deflecting and guiding devices.

9. In a car-haul system having an inclined pathway for forward-moving cars, and a supplemental inclined pathway for backward-moving cars, the combination of a supporting and guiding sheave substantially horizontally disposed between the lower ends of said pathways, vertically-disposed supporting and guiding sheaves each arranged at the upper end of one said pathways on an axis transverse to the longitudinal lines of the pathways, a vertically-disposed sheave arranged beneath the said sheaves at the upper ends of said pathways and on an axis transverse to the axis of said vertically-disposed sheaves, an endless draft device extending around said supporting and guiding sheaves, and means

for applying power to actuate said endless draft device.

10. In a car-haul system having an inclined pathway for forward-moving cars, and a supplemental inclined pathway for backward-moving cars, the combination of a supporting and guiding sheave substantially horizontally disposed between the lower ends of said pathways, vertically-disposed supporting and guiding sheaves each arranged at the upper end of one of said pathways on an axis transverse to the longitudinal lines of the pathways, a vertically-disposed sheave arranged beneath the said sheaves at the upper ends of said pathways and on an axis transverse to the axis of said vertically-disposed sheaves, an endless draft device extending around said supporting and guiding sheaves, car-engaging elements carried by said endless draft device, and a suitable power-drive connected with the lowermost vertically-disposed sheave.

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

ARCHIBALD W. F. STECKEL.

Witnesses:

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P. W. HOLSTEIN.