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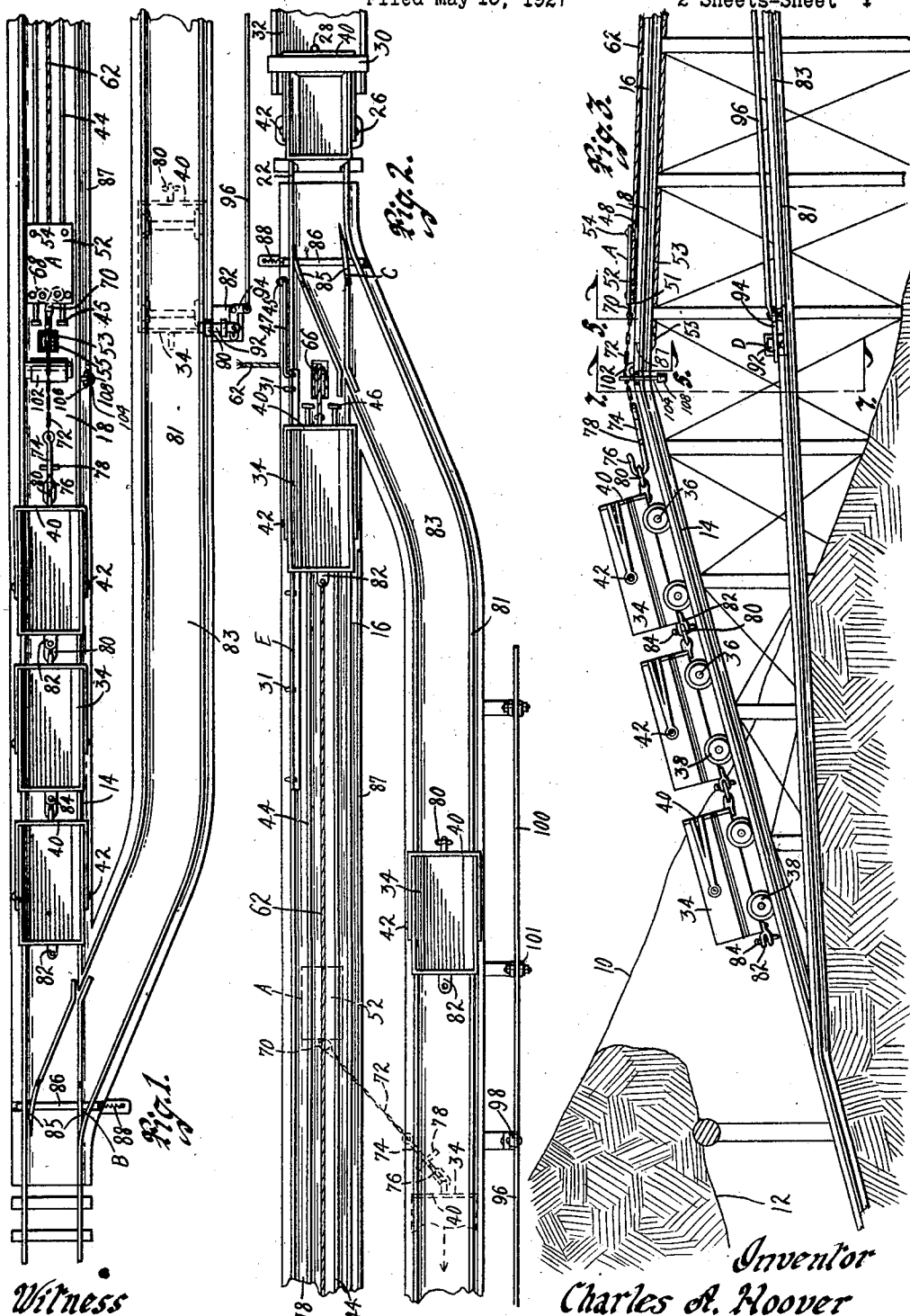
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Filed May 13, 1927

2 Sheets-Sheet 1



Witness

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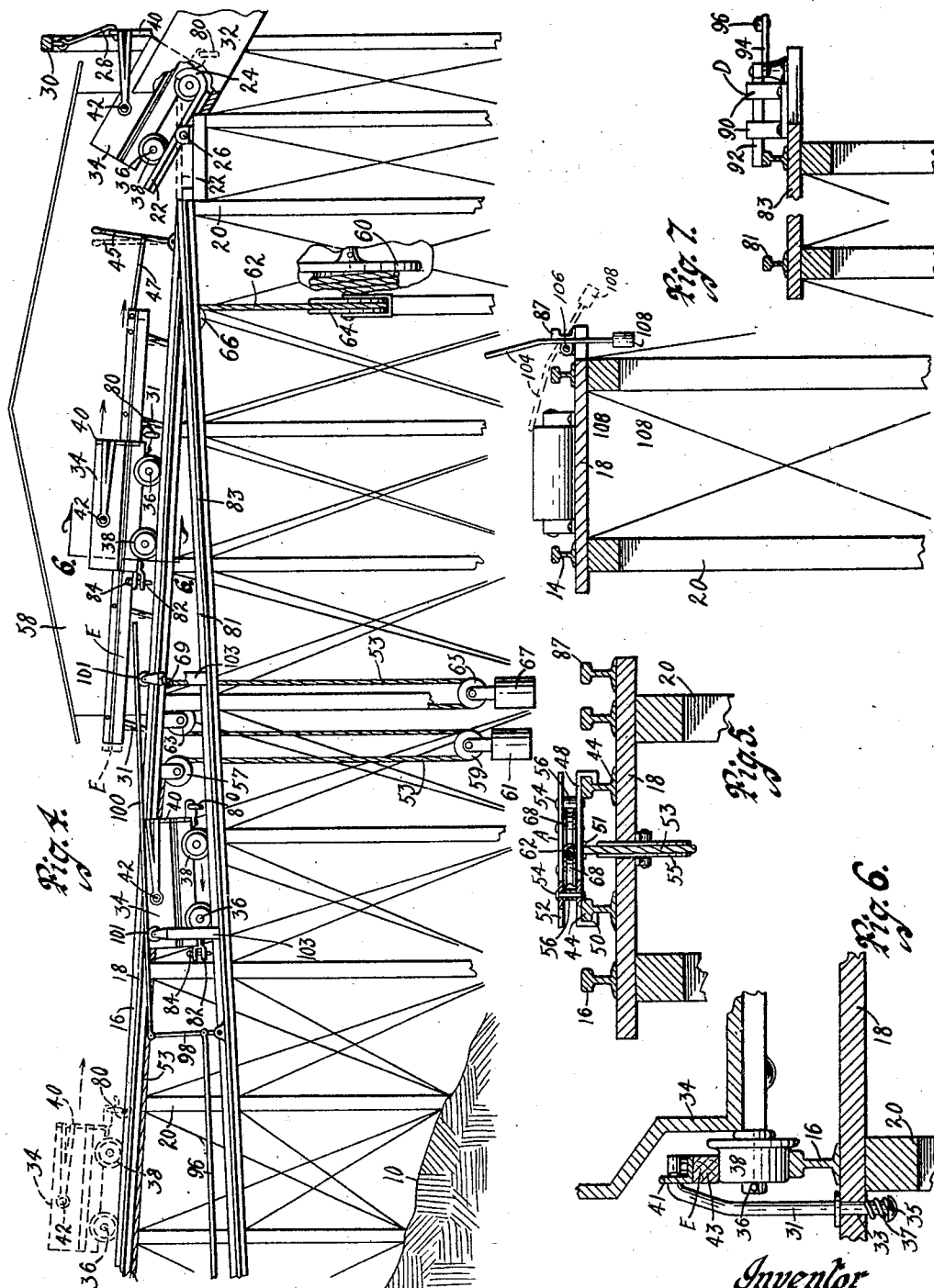
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR HANDLING MINE CARS.

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The object of my invention is to provide an apparatus for efficiently handling mine cars for the purpose of pulling them from the mine and dumping them, the parts thereof being of simple, durable and comparatively inexpensive construction.

More particularly it is my object to provide a novel apparatus to be used in connection with a haulage rope which is used to pull the cars from the mine whereby they may be pulled up a main track and then onto a downwardly inclined portion thereof so that thereafter they can travel by gravity to the dumping mechanism.

A further object of my invention is to provide novel means for attaching the haulage rope to the loaded cars whereby they may be pulled onto the downwardly inclined portion of the main track and automatically released from the haulage rope when motion of the haulage rope is stopped.

Still a further object is to provide means for keeping the haulage rope taut even though the loaded cars have been detached from it so that the danger of kinks in the haulage rope is entirely eliminated.

Still a further object is to provide a return track onto which the cars may be positioned as they are dumped preparatory to being returned to the interior of the mine.

Still a further object is to provide locking mechanism for both the loaded and the empty cars so that they can be held at proper positions on the apparatus.

Still a further object is to provide an apparatus of this character in which the empty cars as well as the haulage rope can be placed at certain points of the apparatus whereby the haulage rope may be attached to the empty cars and they may in this manner be utilized to pull the haulage rope back into the mine in readiness for the next trip of loaded cars.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 illustrates a plan view of the por-

tion of my mechanism which is adjacent the shaft running back into the mine itself.

Figure 2 is also a plan view of another portion of the apparatus and is a continuation of the right hand end of Figure 1.

Figure 3 is a side elevation of the portion of the apparatus illustrated in Figure 1 showing it extending from the mine shaft.

Figure 4 is a side elevation of the portion of the apparatus illustrated in Figure 2 and is a continuation of Figure 3.

Figure 5 is an enlarged detail sectional view taken on the line 5—5 of Figure 3 and illustrates a sliding carriage mounted between the rails of the main track.

Figure 6 is an enlarged detail sectional view taken on the line 6—6 of Figure 4 and illustrates the means for locking the loaded cars; and

Figure 7 is a sectional view taken on the line 7—7 of Figure 3 to illustrate the locking mechanism of the empty cars and a device for automatically causing the haulage rope to be swung into proper position over the main track as the empty cars travel back into the interior of the mine.

On the accompanying drawings I have used the reference numeral 10 to indicate generally the side of a hill into which a mine shaft 12 has been dug for the purpose of obtaining coal from the hill 10. The shaft 12 is usually inclined as clearly illustrated in Figure 3 of the drawings as the coal is usually lower than the surface of the hill.

An inclined main track 14 extends back into the mine shaft 12 and is laid on the bottom of the shaft. The track 14 extends out beyond the surface of the hill 10 and a portion of it is inclined downwardly as indicated at 16. The portions of the tracks 14 and 16 extending beyond the surface of the hill 10 are laid on a platform 18 made of planking and supported on upright timbers 20. Suitable bracing is provided for the timbers 20 as indicated on the drawings.

It will be noted that the portion 16 of the track 14 is inclined slightly downwardly so that cars thereon will travel by gravity to a dumping mechanism comprising a pair of pivoted rails 22. The rails 22 are provided with hook portions 24 and are pivoted on bearing members 26 which are in turn sup-

ported on the upright timbers 20. A hook 28 is supported from a frame 30 and its purpose will hereinafter be described. A chute 32 is positioned adjacent the hook ends 24 of the rails 22.

On the drawings I have illustrated a plurality of mine cars 34 which are the regulation cars used generally in coal mines. These cars are provided with axles 36 on which are flanged wheels 38 whereby they may travel on the various tracks of my apparatus. The forward ends of the cars 34 are open and doors 40 are provided for these open ends. The doors 40 are pivoted to the sides of the cars 34 as at 42 and are provided with openings adapted to be engaged by the hook 28 when the cars travel onto the rails 22 and engage the hook portions 24 thereof.

Adjacent the dumping mechanism just described, I provide a locking mechanism indicated generally by the reference character E for the purpose of locking the cars 34 in position to be discharged onto the dumping mechanism. The locking device E comprises a plurality of rods 31 extending through openings 33 in the platform 18. A head 35 is formed on the lower end of each rod 31 and a spring 37 is positioned between the head 35 and the platform. A flange is formed on the rod 31 above the platform 18. The upper ends of the rods 31 extend pivotally through an angle bar 41 having a long block of wood or the like 43 secured to its under-surface.

A lever 45 is pivoted to the platform 18 and connected by a link 47 to the angle bar 41.

In the construction of my apparatus I provide a pair of carriage rails 44 mounted on the platform 18 between the rails of the main track 16. These carriage rails are provided with stop elements 46 for each of their ends. The carriage rails 44 are adapted to slidably support a carriage indicated generally by the reference character A. The carriage A comprises a pair of bars 48 having hook portions 50 adapted to extend around the upper beads of the rails 44 so that they cannot be lifted therefrom but are free to slide on these rails. A plate 52 is positioned above the bars 48 and is secured to them by rivets 54 which extend through the bars and plate as clearly illustrated in Figure 5 of the drawings. Tubular spacers 56 are positioned between the plate 52 and the bars 48 for holding the plate in spaced relation to the bars.

Secured to one end of the carriage A as at 51 is a cable 53 extending around a pulley 55 centered in the beginning of the portion 16 of the main track 14. The cable 53 then extends over a pulley 57 and through a pulley 59 from which a weight 61 is suspended. It then extends over a pulley 63 and through a pulley 65 from which a weight 67 is suspended. The free end of the cable 53 is then secured as at 69 to the under side of the platform 18. From

the construction of the parts just described it will be obvious that the carriage A is constrained to move, due to the weights 61 and 67 along the carriage track 44 until they are stopped by the stop members 46 at one end of this track.

In the general type of mine installations with which I use my apparatus, a power house 58 is provided for housing a steam boiler, steam engine, and winding drum 60 (see Fig. 4). A haulage rope 62 is wound on the drum 60 and extends to a pulley 64 positioned below the platform 18. The haulage rope 62 is formed of wire cable and it is very necessary to keep it taut at all times in order to prevent it from kinking or from becoming slack on the drum 60 and starting to wind in the wrong groove thereon. Such a means has been provided for in my apparatus by the carriage A as will hereinafter be described. The haulage rope 62 extends upwardly from the pulley 64 and over a pulley 66 positioned in substantially the center of the track 16 from which the haulage rope extends along the track 16 and through the carriage A.

Mounted between the plate 52 and one of the bars 48 of the carriage A is a pair of pulleys 68 and the haulage rope 62 extends between these pulleys as clearly illustrated in Figure 5. An eye connecting member 70 is secured to the end of the haulage rope 62 and a chain 72 is in turn secured to the connecting member 70. A bar 74 is secured to the free end of the chain 72 and is provided with a hook 76 which will always remain upright as illustrated when resting upon the platform 18. This is accomplished by a pin 78 extending through the bar 74 and beyond the sides thereof so as to prevent any sidewise tipping of the hook 76.

Each of the cars 34 is provided at its front end with a chain link 80. The rear end of each car 34 is provided with a yoke 82 through which a pin 84 may be positioned. From the construction of the parts just described it will be obvious that the cars 34 can be coupled together by placing the link 80 of one car between the ears of the yoke 82 of another car and dropping the pin 84 into the yoke. When the cars are uncoupled the links 80 will hang downwardly due to gravity as illustrated in dotted lines in Figure 4.

From the foregoing description, it will be obvious that the haulage rope 62 can be attached to any number of cars 34 which are coupled together by inserting the hook 76 in the link 80 of the foremost car. The drum 60 can then be rotated by the proper mechanism within the power house 58 for pulling the cars up the main track 14 and out of the shaft 12. It will also be obvious that empty cars when attached to the hook 72 will coast down the track 14 and back into the interior of the mine carrying with them the haulage

rope 62 when the brake on the drum 60 is released.

In the construction of my apparatus I provide a return track 81 having switch connections B and C with the main track 14 and the portion 16 thereof respectively. The return track 81 is laid on a platform 83. The switch connections B and C comprise pairs of pivoted rails 85 connected by bars 86 which are constrained to move in one direction by springs 88. Such construction causes the switch B to normally remain closed with relation to the track 14 and the switch C to normally remain open with relation to the track 16. It will therefore be obvious that any car's traveling up the inclined main track 14 will continue to travel thereon as they pass the switch B and will pass through the switch C moving the rails 85 against the action of the springs 88. When returning, the cars will travel onto the return track 81 and back onto the main track 14 after passing through the switch B.

On the return track 81 I provide a stop mechanism for the empty cars indicated generally by the reference character D. The stop mechanism D comprises a pair of bearings 90 in which a stop bar 92 is slidably mounted. A bell crank lever 94 is operatively connected to the stop bar 92 and is pivotally mounted on the platform 83. A link 96 extends from the bell crank lever 94 to a lever 98 which is also pivoted to the platform 83 and extends in upright position. Pivoted to the upper end of the lever 98 is a link 100 supported on grooved rollers 101 mounted on posts 103 extending upwardly from the platform 83. The link 100 may be engaged and moved by an operator when at any point along the platform 83.

At the junction of the main track 14 with the downwardly inclined portion 16 thereof I provide a guide roller 102 for the haulage rope 62. The roller 102 is mounted between the rails of the main track 14 as clearly illustrated in Figure 7 and a pivoted lever 104 is provided in connection therewith, the operation of which will hereinafter be described. The lever 104 is pivoted as at 106 to the platform 18 and is provided with a weight 108 on its lower end whereby it normally remains in the solid line position but can be moved to the dotted line position, both of which positions are shown in Figure 7.

Practical operation.

In the operation of my improved apparatus, let it be assumed that the hook 76 has been hooked to loaded cars within the mine shaft 12. These cars can then be pulled up the inclined main track 14 by proper manipulation of the winding drum 60 as illustrated in Figures 1 and 3 of the drawings. The haulage rope 62 during this part of the operation travels over the roller 102 and between the pulleys 68 of the carriage A. When the connect-

ing member 70 on the haulage rope engages the pulleys 68 the carriage A will be moved along the carriage track 44 pulling with it the cable 53 and thereby raising the weights 61 and 67. It will be noted that the pulleys 57 and 63 which are secured to the platform 18 are placed some distance from the pulley 55. The purpose of this is so that the weights 61 and 67 are positioned far enough away from the outer end of the shaft 12 to have considerable space for movement up and down. By providing two weights 61 and 67 the carriage A can be moved a considerable distance for the amount of space required for the up and down movement of these weights.

After the cars 34 have been pulled to position past the pulley 102 they will travel downwardly on the track 16 due to gravity. The carriage A can now be stopped at any desired position and the foremost car 34 will automatically be uncoupled from the hook 76 as illustrated in dotted lines in Figure 4. The locking mechanism E is now operated by manipulating the handle 45 to bring the rods 31 to position at right angles to the platform 18 so that the wheels 38 of the cars can pass beneath the block of wood 43. The cars can now be stopped at any desired position by pulling the lever 45 forward whereupon a slight downward movement is given to the angle bar 41 due to the radius on which the rods 31 swing. It may here be mentioned that the openings 33 are slotted to allow swinging movement of the rods 31. This swinging movement causes the block of wood 43 to bind against the upper surface of the wheels 38 and thereby prevent further movement of the loaded cars toward the dumping mechanism.

The dumping operator can then let the cars 34 through the locking mechanism E, one at a time, letting them coast onto the pivoted rails 22, and the weight of the cars when in this position will cause them to tip as illustrated in Figure 4. As they are so tipped the hook 28 holds the pivoted door 40 upwardly thereby allowing the coal to be discharged from the car 34 through its forward end and into the chute 32 from which it may be discharged to the various screening mechanisms or directly into coal cars, wagons, or trucks.

After the car has been dumped the operator grasps the back end of it and tips the rails 22 back into the position illustrated in dotted lines and pulls them back onto the switch C. The cars then travel by gravity down the return track 81 to the stop member 92 and the operation just described is repeated until all the loaded cars have been emptied and returned onto the return track 81. The dumping operator then signals to the engineer operating the winding drum 60 and has him move the carriage A to a convenient position where the chain 72 can be extended from the track 16 to the track 81 and hooked onto the

foremost one of the cars 34, emptied of their contents, which cars 34 have been in the meantime coupled together. The link 100 is then moved to withdraw the stop member 92 from the top of the track 81 so that the cars will coast by gravity back into the mine, pulling the haulage rope 62 with them. Their speed and stopping can be regulated by the engineer by properly manipulating the brake on the drum 60 upon receipt of signals from the mine, as practiced in coal mines. The empty cars 34, pulling the haulage rope 62 with them, will allow the carriage A to be pulled back to position against the stops 46 due to the weights 61 and 67. During this part of the operation, the chain 72 slides along a guard rail 87 placed outside of the track 16 to prevent the chain from catching on the platform 18. As the chain 72 and the haulage rope 62 pass the roller 102, they will cause the guide lever 104 to swing to the dotted line position where the haulage rope 62 can slide therefrom and into proper position on the roller 102 after the empty cars 25 have passed the switch B. The cars will then coast back into the mine, pulling the haulage rope 62 with them, where it can be hooked to other loaded cars or the empty cars just returned to the mine can be loaded and pulled out to the dumping mechanism again.

Although I have illustrated three cars in operation on my apparatus it will be obvious that the device can be used for any number of cars which it is desired to handle. In the experimental operation of my device I have found that it entirely eliminates all danger of the haulage rope 62 becoming kinked and therefore worthless. The rope is efficiently held taut when the cars 34 are unhooked from it. One man can conveniently operate my apparatus which is a considerable saving over other methods.

Some changes may be made in the construction and arrangement of the various parts of my invention, without departing from the real spirit and purpose of my invention and it is my purpose to cover by my claims any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. An apparatus for handling cars comprising an upwardly inclined main track having a downwardly inclined portion, a downwardly inclined return track from the end of said downwardly inclined portion to said main track, a winding drum and cable, means for traveling in one direction and thereby pulling cars up said main track and onto the downwardly inclined portion thereof, said means being arranged for disengagement from the cars when the means is stopped and a weight associated with said cable for keeping it taut after the cars have been so disengaged.

2. An apparatus for handling cars comprising an upwardly inclined main track having a downwardly inclined portion, a downwardly inclined return track from the end of said downwardly inclined portion to said main track, means for pulling cars up said main track, and onto the downwardly inclined portion thereof, said means comprising a pulling cable having a hook thereon to engage the cars, said hook disengaging the cars upon being stopped and means for maintaining the cable taut when the hook is so disengaged.

3. An apparatus for handling cars comprising an upwardly inclined main track having a downwardly inclined portion, a downwardly inclined return track from the end of said downwardly inclined portion to said main track, means for pulling cars up said main track, and onto the downwardly inclined portion thereof, said means comprising a pulling cable having a hook thereon to engage the cars, a carriage slidably mounted adjacent the downwardly inclined portion of the main track, means on said cable for engaging said carriage and moving it as the cars are pulled onto said downwardly inclined portion and means associated with said carriage for maintaining the cable taut when the carriage is brought to rest.

4. An apparatus for handling cars comprising an upwardly inclined main track having a downwardly inclined portion, a downwardly inclined return track from the end of said downwardly inclined portion to said main track, means for pulling cars up said main track, and onto the downwardly inclined portion thereof, said means comprising a pulling cable having a hook thereon to engage the cars, a carriage slidably mounted adjacent the downwardly inclined portion of the main track, means on said cable for engaging said carriage and moving it as the cars are pulled onto said downwardly inclined portion, said hook being arranged to disengage the cars when brought to rest and means associated with said carriage for maintaining the cable taut when the carriage and hook are brought to rest.

5. An apparatus for handling cars comprising an upwardly inclined main track having a downwardly inclined portion, a downwardly inclined return track from the end of said downwardly inclined portion to said main track, means for pulling cars up said main track, and onto the downwardly inclined portion thereof, said means comprising a pulling cable having a hook thereon to engage the cars, a carriage slidably mounted adjacent the downwardly inclined portion of the main track, means on said cable for engaging said carriage and moving it as the cars are pulled onto said downwardly inclined portion and means associated with said carriage for maintaining the cable taut when the

carriage is brought to rest, said means comprising a weight operatively connected to said carriage for restraining it in a direction opposing the pull of said pulling cable.

5 6. An apparatus for handling cars comprising an upwardly inclined main track having a downwardly inclined portion, a downwardly inclined return track from the end of said downwardly inclined portion to
10 said main track, means for pulling cars up said main track, and onto the downwardly inclined portion thereof, said means comprising a drum and a cable, a carriage mounted for slidable movement between the rails
15 of said downwardly inclined portion of the main track and adapted to be engaged and moved by said hook, a weight associated with said carriage for maintaining said cable taut, when said carriage is
20 brought to rest, whereupon said hook is disengaged from said cars, means for holding said cars on the downwardly inclined portion of the main track and a stop device associated with the return track for stopping said
25 cars in position to be reengaged by said hook.

7. An apparatus for handling cars comprising an upwardly inclined main track having a downwardly inclined portion, a downwardly inclined return track from the end
30 of said downwardly inclined portion to said main track, means for pulling cars up said main track, and onto the downwardly inclined portion thereof, said means comprising a drum and a cable, a carriage mounted for
35 slidable movement between the rails of said downwardly inclined portion of the main track and adapted to be engaged and moved by said hook, a weight associated with said carriage for maintaining said cable taut,
40 when said carriage is brought to rest, whereupon said hook is disengaged from said cars on the downwardly inclined portion of the main track, a stop device associated with the return track for stopping said cars in position
45 to be reengaged by said hook and means for causing the cable to return to position between the rails of the main track when the cars return thereto from the return track.

8. An apparatus for handling cars comprising an upwardly inclined main track having a downwardly inclined portion, a guide pulley at the junction of the main track and the downwardly inclined portion thereof, a
50 downwardly inclined return track from the end of said downwardly inclined portion to said main track, means for pulling cars up said main track, and onto the downwardly inclined portion thereof, said means comprising
55 a drum and a cable passing over said guide pulley, a carriage mounted for slidable movement between the rails of said downwardly inclined portion of the main track and adapted to be engaged and moved by said hook, a weight associated with said carriage
60 for maintaining said cable taut, when said

carriage is brought to rest, whereupon said hook is disengaged from said cars, means for holding said cars on the downwardly inclined portion of the main track and a stop device associated with the return track for stopping
70 said cars in position to be reengaged by said hook and means for causing the cable to return to said guide pulley when the cars return to the main track from the return track.

9. An apparatus of the class described comprising an upwardly inclined main track having a downwardly inclined portion terminating in a dumping mechanism, a carriage between the rails of said downwardly inclined
75 portion, a cable slidably mounted with relation to said carriage and terminating in a hook portion adapted to engage a car, means for pulling said cable and consequently said car, said hook being adapted to engage said
80 carriage and move it when said car is pulled onto said downwardly inclined portion of the main track and to disengage said car when the cable, carriage and hook are brought to rest.

10. An apparatus of the class described comprising a track having an upwardly inclined portion and a downwardly inclined portion terminating in a dumping mechanism, a carriage between the rails of said
85 downwardly inclined portion, means for constraining said carriage in one direction to a predetermined position, a cable slidably mounted with relation to said carriage and terminating in a hook portion adapted to engage
90 a car, means for pulling said cable and consequently said car, said hook being adapted to engage said carriage and move it when said car is pulled onto said downwardly inclined portion of the main track and to disengage
95 said car when the cable, carriage and hook are brought to rest.

11. An apparatus of the class described comprising a track having an upwardly inclined portion and a downwardly inclined portion terminating in a dumping mechanism, a carriage between the rails of said
100 downwardly inclined portion, means for constraining said carriage in one direction to a predetermined position, a cable slidably mounted with relation to said carriage and terminating in a hook portion adapted to engage
105 a car, means for pulling said cable and consequently said car, said hook being adapted to engage said carriage and move it when said car is pulled onto said downwardly inclined portion of the main track and to disengage
110 said car when the cable, carriage and hook are brought to rest, a downwardly inclined return track from said dumping mechanism and means for stopping said car at
115 a position for being engaged by said hook whereby the car can travel down the return track and main track pulling said cable with it.

12. An apparatus of the class described 130

comprising an upwardly inclined main track having a downwardly inclined portion terminating in a dumping mechanism, a carriage between the rails of said downwardly inclined portion, a drum, a cable wound thereon, a hook on the free end of said cable, a downwardly inclined return track from said

dumping mechanism and means for stopping said car at a position for being engaged by said hook whereby the car can travel down the return track and main track and thereby unwind said cable from said drum. 10

Des Moines, Iowa, April 30, 1927.

CHARLES A. HOOVER.