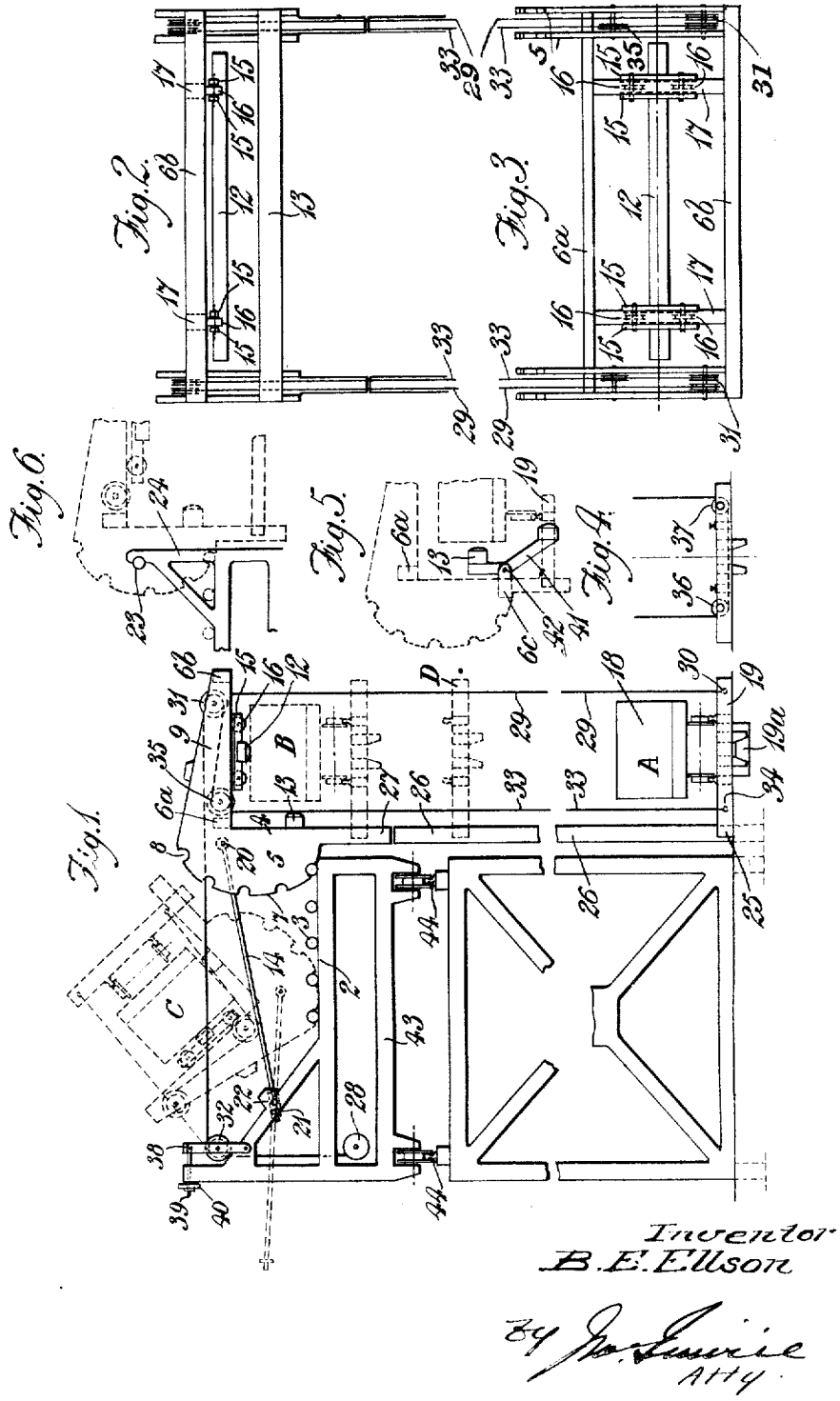
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APPARATUS FOR TIPPING AND DISCHARGING RAILWAY CARS

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## APPARATUS FOR TIPPING AND DISCHARGING RAILWAY CARS

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This invention relates to an apparatus whereby railway cars are tilted sideways sufficiently to invert the car and discharge the contents thereof, and whereby the car may be raised if desired to a required height before the said tilting occurs.

The invention has for its object to provide improvements in the type of apparatus as described in my patent specification No. 1,703,766, to the effect that improved means of easily and securely supporting the car during the tilting operation are provided together with an improved arrangement of hoisting ropes, improved means for quickly entering and removing the car from the apparatus, and means for translating the car to a desired point of discharge.

According to the invention, apparatus is provided of the type as described in patent specification No. 1,703,766, wherein the transverse bar engaging with the top of the car is mounted to roll or slide in a direction to and from the transverse bar engaging with the side of the car. The hoisting cables supporting the car platform are arranged to clear each side of the wagon and after passing over pulleys on the cradle leave the cradle from one common centre or set of pulleys passing thence over movable jockey pulleys to the source of power. At one end of the platform the cables are attached to fixed points thereon whilst at the other end of the platform the cables are carried continuously around pulleys mounted on the platform. The transverse bar enging the side of the car may be either a rigid fixture to the cradle or alternatively the said transverse bar may be attached to pivoted beams the lower ends of which are arranged to engage during tilting with the side of the platform. The cradle with its corresponding rolling path, source of power and other essential parts may be mounted upon a carriage to run along a gantry.

In the drawing:—

Figure 1 is a side elevation of my improved apparatus showing a car in full lines ready for hoisting and a car in dotted lines in two other working positions;

Figure 2 is a front elevation of the cradle only, the car being omitted;

Figure 3 is a plan of the top of the cradle showing the mounting of the rolling or sliding transverse bar which engages with the top of the car;

Figure 4 is a side elevation of the far end of the platform remote from the end shown in Figure 1 showing the different method of arranging the cables at that end;

Figure 5 is a side elevation of the cradle end piece showing an alternative method of supporting the side of the car and also the platform during tilting; and

Figure 6 is a side elevation of the cradle end piece showing an alternative method of limiting the forward movement of the cradle.

Hereinafter the transverse bar which engages with the top of the car and the transverse bar which engages with the side of the car will be called, respectively, the top transverse bar and the side transverse bar.

1 indicates conventionally a frame or gantry on which the tilting aparatus is mounted. The rolling path along which the cradle works or rolls is shown at 2 and may be horizontal or inclined and fitted with pins 3, rollers, or other equivalent fitments to locate accurately the cradle whilst rolling. 4 indicates a cradle comprising end pieces 5 with elongated arms 9 extending over the car and having a suitable number of connecting bars $6^a$ and $6^b$. A side transverse bar $13^b$ is connected across the two end pieces 5. The cradle may be built up of any required shape and braced in any desired manner to provide the mountings for the pulleys, transverse bars, and other essential fittings. Each end piece comprises a body portion which is rounded on one edge to form a rocking surface 7 which may be provided with notches

8 adapted to co-operate with the pins 3 in the operation of tilting a car. The size and shape of the rounded rocking surface 7 will be determined by design to suit the requirements of different cases, as for instance, the required final position and inclination to the horizontal of the inverted car as shown in dotted lines at C. 12 is the top transverse bar and is mounted with bars 15 and rollers 16 running on cross pieces 17 fixed between the connecting bars $6^a$ and $6^b$ to the effect that the transverse bar 12 and car are free to move in a direction to and from the transverse bar 13 thus allowing the side of the car to engage with the transverse bar 13 and be supported thereby during tilting. It will be seen that as the car is hoisted up from the track into the position B in the cradle, the side of the car passes by the transverse bar 13 and that a safe clearance distance is required accordingly. This clearance distance must be closed up during tilting and the mounting of the top transverse bar 12 on rollers 16 provides an ample range of side movement for effecting this.

The cradle is limited in its forward movement by a tie rod 14 pivoted at one end to the cradle at 20 and with an adjustable stop 21 at the other end. The tie rod slides through the pivoted block 22 during the tilting of the cradle. An alternative method of limiting the forward movement of the cradle is shown in Figure 6 in which a stop 23 fixed in the end piece of the cradle butts up against a rigid projecting arm 24.

The railway car 18 to be tilted and dumped is run onto a platform 19 which is centred to be in line with the track by ways $19^a$. The platform has extensions 25 to engage with the guides 26 which steady the platform during hoisting. The lower part of each piece of the cradle is extended and shaped at 27 to form a continuation of the guides 26 so that the platform extension 25 engages with the lower part 27 of the end piece during tilting and dumping of the car. The platform is hoisted by cables attached to a source of power such as a winch 28. Referring to the one end of the platform as shown in Figure 1, a cable or cables 29 are attached to the platform at one corner by a pinned end 30, thence being carried up and over the cradle pulley 31 and the jockey pulley 32 to the winch 28 whilst another cable or cables 33 are attached to the platform at the other corner by a pinned end 34, thence being carried up and over the cradle pulleys 35 and 31 and jockey pulley 32 to the winch 28. Referring to the other end of the platform as shown in Figure 4, the cable or cables supporting the platform are carried continuously from corner to corner around compensating pulleys 36 and 37 fixed to the platform and thence up to the cradle pulleys, jockey pulley, and winch similarly as shown in Figure 1. It will be seen that if the platform were fitted at all four corners with pinned ends only and should the lengths of cable hauled in by the winch be different for the various cables owing to common working errors in the apparatus, then one or more of the cables would run slack and the remainder be overloaded. The provision of pulleys 36 and 37 placed at one end only of the platform compensates for such working errors and ensures all cables remaining in proper tension during hoisting and tilting. All cables are purposely arranged to leave the cradle as shown at one common centre or set of pulleys 31 as the distance between the cradle pulleys 31 and jockey pulleys 32 varies during tilting and it will be seen that such variation must be the same for all cables. In the drawing the cables are shown conventionally only and may, of course, be duplicated or rearranged as required for purposes of strength or in case of working.

The jockey pulley 32 is mounted upon a rocking arm 38 which may be operated by any suitable means and by way of example a screw 39 with a nut inside the gear wheel 40 is shown. By operating arm 38 the set of cables attached to one end of the platform will be moved to tilt the platform and cause the car to run off therefrom by gravity. The jockey pulley 32 with its fitments may be placed on one side only or on both sides of the cradle.

In operation, a car is run on the platform, as shown in full lines at position A in Figure 1, then by applying power the car is elevated to the position shown in dotted lines at B in Figure 1, the platform extensions 25 sliding up the guides 26 and onto the cradle bottom extensions 27. Continued pull on the cables rocks the cradle along the rolling path, whilst also the car and transverse bar 12 move sideways upon the rollers 16 until the side of the car engages with the transverse bar 13. The car is thus held upon the top by transverse bar 12, upon the side by transverse bar 13, and upon the bottom by the platform, and the car is thus securely held and rotated into the position C shown in dotted lines. After the load is discharged, the motion is reversed and the cradle rolls back to its original normal position and the platform and car are lowered down to the track. When the platform has arrived at track level or just previous thereto, the arm 38 is operated to tilt the platform and cause the car to run off therefrom.

If it is desired to remove the car from the platform at some intermediate level above track level, as for example as shown in dotted lines at D in Figure 1, the platform is temporarily stopped at or near this intermediate level D and the arm 38 operated as aforesaid to run the wagon off.

Referring to Figure 1, and in particular to

position C of the wagon, it will be seen that during tilting the weight of the platform is largely taken upon the car wheels and fittings and in certain positions produces a side strain as shown by the arrow E upon the car wheel and axle boxes. If so desired this strain may be largely or completely eliminated by the use of the arrangement shown in Figure 5. 13 is the side transverse bar attached to the upper ends of compensating beams 41 the lower ends of which are arranged to engage during tilting with the side of platform 19. The said beams are pivoted to a suitable part of the cradle, as for instance to a specially provided connecting bar 6e. The provision of these compensating beams free to rock about pivots ensures the positive engagement of the car side and platform side with their respective supports during tilting whilst also by correctly positioning the pivots 42 the weight of the wagon may be made so to balance the weight of the platform as to take all undue side strain from off the car wheels.

It will be seen that the hoisting and tipping arrangements are of such a nature that the cradle, winch and other essential parts may readily be mounted upon a carriage 43 arranged to run along tracks 44 upon the frame or gantry 1. By this means the car may be hoisted into the position B remaining there whilst the carriage moves along the gantry to any desired position thereon where the cradle may then be rocked to discharge the car in a manner as hereinbefore described.

What I claim is:—

1. In a car tipping apparatus, a frame, a cradle mounted for rocking on the frame from a position to receive the car in an upright relation to a position to invert the car for dumping purposes, and means carried by and bodily movable with respect to the cradle for engaging with the top of the car, whereby to permit bodily movement of the car with respect to the cradle in the initiation of the cradle-rocking movement.

2. In a car tipping apparatus, a frame, a cradle mounted for rocking on the frame from a position to receive the car in an upright relation to a position to invert the car for dumping purposes, a bar carried by the cradle for engaging the top of the car, and means for supporting the bar from the cradle to permit bodily movement of the bar transverse the cradle.

3. In a car tipping apparatus, a frame, a cradle rockable thereon from a car receiving position to a car dumping position, a platform on which the car is initially placed, and supporting means connected to the respective ends of the platform and operable for elevating the platform, the supporting means for one end of the platform being capable of operation independently of the supporting means for the other end of the platform to thereby tilt the platform to insure the gravital movement of the car from the platform.

4. In a car tipping apparatus, a frame, a cradle rockable thereon from a car receiving position to a car dumping position, a platform on which the car is initially placed, cables connected to the respective ends of the platform and leading over a common center on the cradle, means for operating the cables to elevate the platform, and means for operating the cables at one end of the platform independently of the cables at the opposite end to thereby tilt the platform for gravital discharge of the car.

5. In a car tipping apparatus, a supporting frame, a cradle rockable thereon from a car receiving position to a car dumping position, a car receiving platform, means for moving the car platform into cooperation with the cradle to secure the car between the platform and cradle, means providing for independent lateral movement of the car in that movement of the cradle tending to dump the car, and means carried by the cradle to limit the lateral movement of the car.

6. In a car tipping apparatus, a supporting frame, a cradle rockable thereon from a car receiving position to a car dumping position, a car receiving platform, means for moving the car platform into cooperation with the cradle to secure the car between the platform and cradle, means providing for independent lateral movement of the car in that movement of the cradle tending to dump the car, beams pivotally supported on the cradle, a bar carried by said beams in position to be engaged by the side of the car during the lateral movement of the car, and a bar carried by said beams to be engaged by the platform to compensate for the side strain on the running gear of the car during the dumping operation.

7. In a car tipping apparatus, a supporting frame, a cradle rockable thereon from a car-receiving position to a car-dumping position, a car-receiving platform, means for moving the platform toward the cradle, said frame guiding the platform in the movement of the platform toward and from the cradle, said cradle having a part to serve as an extension of the frame for guiding the platform beyond the frame and during the final movement of the platform relative to the cradle.

8. In a car tipping apparatus, a frame, a cradle rockable relative thereto from a car-receiving position to a car-dumping position, a platform to receive a car to be dumped, means for moving the platform toward and from the cradle, a member carried by the cradle and bodily movable laterally thereof, said member forming an upper clamp for the car following elevation of the platform, whereby the car is held between the plat-

form and said member against independent vertical movement while capable of lateral movement, and a lateral stop for the car to limit the lateral movement of the car, said stop being carried by the cradle and extended to resist lateral movement of the platform simultaneously with its stop function for the lateral movement of the car.

In testimony whereof I have hereunto signed my name.

BERNARD EDMUND ELLSON.