June 30, 1931. W. E. ERICKSON 1,812,040

EXTERNAL COUNTERWEIGHT FOR CAR DUMPERS

Filed Jan. 8, 1927 3 Sheets-Sheet 1

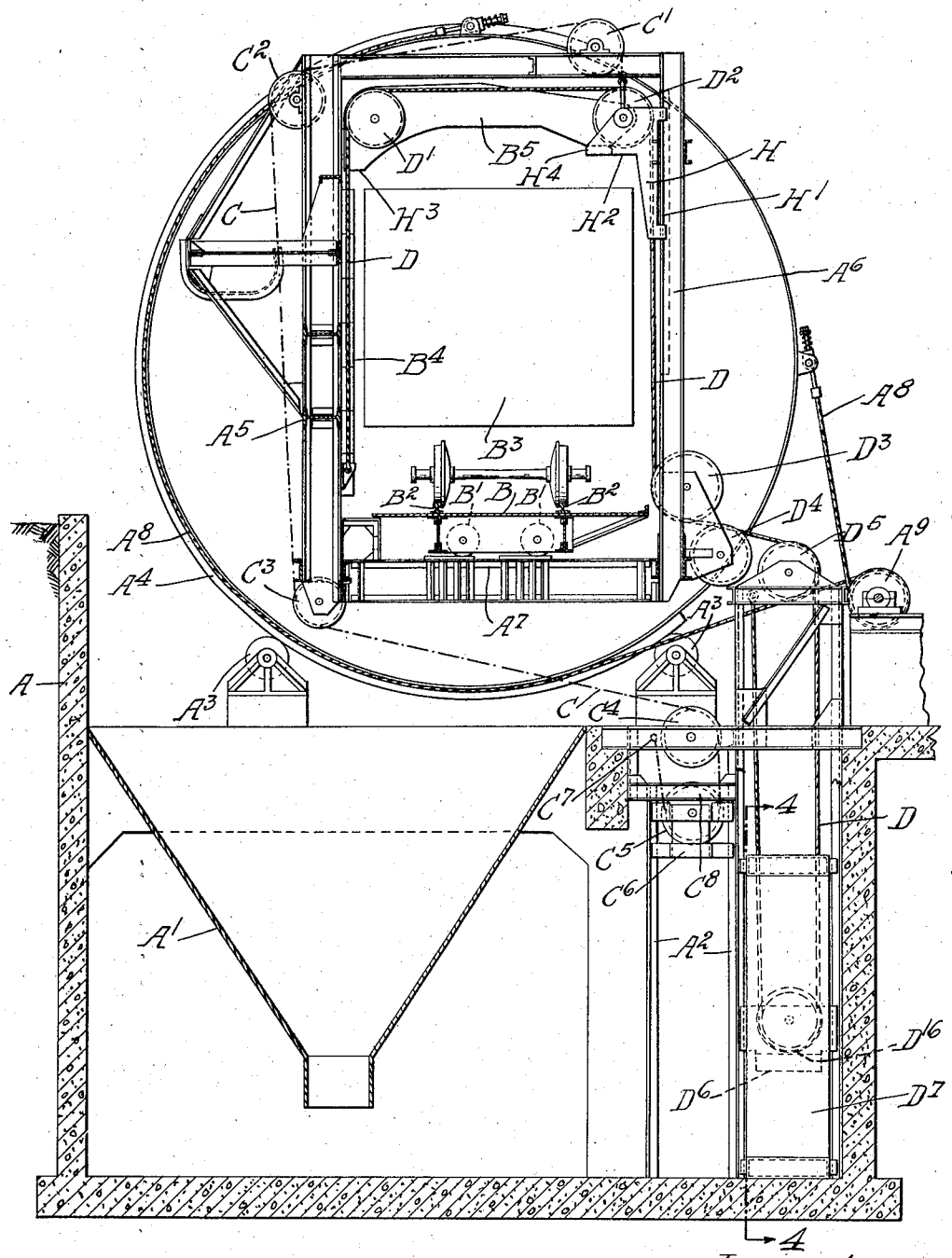


Fig. 1

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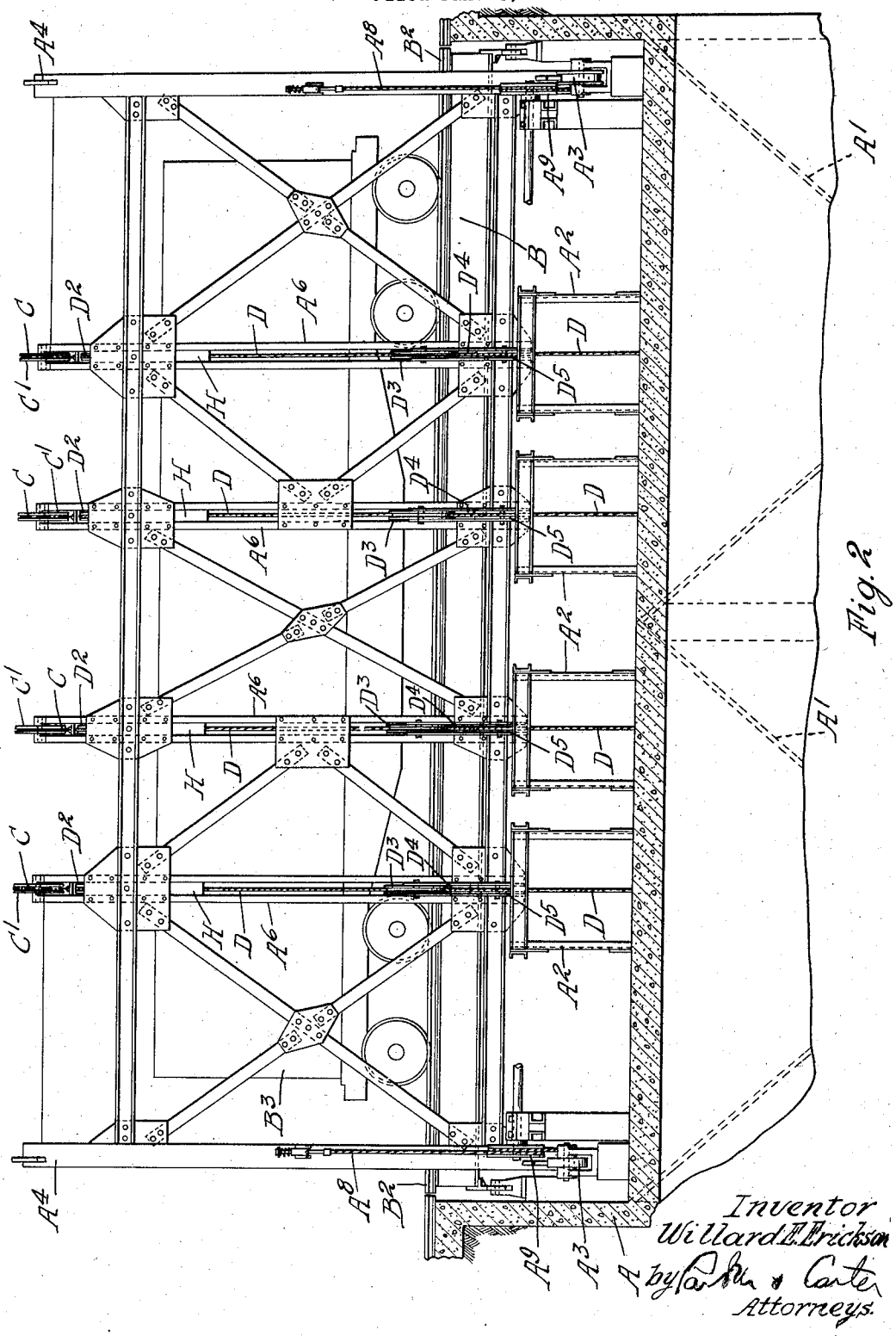


Fig. 2

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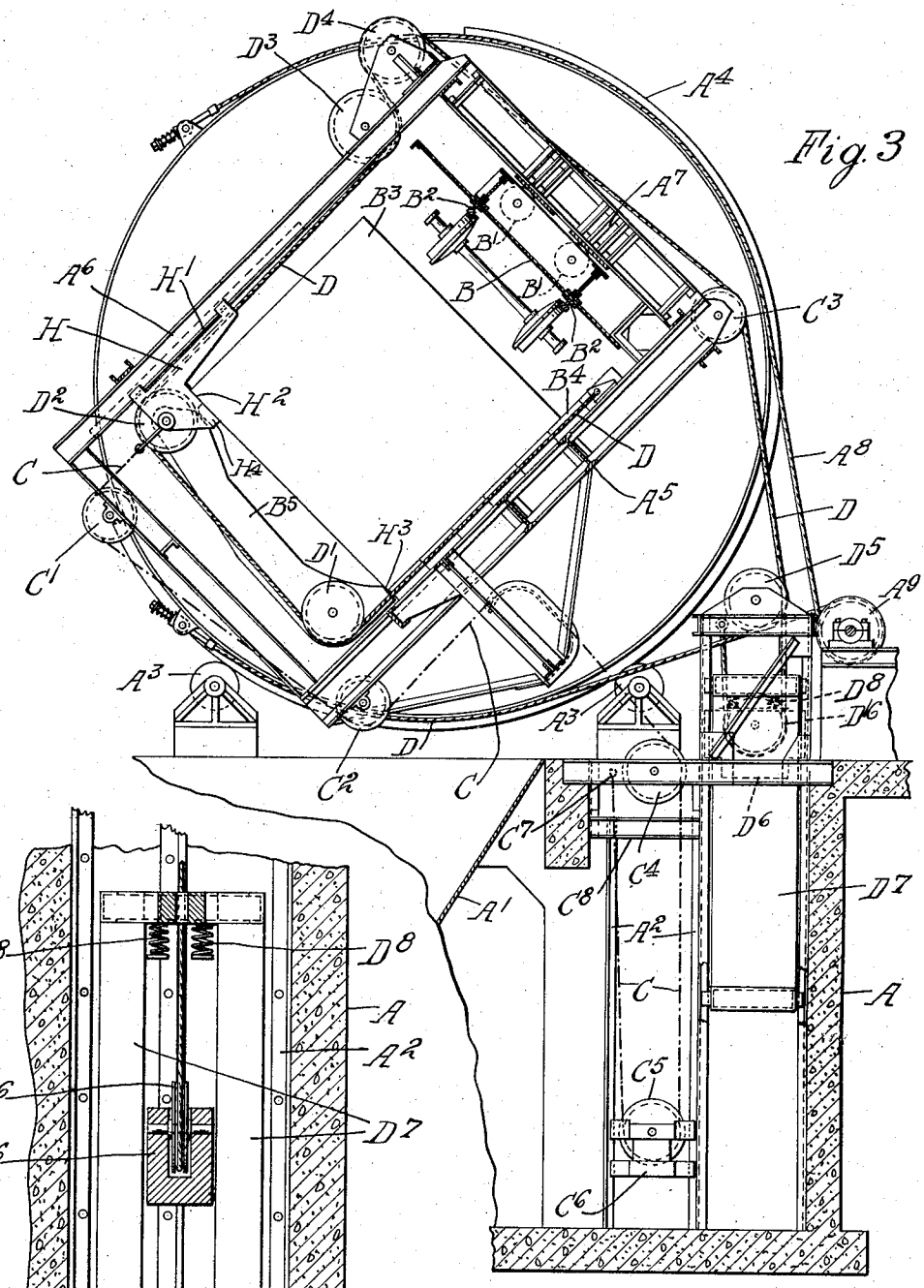


Fig. 3

Fig. 4

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UNITED STATES PATENT OFFICE

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EXTERNAL COUNTERWEIGHT FOR CAR DUMPERS

Application filed January 8, 1927. Serial No. 159,802.

My invention relates to improvements in car holding clamps for rotary car dumpers and has for one object to provide a new and improved clamp mechanism wherein counterweights may be used for raising and lowering the clamp toward and from the car and wherein counterweights may be used for holding the car clamps in place to hold the car on the cradle when in the dumping position, all said counterweights being removed from the cradle so that the cradle may be of lighter and simpler construction. Another object of my invention is to provide a rotary car dumping cradle wherein the car may be rotated about a longitudinal axis passing through the car and held in place on the car by counterweights which are not mounted on the cradle. Another object is to provide a car dumper wherein the car is given a rotary movement for dumping without any lateral movement and wherein the car is held in place by clamps which control by clamp counterweights supported on the main structure and not on the cradle. Other objects will appear from time to time throughout the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a cross section through the apparatus.

Figure 2 is a side elevation of the right hand side as viewed in Figure 1;

Figure 3 is a view similar to Figure 1 showing parts in dumping position;

Figure 4 is a section along the line 4—4 of Figure 1.

Like parts are indicated by like characters throughout the specification and drawings.

A is a supporting structure including a hopper A^1, a counterweight frame A^2, cradles supporting rollers A^3, a cradle made up of roller rings A^4, girders A^5 A^6, a floor beam A^7, a driving cable A^8 wound about one of the rings A^4 and a driving drum A^9 whereby the cradle may be rotated.

B is a transfer table mounted on a plurality of rollers B^1 B^1 on the supporting frame A^7 being adapted to have a slight transverse movement in the cradle. B^2 B^2 are car tracks on the transfer table and B^3 is a car on the tracks. This car is adapted to be run onto the transfer table when the cradle is in the upright position, the transfer table being centered in the cradle by any suitable means not here shown as they form no part of my present invention. The cradle is rotated in a counter clockwise direction from the position shown in the drawings for dumping and is returned in a clockwise direction to the position shown in the drawings after the car is dumped. During such movement the car preferably has at the beginning of the dumping movement, a slight movement to the left so that the car will engage the abutment B^4 before the car clamps go into operation.

B^5 is a car clamp held at the top of its excursion away from the car until the dumping movement starts. This car clamp is mounted for vertical movement in the cradle toward and from the top of the car and it is necessary to provide means for controlling this clamp, lifting it away from the car as the cradle approaches the upright position and lowering it to the car as the cradle starts toward the dumping position.

C is the clamp lowering cable. It is dead ended on the clamp base up over a sheave C^1 at the top of the cradle, extends thence laterally across the cradle to a sheave C^2, thence down about a sheave C^3 toward the bottom of the cradle and then out over a sheave C^4 on the counterweight frame A^2. This cable extends down around a sheave C^5 on the lifting counterweight C^6 and thence back to the top of the counterweight frame where it is dead ended at C^7. The lifting counterweight is mounted to slide vertically in the counterweight frame. In the position there shown it is held against a stop C^8 which limits its upward movement.

If the cradle is rotated from the position shown in Figure 1 in a counter clockwise direction, the distance between the sheaves C^3 and C^4 will decrease. The weight of the clamp is greater than the weight of the lifting counterweight C^6 and the lifting counterweight will remain in contact with the stop C^8 until the slack in the cable between the sheaves C^3 and C^4 has been paid out enough

to permit the clamp to travel down to rest against the top of the car. Further rotary movement of the cradle will then result in allowing the lifting counterweight to travel downward in its path away from the stop thereby keeping a tension on the cable C. After the car is dumped the cradle will return toward its upright position raising the clamp counterweight without lifting the clamps from the car until the clamp counterweight engages the stop. When the counterweight engages the stop further movement of the cradle will exert a sufficient tension on the cable to lift the clamps away from the car and permit the car to run off the cradle and its place be taken by another.

D is the clamp holding rope. It is dead ended at one side of the cradle at a point below the top of the lowest car. It extends up over a sheave D^1 on the clamp B^5 thence across the clamp to a second sheave D^2 thence down over a third sheave D^3 approximately opposite to the end where the cable is dead ended so that the clamp is held between the bight end of the cable between the dead end point and the sheave D^3. From the sheave D^3 the cable extends over a sheave D^4 on the cradle frame and thence to a sheave D^5 at the top of the counterweight frame. From here it extends down around a sheave D^{16} on the lowering counterweight D^6 and thence up to the top of the counterweight frame where it is dead ended. The lowering counterweight D^6 is free to move vertically in the counterweight frame. It is associated with a holding counterweight D^7 also free to move vertically in the counterweight frame, the relation between the two counterweights being such that the lowering counterweight has a certain degree of freedom of movement without picking up the holding counterweight.

With the parts in the position shown in Figure 1, the lowering counterweight is suspended by the holding rope. The holding counterweight is resting at the bottom of its excursion. When the car dumper cradle rotates in a counter clockwise direction, it will tend to increase the distance between the sheaves D^4 and D^5 and therefore pull out on the cable D. This will pull down on the clamp B^5 and since at the same time the clamp lowering cable C is paid out, this tension on the rope D exerted by the lowering counterweight D^6 will insure that the clamp will be drawn down on the car. As the distance between the sheaves D^4 and D^5 is increased after the clamp has settled down on the car, the lowering counterweight will be raised to a point where it picks up the holding counterweight, then further rotation of the cradle will cause both the lowering and the clamp holding counterweight to be raised in bight of the cable between the dead end on the counterweight frame and the sheave D^5 so that the two counterweights are available to hold the weight of the car as the cradle rotates the car into the upside down or dumping position.

Reverse movement of the cradle of course tends to lower these counterweights and as the car comes back into the upright position on the cradle the holding counterweight will be settled down to the bottom end of its excursion and the lowering counterweight will then travel down after the holding counterweight has been released and will hang somewhere between a position where it would rest on the framework and a position where it would pick up the holding counterweight exerting a tension in the cable D such that when the lowering cable is paid out the clamps will be positively drawn down by such tension against the car.

It will be noted that the clamp comprises a slide H traveling along the vertical member H^1. The cable C engages this slide. This slide has a car engaging shoulder H^2; pivoted on it is the clamp body B^5, which at its other end has a car engaging shoulder H^3. The slide H has a stirrup H^4 adapted to be engaged by the inner end of the clamp B^5 to limit its downward movement, the arrangement being such that the shoulder H^3 is appreciably lower than the shoulder H^2 when in the inoperative position. As the clamp is lowered, the shoulder H^3 first engages the car, then the slide goes on down the clamp B^5 rotating with respect to the slide until the shoulder H^2 rests on the car. From then on the clamp is at rest. In the reverse movement as the clamp is raised the slide H first comes up, the shoulder H^3 remaining in contact until further rotation of the clamp bar with respect to the slide H is stopped, when the clamp travels on away from the car. Thus with the clamp guide at only one end there is no possibility of binding or locking of the parts.

It will be noted that the cradle is built up of a lattice structure with two roller rings one located at either end. This structure is conventional and there may be two or more clamps as the case may be. Each clamp preferably being associated with its separate set of counterweights as indicated.

I claim:

1. A clamp for car dumpers and the like comprising a vertical track, a carriage adapted to slide vertically therealong having a car engaging shoulder, a clamp beam pivoted on the carriage extending across the car and having a shoulder adapted to engage the opposed side of the car, positive means for limiting the rotary movement of the clamp beam with respect to the sliding carriage to permit the car engaging shoulder on the end of the beam when in the inoperative position to occupy a position below the car engaging shoulder on the carriage, means for raising

and lowering the clamp connected directly to the carriage and means for locking the clamp comprising a cable and sheaves over which the cable travels one on the end of the beam, the other on the carriage.

2. In a car dumper, a cradle, a car holding clamp, means for rotating the cradle about a longitudinal axis passing therethrough a plurality of counterweights, cables between said counterweights and the clamp and sheaves on the cradle over which the cables travel whereby one of the counterweights raises the clamp, another counterweight lowers the clamp and a third counterweight holds the clamp in lowered position and supports the weight of the car when the car is being dumped, all the elements forming the compound counterweight being so related and so supported by the cable that the tension available to hold the clamps in seated position when the counterweight parts are all in operation is the total sum of all the counterweight elements.

3. In a car dumper, a cradle, a car holding clamp, means for rotating the cradle about a longitudinal axis passing therethrough, a plurality of counterweights, cables between said counterweights and the clamp and sheaves on the cradle over which the cables travel whereby one of the counterweights raises the clamp, another counterweight lowers the clamp and a third counterweight holds the clamp in lowered position and supports the weight of the car when the car is being dumped, the clamp lowering counterweight and the clamp holding counterweight being inter-related so that the weight of both is suspended and cooperates to hold the car in position when it is being dumped, all the elements forming the compound counterweight being so related and so supported by the cable that the tension available to hold the clamps in seated position when the counterweight parts are all in operation is the total sum of all the counterweight elements.

4. In a car dumper the combination with a rotary cradle and a car holding clamp thereon, of a lifting counterweight removed from the cradle, a lifting cable between the counterweight and the clamp and a positive stop in the path of the counterweight whereby rotation of the cradle into the upright position brings the counterweight into engagement with the stop and positively raises the clamp out of contact with the car the counterweight itself being the sole clamp lifting element.

5. In a car dumper the combination with a rotary cradle and a car holding clamp thereon, of a lifting counterweight removed from the cradle, a lifting cable between the counterweight and the clamp and a positive stop in the path of the counterweight whereby rotation of the cradle into the upright position brings the counterweight into engagement with the stop and positively raises the clamp out of contact with the car, the counterweight being freely suspended from the cable to maintain a tension therein while the cradle moves from the upright toward the dumping position and return, the counterweight itself being the sole clamp lifting element.

6. In a car dumper the combination with a rotary cradle and a car holding clamp thereon, of a lifting counterweight a lifting cable between the counterweight and the clamp and a positive stop in the path of the counterweight whereby rotation of the cradle into the upright position brings the counterweight into engagement with the stop and positively raises the clamp out of contact with the car, the counterweight itself being the sole clamp lifting element.

7. In a car dumper the combination with a rotary cradle and a car holding clamp thereon, of a lifting counterweight a lifting cable between the counterweight and the clamp and a positive stop in the path of the counterweight whereby rotation of the cradle into the upright position brings the counterweight into engagement with the stop and positively raises the clamp out of contact with the car, the counterweight being freely suspended from the cable to maintain tension therein while the cradle moves from the upright toward the dumping position and return, the counterweight itself being the sole clamp lifting element.

8. In a car dumper the combination with a rotary cradle and car holding clamp thereon of a compound counterweight comprising clamp lowering and clamp holding elements removed from the cradle, a holding cable between the counterweight and the clamp, sheaves on the cradle and the counterweight support so positioned that rotation of the cradle toward the dumping position increases the distance between them to raise the clamp lowering counterweight element to lower the clamp, the clamp holding element being interposed in the path of the clamp lowering element whereby further rotation of the cradle after the clamp has seated suspends the holding element on the cable to exert a car holding tension on the cable.

9. In a car dumper the combination with a rotary cradle and car holding clamp thereon of a compound counterweight comprising clamp lowering and clamp holding elements, a holding cable between the counterweight and the clamp, sheaves on the cradle and the counterweight support so positioned that rotation of the cradle toward the dumping position increases the distance between them to raise the clamp lowering counterweight element to lower the clamp, the clamp holding element being interposed in the path of the clamp lowering element whereby further rotation of the cradle after the clamp

has seated suspends the holding element on the cable to exert a car holding tension on the cable.

10. In a car dumper the combination with a rotary cradle and a car holding clamp thereon of a lifting counterweight and a compound clamp lowering and holding counterweight removed from the cradle, a cable between the lifting counterweight and the clamp and a positive stop in the path of the lifting counterweight whereby rotation of the cradle into the upright position brings the counterweight into engagement with the stop and positively raises the clamp out of contact with the car, a holding cable between the clamp and the compound counterweight, sheaves on the cradle and the counterweight support so positioned that rotation of the cradle toward the dumping position increases the distance between them to raise the clamp lowering counterweight element to lower the clamp, all the elements forming the compound counterweight being so related and so supported by the cable that the tension available to hold the clamps in seated position when the counterweight parts are all in operation is the total sum of all the counterweight elements.

11. In a car dumper the combination with a rotary cradle and a car holding clamp thereon of a lifting counterweight and a compound clamp lowering and holding counterweight removed from the cradle, a cable between the lifting counterweight and the clamp and a positive stop in the path of the lifting counterweight whereby rotation of the cradle into the upright position brings the counterweight into engagement with the stop and positively raises the clamp out of contact with the car, a holding cable between the clamp and the compound counterweight, sheaves on the cradle and the counterweight support so positioned that rotation of the cradle toward the dumping position increases the distance between them to raise the clamp lowering counterweight element to lower the clamp, the clamp holding element being interposed in the path of the clamp lowering element whereby further rotation of the cradle after the clamp has seated suspends the holding element on the cable to exert a car holding tension on the cable.

Signed at Chicago, county of Cook and State of Illinois, this 28th day of December 1926.

WILLARD E. ERICKSON.