J. A. MORRISON.

CAR DUMPER.

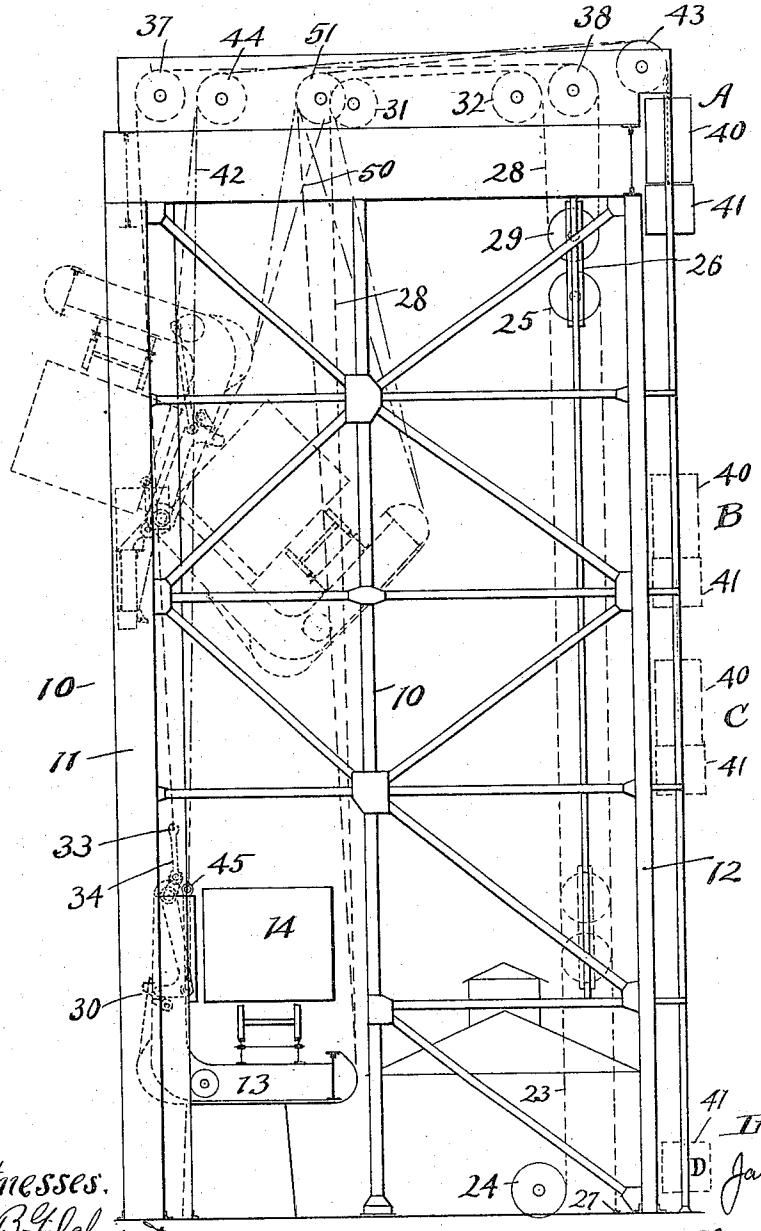
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1,165,698.

Patented Dec. 28, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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3 SHEETS—SHEET 2.

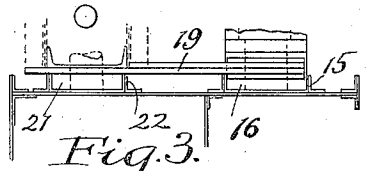
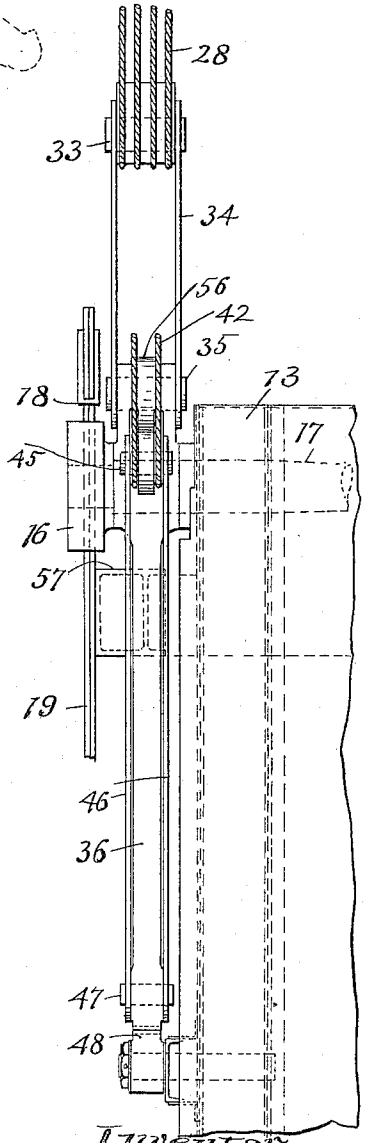


Fig. 3.

Fig. 2.

Fig. 4.



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3 SHEETS—SHEET 3.

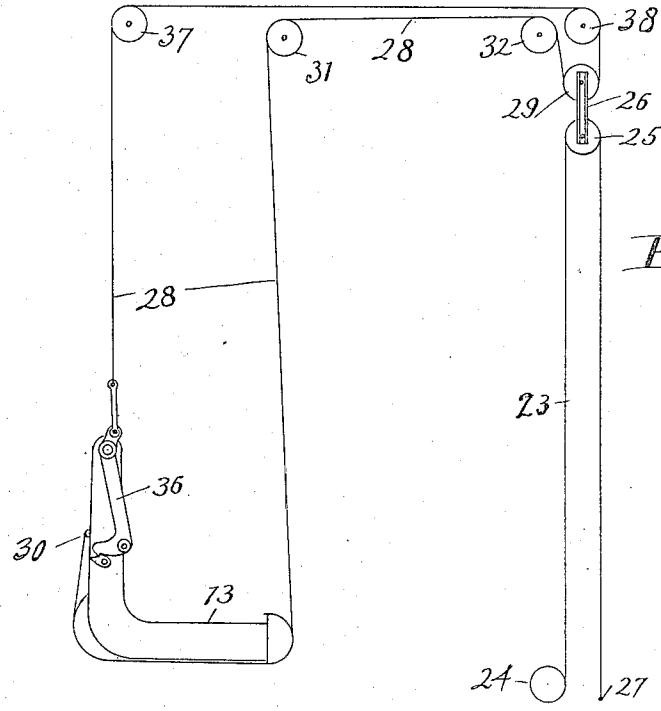


Fig. 5.

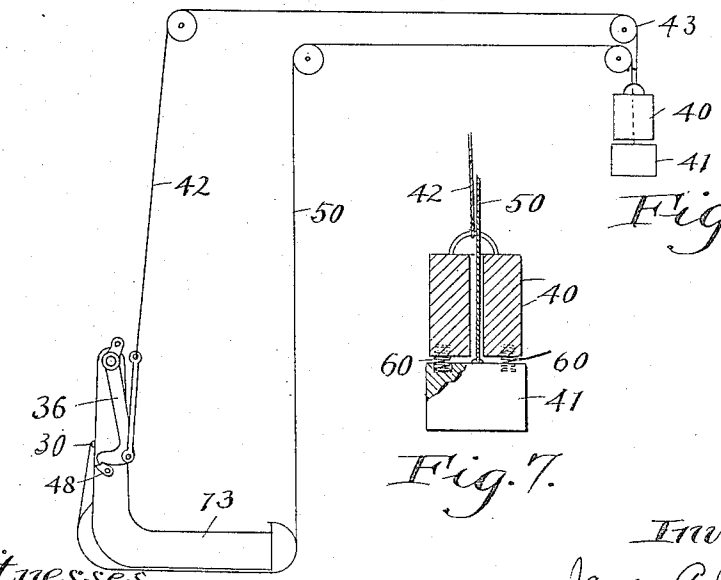


Fig. 6.

Fig. 7.

Witnesses.
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UNITED STATES PATENT OFFICE.

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CAR-DUMPER.

1,165,698. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed March 4, 1915. Serial No. 11,995.

To all whom it may concern:

Be it known that I, JAMES A. MORRISON, a citizen of the Dominion of Canada, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Car-Dumpers, of which the following is a full, clear, and exact description.

This invention relates to car dumpers of the type consisting of a tower and a cradle which is adapted to receive a car, and to be elevated in the tower to a predetermined height, and then tilted to dump the contents of the car into a suitable chute or pan which may discharge into a hold of a boat or other receiving element.

The present invention relates particularly to the hoisting and tilting means for the cradle, and has for one of its objects to avoid the necessity of stopping or slowing down the hoisting apparatus when the cradle is about to engage the fixed stop or abutment about which the cradle is tilted.

A further object is to increase the efficiency of the hoisting apparatus by the provision of means whereby the tilting movement of the cradle is accomplished, principally by counterweights or counterweighted cables, which turn the cradle during that part of the turning or tilting movement when the load on the hoisting apparatus is ordinarily the heaviest.

A still further object is to reduce the rope pull on the hoisting cables and to provide means whereby the load on the cables is more uniform than in the hoist systems of the prior car dumpers.

The above and other objects are accomplished by my invention, which has for one of its important features an arrangement of counterweighted cables such that during the major portion of the elevating movement these cables act on or exert a pull on both the front and rear sides of the cradle, but when the cradle is about to engage the stop or abutment about which it is tilted, the load on the counterweighted cables connected to the front part of the cradle is automatically transferred to the cables connected to the rear part, so as to tilt the cradle and the car supported on it.

My invention may be further briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheet of drawings, wherein I have shown the preferred embodiment of my invention, Figure 1 is an end elevation of a car dumper embodying my invention, different positions of the cradle and car supported thereon being shown by dotted lines; Fig. 2 is a detailed view on an enlarged scale showing part of the cradle hoisting and turning mechanism; Fig. 3 is a sectional view showing a part of one of the corner columns of the tower, and part of the members which engage it; Fig. 4 is a detailed view showing the parts of Fig. 2, but viewed from a direction at right angles to the direction of view of Fig. 2; Fig. 5 is a diagrammatic view showing the power-operated part of the elevating and tilting system; Fig. 6 is a similar view showing the elevating and tilting counterweighted cables; and Fig. 7 is an enlarged fragmentary view of the counterweights.

Referring now to the drawings, 10 represents the tower which may be of any suitable construction, this tower being formed of structural work and including front corner columns 11 and rear corner columns 12 and suitable elements connecting the same so as to form a strong rigid structure. The car dumper also includes a cradle 13, which, on the whole, is of usual construction, this cradle having a track upon which a car 14 may run and being adapted to be elevated along the front portion of the tower to some suitable elevation, and then tilted in the manner shown by dotted lines in Fig. 1. Preferably, the front corner columns 11 are provided on their inner sides or faces with guideways or channels, one of which is shown at 15, in Fig. 3, which channels receive rectangular-shaped shoes 16, mounted on the ends of pins 17, which project laterally from the upper front corners of the cradle (see Figs. 2 and 4). These shoes are adapted to engage stops or shoulders 18 to stop the upward movement of the cradle, these shoulders being in this case carried by plates 19 fastened on the opposite ends of a beam or girder 20, which extends across the front of the tower between the front corner columns 11. This beam as in the usual constructions may be adjusted vertically to adjust the height of

the dumping point, the girder having shoes 21 which slide in channels or grooves 22 on the inner faces of the corner columns 11. Ordinarily, this beam carries the pan or chute into which the contents of the car is dumped. This pan or chute is not shown, as it constitutes no part of the present invention. Furthermore, I do not regard it as necessary to show more in detail the girder or the manner of adjusting the same, as these parts are well known in the art.

The hoisting and tilting cables are connected to the cradle at both ends of the same, but I have illustrated and shall describe simply the cables which are connected to one end of the cradle, it being understood that the arrangement at both ends is the same as herein illustrated and described. For the sake of clearness, I shall divide the hoisting and tilting cables into two groups, namely, the power-operated cables which are adapted to be operated by a suitable engine driven drum, and the counterweighted cables.

For the purpose of hoisting and tilting the cradle, I employ at each end thereof a set of cables including a cable 23, which extends from a suitable engine-driven drum 24 upwardly around a sheave 25 carried by a vertically movable yoke 26, and then downwardly to a deadened point illustrated at 27. Coöperating with this cable, and forming in effect a continuation or extension of the same is a second cable 28 which passes around a second sheave 29 carried by the yoke or shackle 26, and then about suitable sheaves at the top of the tower, and then to the cradle to which both ends of the cable are connected in the manner stated below. One end of this cable is connected to the front side of the cradle at 30, and then passes downwardly around the lower side of the cradle, and then upwardly around a sheave 31 at the top of the tower, then rearwardly around a sheave 32, and then downwardly around the sheave 29 previously referred to. The other end of the power-operated hoisting and tilting cable 28 is connected at 33 to the upper end of an arm or strap 34 (see Figs. 1, 2 and 4) whose lower end is pivotally connected at 35 to the upper short end of a lever 36 adapted to turn or revolve about the pin 17 supported in the upper front part of the cradle, as before described. The function of this lever 36 will be described presently. It may be stated at this point that it is not essential that the end of cable 28 be connected to lever 36 as it may be otherwise connected to the front part of the cradle. From the end of the arm or strap 34 the cable 28 extends upwardly to the top of the tower around a sheave 37, then rearwardly around a sheave 38, and then downwardly to the sheave 29 about which the cable is looped. It will be seen, therefore, that by means of these two power-operated cables 23 and 28, the cradle may be elevated and that the cables will have a tilting action on the cradle when the fixed stops or abutments 18 are engaged by the cradle shoes 16. It will be observed also that inasmuch as the cable 28 is in effect attached at both the front and rear parts of the cradle, the elevating action is applied by the cable 28 substantially equally to both front and rear parts of the cradle.

In addition to the two power-operated cables 23 and 28, I employ at each end of the cradle for the purpose of elevating and tilting the cradle two sets of counterweighted cables whose arrangement and application to the cradle constitute the principal features of the present invention. For each end of the cradle I provide two elevating and tilting counterweights 40 and 41 arranged one above the other, and movable vertically along the rear side of the tower. The upper counterweight 40, as will be observed from Fig. 1 is about twice the size and has about twice the mass of the lower counterweight 41. Normally, these counterweights are separated a short distance which may be approximately two inches. To the upper counterweight 40 is attached a cable 42 which extends upwardly from the counterweight 40 about a sheave 43 at the rear part of the tower, then passes forwardly around a sheave 44 near the upper forward portion of the tower, and then extends downwardly and is connected at 45 to the upper end of an arm or strap 46 whose lower end is pivotally connected at 47 to what normally constitutes the lower end of the lever 36. This counterweighted cable is, therefore, connected to the forward part of the cradle. It may be here stated that the lever 36 is normally held in the position shown in Fig. 2 by means of a spring-pressed pivoted latch 48 carried by the end of the cradle, this latch normally engaging a shoulder at the end of a forwardly extending projection or foot on the lower end of the lever 36, the latch being held in engagement with the shoulder by a compression spring 49 (see Fig. 2).

The lower or smaller counterweight 41 has connected to it a cable 50 which passes upwardly through the heavier counterweight 40, and after passing about a sheave which is in line, or substantially in line with the sheave 43, passes forwardly around a sheave 51 and then passes downwardly around the lower part of the cradle, and is attached to the front of the cradle at the point 30, to which one end of the elevating cable 28 is connected. Thus, it will be seen that this counterweighted cable is in effect connected to the rear part of the cradle.

In operation the cradle and the loaded car on the cradle are elevated by the power-operated cables 23 and 28, and by the coun-

terweighted cables 42 and 50, the cradle and car being in effect suspended by these cables while being elevated, inasmuch as the cables extend downwardly and are connected to both the front and rear sides of the cradle. However, just before the shoes 16 carried by the ends of the cradle engage the stop shoulders 18, which limit the upward movement of the cradle, the latch 48 at each end of the cradle engages a projection in the form of a pivoted spring-pressed latch 55 carried by the transverse girder 20. When this occurs the lever 36 is released, and turns about the axis of the pin 17 from the position shown by full lines in Fig. 2 to the position shown by dotted lines in the same figure. After a very short movement of the lever 36 from its full line position, the upper counterweight 40 comes down upon the lower counterweight 41, whereupon the load or pull of the counterweight 40 is transferred from the cable 42 to the cable 50 connected to the rear part of the cradle. The diminution of pull or power applied to the front part of the cradle, and the increase of pull or power applied to the rear part, due to the transference of load, causes the cradle to turn or tilt, the two counterweights moving downwardly in unison and serving to turn the cradle through a considerable portion of the complete turning movement to which the cradle is subjected. The two counterweights move downward together until the lever reaches substantially the dotted line position shown on both Figs. 1 and 2, whereupon the upper counterweight is stopped, and is again supported or suspended by cable 42, while the lower counterweight 41 continues to move downwardly. While the lever 36 is traveling from the full line position to the dotted line position, there is practically no elevating movement applied to the cradle, but principally the turning movement, and when the lever 36 reaches the dotted line position, the short end of the lever, or rather a roller 56 carried thereby engages a projection or block 57 carried by the beam (see Fig. 2), and inasmuch as at this time the load of the upper counterweight 40 is restored to cable 42, and in view of the fact that the leverage through which this load is transferred to the cradle is greater than the leverage through which the pull or power is transmitted to the cradle through the forward or front section of cable 28, the counterweight 40 serves to rock the lever 36 about the block 57 as a fulcrum and thus serves to pull the shoe or block 16 up against the shoulder 18, and to hold it in that position until the cradle is tilted or turned in the reverse direction and begins to descend. The cradle continues its forward tilting movement until it reaches substantially the position shown by the extreme upper dotted line position shown in Fig. 1, and after the contents of the car is dumped therefrom the cradle is tilted back to its normal position. During the early part of this return tilting movement, the latch 48 and lever 36 reëngage each other, and remain in locked engagement until the cradle is again elevated to the point at which the latch 55 causes the disengagement of the lever and latch 48.

In Fig. 1 I have shown several full and dotted line positions of the two counterweights 40 and 41. The uppermost position indicated by full lines and designated for convenience A shows the position of the two counterweights when the cradle is in its normal lowermost position, the two counterweights being spaced a short distance apart, as indicated. The dotted line position designated B indicates substantially the position of the counterweights at the start of the tilting movement of the cradle, the upper counterweight 40 being shown resting on the lower counterweight 41. The dotted line position designated C indicates substantially the position of the two counterweights when the lever 36 has reached the dotted line position of Fig. 2; in other words, it shows the position of the counterweights when the lower counterweight is about to move away from the upper counterweight, and when the load of the upper counterweight 40 is about to be restored to cable 42. The dotted line position D of the lower counterweight 41 indicates the position of this counterweight at the end of the forward tilting movement of the cradle. It will be observed also that the distance between the positions B and C indicates the length of movement of the two counterweights, while the counterweight 40 is resting on the counterweight 41 during which both counterweights are acting to tilt the cradle.

In order that there may be practically no shock when the upper counterweight is lowered on to the lower counterweight, I prefer to place between the two counterweights one or more springs or equivalent yielding material, such as indicated at 60 in Fig. 7.

Thus, it will be seen that I provide counterweighted cables which assist in elevating the cradle and car, and when the cradle reaches substantially its limit of vertical movement upward, the load on the cables connected to the front part of the cradle is automatically transferred to the counterweighted cables connected to the rear part, whereupon the counterweighted cables tilt the cradle through a considerable portion of the turning movement, in fact, the counterweights provide the greater portion of the pull required to turn the cradle from normal position through an arc of substantially 45°,—that is, the counterweights relieve the engine at a time when the load is ordinarily

the greatest, for with the hoisting systems of practically all car dumpers the load on the engine is the greatest at the time when the tilting movement begins. Additionally, these counterweights assist in supporting the cradle during the latter part of the forward tilting movement and during the early part of the return tilting movement, and not only do both counterweights act to tilt the cradle, say from normal position to substantially the 45° position, but the smaller counterweights have a tilting action throughout substantially the entire tilting movement. It may be noted further that during the entire return tilting movement of the cradle the two counterweights are supported on separate cables so that the counterweight 40 does not retard this return movement as it would if supported on cable 50 as during the forward tilting movement. Thus it will be seen that there is no necessity of slowing down or stopping the hoisting apparatus at the time when the tilting movement is about to begin; there are no extremely great loads on the hoisting cables, such as hoisting cables are required to transmit when they tilt the cradle by power applied through the hoisting drum.

I have not deemed it necessary to illustrate the cables which hold the car on to the cradle while the cradle is being tilted, as these constitute no part of the present invention, it being understood that there may be employed for this purpose ordinary counterweighted cables which are engaged by the edge of the car when the cradle is tilted.

It will be understood that in each cable 23, 28, 42 and 50 I may employ a plurality of sections connected in multiple. As indicated in Fig. 4, the cable 28 is preferably composed of four units or sections.

Having described my invention, I claim:

1. In a car dumper, a tower, a cradle adapted to receive a car and to be elevated in the tower and then tilted, a pair of cables operatively connected to the front and rear parts of the cradle, and means for transferring the load applied to the cable connected to the front part of the cradle to the cable connected to the rear part of the cradle, when the cradle is elevated to the predetermined height.

2. In a car dumper, a tower, a cradle adapted to receive a car, a pair of counterweighted cables operatively connected to the front and rear parts of the cradle, respectively, and means whereby the counterweight load on one cable is transferred to the other cable at a certain point in the cycle of cradle movement.

3. In a car dumper, a tower, a cradle adapted to receive a car, a pair of cables operatively connected to the front and rear parts of the cradle for elevating and tilting the cradle, and means for applying a hoisting pull or load to each of the cables during a certain portion of the cradle movement, and means for causing the pull applied to one cable to be decreased, and the pull applied to the other cable to be correspondingly augmented during another portion of the cradle movement.

4. In a car dumper, a tower, a cradle adapted to receive a car, a pair of elevating and tilting counterweights, cables connected to the two counter-weights, and operatively connected to the front and rear parts of the cradle, and means whereby the counterweight normally supported by the cable operatively connected to the front part of the cradle is caused to be supported by the cable operatively connected to the rear part of the cradle during a certain portion of the cradle movement.

5. In a car dumper, a cradle adapted to receive a car, a cradle supporting structure, means comprising a pair of cables for tilting the cradle, one of said cables being operatively connected to one part of the cradle, a movable device for connecting the other cable to another part of the cradle, and means whereby said device is caused to move from one position to another when a certain point in the cycle of cradle movement is reached.

6. In a car dumper, a tower, a cradle adapted to receive a car, a pair of hoisting and tilting cables, one operatively connected to one part of the cradle, a member pivoted to the cradle and attached to the other cable, means normally holding said pivoted member in one position during a portion of the cradle movement, and means for causing said pivoted member to assume a different position when the cradle reaches a predetermined elevation in the tower.

7. In a car dumper, a tower, a cradle adapted to receive a car, means for elevating and tilting the cradle comprising a pair of counterweights and cables connected thereto, one of said counterweights being operatively connected to one side of the cradle, a member pivoted to another side of the cradle and normally held in a given position, the other cable being connected to said pivoted member and tending to swing the same to another position, and means for releasing said pivoted member when the cradle reaches a predetermined elevation in the tower.

8. In a car dumper, a tower, a cradle adapted to receive the car, means for elevating and then tilting the cradle comprising a pair of counterweights arranged one above the other, cables connected to said two counterweights, one operatively connected to the rear part of the cradle, and the other operatively connected to the front part of the cradle, and means between said last mentioned cable and the cradle for permitting the counterweight which is connected there-

to to be lowered on to the counterweight connected to the other cable during a portion of the cradle movement.

9. In a car dumper, a tower, a cradle adapted to receive a car, means for elevating and then tilting the cradle comprising a pair of counterweights, cables connected thereto one of said cables being operatively connected to the rear part of the cradle, a lever pivoted to the front part of the cradle and connected to said other cable, means normally holding said lever in one position, and means for releasing said lever so that it may swing to another position when the cradle reaches a predetermined elevation in the tower.

10. In a car dumper, a cradle adapted to receive a car, means for elevating and then tilting the cradle, comprising a lever pivoted to the cradle, a pair of cables connected to said lever on opposite sides of its pivotal axis, means normally holding said lever in a given position on the cradle, and means for releasing said lever so that one of the cables may swing the same to another position.

11. In a car dumper, a tower, a cradle adapted to receive a car, means for hoisting and tilting the cradle, comprising a plurality of cables connected to the front and rear parts of the cradle, a pair of counterweights, one arranged above the other and connected to two of said cables, a lever pivoted to the front part of the cradle, two of the cables including one of the counterweighted cables being connected to said lever at unequal distances from its pivotal axis, means normally holding said lever in a given position, and means for releasing said lever so that it may swing to another position when the cradle reaches a predetermined elevation in the tower.

12. In a car dumper, a tower, a cradle adapted to be elevated and then tilted, means for elevating and supporting the cradle while tilted comprising a lever pivoted on the cradle, a cable connected to one end of the lever and an abutment supported by the tower and adapted to be engaged by the other end of the lever.

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

JAMES A. MORRISON.

Witnesses :
A. F. KWIS,
C. V. SCHURGER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."