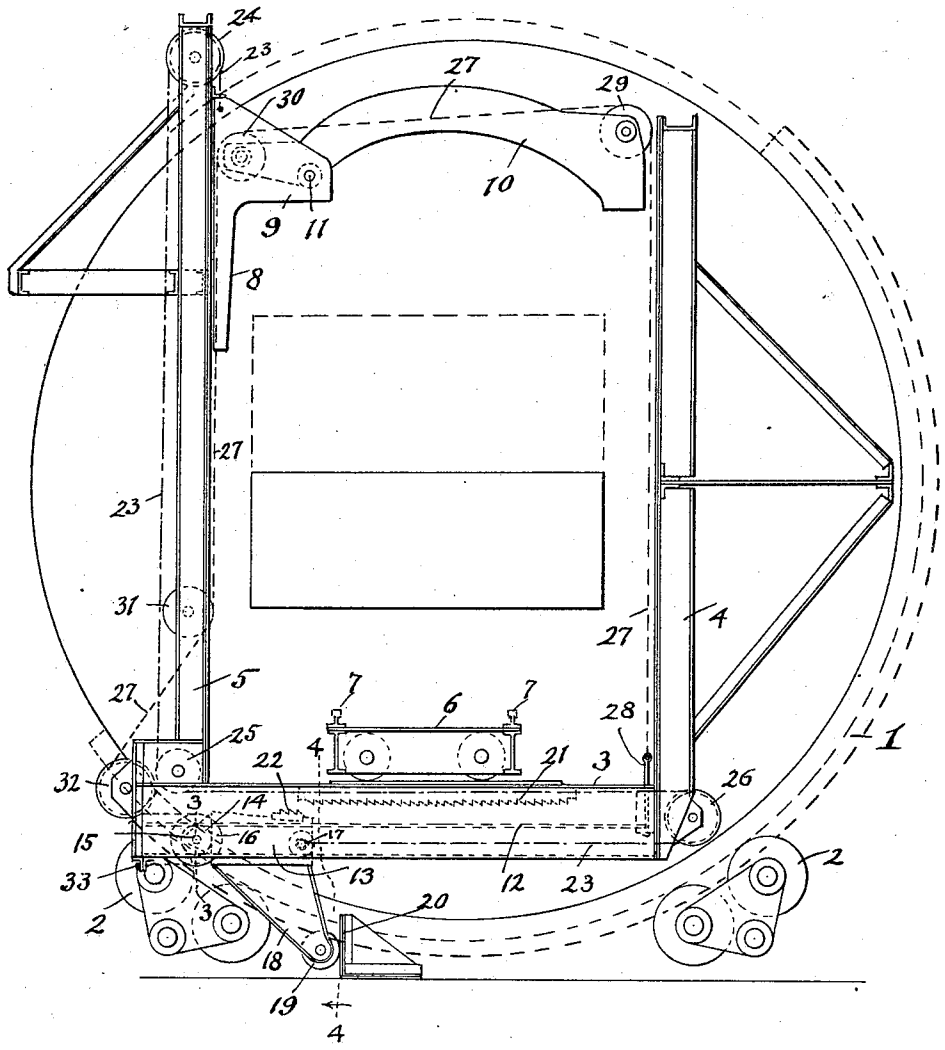
April 8, 1930. A. F. CASE 1,753,456

CAR DUMPER CLAMP

Filed Feb. 2, 1927 4 Sheets-Sheet 1

Fig. 1.



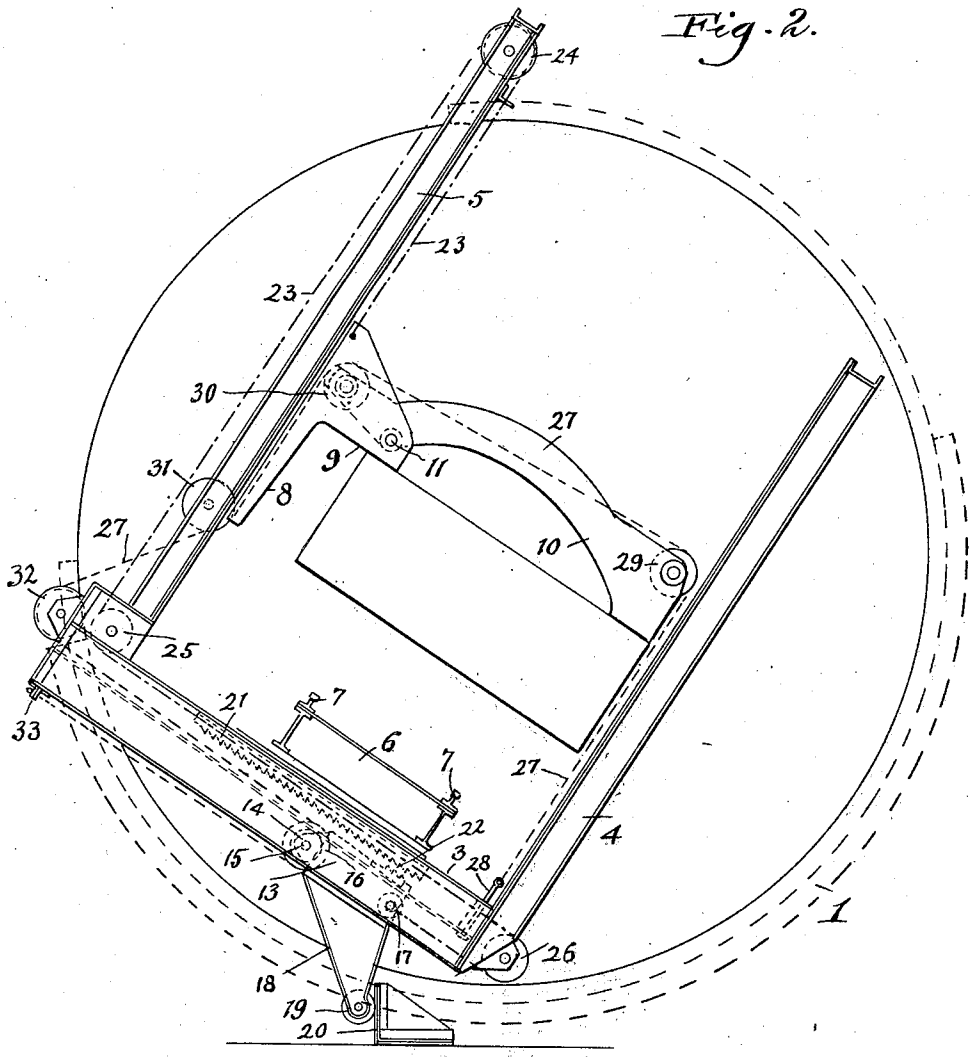
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CAR DUMPER CLAMP

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Fig. 2.



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CAR DUMPER CLAMP

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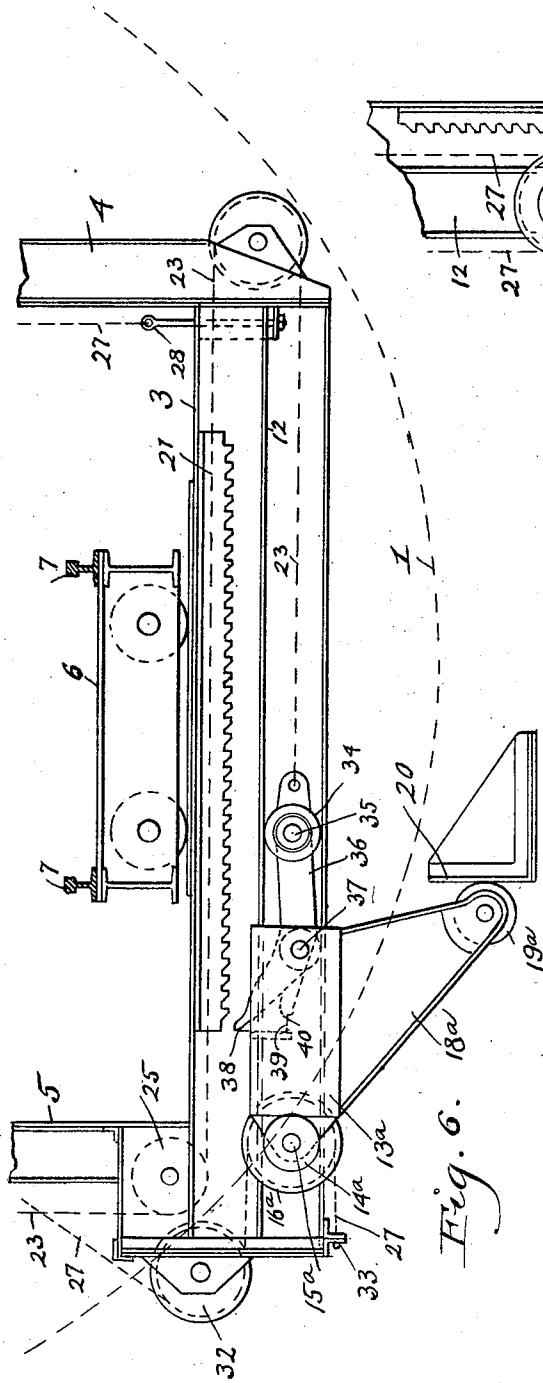


Fig. 6.

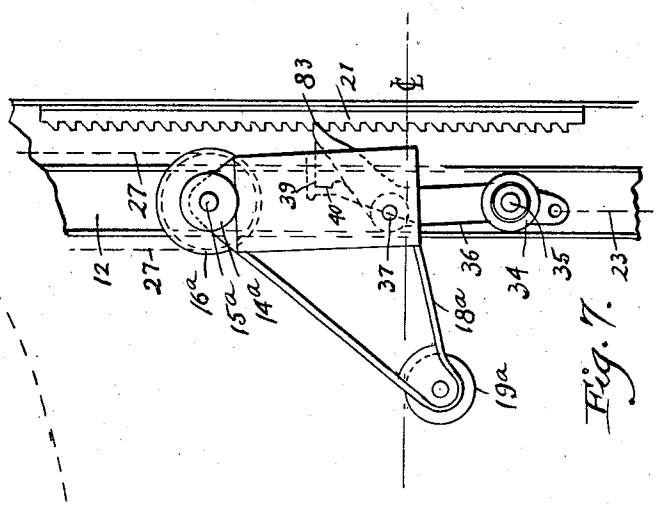


Fig. 7.

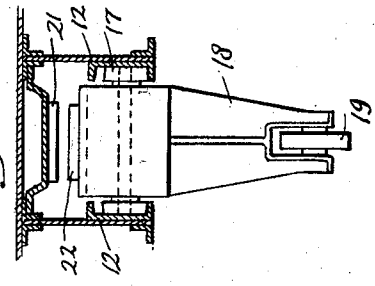


Fig. 4.

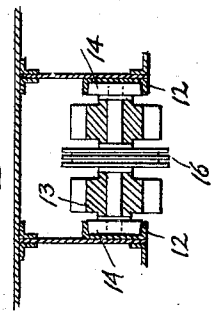


Fig. 3.

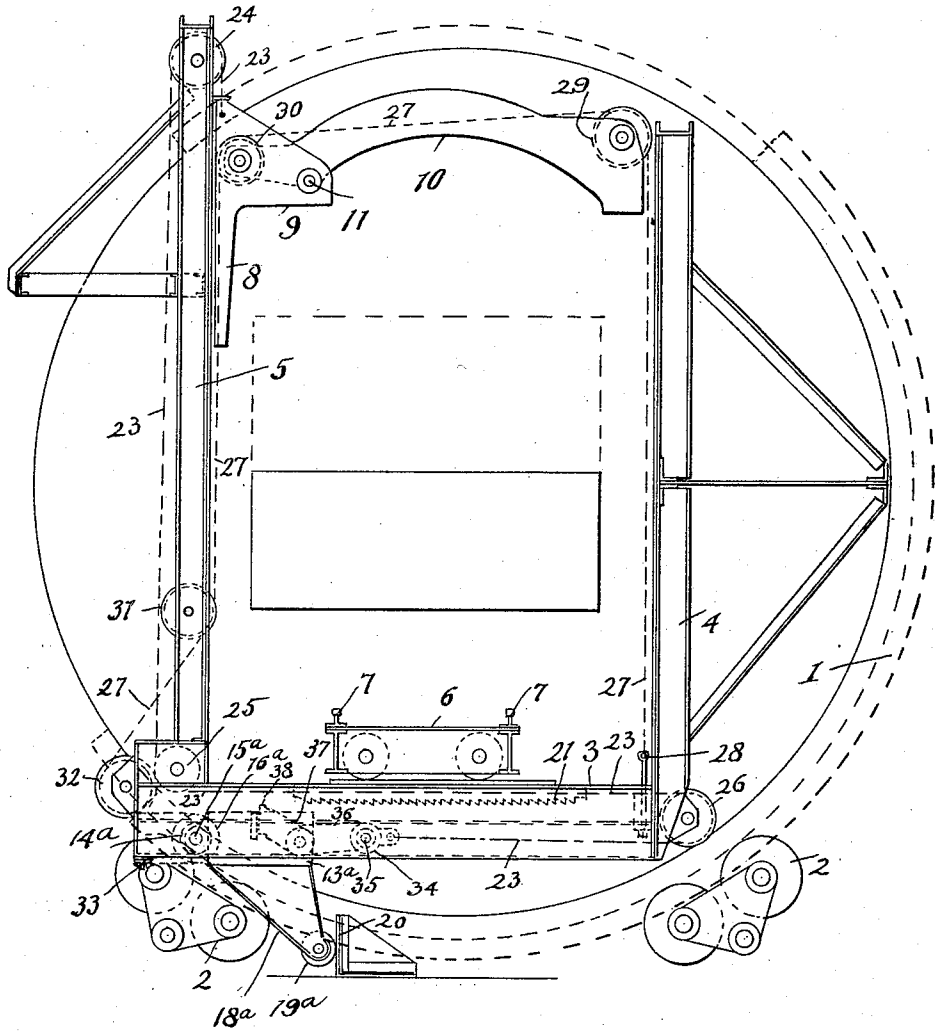
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Fig. 5.



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UNITED STATES PATENT OFFICE

ARTHUR F. CASE, OF CLEVELAND, OHIO, ASSIGNOR TO THE WELLMAN-SEAVER-MORGAN COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

CAR-DUMPER CLAMP

Application filed February 2, 1927. Serial No. 165,262.

This invention relates to clamps of car dumpers which serve to retain a car on the track or supporting platform of the dumper while the dumper is being tilted to discharge the contents of the car, and more particularly of car clamps of the type in which the clamp is automatically controlled to hold the car during the dumping operation and release the same during return of the dumper to its car receiving position.

The present invention has for an object to provide a clamp operating mechanism which is positive and reliable in operation, which is composed of few parts of rugged construction, and which is inexpensive to manufacture.

A further object is to provide car clamps which are automatically controlled and held with a positive actuating pressure against the top of the car, and, in addition, to provide the clamps with positive automatically controlled means for locking them against movement in a releasing direction while the weight of the car is imposed upon them.

A further object is to provide a single controlling device for applying pressure to the clamps to press the same against the car and for locking the clamps against releasing movement.

A further object is to provide a clamp actuating counterweight which is so mounted on the cradle that it is controlled by tilting movements of the cradle to actuate both the clamp and the clamp locking means.

A further object is to provide a car clamp with controlling and locking means mounted within the cradle beneath the car receiving track or platform.

With the above and other objects in view, the invention may be said to comprise a car clamping device as illustrated in the accompanying drawings hereinafter described and particularly set forth in the appended claims, together with such variations and modifications thereof as will be apparent to one skilled in the art to which the invention appertains.

Reference should be had to the accompanying drawings forming a part of this specification in which:

Fig. 1 is an end elevation of a car dumping cradle of the turnover type showing the cradle in car receiving position and a clamp and its controlling members in the positions that they occupy when the cradle is in this position.

Fig. 2 is an end view similar to Fig. 1 showing the cradle in the position during the return movement at which the clamp lifting operation begins.

Fig. 3 is a sectional detail view taken on the line indicated at 3—3 in Fig. 1.

Fig. 4 is a sectional detail view taken on the line indicated at 4—4 in Fig. 1.

Fig. 5 is an end view similar to Fig. 1 showing a modified form of counterweight and clamp locking device.

Fig. 6 is a fragmentary view on an enlarged scale showing the counterweight and locking device in elevation.

Fig. 7 is a fragmentary view showing the counterweight in the position where the pawl is caused to engage the ratchet.

While it will be readily apparent that the car clamp of the present invention can be applied with slight modifications to various types of tilting car dumpers the clamp is illustrated in the accompanying drawings as applied to a rotatably mounted car dumper of the turnover type in which the car receiving frame is mounted within a series of circular enclosing rails 1 which turn upon suitable supporting rollers 2 mounted on a suitable foundation. The car receiving frame within the cradle comprises a bottom or floor 3 extending the full length of the cradle and having at opposite sides thereof uprights 4 and 5. The uprights 4, being on the side toward which the cradle turns in dumping, may be provided with the usual plate to receive and discharge the material from the cradle as it falls from the car during the dumping operation. The uprights 5 on the opposite side are provided with suitable guides for a series of car clamps which engage with the top of the car and hold the car while it is being dumped. The car is supported upon a platen 6 which is mounted for lateral movement on the bottom member or floor 3 of the cradle, the platen 6 being provided with track rails

7 which are adapted to align with the rails of a railway track when the cradle is in car receiving position.

In the accompanying drawings a single clamp has been illustrated but it will be understood that as many of these clamps as desired may be mounted at intervals along the length of the cradle as is common practice in the art. The car clamps are preferably supported upon the side of the cradle opposite that toward which the material is discharged in dumping and, as shown herein, each clamp is carried by a head 8 which is slidably mounted in suitable guides on the standards 5 and has a lateral car engaging extension 9 which is adapted to engage with the top edge of the car on the side adjacent the uprights 5. A clamping beam 10 is pivotally connected at 11 to the extension 9 of the head 8 and extends across the space between the uprights 4 and 5, the free end of the beam 10 being engageable with the edge of the car adjacent the standards 4. The structure so far described is old and well known and the present invention relates to the means for actuating and controlling the car clamping members.

Directly beneath the bottom member 3 and beneath each car clamp there is mounted a counterweight guide formed by a pair of oppositely facing channel bars 12 which extend transversely beneath the bottom member from one side to the other thereof. Mounted to travel in each pair of guides 12 there is a clamp controlling member in the form of a counterweight 13 of a weight suitable to apply the necessary actuating pressure to the clamps in the engaging position thereof and this counterweight is supported at its rear end upon wheels 14 which travel in the guides 12, the diameter of the wheels 14 being but slightly less than the space between the upper and lower flanges of the channels so that the rear end of the counterweight is held against lateral movement with respect to the guides. The wheels 14 are carried by axles 15 which extend transversely through the rear end of the counterweight 13 and midway between the ends of the axle, the counterweight 13 is recessed to receive pulleys 16 which are rotatably mounted on the axle. The forward end of the counterweight is supported upon wheels 17 which travel in the channels 12 but which are of less diameter than the rear wheels 14 permitting a rocking movement of the counterweight 13 for a purpose which will be hereinafter explained. The counterweight 13 has a downwardly extending arm 18 which carries a roller 19 at its lower end which is adapted to engage with an abutment 20 fixed to the foundation for a purpose to be hereinafter explained.

To the under side of the bottom or floor member 3 there is a fixed ratchet bar 21 having ratchet teeth on the under side thereof which are engaged at a predetermined point in the turning movement of the cradle by teeth 22 fixed to the top of the counterweight 13 adjacent the forward end thereof.

Lifting cables 23 are attached to the head 8 and extend upwardly over pulleys 24 at the upper end of the standard 5 and downwardly along the outer side of the standard over guide sheaves 25 at the lower end of the standard and over guide sheaves 26 at the forward end of the guides 12 and rearwardly from the pulleys 26 to the forward end of the counterweight to which they are attached. Clamp applying cables 27 are anchored at 28 to the bottom member 3 adjacent the standard 4 and extend upwardly over sheaves 29 at the forward end of the beam 10, from the sheave 29 over sheaves 30 at the inner end of the beam 10 inwardly of the pivot 11, downwardly from the sheaves 30 over guide sheaves 31 and 32 adjacent the lower end of the standard 5 and from the guide sheaves 32 over sheaves 16 to the point 33 where they are anchored to the cradle frame.

When the cradle is in car receiving position the clamps will be held in their upper or released positions, as shown in Fig. 1, by reason of the fact that the counterweight is held by the fixed abutment 20 at the rear end of its guideway, all of the weight of the clamps being held by the lifting cable 23 extending from the forward end of the counterweight over the pulleys 26, 25 and 24 to the clamp supporting head 8. As soon as the car dumper starts to revolve in a clockwise direction, as shown in the drawings, the counterweight is pulled forwardly in the guideway 12 since the weight of the clamps exert a pull on the cables 23 maintaining the roller 19 in engagement with the abutment 20. This movement of the counterweight overhauls the clamping cables 27 by taking up the slack in the cable between the anchor 33 and guide sheave 32. It will be apparent that the movement of the counterweight in the guideway 12 takes up the cable 27 at twice the rate it pays out the cable 23 and that the movement of the counterweight corresponds to the movement of the clamp. As the counterweight moves forwardly in the guides 12 the clamping means are lowered into engagement with the top of a car in the cradle and as the cradle turns the pressure exerted by the counterweight on the clamp will gradually increase until the guideway 12 assumes a vertical position. As soon as the cradle has turned through a sufficient angle to carry the roller 19 out of engagement with the abutment 20 the weight of the counterweight is applied to the car clamp so that if the clamp is prevented from engaging with the top of the car by engagement with material projecting above the top of the car the clamp will be forced down with an increasing pressure into engagement with the car as the material is spilled from the car during the tilt-

ing movement. The center of gravity of the counterweight 13 is so positioned that when the cradle reaches a predetermined point in its turning movement the counterweight 13 will swing about its rear axle 15 to carry the teeth 22 into engagement with the teeth of the ratchet 21, and this engagement will positively lock the clamping members against movement in a releasing direction during the remainder of the tilting movement of the cradle. The center of gravity of the counterweight is preferably so positioned that the ratchet teeth are caused to engage when the cradle has turned through an angle of substantially 90° so that while the weight of the car is being imposed on the car clamps the clamps are positively locked against releasing movement. Upon return movement of the cradle the locking members are released as the cradle approaches its upright position and the roller 19 engages the abutment 20 which forces the counterweight toward the rear end of the guideway exerting a pull on the lifting cables 23 and elevating the car clamps out of car engaging position. Since the clamps are moved by gravity until they engage the top of the car or the material in the car and since the counterweight can be locked to the ratchet 21 at any point along its length the car clamp is adapted to accommodate itself to cars of various heights.

In the modification shown in Figs. 5, 6 and 7 the cradle construction, the clamps and the clamp operating connections are identical with the modification, above described, and the corresponding parts are identified by the same reference numerals. Figs. 5, 6 and 7 show a modification of the movable clamp controlling counterweight and of the locking device on the counterweight. In this modification the counterweight 13^a is similar to the counterweight 13, above described, being mounted on rear wheels 14^a carried by an axle 15^a which also carries sheaves 16^a for guiding the clamp applying cable 27. The counterweight 13^a also has a downwardly extending arm 18^a provided with a roller 19^a for engagement with the fixed abutment 20. The counterweight instead of being supported directly upon the front wheels as in the modification, first described, is supported at its forward end on wheels 34 which are of the same size as the wheels 14^a and are mounted on an axle 35 which extends through the forward end of a lever 36 which is pivoted intermediate its ends 37 to the forward end of the counterweight 13^a. The rear end of the lever 36 is provided with an upwardly projecting tooth 38 which forms a pawl adapted to engage with the tooth of the ratchet 21. The under side of the lever 36 at the rear end thereof is provided with an abutment 39 which is adapted to engage with the seat 40 formed on the counterweight, the weight of the counterweight when the cradle is in car receiving position tends to rock the lever 36 downwardly about the axle 35 as a pivot and holds the abutment 39 of the lever in engagement with the seat 40 on the body. In this position the pawl tooth 38 is clear of the ratchet 21 and the counterweight is free to move along its guideway. The operation of the counterweight upon tilting movement of the cradle is similar to the modification, first described, the center of gravity of the counterweight being so disposed that until the guideway 12 reaches a substantially vertical position the pawl tooth 38 is held by the counterweight clear of the rack 21. When the guideway 12 reaches a substantially vertical position the counterweight 13^a begins to exert a pressure on the pivot 37 tending to swing the pawl end of the lever 36 into engagement with the ratchet 21. As soon as the pawl tooth 38 engages with the ratchet the counterweight is positively locked against rearward movement and the clamp is positively held in engagement with the top of the car. Upon return movement after the cradle has passed the position in which the guideway 12 is vertical the counterweight 13^a acts to release the pawl so that when the roller 19^a comes into engagement with the abutment 20 the counterweight will be pushed to the rear end of the guideway elevating the clamp to a position clear of the car.

One of the most important advantages of the car clamp mechanism herein disclosed is that the clamps are caused to properly engage with the top of the car before the weight of the car is imposed on the clamps regardless of the amount of material originally projecting above the top thereof. In both modifications above described the counterweight guide moves toward vertical position during the first ninety degrees of turning movement of the cradle, so that a gradually increasing pressure is applied to the clamp. During this portion of the movement material will begin to spill from the car so that all material originally in the path of the clamp shoulder 9 will have fallen out of the way of the shoulder 9 which will be pressed tightly against the edge of the car by the counterweight. When the counterweight guide has reached a substantially vertical position the counterweight will pivot about its rear supporting axle and engage the pawl with the ratchet so that upon continued movement of the cradle and as the weight of the car is imposed upon the clamp the clamp is automatically locked against movement in its releasing direction toward which it is pressed by the weight of the car. The counterweight, however, continues to exert pressure on the clamp and, should the free end of the pivoted beam 10 be held away from the car by material lodged between the same and the edge of the car, the counterweight will act to swing the beam 10 into engagement with the car

as soon as the interposed material is discharged, the pawl and ratchet when engaged permitting movement of the counterweight in the clamp applying direction but preventing movement in the opposite direction.

Having thus described my invention, what I claim is:

1. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, oppositely disposed cables connected to said clamp, a member movably mounted on the cradle and connected to said cables, and releasable means for locking said member to the cradle to hold the clamp in car engaging position.

2. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, oppositely disposed cables connected to said clamp, a member movably mounted on the cradle and connected to said cables, and means operable automatically during the dumping movement of the cradle for locking said member to the cradle to hold the clamp in car engaging position.

3. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, oppositely disposed cables connected to said clamp, a member movably mounted on the cradle and connected to said cables, means operable automatically during the dumping movement of the cradle for locking said member to the cradle to hold the clamp in car engaging position, and means operable automatically during the return movement of the cradle for releasing said locking means and shifting said member to release the clamp.

4. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, oppositely disposed cables connected to said clamp, a member movably mounted on the cradle and connected to said cables, and means operable by gravity during the dumping movement of the cradle for locking said member to the cradle to hold the clamp in car engaging position.

5. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, a guideway carried by the cradle, a clamp controlling member mounted in said guideway, and means for releasably locking said member in the guideway to hold the clamp in car engaging position.

6. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, a guideway carried by the cradle, a clamp controlling member mounted in said guideway and operatively connected to said clamp, and means operable automatically during the dumping movement for locking said member in the guideway to hold the clamp in car engaging position.

7. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, oppositely disposed cables connected to said clamp, a member movably mounted on the cradle and connected to said cables, and locking means including a ratchet and pawl, one attached to the cradle and the other to said member, for preventing release of the clamps during the dumping movement of the cradle.

8. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, a guideway carried by the cradle, a clamp controlling member mounted in said guideway and operatively connected to said clamp, and locking means including a ratchet and pawl, one attached to the cradle and the other to said member, for preventing movement of said member in the clamp releasing direction.

9. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, a guideway carried by the cradle, a clamp controlling member mounted in said guideway and operatively connected to said clamp, locking means including a ratchet and pawl, one attached to the cradle and the other to said member, for preventing movement of said member in the clamp releasing direction, and gravity operated means for shifting said pawl.

10. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamping member mounted for movement toward and from the top of a car on the cradle, oppositely extending cables connected to the clamping member, a guideway carried by the cradle, a member mounted for movement in said guideway and connected to both cables, a ratchet fixed to the cradle alongside said guideway, and a pawl on said member adapted to engage said ratchet.

11. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamping member mounted for movement toward and from the top of a car on the cradle, oppositely extending cables connected to the clamping member, a guideway carried by the cradle, a member mounted for movement in said guideway and connected to both cables, a ratchet fixed to the cradle alongside said guideway, and a gravity actuated pawl on said member adapted to be automatically shifted into ratchet engaging position when the cradle is tilted.

12. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car engaging clamp on the cradle, a counterweight movably mounted on the cradle and connected to the clamp, and means operable during the dumping movement of the cradle for locking the counterweight to the cradle to prevent releasing movement of the clamp from the car engaging position but permitting the counterweight to continue to exert pressure on the clamp.

13. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car engaging clamp on the cradle, a counterweight movably mounted on the cradle and connected to the clamp, and cooperating locking elements on the counterweight and cradle operable during the dumping movement of the cradle to lock the counterweight to the cradle.

14. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car engaging clamp on the cradle, a counterweight movably mounted on the cradle and connected to the clamp, and means operable during the dumping movement of the cradle for locking the counterweight to the cradle to prevent releasing movement of the clamp but permitting the counterweight to continue to exert pressure thereon, and means operable during the return movement of the cradle for releasing the counterweight and shifting the clamp to releasing position.

15. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car engaging clamp on the cradle, a controlling member operatively connected to the clamp and mounted for both linear and pivotal movement on said cradle, and means controlled by the pivotal movement of said member for locking the same against linear movement.

16. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car engaging clamp on the cradle, a cable connected to said clamp, a member connected to said cable and mounted for linear movement in the cradle proportional to movements of said clamp, said member being mounted for pivotal movement by gravity during tilting of the cradle, and means controlled by the pivotal movement of said member for locking said member against linear movement.

17. In a car dumper, a cradle having a car receiving track thereon and mounted for lateral tilting movement to dump a car held on the track, a clamping member mounted on the cradle for movement toward and from the top of a car on the track, a straight guideway arranged between the track and the circular enclosing rails on the cradle and extending transversely beneath the track, and a counterweight mounted for movement in said guideway and operatively connected to the clamp.

18. In a car dumper, a cradle having a car receiving track thereon and mounted for lateral tilting movement to dump a car held on the track, a clamping member mounted on the cradle for movement toward and from the top of a car on the track, a straight guideway arranged between the track and the circular enclosing rails on the cradle and extending transversely beneath the track, a counterweight mounted to travel in said guideway, and a cable connection between said counterweight and clamping member.

19. In a car dumper, a cradle having a car receiving track thereon and mounted for lateral tilting movement to dump a car held on the track, a clamping member mounted on the cradle for movement toward and from the top of a car on the track, a guideway on the cradle extending transversely beneath the track, a controlling member operatively connected to said clamping member and mounted to travel in said guideway, gravity operated means on said controlling member controlled by a movement of the cradle for locking the controlling member against movement in the guideway, and means controlled by a movement of the cradle for releasing said locking means and shifting said controlling member.

20. In a car dumper, a cradle having a car receiving track thereon and mounted for lateral tilting movement to dump a car held on the track, a clamp mounted on the cradle for movement toward and from the top of a car on the track, a guideway on the cradle extending transversely beneath the track, a ratchet alongside the guideway, means for operating said clamp including a controlling device mounted to travel in said guideway, said device having a pivotally suspended member, the position of which is controlled by the angular position of the cradle, and a pawl carried by said member and adapted to engage said ratchet in predetermined angular positions of the cradle.

21. In a car dumper, a cradle having a car receiving track thereon and mounted for lateral tilting movement to dump a car held on the track, a clamp mounted on the cradle for movement toward and from the top of a car on the track, a guideway on the cradle extending transversely beneath the track, a ratchet alongside the guideway, means for operating said clamp including a controlling device mounted to travel in said guideway, said device having a pivotally suspended member, the position of which is controlled by the angular position of the cradle, a pawl carried by said member and adapted to engage said ratchet in predetermined angular positions of the cradle, and means including a fixed abutment for releasing said device and shifting the same in said guideway.

22. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a clamp mounted on the cradle for movement toward and from the top of the car, means operable automatically during the first ninety degrees of turning movement of the cradle toward dumping position for lowering the clamp and for then pressing the same toward the car with a gradually increasing pressure, and means operable automatically after the cradle has turned through substantially ninety degrees to lock said first-named means to the cradle to prevent releasing movement of the clamp from car engaging position but permitting said first-named means to continue to exert pressure on the clamp.

23. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a clamp mounted on the cradle for movement toward and from the top of the car, a counterweight connected to the clamp to exert a pressure thereon while the cradle is in positions in which the weight of the car is imposed on the clamp, means for locking the counterweight to the cradle including a pawl and ratchet adapted when engaged to prevent movement of the clamp in the direction in which the weight of the car tends to move the same but permitting movement of the clamp in the opposite direction, and means operable automatically during the dumping movement of the cradle to engage the pawl and ratchet and during the return movement of the cradle to release the pawl from the ratchet.

24. In a car dumper, a cradle adapted to receive a car and mounted for tilting movement to dump the same, a car clamp movably mounted on said cradle, lifting and clamping cables connected to said clamp, and a member slidably mounted on said cradle and connected to said cables, said member being adapted to move toward said cradle as its center of gravity shifts to lock said clamp in car engaging position.

In testimony whereof, I hereunto affix my signature.

ARTHUR F. CASE.