

Nov. 19, 1929.

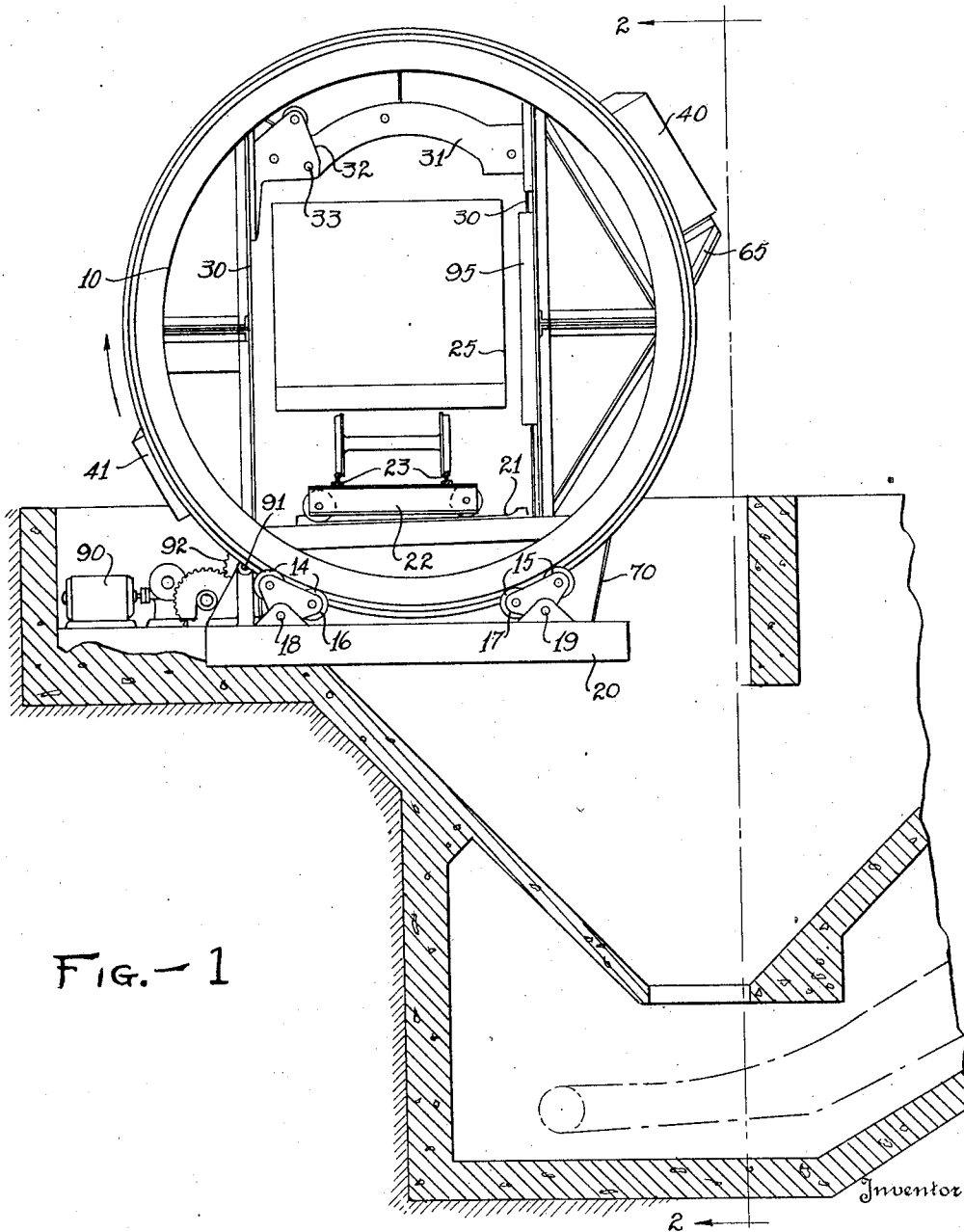
R. W. CAPPER

1,736,520

CAR DUMPING APPARATUS

Filed April 1, 1927

4 Sheets-Sheet 1



Robert W. Capper

By *Dates, Macklin, Golrick & Teare*
Attorneys

Nov. 19, 1929.

R. W. CAPPER

1,736,520

CAR DUMPING APPARATUS

Filed April 1, 1927

4 Sheets-Sheet 2

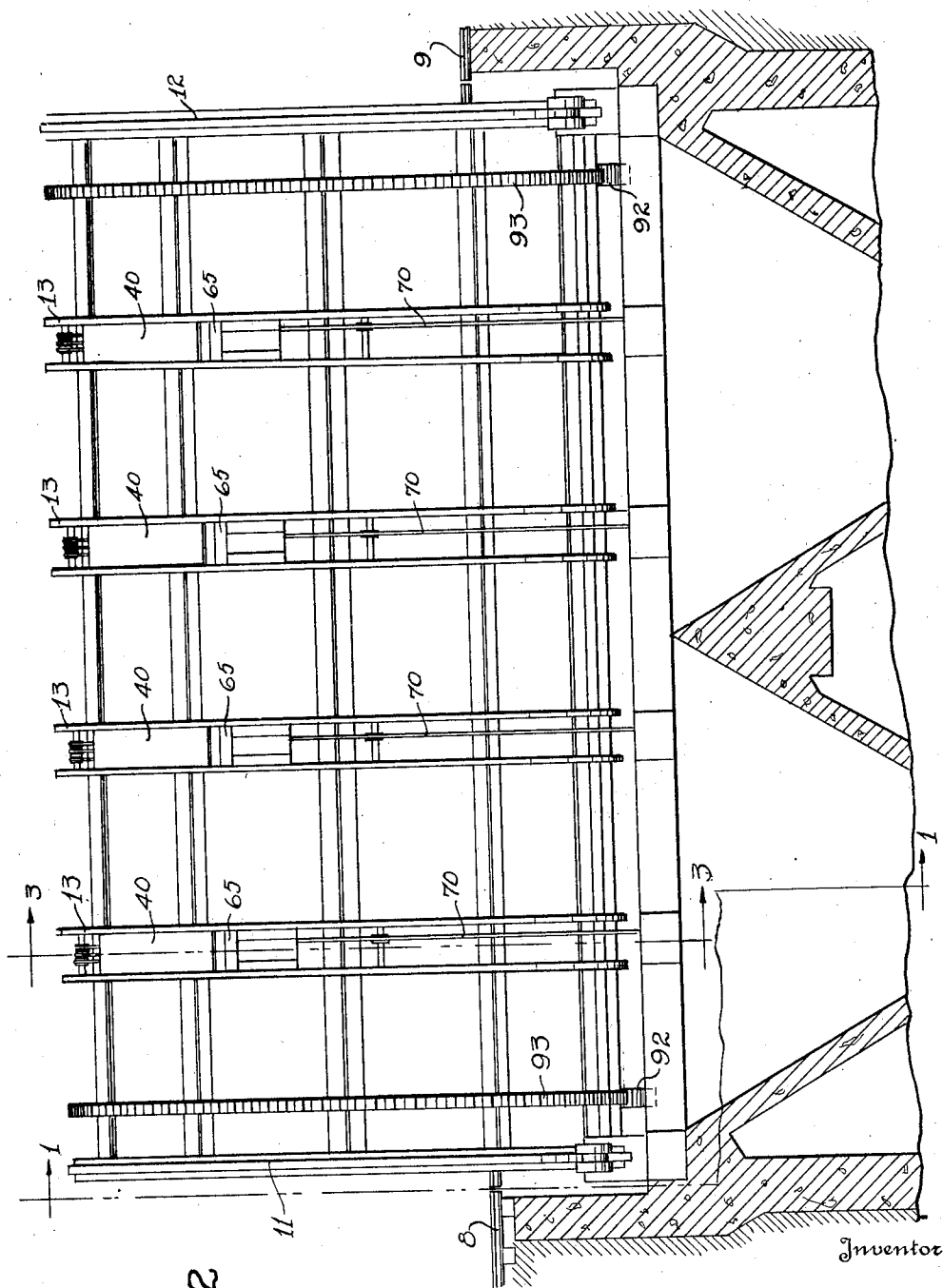


FIG. 2

Inventor

Robert W. Capper

By Bates, Macklin, Solnick & Tears

Attorneys

Nov. 19, 1929.

R. W. CAPPER

1,736,520

CAR DUMPING APPARATUS

Filed April 1, 1927

4 Sheets-Sheet 3

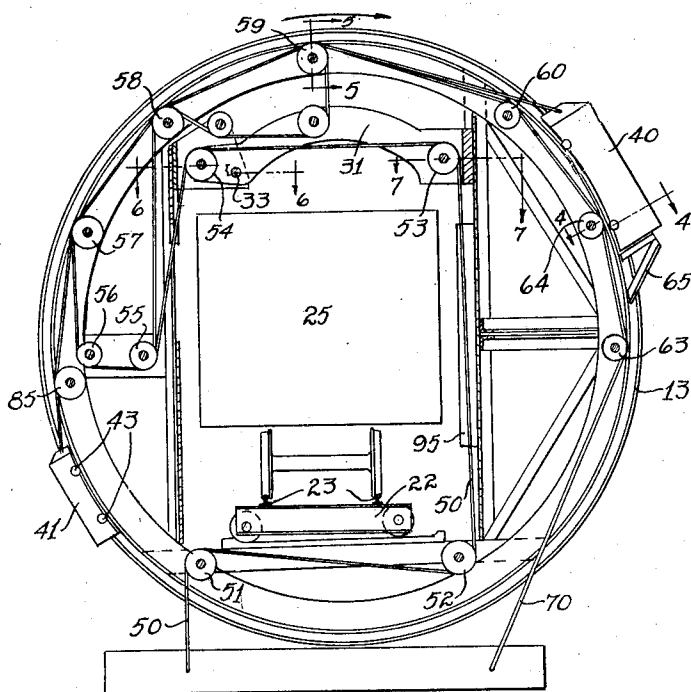


FIG.-3

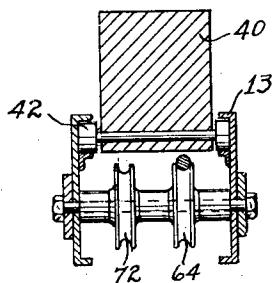


FIG.-4

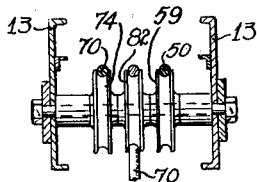


FIG.-5

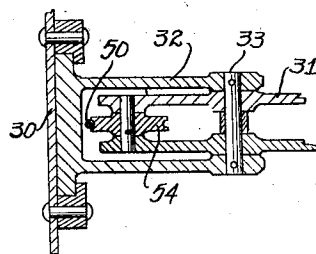


FIG.-6

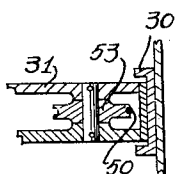


FIG.-7

Inventor

Robert W. Capper

By *Dates, Macklin, Solnick & Leare*

Attorneys

Nov. 19, 1929.

R. W. CAPPER

1,736,520

CAR DUMPING APPARATUS

Filed April 1, 1927

4 Sheets-Sheet 4

FIG.- 8

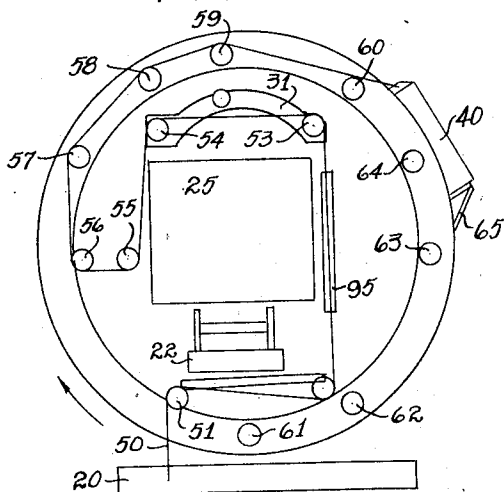


FIG.- 9

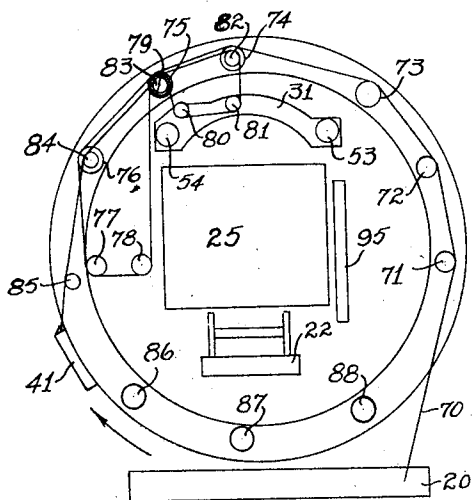
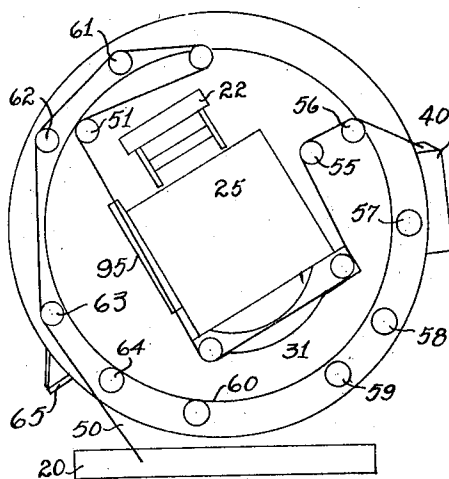


FIG.- 10

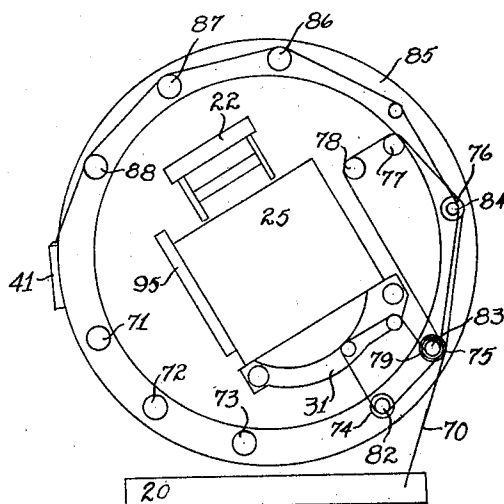


FIG.- 11

Inventor

Robert W. Capper

By Bates, Maklin, Solnick & Neare

Attorney

UNITED STATES PATENT OFFICE

ROBERT W. CAPPER, OF GARFIELD HEIGHTS, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO INDUSTRIAL BROWNHOIST ENGINEERING CORPORATION, A CORPORATION OF OHIO

CAR-DUMPING APPARATUS

Application filed April 1, 1927. Serial No. 180,196.

Rotary car dumpers have heretofore been made with clamping means which engage the top of the car for holding it upon the track during the dumping operation. One form of such means has embodied power mechanism which locks the device after it has been moved into engagement with the car. This form of apparatus is objectionable for the reason that if a lump of coal, or other material being dumped, should be caught between the car and the clamping member, then when the weight of the car is thrown on to the clamping member and the coal is crushed, the wheels of the car will leave the rails. This objection has been overcome by the use of a system of counter-weights, but such system has necessitated the construction of towers which increase the cost of the dumper to a prohibitive degree.

One of the objects of the present invention is to make a rotary car dumper which has clamping mechanism that can be operated to lock the car onto the rails independently of any material which may be caught between the clamping member and the car. In addition, my invention contemplates the construction of a rotary car dumper which can be successively operated to hold the car clamped to the rails without the necessity for an extensive super-structure, such as has been heretofore required with the use of counter-weights.

A further object of this invention is to make a rotary car dumper which is simple in construction yet has sufficient strength that it may be successively operated to permit the dumping of an extremely heavy load.

Referring now to the drawings, Fig. 1 is a vertical transverse section through a pit showing a car dumper embodying my invention, associated therewith, and illustrating the dumper in end elevation, the plane of the section being indicated by the line 1—1 on Fig. 2; Fig. 2 is a side elevation of the car dumper shown in Fig. 1 and more particularly, is a longitudinal vertical section through the pit on a plane indicated by the line 2—2 in Fig. 1; Fig. 3 is a vertical transverse section through the car dumper on a plane indicated by the line 3—3 in Fig. 2;

Figs. 4, 5, 6 and 7 are sections taken through the car dumper on the planes indicated by the correspondingly numbered lines in Fig. 3; Figs. 8 and 9 are diagrammatic views illustrating the cable reeving operation for one set of counter-weights while the car dumper is rotated; Figs. 10 and 11 are two diagrammatic views showing the cable reeving operation for another set of counter-weights during the car dumping operation.

The car dumper embodying my invention is illustrated as a rotary cylindrical cradle 10 which is shown as having bearing rings 11 and 12 adjacent the ends thereof, and as having annular counter-weight guides 13 disposed at spaced intervals around the periphery thereof between the bearing rings. The cradle is journaled between sets of wheels 14 and 15 which are arranged to engage each bearing ring. The sets of wheels are shown as being respectively journaled in brackets 16 and 17 which in turn are pivotally connected as at 18 and 19 respectively to a base 20. The cradle is also shown as having transversely extending tracks 21 on which a carriage 22 is mounted. The carriage has rails 23 supported thereon for receiving a car indicated at 25. The cradle also has vertically extending guideways 30 which are arranged in pairs on opposite sides of the car receiving space. There are four pairs of such guideways illustrated in the drawings.

Slidably mounted within each pair of vertical guideways 30 is a car clamping member which normally, as illustrated in Figs. 1 and 3, is disposed out of engagement with the top of the car. In the preferred form, this clamping device embodies two members 31 and 32 which are connected by a hinge pin 33, and which are adapted to slidably engage one of the guideways 30. The clamping devices are independently operable by counter-weights so that a car may be firmly held upon the rails even though a lump of coal, or other material, may be caught between the car and the clamping member.

In the preferred construction, I employ two sets of counter-weights, one indicated at 40, and another at 41. These weights are mounted to move within the guideways 13

when the cradle is rotated, and to facilitate such movement, the weights are supported upon wheels 42 and 43 respectively. The weight 40 is intended to clamp the car to the rails, and to exert clamping pressure thereon until it is brought back nearly to the original position. The weight 41 is much lighter than the weight 40, and is intended for use in raising the clamping device away from the car and holding it normally in such raised position.

To eliminate the necessity for the use of an overhead super-structure, I employ reeving apparatus by means of which the weights may be satisfactorily supported upon the cradle, and yet may function to operate the clamping devices in the desired manner. In Figs. 3 and 8, the reeving arrangement is illustrated as a cable 50, one end of which is attached to the base 20 and the other end of which is attached to the counter-weight 40. Leading from the base, the cable passes over sheaves 51 and 52, which are mounted on the cradle and thence over sheaves 53 and 54 which are mounted upon the clamping member 31, thence around the sheaves 55, 56, 57, 58, 59 and 60. In peripheral alignment with the sheaves 55 to 60 are additional sheaves 61, 62, 63 and 64 which are adapted to be progressively engaged by the cable as the cradle is rotated in a direction indicated by the arrow in Fig. 8. These last mentioned sheaves engage that portion of the cable between the sheave 51 and the base 20 as indicated in Fig. 9.

Thus, the cradle moves with relation to the counter-weight 40 (except for the slight movement necessary to permit the clamping device to close) during the dumping operation. When in the position indicated in Fig. 9, the counter-weight exerts maximum pressure upon the clamping member even though the counter-weight stop 65 has moved from the position shown in Fig. 8, to that shown in Fig. 9. In other words, the counter-weight has rolled on the periphery of the cradle during the tilting movement.

Referring now to Fig. 10, the counter-weight 41, is shown as holding the clamping device away from the car, so as to permit movement of the car on and off the cradle. While the clamping device is so held, the other counter-weight 40 is held against the stop 65, and hence is exerting no clamping pressure. The reeving arrangement shown in Fig. 10 embodies a cable 70 one end of which is fastened to the base 20 and the other end of which is fastened to the counter-weight 41. Leading from the base the cable passes over sheaves 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85 and is then attached to the counter-weight. The sheaves 80 and 81 are mounted on the clamping device, while the remaining sheaves are mounted upon the cradle.

When the tilting operation of the cradle is started, the first action, as heretofore explained, is the movement of the clamping device against the car, under the force exerted by the counter-weight 40. This action causes the counter-weights 41 to move with the cradle until the clamping action is effected, and then to move with relation to the cradle by rolling on the periphery thereof, in the guideways 13. While so rolling the reach of the cable between the sheave 85 and the counter-weight progressively passes over sheaves 86, 87 and 88, while the counter-weight remains in the position shown in Fig. 11 where it exerts maximum torque and keeps the cable taut.

On the return movement of the cradle the counter-weight still remains in the position shown in Fig. 11, until the stop 65 engages the counter-weight 40, whereupon the weight 41 moves with the cradle and raises the clamping member away from the car.

To actuate the cradle for the tilting operation I have shown an electric motor 90, which is suitably connected by reduction gearing to a shaft 91 which extends for substantially the length of the cradle and carries a pinion 92 near each end thereof. These pinions are adapted to engage annular racks 93 which are mounted upon the periphery of the cradle frame. In the preferred arrangement, the motor is reversible so as to permit rotation of the cradle in either direction.

The operation of a car dumper embodying my invention is as follows:—Normally the carriage 22 is in the position shown in Fig. 1, that is, on the left hand end of the laterally extending rails 21. In such position, the rails 23 are in alignment with the rails 8 and 9 at opposite ends of the pit. The car to be unloaded is then run into the cradle. The only movement on the part of the operator to effect the dumping operation is to start the motor 90. This rotates the cradle in the direction shown by the arrow in Fig. 1. As soon as the cradle has been rotated a few degrees the carriage 22 starts to move along the trackway 21, under the action of gravity, until the side of the car strikes the bumpers 95. In addition to the lateral movement of the car, the clamping devices start to move downwardly under the action of the counter-weights 40, but the distance which the devices must travel before the car is clamped, is sufficiently great that the car is in engagement with the bumpers before the clamping action is effected. Since the counter-weights 40 are heavier than those indicated at 41, the last mentioned weights are pulled upwardly with the cradle until the car is clamped to the rails. Thereafter, both sets of counter-weights roll on the periphery of the cradle but on opposite sides thereof. In the meantime substantially the entire weight of the car is counteracted by the cradle. Such counteraction

continues until the cradle has been rotated 90°. During such movement part of the contents are emptied into the pit. Continued rotation of the cradle then shifts the weight of the car onto the clamping devices but since the counter-weight 40 is heavier than the weight of the car, the car is easily maintained on the rails. Thus, the cradle may be rotated 160°, to effect a complete dumping operation while the car is effectively clamped to the rails. If part of the contents should be caught between the car and any one of the clamping devices, and should subsequently be crushed, there is no danger of car movement occurring since the counter-weights 40 immediately force the clamping devices and the crushed material against the car. By using independently actuated clamping members, I can hold the car in clamped position and can distribute the working stresses throughout the length of the cradle.

After the car has been dumped, the operator need only reverse the direction of motor rotation to bring the empty car back to original position. During such return movement, the car remains clamped to the rails until the stops 65 engage the counter-weights 40. Such engagement is effected before the cradle has returned to the original position, and the position of each stop is so regulated that there is ample time for the counter-weights 41 to remove the clamping devices from contact with the car, to allow the carriage 22 to roll, by gravity, back to the position shown in Fig. 1.

A car dumper made in accordance with my invention is advantageous, in that the entire action of the shifting and holding of the car is automatic in operation. This eliminates the necessity for personal attention on the part of the operator except that of starting the motor, and reversing it at the proper time. In this way a train of cars may be unloaded in an expeditious manner.

I claim:

1. A car dumper comprising in combination, a car receiving cradle, means for rotating the same, said cradle having vertically extending guideways therein, a clamping member shiftable in the guideways, a counterweight normally tending to hold the member out of engagement with a car in the cradle, another counter-weight tending to force the member into engagement with the car when the cradle is rotated, said counter-weights being carried by and mounted on opposite sides of the cradle and adapted to move with reference thereto.

2. A car dumper comprising in combination, rotary car receiving cradle, means for rotating the same, a car clamping member carried by the cradle and shiftable with relation thereto, two counter-weights operatively connected to the clamping member and carried by the cradle, one counterweight tending to force the clamping member into

engagement with the car, means for rendering said counter-weight inactive during a portion of the cradle rotative movement, and the other counter-weight being arranged to release the clamping member while the first mentioned counter-weight is inactive.

3. A car dumper comprising in combination, a car receiving rotary cradle having vertical guideways disposed therein, a car clamping member movable vertically within said guideways, a counter-weight movably carried by the cradle and acting on said member and normally tending to hold it in one position, and another counter-weight movably carried by the cradle and acting on said member and normally tending to hold it in a different position, and cables connecting the member with the respective counter-weights.

4. A car dumper comprising in combination, a rotary car receiving cradle, a car clamping member slidably mounted on the cradle, counter-weights movably carried by the cradle and acting on the member to move it in opposite directions, one of said counter-weights being heavier than the other, and means for rendering the heavier weight inactive to permit the lighter weight to actuate the member during a portion of the rotative movement of said cradle.

5. A car dumper comprising in combination, a rotary cradle, means for rotating the same, a car clamping member mounted on the cradle for movement with reference thereto, two counter-weights acting on said member and tending to move it in opposite directions for clamping and releasing purposes, one counter-weight being heavier than the other, a support for the cradle, cables connecting the respective counter-weights to said support, guide sheaves for said cables, said sheaves being mounted upon the cradle and clamping the member in such manner that one counter-weight moves the member into clamping position when the cradle is rotated a predetermined amount in one direction, while the other counter-weight releases the clamping member when the cradle is moved a predetermined amount in the opposite direction.

6. A car dumper comprising in combination, a rotary cradle, a car clamping member slidably mounted therein, means for rotating the cradle, a counter-weight actuated by movement of the cradle for automatically moving the member into clamping position after the cradle has been rotated a predetermined degree in one direction, and a lighter counter-weight for releasing the member when the cradle has been rotated a predetermined degree in the opposite direction, said counter-weights being carried by the cradle, and being arranged to be moved with reference thereto during the dumping operation.

7. A car dumper, comprising in combination, a rotary car receiving cradle, a clamping member carried by the cradle and movable with reference thereto, a pair of counter-weights of different mass carried by the cradle and operatively connected to the member in such manner that the counter-weights move with the cradle during a portion of the dumping operation, and then with reference to the cradle during another portion of the dumping operation, whereby said member is automatically moved into and is held in clamping engagement with the car.

8. A car dumper comprising in combination, a rotary car receiving cradle having annular guideways extending around the periphery thereof, a clamping member carried by the cradle and shiftable with reference thereto, a pair of counter-weights movable in said guideways, cables connecting the respective counter-weights to the clamping member, said counter-weights being normally disposed on opposite sides of the cradle, one of said counter-weights functioning to urge the member into clamping position, and other counter-weights functioning to release the clamping member.

9. A car dumper comprising in combination, a cradle, a clamping device carried thereby and movable with relation thereto, and a counter-weight carried by the cradle and movable with relation thereto, and means anchored off of the cradle and connected with the counter-weight and clamping device for actuating the car clamping device into coaction with the car during movement of the cradle, a lighter counter-weight on the cradle adapted to move the clamping device away from the car, and means for rotating the cradle.

10. A car dumper comprising in combination, a cradle, means for rotating the cradle, a clamping member mounted for radial movement in the cradle, and a flexible member connected with the clamping member and anchored at a stationary point independent of the cradle and provided with a counter-weight mounted on the cradle for actuating the member to clamp a car to the cradle consequent upon the rotation of the cradle.

11. A car dumper having in combination, a rotary cradle, means for rotating the same, a car clamping member normally held out of engagement with a car on the cradle, a counter-weight carried by the cradle and adapted to be moved along the periphery thereof, a cable connected to the counter-weight, and intermediately connected to the member and anchored independently of the cradle so that the member is brought into engagement with the car during a portion of the rotative movement of the cradle, and is then held in engagement with the car during the remaining portion of the rotative movement.

12. A car dumper, comprising in combina-

tion, a rotary car receiving cradle, a car clamping member carried by the cradle and movable with reference thereto, said member being normally held out of engagement with the car when the cradle is in one position, a counter-weight movable in a peripheral direction on the cradle, a support for the counter-weight on the cradle adapted to move away from the counter-weight when the cradle is rotated, and means for supporting the counter-weight from a point off of the cradle, said last mentioned means being connected to the clamping member, and functioning to urge it into clamping engagement with the car and to hold it thereagainst during the rotative movement of the cradle in one direction.

13. In a car dumping apparatus, the combination of a cradle adapted to be turned, a clamping device movably carried by the cradle, a counter-weight movably carried by the cradle, and means connected to a point off of the cradle and to the counter-weight and intermediately engaging the clamping device to cause the clamping device to act automatically when the cradle is turned.

14. In a car dumping apparatus, the combination of a cradle adapted to be turned on an axis, a clamping device movably carried by the cradle, a counter-weight movably carried by the cradle, a cable connected to a stationary point and to the counter-weight and intermediately to the clamping device to cause the clamping device to act automatically when the cradle is turned on its axis, and means for automatically releasing the clamping device when the cradle is turned in the opposite direction.

15. In a car dumping apparatus, the combination of a cradle adapted to be turned and equipped with a set of sheaves, a clamping device movably carried by the cradle and equipped with sheaves, a counter-weight movably carried by the cradle, and a cable anchored to the counter-weight, thence passing across cradle sheaves, thence upwardly across clamping device sheaves and thence downwardly and finally anchored off of the cradle.

16. In a car dumping apparatus, the combination of a cradle adapted to turn, a clamping device carried thereby and movable with relation thereto, a counter-weight carried by the cradle and movable with relation to it, a support on the cradle adapted to prevent movement of the counter-weight on the cradle and means for causing the counter-weight to react on the clamping device when the said support is withdrawn from the counter-weight.

17. In a car dumping apparatus, the combination of a cradle adapted to turn, a clamping device carried thereby and movable with relation thereto, a counter-weight carried by the cradle and movable with relation to it, a support on the cradle for the counter-weight

positioned to release the counter-weight as the cradle turns from normal position and a cable anchored off of the cradle and to the counter-weight and intermediately movably engaging the clamping device for causing the counter-weight to react on the clamping device when the cradle is turned.

a cable leading from the counter-weight and anchored off of the cradle.

23. In a car dumping apparatus, the combination of a circular cradle adapted to be turned, a clamping device movably mounted therein, and means for actuating the clamping device in the idle direction including a counter-weight movably mounted on the cradle in a position to be raised as the cradle turns from normal position, and a cable leading from said counter-weight and anchored off of the cradle.

24. In a car dumping apparatus, the combination of a circular cradle adapted to be turned, a clamping device movably mounted therein, means for actuating the clamping device in the clamping direction including a comparatively heavy counter-weight movably mounted on the circular cradle in a normally upper quadrant thereof, and means for actuating the clamping device in the idle direction including a comparatively light counter-weight movably mounted on the circular cradle in a normally lower quadrant thereof.

In testimony whereof, I hereunto affix my signature.

ROBERT W. CAPPER.

18. In a car dumping apparatus, the combination of a cradle adapted to be turned, a clamping device therein, counter-weights of different size movably carried by the cradle and connected to operate the clamping device one in the clamping direction and the other in the idle direction.

19. In a car dumping apparatus, the combination of a cradle adapted to be turned, a clamping device movably mounted therein, counter-weights of different mass carried by the cradle and a pair of cables connected to the respective counter-weights and adapted to operate the clamping device, one in the clamping direction and the other in the releasing direction.

20. In a car dumping apparatus, the combination of a cradle adapted to turn, a clamping device movably carried thereby, counter-weights of different mass movably carried by the cradle, two independent cables respectively connected to the counter-weights, and anchored at points off of the cradle, both cables having an intermediate connection with the clamping device.

21. In a car dumping apparatus, the combination of a cradle adapted to turn and equipped with sheaves, a clamping device movably carried by the cradle and equipped with sheaves, counter-weights of different mass movably carried by the cradle, two independent cables respectively connected to the counter-weights and anchored at points off of the cradle, the cable attached to the heavier counter-weight passing normally from its anchorage about a sheave on the cradle, thence upwardly about a sheave on the clamping device, thence downwardly about a sheave on the cradle, thence to the counter-weight, and the cable connected to the lighter counter-weight passing normally from its anchorage about a sheave on the cradle, thence downwardly about a sheave on the clamping device, thence upwardly about a sheave on the cradle, thence to the counter-weight, whereby the turning of the cradle in one direction causes the heavier counter-weight to seat the clamping device and the turning of the cradle in the other direction causes the lighter weight to release the clamping device.

22. In a car dumping apparatus, the combination of a circular cradle adapted to be turned, a clamping device movably mounted therein, and means for actuating the clamping device in the active direction including a counter-weight movably mounted on the circular cradle in a position to be lowered as the cradle turns from normal position, and

95

100

105

110

115

120

125

130

CERTIFICATE OF CORRECTION.

Patent No. 1,736,520.

Granted November 19, 1929, to

ROBERT W. CAPPER.

It is hereby certified that the assignee in the above numbered patent was erroneously described and specified as "Industrial Brownhoist Engineering Corporation", whereas said assignee should have been described and specified as "Industrial Brownhoist Corporation, a Corporation of Ohio", as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 31st day of December, A. D. 1929.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.