Nov. 2, 1926.

1,605,660

E. H. KIDDER

CLAMPING DEVICE FOR CAR UNLOADERS

Original Filed March 19, 1925 3 Sheets-Sheet 1

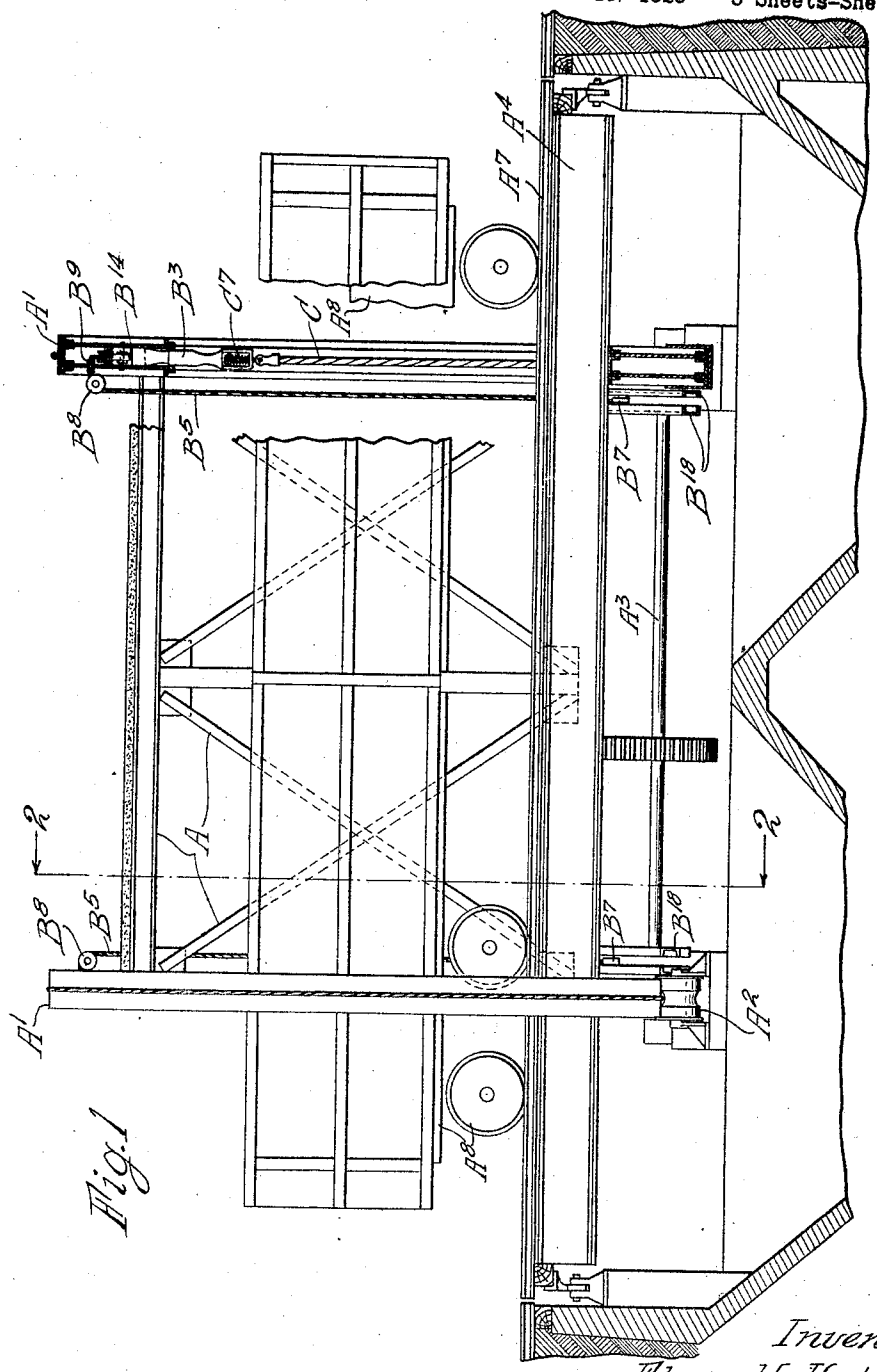

Fig. 1

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Fig. 2

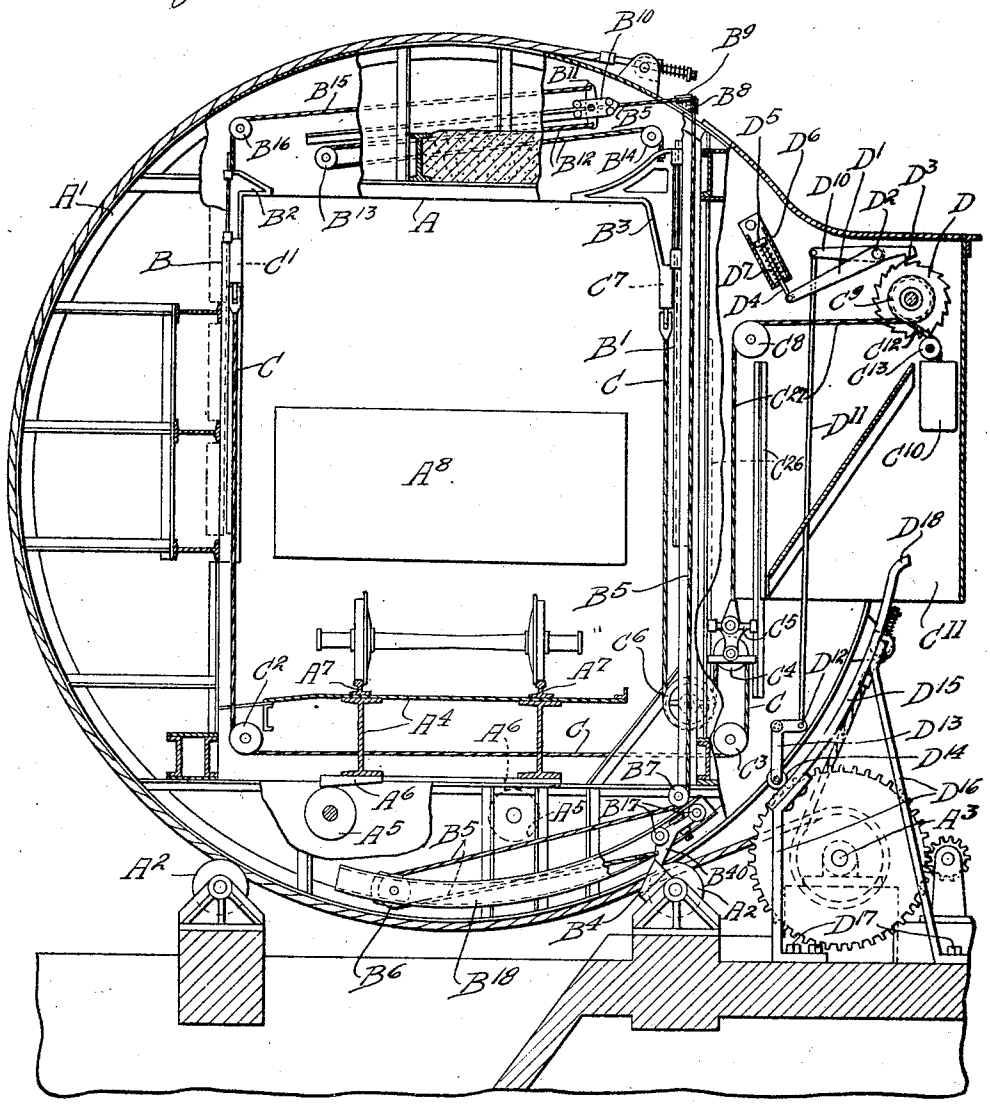

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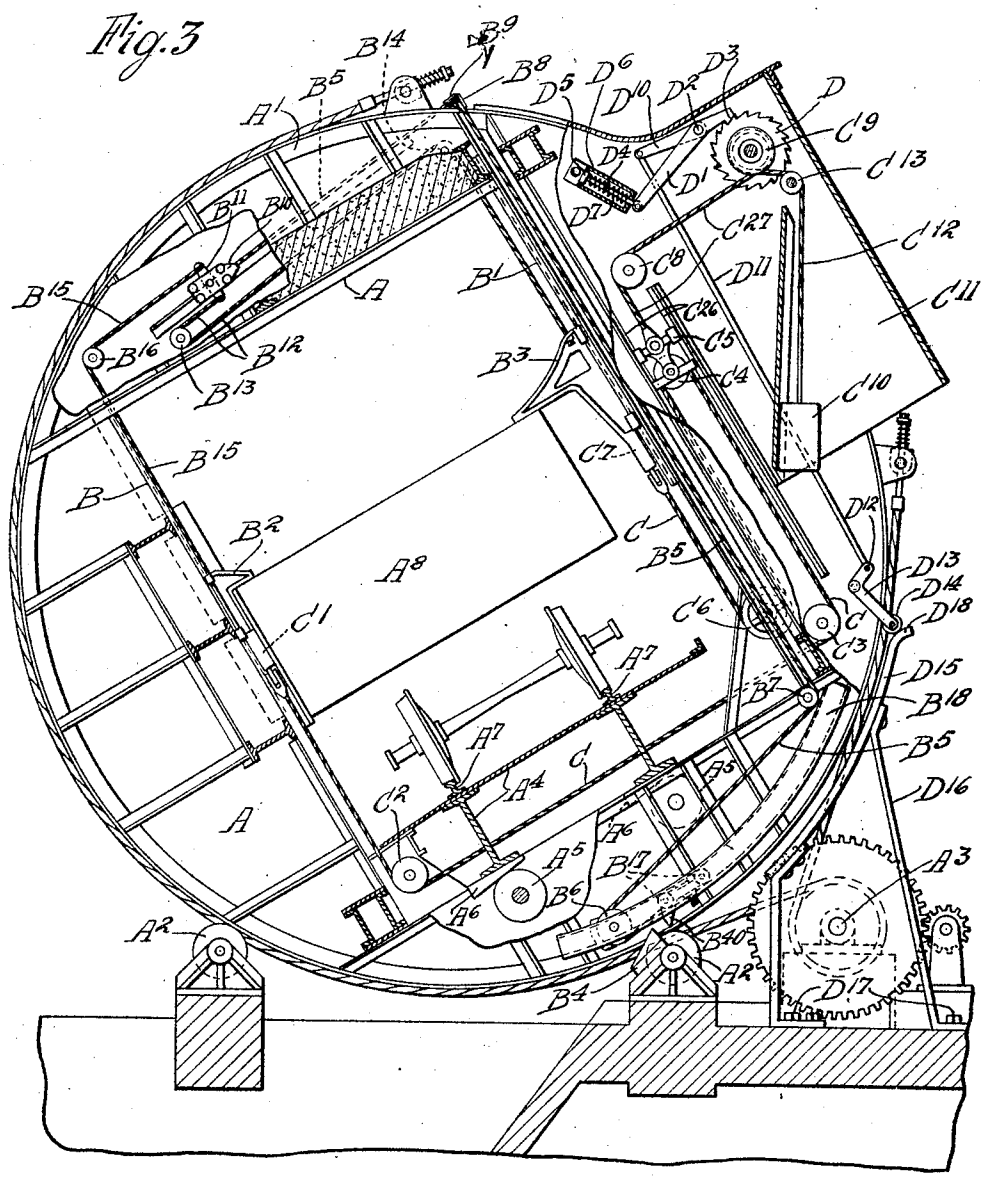
Fig. 3



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Patented Nov. 2, 1926. 1,605,660

UNITED STATES PATENT OFFICE.

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CLAMPING DEVICE FOR CAR UNLOADERS.

Application filed March 19, 1925, Serial No. 16,618. Renewed Septemebr 24, 1926.

My invention relates to improvements in clamping device for car unloaders and embodies a clamping device which will operate automatically to clamp a car on the unloading frame when the frame or cradle rotates to dump the car. One object of my invention is to provide such a device as will be easily and conveniently operated, will be automatic in its operation and will always exert a sufficient amount of power to insure proper functioning of the apparatus. Other objects will appear from time to time in the specification and claims.

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

Figure 1 is a side elevation of the unloader;

Figure 2 is a section along the line 2—2 of Figure 1 showing the clamp mechanism in elevation; and

Figure 3 is a view similar to Figure 2 showing the unloader in partly rotating position with the clamp in operation.

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

A is a cradle mounted on a plurality of ring frame A^1, which frames travel on rollers A^2 adapted to be rotated to rotate the ring frame and cradle by means of power applied through a drive shaft A^3. A^4 is a transfer table supported on rollers A^5 A^5 by means of inclined wedge blocks A^6 A^6 on the cradle. A^7 A^7 are car tracks on the transfer table adapted to support a car A^8.

There may be two or more of the ring frames, depending on the length of the cradle and the length of the cars to be dumped thereby. Associated with each of these ring frames is an automatic clamping device which forms the subject matter of the present invention. This automatic clamping device is adapted to come down and grip the top of the car body and hold it on the tracks so that when the cradle is rotated and the car is turned upside down with the dumping, the car will be held in place without leaving the rails. The clamping arrangement is the same for each ring frame and a description of one, of course, suffices for all.

B B^1 are guide tracks. Slidable on the track B is a short jaw clamp B^2 and slidable on the track B^1 is a long jaw clamp B^3. Associated with the bracket for one of the rollers A^2 is a stop bracket B^4 adapted to be engaged by a lifting carriage B^{40} floating on the ring frame. B^5 is a lifting rope extending from the lifting carriage B^{40} over sheaves B^6 B^7 at the bottom of the ring frame and B^8 B^9 at the top and terminating in an equalizer carriage B^{10}. Extending from the lever B^{11} on the equalizer carriage is the long clamp lifting rope B^{12} which passes over a sheave B^{13} and a sheave B^{14} and is anchored on the long jaw clamp B^3. B^{15} is a short jaw clamp lifting rope extending from the end of the lever B^{11} over a sheave B^{16} to the short jaw clamp B^2. Thus when the cradle is in the upright position, the lifting carriage will have engaged the stop bracket and will have been held against further movement so as to draw out the lifting rope and lift both the long and short jaw clamp. When the cradle is rotated in a counter clockwise direction, the lifting carriage B^{40} will travel on its rollers B^{17} along the track B^{18} toward the sheave B^6 and permit the clamps to descend under the force of gravity until they engage or rest upon the top of the car, the parts being so positioned that this descent of the clamps and their engagement with the car will have been completed before the cradle rotates far enough to unseat the car from the track rails on which it stands.

C is the clamp holding rope. It is anchored at one end on one end through a relieving spring C^1, to the short jaw clamp B^2, passes over a sheave C^2, sheave C^3 to a sheave C^4 on the equalizer sheave carriage C^5, thence over a sheave C^6 to an equalizer spring C^7 anchored on the long jaw clamp B^3. The equalizer carriage C^5 is slidable in tracks C^{26} and a rope C^{27} leads from this carriage over a sheave C^8 and is wound about a drum C^9. C^{10} is a lowering counterweight adapted to travel in the counterweight housing C^{11}. It is suspended by a counterweight rope C^{12}, which passes over a sheave C^{13} and is wound about the drum C^9.

D is a ratchet wheel co-axial with the drum C^9 and fixed against rotation in relation thereto. D^1 is a lever pivoted intermediate its ends as at D^2 and terminating in a dog member D^3 adapted to engage the ratchet teeth of the ratchet wheel D. Pivoted to its outer end is the plunger stem D^4 terminating in the piston or plunger head

D^5 within the cylindrical guide D^6. D^7 is a spiral spring adapted to be compressed between the plunger end D^5 and the opposite end of the casing D^6 and tending normally to force the plunger out of the cylindrical casing or guide. D^{10} is a secondary lever which may be secured or held against movement in relation to the lever D^1. Pivoted to its outer end is the elongated link or rod D^{11}, the opposite end of which is pivoted as at D^{12} to one arm of the bell crank lever D^{13}. The outer end of opposite arm of the bell crank lever carries a roller D^{14} which normally engages, when the cradle is in upright or car receiving position, an arcuate cam track D^{15} mounted on any suitable frame members D^{16} which are secured to the foundations as at D^{17}. The upper end of the cam track is curved or inclined outwardly as at D^{18}.

The purpose of this counterweight and drum is to draw the holding rope tight when the rotation of the cradle permits the clamps to descend. The arrangement is such that as the cradle rotates after the clamps have been drawn down against the top of the car, and as soon as the roller D^{14} rides over the end of the cam track D^{15} the spring D^7 is released and moves the lever in clock-wise direction, as shown in Figure 3, thereby engaging the dog D^3 with the teeth of the ratchet wheel D. This engagement prevents rotation of the drum D^9 in such direction as would slack off the cable C^{27} and permit the clamps to be loosened. The clamps B^2 B^3 are thus maintained in holding position against the weight of the car when the cradle is rotated into dumping position. The relieving springs C^1 and C^7 permit a sufficient amount of play and resiliency to insure smooth operation and to protect the apparatus from shock.

It will be evident that while I have shown in my drawings an operative device, still many changes might be made in the size, shape and disposition of parts without departing materially from the spirit of my invention and I wish, therefore, that my showing be taken as in a sense diagrammatic.

The use and operation of my invention are as follows:

In dumping a gondola car with my unloader, the car to be dumped is positioned on the tracks A^7 while the cradle and associated parts are in upright position. The cradle is then rotated in counter clock-wise direction, as shown in Figure 3, and the car and transfer table are moved to the left through a limited excursion with respect to the cradle, coming to rest against the side thereof. This rotation continues with the lifting carriage remaining at rest with respect to the stop, but moving in the cradle until the clamps have travelled down to engage the car as the sheave at the bottom of the ring frame approaches the stop carriage. This downward movement of the clamps will be assisted by the pull on the counterweight which winds up the holding rope on the drum, so that this rope is taut at all times. As soon as the clamps settle down on the top of the car, they can move no further, and the cradle will continue to rotate, and the holding rope will be held tight. Upon further rotation of the cradle the roller D^{14} rides beyond the end of the cam track D^{15} and the spring D^7 rotates the lever D^1 in clock-wise direction about its pivot, engaging the dog D^3 with the teeth of the ratchet wheel D. Thus rotation of the drum C^9 is prevented before the cradle has turned far enough to cause the weight of the car to be lifted from the rails. As the rotation continues the car will gradually turn over until practically its entire weight is carried by the clamps, the engagement of ratchet wheel and dog holding the drum against rotation. The parts remain in this position until the cradle has rotated sufficiently to dump the car. The car, after being dumped, will be returned to upright position by a reverse rotation of the cradle. When the roller D^{14} engages the inclined portion D^{18} of the cam track D^{15}, the bell crank lever D^{13} will be rotated and will exert a downward pull on the rod D^{11} and the outer end of the lever D^{10}. This will depress the outer end of the lever D^1, against the spiral spring D^7 and will release the dog D^3 from the ratchet wheel D. Then the lifting carriage will engage its stop and a tension will be exerted on the clamp lifting ropes and the clamps will finally be raised to the top of the cradle, drawing in on the brake drum and raising the counterweight and freeing the car. The car can then be removed from the transfer table and the cradle is ready for the next dumping operation.

I claim:

1. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction.

2. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction, and releasing means adapted to release said braking means when the cradle is in car receiving position.

3. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting the rotation in the opposite direction, comprising a ratchet wheel associated with said drum, a dog pivoted adjacent said wheel and means adapted normally to maintain said dog in operative contact with said ratchet wheel.

4. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting the rotation in the opposite direction, comprising a ratchet wheel associated with said drum, a dog pivoted adjacent said wheel and means adapted normally to maintain said dog in operative contact with said ratchet wheel, and means for holding said dog in inoperative position when the cradle is in car receiving position.

5. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction, comprising a ratchet wheel associated with said drum, a dog pivoted adjacent said wheel, yielding means for normally maintaining said dog in operative contact with said ratchet wheel, and means for holding said dog in inoperative position when the cradle is in car receiving position.

6. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction, comprising a ratchet wheel associated with said drum, a dog pivoted adjacent said wheel and means adapted normally to maintain said dog in operative contact with said ratchet wheel, and means for holding said dog in inoperative position when the cradle is in car receiving position, comprising a cam member associated with said dog and an opposed cam member positioned adjacent the cradle.

7. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction, comprising a ratchet wheel and a dog pivoted adjacent thereto, yielding means for normally holding said dog in operative contact with the ratchet wheel, and opposed means adapted to rotate said dog out of engagement with said wheel when the cradle is in car receiving position, comprising a cam member associated with said dog and a cam track positioned adjacent said cradle and adapted to be engaged by said cam member.

8. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction, comprising a ratchet wheel and a dog pivoted adjacent thereto, yielding means for normally holding said dog in operative contact with the ratchet wheel, and opposed means adapted to rotate said dog out of engagement with said wheel when the cradle is in car receiving position, comprising a bell crank lever pivoted on said cradle, a connection between one arm of said bell crank lever and the dog and a cam track positioned adjacent the cradle and adapted to engage the oposite arm of said lever.

9. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction, comprisng a ratchet wheel associated with said drum, a dog pivoted adjacent said wheel, yielding means for normally maintaining said dog in operative contact with said ratchet wheel, and means for holding said dog in inoperative position when the cradle is in car receiving position, comprising a cam member pivoted adjacent the periphery of the cradle and an arcuate cam track, substantially concentric with the periphery of the cradle, opposed thereto.

10. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction, comprising a ratchet

wheel, a dog pivoted adjacent said wheel, a cylindrical guide pivoted adjacent said dog, a stem axially movable along said guide, a connection between said guide and said dog, and yielding means adapted normally to move said stem along said guide to rotate said dog into operative engagement with said ratchet wheel.

11. In a rotary car dumper, a rotary car supporting cradle, clamping means adapted to hold a car thereon, and clamp holding means comprising a drum, a cable leading from the clamping means and wound about the drum, and braking means adapted to lock the drum against rotation in one direction, while permitting its rotation in the opposite direction, comprising a ratchet wheel, a dog pivoted adjacent said wheel, a cylindrical guide pivoted adjacent said dog, a stem axially movable along said guide, a connection between said guide and said dog, and yielding means adapted normally to move said stem along said guide to rotate said dog into operative engagement with said ratchet wheel, and means for resisting such movement of the dog when the cradle is in or near car receiving position.

Signed at Chicago, county of Cook and State of Illinois, this 10th day of March, 1925.

ELWIN H. KIDDER.