

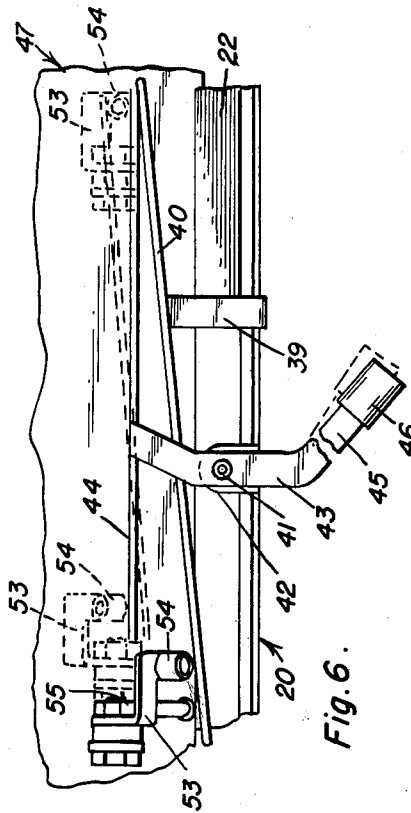
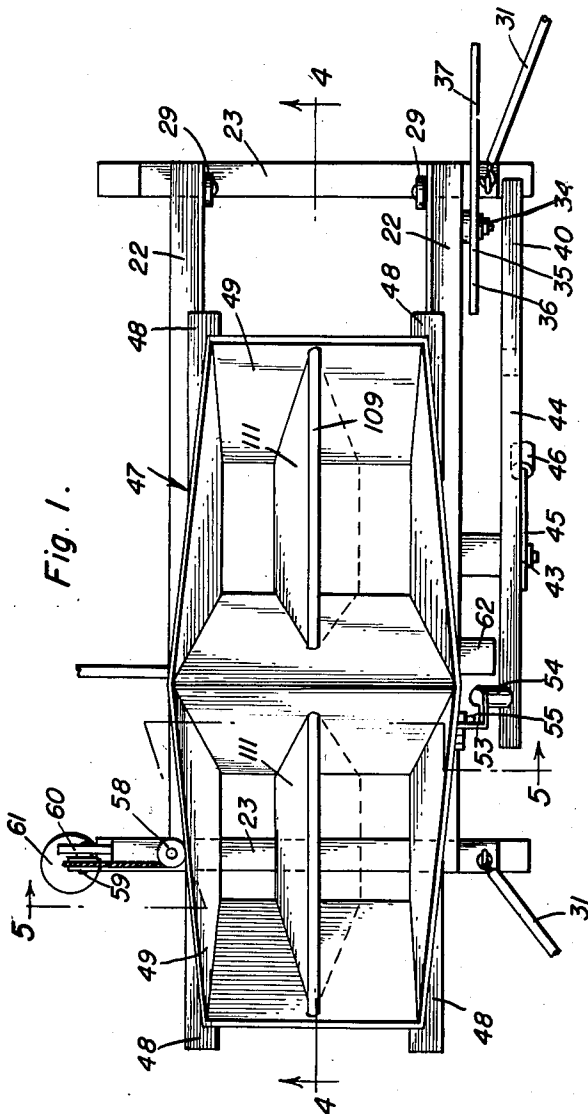
April 14, 1953

R. A. CLINE ET AL
CAR LOADING APPARATUS

2,634,871

Filed Aug. 4, 1947

7 Sheets-Sheet 1



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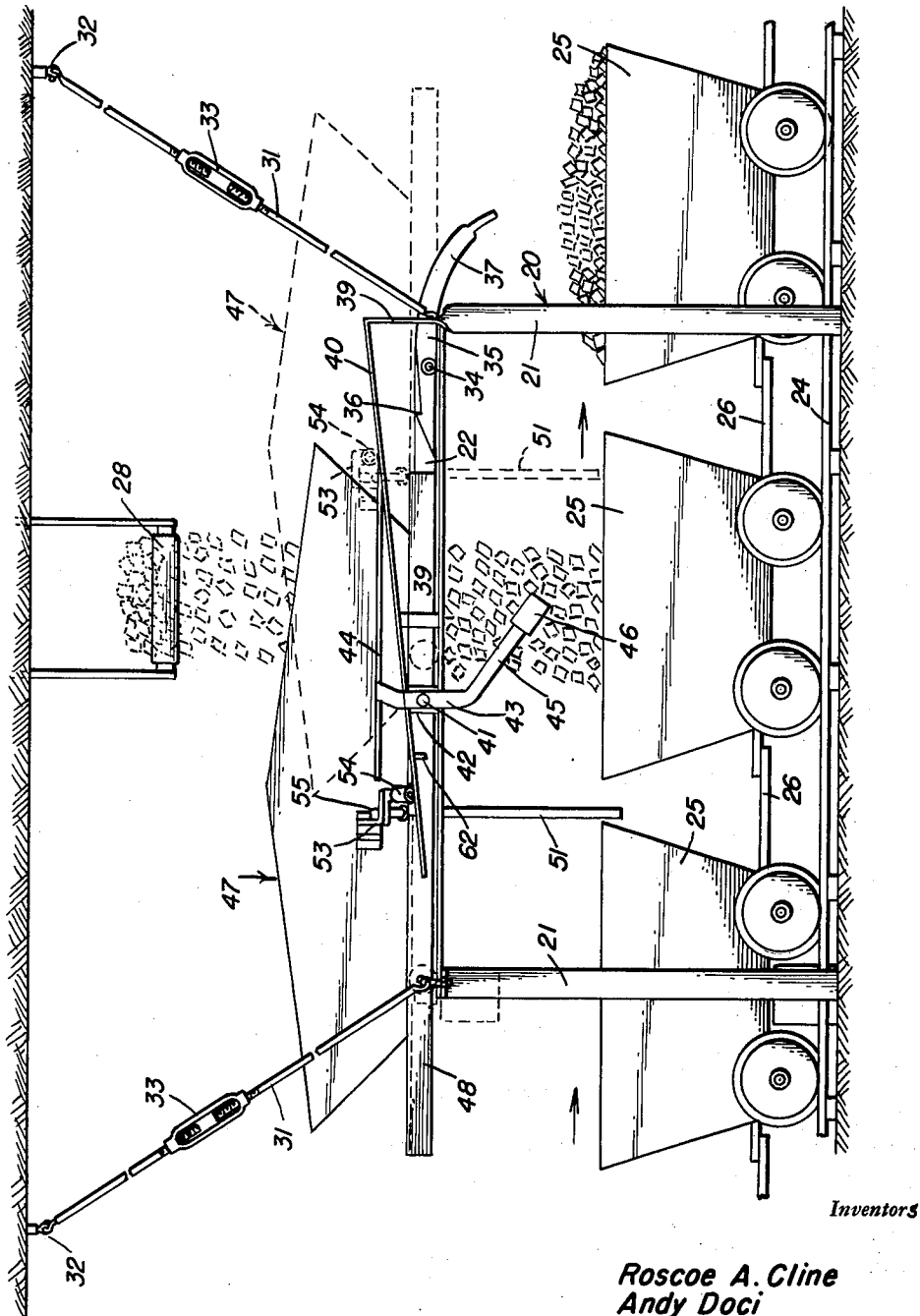
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Fig. 2.



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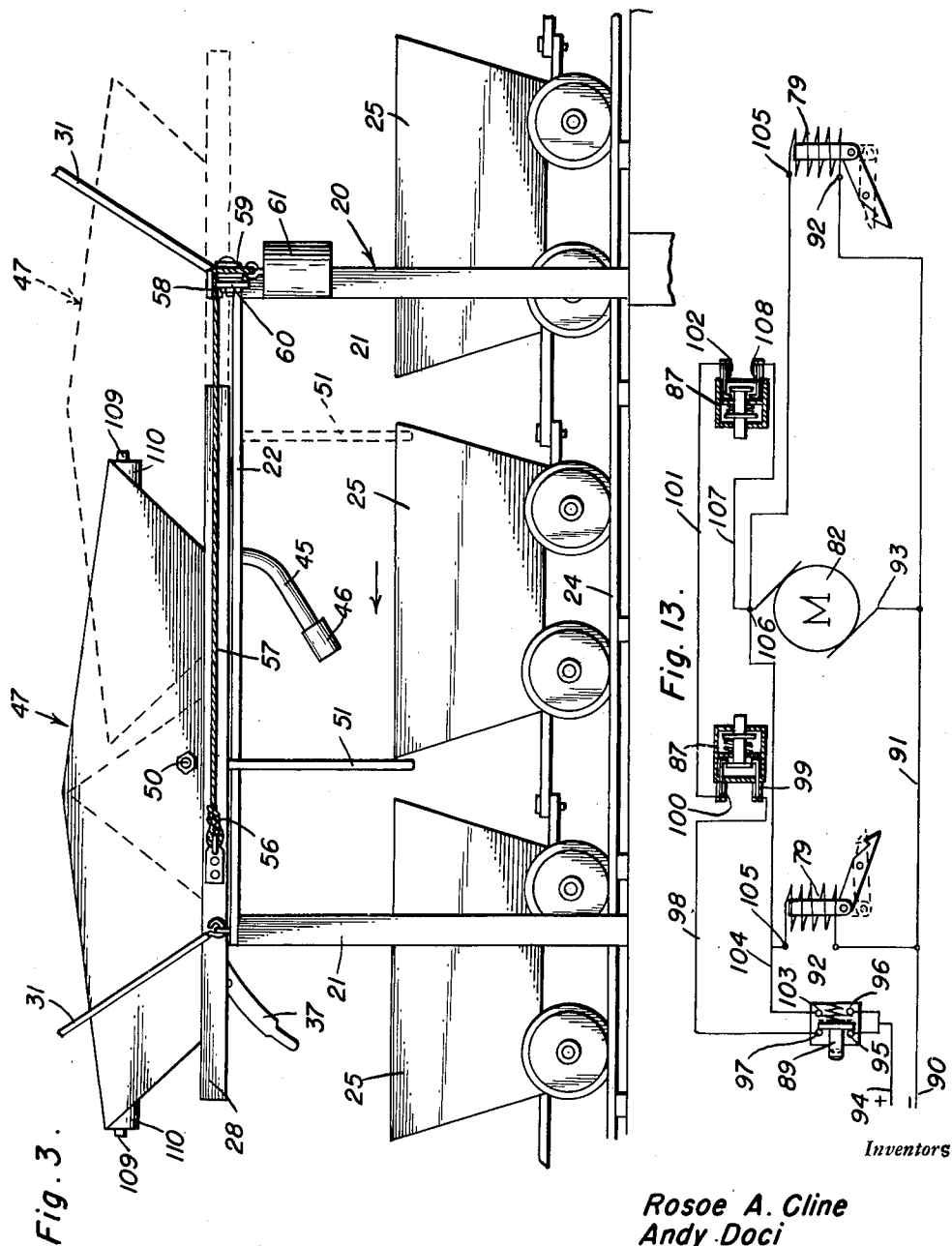
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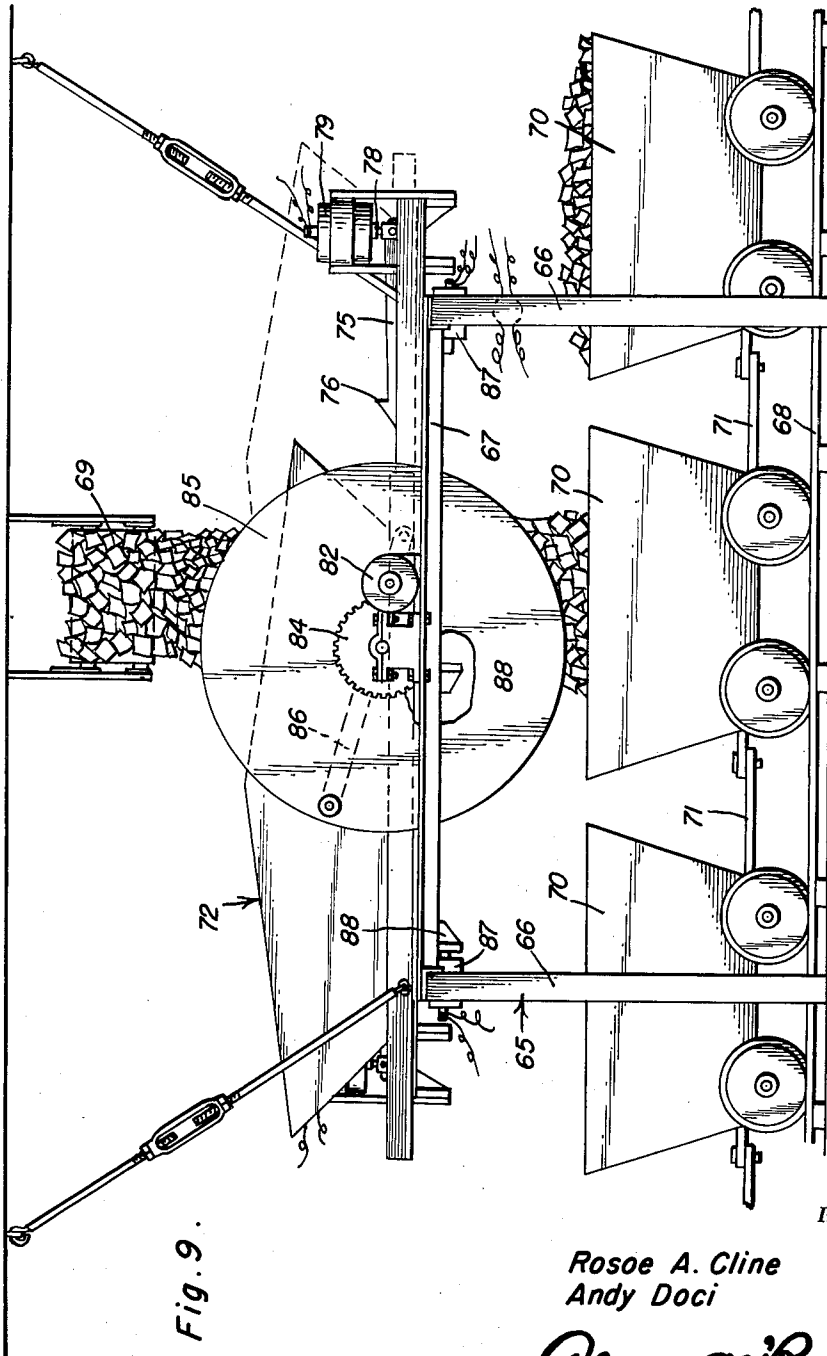
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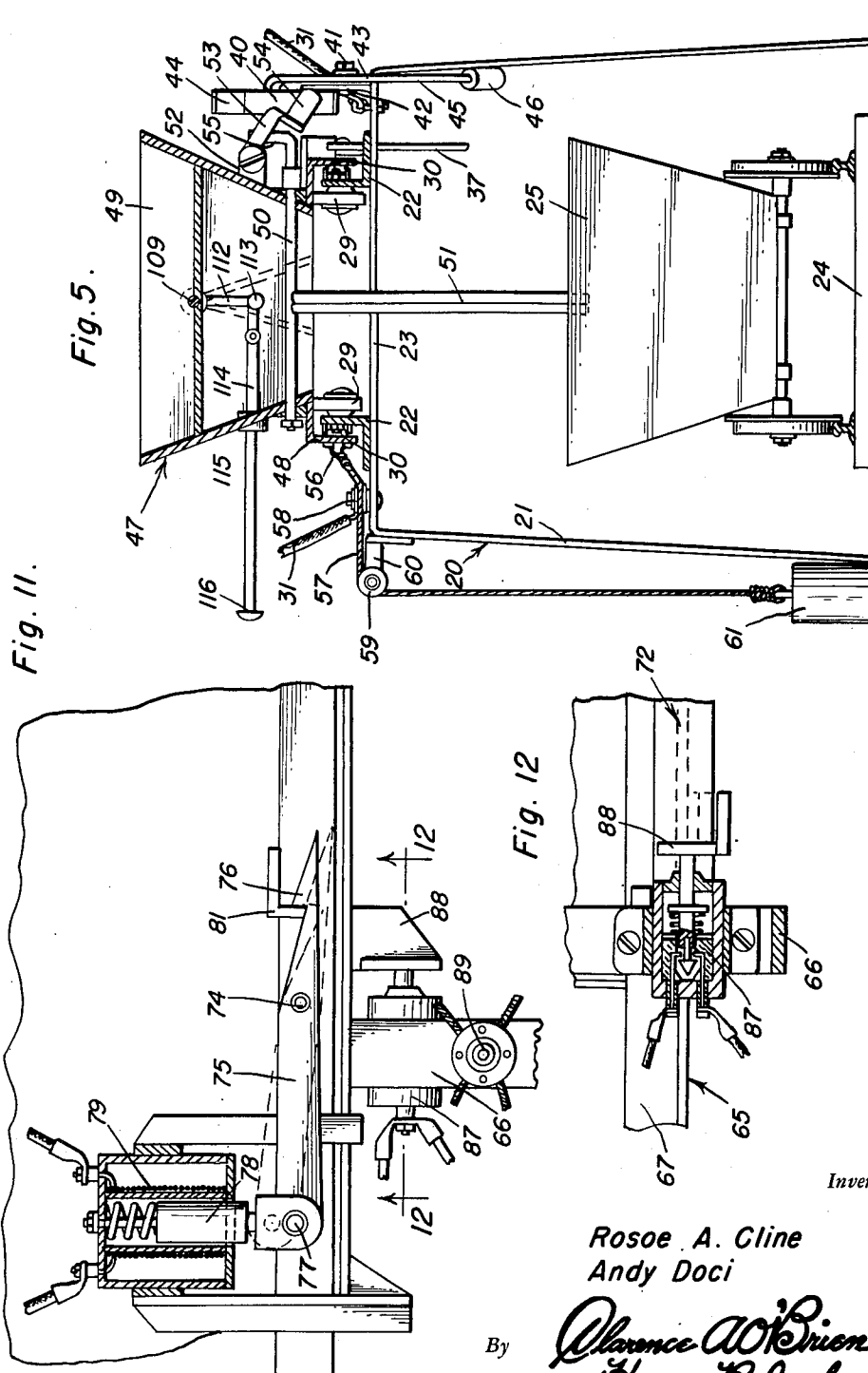
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UNITED STATES PATENT OFFICE

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CAR LOADING APPARATUS

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7 Claims. (Cl. 214-43)

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This invention relates to a car loading apparatus and has for its primary object to direct granular material and the like into cars in succession.

Another object is to maintain a continuous flow of the material to be loaded and permit of the exchanging of a loaded car for an empty car without interrupting the flow of the material.

A further object is to automatically move the loading mechanism as a car being advanced into loading position, and to return the loader to its initial position automatically after the car to be loaded has been moved into loading position.

The above and other objects may be attained by employing this invention which embodies among its features a pair of contiguous hoppers movable in unison between the discharge end of a conveyor and the car to be loaded, said hoppers being disposed over a pair of adjacent cars for directing material discharged by the conveyor into the cars immediately beneath the hoppers, means actuated by the advance of a car into loading position beneath the discharge end of the conveyor to advance the hoppers in unison with the advance of the car and means to return the hoppers to their original position while the car beneath the discharge end of the conveyor is being loaded.

In the drawings:

Figure 1 is a plan view of a car loader embodying the features of this invention;

Figure 2 is a side view of the loader illustrated in Figure 1;

Figure 3 is a view similar to Figure 2 taken from the opposite side of the loader;

Figure 4 is a longitudinal sectional view taken substantially along the line 4-4 of Figure 1;

Figure 5 is a sectional view taken substantially along the line 5-5 of Figure 1;

Figure 6 is a fragmentary enlarged detail view of the hopper advancing and trip mechanism;

Figure 7 is a fragmentary enlarged sectional view through one of the hopper supporting rails;

Figure 8 is a view similar to Figure 1 of a modified form of the invention;

Figure 9 is a side view of the loader illustrated in Figure 8;

Figure 10 is an end view of the loader illustrated in Figure 8;

Figure 11 is a fragmentary side view partially in section of the latch mechanism employed with the modification illustrated in Figure 8;

Figure 12 is a sectional view taken substantially along the line 12-12 of Figure 11; and,

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Figure 13 is the wiring diagram of the modified form of the invention.

Referring now to the drawings in detail this improved car loader comprises a main supporting frame designated generally 20 comprising standards 21 supporting at their upper ends guide rails 22 which extend longitudinally between the standards and are held in spaced parallel relation by cross bars 23. The frame is supported above in spaced parallel relation to a railway track 24 on which cars 25 are arranged to move in a rectilinear path. These cars are coupled together by suitable couplings 26, so that they form a string of cars which move in unison, and are advanced in succession into loading position beneath a continuously operating loading conveyor 28 which is supported above the frame 20, and above the cars 25 so that as they are moved into loading position the conveyor will deposit the material to be loaded into the cars. As illustrated in Figure 7 the side rails 22 comprise angle irons so disposed that one flange of each projects upwardly, and mounted for rotation at spaced intervals on the upwardly projecting flange of each side rail are spaced rollers 29 forming the supporting rollers for the carriage to be more fully hereinafter described. As illustrated the rollers 29 rotate about horizontal axes, and mounted in suitable horizontally spaced brackets carried by the vertically extending flange of each side rail 22 are guide rollers 30 which serve as lateral guides for the carriage.

Inasmuch as the loading device is adapted to be used in a mine, suitable upwardly and outwardly extending anchoring rods 31 are coupled to the upper ends of the standards 21 and anchored as at 32 in the roof of the mine tunnel to further brace the frame 20. The rods 31 are preferably provided intermediate their ends with turnbuckles 33 by which the tension on the rods may be regulated.

Pivotaly mounted as at 34 to one of the side rails 22 adjacent the forward end of the frame 20 is a latch arm 35 which is provided with an upwardly projecting latch 36, and a downwardly curved handle 37. The handle 37 is of greater weight than the opposite end of the latch arm 35 so that the latch dog 36 normally will be held upwardly, and downward movement of the latch arm 35 under the influence of the handle 37 is restricted by the adjacent cross bar 23.

Supported on suitable brackets 39 attached to one of the side rails 22 and projecting vertically in spaced parallel relation to the vertical

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flange thereof is an upwardly and forwardly inclined cam track 40 the purpose of which will more fully hereinafter appear. Pivotally supported as at 41 on an upstanding ear 42 carried by the side rail 22 to which the brackets 39 are attached, and besides the cam track 40 is a lever arm 43 carrying at its upper end a tiltable cam track 44, the forward end of which rests upon the cam track 40 when it is in normal position, but may be moved upwardly as suggested by the dotted lines in Figure 6 under certain conditions. The lever arm 43 is provided with a downwardly and forwardly extending angular projection 45 carrying a counterweight 46 which serves to hold the forward end of the cam track 44 in contact with the upper side of the cam track 40 under yielding pressure.

Mounted for longitudinal sliding movement on the frame 20 is a distributor carriage designated generally 47 comprising a pair of side rails 48 each comprising an angle bar disposed with its vertical flange turned downwardly, and its horizontal flange riding on the rollers 29. The vertical flanges of the angle bars 48 engage the guide rollers 30 to prevent lateral displacement of the carriage on the frame. The distributor carriage 47 is provided with a distributor hopper formed of a pair of hoppers 49 the adjacent ends of which are contiguous as illustrated while their lower ends converge and form discharge chutes over adjacent cars 25 on the track 24.

Pivotally supported in suitable bearings on opposite sides of the carriage, and beneath the convergent contiguous ends of the hoppers 49 is a transversely extending rock shaft 50 carrying intermediate its ends a depending arm 51 which as illustrated in Figures 1 and 4 projects downwardly and engages the forward edge of a car 25 which is to be moved into loading position under the conveyor 28. Pivotally mounted on a bracket arm 52 mounted on the carriage 47 on the side adjacent the cam track 40 is a latch arm 53 carrying at its free end a roller 54 which is adapted to ride on the cam track 40, and in so doing lifts the latch arm, as the carriage moves forward with a car 25 to be advanced into loading position. Formed on one end of the rock shaft 50 is an upward projection 55 which engages the latch arm 53 when it is in its lowermost position so that as the car 25 with which the depending arm 51 engages is advanced into loading position under the conveyor 28, the rock shaft 50 will be held against rocking movement by means of the latch arms 53 until the roller 54 is lifted by the cam track 40 into a position to disengage the extension 55. Such disengagement of the extension 55 by the latch arm 53 will permit the car 25 to advance without moving the carriage.

Fixed as at 56 to the forward end of the side rail 48 of the carriage 47 opposite that adjacent the cam track 40 is a flexible cable 57 which extends rearwardly on the frame adjacent a side rail 22 to a suitable guide pulley 58 over which it entrains and turns laterally to pass over the guide roller 59 carried on a suitable laterally extending bracket 60. The end of the cable 57 opposite that which is coupled to the carriage carries a counterweight 61 which serves to return the carriage to its initial starting position after it has been moved by a car which is being advanced into loading position.

The operation of the device so far described is as follows: As a car 25 is being advanced into loading position beneath the conveyor 28 the arm

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51 engages the forward edge of the car so that the carriage 47 is moved in unison with the car, thus bringing the rearmost hopper 49 which is disposed over the car being advanced into position beneath the discharge end of the conveyor 28 to direct the material being loaded into the car. The carriage is retained in this position by the engagement of the latch dog 36 with a depending tongue 62 carried by the carriage until such time as the operator desires to return the carriage to its initial position. Upon manipulation of the hand lever 37, the latch dog 36 may be moved out of engagement with the tongue 62, thus permitting the carriage to move under the influence of the weight 61 to its initial position so as to bring the foremost hopper into loading position over the car that is being loaded. Obviously as the car is advanced into loading position the roller 54 will ride upwardly along the cam track 40, causing the cam track 44 to swing about in pivot point 41 until the roller passes the end of the cam track 44, at which time it will fall back under the influence of the counterweight 46 into initial position. With the lifting of the roller 54, the latch arm 53 will disengage the upward extension 55 of the rock shaft 50, thus permitting the depending arm 51 to swing freely about the axis of the rock shaft so that as the carriage returns under the influence of the counterweight the arm 51 may escape the upper edges of the car that has just been moved into loading position. The latch arm 53 is held out of engagement with the extension 55 by reason of the engagement of the roller 54 with the cam track 44 until the roller rides off of the rear end of the cam track, thus permitting the latch arm 53 to drop and lock the extension 55, and the arm 51 in a position to be engaged by the car next to be advanced. In this way the contiguous hoppers 49 may be utilized to guide the material being loaded into the cars without loss.

In the modified form of the invention illustrated in Figures 8 through 13 inclusively there is provided a frame designated generally 65 which comprises four legs or standards 66 supporting at their upper ends spaced parallel guide rails 67 which lie between a track 68 and a material handling and discharging conveyor 69 from which the material to be loaded is discharged. Mounted on the track 68 are cars 70 which are coupled together as at 71 to form a string of cars which may be moved one by one into loading position beneath the discharge end of the conveyor. The frame 65 is substantially similar in construction to the frame 20 previously described, and mounted for longitudinal movement along the frame is a distributor carriage designated generally 72 which like the carriage 47 previously described is provided with contiguous hoppers 73 which are adapted alternately to be moved in unison with the movement of the cars into loading position beneath the discharge end of the conveyor 69. Pivotally supported as at 74 to one of the side rails 67 is a latch arm 75 carrying adjacent one end a latch dog 76. The opposite end of the latch arm 75 is pivotally connected as at 77 to one end of a solenoid core 78 which is mounted to operate in an electrical field 79 so that when the field is energized the core 78 will be retracted thereby and consequently rock the latch arm 75 about its pivot 74 to move the latch dog 76 into released position. Such a latch arrangement is provided at each end of the frame 65 so that as the carriage 72 is

moved into its extreme position, the latch dog 76 at the respective end of the frame will engage a keeper 81 carried by the carriage, and hold the carriage against accidental movement until such time as the respective solenoid coil 79 is energized. Mounted intermediate the ends of the frame 65 on one side is a drive motor 82, the drive shaft of which carries a drive pinion 83 which meshes with a drive gear 84, coupled through the medium of a drive disk 85 and connecting rod 86 to the carriage 72, so that as the drive disk 85 is driven by the motor 82 the carriage will move lengthwise of the frame 65. Mounted at each end of the frame 65 beneath the carriage 72 is a push button switch 87 which is so designed as to break contact when the button is pressed, and can make contact when pressure is released from the button. A suitable depending stop member 88 is carried adjacent each end of the carriage 72, and is adapted to engage the push button switch at the end of the frame 65 as it is approached by the carriage.

A two-way push button control switch 89 is mounted at some convenient place on the frame 65 to be manually actuated by the operator of the device.

As illustrated in the diagram in Figure 13 one pole 90 of a power supply line leads through a conductor 91 to one terminal 92 of each solenoid 79, and also to one terminal 93 of the motor 82. The opposite pole 94 of the power line is coupled to the terminals 95 and 96 of the push button switch 89. Leading from the terminal 97 of the push button switch 89 is a conductor 98 which leads to one terminal 99 of the push button switch 87 at one end of the frame 65. The opposite terminal 100 of the push button switch 87 just referred to is coupled through the medium of a conductor 101 to one terminal 102 of the push button switch 87 at the opposite end of the frame 65. Leading from the contact 103 of the push button switch 89 is a conductor 104 which is connected to the terminals 105 of each solenoid 79, and this conductor is also connected to the terminal 106 of the motor 82, and through the medium of a conductor 107 to the terminal 108 of the push button switch 87 at one end of the frame 65 opposite that to which the conductor 98 leads.

It will thus be seen that when the push button switch 89 is in the position illustrated in Figure 13, current will flow through the conductor 94, the pole 95, the pole 97 and the conductor 98 to the pole 99 of the switch 87 at one end of the frame 65. Continuing through the switch 87 just referred to the current will flow through the pole 100 into the conductor 101 and the pole 102 of the switch 87 at the opposite end of the machine. Flowing across the switch 87 just mentioned through the pole 103 the circuit will be completed through the motor 82, thus causing the motor to drive a drive disk 85 until the carriage 72 moves to a position to bring its stop member 88 into contact with the push button of a switch 87. At this time the circuit will be broken through the motor 82 and through the solenoid coils 79, thus permitting their latch arms to move into latching position. When it is desired again to move the carriage and shift it to the opposite end of the frame, the push button switch 89 is operated to move the contact inwardly and cause the poles 96 and 103 thereof to be bridged. This will cause the current to flow through the conductor 94, contact 96, contact 103 and conductor 104, thus to energize the solenoid

coils 79 at both ends of the frame and simultaneously set the motor 82 into operation. Having given the initial start to the carriage in this manner the pressure is released from the push button switch 89, thus permitting it to return to original position so that the contacts 95 and 97 are bridged, and the motor is energized through the push button switches 87 until such time as one or the other of the switches 87 is moved to open the circuit through the motor. In this way the carriage may be caused to move in unison with the cars simply by pressing the push button of the switch 89 and releasing it, and as the carriage approaches either end of the frame, the latch at that end of the frame will engage the carriage and hold it until the push button switch 89 is again manipulated.

In order that the material being loaded in the cars may be directed from one side to the other a rock shaft 109 is mounted in suitable bearings 110 at opposite ends of the carriage and fixed to the rock shaft and projecting downwardly into each hopper is a movable baffle 111 which may be shifted angularly about the axis of the rock shaft 109 to direct the material falling through the hopper to one side of the other thereof. Fixed to the rock shaft intermediate its ends is a depending arm 112 to the lower end of which is pivoted as at 113 one end of a push rod 114, the opposite end of which projects through a suitable guide 115 in the side of the carriage and is equipped with a suitable handle 116 by means of which the rod may be moved longitudinally to cause the arm 112 to rock the shaft 109 and adjust the baffles 111 to the desired position.

While in the foregoing there has been shown and described the preferred embodiment of this invention it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

1. The combination with a car loading conveyor and a string of cars adapted to be advanced in succession into loading position beneath the discharge end of said conveyor, of a pair of contiguous hoppers movable in unison between the discharge end of the conveyor and the cars, said hoppers being disposed over a pair of adjacent cars in said string of cars for directing material discharged by the conveyor into the cars immediately therebeneath, an arm carried by the hoppers for engaging a car during its advance into loading position beneath the discharge end of the conveyor to move the hoppers in unison with the advance of the car, a trip for automatically disengaging said arm from the car when it reaches loading position beneath the discharge end of the conveyor and means to return the hoppers to starting position while the car beneath the discharge end of the conveyor is being loaded.

2. The combination with a car loading conveyor and a string of cars adapted to be advanced in succession into loading position beneath the discharge end of said conveyor, of a pair of contiguous hoppers movable in unison between the discharge end of the conveyor and the cars, said hoppers being disposed over a pair of adjacent cars in said string of cars for directing material discharged by the conveyor into the cars immediately therebeneath, an arm carried by the hoppers for engaging a car during its advance into loading position beneath the discharge end of

the conveyor to move the hoppers in unison with the advance of the car, a trip for automatically disengaging said arm from the car when it reaches loading position beneath the discharge end of the conveyor and gravity actuated means to return the hoppers to starting position while the car beneath the discharge end of the conveyor is being loaded.

3. The combination with a car loading conveyor and a string of cars adapted to be advanced in succession into loading position beneath the discharge end of said conveyor, of a pair of contiguous hoppers movable in unison between the discharge end of the conveyor and the cars, said hoppers being disposed over a pair of adjacent cars in said string of cars for directing material discharged by the conveyor into the cars immediately therebeneath, an arm carried by the hoppers for engaging a car during its advance into loading position beneath the discharge end of the conveyor to move the hoppers in unison with the advance of the car, a trip for automatically disengaging said arm from the car when it reaches loading position beneath the discharge end of the conveyor and means to return the hoppers to starting position while the car beneath the discharge end of the conveyor is being loaded and manually releasable means for holding the hoppers advanced.

4. The combination with a car loading conveyor and a string of cars adapted to be advanced in succession into loading position beneath the discharge end of said conveyor, of a pair of contiguous hoppers movable in unison between the discharge end of the conveyor and the cars, said hoppers being disposed over a pair of adjacent cars in said string of cars for directing material discharged by the conveyor into the cars immediately therebeneath, an arm carried by the hoppers for engaging a car during its advance into loading position beneath the discharge end of the conveyor to move the hoppers in unison with the advance of the car, a trip for automatically disengaging said arm from the car when it reaches loading position beneath the discharge end of the conveyor and means to return the hoppers to starting position while the car beneath the discharge end of the conveyor is being loaded and a latch for holding the hoppers advanced.

5. The combination of a car loading material conveyor with material distributing means adapted to direct material continuously received from the conveyor into a string of cars advanced sequentially therebelow, said means comprising a pair of contiguous material directing hoppers having horizontally spaced discharge openings, said hoppers being mounted for horizontal reciprocation below the discharge end of the conveyor, means for advancing the hoppers from a first position in which one of the hoppers only is disposed directly below the discharge end of the conveyor to a second position in which the

other hopper only is disposed directly below the discharge end of the conveyor, means for retaining the hoppers in the second position, means for releasing said retaining means, and means for returning the hoppers to the first position.

6. The combination of a car loading material conveyor with material distributing means adapted to direct material continuously received from the conveyor into a string of cars advanced sequentially therebelow, said means comprising a pair of contiguous material directing hoppers having horizontally spaced discharge openings, said hoppers being mounted for horizontal reciprocation below the discharge end of the conveyor, means for advancing the hoppers from a first position in which one of the hoppers only is disposed directly below the discharge end of the conveyor to a second position in which the other hopper only is disposed directly below the discharge end of the conveyor, means for retaining said hoppers in each of said positions, means for releasing said hoppers from said retaining means, and means for returning the hoppers from the second to the first position.

7. The combination with a car loading material conveyor and first and adjacent connected cars movable in succession below the discharge end of the conveyor, of a pair of contiguous material directing hoppers mounted for horizontal reciprocation between the discharge end of the conveyor and the cars, said hoppers having horizontally spaced discharge openings adapted to be disposed above the cars, means for moving the hoppers while the cars are stationary from an original position in which one of the hoppers is disposed directly below the discharge end of the conveyor with its discharge opening being disposed directly above said first car to a first position in which the other of the hoppers only is disposed directly below the discharge end of the conveyor with the discharge opening of said one hopper being disposed directly above said adjacent car, and means for returning the hoppers from the final position to the original position with respect to the conveyor, said last-mentioned means including a releasable normally operative driving connection between one of the cars and the hoppers, and means responsive to the positioning of the hoppers in the original position to release said driving connection.

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