Nov. 29, 1932. C. A. GRIFFITH 1,889,066

DROP BOTTOM CAR

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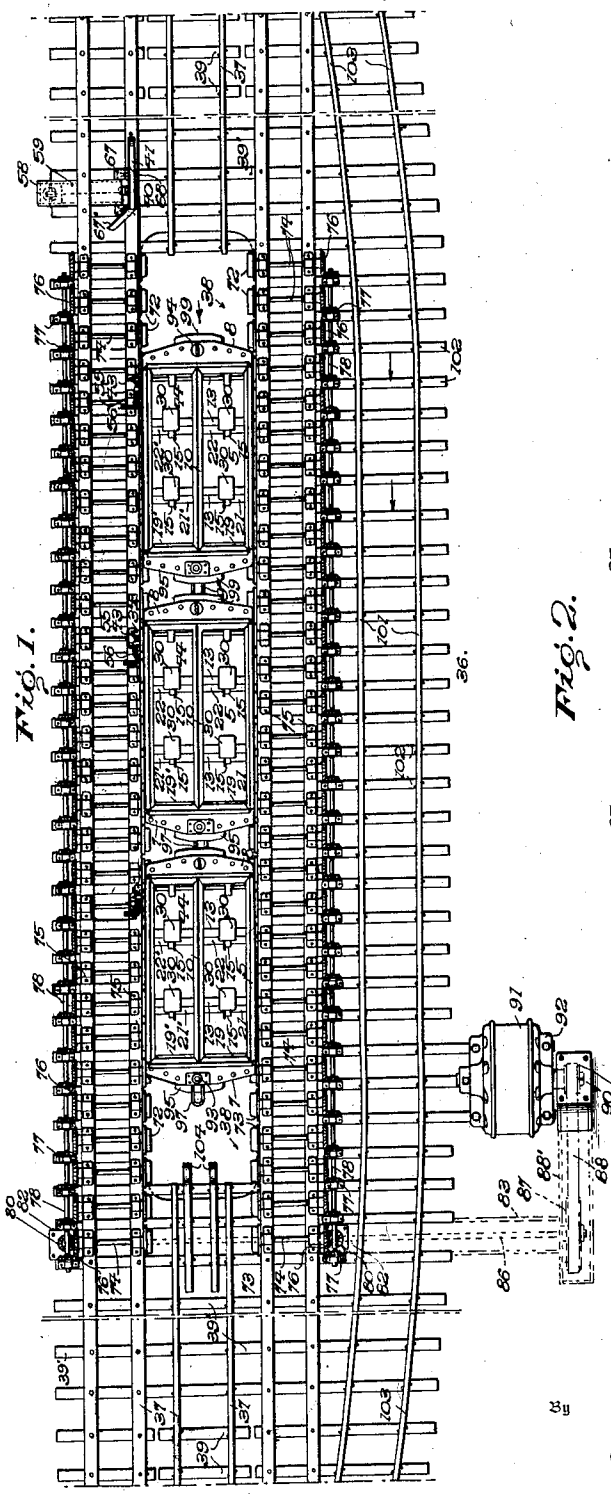


Fig. 1.

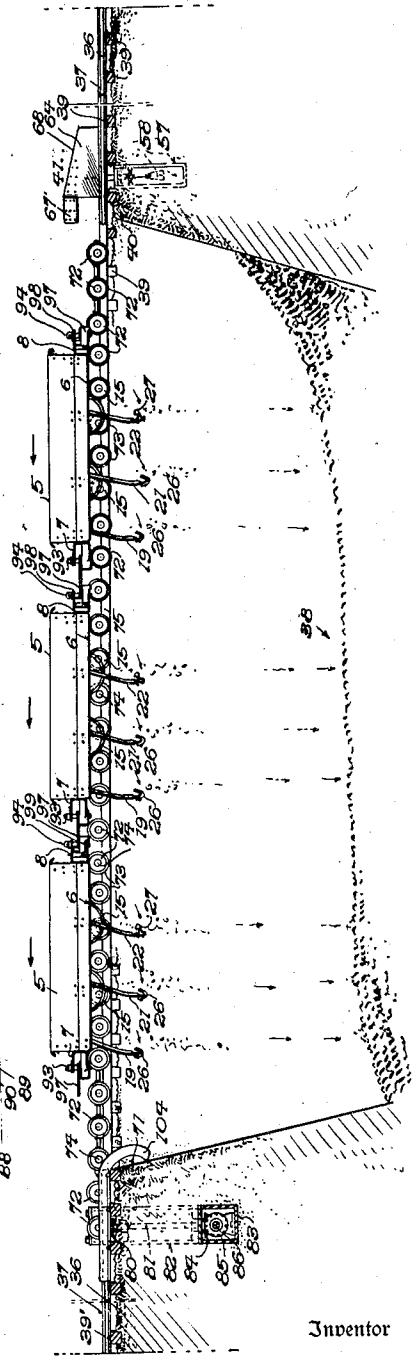


Fig. 2.

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DROP BOTTOM CAR

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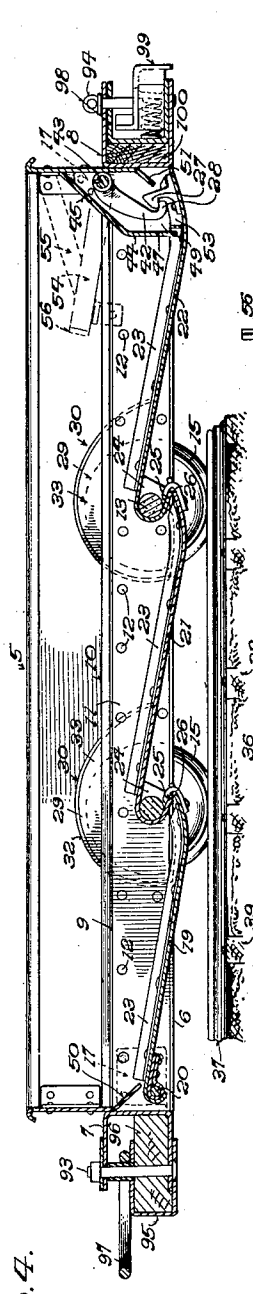


Fig. 4.

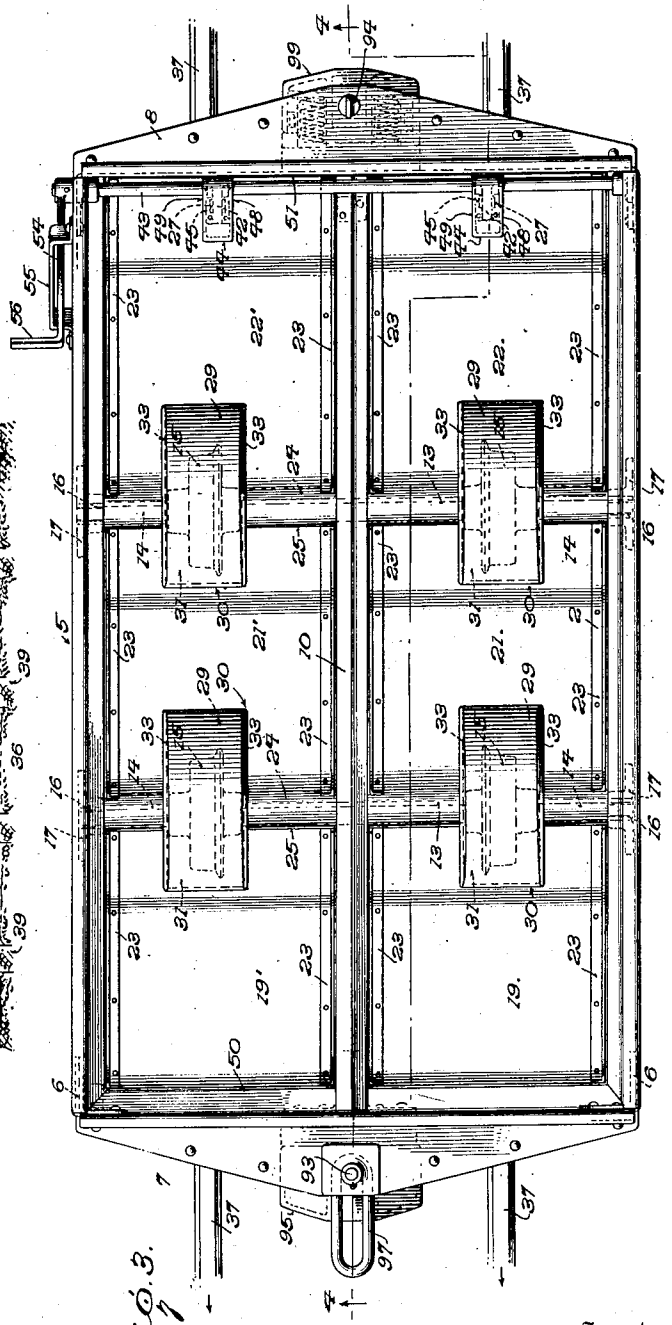


Fig. 3.

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DROP BOTTOM CAR

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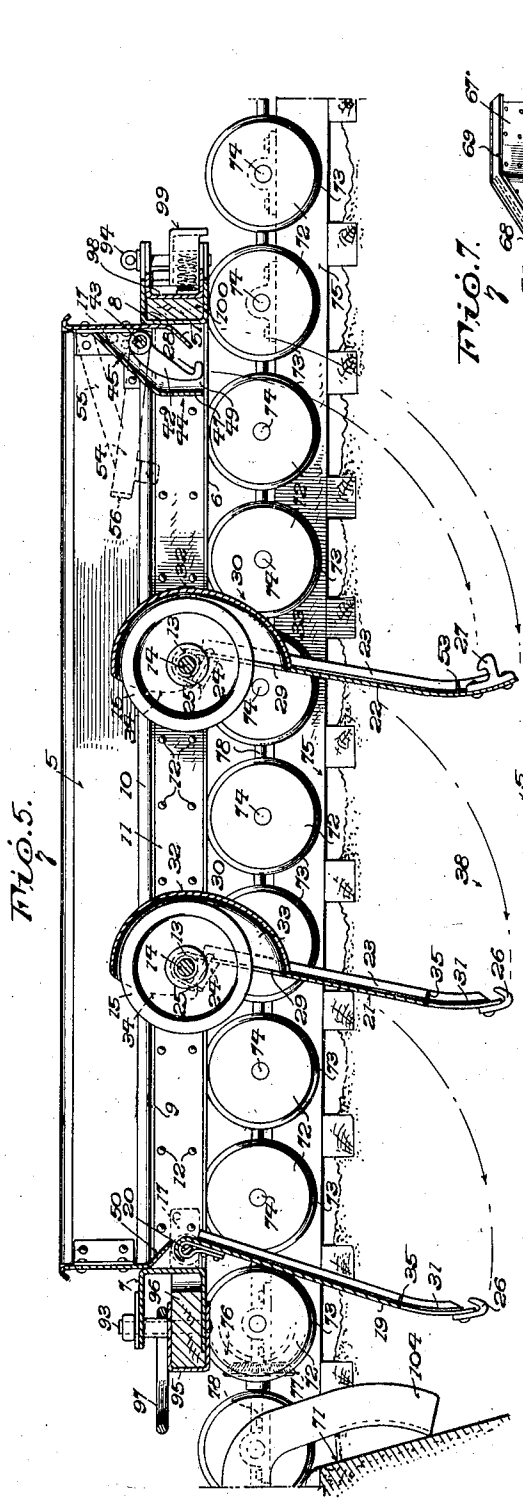


Fig. 5.

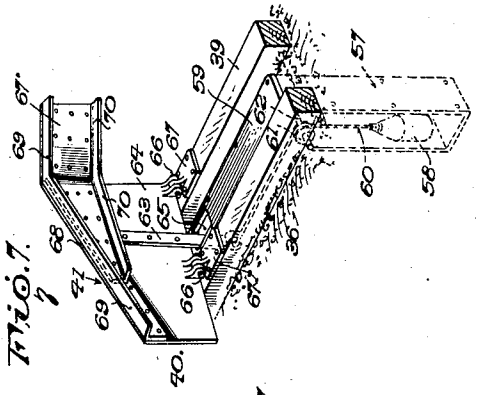


Fig. 7.

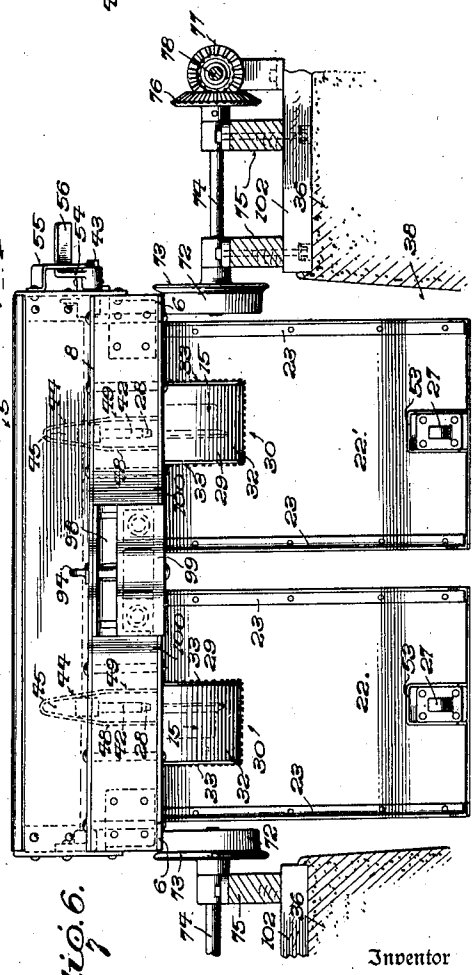


Fig. 6.

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DROP BOTTOM CAR

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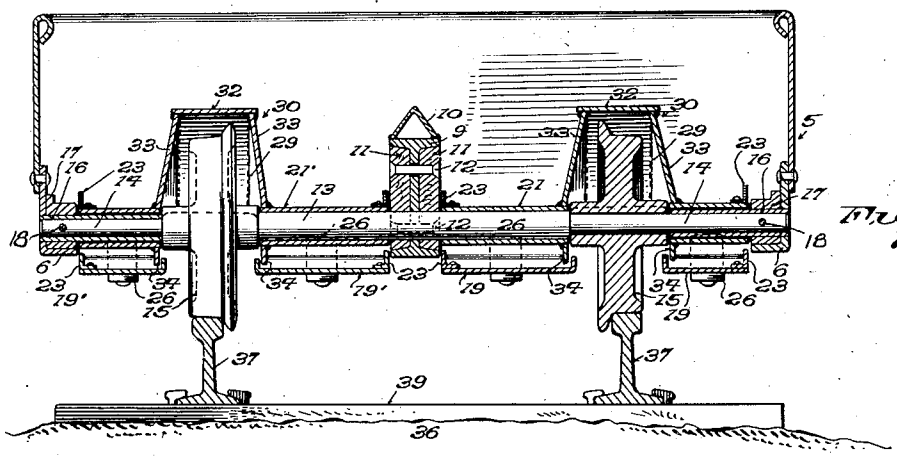


Fig. 8.

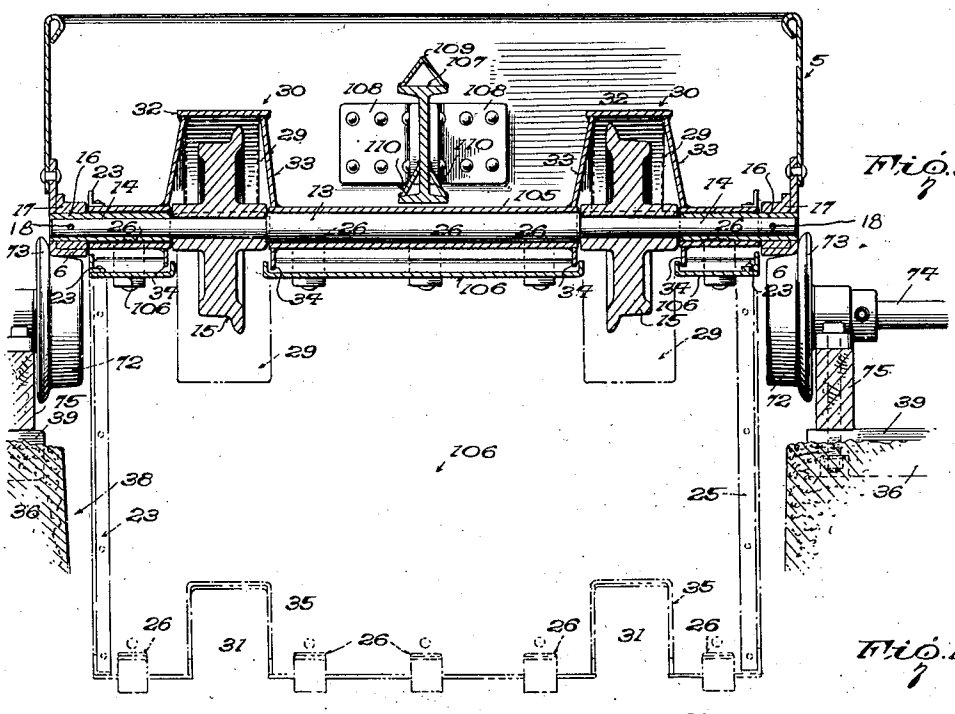


Fig. 9.

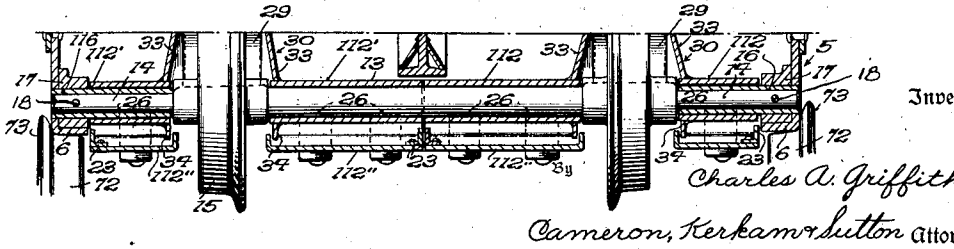


Fig. 10.

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DROP BOTTOM CAR

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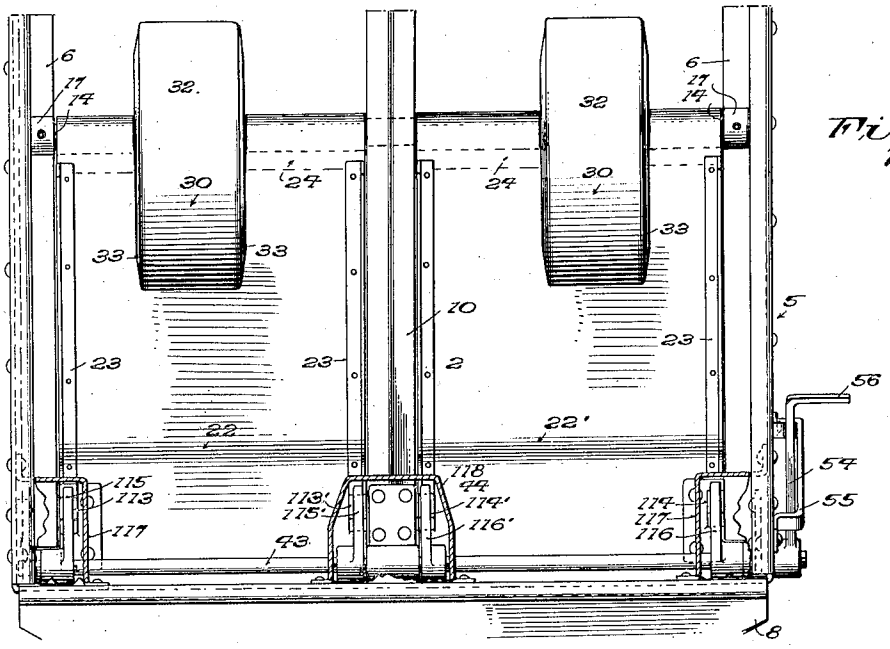


FIG. 11.

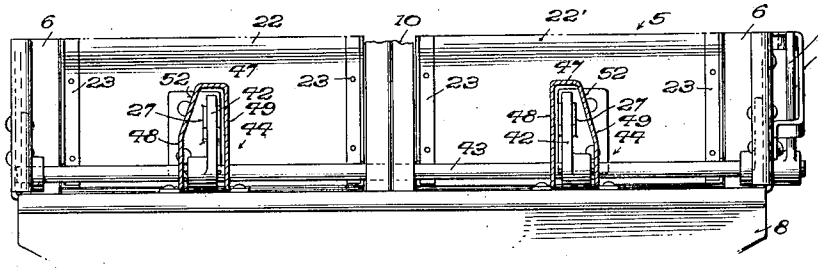


FIG. 12.

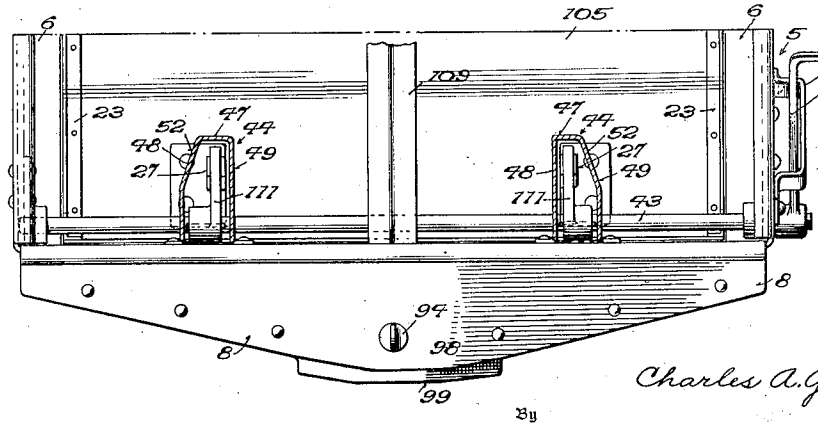


FIG. 13.

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DROP BOTTOM CAR

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Fig. 14.

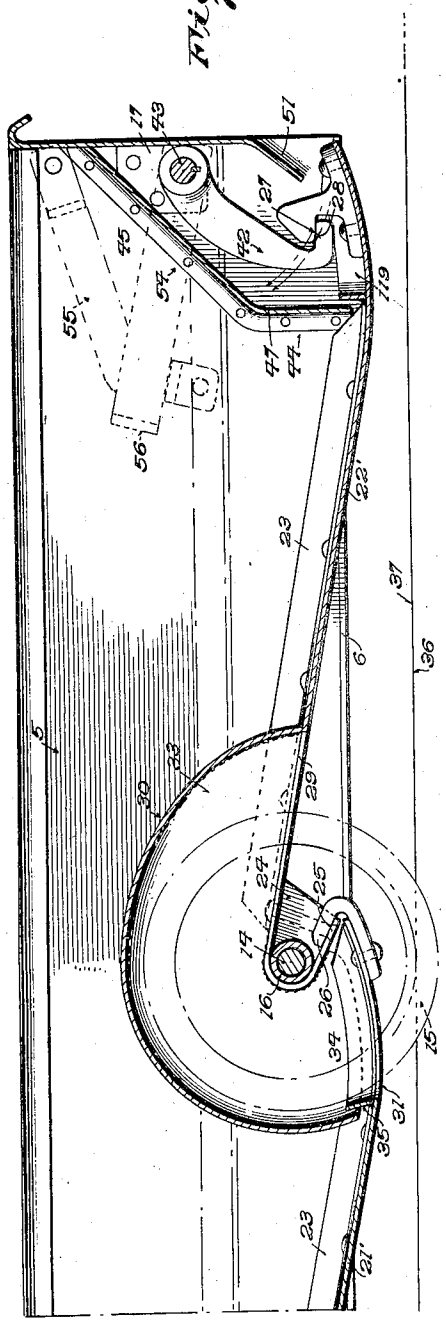


Fig. 16.

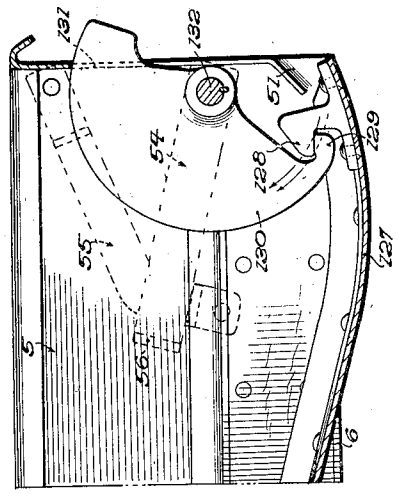
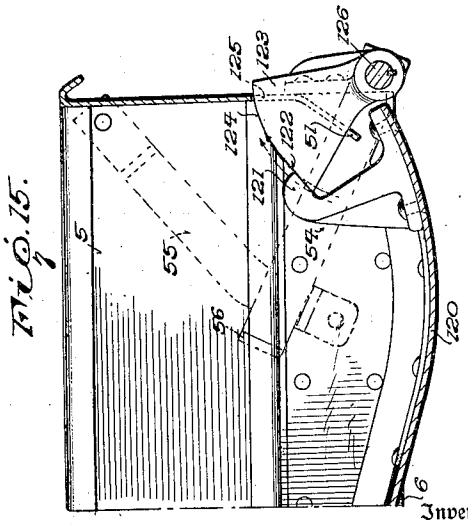


Fig. 15.



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Patented Nov. 29, 1932 1,889,066

UNITED STATES PATENT OFFICE

CHARLES A. GRIFFITH, OF KNOXVILLE, TENNESSEE

DROP BOTTOM CAR

Application filed January 21, 1931. Serial No. 510,249.

This invention relates to drop bottom cars, and more particularly to drop bottom cars of the type embodying the principle disclosed in my Patent No. 1,268,344 and wherein a plurality of interlocking automatically operated drop bottom doors are hinged on axes extending transversely of the car.

One object of the present invention is to provide a car of the type above referred to, which has a much greater capacity than interlocking drop bottom door cars heretofore proposed.

Another object of the present invention is to provide a car of the drop bottom door type, which embodies wheel housings so constructed and arranged that the car may be of considerably increased width with correspondingly increased capacity.

Another object of the present invention is to provide a car of the interlocking drop bottom door type, which is provided with a longitudinally extending center beam affording increased strength for the car and enabling a smaller or any standard form of bumper to be employed.

Another object of the present invention is to provide a car of the interlocking drop bottom door type, which has greatly increased width and capacity and may embody a single series of doors or a plurality of series of doors in parallel relation.

Another object of the present invention is to provide a car of the interlocking drop bottom door type, which has improved latch means for both single and multiple series of doors.

Another object of the present invention is to provide a car of the interlocking drop bottom door type, which has improved latch means for a drop bottom door or doors of the car.

Another object of the present invention is to provide a drop bottom car which has improved door latching means enabling cooperating parts thereof to be tightly interlocked by the weight of the load in the car.

Another object of the present invention is to provide, at the pit or bin where the car is dumped, improved mechanism which acts to transport the car over said pit or bin.

Another object of the present invention is to provide, at the pit or bin where the car is dumped, improved car transporting mechanism which facilitates the dumping of material from a car of considerably increased width.

These and other objects of the present invention will appear as the following description thereof proceeds, and in order to more clearly understand said invention, reference may be had to the accompanying drawings which illustrate several embodiments of the inventive idea.

In said drawings:—

Fig. 1 is a top plan view of a train of cars each constituting one embodiment of the present invention, showing car transporting mechanism and a pit or bin over which the cars are carried thereby;

Fig. 2 is a side elevation, partly in section, of the cars, mechanism, and pit or bin shown in Fig. 1;

Fig. 3 is an enlarged top plan view of one of the cars shown in Figs. 1 and 2;

Fig. 4 is a vertical longitudinal sectional view on the line 4—4 of Fig. 3, showing the drop bottom doors of the car closed, and illustrating, in side elevation, wheel housings on certain of said doors;

Fig. 5 is a view similar to Fig. 4, showing the drop bottom doors open and the wheel housings in section;

Fig. 6 is an end view, partly in section, of a car and devices shown in Figs. 1 and 5, looking from the right thereof;

Fig. 7 is an enlarged detail perspective view of a trip shown in Figs. 1 and 2;

Fig. 8 is a transverse vertical sectional view of the car shown in Figs. 1 to 6, taken through the wheel housings with the doors closed as in Fig. 4, and showing the center beam between the doors and the wheel housings;

Fig. 9 is a transverse vertical sectional view similar to Fig. 8, showing one of a single series of doors, a different construction and arrangement of the center beam, and part of the car transporting mechanism illustrated in preceding figures;

Fig. 10 is a transverse vertical sectional

view similar to Fig. 9, showing two doors of parallel series thereof;

Fig. 11 is an enlarged fragmentary top plan view of a car, showing latch operating mechanism, and a plurality of latches for each rear door of two parallel series thereof;

Fig. 12 is a view similar to Fig. 11, showing a single latch for each rear door of two parallel series thereof;

Fig. 13 is a view similar to Figs. 11 and 12, showing the rear door of a single series and a plurality of latches for said door;

Fig. 14 is an enlarged fragmentary vertical longitudinal sectional view of the car and latch mechanism shown in Fig. 11;

Fig. 15 is a view similar to Fig. 14, showing another form of latch mechanism embodying the present invention; and

Fig. 16 is a view similar to Figs. 14 and 15, showing another form of latch mechanism, embodying the present invention.

Referring to the drawings, wherein like reference numerals designate like parts throughout the several views, 5 indicates the body of a car of the interlocking drop bottom door type, having side sills 6, and end sills 7 and 8. In accordance with the present invention, the car is provided with a center beam 9 extending longitudinally thereof and secured in any suitable manner to the end sills 6 and 7 (Figs. 1 to 6, 8 and 14). The center beam 9 has secured to or formed integrally with the top thereof, an inverted, V-shaped guard or deflector for preventing material from lodging on top of said beam when the car is dumped, as hereinafter described. The center beam 9 may, if desired, be provided in the opposite channelled sides thereof, with fillers 11 of wood or other suitable material, which are secured to said beam by rivets 12 or other suitable means that extend through suitable openings formed in said beam and said fillers.

Extending transversely of the car through suitable openings in the beam 9 and the fillers 11, are axles 13 the opposite ends of which are provided with reduced extensions 14 on which are journalled the car wheels 15. The axle extensions 14 are provided at the outer sides of the wheels 15 with sleeves 16 which extend through suitable openings in the side sills 6 and brackets 17 that are secured thereto in any suitable manner. The axles 13 are retained against rotation, as by pins 18 which pass through suitable openings in the axle extensions 14 and the brackets 17, respectively.

In accordance with the present invention, the car may be provided with parallel series of interlocking automatically operated drop bottom doors, or said car may be provided with a single series of interlocking, automatically operated drop bottom doors. As shown in Figs. 1 to 6, 8, and 10 to 12, the car is provided with parallel series of interlocking, automatically operated doors hinged on axes extending transversely of the car, the forward doors 19, 19′ being hinged in any suitable manner on a rod 20. This rod 20 extends transversely of the car through suitable openings in the side sills 6 and the center beam 9, and said rod is secured in any suitable manner to said side sills, adjacent the end sill 7 of the car. Doors 21, 21′ are interposed between the forward doors 19, 19′ and rear doors 22, 22′, the doors 21, 21′ and 22, 22′ being hinged on axes extending transversely of the car and herein shown as comprised by the axles 13 and the extensions 14 thereof. If desired, however, the doors 21, 21′ and 22, 22′ could be hinged on transverse axes independently of the wheel axles of the car.

The several doors are each preferably constructed of a sheet of steel or other suitable metal and may, if desired, be reenforced at opposite sides thereof by flanges 23 of channel iron or the like bolted or otherwise suitably secured to said doors. The doors 21, 21′ and 22, 22′ are preferably hinged to their pivotal axes by hinges formed and constructed as shown in my co-pending application Serial No. 440,802, filed April 1, 1930. Accordingly, the front edge portions of the doors 21, 21′ and 22, 22′ are bent around the axles 13 and the sleeves 16 on the axle extensions 14, and blocks 24 shaped to fit said axles and said sleeves, and preferably made of metal, are interposed between said doors and the portions thereof which are bent around said axles and said sleeves. The blocks 24 are riveted or other otherwise suitably secured to the doors 21, 21′ and 22, 22′, proper, and to the forward edge portions 25 thereof which are bent around the pivotal axes of the door, as previously described.

The rear or free edge portions of the doors 19, 19′ and 21, 21′ have secured thereto, catches 26 which, when said doors are in raised or closed positions, engage over the edge portions 25 of the doors 21, 21′ and 22, 22′, between the blocks 24, or in suitable openings formed therein. The rear edge portions of the doors 22, 22′, as shown in Figs. 3 to 6, inclusive, of the drawings, have secured thereto catches 27 which, when said doors are in raised or closed positions, engage catches 28 of latch mechanism to be hereinafter described.

In accordance with the present invention, the wheel housings, instead of being stationary and secured to the side sills of the car, are movable and secured to drop bottom doors, thereby enabling the car to be increased in width, as desired, with the result that the capacity of the car is materially increased. Accordingly, drop bottom doors adjacent the wheels of the car, are provided with openings 29 and housings for said wheels, the

housings being indicated broadly at 30, and said openings and said housings, as shown in Figs. 1 to 6 and 14 of the drawings, being formed in and secured to, the forward portions of the doors 21, 21′ and 22, 22′. The doors 19, 19′ and 21, 21′ are also provided with openings for the wheels 15, said openings being formed in the rear portions of said doors, and being indicated at 31 in Figs. 3 and 5 of the drawings.

When the doors are in their raised or closed positions, the wheels 15 extend through the openings 29, 31 and are covered by the housings 30 which also cover said openings. The housings 30 may be constructed in any suitable manner, and are secured to the doors which carry them, in any suitable way, or by any suitable means, as desired. The housings 30 preferably have top walls 32 curved for portions of their lengths in conformity with the curvature of the wheels 15, and curved in the remaining portions of their lengths eccentrically of the wheels to points where said top walls of the housings join the doors that carry them.

The top walls of the housings 30 are welded, or otherwise suitably secured, to side walls 33 of the housings. The side walls 33, in turn, are welded, or otherwise suitably secured, to the doors 21, 21′ and 22, 22′ on the edge portions thereof that define the openings 29. The side walls 33 of the housings 30 are preferably inclined to facilitate dumping of the car, and the edges 34 of said side walls are preferably curved in conformity with the curvature of the rear portions of the doors 19, 19′ and 21, 21′ to fit said doors when the same are closed. The doors 19, 19′ and 21, 21′ may, if desired, be provided adjacent the openings 31 therein, with flanges 35 over which the housings 30 extend when the several doors are in their raised or closed positions. These flanges 35 are made of angle iron or of other suitable material secured to the doors that carry them in any suitable manner, and said flanges serve to prevent material in the car from sifting therefrom under the wheel housings through the wheel openings 31.

Referring now to Figs. 1 to 4, inclusive, of the drawings, 36 indicates the roadbed of a track comprised by rails 37 along which a car, or a train of cars, travels to a pit or bin 38 where the car or cars may be dumped as hereinafter described. The rails 37 are secured in the usual manner to crossties 39 placed on the roadbed 36 transversely of the track. Mounted on the roadbed, adjacent the rear edge 40 of the pit or bin 38, is a trip indicated broadly at 41 in Figs. 1, 2 and 7 of the drawings. As each car approaches the pit or bin 38, the trip 41 engages a part of latch mechanism on said car, this latch mechanism releasing the rear doors 22, 22′ so that when the car passes over the pit or bin the doors 22, 22′, 21, 21′, and 19, 19′ are opened in the order named to dump the load in the pit or bin.

In accordance with the present invention, the latch mechanism above referred to, comprises one or more catches on a drop bottom door or doors, and one or more catches which are fixed on a rotatable member extending transversely of the car, the last named catches, when operated, having rotary movement in a vertical plane or planes and being so constructed and arranged as to occupy a minimum amount of space and afford a positive interlocking engagement with the catches on the adjacent drop bottom doors such that the weight of the load in the car assists in maintaining said doors latched. Accordingly, the catches 28, which form parts of latch mechanism embodying the present invention, are made in the form of hooks or the like secured to, or formed integrally with, arms 42 that are fixed on a rockshaft 43 extending transversely across the car interiorly thereof and in close proximity with one end of said car. This rockshaft 43 is journalled in suitable bearings on the center beam 9 and the side sills 6, and the interengaging portions of the catches 28 and 27 are so formed that said catches will be tightly engaged by the weight of a load in the car.

The catches 28 and the arms 42, extend within, and are enclosed by, housings which are indicated broadly at 44 in Figs. 3 to 6, 12, and 13 of the drawings. The rear walls of the housings 44 are formed by the rear end of the car, and the top walls 45 of said housings are inclined forwardly and downwardly from the rear end wall of the car and provided with flanges that are riveted or otherwise suitably secured to said rear end wall. The front walls 47 of the housings 44 extend vertically from the top walls 45 and are preferably formed integrally therewith. The side walls 48 and 49 of the housings 44 are preferably formed integrally with the front walls 47 thereof, and said side walls are provided with flanges that are riveted or otherwise suitably secured to the adjacent end of the car that forms the rear walls of the housings.

The side walls 48 and 49 of the housings 44 are welded or otherwise suitably secured to the top walls 45 thereof, and the rockshaft 43 extends through suitable openings formed in said side walls. The inclined top walls 45 of the housings facilitate dumping of the load from the car, and for this purpose the ends of the car may be provided transversely thereof with small inclined bottom wall portions 50 and 51, respectively. Similar inclined bottom wall portions could, if desired, be provided on the side sills 6 of the car.

In order to reduce the size of the housings 44 to a minimum, with correspondingly increased capacity of car, the side walls 49

of said housings may, if desired, have inwardly inclined portions 52, as clearly shown in Figs. 12 and 13 of the drawings, in which case, the hubs of the arms 42 would extend from one side thereof only, instead of from both sides of said arms, as shown in Figs. 3 of the drawings. The rear portions of the doors 22, 22′ adjacent the housings 44, are preferably provided with flanges 53 over which the housings 44 extend when said doors are in their raised or closed positions. These flanges 53 prevent material in the car from sifting out of the same under the housings 44.

The rockshaft 43 extends outwardly beyond one side of the car through a suitable opening therein, and the outwardly projecting end of said rockshaft has fixed thereon an arm 54 which extends through a keeper 55 that is bolted or otherwise suitably secured to the adjacent side of the car. The arm 54 is provided on the free end thereof with a detent 56 which, as the car approaches the pit or bin 38, engages the trip 41, thus rocking the shaft 43 so that the catches 28 are disengaged from the catches 27 to thereby unlatch the doors 22, 22′. When the car passes over the pit or bin, through the medium of mechanism to be hereinafter described, the doors 22, 22′, 21, 21′, and 19, 19′ open one after another in the order named, to dump the load in the pit or bin, as previously pointed out.

The trip 41 may be of any suitable construction, but as herein shown, said trip is preferably constructed, mounted, and operated as follows. Arranged in the roadbed 36 adjacent the rear edge 40 of the pit 38 is an L-shaped housing 57 enclosing a counterweight 58 and provided with a removable cover 59. The counterweight 58 has secured thereto in any suitable manner, one end of a cable 60 which passes over a pulley 61 fixed on a shaft 62 journalled in suitable bearings on opposed walls of the housing 57. The opposite end of the cable 60 is secured in any suitable manner, to one end of a bar 63 riveted or otherwise suitably secured to a cam plate 64 and extending into the top portion of the casing 57 through a suitable opening 65 in the cover 59 therefor.

The cam plate 64 is pivotally mounted at 66, 66 on brackets 67, 67 bolted or otherwise suitably secured to a pair of the crossties 39, the brackets 67 and the cam plate 64 being located at one side of the track outwardly of, and in spaced relation, with one of the rails 37 thereof. Extending forwardly of the cam plate 64 toward the pit 38 and inclined outwardly from said cam plate, is a cam arm 67 formed of a sheet of metal bent intermediate its opposite ends and bolted or otherwise suitably secured to said cam plate on the upper forward portion thereof. The cam plate 64 has an edge 68 inclined upwardly and forwardly toward the pit, the portion of the arm 67 secured to the cam plate having an upper edge inclined in conformity with the edge 68 of said cam plate and disposed under an angle iron 69 riveted or otherwise suitably secured thereto. A second angle iron 70 riveted or otherwise suitably secured to the cam plate 64 extends along the lower edge of the arm 67, and the angle irons 69 and 70 are bent in conformity with the outwardly bent portion of the arm 67 and riveted or otherwise suitably secured thereto.

When the cars travel from the right to the left along the track, as viewed in Figs. 1 and 2 of the drawings, the detents 56 engage the upwardly and forwardly inclined edge 68 of the cam plate 64 and the rear doors of said cars are tripped as hereinbefore described. If for any reason, however, the cars with their doors closed, travel along the track from the left to the right thereof, as viewed in Figs. 1 and 2 of the drawings, the detents 56 engage the cam arm 67 of the trip thereby swinging it outwardly and downwardly about the pivot 66 so that the drop bottom doors of the cars remain latched and are not opened as the cars travel in said direction past the trip. After the car or cars traveling along the track from the left to the right, as viewed in Figs. 1 and 2 of the drawings, have passed the trip 41, said trip is automatically raised to its normal position by the counterweight 58.

In accordance with the present invention, cars are constructed in such manner as to have considerably increased capacity, especially in the direction of their width, and the drop bottom doors are preferably of considerably greater width than the distance between the rails 37 of the track. In order to dump such cars at the pit or bin, the rails 37 are extended only to the rear edge 40 of the pit or bin 38 and the forward edge 71 thereof, respectively, and separate mechanism is employed to transport the cars over said pit or bin. In accordance with the present invention, said mechanism is driven from any suitable source of power and constructed and operated to transport the cars over the pit or bin in either direction, through engagement of driven members with the cars. Accordingly, when the cars reach the pit 38, they pass off rails 37 onto driven wheels 72 which preferably engage the sills 6 on the undersides thereof and have flanges 73 that engage said sills on the outer sides thereof. Each car is thus transported across the pit or bin 38 from one side thereof to the other, and upon arrival of the car at the last named side of the pit, the wheels 15 thereof engage the rails 37 and the car passes off the driven wheels 72 onto said rails.

The wheels 72 are fixed on shafts 74 journalled in suitable bearings on sills 75 that are supported by the roadbed rearwardly and

forwardly of said pit or bin, as by the crossties 39′ adjacent thereto which, for this purpose, are of greater length than the crossties 39. The sills 75 may, if desired, be supported intermediate the front and rear edges of the pit or bin, by any suitable means for this purpose. The shafts 74 and the wheels 72 may be driven in any suitable manner, and by any suitable means for this purpose. As herein shown, said shafts are driven through the medium of bevel gears 76 fixed on the ends of the shafts 74 opposite those carrying the wheels 72 and meshing with bevel gears 77 fixed on shafts 78 extending in parallel relation with the sills 75 and journalled in suitable bearings on the latter. The bevel gears 76 on the forward shafts 74, shown at the left of Figs. 1 and 2, mesh with similar gears 80 that are fixed on the upper ends of vertical shafts 81 extending in wells or casings 82 and journalled thereon in any suitable manner.

The wells or casings 82 are arranged at opposite sides of the track 37 and extend downwardly therefrom in the ground for connection with a casing 83 extending under the track transversely thereof. Fixed on the lower ends of the shafts 81 are bevel gears 84 which mesh with similar gears 85 that are fixed on a shaft 86 extending through the casing 83 and journalled in any suitable manner thereon. This shaft 86 has fixed thereon a pulley 87 around which passes a belt 88 that also passes upwardly through a suitable casing 88′ and around a pulley 89 which is fixed on the armature shaft 90 of an electric motor 91, bolted or otherwise suitably secured on a foundation 92. This motor 91 is supplied with current from any suitable source and controlled by any suitable switch (not shown) in such manner that the armature shaft thereof may rotate in one direction or the other to rotate the wheels 72 in one direction or the other through the described driving connections for said wheels with said armature shaft.

In Figs. 1 and 2 of the drawings, each car therein shown is provided with coupling pins 93 and 94 at the front and rear thereof, respectively. The coupling pins 93 extend through suitable openings in the front sills 7 and small bumpers 95 for said sills which have wood fillers 96 therein that extend into the sills 7 and are bolted or otherwise suitably secured to said sills and said bumpers. The bumpers 95, in turn, are bolted or otherwise suitably secured to the sills 7 at the bottoms thereof to provide spaces for links 97 through which the coupling pins 93 extend. The coupling pins 93 are rigidly secured to the sills 7 and the bumpers 95 carried thereby, by any suitable means for this purpose.

The coupling pins 94 extend loosely through suitable openings formed in the sills 8 and yokes 98 positioned within said sills and bolted or otherwise suitably secured thereto. The coupling pins 94 also extend loosely through slotted openings formed in small spring bumpers 99 disposed within the yokes 98 and retained against displacement therefrom in any suitable manner. Suitable fillers 100 of wood or other material may, if desired, be interposed between the vertical walls of the sills 8 and the yokes 98. The bumpers 99 are spaced from the upper portions of the yokes 98 to receive the links 97 therebetween, the coupling pins 94 extending through said links and being removably mounted in the sills 8 and bumpers 99 so that the cars may be connected and disconnected, as desired with respect to each other and to an engine (not shown) for pulling or pushing the cars along the track 37. The engine may, if desired, travel around the pit or bin at one side or the other thereof, on a track such as shown in Fig. 1 of the drawings and including rails 101 secured in any suitable manner to crossties 102 on a suitable roadbed at one side of the pit or bin 38. The track 101 is provided at opposite ends thereof, with curved rails 103 connected by suitable frogs, switches or the like (not shown) with the rails 37.

Assuming a car, or a train of cars, to be traveling along the rails 37 in the direction indicated by the arrows in Figs. 1 to 5, inclusive, of the drawings, the detent 56 of each car engages the trip 41, thereby rocking the shaft 43 on said car, and disengaging the catches 27 and 28 of the latch mechanism for the rear doors 22, 22′ of the car. The rear doors 22, 22′ therefore drop slightly, and in continued travel of the car it passes from the rails 37 onto the driven wheels 72 of the car transporting mechanism which carries the car across the pit or bin 38. In the travel of the car across the pit or bin, the doors 22, 22′, 21, 21′ and 19, 19′ open one after another to positions such as illustrated in Figs. 2 and 5 of the drawings, the wheel housings 30 turning with said doors, and the load in the car, upon opening of the doors, dropping into the pit or bin 38.

When the car transporting mechanism has carried the car, after dumping thereof, to the forward edge of the pit or bin 38, the forward doors 19, 19′ engage a cam or cams 104 extending over the forward edge of the pit or bin and secured to the crossties 39 adjacent thereto. The doors 19, 19′ are thus raised, and through continued motion of the car imparted thereto by the car transporting mechanism, the doors 19, 19′, 21, 21′, and 22, 22′ successively engage the cam or cams 104 and are raised, in the order named, so that the catches 26 engage the edges 25 of the doors 21, 21′ and 22, 22′, and the catches 27 engage the catches 28 of the latch mechanism. The doors are thus locked in their raised

positions, and the car passes from the car transporting mechanism onto the rails 37 forwardly of the pit or bin 38. It is obvious, that by changing the direction of rotation of the driven members 72 of the car transporting mechanism, cars could be carried thereby across the pit or bin from the left to the right thereof as viewed in Figs. 1 and 2 of the drawings, the detents 56 of the latch mechanism on the cars engaging the cam arms 67 to depress the cam plate 64, as previously described, and prevent opening of the drop bottom doors of the car. The cars would, in this case, pass from the car transporting mechanism onto the rails 37 of the track rearwardly of the pit or bin 38 for travel to any desired destination.

The embodiment of the invention disclosed in Figs. 9 and 13 of the drawings is substantially the same as the embodiment of the invention previously described, with the exception that a single series only of interlocking automatically operated drop bottom doors are employed and the center beam is located above the pivoted axes for said doors. In the embodiment of the invention shown in Figs. 9 and 13, the adjacent doors are indicated at 105 and 106, respectively, and are identical in construction and operation with doors previously described, except that they are single doors extending across the entire width of the car. In Fig. 9, door 106 is shown in dotted lines, open and depending downwardly from the car into the pit or bin 38, and the axle 13 instead of extending through the center beam 107 extends below and in spaced relation therewith.

The center beam 107 is secured to opposite ends of the car, as by brackets 108 which are riveted or otherwise suitably secured to said center beam and said ends of the car, respectively. The center beam 107 is provided on the top thereof with an inverted V-shaped guard or deflector 109 the inclined sides of which facilitate dumping of the car. The center beam 107 is further provided, along the bottom portion thereof, with inclined deflectors 110 for the same purpose. The deflectors 109 and 110 may be welded or secured in any other desired manner to the center beam 107. The door 105, as shown in Fig. 13, is provided with two catches 27 which, when the door is raised, engage catches similar to those shown at 28 in the drawings and formed on arms 111 which are fixed on the rockshaft 43. The construction and operation of the embodiment of the invention shown in Figs. 9 and 13, is otherwise the same as the construction and operation of the embodiment of the invention previously described.

In the embodiment of the invention shown in Fig. 10 of the drawings, parallel series of interlocking automatically operated drop bottom doors are employed, as in the case of the embodiment of the invention shown in Fig. 8 and preceding figures of the drawings. Two of the drop bottom doors are indicated at 112, 112′, and the axle 13, instead of passing through the center beam, passes under a center beam 107 such as shown in Figs. 9 and 13 of the drawings. The construction and operation of the embodiment of the invention shown in Fig. 10 of the drawings, is otherwise the same as the construction and operation of the embodiments of the invention previously described.

In the embodiment of the invention disclosed in Figs. 11 and 14, parallel series of interlocking automatically operated drop bottom doors are employed, as in the case of the first described embodiment of the invention. Four catches 113, 113′ and 114, 114′ are employed, however, on the rear doors 22, 22′ of the car. These catches are secured in any suitable manner at opposite sides of the rear doors, respectively, and adjacent the rear edges thereof. When said doors are in their raised or closed positions, the catches 113, 113′ and 114, 114′ engage catches formed on the ends of arms 115, 115′ and 116, 116′, respectively. The arms 115 and 116 are fixed on the rockshaft 43 adjacent outer ends thereof, respectively, and said arms extend in suitable housings 117 which are bolted or otherwise suitably secured to the side and rear end walls of the car.

The arms 115′ and 116′ are fixed on the rockshaft 43 near the center thereof, and said arms both extend in a single housing 118 that is riveted or otherwise suitably secured to the rear end of the car centrally thereof in line with the center beam 9. The top walls of the housings 117 and 118 are inclined to facilitate dumping of the car and provide greater capacity thereof, and the side walls of the housing 118 are inclined inwardly toward the front wall thereof for the same purpose. The catches 113, 113′ and 114, 114′ are secured to the doors 22, 22′, respectively, within flanges such as indicated at 119 in Fig. 14 of the drawings. Similar flanges may be formed on the doors adjacent the housing 118. The housings 117 and 118 extend over these flanges, and the latter prevent material in the car from sifting out of the same below said housings. The construction and operation of the embodiment of the invention disclosed in Figs. 11 and 14 is otherwise the same as the construction and operation of the embodiments of the invention previously described.

In the embodiment of the invention disclosed in Fig. 15 of the drawings, the drop bottom door 120 is provided with a catch 121 riveted or otherwise suitably secured on the rear edge of said door. When the door is in its raised or closed position, the catch 121 engages over the flat upper surface 122 of an arm 123 provided rearwardly of said surface

with a curved surface 124. This arm 123 is arranged for rocking movement within the car and in material therein, and said arm also extends outwardly from the car through an opening 125 formed in the rear end thereof. The arm 123 is fixed on a rockshaft 126 extending transversely of the car and journalled in suitable bearings on the rear end of said car exteriorly thereof. The rockshaft 126 has fixed thereon exteriorly of the car a trip arm and detent such as secured on the rockshaft 43.

When this arm and detent are rocked through engagement of the latter with the trip 41, shaft 126 is also rocked and imparts like motion to the arm 123. The flat surface 122 of said arm is thus disengaged from the catch 121 and the door 120 is dropped for dumping of the load in the pit or bin when the car is transported thereover as previously described. When the car passes over the pit or bin the doors are closed one after another, and the catch 121 of the door 120 slides up over the front of the arm 123 and onto the top thereof in engagement with the flat surface 122, the arm 123 first rocking in one direction through engagement with the catch 121 with the front of said arm, and then rocking by gravity of the arm 123 and the arm 55, to engage the nose 122 under the catch 121, as stated. The construction and operation of the embodiment of the invention disclosed in Fig. 15 of the drawings is otherwise the same as the construction and operation of the embodiments of the invention previously described.

In the embodiment of the invention disclosed in Fig. 16 of the drawings, the door 127 is provided on the rear edge thereof with a catch 128 which, when the door is in its raised or closed position, extends over and engages a catch 129 that is secured to or formed integrally with a substantially semicircular block or plate 130. This block or plate 130 is arranged to rotate in opposite directions within the car through an opening 131 in the rear end thereof, and said block or plate is fixed on a rockshaft 132 that extends transversely of the car interiorly thereof and in close proximity with the rear end of said car. The rockshaft 132 is journalled in suitable bearings on the center beam 9 and the sides of the car, respectively, and said rockshaft is provided on one end thereof with a trip arm and detent such as disclosed in previously described embodiments of the invention.

When the car, in its travel along the track, passes the trip 41 the detent 56 on the arm 55 carried by shaft 132 engages said trip, thereby rocking said shaft to turn the plate 130 and disengage catch 129 from the catch 128. Door 127 is thus unlatched, and as said car is transported across the pit or bin said door and the doors forwardly thereof open one after another to dump the load in the pit or bin. When the car travels over the forward edge of the pit or bin onto the track ahead of the same, the doors are closed one after another from the front to the rear of the car, the door 127 being raised so that the catch 128 engages the rear portion of the catch 129 and then passes over and engages the top portions thereof, plate 130 and the shaft 132 rocking first in one direction and then in the opposite direction through engagement of the catches, and gravity action of the plate 130, the shaft 132, and the trip arm carried by the latter.

It will appear, from the foregoing, that the mounting of the wheel housings on drop bottom doors of the car enable the width thereof to be considerably increased, with corresponding increased capacity of the car, and that in the case of either a single series of interlocking drop bottom doors or parallel series thereof being employed, said doors may extend the full width of the car with the resulting advantages of increased capacity afforded by the ability to provide substantially straight side walls for the car. It will further appear, that the center beam provides a car of increased strength, enables smaller bumpers to be employed, and affords surfaces that facilitate dumping of the load of material from the car. This is also true as respects the form of the wheel housings and the latch housings, the former having the ability to turn in the load of the car while dumping the same, and the latter occupying minimum space within the car and having surfaces facilitating dumping of the load thereof.

It will further appear, from the foregoing, that the latch mechanism occupies a minimum amount of space, and provides interlocking elements tightly, though releasably engaged, and operated through minimum turning motion of the latches in a vertical plane. The latches are so constructed and operated that the rear edges of the rear doors do not have to be curved appreciably, thereby increasing the capacity of the car. In instances where the latches are uncovered and operate within the car, their surfaces are so formed as to turn freely in the load of material in the car when the doors are opened to dump said load.

While several embodiments of the present invention have been illustrated and described herein with more or less particularity, the invention is not limited to said embodiments or otherwise than by the terms of the appended claims.

What is claimed is:

1. In a drop bottom car, axles thereon, wheels on said axles, a plurality of drop bottom doors hinged to the car on axes extending transversely thereof, and wheel housings on said doors.

2. In a drop bottom car, an axle thereon,

wheels on said axle, one or more drop bottom doors hinged to the car on an axis extending transversely thereof, and wheel housings on said door or doors.

3. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, an axle on said car, a wheel on said axle, and a wheel housing on said door.

4. In a drop bottom car, a bottom therefor including two doors extending one rearwardly of the other and hinged to the car on axes extending transversely thereof, axles on the car, wheels on the axles, and wheel housings on said doors.

5. In a drop bottom car, a bottom therefor including two doors extending one rearwardly of the other and hinged to the car on axes extending transversely thereof, an axle on the car, a wheel on said axle and adapted to extend through openings in said doors, and a housing on one door adapted to cover said wheel and said openings.

6. In a drop bottom car, an axle thereon, a wheel on said axle, a bottom for the car including two doors having openings therein for said wheel and pivotal axes extending transversely of said car, a flange on one door adjacent the opening therein, and a housing on the other door adapted to cover the wheel and said openings.

7. In a drop bottom car, axles thereon, wheels on said axles, drop bottom doors having openings for said wheels and hinged to the car on axes extending transversely thereof, and housings mounted on said doors over said wheels and openings.

8. In a drop bottom car, axles thereon, wheels on said axles, drop bottom doors having openings for said wheels and hinged to the car on axes extending transversely thereof, and means carried by said doors and covering said wheels and said openings.

9. In a drop bottom car, parallel series of automatically operated interlocking drop bottom doors hinged to the car on axes extending transversely thereof.

10. In a drop bottom car, a plurality of automatically operated interlocking drop bottom doors arranged one behind another and hinged to the car, and a beam between opposite sides of the car extending longitudinally of the latter and transversely of the pivotal axes of said doors.

11. In a drop bottom car, parallel series of automatically operated interlocking drop bottom doors hinged to the car, and a beam between opposite sides of the car extending longitudinally of the latter and transversely of the pivotal axes of said doors.

12. In a drop bottom car, drop bottom doors hinged to the car and extending one behind another, a beam between opposite sides of the car extending longitudinally of the latter and transversely of the pivotal axes of said doors, and inclined means on said beam over which material may move when the car is dumped.

13. In a drop bottom car, drop bottom doors hinged to the car and extending one behind another, a beam between opposite sides of the car extending longitudinally of the latter and transversely of the pivotal axes of said doors, said beam having channels in opposite sides thereof, and fillers in said channels.

14. In a drop bottom car, a beam between opposite sides of the car and extending longitudinally thereof, and interlocking automatically operated drop bottom doors extending one behind another and hinged to the car on axes extending transversely thereof through said beam.

15. In a drop bottom car, a beam between opposite sides of the car and extending longitudinally thereof, and interlocking automatically operated drop between doors extending one behind another and hinged to the car on axes extending transversely thereof in spaced relation with said beam.

16. In a drop bottom car, automatically operated interlocking drop bottom doors extending one behind another and hinged to the car, a beam between opposite sides of the car extending longitudinally thereof and transversely of the pivotal axes of said doors, and bumpers mounted on opposite ends of the car in alinement with said beam.

17. In a drop bottom car, automatically operated interlocking drop bottom doors extending one behind another and hinged to the car, a beam between opposite sides of the car extending longitudinally thereof and transversely of the pivotal axes of said doors, and bumpers mounted on opposite ends of the car in alinement with said beam, one bumper being rigidly mounted on the car and the other bumper being yieldably mounted thereon.

18. In a drop bottom car, parallel series of interlocking automatically operated drop bottom doors hinged to the car on axes extending transversely thereof, and latch mechanism for the rear doors comprising one or more catches on each of the same and devices adapted to be engaged with and disengaged from said catches and mounted on the car to turn about an axis extending transversely thereof.

19. In a drop bottom car, a door hinged to the car on an axis extending transversely thereof, a housing within the car at one end thereof, and automatically operated latch mechanism for the door comprising a device pivotally mounted in the housing to turn about an axis extending transversely of the car and a catch on the door adapted to be engaged with and disengaged from said device.

20. In a drop bottom car, a bottom therefor including a door hinged to the car on an

axis extending transversely thereof, a housing within the car at one end thereof and having an opening, and automatically operated latch mechanism for the door comprising a device pivotally mounted in the housing to turn about an axis extending transversely of the car and a catch on the door adapted to be engaged with and disengaged from said device through the opening in said housing.

21. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, a housing in the car and having an opening in the bottom thereof, and automatically operated latch mechanism for the door including a catch mounted thereon for movement into and out of the housing through said opening and a device pivotally mounted in the housing to turn about an axis extending transversely of the car and adapted to be engaged with and disengaged from said catch.

22. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, a housing in one end of the car open at the bottom thereof and provided with an inclined wall along which material may move freely when the car is dumped, and automatically operated latch mechanism for the door including a catch thereon movable into and out of the housing through the opening in the bottom thereof and a device pivotally mounted in the housing on an axis extending transversely of the car and adapted to be engaged with and disengaged from said catch.

23. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, and automatically operated latch mechanism for the door including hook-shaped interlocking catches on the door and the car respectively adapted to be engaged with and disengaged from each other, the catch on the car being pivoted thereon to turn about an axis extending transversely of said car.

24. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, and automatically operated latch mechanism for the door including interlocking devices on the door and the car respectively adapted to be engaged with and disengaged from each other, the device on the car extending therein and being mounted on the car to turn through an opening in a wall thereof about an axis extending transversely of the car.

25. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, and automatically operated latch mechanism for the door including a catch thereon faced toward the side of the door opposite that hinged to the car, and a member on said car pivoted on and projecting upwardly from an axis extending transversely of the car and adapted to be engaged with and disengaged from said catch through raising and lowering movements of the door and swinging movement of said member under the catch.

26. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, and automatically operated latch mechanism for the door including a catch thereon and a substantially semicircular member mounted on the car to turn about an axis extending transversely thereof and having a catch adapted to be engaged with and disengaged from said first named catch.

27. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, latch mechanism for the door comprising interlocking devices on the door and the car adapted to engage with and disengage from each other, the device on the door extending upwardly within the car when the door is closed, and the device on the car being pivotally mounted thereon to turn about an axis extending transversely of said car.

28. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, latch mechanism for the door comprising interlocking devices on the door and the car adapted to engage with and disengage from each other, the device on the door extending upwardly within the car when the door is closed, and the device on the car being pivotally mounted thereon to turn about an axis extending within and transversely of said car.

29. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, latch mechanism for the door comprising interlocking devices on the door and the car adapted to be engaged with and disengaged from each other, the device on the door extending upwardly within the car when the door is closed and the device on the car being pivotally mounted thereon to turn about an axis extending transversely of said car for engagement with and disengagement from the device on the door, said device on the car having a surface extending from the device on the door to and through an opening in the end wall of the car when the two devices are in catching engagement.

30. In a drop bottom car, a bottom therefor including a door hinged to the car on an axis extending transversely thereof, and a latch mechanism for the door comprising interlocking devices on the door and the car adapted to be engaged with and disengaged from each other, the device on the door extending upward within the car when in latching position, and the device on the car being pivotally mounted thereon to turn about an axis

extending transversely of said car, said latching device on the car having an arc-shaped surface extending from the latch engaging point to an opening in the rear end of the car above said transversely extending axis.

In testimony whereof I have signed this specification.

CHARLES A. GRIFFITH.