

F. C. GREENE.

CAR LIFT.

APPLICATION FILED JULY 8, 1907.

949,228.

Patented Feb. 15, 1910.

3 SHEETS—SHEET 1.

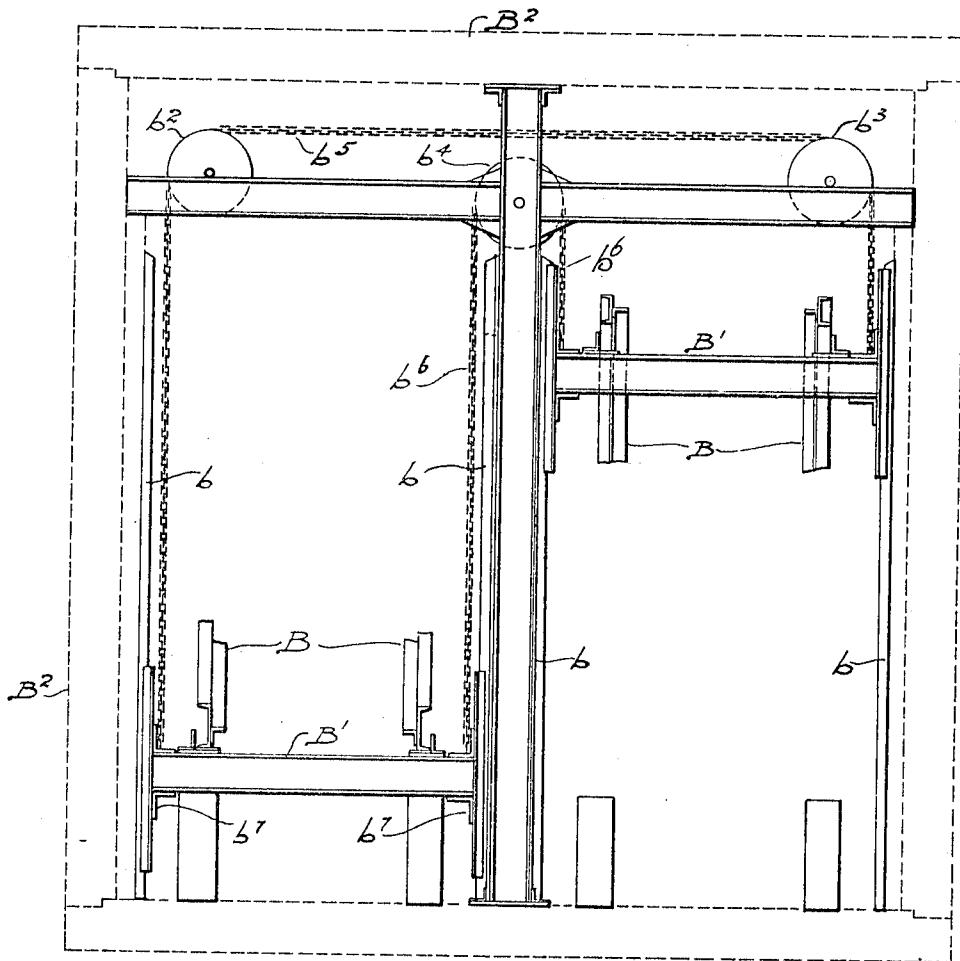


Fig 1

WITNESSES:

J. C. Shinnock
Jno. F. Oberlin

INVENTOR

Frank C. Greene

BY

J. B. Fay
ATTORNEY

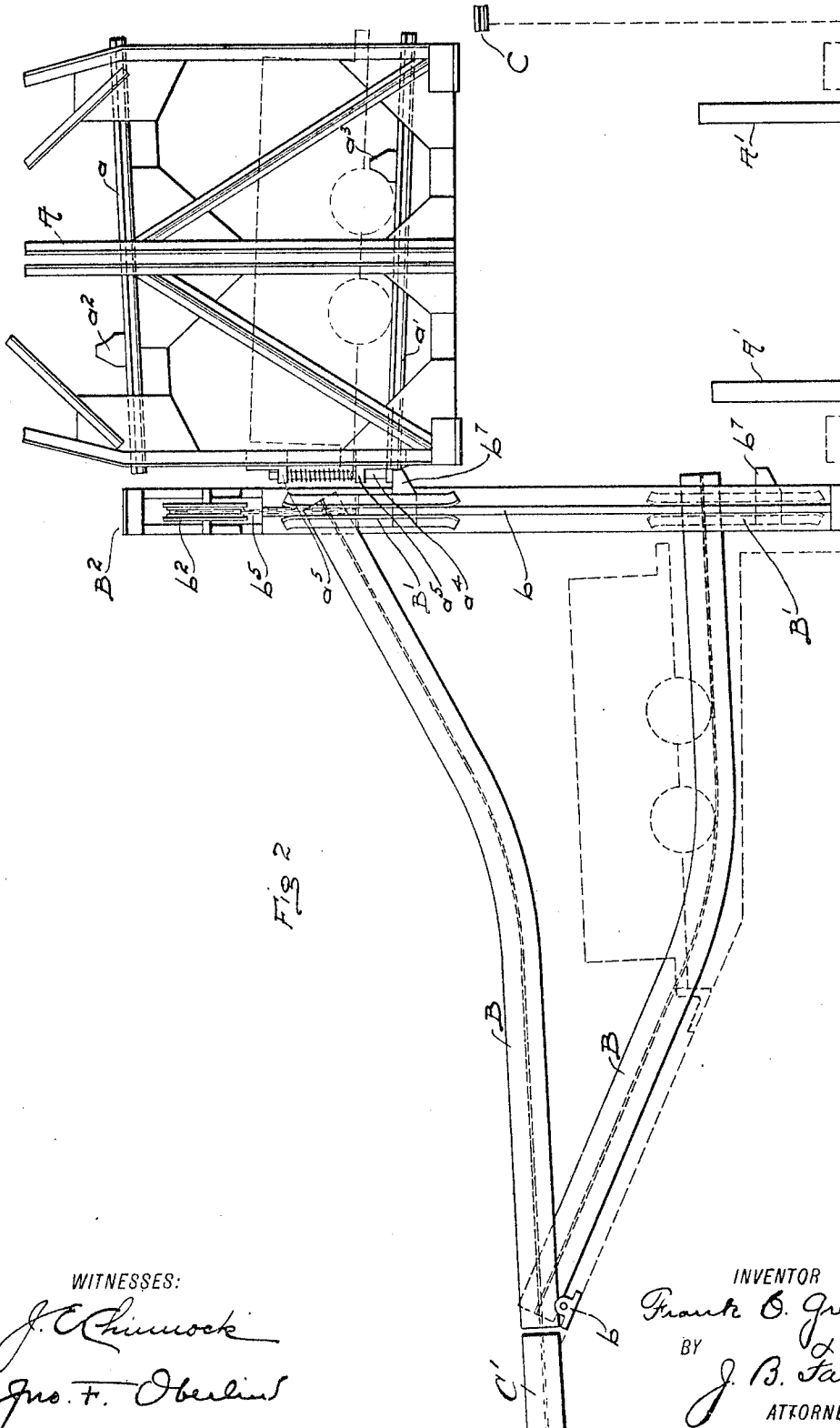
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Jno. F. Oberlin

INVENTOR

Frank C. Greene

BY

J. B. Fay
ATTORNEY

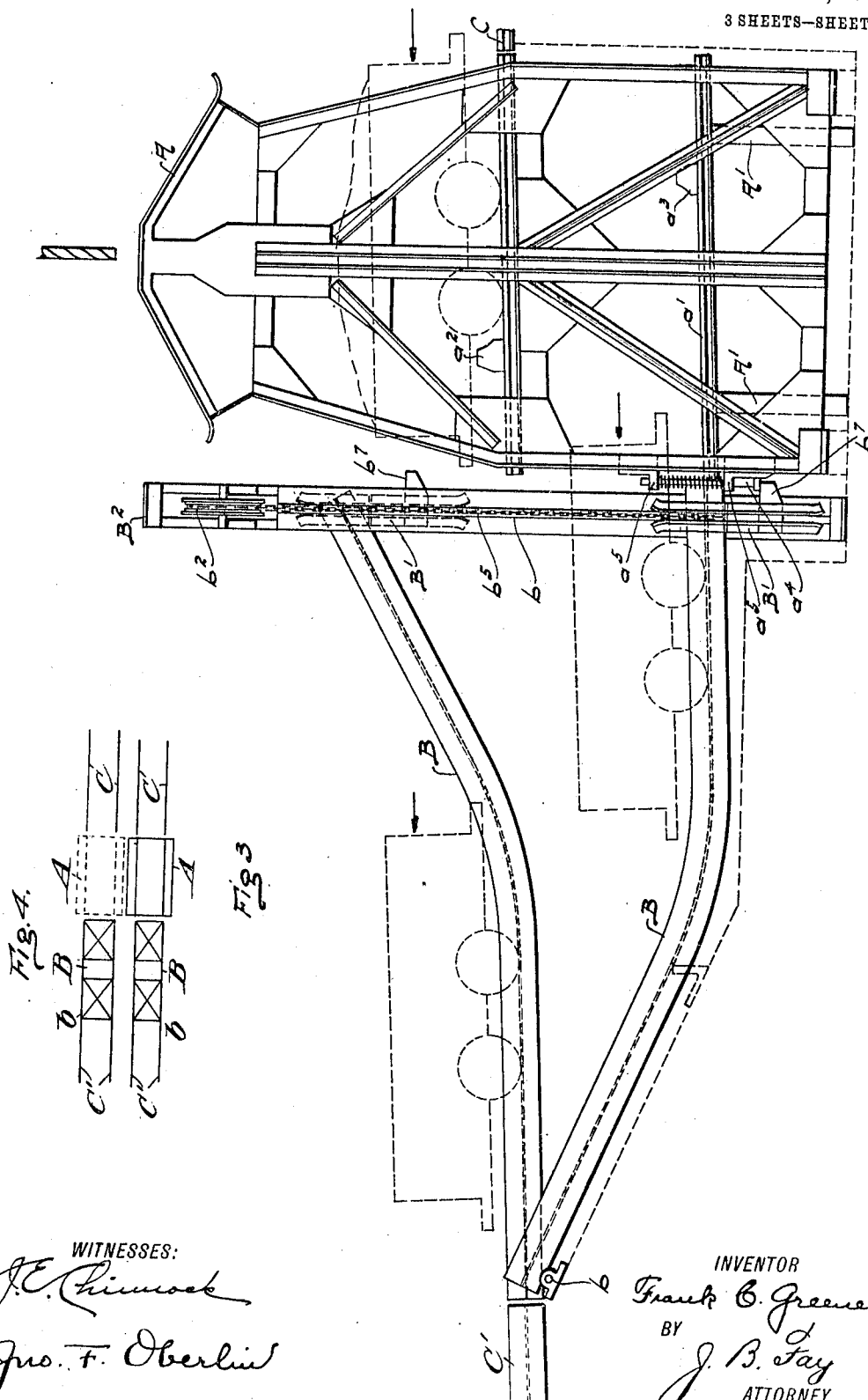
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Jno. F. Oberlin

INVENTOR
Frank C. Greene
BY
J. B. Fay
ATTORNEY

UNITED STATES PATENT OFFICE.

FRANK C. GREENE, OF CLEVELAND, OHIO.

CAR-LIFT.

949,228.

Specification of Letters Patent.

Patented Feb. 15, 1910.

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To all whom it may concern:

Be it known that I, FRANK C. GREENE, citizen of the United States, resident of Cleveland, county of Cuyahoga, State of Ohio, have invented a new and useful Improvement in Car-Lifts, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My present invention relates to mechanism for handling cars and particularly to mechanism for handling cars in coal mines and like situations.

Said invention has still more especial regard to the provision of improved means for placing the loaded cars onto the cage at the foot of the coal mine shaft and for discharging the empty cars from such cage.

The object is to make such operations practically automatic and thus secure not only an increased efficiency, but a reduction in expense, in the running of the plant.

To the accomplishment of these and related objects, said invention consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 represents a front elevation of my improved car lift as installed at the foot of a shaft; Fig. 2 represents a side elevation of the same, together with a portion of a cage operating in said shaft, such cage being shown in its initial operative position in respect to the lift mechanism; Fig. 3 is a similar side elevation, but showing such cage in its final operative position with respect to said mechanism; and Fig. 4 is a diagrammatic plan view of the arrangement of tracks at the foot of the shaft.

The type of the lifting mechanism here shown is designed especially for use in connection with shafts in which are operated two cages side by side, this being the prevailing mode of operation in all large plants,

inasmuch as the cages can then be counter-balanced and the amount of power required to raise the same thus materially decreased. While the cage shown in the annexed drawings is furthermore provided with a double deck, it will be understood that such is not the only one that can be employed in conjunction with my improved apparatus. By having two superposed decks on the cage, however, I am enabled, as will be pointed out presently, to handle the cars at the foot of the shaft much more expeditiously than would be the case if the cages were of the single deck type. As it is, the double deck cage A is obviously adapted simultaneously to receive a loaded car and to discharge an empty car. Such loaded car is designed to pass on to the upper deck *a* of the cage when in its lowermost or final position from a loaded-car track C abutting on and inclining downwardly to the shaft, such upper deck being similarly inclined and provided with stops *a*² to prevent the escape of the car therefrom.

The lower deck *a'* of the cage consists of a loosely supported track section that is adapted in the normal position of the cage to incline oppositely from such upper deck, being likewise provided with stops *a*³ for retaining the car thereon. Upon the cage A being lowered, however, into its final position, deck *a'* is received upon landing blocks *A'* so disposed and of such relative elevations as to incline the floating track section constituting such deck in the same direction as the upper deck and thus cause the empty car resting thereon to run off the same. It is with the apparatus designed to receive such empty car as it is thus discharged, that the present application is chiefly concerned. This apparatus, to which the term car lift may be specifically appropriated, consists of two track-sections B B of substantially the form shown in Figs. 2 and 3 disposed side to side with their inner ends abutting on the shaft adjacent to the paths of travel of the respective cages A therein. The outer ends of said track-sections are pivotally supported at *b* as shown, and such inner ends are so connected that depression of the one effects elevation of the other. The means whereby this re-

sult is accomplished comprise, briefly stated, two sets of vertical guide-ways b , Fig. 1, disposed adjacent to the shaft, between each of which sets is mounted a transverse bar B' .
 5 In the upper part of the frame work B^2 in which said guide-ways b are mounted, are supported three sheaves b^2 b^3 b^4 , of which one is disposed substantially over each of the non-adjacent ends of said bars, the other
 10 above the adjacent ends of the same. Passing over said first two sheaves b^2 b^3 and connecting such two non-adjacent ends of the bars B' is a cable b^5 , and similarly passing over the intermediate sheave b^4 and connecting the adjacent ends of the bars is a
 15 second cable b^6 , the length of such cables being so arranged that depression of the one bar effects the elevation of the other. The inner ends of the track sections B slidably rest upon these bars and are correspondingly actuated upon movement of the
 20 same.

Depression of the respective bars and corresponding track section ends is designed to
 25 be effected by engagement therewith of the corresponding cage A . To this end each bar B' is provided with projections b^7 , Figs. 2 and 3, extending into the shaft opening, and, on its contiguous side each cage bears
 30 a catch member a^4 resiliently mounted in brackets a^5 and adapted, on the downward movement of the cage, to contact with said projections.

Having thus described with what is
 35 thought is sufficient detail the structure of my improved car lift, the mode of operation of the same may be briefly explained. In the normal condition of the lift in which condition it appears in each of the several
 40 figures, there will always be an empty car resting upon one of the pivoted track-sections B , whereby such track-section is maintained in its depressed position and the other track-section correspondingly elevated. Assuming this to be the case, and further assuming that a cage A is descending in that
 45 shaft-way adjacent to such elevated track-section, engagement will be had by such cage with the bar B' upon which the free
 50 end of the track-section in question is supported, and such bar and track-section depressed. At the same time, the other track-section with the empty car resting upon it will be raised, such car being thereby discharged onto the regular mine track C , Fig.
 55 3, there to be taken care of in the usual fashion. As the cage A descends and finally assumes its lowermost or final operative position, the track-section with which it has been in engagement occupies a position corresponding to that previously held by the other track-section. When this position of the cage is reached, by virtue of the new position given the floating track-section constituting the lower deck a' of such cage,
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the empty car that will always be resting thereon during the regular operation of the lift is discharged onto such depressed track-section B , there to remain pending the ascent of the cage just referred to, and until the descent of the other cage reverses the operation just described.

Simultaneously with the discharge of the empty car in the manner just described from the lower deck a' of the cage A , a loaded car is being received upon the upper deck a from the loaded-car track C with which such upper deck is alined in its final operative position of the cage, Fig. 3. As the cage ascends it accordingly will carry with it this loaded
 80 car in the place of the empty car that has been left at the foot of the shaft.

From the foregoing description, it will be evident that my improved lift, in spite of its extreme simplicity of construction, is entirely automatic in operation. The connection between the two pivoted track-sections, constituting the main elements of such lift, being positive, and the power for the operation being supplied directly from the descending cage, the necessity for an extraneous source of power is obviated and consequent saving in running charge is effected.

From the preceding description of the operation of the lift it will appear that the effect of the particular track section B , upon which the empty car happens to be standing, is that of a counterweight, so far as the other track-section is concerned. Were the latter being operated alone an obvious simplification in the mechanism would be the substitution for such first-named track-section of more compact counterweight means. Similarly whether a single or double system of tracks be employed, changes may be made in the tackle connections between the two sections B , B , as special circumstances, or the preference of the constructor, may suggest.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. Mechanism of the class described, comprising oscillatorily supported track-sections located side by side and so connected that oscillation of the one effects oscillation of the other in a reverse direction.

2. Mechanism of the class described, comprising oscillatorily supported track-sections located side by side and so connected that oscillation of the one effects corresponding oscillation of the other but in a reverse direction.

3. Mechanism of the class described comprising oscillatorily supported track-sections

located side by side and so connected that oscillation of the one positively effects corresponding oscillation of the other but in a reverse direction.

5 4. Mechanism of the class described comprising oscillatorily supported track-sections located side by side and so connected that oscillation of the one positively effects corresponding oscillation of the other but in a reverse direction.

10 5. In mechanism of the class described, the combination of track-sections respectively oscillatorily supported at one end, and having their other ends connected so that depression of one such end effects the elevation of the other.

15 6. In mechanism of the class described, the combination of track-sections respectively oscillatorily supported at one end, and having their other ends connected so that depression of one such connected end positively effects the elevation of the other.

20 7. In mechanism of the class described, the combination of track-sections respectively oscillatorily supported at one end, and tackle connecting their other ends so that depression of one such end positively effects the elevation of the other.

25 8. In mechanism of the class described, the combination of two track-sections disposed side by side and respectively pivotally supported at one end, sheaves, and cables passing over said sheaves and connecting the free ends of said track-sections, said sheaves being disposed so that depression of one track-section end positively effects the elevation of the other.

30 9. In mechanism of the class described, the combination of two track-sections disposed side by side and respectively pivotally supported at one end, three sheaves disposed above the free ends of said track-sections, one substantially over each of the two non-adjacent sides, and one over the adjacent sides thereof, a cable passing over said first two sheaves and connecting such non-adjacent sides, and another cable passing over said third sheave and connecting such adjacent sides, the length of said cables being arranged so that depression of one track-section end effects the elevation of the other.

40 10. In mechanism of the class described, the combination of vertical guideways, a transverse bar mounted between said guideways, counterweight means normally positioning said bar, and a track-section pivotally supported at one end and having its free end slidably resting upon said bar.

45 11. In mechanism of the class described, the combination of two laterally adjacent sets of vertical guideways, a transverse bar mounted between each of said sets of guideways, two track-sections respectively pivotally supported at one end and having their free ends slidably resting upon said bars re-

spectively, sheaves, and cables passing over said sheaves and connecting said bars, said sheaves being disposed so that depression of one bar effects the elevation of the other.

12. A car lift for a shaft comprising oscillatorily supported track-sections located with their free ends contiguous to such shaft, said track-sections being so connected that oscillation of the one effects oscillation of the other in a reverse direction.

13. A car lift for a shaft comprising oscillatorily supported track-sections located side by side with their free ends contiguous to such shaft, said track-sections being so connected that oscillation of the one effects oscillation of the other in a reverse direction.

14. A car lift for a shaft comprising oscillatorily supported track-sections located with their free ends contiguous to such shaft, and positive connections between said track-sections, whereby oscillation of the one effects oscillation of the other in a reverse direction.

15. A car lift for a shaft comprising oscillatorily supported track-sections located side by side with their free ends contiguous to such shaft, and positive connection between said track-sections, whereby oscillation of the one effects oscillation of the other in a reverse direction.

16. In mechanism of the class described, the combination with a cage adapted to travel in a shaft, of an oscillatorily supported track-section located with its free end contiguous to such shaft, and means normally elevating such end, said cage being adapted to depress such end.

17. In mechanism of the class described, the combination with a cage adapted to travel in a shaft, of an oscillatorily supported track-section located with its free end contiguous to such shaft, and means normally elevating such end, said cage being adapted to depress such end, and thereupon discharge a car onto said track-section.

18. In mechanism of the class described, the combination with a cage adapted to travel in a shaft, of a track-section pivotally supported at one end and having its other free end disposed adjacent to such shaft, and counterweight means normally elevating such free end, said cage being adapted to engage such end to depress the same and thereupon to discharge a car onto said track-section.

19. In mechanism of the class described, the combination of track-sections respectively oscillatorily supported at one end, the other ends of said track-sections being so connected that depression of one effects elevation of the other, and cages movable contiguously to such connected track-section ends, respectively, and respectively adapted to depress such ends.

20. In mechanism of the class described, the combination with two cages adapted to

travel in a shaft, of two track-sections respectively pivotally supported at one end and having their free ends disposed adjacent to such shaft and to the paths of travel of
 5 said cages respectively, and means connecting such free ends whereby depression of one end effects elevation of the other, said cages being respectively adapted to thus depress the corresponding track-section end
 10 and thereupon to discharge a car onto the same.

21. In mechanism of the class described, the combination with two cages adapted to travel in a shaft, of two track-sections respectively pivotally supported at one end and having their free ends disposed adjacent to such shaft and to the paths of travel of
 15 said cages respectively, and means connecting such free ends whereby depression of one end effects elevation of the other, said cages being respectively adapted positively to thus depress the corresponding track-section end and thereupon to discharge a car
 20 onto the same.

22. In mechanism of the class described, the combination with two cages adapted to travel in a shaft, of two track-sections respectively pivotally supported at one end and having their free ends disposed adjacent to such shaft and to the paths of travel of
 30 said cages respectively, a sheave, and a cable passing over said sheave and connecting the free ends of said track-sections, said sheave being so disposed that depression of one such
 35 end effects the elevation of the other, said cages being respectively adapted to thus depress the corresponding track-section end and thereupon to discharge a car onto the same.

23. In mechanism of the class described, the combination with two cages adapted to travel in a shaft, of two track-sections respectively pivotally supported at one end and having their free ends disposed adjacent to such shaft and to the paths of travel of
 45 said cages respectively, three sheaves disposed above the free ends of said track-sections, one substantially over each of the two non-adjacent sides and one over the adjacent
 50 sides, thereof, a cable passing over said first two sheaves and connecting such non-adjacent sides and another cable passing over said third sheave and connecting such adjacent sides, the lengths of said cables being
 55 arranged so that depression of one track-section end effects the elevation of the other, said cages being respectively adapted to thus depress the corresponding track-section end and thereupon to discharge a car onto the same.
 60

24. In mechanism of the class described, the combination with two cages adapted to travel in a shaft, two sets of vertical guideways disposed adjacent to such shaft and

to the paths of travel of said cages respectively, a transverse bar mounted between
 65 each of said sets of guideways, two track-sections respectively pivotally supported at one end and having their free ends slidably resting upon said bars respectively, sheaves,
 70 and cables passing over said sheaves and connecting said bars, said sheaves being so disposed that depression of one bar effects the elevation of the other, said cages being
 75 respectively adapted to thus depress the corresponding track-section end and thereupon to discharge a car onto the same.

25. In car-handling mechanism for use in connection with a shaft, the combination of two tracks, for the discharge of loaded cars,
 80 abutting on one side of such shaft and inclining downwardly thereto; two track-sections, for the reception of empty cars, abutting on the opposite side of such shaft and adapted to incline downwardly therefrom,
 85 said track-sections being pivoted at their outer ends and having their inner free ends connected so that the depression of one effects the elevation of the other; and two double-deck cages adapted to travel in such
 90 shaft, each of said cages being adapted to receive a loaded car from one of said tracks onto its upper deck and to depress the corresponding track-section and discharge thereon an empty car from its lower deck.
 95

26. In car-handling mechanism for use in connection with a shaft, the combination of two tracks, for the discharge of loaded cars, abutting on one side of such shaft and inclining downwardly thereto; two track-sections,
 100 for the reception of empty cars, abutting on the opposite side of such shaft and adapted to incline downwardly therefrom, said track-sections being pivoted at their outer ends; a sheave; cables passing over
 105 said sheave and connecting the inner free ends of said track-sections, said sheave being so disposed that depression of one such end effects the elevation of the other; and two double-deck cages adapted to travel in
 110 such shaft, each of said cages being adapted to receive a loaded car from one of said tracks onto its upper deck and to depress the corresponding track-section and discharge thereon an empty car from its lower
 115 deck.

27. In car-handling mechanism for use in connection with a shaft, the combination of two tracks, for the discharge of loaded cars, abutting on one side of said shaft and inclining downwardly thereto; two sets of vertical guideways disposed adjacent to the opposite side of such shaft; a transverse bar mounted between each of said sets of guideways; two track-sections for the reception
 120 of empty cars pivotally supported at their outer ends and having their inner free ends slidably resting upon said bars respectively;

sheaves; cables passing over said sheaves, and connecting said bars, said sheaves being so disposed that depression of one bar effects the elevation of the other; and two
5 double-deck cages adapted to travel in such shaft, each of said cages being adapted to receive a loaded car from one of said tracks onto its upper deck and to depress the corre- sponding track-section and discharge there-
on an empty car from its lower deck. 10
Signed by me this 5th day of July, 1907.
FRANK C. GREENE.
Attested by:
O. V. GREENE,
JNO. F. OBERLIN.