Dec. 8, 1931. H. H. FRENCH 1,835,859

SYSTEM OF TRANSFERRING FREIGHT

Filed Aug. 31, 1928 4 Sheets-Sheet 1

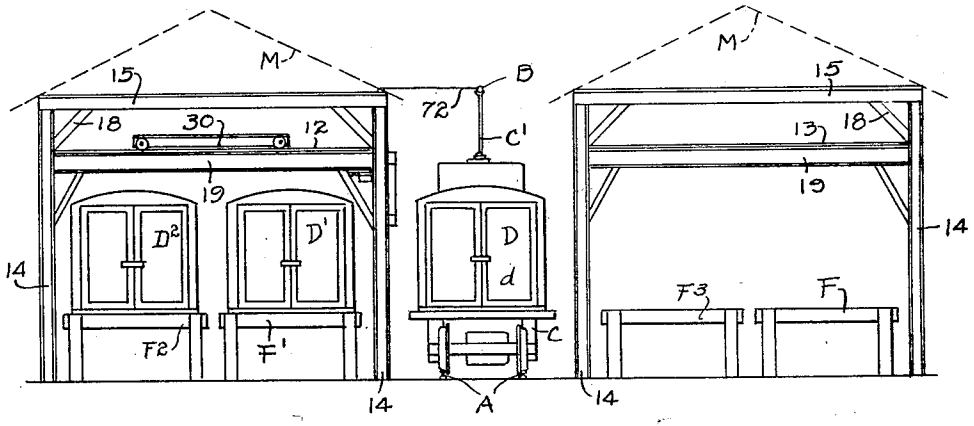


FIG.-1

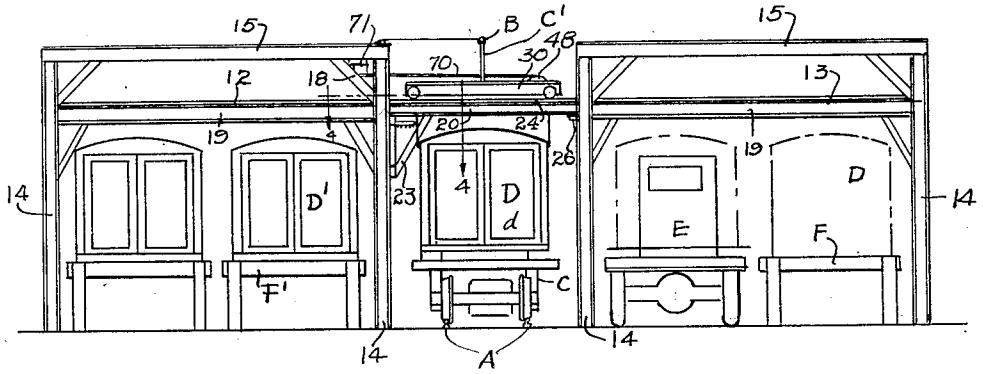


FIG.-2

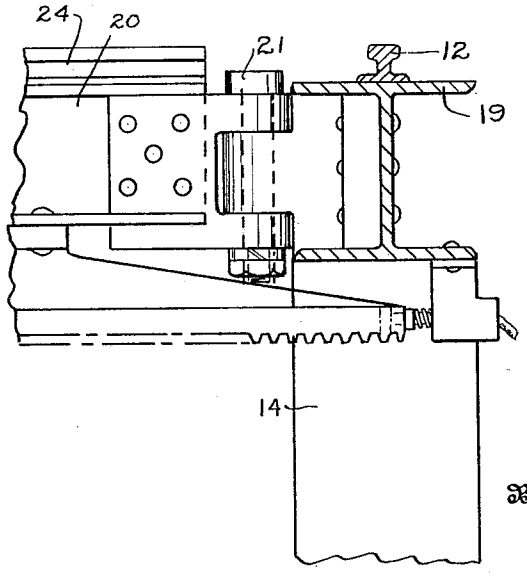


FIG.-7

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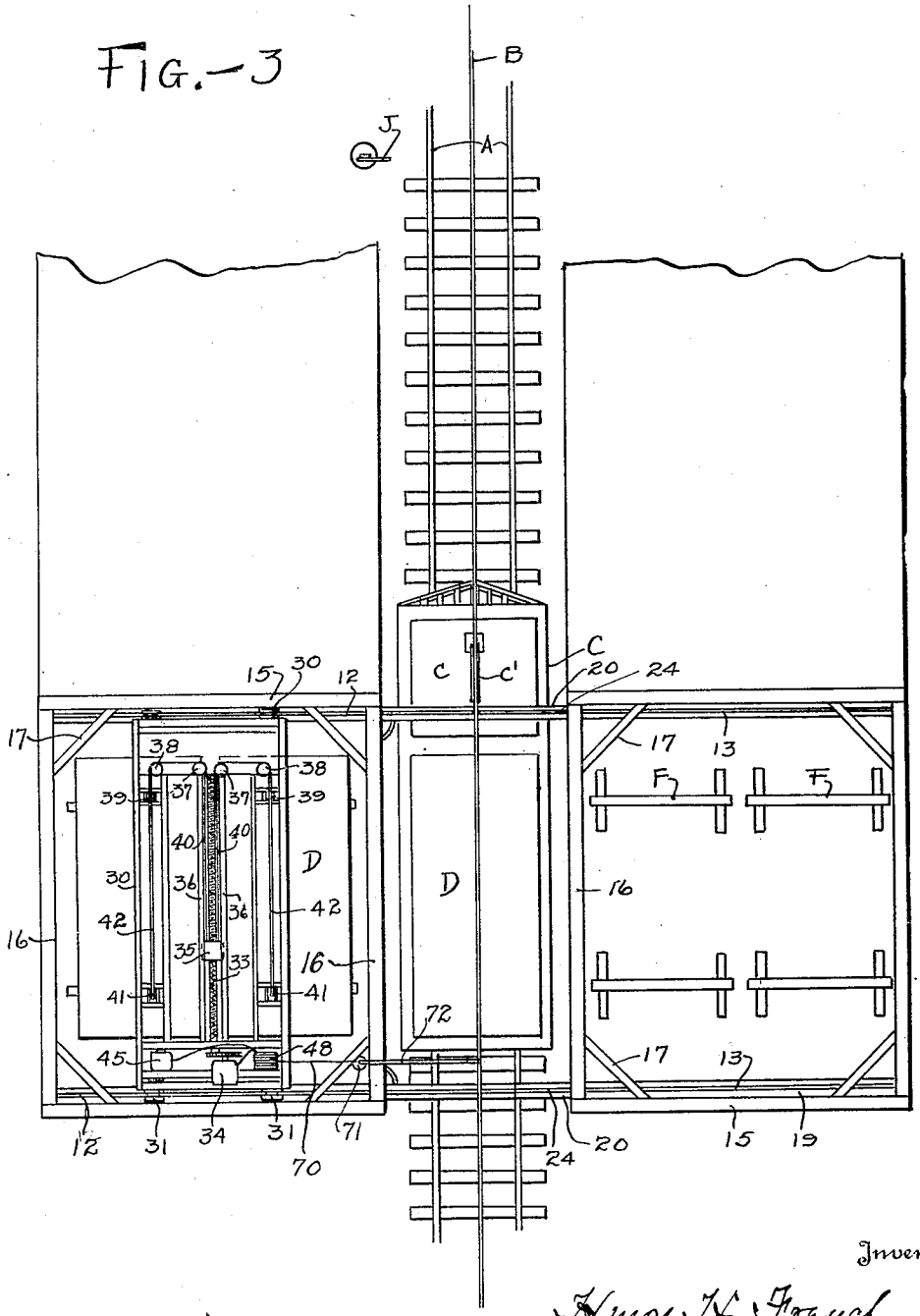
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Dec. 8, 1931. H. H. FRENCH 1,835,859

SYSTEM OF TRANSFERRING FREIGHT

Filed Aug. 31, 1928 4 Sheets-Sheet 2

FIG.-3



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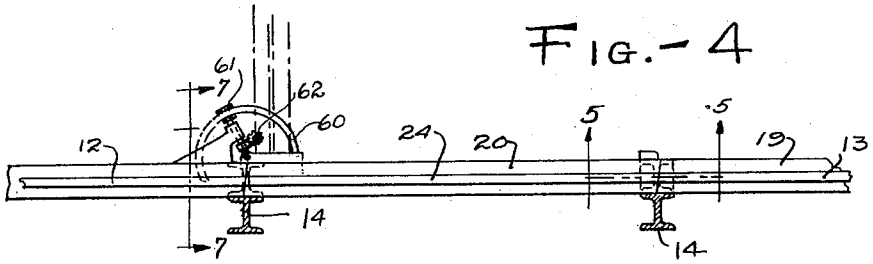
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Dec. 8, 1931. H. H. FRENCH 1,835,859

SYSTEM OF TRANSFERRING FREIGHT

Filed Aug. 31, 1928 4 Sheets-Sheet 3

FIG.-4



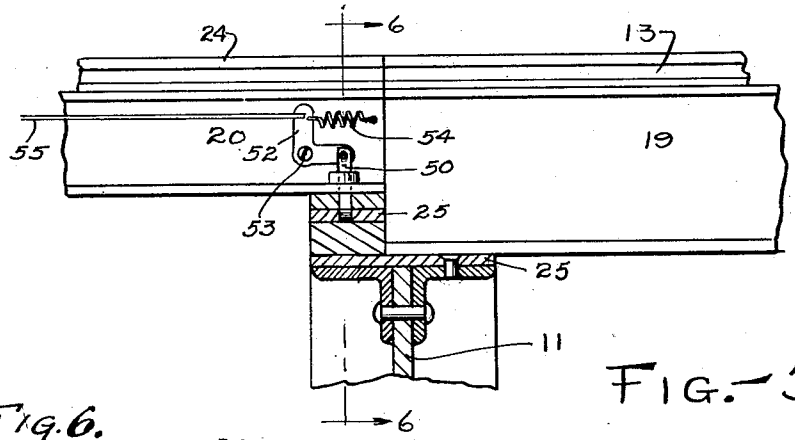
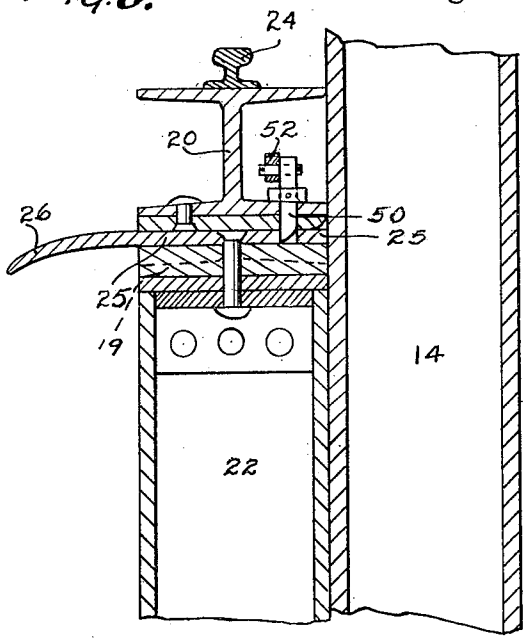


FIG.-5

FIG.6.



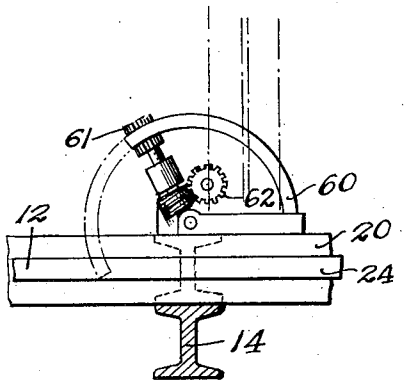


FIG.11.

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SYSTEM OF TRANSFERRING FREIGHT

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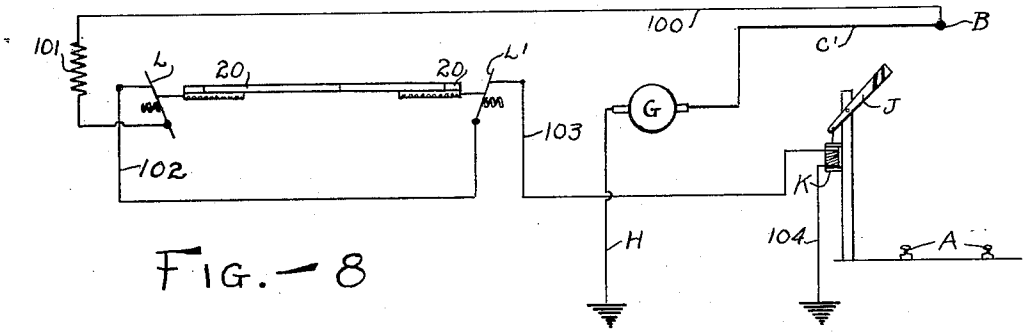


FIG. — 8

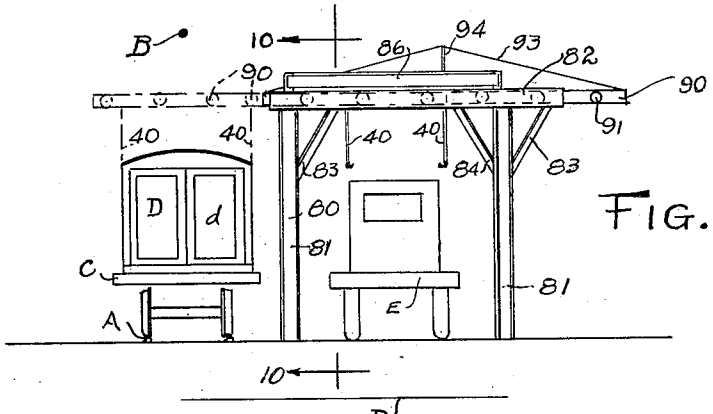


FIG. — 9

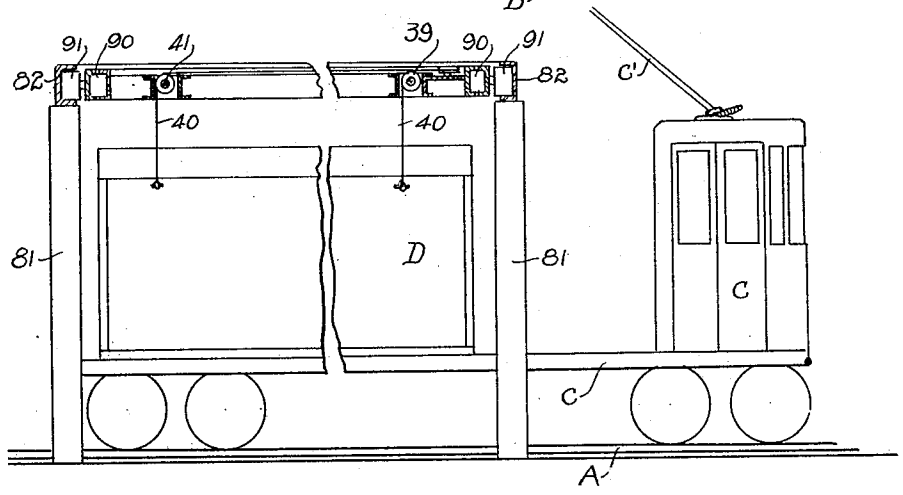


FIG. — 10

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Patented Dec. 8, 1931 1,835,859

UNITED STATES PATENT OFFICE

HENRY H. FRENCH, OF DARIEN, CONNECTICUT, ASSIGNOR TO MOTOR TERMINALS COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

SYSTEM OF TRANSFERRING FREIGHT

Application filed August 31, 1928. Serial No. 303,304.

This invention relates to a freight handling system wherein removable containers are provided which are adapted to be transported by a vehicle to a transfer point and there removed with the contained load from the vehicle. As such containers to be efficient must be of considerable size, some sort of hoisting and transporting mechanism is essential in removing the loaded container. It is an object of this invention to provide such hoisting and transporting mechanism in a very simple and efficient form, suitable for installation at comparatively small expense.

My invention is more particularly concerned with the transfer of containers to and from flat cars of electric interurban lines, and when so used I propose to operate the hoisting and transferring mechanism by current derived from the trolley wire or feed line for the electric car. The invention contemplates the installation of a superstructure located adjacent the side of the railway track and having an overhead trackway for a traveling crane and means whereby the same may be supported over the railway track and beneath the trolley wire.

Where it is desired to employ a very simple and inexpensive superstructure, the same may be arranged at one side only of the track and the hoist arranged to be projected therefrom as a cantilever over the electric railway beneath the trolley wire. For a more elaborate installation, I prefer to mount superstructures opposite each other on the two sides of the trackway and provide a movable bridge construction which is normally out of the way of the trolley pole of the electric car but may be moved transversely of the trackway to form a bridge from one superstructure to the other whenever it is desired to locate the crane over the electric trackway.

Normally the crane stands on one side or the other of the railway track in idle position and the space is clear for the electric train to pass. When however, it is desired to raise a body from a car, the car is stopped adjacent the crane support, and the crane shoved over or the bridge extended transversely beneath the trolley wire, and the crane moved onto it; then the body is raised by this crane and transported to one side of the electric trackway and deposited, or a reverse operation may place a body on the car. In either case, the power for raising and transporting may be derived from the trolley wire or feed wire itself, suitably connected to an electric motor or motors on the crane.

In case two superstructures are employed, these are located directly opposite each other with a single electric railway track extending between them. Each of these structures carries a crane overhead trackway at an elevation somewhat higher than the top of a removable container on the electric freight car but lower than the trolley wire. Mounted on one of the crane structures, are a pair of bridge members adapted to normally clear the trolley pole, but adapted to be moved transversely above the railway track and rest at their opposite ends on the opposite structure, thus providing a through crane trackway from one side to the other, whereby the crane may be located directly above the electric car or at either side thereof as desired.

In the construction having the movable bridge members, I prefer to employ two of these members in the form of cantilever beams hinged at their ends on vertical pivots to one of the superstructures, and there being suitable means for swinging such beams on their pivots. The other superstructure in this case is provided with seats to receive the ends of the beams and suitable latches to lock them in place.

To eliminate the hazard of the trolley pole striking the projecting crane or one of the bridge beams, I prefer to couple my installation with either the signal of the electric railway or with a special signal so arranged that the signal shows danger whenever the bridge or crane is projected transversely of the electric trackway.

My invention includes a system of transferring freight as above outlined and also the apparatus referred to. Such system and apparatus are hereinafter more fully described in connection with the drawings, which illustrate two embodiments thereof, and the essential novel features are summarized in the claims.

In the drawings, Fig. 1 is an elevation transversely of an electric railway track, of the two superstructure construction, showing the relationship where the crane is idle and the passageway open for the travel of the trolley car; Fig. 2 is a similar view showing the trolley car standing and the crane in an active position above it; Fig. 3 is a plan of the installation shown in Figs. 1 and 2; Fig. 4 is a detail in plan illustrating the swinging bridge which may span the railway car space and continue the crane trackway from one side structure to the other, this view being in the nature of a horizontal section on the line 4—4 on Fig. 2; Fig. 5 is an enlarged vertical cross section adjacent one end of the bridge structure when in its active position, showing the support for the free end of the bridge taken on line 5—5 of Fig. 4; Fig. 6 is a vertical cross section at right angles to Fig. 5 as indicated by the line 6—6 on Fig. 5; Fig. 7 is a vertical cross section adjacent the hinged end of the bridge beam as indicated by the line 7—7 on Fig. 4; Fig. 8 is a diagram illustrating the signal circuits automatically controlled by the bridge beams; Fig. 9 is an end elevation of a simple installation located at one side only of the trackway; Fig. 10 is a vertical section thereof on a plane indicated by the line 10—10 on Fig. 9 showing the hoist in position to raise a removable body from the electric flat car; Fig. 11 is an enlarged view in plan of the gearing shown in Fig. 4 for swinging the bridge.

As shown in Figs. 1, 2, 3, 9 and 10, A represents an electric railway track, B the suspended trolley wire therefor, and C an electric flat car adapted to travel on such rails by electric power. This flat car may have a cab c as shown in Figs. 3 and 10, and a trolley pole c'. D indicates the removable body, which is shown as mounted on the flat car in the rear of the cab. This body is preferably of such size that it may also readily fit an automobile truck, so that the body may be interchanged as desired between the truck and flat car. It is provided with suitable doors d, and side hooks or other means for attachment of raising cables.

I will first describe the construction illustrated in Figs. 1 to 7 where the superstructure is mounted in duplicate at opposite sides of a trackway. Thus Figs. 1, 2 and 3, show two opposed structures carrying, at an elevation somewhat less than that of the trolley wire, pairs of aligned crane trackways 12 and 13, and one of these structures carries a pair of swinging bridges 20 supporting crane track rails 24 which may thus be caused to align with the rails 12 and 13 and connect them. 30 indicates a suitable traveling crane which may be operated on the crane trackway thus provided from one structure to the other and thus placed over the trolley car and beneath the trolley wire.

More specifically, the crane structures shown in Figs. 1, 2 and 3 comprise four upright corner posts 14 shown as connected by transverse members 15 and 16 and suitable diagonal braces 17 and 18. Likewise there are horizontal beams 19 carried by the corner posts and suitably braced to support the rails 12 or 13.

The bridge which serves to connect the crane trackway 12 with the trackway 13 whenever desired, preferably comprises two beams 20 hinged on vertical pivots 21 (Fig. 7) adjacent the front and rear inner corner posts 14 of one of the side structures, as illustrated in Fig. 3. Suitable diagonal struts 23 and vertical hinges at the lower ends thereof brace these cantilevered beams. Each beam carries a rail 24 adapted to align with the stationary rails 12 and 13 of the superstructures.

Normally these bridge beams stand substantially parallel with the trackway A and do not interfere with the operation of the trolley car. However, whenever it is desired to move a body to or from a car standing between the side structures, the bridge beams are swung transversely of the trackway A, and in that position their free ends rest on supports carried by the opposite side structure.

As shown in Figs 5 and 6, an upright post 22 adjacent the corner post 14 of the side structure opposite the one to which the bridge beams are pivoted and which carries the horizontal beam supporting the trackway 13, has a downwardly stepped seat 25 adapted to support the shallower bridge beam 20 with its rail 24 aligned with the rails 12 and 13. To allow the bridge beam to swing easily into place, notwithstanding its sagging when supported only by its pivot, I extend the top plate 25 of the seat referred to beyond the post 22 in the direction of the railroad trackway and curve such extension downwardly as shown at 26 in Fig. 6. Accordingly, when the bridge is being swung crosswise, its free end will strike somewhere on the downwardly extending face 26 which will cam the end up so that it may readily come into its final position as shown in Fig. 5.

It is desirable to provide latches to lock the bridge beams in their active position. Such a lock is indicated at 50 in Figs. 5 and 6, and comprises a vertical bolt extending downwardly through the bridge beam 20 and carried by a lever 52 pivoted to the beam 20 at 53. A spring 54 acts on the lever 52 in such a manner as to give the bolt a downward pressure. The lower end of the bolt is beveled as shown in Fig. 6 and the downward extension 26 of the seat 25 engages the latch so that when the bridge beam is swung into position, it will cam the latch upwardly, after which the latch will spring downwardly into locking position as shown in Figs. 5 and 6. A cord or rod 55 attached to the lever 52 fur-

nishes means for pulling the latch upwardly manually to release the bridge beam whenever desired. The cord or rod may extend along the bridge beam 20 to a point near its pivot and by means of a pulley or bell crank, continued downward to a point where it may easily be grasped by the operator of the swinging mechanism as hereinafter described.

Any suitable mechanism may be provided to swing the bridge beams. Thus I may for example, mount on the bridge beam concentric of the pivot of each of them a segment 60 (Fig. 4) which may be engaged by the pinion 61 or a train of gearing leading from a suitable operating crank, not shown. I have shown the pinion mounted on a shaft radial of the rack 60, which shaft carries a worm wheel with which meshes a worm 62 on a vertical shaft to which the crank may be attached.

The traveling crane for the superstructure described may be of any desired type but it is preferable that it should be quite low so that it may readily ride in the space above the top of the trolley car and below the trolley wire. To this end I prefer to employ the crane illustrated in Patents Nos. 1,598,273 and 1,657,670 of B. F. Fitch.

Such crane is shown herein in Fig. 3, and comprises briefly a low height frame 30 having wheels 31 tracking on the trackways 12 and 13. Mounted longitudinally of the hoist frame is a long screw 33 driven through suitable gearing by a motor 34. On this screw is a nut 35 slidably guided and prevented from rotating by longitudinal bars 36 of the frame. Connected with the nut are four cables 40 which lead parallel with the screw to its far end, then pass laterally about sheaves 37 and then forwardly about sheaves 38. Two of these cables (one on each side) then pass downwardly over sheaves 39 adjacent the sheaves 38 while the other two cables, as indicated at 42, pass horizontally to a point near the other end of the frame thence downwardly over sheaves 41.

The hoist described provides four depending load cables all operated by the same motor. Suitable load hooks or other attaching devices on the ends of the four cables are adapted to engage the body to raise or lower it as desired. Another motor 45 on the crane (or gearing and a clutch connected with the motor 34) are adapted to rotate some of the wheels 31 to progress the crane as desired. The motors are preferably grounded to the hoist structure. They are supplied by an intake conductor which after leading through a control switch is wound up on a spring reel 48, Fig. 3. From this reel an electric cable 70 leads to a suitable intake connection 71 carried by the superstructure adjacent its top, this intake connection being permanently connected with the main feed wire or with the trolley wire itself as indicated at 72. Thus the current for operating the hoist is derived from the trolley circuit.

I will now describe the simpler installation illustrated in Figs. 9 and 10. In this case I provide a single superstructure 80 located at one side of the trackway A and of sufficient size so that an automobile truck carrying a movable body may be driven through it. This superstructure has vertical posts 81 carrying hoist trackways which are shown as inwardly facing channel beams 82. These channel beams are suitably supported by diagonal struts as 83, 84 and 85 and by suitable cross bracing above them indicated at 86.

The hoist for the structure just described may have longitudinal side beams 90 each carrying a number of rollers 91 tracking in the channels of the beams 82. The frame may be trussed on its upper side as indicated by the truss 93, 94, Fig. 9. The elevating mechanism of this hoist may be identical with that heretofore described with reference to Fig. 3.

In the installation being described the hoist frame may if desired be projected at the side of the superstructure as indicated in broken lines in Fig. 9 beneath the trolley wire B and above the body D on the flat car, and in this position the depending cables 40 are in position to engage the body D on the flat car. The hoist mechanism may then raise this body free from the car and the hoist frame with its load may be trolleyed within the superstructure 80 and deposited on a suitable support, as for instance, the automobile truck E.

It is to be understood that in the construction just described, the hoist trackway is of sufficient length and the hoist frame is sufficiently rigid to effectively support the hoist with its load whether the frame be over the superstructure or partially projecting to overhang the railroad track. The travel of the hoist may be effected by an electric motor as already described with reference to Fig. 3.

In the operation of my apparatus, let us suppose that a trolley car arrives at the station bringing a loaded body D, such car stopping at the side of the single structure of Figs. 9 and 10, or between the two structures of Figs. 1, 2 and 3, and that the trolley pole has been pulled down out of the way. In the two structure arrangement the bridges 20 are then swung transversely to form a continuous hoist trackway over the railroad track. Now, in each construction the traversing motor of the hoist is energized and the hoist frame brought over the trolley car.

Now the raising cables are lowered by the operation of their motor and attached to the body D, and then later raised clear of the railway car. This body D is now transported laterally, by operation of the trolleying motor of the hoist, and may be deposited on an automobile truck as indicated at E in Figs. 2 or 9, or deposited on some suitable support,

as shown at F, F1, F2 or F3 in Fig. 1. Such supports are preferably portable "horses" and may be placed wherever desired within either side structure.

In the case of the two structure installation if another automobile loaded or empty is ready for the flat car, as for instance the body D1 standing on the support F1 in Figs. 1 and 2, the crane is simply driven into position above such body and then the latter slightly raised and transported to a position above the flat car and deposited thereon.

The double structure has a further advantage in that it may be so operated as to provide for several bodies side by side on either side of the electric railway. In this case, any automobile body which is between one it is desired to shift and the electric car may be transported by the hoist to the other superstructure and deposited out of the way. Thus in Fig. 1, the automobile body D may be deposited on the support F and the body D1 shown standing on the support F1 supported across the track and stood on the support F3, then the body D2 on the support F2 may be trolleyed over and placed on the flat car.

To prevent possible accident in case the trolley car should run past the superstructure when a bridge member is in transverse position or the hoist projected in the path of the trolley pole, I provide a connection to a signal system along the railway track as illustrated in Fig. 8. In this diagram A indicates the railroad track, B the trolley wire, C1 the trolley pole, G the motor of the car connected with the trolley pole and H a ground connection therefrom. J designates a suitable signal operated by a magnet K or by a motor (not shown) controlled by such magnet. L and L1 are switches operated automatically by the swinging gates or the projecting crane of Fig. 9 to control the circuit to the magnet K and thus the signal J. As shown in this diagram, a conductor 100 leads from the trolley wire or feed line through a resistance 101 to the switch L from which a conductor 102 leads to the switch L1. From this switch a conductor 103 leads to the magnet K and from the latter magnet a conductor 104 leads to the ground. Normally the two bridge beams 20 or the switches L and L1 cause this circuit to be closed and the energized magnet K holds the signal in safety position as illustrated in Fig. 8. If either gate however is swung crosswise, the spring L or L1 operates the corresponding switch to open it, thus breaking the circuit to the magnet K and the signal goes to danger as by its own counterweight.

It is to be understood that a similar signal system may be employed with the projecting hoist of Fig. 9, only one switch being necessary in that case in place of the two switches for the two bridge members. Also the signal J shown as a semaphore may if desired be a light. In place of a single signal, it may be part of the regular signal system of the railway and operate on both distance and home signals.

My system is not only very simple in its apparatus, but it is operated very economically by using the trolley current. It is well adapted for installation in locations where the cost of heavy swinging cranes would be prohibitive. By suitably boxing the motors the structure may if desired remain exposed to the weather, or the crane structures may be roofed, as indicated at M in Fig. 1 to better protect the mechanism of the crane. In any case, no regular attendant is necessary, the trolley car attendants simply swing the bridges and operate the trolley hoist as necessary to remove or place a container. Such containers may be transferred directly between the trolley car and a waiting truck or may be temporarily stored, allowing the trolley car to proceed. Should either bridge member or the projecting hoist be inadvertently moved across the path of the trolley pole before the trolley car arrives, notice thereof is given to the motorman of the trolley car by the signal circuit described. If desired, the bridges and projecting hoist may be locked in idle position with suitable locks to which only the car attendants would have keys.

I claim:—

1. The means for transferring freight to or from an electric car comprising a pair of elevated structure opposite each other on two sides of an electric railway track, and a pair of swinging bridge trackways individually and pivotally carried by one of such elevated structures and adapted to span the railway truck beneath the trolley wire and be supported at the free end by the other structure, and said trackways being adapted to support a traveling hoist on the elevated structure which may move by means of said bridge from one structure to the other.

2. In combination, a railway track, a trolley wire above it, elevated structures on opposite sides thereof, an overhead crane runway on such structures extending transversely of the track lower than the trolley wire, there being a section of the runway consisting of a pair of bridges individually and pivotally mounted on one of the structures so as to be movable with reference to the remaining part of the runway, means on the other structure for supporting the free ends of said bridges, mechanism for swinging the bridges on their pivots to cause this runway section to span the railway track or clear the space above the track, and a trolley hoist movable transversely on said runway.

3. The combination of two supporting structures spaced apart, each carrying a pair of parallel horizontal rails, the rails of one structure substantially aligning with those

of the other, two bridge members movably carried by one of the structures and each carrying a rail along its top adapted to be positioned to form an operating connection between corresponding rails of the two structures or to be positioned to maintain a gap between such rails and a traveling crane having four wheels adapted to rest simultaneously on the two bridge members.

4. The combination of two supporting structures spaced apart, each having a pair of rails, a pair of bridge members hinged to one of the supporting structures and adapted to form a connection between said rails, seats carried by the other supporting structure adapted to support the free ends of said bridge members, mechanism for swinging the bridge members, and a traveling crane adapted to rest simultaneously on the two bridge members.

5. The combination of two supporting structures spaced apart, each having a pair of rails, a pair of bridge members hinged to one of the supporting structures and adapted to form a connection between said rails, and seats carried by the other supporting structure adapted to support the free ends of said bridge members, each seat being formed with an inclined guide leading thereto adapted to receive and raise the bridge member as it swings into place.

6. The combination with a railway track, of a superstructure alongside thereof, trolley hoist mechanism having a movable support carried by the superstructure and adapted to be positioned over the railway track or clear thereof, a signal adjacent the railway track, and means whereby the movement of said support into position over the track causes the signal to go to danger.

7. The combination of a pair of superstructures adjacent each other but spaced apart, an intermediate support adapted to extend transversely and form a continuation of crane trackways on the two superstructures, means whereby the movement of said intermediate support toward transverse position actuates a danger signal, and a traveling hoist mechanism adapted to operate on the crane trackway.

8. The combination with a railway track a superstructure adjacent the side thereof, a pair of crane rails carried by the superstructure, a pair of bridge members pivotally carried by the superstructure and adapted to stand substantially parallel with the track or extend crosswise thereof to form a continuation of the crane trackway, a signal adjacent the railway track, means whereby the moving of either bridge member to transverse position automatically causes the signal to indicate danger, and a traveling crane adapted to rest simultaneously on the two bridge members.

9. An apparatus for transferring freight to and from an electric car comprising a railway track having a trolley wire above it, an elevated structure alongside of the railway track, a movable member carried by the elevated structure and adapted to project laterally above the top of the railway car and below the trolley wire, mechanism for moving said member into and out of position beneath the trolley wire, a hoist shiftable laterally on such movable member, an automobile truck having a demountable body and means for transporting the body laterally by such hoist between the car and truck.

10. The means for transporting freight to or from an electric car comprising elevated structures opposite each other on two sides of an electric railway track having a trolley wire above it, and a movable bridge trackway carried by one of such elevated structures and adapted to rest also on the other structure and span the railway track beneath the trolley wire or to be moved laterally to clear the space beneath the trolley wire, and mechanism for so moving said bridge trackway whereby a traveling hoist on the elevated structure may travel by means of said bridge from one structure to the other.

11. An apparatus of transferring freight to or from an electric car carrying a removable body comprising elevated structures opposite each other on two sides of an electric railway track, a movable bridge trackway carried by such elevated structure, mechanism for moving said bridge to cause it to span the railway track beneath the trolley wire or to be moved to clear the trolley pole, an electric traveling hoist on the elevated structure, adapted to travel by means of said bridge from one structure to the other, means connecting the motor of such hoist with the trolley circuit.

12. The combination of an electric railway track having a trolley wire disposed above it, an electric car on the track carrying a removable body, an elevated structure adjacent the track having a transverse crane runway, a movable extension of the runway, mechanism for moving said extension to cause it to extend across the railway track beneath the trolley wire and above said body or to be withdrawn to clear such space, a trolley hoist on the said crane runway adapted to ride on said extension beneath the trolley wire, and means to connect the raising mechanism of the hoist with said removable body, whereby the same may be raised and transported from the car on the trackway.

In testimony whereof, I hereunto affix my signature.

HENRY H. FRENCH.