June 24, 1930. B. F. FITCH 1,766,620

APPARATUS FOR TRANSFERRING FREIGHT

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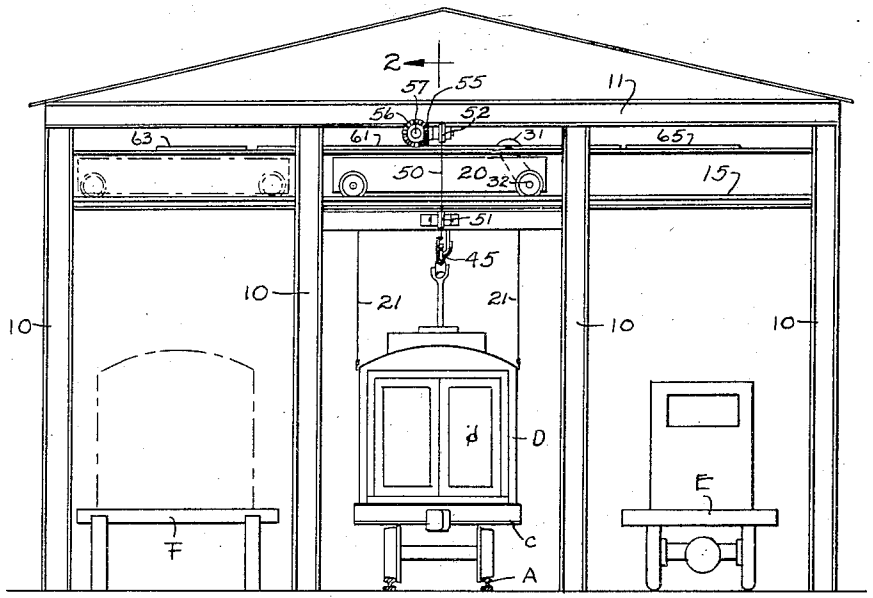


FIG.-1

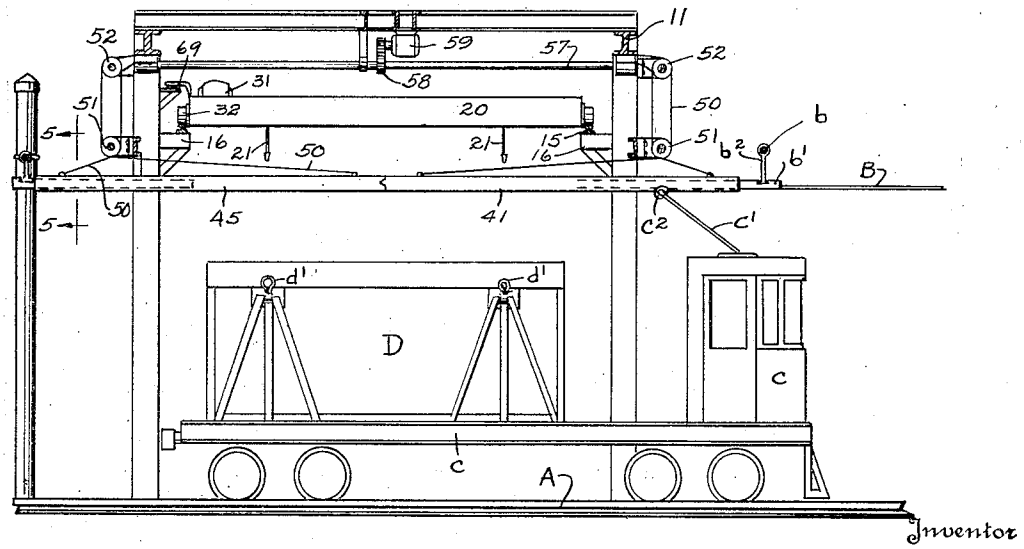


FIG.-2

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FIG. 3

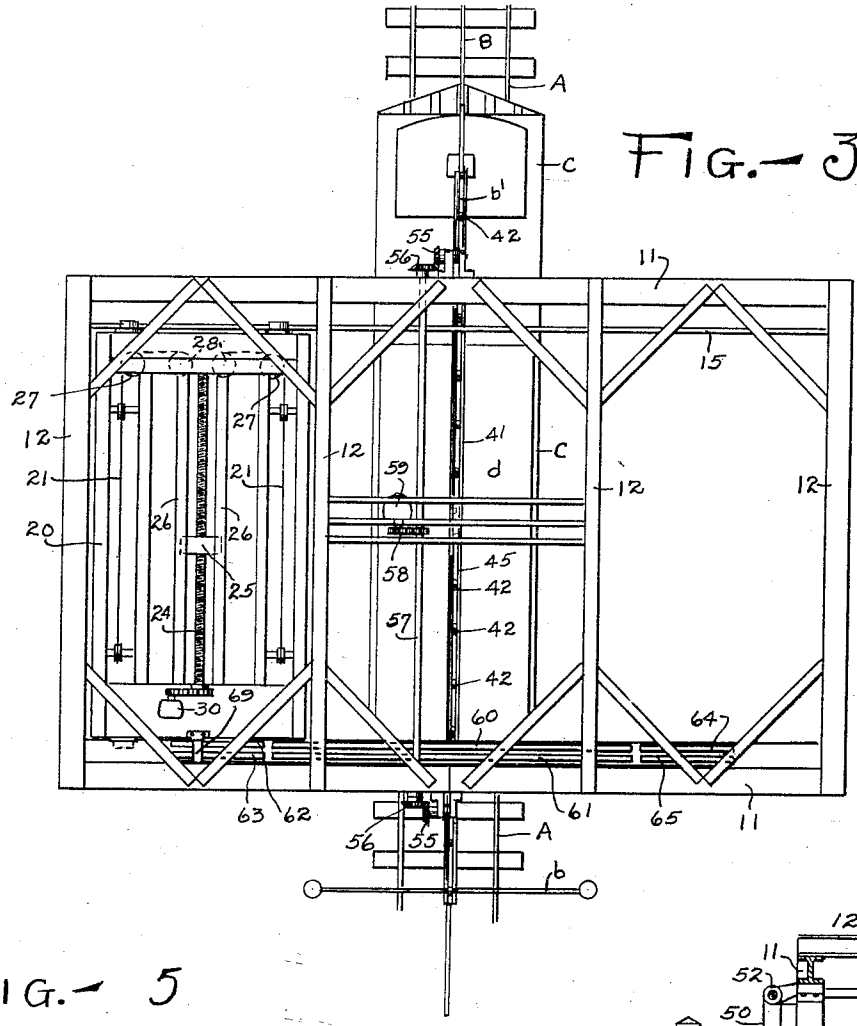


FIG. 5

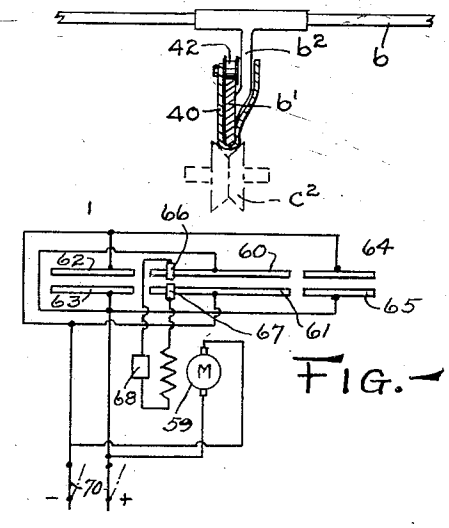


FIG. 4

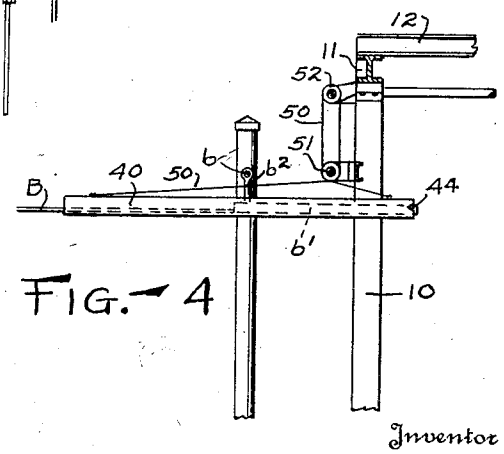


FIG. 6

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APPARATUS FOR TRANSFERRING FREIGHT

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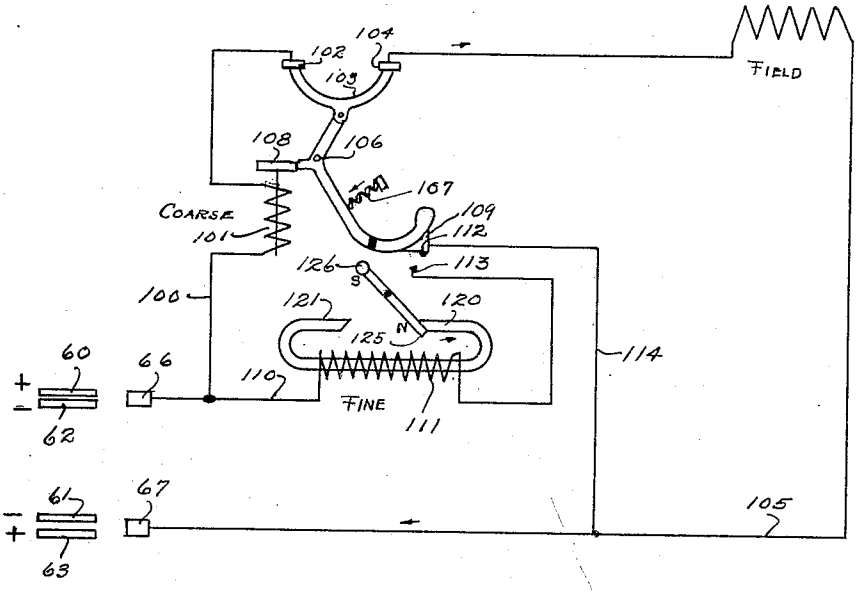


FIG. 7

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UNITED STATES PATENT OFFICE

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APPARATUS FOR TRANSFERRING FREIGHT

Application filed February 9, 1929. Serial No. 338,680.

This invention relates to a freight handling apparatus associated with an electric railway having an overhead trolley wire. Removable containers are provided which are adapted to be transported by the electric car to a transfer point and thereafter another loaded container deposited on the car. The latter container may for instance be brought to the transfer point by a motor truck, which will carry away another container. As such containers to be efficient must be of considerable size, hoisting and transporting mechanism is essential in removing or replacing 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, associated with means for moving the trolley wire out of the way of the crane cables suspending the container, so that the crane may transport the body laterally.

More particularly, I propose in this invention to so mount that portion of the trolley wire which is at the transfer point that it may be readily moved out of the way of the crane cables, that is to say, I provide a section which is telescopically mounted adjacent an end of the trolley wire proper, and may continue the line of that wire or may be shoved backwardly thereon to leave a gap across which depending crane cables may travel. Preferably there are two of these sections, slidably supported adjacent the ends of the crane superstructure, the two sections being adapted to meet at the center of such structure. When so meeting, the sections make a continuation of the trolley wire; when moved back longitudinally of the trolley wire, they leave an open path for the shifting of the crane cables. Preferably power mechanism is provided for effecting the movement of the sections. Such an apparatus is illustrated in the drawings hereof, and is hereinafter more fully explained. The essential novel features of the invention are summarized in the claims.

In the drawings, Fig. 1 is an elevation transversely of an electric railway track and two side superstructures, and an overhead crane trackway; Fig. 2 is a sectional elevation thereof at right angles to Fig. 1, being on a plane indicated by the line 2—2 on Fig. 1; Fig. 3 is a plan of such installation, the roof being omitted; Fig. 4 is a fragmentary sectional side elevation adjacent one end of the superstructure shown in Fig. 2 with corresponding telescoping trolley sections drawn back on the trolley wire; Fig. 5 is a detail of the support for the telescoping section, being a transverse sectional view as indicated by the line 5—5 in Fig. 2; Fig. 6 is a diagram of electric circuits which may be used to control the motor which operates the telescoping sections; Fig. 7 is a diagram illustrative of an automatically restored circuit-breaker which may be employed.

As shown in Figs. 1, 2, 3, A represents an electric railway track, B the usual 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* and a trolley pole *c'*. D indicates the removable body, which may be mounted on the flat car in the rear of the cab. This body is preferably of such size that it may also readily fit on an automobile truck (as indicated at E in Fig. 1) so that the body may be interchanged as desired between the truck and flat car. The body may be provided with suitable doors *d*, and at the eaves with hooks or eyes *d'* or other means for attachment of raising cables.

In Figs. 1, 2 and 3, I have shown superstructures located opposite each other on both sides of the track and connected by a bridge, thus providing a continuous overhead support for the crane as well as means for moving the sections of the trolley wire to be presently described. Such superstructure has upright posts 10, suitable cross beams 11 and tie members 12. It carries crane tracks 15 resting on beams 17 bridging across the railway track space. These beams are shown as mounted on brackets 16 carried by the posts 10.

The tracks 15 carry a suitable crane 20 having four raising cables 21 terminating at their lower ends in hooks or eyes. Mounted on the crane frame is a suitable mechanism

for pulling up these cables as a unit. The mechanism shown comprises a rotatable screw 24 (Fig. 3), a travel nut 25 thereon, and guide bars 26 for the nut. The cables 21 pass upwardly over sheaves 27 and thence around sheaves 28 and 29, and are finally anchored to the nut 25. Accordingly, the rotation of the screw operates to raise or lower simultaneously all four of the lift hooks. The screw may be rotated by any suitable means, as for instance an electric motor 30, which may receive its power from the trolley circuit. The crane preferably has also a motor 31 geared with one of the supporting wheels 32, whereby the crane may be shifted along its track.

Normally the traveling crane stands at one side or the other of the trackway, and the trolley wire is substantially continuous through the superstructure so that a car may run freely past the transfer structure. However, to use the hoist mechanism to raise a body and shift it laterally to or from the car, it is necessary to provide some means whereby the trolley wire will not interfere with the supporting cables. To accomplish this, I terminate the trolley wire proper adjacent the two ends of the superstructure, and support the free ends by suitable transverse wires or brackets indicated at b in Figs. 4 and 5, and I mount two normally aligned intermediate sections of the trolley wire so that they may be telescoped in opposite directions on the two supported sections leaving an open gap for operation of the raising cables. Such construction will now be described.

Each of the fixed trolley wires B is shown as terminating adjacent one of the opposite ends of the superstructure in a suitably supported bar b^1 from which a bracket b^2 is shown as extending to the transverse supporting wire b. The sliding trolley section designated 40 is preferably a trough shaped member embracing the bar b^1 and having at its upper edges rollers 42 riding on the top of that bar. The doubled portion of this telescoping section is sufficiently thin at its bottom so that it makes a substantially continuous path with the wire B for the trolley wheel c^2. When the two sections 40 and 41 are in normal position a wedge shaped projection on the end of the section 41 may enter a wedge shaped notch 44 on the section 42 so that their meeting ends will be accurately aligned.

The drawings show means for moving these telescoping sections into and out of position, thus as shown in Figs. 2 and 4 I have provided a cable 50 anchored at one end to the trolley section adjacent its innermost end, thence passing backwardly above the section over a sheave 51, thence upwardly looping around a sheave 52, thence downwardly about the other side of the sheave 51 and finally anchored to the section adjacent its outer ends. With this construction, it is only necessary to rotate the sheave 52 in one direction or the other to move the trolley section in or out as desired.

The operating cable construction for the two trolley sections is identical. Furthermore. I may connect the two sheaves 52 together for operation from a single source. Thus, I may provide on each sheave a bevel gear 55 meshing with the gear 56 on a common shaft 57 which is connected by reduction gearing 58 with a suitable motor 59. Accordingly the operation of this motor in one direction or the other will draw the two sections apart to form the open gap for the passage of the hoist cables or will move them together to restore the through trolley wheel pathway.

If desired, the motor 59 may be caused to operate automatically consequent upon the shifting of the traveling crane, so that whenever the crane is moved toward the central position, the telescoping trolley sections are separated, while whenever the crane returns to either side, the sections would be restored. A simple way to effect this is to provide electric circuits controlled by the movement of the traveling crane as illustrated in Fig. 6. In that figure and also in Fig. 3, 60 and 61 indicate a pair of contact bars extending across the bridge portion of the structure, 62 and 63 contact bars over the portion of the structure at the left hand side of the trackway, and 64 and 65 similar bars over the structure at the right hand side of the trackway. 66 and 67 illustrate two terminals from the field winding of the motor 59, which are carried by the frame of the trolley hoist as shown, for instance, by a bracket 69 in Fig. 3. Normally, the telescoping trolley sections are closed, as shown in Fig. 2 and the crane is at one side of the structure as shown in Fig. 3. The brushes 66 and 67 engage either the contact bars 62 and 63, or the bars 64 and 65. This sends the current through the motor in a direction tending to bring the trolley sections together. Now, if the crane moves toward the center, as soon as the brushes 66 and 67 engage the bars 60 and 61, the armature of the motor becomes reversed with reference to the field, causing the motor 59 to operate in the opposite direction to draw the sections apart, so that before a crane cable reaches the position over the trackway, the trolley sections have separated. Thereafter, when the crane returns to either side, just as soon as the brushes 66 and 67 pass onto either the bars 62 and 63 or 64 and 65, the direction of the motor is again reversed and the trolley sections are automatically brought back to closed position. 68 in Fig. 6 indicates a suitable circuit breaker operating to stop the motor when the section reaches either extreme position, but serving to close the circuit when the motor is reversed.

In Fig. 7, I have indicated by way of il-

lustration a circuit breaker 68 which has the operation just mentioned. In this view a line 100 leads from the brush 66 through a magnet 101 to a contact 102; thence through the bridge arm of the circuit breaker lever 103 to contact 104; thence through the field of the motor M to the line 105; thence to the brush 67. The circuit breaker lever 103 pivoted at 106, is pressed in opening direction by a spring 107, but is adapted to be locked in the closed position by a normally active latch 108 which forms the armature of the magnet 101 and will be moved to unlatching positions whenever that magnet is over-energized. A shunt line 110 leads from the line 100 through a coil 111 to a terminal 112. Adjacent this terminal is a terminal 113 connected by a line 114 with the line 105. The magnet 111 is provided with a horse-shoe core presenting poles 120 and 121 to a permanent magnet 125 which is pivoted intermediately and has its upper end 126 adapted to bear against the circuit breaker lever 103 whenever the latter is depressed.

In the diagram just described, if we assume that the brush 66 is in contact with a positive conductor as 60, and the brush 67 with a negative conductor as 61, then the current would flow through the circuit breaker series magnet 101 across the bridge 103, through the field of the motor, returning to the negative conductor 61, thus maintaining the circuit breaker closed and energizing the motor. Now when the shiftable trolley wire section comes to either extreme position and is unable to move further, a greater electric load is thrown on the motor, more current flows to it, and the magnet 101 is over-energized sufficiently to withdraw the latch 108. This frees the circuit-breaker-lever and the spring 107 swings it so that its yoke arm becomes disconnected from the terminals 102 and 104. At the same time a lower arm of this lever serves to move a plate 109, rigidly secured to the arm 103, across both conductors 112 and 113, bridging them so that current then flows from the line 60, brush 66 through the line 110, the winding 111, to the contact 112, contact 113, to the line 114, to the minus line 61. This energizes the magnet 111. The winding of this magnet is in such direction that its energization, causes the pole 120 to be of opposite polarity to the lower end of the permanent magnet 125. Accordingly the core simply holds that magnet in the position shown.

Now when the hoist moves so that the brushes engage lines of opposite polarity (as for instance the brush 66 on the negative line 62, and the brush 67 on the positive line 63) this changes the polarity of the poles 120 and 121 and the pole 121 now attracts the lower end of the permanent magnet 120. The upper end 126 of this magnet thus moves toward the right and engages the circuit breaker lever and restores it to normal position. When restored, it snaps into place under control of the latch 108, to be released only when there is a subsequent over-energization of the magnet 101.

It will be understood that the circuit to the motor 59 is ordinarily entirely open, as for instance by a double pole switch indicated at 70 in Fig. 6, but is closed manually or otherwise whenever it is desired to operate the crane.

Suppose it be desired to transfer a loaded container D from an electric freight car C to a truck E standing alongside of the car at the transfer point as in Fig. 1. After the trolley car has arrived at the transfer position, the hoist is trolleyed by its motor 31 directly over the flat car, the intermediate wire supports moving back ahead of it, the cables are then attached to the body, the body is raised by the operation of the motor 30 and then transported laterally by the motor 31, and thereafter lowered by the reverse operation of the motor 30 onto the truck E. This latter movement may automatically restore the trolley sections to through position. All of the motors may receive their current from the trolley wire circuit. In place of depositing the body on a motor car, it may of course be deposited on suitable temporary supports, as for instances "horses" F on the other side of the double superstructure of Fig. 1. A reverse operation from that described may transfer a body from the support or truck to the electric flat car where it may be transported.

I claim:—

1. In an apparatus for transferring freight, the combination of a superstructure, a traveling crane carried thereby, and two slidable trolley wheel guides carried by the superstructure and adapted to stand in registration or to be moved longitudinally of the trolley wire to clear a space for the depending member of the traveling crane.

2. In an apparatus for transferring freight, the combination of a railway track, of a supporting structure alongside of the track, said structure extending over the track, two trolley wheel guides adapted to telescope with the trolley wires adjacent opposite ends of the supporting structure, and a traveling crane mounted on the superstructure and having a depending elevating member adapted to move across the region normally occupied by the trolley wheel guides.

3. In an apparatus for transferring freight, the combination of a superstructure, a traveling crane mounted thereon and having depending raising cables adapted to engage and lift a removable body from a vehicle, a pair of trolley wheel guides adapted to telescope with the trolley wires adjacent opposite ends of the superstructure, and means for moving said guides in opposite directions.

4. In an apparatus for transferring freight, the combination of a railway track, a pair of supporting structures opposite each other on opposite sides of the track, said structures having a bridge extending across the track, a traveling crane on said bridge adapted to stand on the track or on either side thereof, there being a vehicle runway on at least one side of such track over which the crane may stand, trolley wires over the railway track and in a plane lower than the bridge and terminating adjacent opposite ends of the bridge, a pair of trolley wheel guides so supported that they may telescope with the two trolley wires or brought into registration with each other beneath the bridge.

5. The combination with a railway track and a trolley wire above it, of a supporting structure over the track, a crane on said structure, a telescoping section of the trolley wire, and mechanism mounted on the structure and movable with relation to the telescoping section for moving such section backwardly on the trolley wire to clear a space for the lateral travel of the depending crane member.

6. The combination with a trolley wire, a crane support in a plane above the trolley wire, a telescoping section of the trolley wire beneath the support, and electrically operated power mechanism on the support for moving the telescoping section of the trolley wire.

7. The combination with a railway track and a trolley wire above it, of a supporting structure above the railway track and trolley wire, two telescoping sections of the trolley wire adapted to register beneath the support or to be moved back to leave an open space, and means for simultaneously moving said sections toward or from each other.

8. The combination with a railway track and a trolley wire above it, of a supporting structure above the railway track and trolley wire, a telescoping section of the trolley wire adapted to be moved back to leave an open space, a rotatable member connected with said section and adapted to move it in either direction, and means for operating said rotatable member.

9. The combination with a railway track and a trolley wire above it, of a supporting structure above the railway track and trolley wire, two telescoping sections of the trolley wire adapted to register beneath the support or be moved back to leave an open space, a pair of rotatable members connected with the two sections respectively and adapted to move them in either direction, a connection between said rotatable member, and mechanism for operating said connection.

10. The combination with a railway track and a trolley wire above it, of a supporting structure above the railway track and trolley wire, a telescoping section of the trolley wire adapted to be moved back to leave an open space, a flexible member anchored at its ends to opposite ends of the telescoping section and intermediately passing around a sheave, and mechanism for rotating said sheave to move the section in one direction or the other.

11. The combination with a railway track and a trolley wire above it, of a supporting structure above the railway track and trolley wire, a traveling crane on the supporting structure having a depending raising cable, two telescoping sections of the trolley wire adapted to register beneath the support or be moved back to leave an open space, two flexible members each anchored at its ends to opposite ends of the corresponding telescoping section and intermediately passing around a sheave, a driving member connected with the two sheaves, and an electric motor for operating the driving member.

12. In an apparatus for transferring freight to or from electric cars, the combination of a railway track and a trolley wire above it, a structure alongside of the track, hoist mechanism mounted on said structure and having four depending cables adapted to engage a demountable body on a car on the track, two sections of the trolley wire at opposite ends of the structure being interrupted and a trolley-wheel-guide between such interrupted ends adapted to register therewith, and means for moving said guide longitudinally of the trolley wire to open a gap large enough for the passage of two of said cables.

13. The combination, with a trolley wire and a traveling crane operating in a plane above the trolley wire, of a telescoping section of the trolley wire so located that when moved back on the trolley wire it will clear a space for the lateral travel of a raising member depending from the crane, and means operated automatically by the crane for causing movement of said telescoping section.

14. The combination with a trolley wire, a crane supported in a plane above the trolley wire, a movable section of the trolley wire beneath the support carried independently of the crane, and mechanism controlled by the crane for moving said section of the trolley wire.

15. The combination with a railway track and a trolley wire above it, of a supporting structure above the railway track and trolley wire, a telescoping section of the trolley wire adapted to register with the rest of the wire or to be moved back to leave an open space, mechanism for moving said section and means controlled by the position of the crane for causing such movement.

In testimony whereof, I hereunto affix my signature.

BENJAMIN F. FITCH.