ABSTRACT: An unloading structure for unloading lading from the bottom discharge outlet on either side of a covered hopper railway car. A conveyor structure having wheels thereon is rolled beneath the bottom discharge outlet and outwardly projecting horizontal flanges on the upper surface of the conveyor structure match interfitting inwardly projecting flanges on the bottom outlet which extend in a direction transversely of the car. The flanges on the conveyor structure slide along the upper surfaces of the interfitting flanges on the bottom outlet to position the conveyor accurately with respect to the outlet. Releasable latch means retains the conveyor in position beneath the bottom outlet. The conveyor structure includes a horizontal portion directly beneath the outlet and an upwardly inclined portion integral with the horizontal portion. A wheeled frame is mounted for sliding movement along the upwardly inclined portion to adjust the height of the conveyor.
UNLOADING STRUCTURE FOR A COVERED HOPPER RAILWAY CAR

BACKGROUND AND DESCRIPTION OF THE INVENTION

Hereinbefore, conveyors have been positioned beneath bottom discharge outlets of railway hopper cars. However, such conveyors have not been connected to the bottom discharge outlet in interfitting relation except by the employment in some instances of separate C-clamps to secure the flanges of the outlet to the subjacent conveyor flanges to provide a tight fit therebetween.

The present invention is directed to a sliding fit between the flanges of the conveyor and the bottom discharge outlet with inwardly extending flanges on the conveyor being in supporting relation to outwardly extending flanges on the conveyor. The conveyor may be inserted from either side of the car and has an upwardly inclined conveyor portion with a wheeled frame mounted thereon for sliding movement to adjust the height of the conveyor. Relessable latch means upon the accurate positioning of the conveyor automatically secure the conveyor in the bottom outlet.

FIG. 1 is a side elevation of the unloading structure comprising the present invention and showing a conveyor structure in unloading position beneath a bottom discharge outlet of a hopper;

Fig. 2 is an end elevation of the unloading structure shown in FIG. 1;

Fig. 3 is a top plan of the unloading structure shown in FIGS. 1 and 2 with a portion of the hopper removed;

Fig. 4 is a section taken generally along line 4-4 of FIG. 3 showing the conveyor structure removed from beneath the bottom discharge outlet;

Fig. 5 is a section taken generally along line 5-5 of FIG. 2 and illustrating the upper and lower conveyor runs;

Fig. 6 is a section taken generally along line 6-6 of FIG. 1 and showing means to adjust the height of the conveyor structure relative to the hopper;

Fig. 7 is a side elevation similar to FIG. 1 but showing the conveyor structure being supported on a surface in the same plane as the upper surface of the rails;

Fig. 8 is an enlarged top plan of means releasably connecting the conveyor structure beneath the bottom outlet structure; and

Fig. 9 is an enlarged side elevation of the releasable connecting means shown in FIG. 8.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now to the drawings for a better understanding of the invention, a hopper structure indicated generally 10 of a railway covered hopper car has sides 12 and connected ends 14 leading to a bottom discharge opening 16 defined by outer flange 18. Mounted on the lower surface of flange 18 is a bottom outlet structure generally indicated 20 and having an upper flange 22 secured, such as by welding, to flange 18 as shown in FIG. 4. Bottom outlet structure 20 includes opposed end walls 24 and opposed side walls 26 connected thereto. As shown in FIG. 2, side walls 26 adjacent their lower ends each comprise an outwardly facing generally channel-shaped member 28 forming an upper horizontal ledge 30. Secured to the lower leg of each channel-shaped member 28 is an angle-shaped member 32 having a lower inwardly extending leg or flange 34. End walls 24 each include a lower vertical web 36 having an outwardly extending flange 38 thereon as shown in FIG. 4. An inwardly extending ledge 40 is secured to web 36.

Mounted on ledges 30 and 40 for sliding movement is a gate 42 having a pair of racks 44 secured to the underside thereof. A pinion shaft 46 secured to outlet structure 20 has pinions 48 engaging racks 44 for moving gate 42 between open and closed positions. Channel-shaped member 28 adjacent pinions 48 has a releasable slot therein to receive gate 42 and gate 42 controls the discharge of lading from bottom outlet structure 20.

Bottom outlet structure 20 is particularly adapted to receive a conveyor structure generally indicated 50 therebeneath. Conveyor structure 50 includes a wheeled frame 52 having large diameter wheels 54 mounted on shaft 55 adjacent one side of frame 52 and small diameter caster wheels 56 mounted adjacent the other side of frame 52. Conveyor structure 50 is easily rolled along a supporting surface 58 on wheels 54 and 56.

Conveyor structure 50 includes a generally horizontal portion 58 and an integral upwardly inclined portion 60. Horizontal portion 58 is of a length to fit between rails 70 and bottom outlet structure 20. Conveyor structure 50 has an endless conveyor generally indicated 62 formed of a plurality of pivotally connected links 64 having slats 65 extending across the width of the conveyor to form a supporting surface for the lading to be unloaded. Horizontal portion 58 has a shaft 66 with sprockets 68 thereon and inclined portion 60 has a shaft 70 with sprockets 71 thereon. Suitable rollers 72 and 73 are provided to change the direction of the conveyor. To drive conveyor 62, a motor 74 drives bevel gear 75 in mesh with bevel gear 76 on shaft 70. Pushers 78 are spaced on slats 65 at predetermined intervals along the length of the conveyor for moving and restraining the lading being unloaded from bottom outlet structure 20.

The conveyor housing includes sides 80 having an angle-shaped member 82 along their upper surfaces. Angle-shaped members 82 include outwardly extending support flanges or legs 84 as shown in FIG. 2. Sides 80 are spaced to fit angle-shaped members 82 between the superjacent angle-shaped members 32 of bottom outlet structure 20 with flanges 84 overlying flanges 34 in a supporting relation. An intermediate partition 83 is secured between opposed sides 80.

To position conveyor structure 50 beneath bottom outlet structure 20, flanges 84 are initially positioned slightly above flanges 34 in matching relation and then conveyor structure 50 is pushed manually beneath bottom outlet structure 20. Leg 84 is cutaway adjacent an end of horizontal portion 58 and an extension 85 secured to member 82 form a stop upon abutting superjacent angle-shaped member 32. Extension 85 forms a clevis and a latch 86 is pivotally mounted on clevis pin 87 as shown in FIGS. 8 and 9. Latch 86 has an outer detent 88 adapted to enter an opening 89 in angle-shaped member 32 upon proper positioning of conveyor structure 50 beneath bottom outlet structure 20. A spring 90 urges latch 86 against a stop 91 on extension 85. Latch 86 may be manually depressed to release conveyor structure 50 for removal from beneath bottom outlet structure 20.

As shown in FIG. 7 the elevation of the supporting surface 58 of conveyor structure 50 adjacent rails 5 may vary. Thus, wheeled frame 52 is adjustable in height to vary the elevation of horizontal portion 58. An adjusting screw 96 having a handwheel 98 on an end thereof is mounted on an end cross member of frame 52. Conveyor sides 80 along inclined conveyor portion 60 have outwardly extending lower flanges 100 and inwardly extending upper flanges 102 as shown in FIG. 6. Upper vertical side portions 104 confine the lading on the upper run of the conveyor. Secured to the lower surfaces of flanges 100 is a cross support member 106 having a support plate 108 secured thereto and carrying an internally threaded nut 110 which receives screw 96. Upper frame member 112 of wheeled frame 52 has a pair of angle-shaped guides 114 on each side thereof. Guides 114 have inwardly extending upper flanges 116 which fit over lower supporting flanges 100. Upon rotation of handwheel 98, wheeled frame 52 and guides 114 are moved along support flanges 100. Thus, the elevation of horizontal portion 58 may be varied as desired.

From the foregoing, an unloading structure has been provided which may unload from either side of a railway covered hopper car. A conveyor structure is easily positioned beneath a bottom outlet structure in interfitting relation and is releasably secured in position. The conveyor structure may be adjustably elevated in a minimum of time for positioning between the rails and the bottom outlet structure.
In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results obtained.

We claim:

1. For use with a bottom discharge outlet positioned centrally of the width of a railway hopper car and having a housing including opposed vertical sides extending in a direction transversely of the railway car and horizontal support flanges beneath the vertical sides extending inwardly to provide free inner edges not substantially inward of the adjacent vertical sides; an unloading conveyor structure comprising a horizontal conveyor portion and an integral upwardly inclined conveyor portion, the horizontal conveyor portion adapted to fit beneath said bottom discharge outlet, and endless conveyor positioned within said horizontal portion and said integral upwardly inclined portion for conveying lading discharged from the bottom outlet, said conveyor structure including opposed vertical sides and upper horizontal support flanges extending along the opposed sides and adapted to interfit with said housing support flanges to provide a connection between said conveyor structure and the bottom discharge outlet, support wheels on said conveyor structure for supporting the conveyor structure for movement, said conveyor flanges being adapted for interfitting with said housing flanges from either side of the railway car upon movement of the conveyor structure in a direction transversely of the car and a sliding movement of the conveyor flanges along the housing flanges, and means to adjust the height of the conveyor support wheels relative to the conveyor structure whereby the height of the conveyor structure relative to the bottom discharge outlet may be varied.

2. An unloading structure as set forth in claim 1 wherein said means include interfitting flanges on said inclined conveyor portion and said wheeled support frame, and manually actuated screw means are positioned between the wheeled support frame and the inclined conveyor portion to provide relative movement therebetween.

3. In an unloading conveyor structure adapted to fit beneath the bottom discharge outlet of a railway hopper car; an horizontal conveyor outlet and an integral upwardly inclined conveyor portion, the horizontal conveyor portion adapted to fit beneath said bottom discharge outlet, an endless conveyor on said horizontal portion and on said upwardly inclined conveyor portion for conveying lading discharged from the bottom discharge outlet, opposed vertical sides having outwardly extending horizontal support flanges therealong adapted to fit over mating support flanges on the outlet to provide a connection between the conveyor structure and the outlet, support wheels on said conveyor structure for supporting the conveyor structure for movement, a support frame for said support wheels mounted on the upwardly inclined conveyor portion, and means mounting the support frame for adjustable movement in a direction generally parallel to the longitudinal axis of the inclined conveyor portion.

4. In an unloading conveyor structure adapted to fit beneath the bottom discharge outlet of a railway hopper car; an horizontal conveyor portion and an integral upwardly inclined conveyor portion, the horizontal conveyor portion adapted to fit beneath said bottom discharge outlet, an endless conveyor on said horizontal portion and on said upwardly inclined conveyor portion for conveying lading discharged from the bottom discharge outlet, opposed vertical sides having upper support flanges extending horizontally therealong adapted to interfit mating support flanges on the outlet to provide a connection between the conveyor structure and the bottom discharge outlet, a wheeled support frame on the upwardly inclined conveyor portion, guide means mounting the wheeled support frame for movement along the inclined conveyor portion to vary the height of the conveyor structure whereby the conveyor support flanges are adapted for interfitting with the mating outlet support flanges, and releasable means adapted to secure the conveyor structure in position beneath the bottom outlet for unloading lading from the car.