DEFLECTOR ASSEMBLY FOR RAILROAD TRACK SWEEPERS

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INVENTOR. Royce G. Kershaw

BY. Jennings, Carter & Thompson
Attorneys
DEFLECTOR ASSEMBLY FOR RAILROAD TRACK SWEEPERS

Royce G. Kershaw, Montgomery, Ala., assignor to Kershaw Manufacturing Company, Inc., a corporation of Alabama

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This invention relates to a deflector assembly for railroad track sweepers and more particularly to a deflector assembly mounted forwardly of a rotary broom in a railroad track sweeper.

Therefore, in the use of rotary brooms for sweeping or cleaning loose material from between the rails of a railroad track, one or more transverse conveyors have been provided adjacent a rotary broom for transporting the loose materials swept up by the broom from between the rails to a position outwardly of the rails. The present invention provides a deflector assembly forwardly of the rotary broom which deflects ballast swept up by the rotary broom from between the rails outwardly thereof and thereby obviates the necessity for transverse conveyors or other means for carrying the loose ballast from between the rails.

It is an object of the present invention to provide in a railroad track sweeper a ballast deflector assembly forwardly of and directly adjacent a rotary broom which assembly comprises a plurality of substantially vertical deflectors inclined to the direction of movement of the track sweeper whereby ballast is thrown by the rotary broom against the inclined deflectors and deflected outwardly of the track.

It is a further object of the present invention to provide a broom frame for the rotary broom which frame is movable vertically in relation to the track and to mount a deflector frame on the broom frame, whereby vertical movement of the broom frame raises the deflector frame.

An additional object of my invention is to provide a detachable ballast sweeper unit which unit comprises a broom frame adapted for vertical movement and a deflector frame pivotally mounted on the broom frame, the broom frame having a rotary broom mounted thereon and the deflector frame having a plurality of substantially vertical deflectors thereon.

Further, the power means for driving the rotary broom is mounted on the broom frame whereby the unit may be easily attached to the rear or front of a railroad vehicle.

Apparatus embodying features of my invention is illustrated in the accompanying drawings forming a part of this application, in which:

Fig. 1 is a side elevational view of the present invention showing my invention attached to an end of a railroad vehicle with only a portion of the railroad vehicle shown;

Fig. 2 is a front elevational view of the invention shown in Fig. 1 with a portion of the deflector frame broken away and in section;

Fig. 3 is a plan view of the present invention, partly broken away, and with the drive means removed;

Fig. 4 is a rear elevational view of the frame for my detachable sweeper unit shown detached from the railroad vehicle with the broom frame adapted for moving vertically relative to the frame attached to the railroad vehicle and taken generally along line 4—4 of Fig. 1;

Fig. 5 is an elevational view of a support wheel for the deflector frame, the view being taken in the direction of line 5—5 of Fig. 3;

Fig. 6 is a side elevational view looking in direction of line 6—6 of Fig. 5;

Fig. 7 is a view taken generally along line 7—7 of Fig. 3 and shows a stop for limiting downward movement of the detachable unit; and

Fig. 8 is a side elevational view of the stop taken generally along line 8—8 of Fig. 7.

Referring now in detail to the drawings for a better understanding of my invention, I show in Fig. 1 a portion of a railway vehicle indicated generally by the numeral 10. Flanged wheels 12 are provided on the vehicle 10 for riding on the rails 13 supported on the crossties 14.

My improved track sweeper is mounted on the rear of the vehicle 10, it being understood that the track sweeper comprising the present invention may be used on either end of vehicle 10 and on many types of railway vehicles, not being limited to use with a specific type of railway vehicle. My improved sweeper is indicated generally by the numeral 16 and is mounted at the top of vehicle 10 through overhanging arms 18 secured to the top body portion of vehicle 10 and to the sweeper. The bottom portion of the track sweeper 16 is mounted on vehicle 10 through blocks 18 (see Fig. 4 also) that are bolted to a cross-beam 19 on the railway vehicle 10. Lower transverse frame members 20 connect the blocks 18 and upper transverse frame member 21 connects the arms 17.

Vertical I beams 21 extend between the transverse frame members 20. The direction of travel of the railroad track sweeper is indicated by the arrow 15.

A broom frame is mounted for vertical movement relative to the rails 13 on the vertical beams 21. As shown in Fig. 4, the broom frame comprises transversely extending beams 22 and 23 arranged in face to face contact with beams 21 that are fixed on vehicle 10. Each of the beams 22 and 23 has upper and lower brackets 24 and 26, respectively, each bracket comprising a pair of spaced arms. Rollers 27 are mounted between the spaced arms of the brackets 24 and 26 on axles 28 extending between the arms of the brackets and ride on the vertical beams 21.

Cross channel members 29 connect vertical beams 22 and 23 on the movable frame to each other. Hydraulic cylinders 31 and 32 are connected to a lower transverse member 20 extending between the vertical beams 21. Piston rods 34 and 36 of the cylinders 31 and 32 respectively, are pivotally connected to the upper channel member 29. Thus, upon actuation of cylinders 31 and 32, the broom frame moves relative to the vertical beams 21 secured on the vehicle 10. Cylinders 31 and 32 are controlled from the vehicle 10 through suitable controls indicated generally at 35.

Adjustable stops comprising a pair of angles bolted to the web of the vertical beams 21 are provided for limiting the downward movement of the broom frame on the beams 21. The pressure and load are thus removed from the hydraulic cylinders 31 and 32 when the broom frame is brought downwardly to working position.

As shown in Figs. 7 and 8, angles 37 and 38 are bolted by suitable means 39 to the web of beam 21 and the two arms of bracket 24 engage the laterally extending flange of the angles 37 and 38 thereby limiting the broom frame in its downward movement by engagement with the angles 37 and 38. Spaced pairs of apertures 41 are provided in the vertical beams 21 to vary the height of angles 37 and 38 on the beams 21 and thereby vary the height of the broom frame above the rails 13.

In the event it is desired to secure the broom frame in fixed raised position above the stops, chains 42 are connected to the top portion of beams 21. See Figs. 1 through 4. A laterally extending support angle 43 is provided on brackets 24 and the laterally extending flange of
the supports 43 has a slotted opening 44 extending there-through adapted for receiving chain 42 and for securing a link of chain 42 in the slotted opening 44. See Fig. 3. Thus, upon the broom frame being raised by hydraulic cylinders 31 and 32, the chains 42 can be engaged by the supports 43 and the load released from the cylinders 31 and 32, the weight of the broom frame being carried by the chains 42.

A broom housing 46 is connected to the vertical beams 22 and 23 through suitable frame members. As shown in Fig. 2, slots 47 and 48 extend downwardly in housing 46 at the passive rails thereof over the rails 13 for a purpose to be explained in detail later. A rotary broom indicated generally by the numeral 51 is mounted in housing 46 on shaft 52 extending transversely of the rails 13 for substantially the entire length of the housing 46. The rotary broom 51 is divided into three sections, a center section 53 mounted between the rails 13 and an end section 54 mounted outwardly of each of the rails 13. The portion of the rotary broom 51 that is directed adjacent the rails 13 is provided with circular discs 56 for riding along the rails 13. The discs 56 are mounted for rotation with the shaft 52 and are fixed thereto. Suitable brushes 57 are arranged on the rotary broom and are preferably formed of heavy flexible steel cables.

In Fig. 2, the means for operating the rotary broom 51 are shown as comprising a gasoline engine 58 mounted on the broom frame and having a drive shaft extending therefrom to a gear reduction box 61. A lever 63 is provided for controlling a clutch for the engine. A counter-shaft 64 is mounted between the gear reduction 61 and sprocket 66 on one end of the broom housing 46. A second sprocket 67 is secured to the brosshaft 52 and is connected to sprocket 66 through the sprocket chain 68. Thus, the drive means for the rotary broom is mounted entirely on the broom frame.

It is understood that in working position, the broom engages ballast and other materials lying between and alongside the rails and propels the same to the right as viewed in Fig. 1. In order that the material swept up from the brossm be deposited laterally of the rails 13, my improved deflector is provided for deflecting the material laterally from the center of the track to a position outwardly of the rails 13. The means for deflecting the material comprises a deflector frame 71 having a pair of arms 72 and 73 extending rearwardly therefrom through the slots 47 and 48, respectively, in the brossm housing 46. Arms 72 and 73 are pivotally connected to the brossm housing 46 by brackets 74 on housing 46 (see Fig. 3). Thus, deflector frame 71 is pivotally mounted for movement relative to the brossm frame by the arms 72 and 73 that the deflector frame may be adjusted in height relative to the brossm frame.

The deflector frame 71 comprises a pair of spaced angles 76 and 77 extending transversely of the rails 13 and connected at their ends by angles 78 and 79. A plurality of deflector support angles 81 and 82 is secured between the angles 76 and 77, the angles 81 being inclined outwardly from the center of the track on one half of the deflector frame and the angles 82 being inclined outwardly from the center of the track on the other half of the deflector frame. Angles 81 and 82 have downwardly extending inclination deflector plates 83 and 84, respectively, secured thereto and arranged directly adjacent the rotary brossm 51 on the material discharge side thereof. The defectors 83 and 84 extend across the length of the deflector frame 71 and are formed of steel plates arranged at approximately 45° to the direction of travel of the track sweeper. Defectors arranged between 30° and 60° to the direction of travel have been found to work effectively. As shown in Fig. 2, there is a very slight overlap between the paths of adjacent deflector plates except for the two center plates.

The deflector plates extending over the rails 13 have cut out portions 86 for receiving the rails, thereby allowing all the deflectors 83 and 84 to extend downwardly below the top surface of the rails 13. The top portion of the deflector frames 71 is covered by a top plate 87 and the front end of the deflector frame 71 is partially covered by a pivoted front plate 88 extending along the entire length of the deflector frame 71. An adjustable end plate 89 is pivotally mounted on each end of the deflector frame 71 through pins 91. The slots 92 which receive pins 93. Suitable flexible material, such as a rubber composition, indicated generally by the numeral 96, is secured to the bottom edge of the front plate 88 and the end plates 89 so as to form a hood or cover around the deflector frame 71 and deflect materials from the deflectors downwardly.

In order to support the deflector frame 71 when in working position, rollers 97 are arranged on the front end of the deflector frame for riding on the rails 13. Rollers 97 are mounted on legs 98 extending downwardly on the forward end of arms 72 and 73. Brackets 99 are secured to the legs 98 through suitable connections, such as bolts 101. In order to adjust the height of the deflector frame 71 relative to the rails 13 to accommodate rails of different heights, spaced apertures 102 (see Figs. 5 and 6) are provided in leg 98 and bracket 99. Rollers 97 thus are vertically adjustable on the legs 98. When the detachable track sweeper is in working position, the rollers 97 are raised out of contact with the rails.

Adjustable supports 103 are arranged on my detachable railroad track sweeper to support the sweeper if it is removed from the railroad vehicle 10. A foot portion 104 (see Fig. 1) is adapted for resting on the ground or other supporting surface upon detachment of the sweeper from the vehicle 10.

In operation, the rotary brossm 51 sweeps up the ballast and other material from between and alongside the rails and throws the same from beneath the brossm against the deflectors 83 and 84. The brossm thus strikes the surfaces of the angularly directed deflectors 83 and 84 and is deflected outwardly from the center of the track where it falls on the roadbed. Any material which is not thrown to the sides of the roadbed is swept up a second time and thrown again against the next outer deflectors 83 and 84. It is evident then that material lying between the rails 13 may be swept up and deflected several times before it reaches the last deflector on the end of the deflector frame 71. Upon reaching the last deflector, the material is windrowed along the side of the track.

From the foregoing, it will be seen that I have devised a detachable railroad track sweeper provided for attachment to a railroad vehicle and comprising a rotary brossm and a deflector unit mounted adjacent the rotary brossm for deflecting ballast and other material outwardly of the rails. The deflectors are inclined outwardly from the center of the railroad track and the brossm is picked up by the brossm and propelled against the deflectors and by them deflected outwardly. The deflector unit is pivotally mounted on the rotary brossm frame and may be adjusted in height relative to the rotary brossm through adjustable wheels. Drive means for the rotary brossm is provided on the brossm frame, thus not requiring additional drive means from the railroad vehicle. The rotary brossm and the deflector unit are both movable vertically on a fixed frame secured to the railroad vehicle 10 and may be raised vertically from working position. The deflector assembly of the present invention effectucrets ballast and other materials from the center of the track outwardly alongside of the rails without the use of moving parts. The deflector is unusually simple in design compared to the conveyor systems hereof employed to convey outwardly material swept up by a rotary brossm. While the brossm sweeper and deflector are shown mounted on the rear of the vehicle, they may with equal facility be mounted on the front thereof, it being
understood that the deflector leads the sweeper in the movement of the vehicle.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In a railroad track sweeper, the combination of a vehicle having supporting wheels for riding on the rails, a rotary broom mounted on the vehicle transversely of the rails and extending between and outwardly of the rails for engaging loose material between and alongside the rails and throwing the same forward, and a deflector assembly mounted on the vehicle in advance of and directly adjacent the rotary broom and extending between and outwardly of the rails, said deflector assembly embodying a plurality of substantially vertical deflectors extending along substantially the entire length thereof, these deflectors being inclined outwardly from the center of the track at an angle between about 30° and 60° from the center line of the track, whereby loose material between and alongside the rails is thrown by the rotary broom against the inclined deflectors and thereby deflected outwardly of the rails.

2. A railroad track sweeper as defined in claim 1 and further characterized in that the deflectors extend downwardly below the upper surfaces of the rails and the deflectors arranged directly over the rails are provided with cut-out sections for receiving the rails.

3. In a railroad track sweeper, a vehicle having a main frame and supporting wheels for riding on the rails, a vertical frame on an end of the main frame, a broom frame mounted on the vertical frame for vertical movement relative to the track, a rotary broom mounted on the broom frame and extending transversely of and between the rails for engaging loose material between the rails and throwing the same forwardly, a deflector frame pivotally mounted on the broom frame and extending between the rails on the material discharge side of the broom, and a plurality of substantially vertical deflectors mounted on the deflector frame and extending between the rails and inclined relative to the center line of the track, whereby loose material thrown forwardly by the rotary broom against the inclined deflectors is thereby deflected outwardly of the rails.

4. In a railroad track sweeper, a vehicle having a main frame and supporting wheels for riding on the rails of a track, a frame extending vertically from an end of the main frame, a broom frame mounted on the vertical frame for vertical movement relative to the track, a rotary broom mounted on the broom frame and extending transversely of and between the rails for engaging loose material between the rails and throwing the same longitudinally in the path of the material thrown off the broom and inclined outwardly from the centerline of the track toward the adjacent rail at an angle to the rails, the lateral edges of adjacent plates in each series overlapping each other whereby loose material between the rails is thrown by the rotary broom against the deflectors and is deflected thereby in outward stepwise relation outwardly of the rails.

5. In a railroad track sweeper, a vehicle having a main frame and supporting wheels for riding on the rails of a track, a frame extending vertically from an end of the main frame, a broom frame mounted on the vertical frame for vertical movement relative to the track and extending laterally of the rails, a rotary broom mounted on the broom frame and extending substantially the entire length of the broom frame in position to sweep up loose material between and alongside the rails, means to rotate the broom and throw said material longitudinally of the track, a housing mounted over the top of said rotary broom and having a pair of slots extending downwardly therein, a deflector frame having a pair of arms extending therefrom within said slots and pivotally mounted on the broom frame, means on the deflector frame for riding on the rails, and a plurality of substantially vertical deflectors mounted on the deflector frame and inclined to the direction of movement of the track sweeper, whereby loose material thrown by the rotary broom against the inclined deflectors is thereby deflected outwardly of the rails.

6. In a railroad track sweeper, the combination of a vehicle having supporting wheels for riding on the rails, a rotary broom mounted on the vehicle transversely of and between the rails for engaging loose material between the rails and throwing the same longitudinally of the rails, and a deflector assembly mounted on the vehicle adjacent the rotary broom and embodying a pair of spaced, vertically extending deflectors extending from a point generally at the centerline of the track to a position outwardly below the upper surface of the rails with cut out portions to receive the rails and being inclined outwardly with respect to said broom from the center of the track at an angle to the rails, an end cover plate on each end of the deflector assembly adjacent the outer edges of the deflectors for guiding the material being thrown outwardly by the deflectors onto the roadbed, an upper cover plate extending transversely of the rails and covering the upper edges of the deflectors, and a front cover plate disposed forwardly of the deflectors adjacent the end cover plates, whereby loose material between the rails is thrown off the rotary broom against the deflectors and is deflected thereby outwardly of the rails where it is guided downwardly onto the roadbed by the cover plates.

7. In a railroad track sweeper, the combination of a vehicle having supporting wheels for riding on the rails, a rotary broom mounted on the vehicle and extending between the rails for engaging loose material and throwing the same longitudinally of the rails, a deflector assembly mounted on the vehicle adjacent the rotary broom and embodying two series of spaced vertically disposed deflector plates, one series being on one side of the centerline of the track and the other series being on the opposite side of the centerline of the track, each of said series comprising a plurality of substantially parallel vertically extending spaced deflector plates arranged in the path of the material thrown off the broom and inclined outwardly from the centerline of the track toward the adjacent rail and at an angle to the rails, the lateral edges of adjacent plates in each series overlapping each other whereby loose material between the rails is thrown by the rotary broom against the deflectors and is deflected thereby outward stepwise relation outwardly of the rails.

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