

Dec. 7, 1943.

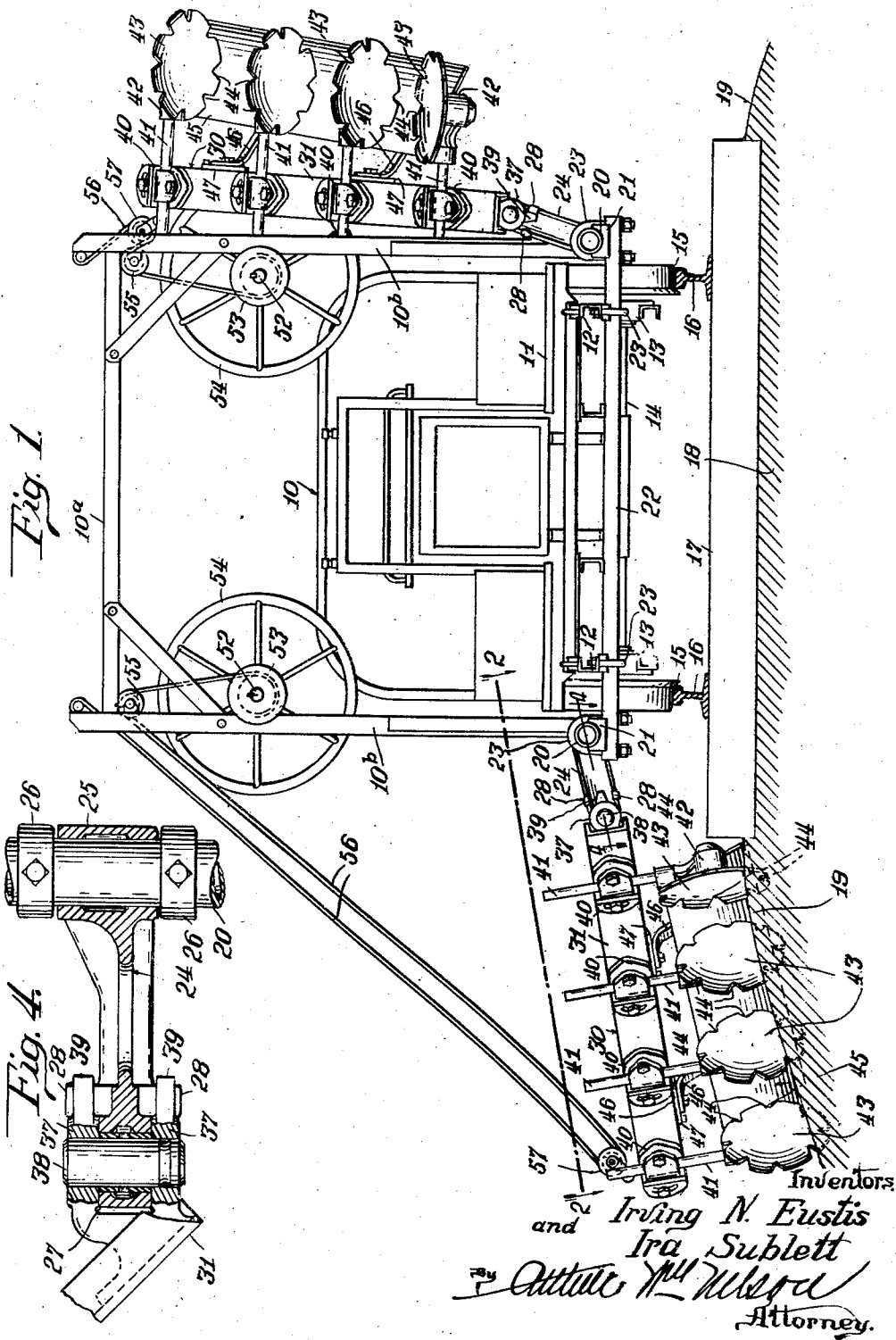
I. N. EUSTIS ET AL

2,336,079

BALLAST WORKING APPARATUS

Filed Nov. 10, 1941

2 Sheets-Sheet 1



Dec. 7, 1943.

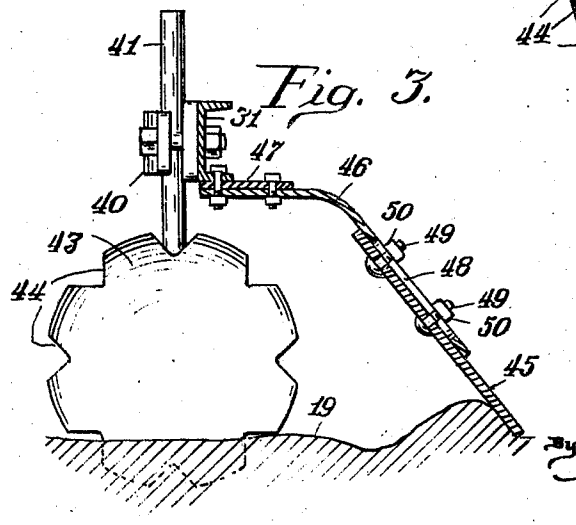
I. N. EUSTIS ET AL

2,336,079

BALLAST WORKING APPARATUS .

Filed Nov. 10, 1941

2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,336,079

BALLAST WORKING APPARATUS

Irving N. Eustis and Ira Sublett, Fairmont, Minn.,
assignors to Fairmont Railway Motors, Inc.,
Fairmont, Minn., a corporation of Minnesota

Application November 10, 1941, Serial No. 418,452

9 Claims. (Cl. 37—105)

This invention relates to improvements in ballast working apparatus and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The ballast working apparatus with which the present invention is more especially concerned, is of the kind generally mounted upon a railway motor car and includes a set of ballast engageable discs and suitable supporting means therefor at each side of the car. It further includes some means, usually manually operable, for moving the supporting means and the associated sets of discs from a working position in the ballast, to a substantially upright position wherein the discs are in a non-working position with respect to the ballast, as when the car is under way from one point of use to another.

Apparatus of this kind as heretofore constructed, had certain defects in that the discs would not function satisfactorily in uneven ballast. In some instances, when the leading disc of one set, which is the one closest the tie ends of the track, engaged a soft spot or area in the ballast, it would "dig in" and either stall or derail the car. Also, in apparatus of this kind as heretofore constructed, when the leading disc of a set of discs struck an obstruction in the ballast or the end of a long tie and rode over the same, the tendency was to impart a lift to the associated side of the car or to lift the outer discs out of the ballast, thereby doing unsatisfactory work by leaving undisc'd spots or areas in the ballast.

One of the objects of the present invention is to provide apparatus of this kind which will function satisfactory in ballast of all kinds, whether of an even or uneven contour and section.

Another object of the invention is to provide apparatus of this kind wherein even though the leading disc of either set engages a soft spot in the ballast or rides over an obstruction therein, the remaining discs in the set will not be lifted out of the ballast to stall or possibly derail the car of the apparatus.

A further object of the invention is to provide apparatus of this kind wherein the supporting means for the sets of discs are capable of a limited floating movement upwardly or downwardly better to follow the contour or section of the ballast without lifting any of the discs from the ballast.

Again, it is an object of the invention to provide apparatus of this kind which imparts a contour to the ballast after the discing operation.

The above mentioned objects of the invention, as well as others, together with the advan-

tages thereof will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a view in front elevation of a railway motor car to which the improved ballast working apparatus has been applied, the set of discs at one side of the car being illustrated in the operative working position in the ballast and the set of discs at the other side of the car being illustrated in the inoperative position out of the ballast, as when the car is being moved from one place of use to another.

Fig. 2 is a horizontal sectional view through a part of the apparatus as taken on the line 2—2 of Fig. 1.

Fig. 3 is a detail vertical sectional view through a part of the apparatus as taken on the line 3—3 of Fig. 2.

Fig. 4 is a detail view, on an enlarged scale, through certain parts of the apparatus as taken on the line 4—4 of Fig. 1.

Referring now in detail to that embodiment of the invention illustrated in the drawings, 10 indicates as a whole a so-called railway motor car that includes a deck 11 mounted upon side sills 12. These sills carry suitable journal boxes 13 for the front and rear axles 14 to the outer ends of which are operatively secured the wheels 15. These wheels are flanged to roll upon the rails 16 of the track and which are supported upon cross ties 17 disposed upon a suitable ballast bed 18. In a single line railroad track, the ballast thereof beyond the tie ends usually has an outwardly and downwardly curved contour indicated at 19 in Fig. 1. It is to be understood that the contour shown is merely illustrative of one contour often employed in a single line railroad track. It is also to be understood that the motor car has the usual gasoline motor, transmission, braking equipment and the like, that are conventional in cars of this kind but which are not illustrated herein.

The ballast working apparatus of the present invention, when attached to the car, includes a tubular rock shaft 20 at each side of and extending longitudinally therealong in about the horizontal plane of the side sills 12—12. The rock shafts 20—20 are engaged at their ends in suitable cradles or blocks 21—21, which are carried upon the ends of cross tubes 22, one at each end of the car and only one of which appears in Fig. 1. Said cross tubes are disposed in a plane below the ends of the side sills 12—12 and to which they are secured by suitable yokes or U-bolts 23. The construction described makes it possible to

apply the apparatus to a railway motor car so as readily to convert it into a ballast working car and to then remove the apparatus from the car when it is necessary to use the car for other purposes upon the track.

Associated with each shaft 20 is a pair of arms 24—24, one arranged toward each end of said shaft. Each arm is provided at its inner end with a hub or bearing sleeve 25 that is journaled on the shaft 20 for a turning movement thereon, each arm being held against endwise displacement on the shaft by collars 26—26 fixed to the shaft. The outer end of each arm is formed as a short bearing sleeve or eye 27 and on each side of said arm near the sleeve or eye 27 is a pair of laterally spaced bosses 28—28, the purpose of which will later appear.

At each side of the car is an open substantially triangular frame 30 that includes front and rear members 31—32, and a longitudinal member 33. The member 33, which is relatively long, is disposed between and connects the inner end of the front and rear members 31—32 while a relatively short plate 34 is disposed between and connects the outer end of the members 31—32. The rear member 32 is disposed at a right angle to the member 33 and the front member 31 is disposed at an angle of about 45° with respect to each of the members 32—33, the member 31 forming the hypotenuse of the triangular frame. The frame mentioned may be braced in any suitable manner to withstand the strains to which it is subjected in use.

The inner end of each member 31—32 carries a bracket 35—36, each of which includes a pair of laterally spaced apertured ears 37—37 to embrace the bearing sleeve or eye 27 of the associated arm 24. A pin 38 extends through each pair of ears 37—37 and associated eye 27 and provides a hinged or pivotal connection therebetween. Each ear carries a lug 39 that is disposed between the bosses 28—28 of the associated eye and said lug 39 is adapted to engage either boss 28 so as to determine or limit the relative angular or floating movement between the frame 30 as a whole and said arms 24—24.

Longitudinally spaced along the front face of the member 31 of the frame is a plurality of clamps 40—40 each to receive a substantially upright post or stem 41. The clamps 40—40 are so constructed that the stems may be adjusted longitudinally or axially therein and said clamps are further constructed so that the posts or stems may be turned into limited angles to one side or the other of the longitudinal plane of the member 31. Each post or stem is provided at its bottom end with a bearing housing 42 for the stub shaft (not shown) of an associated concavo-convex disc 43. Preferably in the periphery of each disc are recesses 44, which as the disc moves forwardly in the ballast, cause the disc to rotate on its stub shaft for a better discing action in the ballast. By means of the construction described, the discs are capable of being adjusted into that position required by the material in the particular stretch of ballast to be worked in order to maintain the desired depth of action.

Means are provided on each frame to the rear of the discs thereof to strike off the worked ballast so as to impart the desired cross sectional contour thereto. As best shown in Fig. 1, said means includes a plate or wide blade 45 disposed rearwardly of the discs and parallel with the member 31 of the frame. The bottom edge of said plate, which angles downwardly and rear-

wardly from said member, is formed to produce the desired contour to the surface of the worked ballast. This plate is supported by means of spring arms 46—46 fixed at the upper end to attachment plates 47, which in turn are fixed to the underside of the frame member 31. The arms 46 which are disposed to engage the rear face of the strike off plate, have longitudinal slots 48 therein and pairs of bolts 49 carried by said plate extend through said slots and receive nuts 50. The plate or blade 45 is provided with longitudinal rows of holes 51 for the passage of the bolts. By loosening the nuts, the plate may be adjusted longitudinally of the arms after which the nuts are tightened to lock the plate in the adjusted position. By disposing the bolts 49 in the proper holes 51, the desired position of the plate or blade 45 relatively to the frame member 31 may be accurately gauged. With the arms 46 made as springs, should the plate or blade 45 strike a cobble stone or other obstruction in the ballast, the arms will give a yield so that said plate or blade can pass over the same without material damage.

Any suitable mechanism may be applied to the car for lowering the frames into working position for the discs, as appears at the left hand side of Fig. 1 and for raising the frames into a substantially upright position, as shown at the right hand of Fig. 1 and which position the frames occupy when the car is in movement along the rail from one place of use to another. As best illustrated in Fig. 1, we may employ upright posts 10^b which rise from the sides of the car toward the rear end thereof and which are connected together at the top end by a cross piece 10^a. Each post has a stub shaft 52 journaled on the inner face thereof and on which is fixed a drum 53 and a hand wheel 54. A pulley 55 is mounted on the top end of each post and a cable 56 is trained over this pulley. One end of said cable is wound in the proper direction upon the drum 53 and has its extremity fixed thereto. The other end of said cable passes about a pulley 57 carried by the outer end of the associated frame 30 to lead to and be secured at its extremity to the top end of the associated post 50.

When the hand wheel 54 is turned in one direction, the cable is wound upon the drum 53 and this shortens the cable so that the frame 30 is swung upwardly and inwardly, the drum being releasably locked against return movement in any suitable manner. In the initial part of this movement, the frame 30 swings about the axis as provided by the pin 38 until the lugs 39 engage the lower bosses 28 on the arms 24 and this locks the frame to the arms so that they thereafter turn as one, about the axis of the associated shaft 20 into the position shown in the right hand side of Fig. 1.

When the frames are in the position wherein the discs are in the operative working position in the ballast, that part of the cable 56 between the pulleys 55 and 57 and top end of the associated post is left a trifle slack. Therefore, should the inner disc of the frame hit a soft spot and sink therein, the frame swings about the axis as provided by the pins 38 and the arms 24 swing downwardly about the axis of the hollow shaft 20. Thus the knuckle-like joints between the frame and the arms "break" downwardly so that there is no tendency to lift the remaining discs of the frame upwardly and outwardly out of the ballast to there skip a part of the discing

action. If the inner disc of the frame strikes an obstruction, such as a large stone or the end of a long tie 17, it rides over the same, the knuckle joint before mentioned breaking upwardly. Thus, by reason of the knuckle-like joint and the hinged or pivotal connection, the arms 24 have on the shaft 20, the frame can float to accommodate irregular conditions in the ballast which tend to retard, if not derail, the car in apparatus heretofore made for discing ballast.

The construction described comprises but a relatively few parts, which efficiently coact for the purpose mentioned.

When in describing the invention, we have referred in detail to the form, arrangement and construction of the parts involved, the same is to be considered only in the illustrative sense, so that we do not wish to be limited thereto except as may be specifically set forth in the appended claims.

We claim as our invention:

1. In combination with a vehicle adapted for travel upon a railroad track, ballast working means associated with one side of the vehicle, supporting means for the ballast working means and having a pivotal connection at one end with said side of the vehicle for a swinging movement from an operative position of the ballast working means in the ballast to an inoperative position out of the ballast, said supporting means comprising inner and outer end portions connected together for a limited relative floating movement in substantially a vertical plane, and projections on said end portions for limiting said floating movement.

2. In combination with a vehicle adapted for travel upon a railroad track, ballast working means associated with one side of the vehicle, supporting means for the ballast working means and having a pivotal connection at one end with said side of the vehicle for a swinging movement from an operative position of the ballast working means in the ballast to an inoperative position out of the ballast, said supporting means having inner and outer end portions, means providing a pivotal connection between said inner and outer end portions so that they are capable of a limited relative pivotal floating movement, the axis of said pivotal connection being substantially parallel with the axis of the first mentioned pivotal connection, and means for limiting the amount of relative pivotal floating movement between said inner and outer end portions of said supporting means.

3. In combination with a vehicle adapted for travel upon a railroad track, ballast working means associated with one side of the vehicle, supporting means for the ballast working means and having a pivotal connection at one end with said side of the vehicle for a swinging movement from an operative position of the ballast working means in the ballast to an inoperative position out of the ballast, said supporting means having inner and outer end portions, and coacting means on the meeting ends of said end portions providing a pivotal connection therebetween so that they are capable of a limited relative pivotal floating movement, said coacting means having parts arranged to engage each other and limit the amount of pivotal floating movement between said inner and outer end portions of said supporting means.

4. In combination with a vehicle adapted for travel upon a railroad track, ballast working

means associated with one side of the vehicle, supporting means for the ballast working means and having a pivotal connection at one end with said side of the vehicle for a swinging movement from an operative position of the ballast working means in the ballast to an inoperative position out of the ballast, said supporting means having inner and outer end portions, coacting members on the meeting ends of said inner and outer end portions providing a pivotal connection therebetween so that they are capable of a limited relative floating movement, one of said members including a projection adapted to engage with a shoulder on the other member for limiting the amount of pivotal movement between said inner and outer end portions of said supporting means.

5. In combination with a vehicle adapted for travel upon a railroad track, ballast working means associated with one side of the vehicle, a supporting frame for the ballast working means, said supporting frame including front and rear members, an arm associated with each of said front and rear members, each arm having a pivotal connection at one end with said side of the vehicle, means providing a pivotal connection for the outer end of each arm with the associated front or rear member, each arm and the associated front and rear members being formed with engageable parts for limiting the amount of pivotal movement between each arm and its associated member and whereby said arms and frame may be swung from an operative position of the ballast working means in the ballast to an inoperative position of said means out of said ballast.

6. In a ballast working vehicle, the combination of an arm, means providing a pivotal connection between one end of said arm and one side of the vehicle, means for supporting ballast working means, coacting means on one end of said supporting means and on the other end of said arm respectively providing a pivotal connection therebetween and whereby said means and said arm are capable of a relative pivotal floating movement, and coacting parts associated with said means and adapted for interengagement to limit the relative pivotal floating movement between said means and said arms.

7. In combination with a vehicle adapted to travel upon a railroad track, ballast working means associated with one side of the vehicle and including a plurality of rotatable discs, supporting means for the ballast working means and arm-like means having a pivotal connection at one end with said side of the vehicle, means providing a pivotal connection having limited movement between the other end of said arm-like means and said supporting means, and means carried by said supporting means and disposed to the rear of the discs of said ballast working means and functioning when the latter is working in the ballast for striking off the worked ballast to the desired contour.

8. In combination with a vehicle adapted to travel upon a railroad track, ballast working means associated with one side of the vehicle and including a plurality of ballast working elements, supporting means for the ballast working means and arm-like means having a pivotal connection at one end with said side of the vehicle, said supporting means including a frame member to which said elements are attached, means providing a pivotal connection having a limited movement between the other end of said arm-

like means and said supporting means, means disposed to the rear of said elements and functioning when the latter are working in the ballast for striking off the worked ballast to the desired contour, and yielding means carried by said frame member of said supporting means for supporting said last mentioned means.

9. In a ballast working vehicle, a frame at one side of the vehicle and carrying ballast working means, an arm pivotally connected to said side of the vehicle, an ear on the other end of said

arm, a second arm connected at one end to said frame and having an ear at the other end pivotally connected to the ear on the first arm, one of said ears carrying spaced shoulders and the other ear carrying a part disposed between said shoulders so as to engage either one thereof to limit the relative pivotal movement between said arms in two directions.

IRVING N. EUSTIS.
IRA SUBLETT.