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METHOD OF SURFACING TRACK

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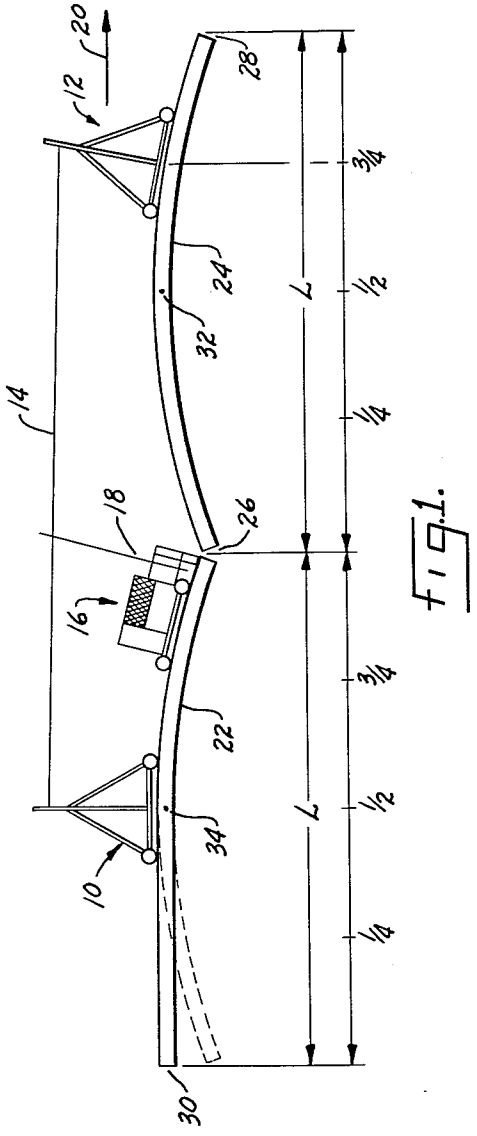


FIG. 1.

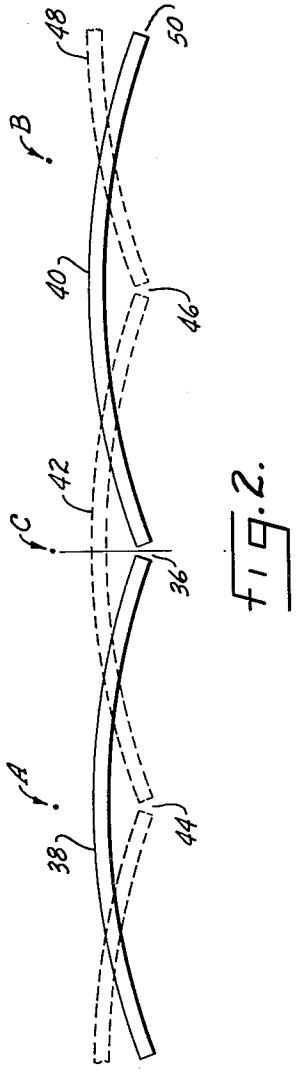


FIG. 2.

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METHOD OF SURFACING TRACK

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This invention is in the field of railroad track surfacing equipment and methods and is concerned with a method of removing what might be referred to as minor surface variations in the track.

After being in service for quite a while, the joints between adjacent rails get beat down due to the traffic going over them. This is probably due to the fact that a slight gap for expansion and contraction is left in the joints between the butt ends of adjacent rails. The wheels of the traffic when rolling over these joints or gaps will fall or drop a microscopic amount when they roll off of the end of one rail before hitting the adjacent end of the next rail. The fall or drop, while small, nevertheless means that a shock or blow is applied to the end of the next rail. After several months or years, the joints on a much traveled road will be depressed or beat down, and it is characteristically true of well used track that the joints are low and the center of the rails will be high. This is true whether there is one way traffic or traffic in both directions. It is also true in track regardless of whether the joints are directly opposite each other in adjacent rails or staggered, which is the more conventional arrangement. Low joints in track result in an extremely rough roadbed.

A primary object of this invention is a method of correcting such low joints in track.

Another object is a method of surfacing track to remove minor surface irregularities.

Another object is a method of jacking the joints in track with maximum accuracy.

Another object is a method of raising the joints in an accurate manner when the joints are staggered.

Another object is a method of jacking the joints with both speed and accuracy.

Other objects will appear from time to time in the ensuing specification and drawings in which:

FIGURE 1 is a diagrammatic side view of the method; and

FIGURE 2 is a diagrammatic side view, similar to FIGURE 1, of an additional feature.

In FIGURE 1, a surfacing assembly has been shown which may include rear and front cars **10** and **12**, respectively. A line **14** extends between the front and rear cars and the line may be a wire or a pair of wires, or any number of wires for that matter. If a wire is used, it is preferred that it be suitably tensioned so that as little sag as possible will exist. But it should be understood that the invention is not restricted to a wire and any line establishing medium may be used.

The assembly additionally may include a jack, designated generally **16**, which may carry or be associated with a sensing device, designated generally **18**, constructed to sense the distance between the wire or line **14** and the rails. Suitable spacer buggies or bars may extend between the buggies or cars and the jack so that the entire assembly may be rolled along the track and the same relative spacing will be maintained. The assembly may be self-propelled or it may be pushed or pulled. An assembly of this general nature is shown in U.S. Patent No. 2,974,607, issued March 14, 1961, and for details and additional information reference is made to that application. For purposes of illustration, it will be assumed that the entire assembly is moving from left to right as indicated by the arrow **20**.

The two end cars or buggies should be constructed so that the line **14** may be established at a predetermined distance above the rails at each end. This is to say that each end of the line should be positioned the same distance above the rails so that either a line or a plane will be established by the assembly which will be a uniform distance above the rails at each end and in between.

The track is made up of rail and in FIGURE 1 two such adjacent rails have been shown and are designated generally **22** and **24**. The ends of these rails come together at a joint **26** and, as shown, a slight gap, somewhat exaggerated in FIGURE 1, is provided so that the rails may expand or contract in hot and cold weather. Only two such rails have been shown in FIGURE 1 because the invention can be adequately illustrated and explained in connection with only two rails, but additional rails both ahead and behind the assembly are present. Thus there will be a joint, as at **28**, ahead of the assembly and another, at **30**, behind.

Below the diagrammatic showing of the rails and the surfacing assembly in FIGURE 1, a scale has been laid out with the length of each rail being designated generally L from one joint to the next, with the center of each rail designated ½ and the quarters designated ¼ and ¾.

The length of the line from the front to the rear station or buggy is important and it will be noted in FIGURE 1 that the rear end of the line on the rear car **10** is in the middle of one rail, as at ½, and the front end of the line on the front car **12** is on the forward quarter of the next rail, designated ¾. Thus the line is a rail length and a quarter long. The rear car or the rear end of the line will be positioned in the middle of the previous rail and the front end of the line or front car will be positioned on the forward quarter of the next rail.

The jack and sensing assembly are positioned approximately a half a rail length from the rear car **10** so that when the front and rear cars with the ends of the lines are in the position set forth above, the jack will be over a joint, designated **26** in FIGURE 1. The sensing mechanism **18** will sense the distance that the joint is low and the jack **16** may be used to raise the joint until the sensing mechanism **18** indicates that the joint is back up to the proper position and is spaced the predetermined distance from the line **14**, which is the same as the distance established at the front and rear cars **10** and **12**. It will be noted that in raising the low joint **26**, the rear half of the forward rail **24** will pivot or flex upwardly and may be considered to pivot about its mid point, designated generally **32** in FIGURE 1. Thus the forward half of the rail, from **32** to **28**, will not be affected when the joint **26** is raised, or if affected, it will be very slight. It should be noted that the forward car with the forward end of the line is positioned on this unaffected half of the forward rail. At the same time, the rear end of the wire or line is over the center **34** of the rear rail, and the forward half of the rear rail, from **34** to **26**, may be considered to flex upwardly about **34** as its pivot when the joint is jacked. But the raising of the forward portion of the rear rail **22** will have little, if any, effect upon the position of the rear end of the line. It will also be noted that the rear half of the rear rail **22**, running from **30** to **34**, is shown as generally level since the joint **30** has previously been raised or corrected and the old or low position is shown in broken lines.

As soon as the joint **26** has been raised, the jack **16** may have a tamping head so that the joint may be suitably tamped or otherwise maintained in its new position. Then the entire assembly may be moved forward until the jack and sensing arrangement come to the next joint. At the next joint, as before, the rear car should be approximately a half a rail length behind the jacking sta-

tion and the front car should be three-quarters of a rail length ahead, and the relationship set forth hereinabove will be reestablished.

The importance of the distance relationship of the line relative to a rail length is that when a joint is raised, the two ends of the line will not be affected and these are the points where the line is supported. At the same time, the line must be sufficiently short that the minor dips or irregularities caused by low joints will be reflected. If the line is excessively long, for example 120 feet, the minor variations, such as low joints, will not show up but only the major dips or sags will be sensed. In short, an excessively long line will not pick up or detect low joints. So the line must be relatively short, but at the same time it must be long enough so that the supported ends will not be shifted a detrimental amount when a joint is jacked.

As is conventional with track, the joints are normally staggered. As shown in FIGURE 2, the near rail is in heavy or solid lines and the far rail is in broken lines. The joint **36** between the two adjacent rails **38** and **40** of the near rail will be in the middle or center of a rail **42** of the far rail, while the joints **44** and **46** of the far rail will be laterally opposite the center of rails **38** and **40** in the near rail. It should also be noticed that FIGURE 2 has been shown directly below the rail section of FIGURE 1 so that the joint **36** of FIGURE 2 lines up with the joint **26** of FIGURE 1. For this matter rails **38** and **40** may be considered the same as rails **22** and **24** of FIGURE 1. Also, the surfacing assembly may be considered positioned on the track of FIGURE 2 with the rear car at A, the forward car at B and the jack and sensing assembly at C. The stations A, B and C are directly below the assembly shown on the track in FIGURE 1. It may be considered that the joint **44** has previously been raised or jacked so that the rear car **10** at the station A will be horizontal and in proper position. The jack at station C, however, will have its far wheels high since they rest in the center of the far rail **42** and its near wheels low since they are positioned approximately on the low joint **36**. In this sense the car will be tipped somewhat. The front car **12**, positioned at B, will be on the forward quarter of the near rail **40** and the rear quarter of the far rail, only the rear half of which is shown, as at **48**. Since the quarters of uncorrected track are half way between the high center and low joint, the track at this point may be considered to be only half low, if that much.

The point is that the rear car will rest on totally correct track and the front car will be on quarters which are approximately correct or a little low, while the jack and sensing assembly or station will be tipped a maximum amount. The jack, as shown in the above referred to prior application, will be used to raise the low joint **36** until it is level with the center of the far rail **42**. In this situation two lines or wires may be used to establish a plane or one may be used and doubled back to give two lengths with one tensioning arrangement so that the same amount of sag or deflection will occur in each or will balance out.

After the low joint **36** has been brought up, the entire assembly is moved forward and the rear car **10** will next be positioned at point C. The jack will be over the low joint **46** in the far rail and the front or forward car **12** will move to the next quarter beyond the last joint **50** shown in FIGURE 2. The entire assembly will move in a step by step manner with the jack working on joints alternately, first in the near rail, then in the far rail, and each step will be a half rail length long. In each case the rear car will be on corrected track and the line support will be accurate. The forward car will be on a quarter and the inaccuracy or deflection will be at a minimum. The jack will be over a joint of either one rail or the other where the depression or variation is a maximum and, accordingly, a maximum correction may be applied. If the line were exactly or approximately a rail length long, this would put the forward car or buggy over an uncorrected joint which would tilt it a maximum. But on the quarter, the forward buggy will be level and fairly close to proper elevation.

The use, operation and function of the invention are as follows:

The invention is concerned with removing what may be considered minor irregularities in the surface of track and is specifically concerned with low joints which inevitably occur. Normally the joints between the near and far rails are staggered with the joint of one occurring in the center of the other, as shown in FIGURE 2. Thus the procedure of moving the entire assembly in steps of a half rail length long is quite advisable. The length of the line or plane established should be a rail length and a quarter long so that the rear support will be on corrected track and the forward support will be on the forward quarter of the next rail, which will not be affected or at least will be affected to a minimum degree during jacking of the joint behind it. Also, the forward buggy or car or station will rest on a quarter where the deflection or depression will be at a minimum and the buggy will be level or relatively so.

The length of line or plane is short enough so that the joints may be accurately raised and brought to a new position but at the same time is also long enough so that the ends of the line or wire or plane will not be affected during jacking.

While the preferred form and several possible modifications of the invention have been shown and described, it should be understood that suitable additional modifications, changes, substitutions, alterations and variations may be made without departing from the invention's fundamental theme. It is, therefore, wished that the invention be unrestricted, except as by the appended claims.

We claim:

1. A method of removing depressions at the joints in railroad track made up of rails of a predetermined standard length interconnected end to end, including the steps of establishing a line above the track generally parallel thereto and an equal distance above the track at each end, making the line approximately a rail length and a quarter long, establishing a jacking station in the line, positioning the line and jacking station on the track with the jacking station at a point approximately a half rail length from the rear end of the line, sensing any increase in the distance between the line and the track at the joint, jacking the joint up to the predetermined distance previously established when such increase exists, and moving the line and jacking station along the track from one joint to the next and jacking the joints up where such increase is detected.

2. The method of claim 1 further characterized by and including the step of establishing a generally horizontal plane above the track generally parallel thereto an equal distance above the track at each end, and establishing the jacking station in the plane.

3. A method of removing depressions in track made up of rails of a predetermined length interconnected end to end, including the steps of establishing a line above the track generally parallel thereto and an equal predetermined vertical distance above the track at its front and rear ends, making the line approximately a rail length and a quarter long, establishing a jacking station in the line approximately a quarter rail length from the rear end, moving the line and jacking station, as a unit, along the track with the same relatvie spacing and, at the same time, maintaining the ends of the line at the predetermined vertical distance above the track, sensing variations in the vertical distance between the track and the line at the jacking station, and jacking the track up to the predetermined distance previously established between each end of the line and the track.

4. The method of claim 3 further characterized by and including the step of positioning the line and jacking sta-

tion on the track with the jacking station at a joint, sensing any increase in the distance between the line and the track at the joint, jacking the joint up to the predetermined distance previously established when such increase exists, moving the line and jacking station, as a unit, along the track from one joint to the next with the jacking station positioned at the joint, and jacking the joints up where such increase is detected.

5. A method of detecting minor surface variations in track made up of rails of a predetermined standard length, including the steps of establishing a line above the track generally parallel thereto and an equal distance above the track at each end, making the length of the line slightly greater than a rail length, establishing a sensing station in the line between the ends thereof closer to the rear end, moving the line and sensing station, as a unit, along the track and, at the same time, maintaining both the same relative spacing and the ends of the line at the predetermined distance above the track, and sensing any variations in the vertical distance between the track and the line at the sensing station.

6. The method of claim 5 further characterized by and including the step of jacking the track up where any variations are sensed until the previously established distance between the track and the line is established at the sensing station.

7. The method of claim 5 further characterized by and including the step of making the length of the line approximately a rail length and a quarter long.

8. The method of claim 1 further characterized in that the step of establishing a line above the track includes disposing and tensioning at least one wire above and generally parallel to the track.

9. The method of claim 1 further characterized in that the step of establishing a line includes positioning a wire along the track and doubling it back on itself so as to define two lengths, disposing each length generally over a rail spaced laterally from each other, each length being generally parallel to its rail, and applying tension to the ends of the wires so that the same amount of sag will occur in each length.

10. The method of claim 3 further characterized in that the step of establishing a line above the track includes disposing and tensioning at least one wire above and generally parallel to the track.

11. The method of claim 3 further characterized in that the step of establishing a line includes positioning a wire along the track and doubling it back on itself so as to define two lengths, disposing each length generally over a rail spaced laterally from each other, each length being generally parallel to its rail, and applying tension to the ends of the wires so that the same amount of sag will occur in each length.

12. The method of claim 5 further characterized in that the step of establishing a line above the track includes disposing and tensioning at least one wire above and generally parallel to the track.

13. The method of claim 5 further characterized in that the step of establishing a line includes positioning a wire along the track and doubling it back on itself so as to define two lengths, disposing each length generally over a rail spaced laterally from each other, each length being generally parallel to its rail, and applying tension to the ends of the wires so that the same amount of sag will occur in each length.

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