

Dec. 7, 1971

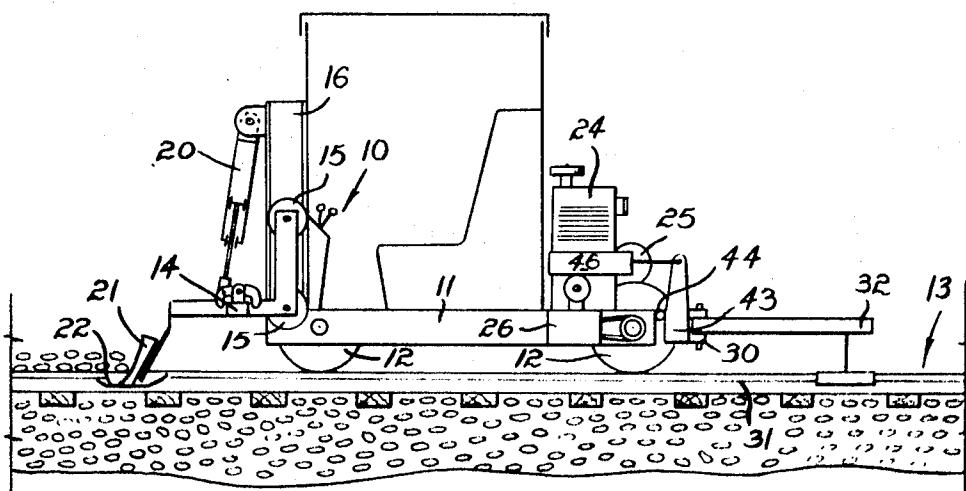
W. J. YARD

3,624,936

BALLAST REGULATOR

Filed Aug. 27, 1969

3 Sheets-Sheet 1



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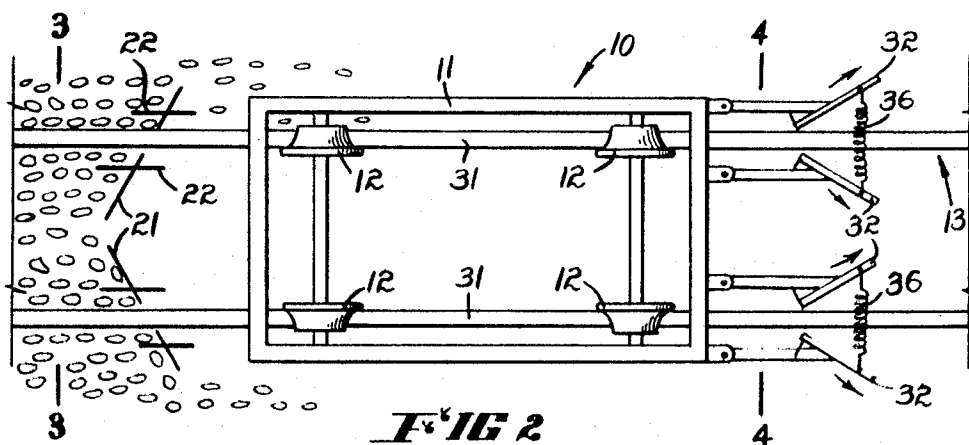


FIG 2

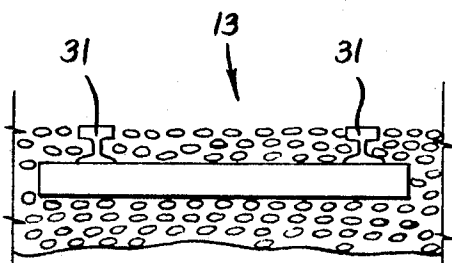


FIG 3

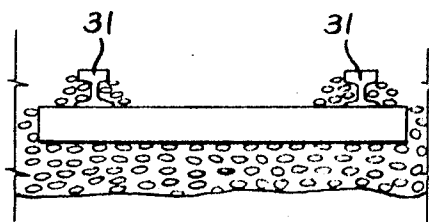


FIG 4

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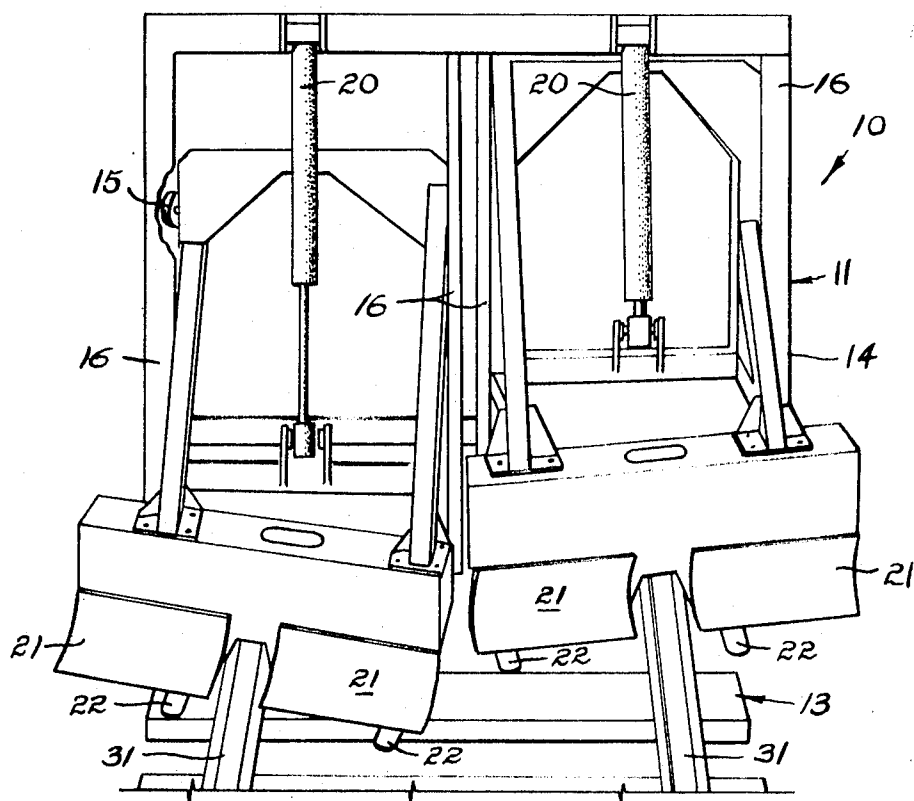


FIG 5

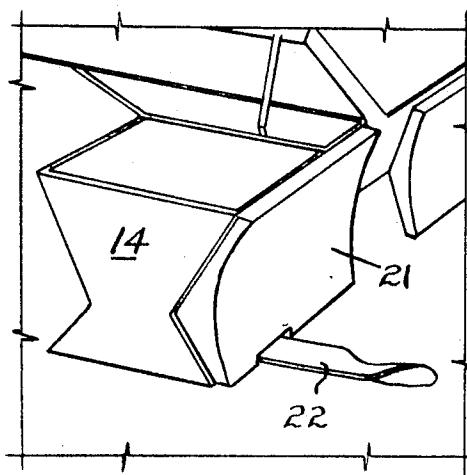


FIG 6

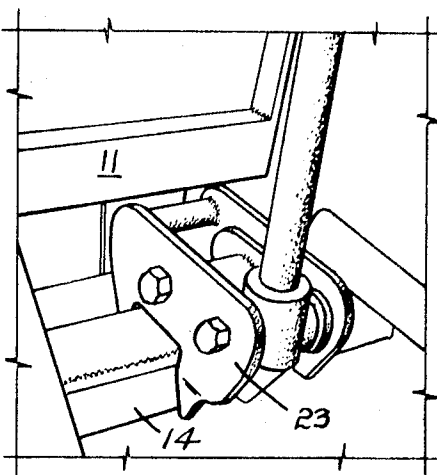


FIG 7

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BALLAST REGULATOR

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3 Sheets-Sheet 3

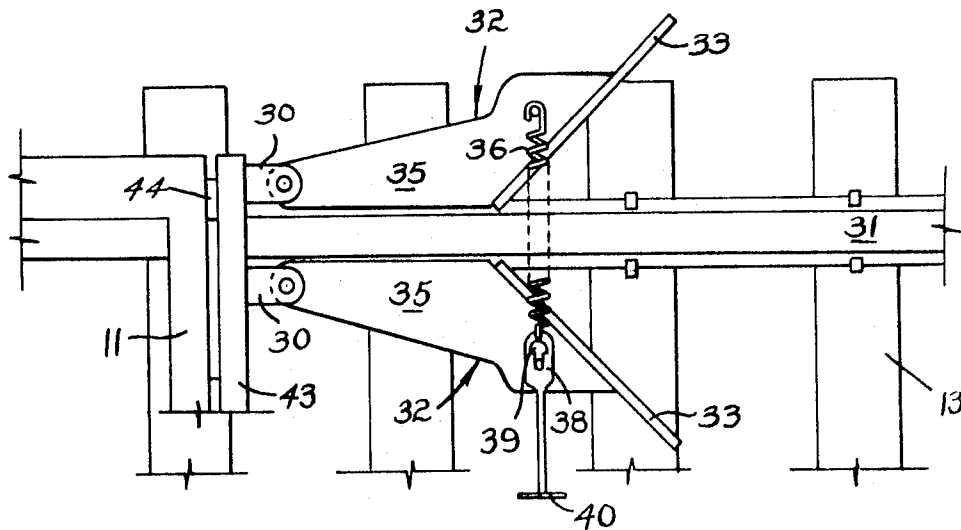


FIG 8

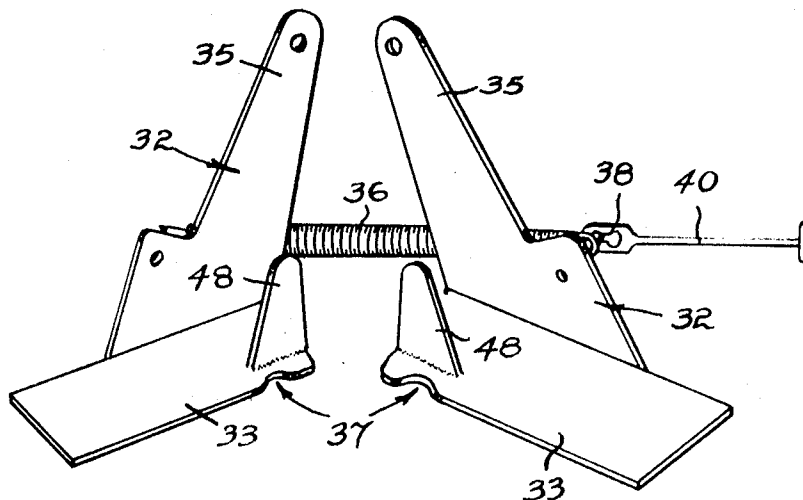


FIG 9

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3,624,936

BALLAST REGULATOR

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9 Claims

ABSTRACT OF THE DISCLOSURE

Ballast levelling and regulating device for levelling ballast dumped on rail tracks, the device being provided with plow blades and skid plates which can be raised or lowered, the skid plates extending in a fore and aft direction and being effective in preventing the device from tearing or dislodging the ties supporting the rails as the device moves along the rails to level the ballast.

This invention relates to a levelling device which is useful for the regulating and profiling of the ballast of a permanent way.

Currently levelling devices are in common use and the levelling devices used consist of a pair of sloping wings arranged in a V-formation when viewed in plan, these wings normally being termed "plow blades." However it is necessary with the existing plow blades to have large notches to bridge the rails and clear the fish plates and bolts, and to allow the plow blades to negotiate curves. Consequently after ballast has been levelled with the usual existing type of machine, some ballast remains on each side of the rail and this can be heaped up almost to the rail head level in some instances. This is undesirable, and removal of this residual ballast is frequently effected by hand.

One of the objects of this invention is to provide an improvement whereby the ballast can be spread closer to rails than heretofore and the invention may in one of its forms include as a feature a machine having a pair of swivel arms pivoted to its chassis, and side wings on the swivel arms, the swivel arms having scraper blades thereon and also being provided with means to retain them adjacent a rail. If the swivel arms are pivoted relative to one another, clearly they can be arranged to move very close to the rail and thereby remove the residual ballast.

On existing ballast regulators it has been considered necessary to incorporate rotary brooms, for the purpose of removing ballast left on the track bed due to the need to provide clearance between the lower edge of the plow blade and the sleepers. Without this clearance there is a danger of a plow blade cutting into a tie, tipping it (thereby more firmly engaging it), and driving it towards adjacent ties thereby damaging the track. Since the ballast above the ties serves no useful purpose, it has been the practice to sweep them to the side of the track, utilising a large rotary broom having combination wire and rubber bristles. These brooms are expensive to install, and maintenance costs are high, and a further object of the invention is to provide improvements whereby the work performed by these brooms is much reduced, and in some instances even eliminated.

This invention may include as one of its features skid plates fixed relative to the plow blades, the skid plates having upwardly sloping front and rear ends providing a "lead-in" effect so that they ride over any ties which are abnormally high. The lower edges of the plow blades then move much closer to the upper surfaces of the ties, in turn more effectively removing the ballast, and in some instances the rotary broom can be dispensed with.

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An embodiment of the invention is described herewith in some detail with reference to and is illustrated in the accompanying drawings in which:

FIG. 1 is a diagrammatical sectional elevation showing operation of the device,

FIG. 2 is a plan view of FIG. 1, also diagrammatical and showing operation of the device,

FIG. 3 is a section of the track before ballast is initially cleared by plow blades,

FIG. 4 is a section of the track showing how, although the plow blades initially clear most of the ballast, they nevertheless leave residual ballast alongside the rails for final clearing by the sloping wings of pivoted arms.

FIG. 5 is a front elevation of the device showing some constructional details,

FIG. 6 is an enlarged perspective view of portion of the frame showing the plow blades and skid plate attached,

FIG. 7 is a similarly enlarged perspective view showing interconnection between power lifting means and the frame,

FIG. 8 is an enlarged plan view showing a pair of swivel arms pivoted to the chassis of the device, and

FIG. 9 is an underside perspective view of the swivel arms of FIG. 8, with the blades angled from their normal positions to more clearly illustrate the structure of the swivel arm and blade assembly.

A ballast levelling and regulating device 10 is provided with a chassis 11 having on it four rail engaging support wheels 12 arranged to support the chassis for travelling along a railroad track 13, the device also having a pair of frames 14 which are provided with rollers 15 engaging channel guides 16 to thereby form co-operating guide means guiding the frames 14 for movement downwardly towards or upwardly away from the track 13.

Power levelling means are constituted by hydraulic cylinders 20 which operably couple the frame 14 of the chassis 11 for effecting the movement upwardly and downwardly.

The frame 14 has secured to it plow blades 21 which are angled to the direction of travel so that under normal operation they deflect the ballast from the track outwardly, and in order to avoid possibility of the plow blades 21 digging into any higher ties, each plow blade is provided with a skid plate 22, the skid plates 22 extending in a fore and aft direction and terminating at their front and rear ends in portions which slope upwardly.

In order to allow the skid plates 22 to lift the plow blades, the hydraulic cylinders 20 are coupled to respective frames 14 through C-shaped members 23 (FIG. 7) pivoted to the frame 14, but pivotal movement is limited by engagement of the arms of the C-shaped members 23 against the front and rear side walls of the frame member to which they are pivoted.

Frame 14 is shaped similarly on its front and rear face (FIG. 6) so that the plow blades 21 can be carried on either or both front and rear faces if desired thereby enabling the machine to deflect ballast inwardly towards the centre of the track upon reversal of direction of travel.

The hydraulic pressure and drive required for the machine is obtained from an engine 24 which drives a pump 25 and it also couples to the wheels 12 through gear box 26, shown diagrammatically in FIG. 1.

The rear end of the chassis is provided with lugs 30 arranged in two pairs one over each rail 31 of the railroad track 13, and a swivel arm 32 is pivoted to each respective lug 30 as shown in FIG. 8. Each swivel arm 32 carries on it a sloping wing 33 arranged to diverge outwardly and rearwardly in respect of each rail 31 as shown in FIG. 8. Each sloping wing 33 is provided with an upper deflector plate 35 arranged to retain ballast

against sloping wings 33 and thereby avoid the tendency for ballast to be heaped over rail 31.

The wings 33 are provided, as shown in FIG. 9, with clearance notches 37 near their inner ends to clear dog spikes disposed along the track, but these are small compared with a clearance between adjacent plow blades 21. The two deflector plates 35 of each pair of swivel arms 32 are urged towards one another by means of a tension spring 36, one end of which engages a plate 38 containing a "key hole" slot 39, the plate 38 having an extending handle 40 so that the spring can be quickly released.

The lugs 30 extend rearwardly from a hinged rear cross member 43, connected by means of hinges 44 to the chassis 11. The four wings are lowered by lowering of the cross member 43 (effected by hydraulic cylinder 46, FIG. 1), the two wings are positioned one on each side of each rail, each spring 36 retaining them against the sides of the rail. As the device moves upwardly, the spring retains the wings adjacent to or in contact with the sides of the rail while the deflector plate ensures that ballast is deflected by the wings. The wings also are provided with cam plates 48 (FIG. 9) to enable them to pass fish plates or other obstructions along the rails. Thus the sloping wings spread the residual ballast (illustrated in FIG. 4) to each side of each rail.

What I claim is:

1. A ballast leveling and regulating device having a chassis, rail engaging wheels supporting the chassis for traveling along a railroad track, a pair of frames positioned one over each rail of said track, a respective horizontal frame member having front and rear faces on each said frame, a respective plow blade secured to and depending from each said frame, upstanding guides on the chassis engaged by respective guide engaging means on the frames guiding the frames for movement downwardly towards or upwardly away from said track, a pair of hydraulic lifting cylinders, pivot means coupling the upper end of each cylinder to the chassis, a pair of C-shaped members, pivot means attaching the lower end of each said cylinder to a respective said C-shaped member about a first axis, and further pivot means attaching each said C-shaped member to a respective said horizontal frame member about a second axis spaced from but parallel to the first said axis, so arranged that the arms of each C-shaped member are positioned respectively fore and aft of said front and rear faces of the respective horizontal frame member, each arm being engageable against a respective said face upon rocking of the C-shaped member thereby permitting corresponding limited upward movement of the frames relative to the chassis without operation of the respective cylinders.

2. A ballast leveling and regulating device according to claim 1 further comprising two pairs of swivel arms pivoted to the chassis, the pivot arms of each pair being positioned one on each side of a respective rail, a scraper blade on each swivel arm, and means urging the arms of each said pair towards respective sides of a respective rail comprising a spring, a plate on one end of the spring, a key hole shaped slot in the plate engageable over a pin on one of the swivel arms, and means connecting the other end of the spring to the other swivel arm.

3. A ballast leveling and regulating device according to claim 1 further comprising skid plates extending in a fore and aft direction, the skid plates being positioned beneath respective said plow blades, the front and rear ends of the skid plates sloping upwardly.

4. A ballast levelling and regulating device according to claim 1 wherein the plow blades are angled to define a V-formation when viewed in plan, each plow blade having a notch in its lower edge positioned above a respective rail of the track, and a skid plate on each side of each notch.

5. A ballast levelling and regulating device according to claim 4 further comprising two pairs of swivel arms pivoted to the chassis, the swivel arms of each pair being positioned one on each side of a respective rail, a scraper blade on each swivel arm, and spring means between the arms of each pair drawing the arms towards each other.

6. In a ballast leveling and regulating device having a chassis, rail engaging wheels supporting the chassis for movement along a railroad track, and a pair of plow blade assemblies carried by the rail engaging wheels for distributing ballast, the improvement comprising:

a pair of scraper assemblies connected to the chassis and extending rearwardly of the rail engaging wheels, one scraper assembly being positioned over each rail of the track, each scraper assembly having a pair of arms pivotally connected to the chassis and extending generally parallel to and on opposite sides of the respective rail, a scraper blade depending from each arm at the end thereof remote from the chassis, the scraper blades extending in close proximity to the side portions of the respective rail and the ties of the track and means connecting the two arms of each scraper assembly to bias the arms and scraper blades toward the sides of the rails.

7. The improvement according to claim 6 wherein the arms are connected to the chassis by means of a cross member, the cross member being pivotally connected to the chassis for movement about a horizontal axis transverse to the rails, and means for pivoting the cross member about the axis to raise and lower the scraper assemblies toward and away from the rails.

8. The improvement according to claim 6 wherein the two scraper blades of each scraper assembly are in diverging relation to one another, each blade having at least one notch in its lower surface to provide clearance for the spikes of the track.

9. The improvement according to claim 8 wherein each blade has a cam plate projecting therefrom for guiding the blade clear of fishplates and other obstructions along the rail.

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