July 15, 1930. J. F. ROBB 1,770,552

BALLAST CLEANING AND REMOVING MACHINE

Filed Feb. 5, 1927 2 Sheets-Sheet 1

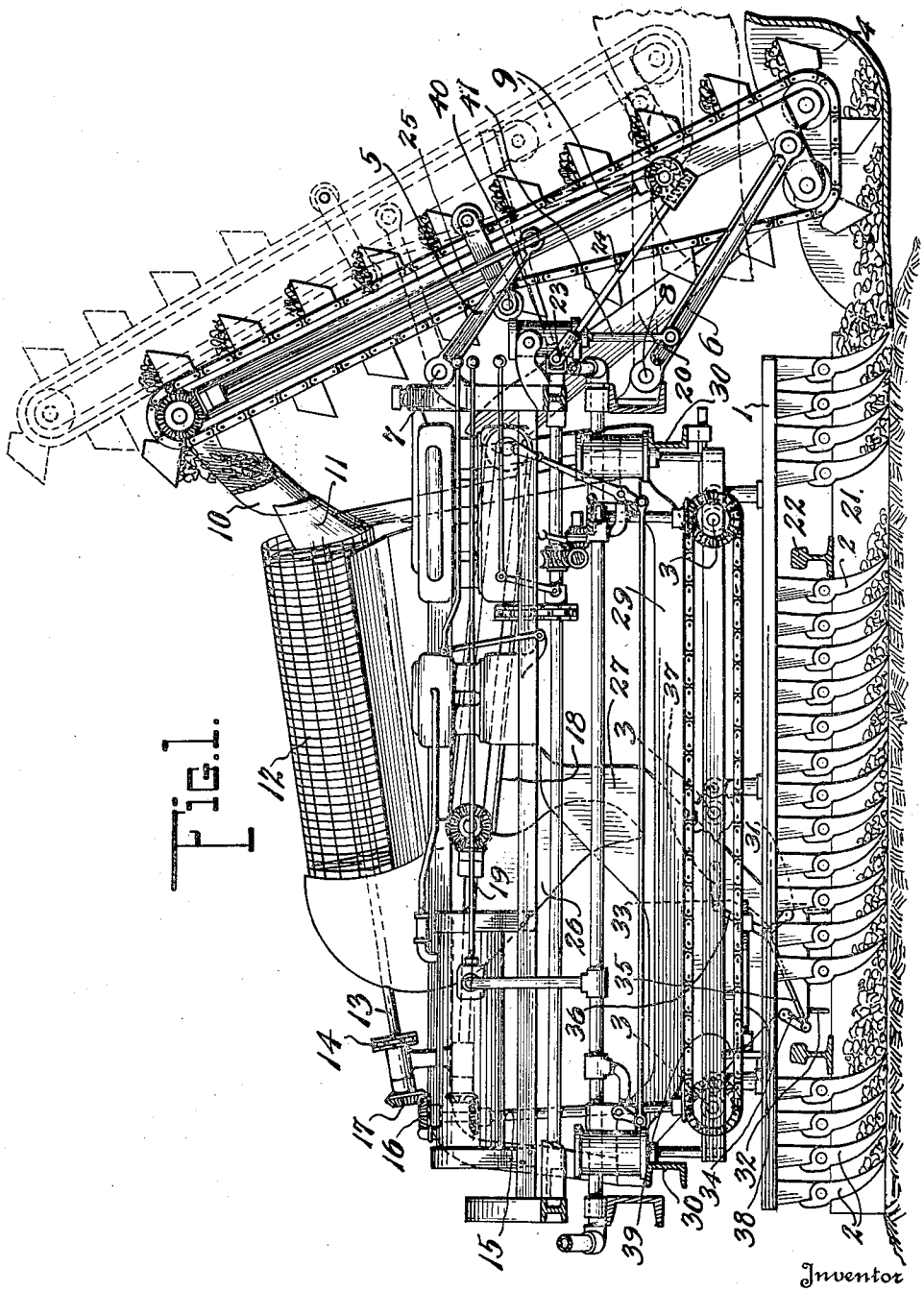


Fig. 1.

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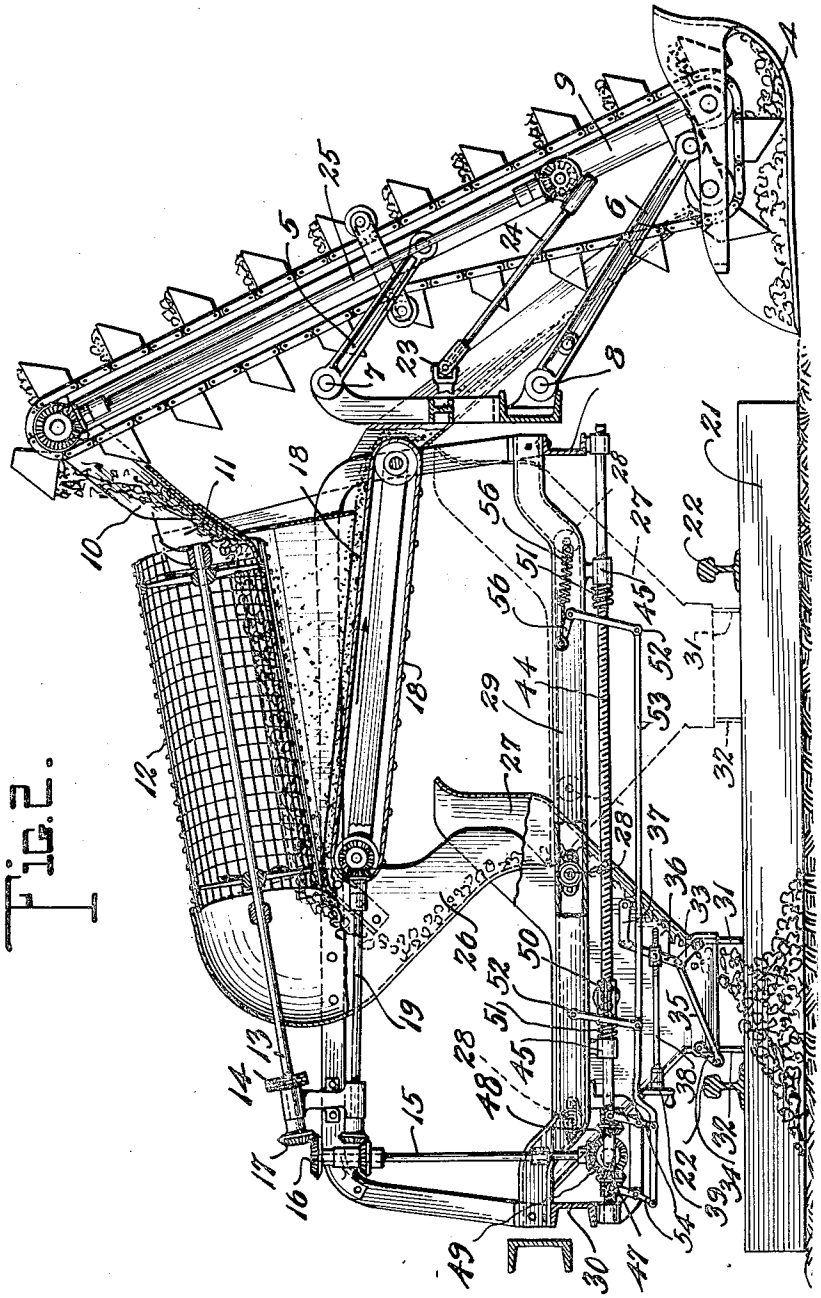


Fig. 2.

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UNITED STATES PATENT OFFICE

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BALLAST CLEANING AND REMOVING MACHINE

Application filed February 5, 1927. Serial No. 166,144.

The purpose of this invention has been to develop a practical design of machine for removing, cleaning and replacing ballast between railroad tracks. There are today, I believe, ballast cleaning machines which handle ballast located at the sides of the railroad track, digging up the ballast, or otherwise removing it and screening the same to clean it. So far as I am aware, however, there has never been proposed, or made, any machine which will handle the removal of the ballast from between the ties, and between the tracks resting on the ties, and clean such ballast as a part of the general machine operation.

In the carrying out of my invention, I propose to employ ballast removing means, which operates in paths parallel to and between the ties, to remove the ballast from between the ties throughout their entire lengths and shift the ballast to a side of the railroad track, including such ties. My machine includes an elevator, or conveyor, of suitable construction, which is arranged at one side of the track and adapted to elevate the ballast as it is removed from between the ties and, by the removing mechanism, cause the same to be conveyed to a screening or any suitable cleaning means whatsoever. The screening or cleaning means is a part of the general machine and is preferably located above the track itself and adapted to travel along the track by means of the traction support which not only supports the cleaning mechanism but also the ballast removing means and conveyer means referred to.

My invention includes a ballast conveyor which is movably supported and adjustable to be raised and lowered when out of and in use, respectively.

My invention further proposes special conveyer mechanism for carrying off from the machine the dirt and foreign matter which is screened or otherwise cleaned out of the ballast, thus getting rid of this undesirable portion of said ballast.

My invention further includes provisions for the replacement of the cleaned ballast between the ties, including preferably a moving type of hopper which is shiftable transversely of the frame of the traction support, and transversely of the railroad track itself, so that the cleaned ballast received in the hopper may be dumped along the spaces between the ties from which spaces it has been previously removed with the dirt forming a part of the same.

Or if I use a hopper that is stationary, or has only movement between the rails, I may employ special spreading devices to spread out the replaced ballast as it passes to the road bed.

My invention includes other detailed features of construction which will appear more fully hereinafter as this description proceeds.

In the accompanying drawings:—

Figure 1 is a cross sectional view through a machine largely as constructed in my Letters Patent No. 1,595,420 granted August 10th, 1926, on which machine the ballast removing, elevating and cleaning means of the present invention are mounted.

Figure 2 is a view similar to Figure 1 but taken at a different cross section point and showing more particularly the devices for feeding the ballast back to the road bed after it has been removed by means illustrated in Figure 1.

My invention contemplates the use of ballast removing mechanism and traction supporting means substantially as set forth in my Letters Patent No. 1,595,420, issued August 10th, 1926, or, if desired, I may employ for the ballast removing mechanism of my machine, the removing means which is set forth in Overmier Patent No. 1,588,801, of June 15th, 1926, which patent shows a very excellent type of ballast removing devices that might be used readily for the purposes of my invention, in order to remove the ballast from between the ties to a place at one

side of the track where a receiver and conveyer are mounted and ready to receive said ballast, to transfer the same to the cleaning mechanism of the invention.

Referring to the drawings, I do not think it necessary to specifically set forth the various features of my machine which is fully illustrated in my Letters Patent previously identified herein. It suffices to state that the general frame work and ballast digging or removing devices which are shown in my previous patent are used in my present construction. I note that the ballast removing devices or diggers are carried by the supporting frame 1 and are designated 2. The frame 1 is oscillated by being suspended from cranks supported by shafts 3 as will be understood from my previous patent. The diggers or ballast removers may be raised and lowered as heretofore presented in said patent.

The novel features of my invention comprise mainly the use at one side of my machine, preferably of a ballast receiver or receptacle 4. As the diggers 2 operate they push or kick the ballast to one side of the railroad track by carrying it lengthwise of the ties, from between those portions of the ties intermediate the rails, and the portions at the outside of the rails. There is mounted on the frame-work of the machine by means of arms 5 and 6 pivoted at 7 and 8 respectively, an endless bucket conveyer or elevator 9. The buckets of said elevator 9 are so disposed as to operate through and elevate the material received by the receiver 4 until said material passing over the upper end of the elevator is dropped into a chute 10 and thence passes into a stationary chute 11. In this manner the chute 11 is supplied with the dirty ballast and from the chute 11 said ballast passes into a rotary sieve or screen 12. The screen 12 is driven by a drive shaft 13, operated by a sprocket chain 14 and in turn driving a vertical shaft 15 to which it is geared by bevel gears 16 and 17. As the material is screened by the sieve 12, the dirt passing through the orifices of the sieve will fall upon a conveyer belt 18 driven by a shaft 19 from the shaft 15. Said conveyer belt 18 conveys the dirt and foreign matter removed from the ballast to a chute 20 that leads off quite a distance from one side of the road bed on which the ties 21 are laid with rails 22.

The elevator 18 is operated by taking power off of a suitable drive shaft supported on the frame-work of the machine and connected by a universal joint 23 with the elevator driving shaft 24. Said shaft 24 is geared to a secondary driving shaft 25 mounted in suitable bearings on one side of the elevator frame.

The ballast comprising the larger aggregates from which the dirt has been removed by the sieve 12 passes on through the hollow portion of the sieve 12 and enters a ballast return chute 26 arranged at the lower end of the sieve. The chute 26 conducts the cleaned ballast to a movable hopper 27 beneath the chute and beneath the sieve. The hopper 27 has a wide open upper end or mouth and is adapted to reciprocate transversely of the frame work of the machine by the provision of rollers 28 on the sides of the hopper entering channels or tracks 29 spanning the frame-work of the machine between the frame members 30. At its lower end the hopper 27 is equipped with a pair of doors 31 and 32. The door 31 having an arm 33 and the door 32 an arm 34. The two arms 33 and 34 are connected by link 35 and are operable by a lever 36 from arm 37, said lever 36 being shiftable back and forth by a shaft 38 and crank wheel 39, to thus open and close the doors 31 and 32.

While I have shown the hopper 27 so that it operates between the rails 22, nevertheless by having it elevated so that its lower end is above the plane of the rails 22, said hopper may be caused to move the entire length of the ties 21 to feed the ballast back both between the rails 22 and at the outer sides of the rails, to occupy its space between the ties.

The hopper 27 will be reciprocated back and forth automatically, by suitable means later described.

I contemplate provisions for raising and lowering the elevator 9 including compressed air receiving cylinder 40 on the frame of the machine, the piston of which cylinder is connected by rod 41 to the lower arm 6 supporting the elevator. Introduction of air into the lower end of the cylinder 40 by forcing its piston upwards will raise the elevator and if desired the latter may be locked up by suitable locking means not shown, in which position it will remain while the machine is being transported from place to place and the ballast cleaning mechanism is not in use at such time.

It will, of course, be obvious that if I use diggers or ballast removing devices like those of the Overmier patent, I will provide an elevator 9 at opposite sides of my machine instead of one side, and will use two sieves 12 connected with a chute substantially like the chute 26.

It will be understood that my invention involves the combination of the ballast removing, cleaning and returning means herein presented with a machine such as described in my previous Letters Patent. Such a combination machine is new, so far as I am aware and I therefore do not wish to be limited solely to the improvements which are presented herein and which may be used exclusively as a ballast removing and cleaning machine.

I now proceed to describe the means for automatically reversing the movement of the

hopper 27, which as it moves back and forth always receives the ballast from the chute 26, at whatever position the hopper may assume in its transverse movement.

This reversal may be efficiently effected by a screw shaft 44 mounted in bearings 45 and carrying slidably mounted gears 47 and 48 adapted to selectively mesh with a bevel gear 49 driven from the vertical shaft 15, Figure 2. The screw shaft carries a threaded traveling block 50, which is cushioned at each limit of its travel by springs 51 disposed at the bearings 45, and arranged to engage the shifting levers 52 which are pivotally connected by a rod 53 also pivoted to the gear levers 54 for jointly shifting the gears 47 and 48. To retain these gears in shifted position one of the levers 52 is provided with a crank arm 55 having a snapover spring 56 disposed to hold said arm at either side of the pivotal center of the lever 52.

So far as the subject matter relating to the ballast removing and elevating features is concerned, this application is a continuation in part of my copending application, Serial No. 128,236, filed August 9th, 1926, which application is a division of my Patent No. 1,595,420, August 10th, 1926, with which it was copending. So this application also constitutes a continuation in part of the patent referred to as regards the ballast removing and elevating feature.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a machine of the class described, in combination, a portable support arranged to operate along a railroad track, ballast removing devices carried by said support and operating between the ties of the track to displace the ballast from the cribs between the ties and push it to one end of the ties, a ballast cleaning device, and means for conveying the ballast as removed by the removing devices to said cleaning device, and instrumentalities for returning the ballast after it is cleaned to the spaces between the ties from which it has been removed, including a hopper arranged to travel transversely of the railroad track and longitudinally of the ties.

2. In a machine of the class described, in combination, a portable support arranged to operate along a railroad track, ballast removing devices carried by said support and operating between the ties of the track to displace the ballast from the cribs between the ties and push it to one end of the ties, a ballast cleaning device and means for conveying the ballast as removed by the removing devices to said cleaning device, and instrumentalities for returning the ballast after it is cleaned to the spaces between the ties from which it has been removed, including a hopper arranged to travel transversely of the railroad track and longitudinally of the ties, the conveying means above mentioned consisting of an elevator for carrying the ballast from its elevation adjacent the tracks up to a higher elevation from which it is fed to the cleaning device.

3. A portable ballast cleaning machine, comprising mechanically operated digging elements for removing ballast from between railroad ties, a receiver to receive the ballast so removed, a ballast cleaner, and means for conducting the ballast from the receiver to the ballast cleaner.

4. A portable ballast cleaning machine, comprising diggers for removing ballast from between railroad ties, a receiver to receive the ballast so removed, a ballast cleaner, and means for conducting the ballast from the receiver to the ballast cleaner, and means for conducting cleaned ballast back to the spaces between the railroad ties.

5. A portable ballast cleaning machine, comprising diggers for removing ballast from between railroad ties, a receiver to receive the ballast so removed, a ballast cleaner, and means for conducting the ballast from the receiver to the ballast cleaner, and means for conducting cleaned ballast back to the spaces between the railroad ties, and means for conducting dirt removed from the ballast to one side of a railroad track.

6. A ballast handling machine of the class described, a portable support to move parallel with a railroad track, ballast removers arranged to move transversely of the track, ballast elevating means to receive and carry the ballast so removed, ballast cleaning means to receive the ballast from the elevating means, and dirt conveying means to receive the dirt cleaned out of the ballast and carry it to one side of the track.

7. A ballast handling machine of the class described, a portable support to move parallel with a railroad track, ballast removers arranged to move transversely of the track, ballast elevating means to receive and carry the ballast so removed, ballast cleaning means to receive the ballast from the elevating means, and dirt conveying means to receive the dirt cleaned out of the ballast and carry it to one side of the track, and a means to receive the cleaned ballast from the cleaning means and conduct the same between the ties of the track.

8. A ballast handling machine of the class described, a portable support to move parallel with a railroad track, ballast removers arranged to move transversely of the track, ballast elevating means to receive and carry the ballast so removed, ballast cleaning means to receive the ballast from the elevating means, and dirt conveying means to receive the dirt cleaned out of the ballast and carry it to one side of the track, and a hopper to receive the cleaned ballast from the cleaning means and conduct the same between the

ties of the track, and means for reciprocating the hopper so it will travel parallel with the ties as it deposits the ballast therebetween.

9. A portable ballast cleaning machine, comprising diggers for removing ballast from between railroad ties, a receiver to receive the ballast so removed, a ballast cleaner, and means for conducting the ballast from the receiver to the ballast cleaner, and means for conducting cleaned ballast back to the spaces between the railroad ties, and means for conducting dirt removed from the ballast to one side of a railroad track, and means for adjusting the conducting means to an elevated position when not in use and lower it to a position to receive ballast from between the ties when it is to be used.

10. A machine of the class described, comprising ballast removing mechanism, ballast receiving and elevating mechanism cooperating with the removing mechanism, ballast cleaning mechanism receiving the ballast from said elevating mechanism, and ballast return mechanism to replace the ballast between the ties from which it has been removed.

11. In a machine of the class described, in combination, a portable support arranged to operate along a railroad track, ballast removing devices carried by said support and operating between the ties of the track to displace the ballast from the cribs between the ties, a ballast cleaning device, means for conveying the ballast as removed by the removing devices to said cleaning device, a hopper arranged to travel transversely of said track, and means for automatically reversing the direction of travel of said hopper.

12. In a machine of the class described, in combination, a portable support arranged to operate along a railroad track, ballast removing devices carried by said support and operating between the ties of the track to displace the ballast from the cribs between the ties, a ballast cleaning device, means for conveying the ballast as removed by the removing devices to said cleaning device, a hopper arranged to travel transversely of said track, a screw shaft provided with a traveling device, and levers having gear shifting connections and disposed to be actuated by said device at the opposite limits of its travel.

13. In a ballast machine of the class described, the combination with a frame, of means for removing ballast from between the ties and pushing the same to one end of the ties, and means for elevating said ballast and returning it to the roadbed between the ties.

14. In a ballast machine of the class described, the combination with a frame, of means for pushing the ballast to a position at the end of the ties, means for elevating the ballast, and means for returning the ballast to the roadbed.

15. In a ballast machine of the class described, the combination, with a frame, of means for pushing ballast to one end of the ties, an elevator for receiving and elevating said ballast, and means for returning it to a position intermediate the ties of a railway roadbed.

In testimony whereof I affix my signature.

JOHN F. ROBB.