April 30, 1963 H. H. TALBOYS 3,087,179

BRUSH FOR TRACK AND RIGHT-OF-WAY

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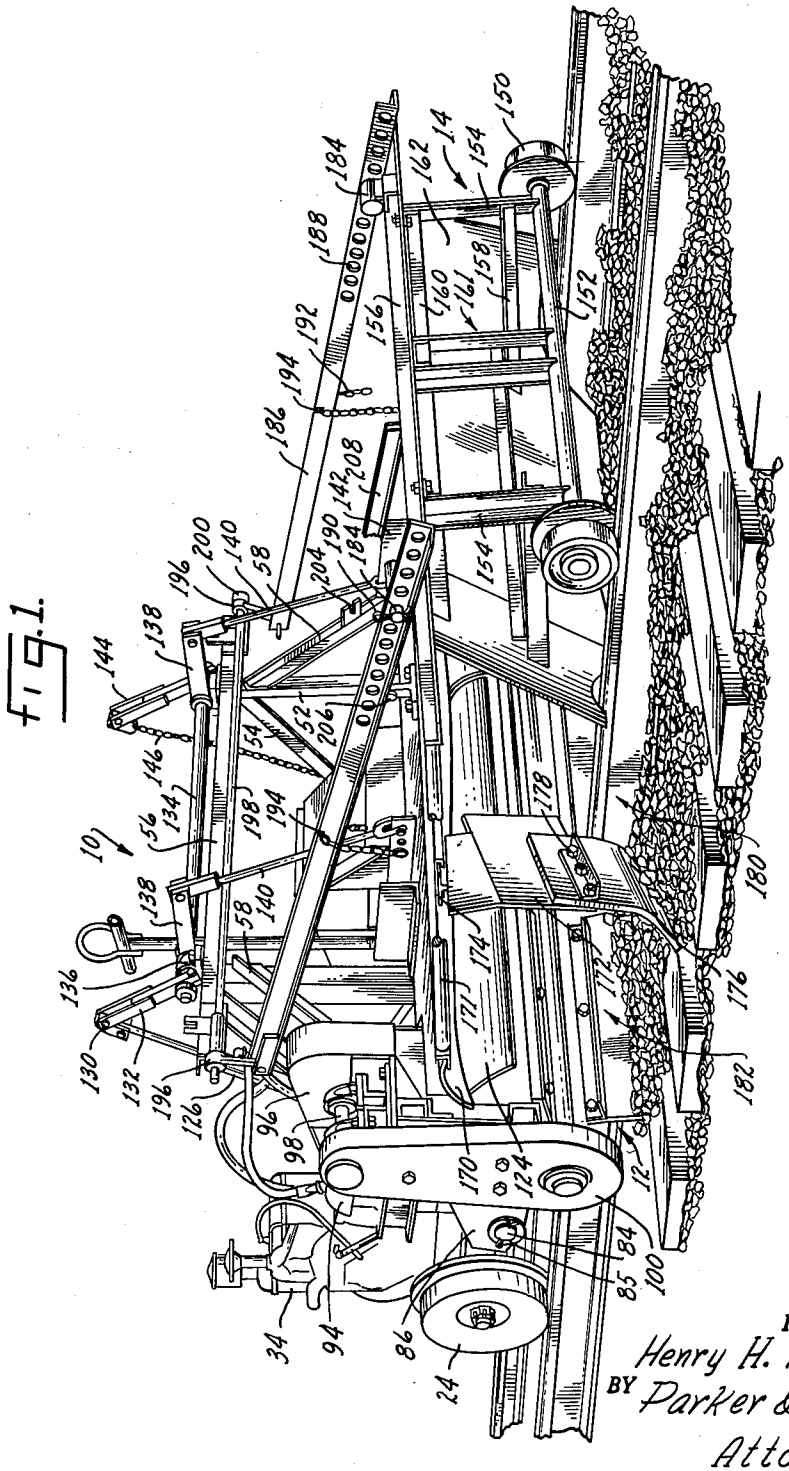


Fig. 1.

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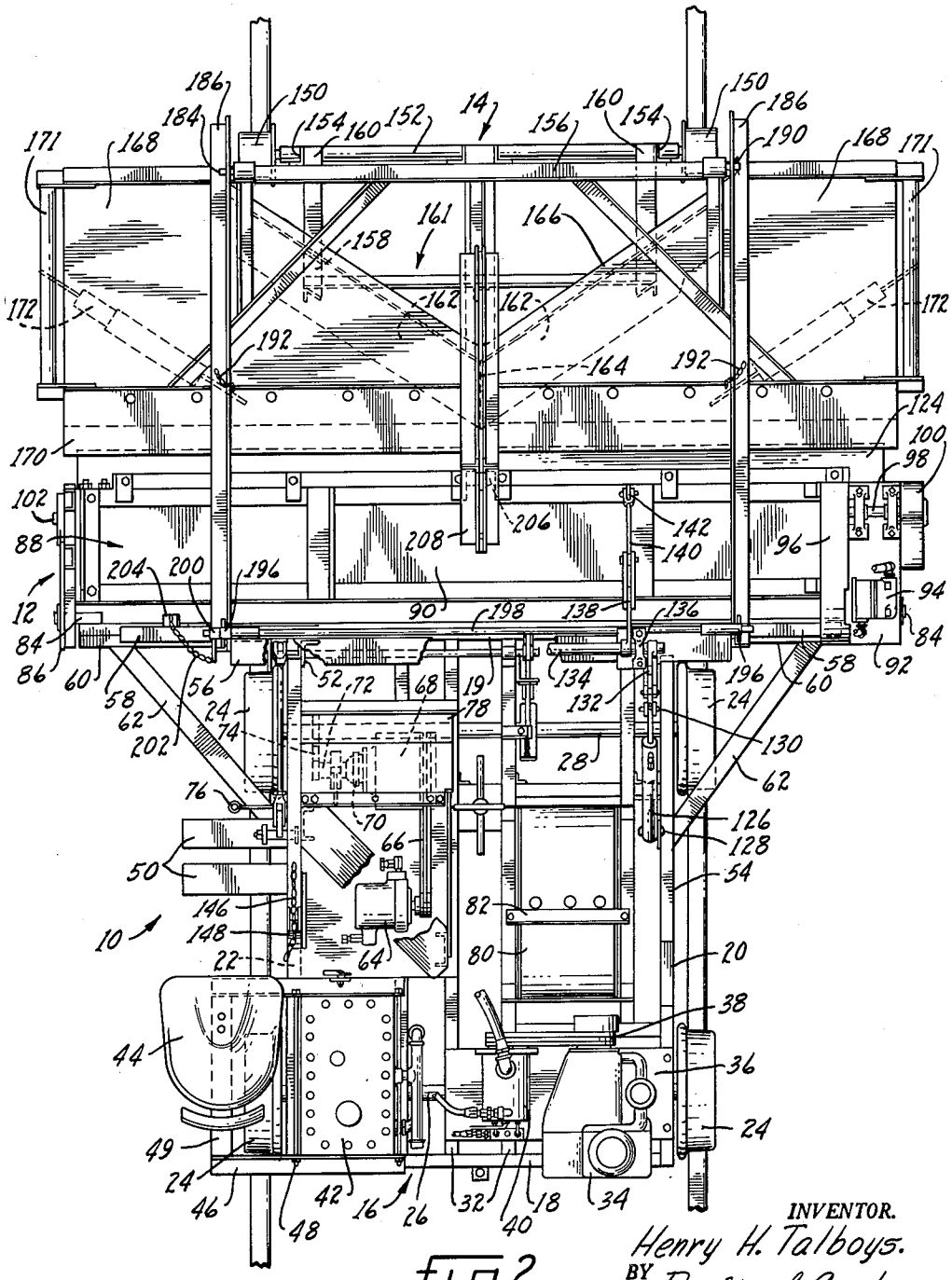


Fig. 2.

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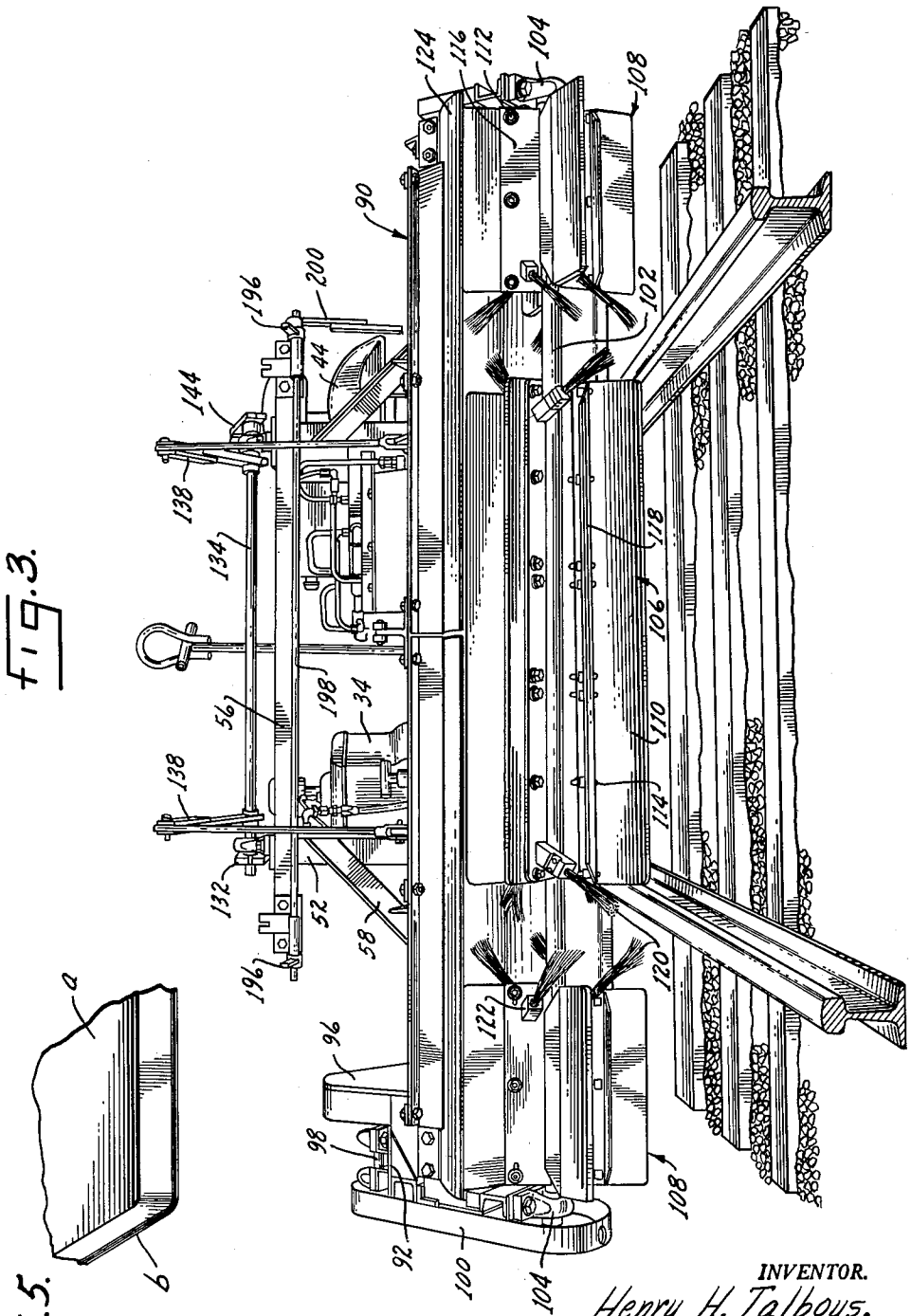


FIG. 3.

FIG. 5.

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BRUSH FOR TRACK AND RIGHT-OF-WAY

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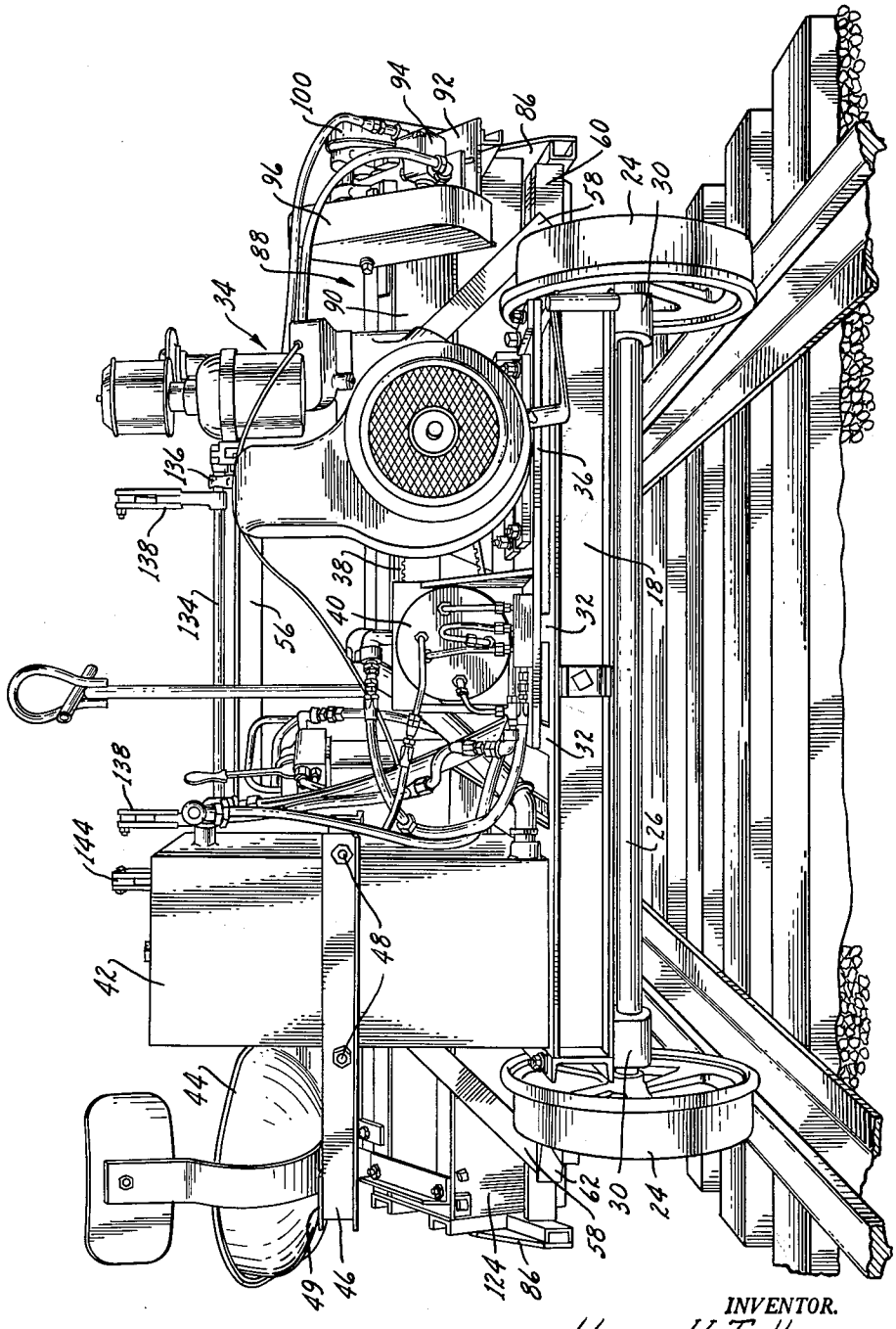


Fig. 4.

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BRUSH FOR TRACK AND RIGHT-OF-WAY

Filed May 17, 1960 5 Sheets-Sheet 5

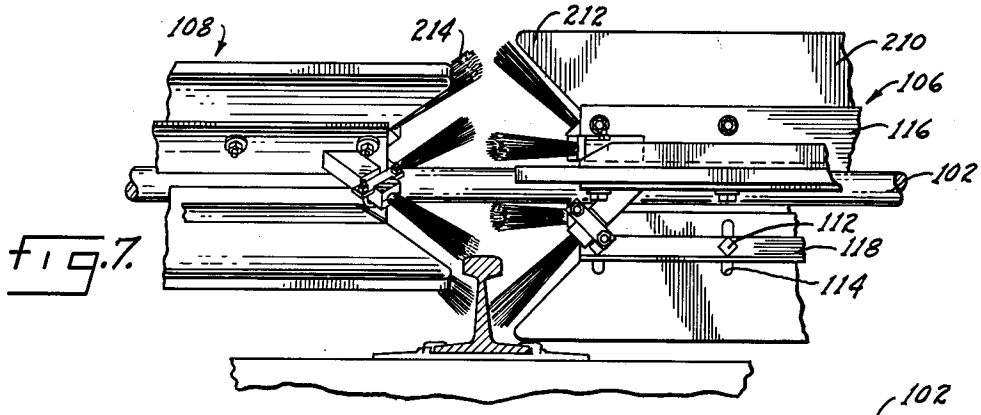


Fig. 7.

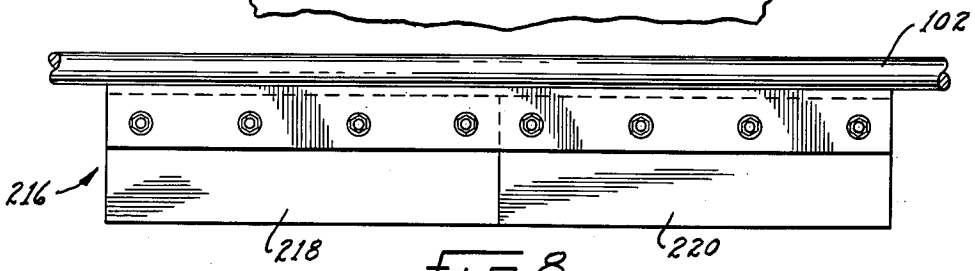


Fig. 8.

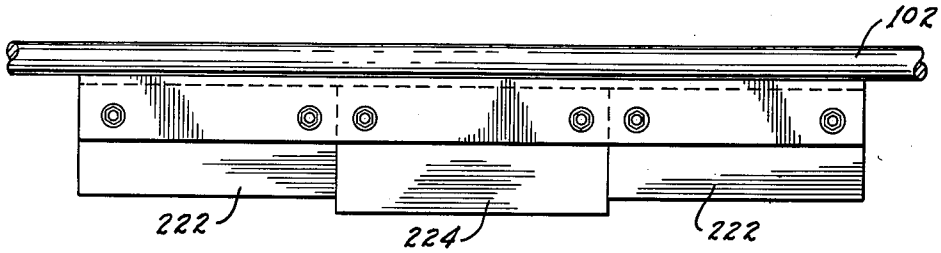


Fig. 9.

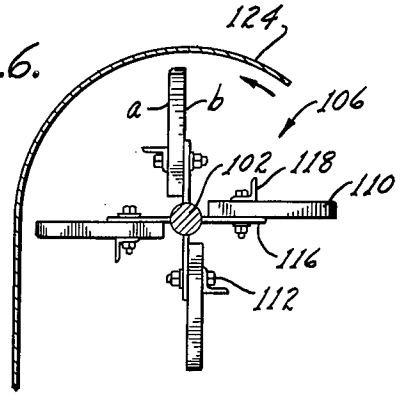


Fig. 6.

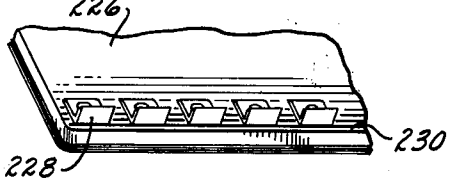


Fig. 10.

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United States Patent Office 3,087,179 Patented Apr. 30, 1963

3,087,179

BRUSH FOR TRACK AND RIGHT-OF-WAY

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Filed May 17, 1960, Ser. No. 29,605
10 Claims. (Cl. 15—55)

This invention is in the field of track working equipment and is concerned with a track sweeper for use on railroad track and the like.

A primary object of the invention is a light-weight self-propelled sweeper.

Another object is a track sweeper which is primarily constructed for ballast placement.

Another object is a track sweeper which levels the ballast across the crib area for use, for example, ahead of a tamper.

Another object is a track sweeper which removes excess ballast from the tops of the ties after a raising operation.

Another object is a track sweeper which is sufficiently light so that it does not disturb the track surface when operating between the jack and the tamper in a raising operation.

Another object is a track sweeper specifically constructed to clean the tie tops after a raising operation.

Another object is a track sweeper which may be used as a dresser after a raising operation.

Another object is a multi-speed sweeper which may be used for several types of track sweeping jobs.

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

FIGURE 1 is a perspective taken from the right side of the machine;

FIGURE 2 is a top plan view with parts omitted for clarity;

FIGURE 3 is a front perspective without the deflector;

FIGURE 4 is a rear perspective;

FIGURE 5 is a partial perspective of a paddle;

FIGURE 6 is a cross section of the impeller;

FIGURE 7 is a front view of a modified form of the impeller;

FIGURE 8 is a partial front view of a further modified impeller;

FIGURE 9 is similar to FIGURE 8 but of an additional variation of the impeller; and

FIGURE 10 is a perspective of an additional modification.

As shown in FIGURES 1 and 2 the sweeper is made up primarily of three main units, a vehicle **10**, an impeller **12** on the front of the vehicle, and a deflector or baffle **14** ahead of the impeller.

Considering each in detail, the vehicle is made up of a frame **16**, shown best in FIGURE 2, which may be considered as generally rectangular, defined by laterally disposed channels **18** and **19** at each end and longitudinally disposed side channels **20** and **22**. Flanged wheels **24** which ride on the rails may be mounted on axles **26** and **28** which pass through bearings **30** connected to the bottom of the frame, shown in FIGURE 4. Longitudinally disposed inner channels **32** extend up the middle of the frame, as shown in FIGURE 2, and a suitable gasoline engine **34** or the like is mounted on a supporting plate **36** bolted or otherwise held generally on the right rear corner of the frame. Through a belt **38** or the like the engine drives a pump **40** which is disposed generally on the rear of the frame in the center between the engine **34** and a reservoir or tank **42** positioned generally on the left rear corner of the frame. The engine, pump and tank may all be mounted on suitable plates bolted or otherwise suitably connected to the frame, not

shown in detail. An operator seat **44** is mounted on the left side of the frame on a U-shaped support **46** made up of angles welded together and held around the tank or reservoir **42** by bolts **48** or the like. It will be noted that one leg of the U-shaped support extends in front of the tank and the other behind with the bolts passing on each side and the crosspiece **49** of the U extending under the seat **44**. As shown, the seat projects out to the left side of the frame, but may be positioned in any suitable manner. A foot rest or step **50**, in the form of two upside down channels welded to the underside of the frame and projecting from the left side somewhat, as shown in FIGURE 2, may be provided in front of the seat **44**.

The forward corners of the frame have upright angles or stanchions **52** with rearwardly extended braces **54** connected to the frame, a crosspiece **56** extending laterally between the upper ends of the stanchions and outwardly beyond the stanchions somewhat, as shown in FIGURE 3, side braces **58** connected at their upper ends adjacent the top of the stanchions and extending laterally outwardly and downwardly and connected at their lower ends to an elongated crossbeam **60** extending across the front of the frame which supports or functions as a mounting for the impeller **12**. Braces **62**, in FIGURE 2, extend outwardly from the sides of the frame and are connected at or near the outer ends of crossbeam **60**.

The vehicle may be self-propelled. Engine **34** drives the pump **40** which is supplied with fluid from the tank or reservoir **42** through suitable leads, not shown in detail. Fluid under pressure goes from the pump by suitable leads to various operating parts on the machine. A fluid motor **64** drives a belt **66** or the like which drives a pulley **68** and clutch arrangement **70** on a countershaft **72** which drives the front axle through a chain **74**. The clutch may be actuated by a linkage and handle arrangement **76** which, as shown in FIGURE 2, extends over to the left side in front of the operator's seat. The clutch and chain drive may be provided with a suitable cover **78**, as shown in FIGURE 2.

A suitable fuel tank **80** for the engine may be mounted on the right side of the frame, and held in place by a strap arrangement **82** or the like, with a suitable line, not shown, to supply fuel to the engine.

The impeller **12** may include a suitable frame pivoted on the front of the vehicle at **84**, the pivot being in the form of stub shafts projecting from each end of the crossbeam **60** into suitable bearings **85** in the sides of the impeller frame. Side plates **86** extend forwardly from the ends of the pivots **84** to a cross frame **88** having a more or less flat top plate **90**. On the right side a suitable platform **92** rises above the top plate somewhat and serves as a support for a fluid motor **94** which, through a chain drive or the like, not shown, enclosed within a shield or guard **96**, drives a countershaft **98**. Through a suitable chain and sprockets inside of a guard **100**, the counter-shaft drives the main support shaft **102** of the impeller which, as shown in FIGURE 3, rotates in bearings **104** on each side of the impeller frame.

The impeller proper, as shown in FIGURE 3, is made up of three sections, a center section **106** and two side sections **108** with gaps between so that they will fit between and on each side of the rails. Each of the impeller sections may for example be made up of four circumferentially spaced radially disposed blades or paddles **110** which are solid, flexible, but resiliently stiff strips adjustably and removably connected for example by bolts **112** which pass through slots **114** in the inner edge of the paddles and on one side through a plate **116** welded or otherwise suitably secured to shaft **102** along its inner edge, and through an angle or strip **118** on the other side which is not connected to the shaft **102**. When the nuts on the bolts **112** are backed off, the paddles or blades

may be adjusted radially to compensate for wear and for proper alignment. It is preferred that the paddles be equally spaced circumferentially. The paddles of the outer sections **108** are generally aligned and should be between the paddles of the center section **106** so that as the impeller rotates the load on the impeller, due to contact with the ballast and ties, will not go off all at once.

One of the strips which make up the paddles is shown in FIGURE 5 and is preferably a resilient stiffly flexible rubber *a*, preferably backed up by canvas or a fabric or textile mesh *b*, possibly two to four mesh, on the lee side. The overall strip might be ¾ of an inch in thickness with the dimensionally stabilizing material *b* of the order of 1/16 to ⅛ of an inch. The fabric or textile may be bonded or vulcanized to the back of the resilient material or it may be molded directly in or otherwise secured.

I have said that the paddle is preferably a rubber or a rubber substitute which will have stiff flexibility and high wear resistance. But it might be something other than rubber. In any event, when rubber is used, it is held against excess stretching by a fabric layer, or layer of dimensionally stable material, which is on or next to the rear side and is protected from wear by the rubber itself. The fabric reinforces the rubber layer and maintains dimensional stability without being directly subjected to wear itself. While rubber is preferable, nevertheless a solid plastic paddle which is suitably wear resistant and sufficiently stiff but nevertheless flexible might be used. This is to say that the invention is not limited to rubber. In fact, a suitable laminated paddle might be used.

It will be noted that the edges of the paddles or blades next to the rails are square cut so that they miss the spikes and I position cable ends **120** in sockets **122** on the plates **116**, the cable ends being shown in groups of four around the shaft **102**, disposed inwardly toward the rail and diagonally arranged to work in under the railhead to clean the flange and spike heads. While four cables are shown in each location, I might use two, about 180 degrees apart. I may use a band around the middle of each cable end to keep it from fraying or opening up. A curved shield or baffle **124**, possibly in one section or two, as shown in FIGURE 1, is mounted in the impeller frame and conforms closely around the impeller paddles to form a hood or housing for the impeller.

The impeller and impeller frame are raised and lowered about the pivots **84**, shown in FIGURE 2, for example by a hydraulic cylinder **126** which is pivotally connected, as at **128**, to the frame, and at its upper end, at **130**, to a lever arm **132** mounted on a cross shaft **134** which is pivotally supported in suitable bearings **136** on the crosspiece **56**. The cross shaft **134** carries levers **138** which are connected through links **140** to brackets **142** toward the forward edge of the impeller frame. It will thus be seen that the hydraulic cylinder **126** may be used to rock the cross shaft **134** in either direction thus raising or lowering the impeller and impeller frame. The cylinder may be selectively supplied with fluid from the pump **40** through the valve controls.

The other end of the cross shaft **134** may have a second lever arm **144** with a chain **146** or the like connected to it extending down to a suitable cleat **148**, in FIGURE 2, on the frame so that when the impeller has been brought to the proper position at the right height above or slightly below the tie tops by the cylinder, the chain may be connected to the cleat and hydraulic pressure relieved. The chain may be used to hold the impeller in position during operation.

The deflector or baffle **14** is mounted on suitably flanged wheels **150** on an axle **152**. Angles **154** on each side rise from the axle to a crosspiece **156**. Lower and upper braces or angles **158** and **160** extend rearwardly to form a frame **161** which supports diagonally disposed deflector plates **162** which come together to form an edge **164** with a divider of V-shaped appearance disposed generally midway between the rails in a position just forward of the impeller. The top of the deflector has a cover or shield **166** which extends outwardly on each side forming wings **168**, the rear edge of the shield and wings being provided with an over-lapping flexible strip extending laterally across the unit, as at **170**. Each side may be provided with handle bars **171**, if desired.

A removable deflector **172** is mounted under each wing by a T slot connection **174**, the lower end of each such deflector being provided with a flexible section **176** removably connected at **178** so that it may be replaced when excessively worn. It will be noted in FIGURE 1 that the lower end of the flexible piece or section may engage the ballast.

The ballast is propelled forwardly by the impeller and is deflected outwardly by the V-shaped divider. The two deflector plates **162** making up the V-shaped deflector divide the ballast in half and propel or deflect the ballast toward opposite sides. The removable deflector **172** on each side is disposed generally parallel to the divider plate **162** but is spaced from it to define two outlets or channels, one between them, as at **180** in FIGURE 1, and the other rearwardly of the removable deflector, as at **182**. The removable deflector projects in far enough so that its inner edge is next to the rails. Thus the center section **110** of the impeller works against the dividing plates **162** while the outer sections **108** of the impeller project ballast against the removable deflectors **172**. Therefore ballast may leave through two exits on each side.

The crosspiece **156** of the deflector has stubs **184** at each end to receive a bar **186**. The bar may have a plurality of longitudinally spaced holes **188**, shown in FIGURE 1, any one of which may fit over the stub to provide a pivotal connection removably held by a cotter key **190** or the like. A chain **192** is connected to the top of the deflector and extends up over the bar **186** and fits into a notch **194** or the like to hold the entire deflector structure in any selected pivotal position.

The rear ends of the bars **186** are connected to levers **196** mounted on a cross shaft **198** which is pivoted on the cross bar **56** of the main frame. The cross bar **198** has an operating handle **200** which may be connected by a chain **202** to a cleat on the frame of the vehicle, as at **204**, to hold the cross shaft **198** in any pivoted position. The cross shaft may be pivoted to raise or lower the entire deflector structure in a pivoting action about its wheels **150**.

All of the plates on the deflector may be removably mounted and, in fact, the deflector may take on the character of a frame made up of angle irons with the plates removably bolted to it so that when the plates are worn, they may be quickly and easily removed and replaced. This is true of plates **162**, **166** and **172**. Also, the curve plate **124** partially around the impeller may be removably mounted so that it may be quickly and easily replaced.

I may position a roller **206** on top of the impeller frame to engage an angle **208** projecting rearwardly on top of the deflector. Thus the operator may raise the impeller which, in turn, will raise the rear end of the deflector so that adjustment of the chains **192** may be made to either raise or lower the rear of the deflector prior to a sweep. This may also be used to raise the deflector at crossings, switches, etc.

I may position a jack or the like in the middle of the frame so that the vehicle can be raised, turned and rolled off on setup rails to allow traffic to pass. I may also provide the vehicle with a lifting eye, as shown in the drawings, so that it can be picked up and moved by a crane or the like.

In FIGURE 7, I have shown a modified form in which the impeller paddles **210** have an undercut or slanting edge **212** next to the rail so that the flange and base of the rail around the spike heads and bolts will be thoroughly cleared and cleaned. It should be noted in FIG-

URE 7 that both the center and outboard paddles may be so formed and I also may use cable ends **214** which are disposed more or less parallel to the slanting edge of the paddles to work on the rail base and flange.

In FIGURE 8, a further modification is shown in which the center paddle **216** is shown as divided into two sections or parts **218** and **220**. In the event that the outboard edge of each section becomes worn due to contact with the spike heads and bolts, I may reverse them so that what was their abutting inner edges will now become their outer edges. It should also be noted that I may reverse the outboard paddles, such as at **108** in FIGURE 3, in the event that the edges next to the rails become worn. But, in any event, the fabric side, as at *b* in FIGURE 5, should be the trailing side when the paddles or paddle sections are reversed.

In FIGURE 9, I have shown a further modification of the centered paddle which I divide into three sections, two outer parts **222** and one inner somewhat longer sheet **224**. When a sweeper of this type is working between the tamper jack and the gang tamper, the operator may not be able to see the ties. With the middle of the center panel somewhat longer, as at **224** in FIGURE 9, I will effect a more thorough cleaning or sweeping at the center of the ties than I do next to the rails. This would serve to expose the ties somewhat in the center so that the tamper operator could clearly see them. The precise length of each panel in FIGURE 9 is not important. Also, when the outer edges of the outside panels **222** next to the rails become worn, they could be easily reversed.

In FIGURE 10, I have shown a perspective of a further modification in which the paddle **226** has a plurality of teeth **228** mounted in a lateral row adjacent but somewhat spaced from the lower edge, as at **230**. In FIGURE 10, each of the teeth is shown in the form of an angle connected by a bolt or the like extending through the paddle and the upper leg of the angle. I find it particularly advantageous to attach metal digging elements, either in the precise shape shown or otherwise, next to the business edge of the paddles for use in breaking up hard or compacted material. I prefer that the metal attachments be in the form of separate teeth or the like, instead of one long bar, so that the paddle will retain its flexibility at the lower end. Also, where teeth are used, such as in FIGURE 10, they should be spaced somewhat from the lower edge so that as the teeth break through the hardened or compacted material, the exposed lower edge of the panel will follow through immediately with a sweeping action. I thus get a double effect, breaking and sweeping, with one stroke.

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

Primarily I am concerned with a lightweight unit which may be used between the jack and tamper in a track raising operation. In such a situation, the rails are only supported at spaced intervals, for example, every 13 feet. New ballast is on top of the ties, on the rail flanges, in the cribs and on the shoulders and since the rails are only supported at intervals, a heavy sweeper would knock down the lift.

Thus the unit is lightweight and will not cause the rails to lose their lift. The unit sweeps or moves the ballast forward and fills the cribs or spaces between the ties. The outside sections of the impeller sweep the ballast forward between the ties and the result is a complete movement of the ballast into the cribs or intertie spaces. In effect, the unit places the ballast for the tampers which follow.

The new ballast in a raising operation is dropped by a hopper car prior to the raise. Thereafter, the jack raises the track the desired amount, for example 1 to 5 inches, and the ballast, or a substantial portion of it, is still on top of the ties and on the rail flanges and unevenly distributed. Prior to this invention the ballast has been manually swept or moved by a gang of men so that the tamper, which follows, will compact the ballast under the ties and in the cribs. But the present sweeper is lightweight and will be easily supported by the intermittently supported rails without causing the rails to lose their raise. The impeller, as such, may be raised and lowered to effect the precise ballast placement required to support the track in the desired raised position. The deflector also may be independently adjusted to give the proper deflection of propelled ballast so that the proper amount will be deflected outside of the rails, but at the same time will only go the desired distance. For example, in some situations it may be that the excess ballast should be thrown out onto the shoulders. In others, it may go farther. But by adjusting the impeller and the deflector independently, the proper combination may be used.

The unit may be used as a dresser after the tamper to clean up the ties and rail flanges, if desired.

In a raising operation, the impeller should probably be set a little higher than in a cleaning up operation. For example, in raising it might be set approximately an inch above the tie tops. But in sweeping up, I might set it at a half an inch or less above the tie tops. In certain situations, depending upon the condition of the ballast, I may set the bottom of the impeller blades slightly below the tie tops, for example half an inch or one inch, so that the cribs will be packed down and swept out, thereby improving the appearance of the track.

This invention will give a uniform ballast condition so that the tamper operator does not have to adjust and change the setting of his machine from time to time due to a change in the condition of the ballast. Thus the tamper, which is normally considered a slow-moving machine, may be speeded up.

The details of the hydraulic and propulsion mechanism are not important.

The impeller itself is important. Prior to this invention, sweepers for track use have had a plurality of closely spaced, radially disposed cable ends or pieces of rubber hose as the sweeping means but these did not do a complete job. My solid paddles or flexible strips give a complete and thorough sweep across the tie tops. For ballast placement ahead of the tamper, the impeller may be slowed down so that the ballast will be moved from the tie tops to the intertie spaces. For a sweep-up after tamping, the entire unit may be speeded up so that excess ballast will be thrown out. In fact, I might use three speeds, a slow speed to clear material from tie tops, an intermediate speed to clear material from the track and throw it out of the way, and a high speed to clear the maximum amount of material from the track. The ideal in any operation is to end up with clean tie tops and the ballast in the intertie space about one inch below the tie tops. The flexible blades also have the advantage that they will not injure the threads, nuts, etc. of the joint bar bolts. Nor will they injure the ties.

A big advantage in making the deflector separate from the vehicle is that it can be quickly removed from the machine and manually set off the track while the track sweeper travels to and from the set-off or siding.

While I have shown four blades or paddles for the impeller sections, it should be understood that more or less may be used. The same is true of the cable ends.

The impeller blades or paddles have been shown as plain. But I may mount metal digging teeth on the edges thereof in certain situations to break up the ballast. In such event the deflector may, if desired, be omitted.

While I have shown and described the preferred form and one modification of my invention, it should be understood that suitable additional modifications, changes, substitutions and alterations 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.

I claim:

1. In a sweeper for use on railroad track and the like,

a vehicle adapted to move along the track, a rotatable impeller on the vehicle spanning the rails, power means for rotating the impeller in a direction to sweep ballast forwardly of the vehicle between the tie ends, the impeller including a plurality of peripherally spaced, radially and laterally extending, solid flexible blades adapted to perform a flexible ballast placement operation ahead of the impeller, and a plurality of radially disposed cable ends attached to the impeller, one next to each edge of the blades, to work against the base and flange of the rails.

2. In a sweeper for use on railroad track and the like, a vehicle adapted to move along the track, a rotatable impeller on the vehicle spanning the rails, power means for rotating the impeller in a direction to sweep ballast forwardly of the vehicle between the tie ends, the impeller including a plurality of peripherally spaced, radially and laterally extending, solid flexible blades adapted to perform a flexible ballast placement operation ahead of the impeller, and inclined flexible cable elements mounted on the hub and positioned to extend angularly toward the opposite sides of each of the two rails of a track.

3. In a brush assembly for performing a ballast sweeping and placement operation on track sweepers and the like, a rotatable impeller structure including an axial hub and a plurality of peripherally spaced, generally radially extending, solid blades removably mounted thereon, said blades being flexible throughout their radial and lateral extent and having a forward layer of a material having the general characteristics of rubber, as to flexibility and wear, and having dimensionally stabilizing material bonded thereto, and attaching means rigidly connected to the hub for removably mounting each such blade on the hub so that when mounted a substantial extent of each blade will project radially beyond the attaching means, compared to blade thickness, and will be otherwise free to flex when in contact with the ballast, the flexibly free portion of each blade beyond the attaching means being at least half of the full radial extent of the blade from the axial hub whereby the blades will flexibly arch somewhat when in contact with the ballast and will flex across the ties when the impeller is set low enough so that the extremities of the blades will be slightly below the top of the ties, each blade being substantially laterally elongated compared to its thickness.

4. The structure of claim 3 further characterized by and including a vehicle adapted to move along the track, the impeller structure being pivotally mounted on the vehicle for adjustment so that it may be raised and lowered, and means on the vehicle for pivoting the impeller structure to raise and lower it so that its distance above the ties may be varied.

5. The structure of claim 3 further characterized in that the impeller is divided into three laterally aligned sections, a center section and two outside sections with a gap between them so that the impeller will span the rails with the center section effective between the rails and the outer sections effective on the tie ends, the side edges of the blades on each side of the rails being undercut from the outer edge of the blade to the axis of the impeller so that the blade will be effective under the rail heads.

6. The structure of claim 3 further characterized by and including a plurality of radially disposed cable ends attached to the impeller, one next to each edge of the blades, to work against the base and flange of the rails.

7. The structure of claim 3 further characterized in that the dimensionally stabilizing material is constituted by a textile.

8. The structure of claim 3 further characterized in that the blade is formed of a plurality of interchangeable sections.

9. The structure of claim 3 further characterized in that the blade includes three side-by-side sections, the center section extending radially beyond the two side sections.

10. The structure of claim 3 further characterized in that each flexible blade is interrupted along its length by spaces sufficient to permit the passage of the brush assembly along the rails of the track with generally radially extending blade edges located outside of and inside of and out of contact with the sides of each of the rails of a track.

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