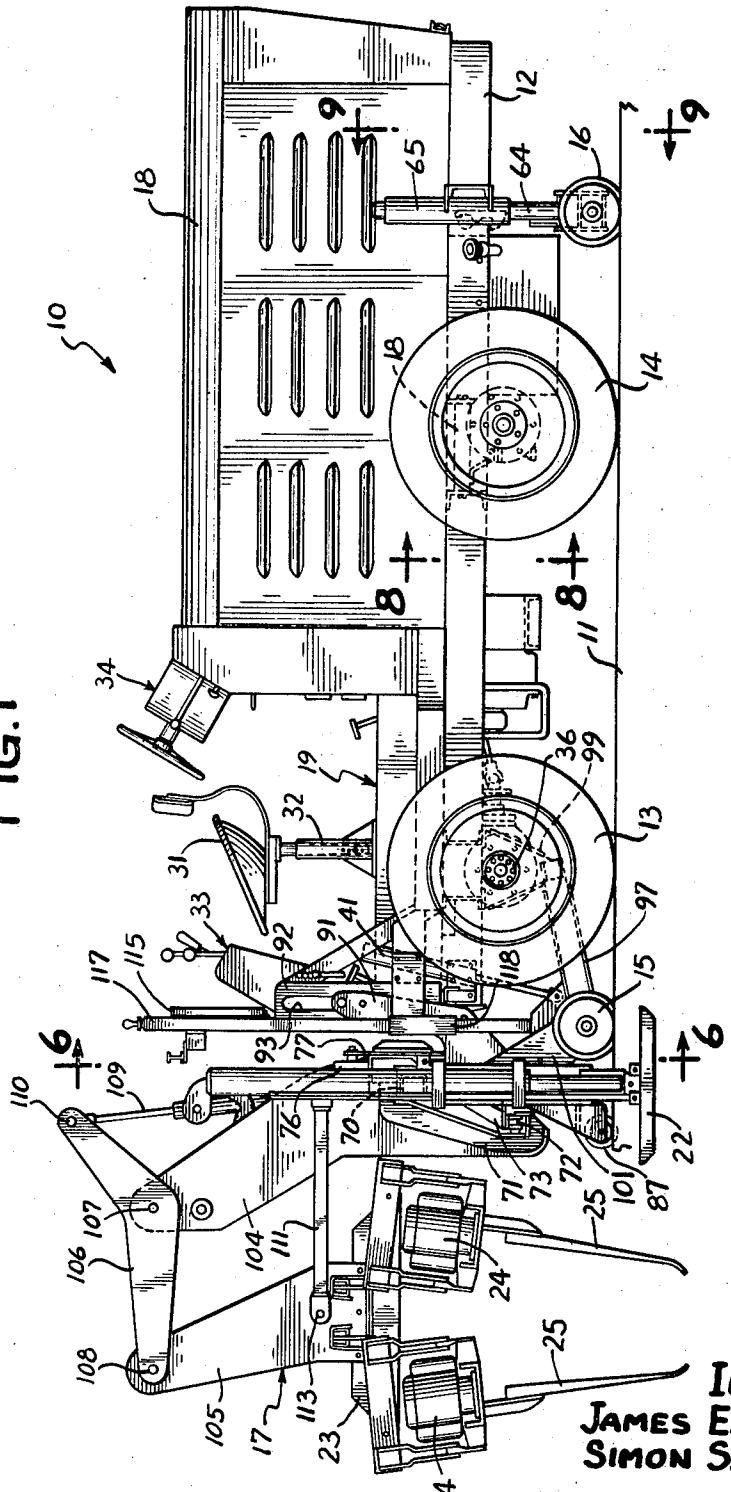
Feb. 10, 1970 J. E. ANDERSON ET AL 3,494,300

ON TRACK-OFF TRACK TAMPER

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FIG. 1



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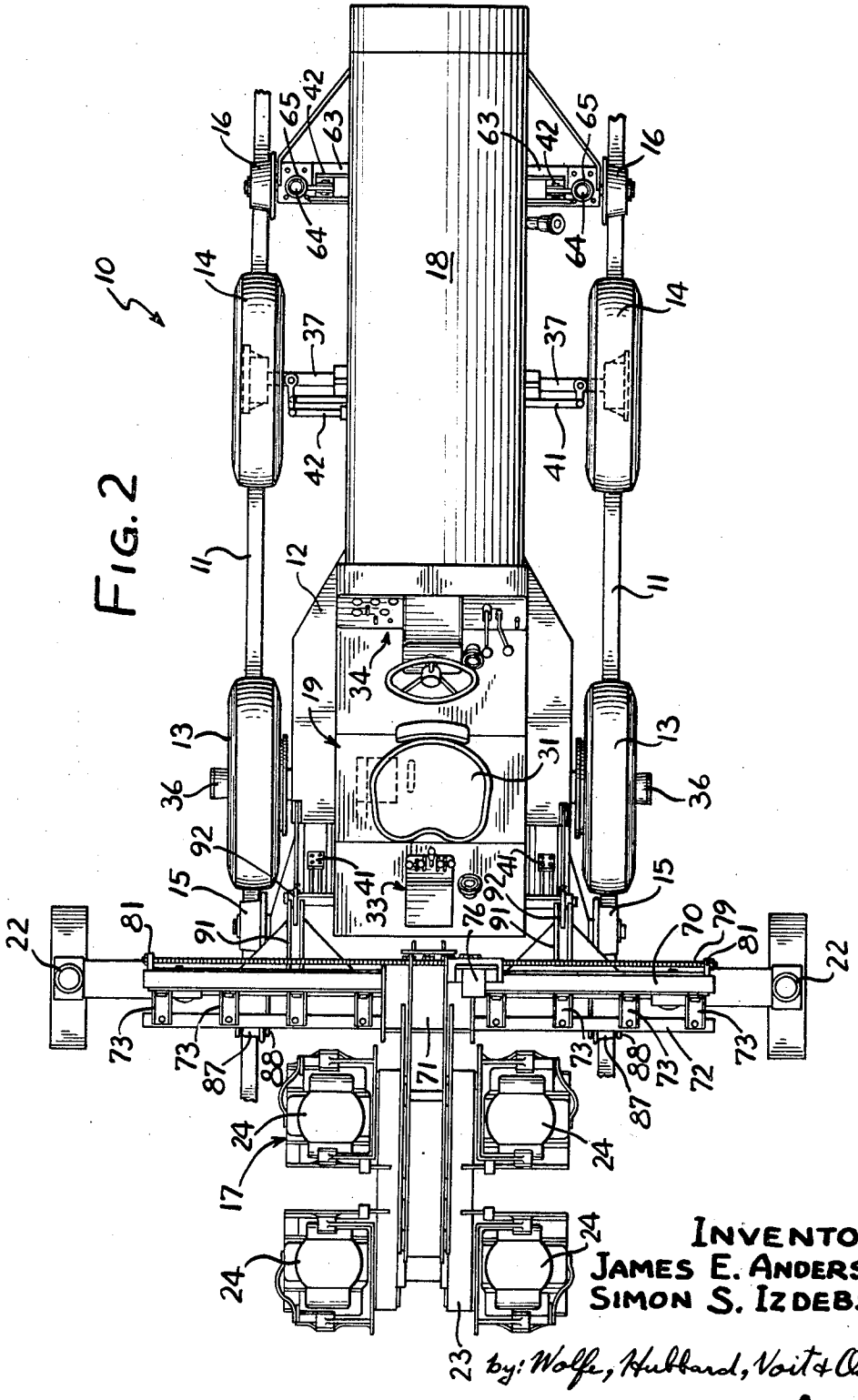
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ON TRACK-OFF TRACK TAMPER

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FIG. 2



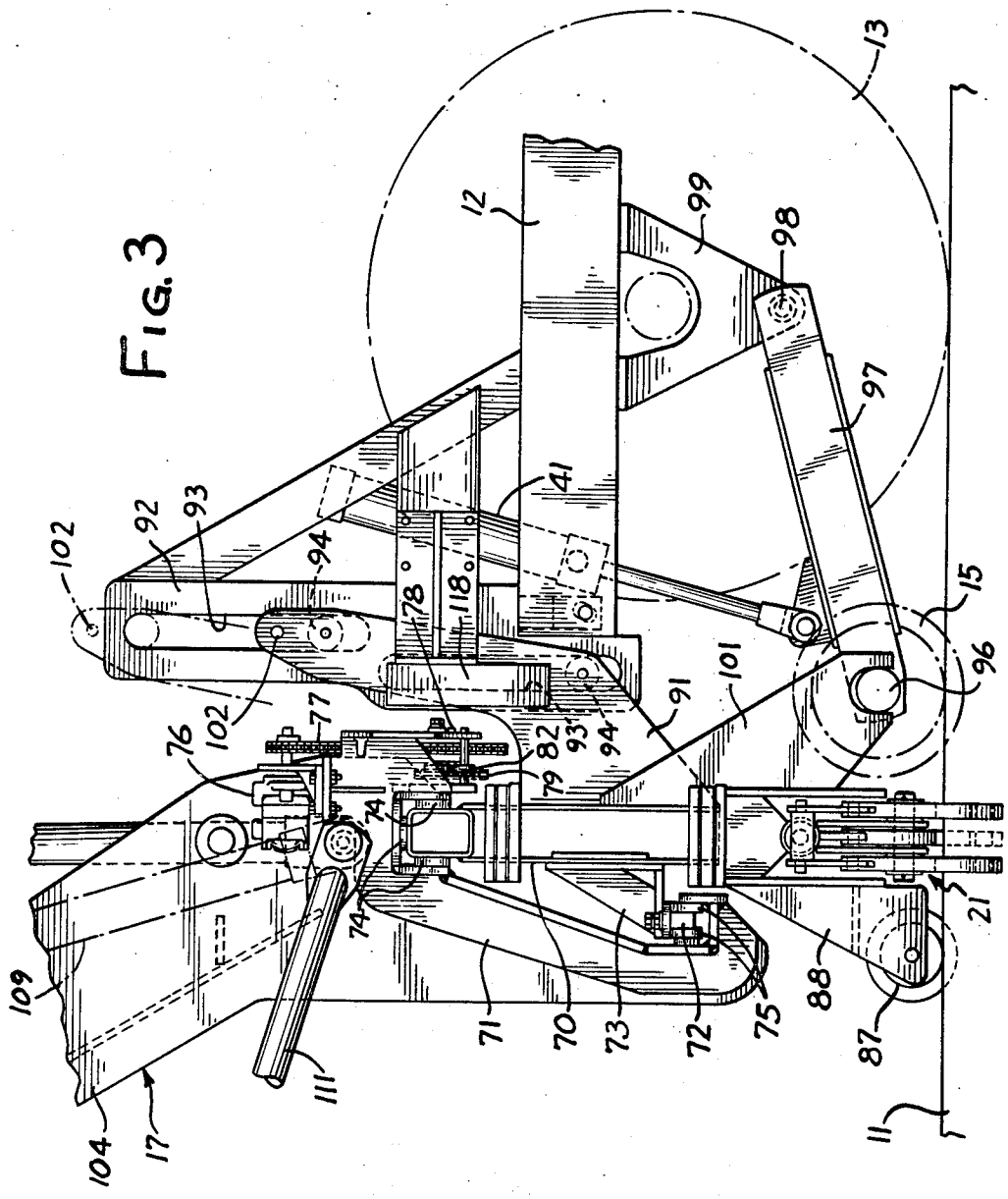
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FIG. 3



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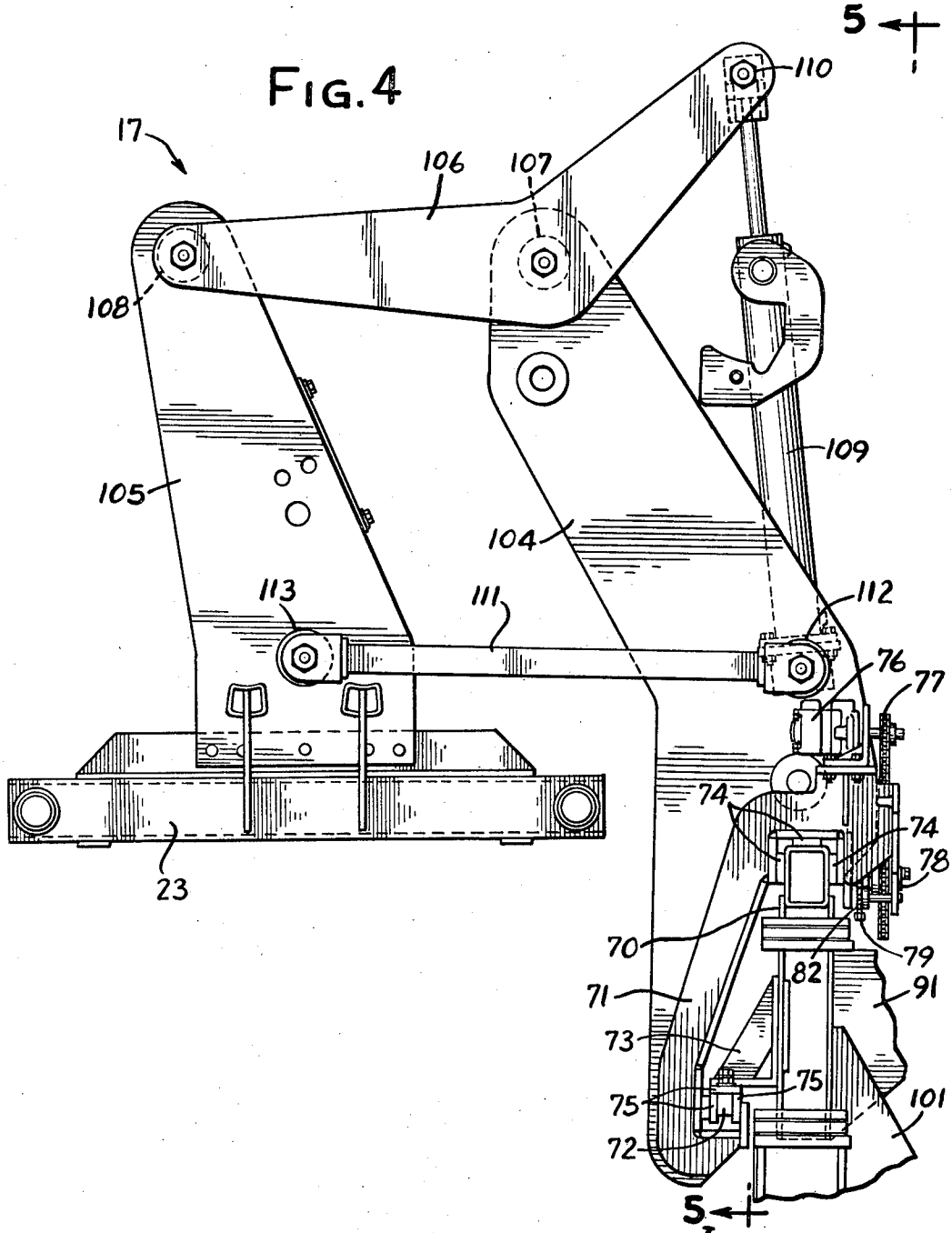
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FIG. 4



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FIG. 5

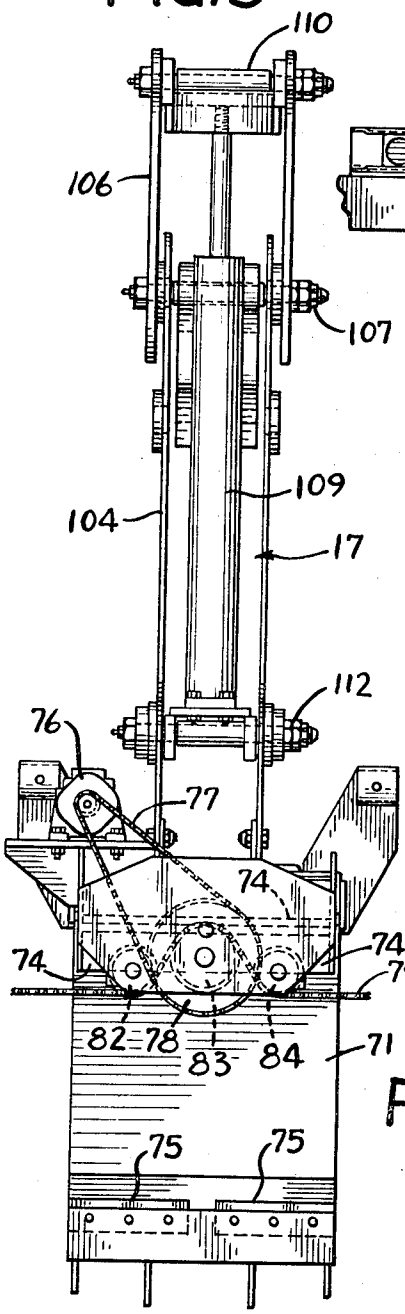


FIG. 6

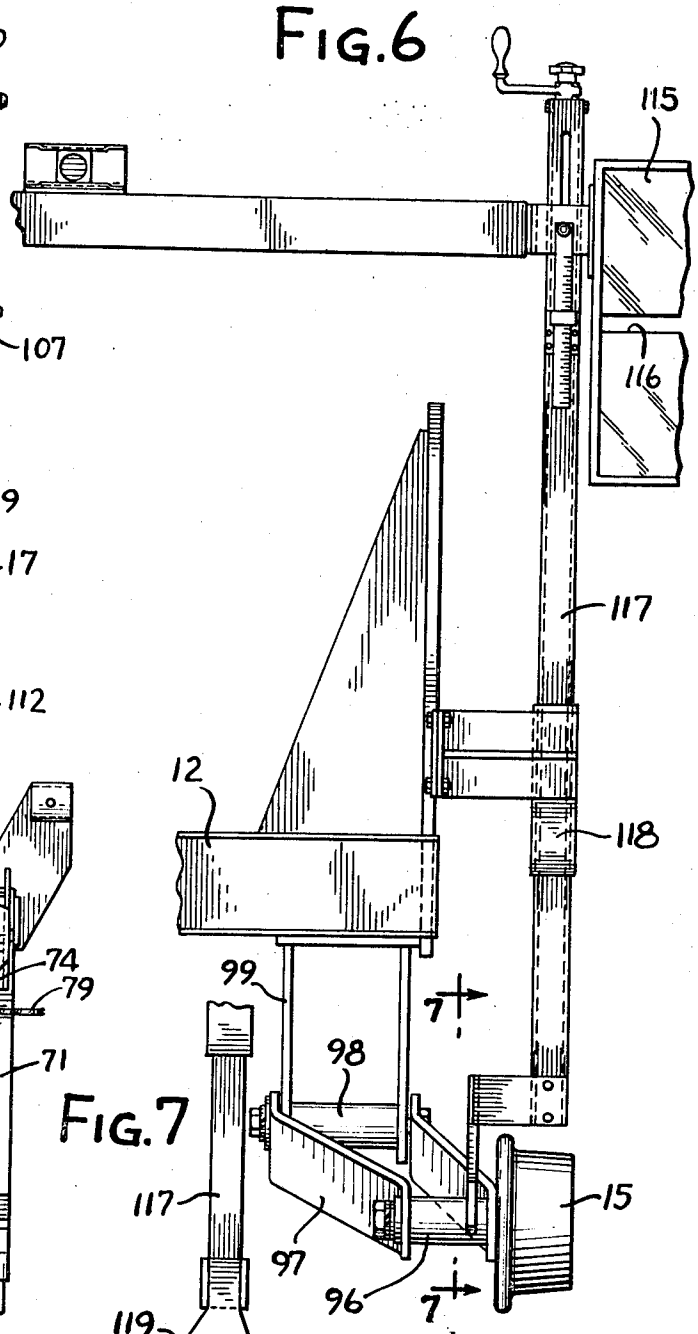


FIG. 7

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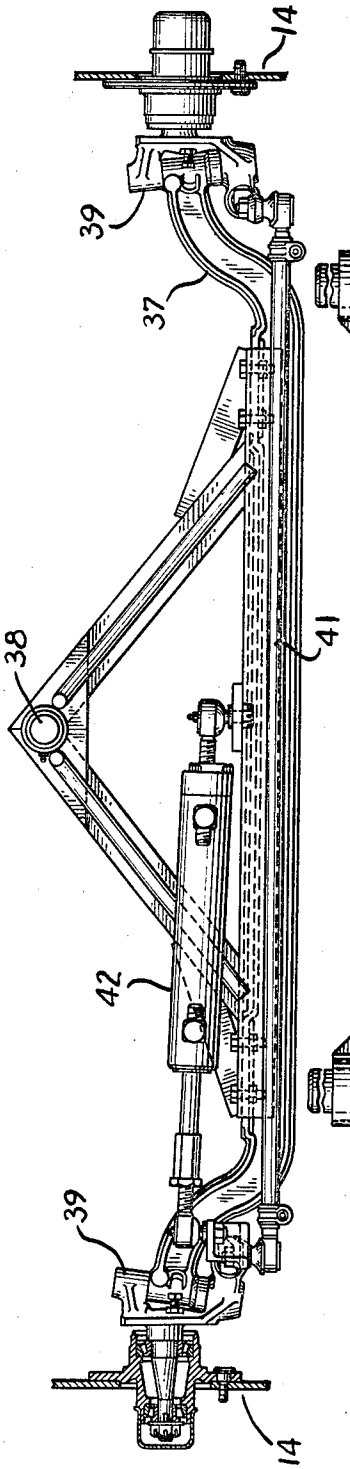


FIG. 8

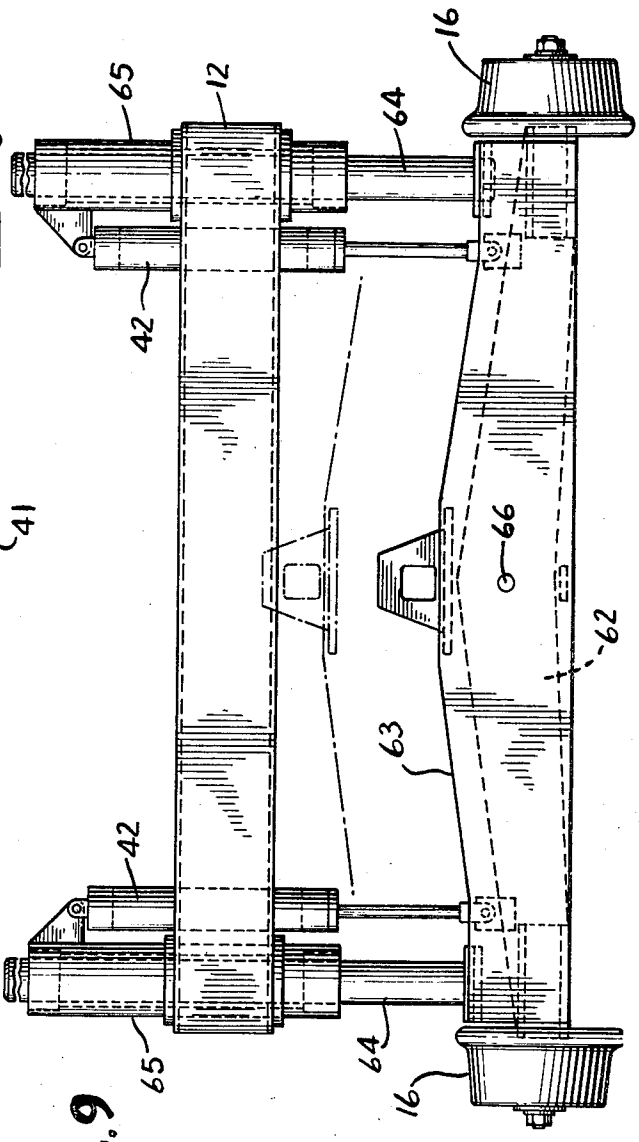


FIG. 9

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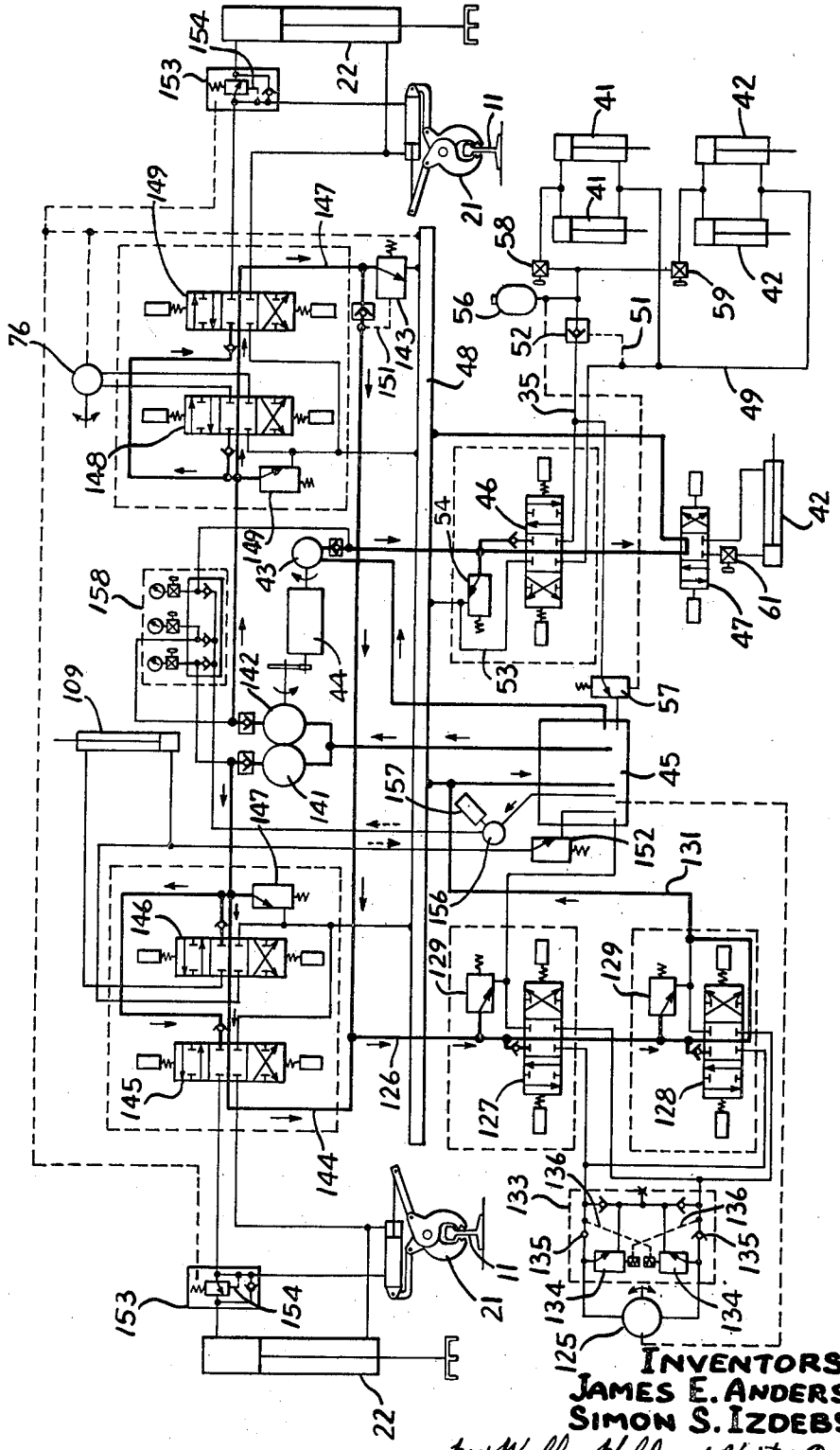
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FIG. 10



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3,494,300
Patented Feb. 10, 1970

3,494,300

ON TRACK-OFF TRACK TAMPER

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Filed Mar. 18, 1968, Ser. No. 713,961
Int. Cl. E01b 27/00
U.S. Cl. 104—12 20 Claims

ABSTRACT OF THE DISCLOSURE

An on-track, off-track tamper for railroad track having both rubber-tired wheels, gauged for riding on track rails and suitable for highway travel, and steel flanged track wheels which can be hydraulically lowered to lift a portion of the tamper weight from the tires and hold the tamper firmly on the track. About 20% of the weight of the tamper is floatingly supported on the flanged wheels so that weight transfer remains constant despite relative movement between the wheels and the tamper. The tamper workhead is cantilever suspended to minimize overhanging weight, and is slidably and solidly mounted on a plate-like jack beam to be shiftable from rail to rail. The tamper has hydraulic drive and a double pump is valved to provide a portion of the available power for start-ups and indexing while full power is delivered at higher speeds for travel.

Description of the invention

This invention relates generally to railroad track tamping machines and more particularly concerns a tamper which can be driven on or off railroad track.

Present-day production tampers normally run on the track that is being tamped, both when working and when moving to and from the work location. To clear the track for railroad traffic, special set-off devices or structures are employed to lift the tamper and shift it to one side of the track.

Because it would be obviously desirable to have a tamper capable of running on ordinary roads to the job site, some attention in the past has been given to constructions allowing a tamper to run on either railroad track or paved roads. An example of such a machine as shown in Jackson Patent No. 3,022,744, issued Feb. 27, 1962. The wheel and suspension requirements of relatively high-speed highway travel are, however, quite different from what is needed for an on-track tamper and heretofore machines of this type have enjoyed only limited commercial success.

Accordingly, it is the primary aim of this invention to provide an on-track, off-track tamper having proper suspension and weight distribution for both highway travel and safe, reliable on-track tamping. In more detail, it is an object to provide a tamping workhead that minimizes overhanging weight for highway travel while retaining proper vertical movement of the tamping blades while working. A further detailed object is to utilize rubber-tired wheels for both on- and off-track drive, but to transfer controlled and uniform portions of the machine's weight to flanged wheels for on-track operation so that the machine holds the track properly and provides a solid base for the tamping workhead.

Another object of the invention is to provide a novel hydraulic drive for a tamper of the above kind which efficiently employs its power for start and stop working movement of the tamper as well as for high-speed travelling movement. A related object is to provide a hydraulic circuit for a tamper of this character which is convenient to control.

It is also an object to provide a tamper having a single rail workhead mounted for quick transfer from rail to rail, or to other positions for tamping switches and turnouts, while retaining solid support for the workhead.

Yet another object to to provide a tamper as characterized above which is compact, often using parts for dual purposes, reliable in operation and well suited for economical manufacture.

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings, in which:

FIGURE 1 is a side elevation of a tamper embodying the invention;

FIG. 2 is a plan view of the tamper shown in FIG. 1;

FIG. 3 is an enlarged fragmentary elevation, partially in section, of a portion of the tamper shown in FIG. 1;

FIG. 4 is an enlarged fragmentary elevation of another portion of the tamper shown in FIG. 1;

FIG. 5 is an elevation taken approximately along the line 5—5 in FIG. 4;

FIG. 6 is a fragmentary elevation taken approximately along the line 6—6 of FIG. 1;

FIG. 7 is a fragmentary view taken approximately along the line 7—7 in FIG. 6;

FIG. 8 is an enlarged fragmentary view taken approximately along the line 8—8 in FIG. 1;

FIG. 9 is an enlarged fragmentary view taken approximately along the line 9—9 in FIG. 1; and

FIG. 10 is a schematic hydraulic diagram of the circuit utilized in the tamper of FIG. 1.

While the invention will be described in connection with a preferred embodiment, it will be understood that we do not intend to limit the invention to that embodiment. On the contrary, we intend to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

Turning now to FIGS. 1 and 2, there is shown a tamper **10** embodying the invention and running on railroad track rails **11**. The tamper **10** includes a frame **12** supported on the rails **11** by both rubber-tired wheels **13** and **14** and flanged steel wheels **15** and **16**. A tamping workhead **17** is positioned at one end of the frame **12** and a housing **18** enclosing a power plant, electrical generator and hydraulic circuit components is located at the other end of the frame. An operator's platform **19** is positioned on the frame **12** between the workhead **17** and the housing **18**.

The tamper **10** illustrated is a jack tamper with a pair of rail clamps **21** (see FIGS. 3 and 10), a pair of hydraulic jacks **22**, and a workhead subframe **23** suspending a plurality of vibratory motors **24** with depending tamping blades **25**. In tamping operation, the rail clamps **21** grip the rails **11**, the jacks **22** engage the road bed outside of the rails and lift the track, and the tamping blades **25** are then driven into the ballast about either rail, the workhead **17** being shiftable from side to side so as to work alternately about one rail or the other.

In carrying out the invention, both the flanged wheels **15**, **16** and the rubber-tired wheels **13**, **14** are gauged to ride on the rails **11** of the railroad track and, when riding on the track and tamping, the flanged wheels **15**, **16** are hydraulically forced against the track so that a predetermined portion of the total tamper weight is transferred from the rubber-tired wheels to the steel flanged wheels. For off-track, highway travel, the flanged wheels **15**, **16** are hydraulically raised and the tamper **10** runs on the rubber-tired wheels **13**, **14** as a conventional vehicle. The wheels **13** are driving wheels for both on-track and off-track movement of the tamper. Off-track, the rubber-tired wheels **14** are steering wheels. On-track, the flanged wheels **15**, **16** hold the tamper solidly on the track.

As a feature of the invention, a reversible seat **31** is mounted centrally on the operator's platform **19**, being pivoted in an upstanding post **32**, and a set of drive and workhead controls **33** are positioned between the seat **31** and the workhead **17**, and a set of drive and steering controls **34** are positioned between the seat **31** and the housing **18**. As seen in FIGS. 1 and 2, the tamper **10** appears riding on track with the seat **31** facing the workhead. In this case, the operator utilizes the control set **33** to drive the tamper to the left and manipulate the tamper blades **25**. When going off the track, the workhead **17** is raised to a travel position, the flanged wheels **15, 16** are lifted, the seat **31** is reversed, and the operator utilizes the control set **34** to drive the tamper **10** much as any conventional vehicle.

The rubber-tired drive wheels **13** are mounted on a fixed driven axle **36** but, to give some off-track riding smoothness, the rubber-tired steering wheels **14** are journalled at opposite ends of an axle **37** which is pivoted at **38** (see FIG. 8) on the tamper frame **12** for tilting movement about a fore-and-aft axis along the approximate center line of the frame. The wheels **14** are pivoted for steering on king-pin assemblies **39** which are interconnected by a tie rod **41**. A two-way linear hydraulic actuator **42** anchored to the axle **37** steers the wheels **14**. The pivot **38** provides some "float" in the off-track vehicle suspension that reduces the harshness of the otherwise springless support. Of course, the rubber tires on the wheels **13, 14** also soften off-track travel.

In accordance with the invention, the flanged wheels **15, 16** have individual actuators **41** and **32**, respectively, with a common hydraulic circuit for driving the flanged wheels against the rails, and pressure is maintained in the common circuit so that a predetermined weight transfer is floated onto the flanged wheels and maintained despite relative vertical movement between the frame **12** and the steel wheels **15, 16**. As shown more particularly in FIG. 10, a source of fluid under pressure including a pump **43** driven by an engine **44**, constituting the power plant for the tamper **10**, circulates fluid from a sump tank **45** through a pair of three-position valves **46** and **47** back to a sump return manifold **48**. The valve **46** is detented and stays in the position to which it is manually shifted. Shifting the valve to the right in FIG. 10 pressurizes a circuit **49** that retracts the actuators **41, 42** and raises the flanged steel wheels. With the circuit **49** pressurized, a pilot line **51** opens a check valve **52** to permit fluid to be returned to the sump tank **45** from the tops of the actuators **41, 42** through a return line **53**. A pressure limiting valve **54** relieves the circuit **49** when the wheels **15, 16** are fully raised.

When the valve **46** is shifted to the left as seen in FIG. 10, a second circuit **55** is pressurized and fluid, through the check valve **52**, extends the actuators **41, 42** to drive the flanged wheels **15, 16** against the rails **11**. An accumulator **56** and a settable unloading valve **57** act to maintain a constant pressure in the circuit **55** behind the check valve **52**. A pair of shutoff valves **58** and **59** are normally open so that the weight borne by the flanged wheels **15, 16** is floated on the fluid in the circuit **55**. The tamper **10** can rock relative to the flanged steel wheels, and the wheels can conform to minor variations in track rail height, without changing the amount of weight transfer.

It has been found desirable to set the valve **57** so that approximately 20% of the total tamper weight is transferred to the flanged steel wheels **15, 16**, leaving about 80% of the total weight supported by the rubber-tired wheels **13, 14**. The 20% weight transfer causes the tamper **10** to firmly hold the track, while the 80% load gives adequate traction to the drive wheels **13** for moving the tamper **10** along the track.

As another feature, the actuators **41** are of larger diameter than the actuators **42** so as to approximately equalize the loading on the rubber-tired wheels **13, 14** despite the overhanging weight of the workhead **17**. The larger diameter actuators **41** cause the flanged wheels **15** at the workhead end of the frame **12** to carry a greater load than the other pair of flanged wheels **16** at the uniform pressure maintained in the circuit **55**. As a result, the rubber-tired wheels **13, 14** aer approximately equally loaded and the tamper **10** is more stable on the track and provides a more solid base for the workhead.

A further feature of the arrangement of the valves **46, 47** lies in the use of the valve **47** for controlling the tamper steering actuator **42**. With the valve **46** centered, manually shifting the valve **47** to the left or right as seen in FIG. 10 swings the steering wheels **14** to one side or the other. However, if the valve **46** is not in centered position, fluid under pressure cannot reach the valve **47** and hence the wheels **14** cannot be inadvertently turned. This avoids having the wheels **14** turned while the flanged wheels **15, 16** are being held down under pressure and the tamper is riding on the track rails **11**. Therefore, after driving the tamper **10** from a road onto the track and straightening the steering wheels **14**, a shutoff valve **61** can be closed to lock the steering wheels in position but, in any event, fluid will not be available to turn the wheels **14** when the valve **46** is manipulated to control the flanged wheels **15, 16**.

With the circuit to the flanged wheel actuators **41, 42** being common, it is desirable to make some provision for preventing the two actuators at either side of the tamper **10** from accepting all of the fluid when the circuit **55** is pressurized and thus tipping the tamper to one side or the other. In carrying out this aspect of the invention, the wheels **16** are journalled on a rigid beam **62** (see FIG. 9), to the ends of which the actuators **42** for these wheels are pivoted. A second beam **63** is disposed parallel to the beam **62** and is mounted for vertical movement on the frame by means of posts **64**, fixed at each end of the beam **63**, which are slidably received in sleeves **65** anchored on the frame **12**. The beam **62** is pivoted at **66** on the beam **63** for tilting movement about a fore-and-aft axis midway between the flanged wheels **16**. Thus, while the tamper **10** and the beam **63** can rock about the pivot **66** relative to the flanged wheels **16** and the axle beam **62**, the fact that the beam **63** will not rock relative to the tamper frame **12** prevents the wheels **16** from being driven down against the rails **11** unless pressure is developed in both of the actuators **42**. This avoids tilting the tamper **10** sidewards when fluid is directed to the common circuit **55** and assures that all of the actuators **41, 42** are uniformly pressurized.

Pursuant to one aspect of the invention, the workhead **17** is mounted solidly, but slidably, on a strongback **70** formed as a thick, generally rectangular, plate-like body disposed transversely at the workhead end of the tamper frame **12**. The workhead **17** includes a carrier **71** (see FIGS. 3 and 5) having an upper portion embracing the top edges of the strongback **70** and a lower portion embracing a rail **72** fixed by brackets **73** to the lower portion of the strongback. One set of bearing members **74** is mounted on the carrier **71** to slidably engage the top, front and back of the strongback **70**, and another set of bearing members **75** is mounted on the carrier to slidably engage the front and back of the rail **72**. Preferably, the bearing members **74, 75** are formed of a resinous composition with a low coefficient of friction, such as nylon, and are impregnated with a lubricant such as molybdenum.

To prevent upward movement of the workhead **17** relative to the strongback **70**, as when the tamping blades are being driven down into the ballast, the rail **72** is T-shaped and the bearing members **75** engage the underside of the horizontal portions of the rail. It can thus be seen that the carrier **71** is slidably but solidly carried on the strongback **70** with the bearing members **74, 75** restricting movement in all directions but transversely along the strongback.

In order to position the workhead **17** transversely relative to the rails **11**, a small reversible hydraulic motor **76** is mounted on the carrier **71** and connected, by a chain **77**, to a sprocket cluster **78** journalled in the carrier **71**. A second chain **79** extends the length of the strongback **70** and has its ends secured to brackets **81** (see FIG. 2). Between its ends, the chain **79** is trained about three sprockets **82, 83** and **84** journalled on the carrier **71** (see FIG. 5) and the sprocket **83** is part of the cluster **78**. Thus, operating the motor **76** causes the carrier **71** to pull itself along the chain **79**, the carrier sliding freely on the strongback **70** and its rail **72**. The bearing members **74, 75** insure that wherever positioned, the workhead **71** is firmly supported on the strongback.

When tamping, the strongback **70** rides directly on the rails **11** and for this purpose is provided with rollers **87** journalled in brackets **88** on the outer face of the strongback **70** (see FIGS. 2 and 3). The strongback **70** serves as a track jack beam and supports both the rail clamps **21** and the hydraulic jacks **22**. For travelling, the strongback **70** is raised to a travel position and, to mount the strongback for vertical movement on the tamper frame **12**, the strongback has double arms **91** which embrace frame members **92** fixed on the end of the frame **12**. The members **92** have upper and lower vertical slots **93** and the arms **91** carry rollers **94** which ride in the slots, thus guiding the strongback **70** for up and down movement and also providing a connection permitting the tamper **10** to push the strongback **70**, when in lowered tamping position, along the track rails **11**.

Another feature of the invention lies in using the flanged wheel actuators **41** for shifting the strongback **70** between working and travel positions. For this purpose, each of the wheels **15** is mounted on a short axle **96** (see FIGS. 3 and 6) secured in a bracket **97** that is pivoted at **98** on flanges **99** extending downwardly from the frame **12**. The actuators **41** interconnect the frame **12** and the brackets **97** so that the wheels **15** are moved vertically by swinging the brackets **97** about their pivots **98**. The strongback **70** carries a pair of supports **101** having lower bifurcated portions adapted to ride on the axles **96** so that raising and lowering the flanged wheels **15** with the actuators **41** shifts the strongback **70** and the workhead **17** between working and travel positions. By slipping pins in holes **102** at the top of the double arms **91** when the strongback is in raised travel position, the pins can abut the tops of the frame members **92** and releasably lock the strongback and the workhead **17** in travel position. The wheels **15** are then lowered with the axles **96** moving freely from the supports **101** so that a portion of the tamper weight is again borne by the wheels **15** for on-track travel of the tamper **10**.

Thus, looking at the FIG. 10 circuit, when it is desired to lift the workhead **17** and travel along the track, the shutoff valve **59** is closed and the valve **46** shifted to the right as seen in that figure. The closed valve **59** holds the flanged wheels **16** on the track, but the actuators **41** lift the wheels **15** and the strongback **70** to its travel position. The strongback is locked up by placing pins in the holes **102**, and the valve **46** is then shifted back to the left so as to lower the wheels **15** and re-establish the desired weight transfer. The shutoff valve **59** is then opened and the tamper is ready for on-track travel.

Pursuant to the invention, the effect of the overhanging workhead weight is minimized by supporting the tamping motors **24** cantilever fashion while providing for proper up and down movement of the tamping blades **25**. In the illustrated construction, the workhead carrier **71** includes a substantially vertical column **104**, and a post **105** is secured to the subframe **23** in substantially parallel relation to the column **104**. A bell crank **106** is pivoted at **107** on the column **104**, and one arm of the bell crank **106** extends away from the frame to support the post **105** at a pivot **108**. An actuator **109** is anchored on the carrier **71** and is pivotally connected at **110** to the other end of the bell crank **106**. A link **111** is pivoted at **112** and **113** on the column **104** and the post **105**, respectively, so as to create, with the post, column and bell crank **106**, a parallelogram linkage that keeps the tamping blades **25** properly oriented during up and down tamping movement of the subframe under power of the actuator **109**. With this construction of the workhead, a minimum amount of weight is suspended out from the tamper frame and this enhances the off-track riding qualities of the tamper.

Tampers are often operated under automatic, or semi-automatic, control of the kind shown in U.S. Patent No. 3,270,690 issued Sept. 6, 1966, in which a rail height indicating device, such as a light mask **115** with a central slot **116** (see FIGS. 1 and 6) rides the rails **11** to indicate the effect of the jacks **22** on the elevation of the track. As another feature of the tamper **10**, the mask **115** utilizes the flanged wheels **15** as rail followers. For this purpose, the mask **115** is secured to an inverted U-shaped frame **117** which floats freely up and down in sleeves **118** secured at each side of the tamper frame **12** closely adjacent the strongback **70**. Each lower end of the frame **117** carries a bifurcated shoe **119** adapted to ride on the axles **96** of the flanged wheels **15**. Thus, when it is desired to use the rail height indicating mask **115**, the frame **117** is simply lowered onto the axles **96** and the flanged wheels **15** serve as rail followers shifting the mask **115** with up and down movement of the rails **11**.

The tamper **10** is driven both on-track and off-track by a reversible hydraulic motor **125** (see FIG. 10) coupled to the drive wheels **13** and which is powered by fluid from a circuit **126**. Preferably, the circuit **126** delivers fluid to a pair of parallel forward and reverse valves **127** and **128**, each associated with a safety release valve **129**, with the valve **127** being in the control set **33** and the valve **128** being in the control set **34**. The valves **127, 128** are identical except that the valve **127** is spring centered to normally dump fluid from the circuit **126** through a line **131** to the sump tank **45**, while the valve **128** is detent held in any one of its three positions. Thus, when the operator is tamping and using the control set **33**, the valve **127** must be manually held to drive the tamper. But, for off-track travel, the operator uses the valve **128** in the control set **34** so that the circuit **126** remains open to the motor **125** in either forward or reverse direction without continuous manual pressure and the operator can concentrate on steering or otherwise controlling the tamper.

Both valves deliver fluid to the motor **125** through a brake valve assembly **133**. The brake valve assembly **123** insures that the drive motor **125** stops when fluid flow stops, whether in forward or reverse direction, and without the motor becoming a pump driven by movement of the tamper. Thus, the assembly **133** includes valves **134** which by-pass check valves **135** to exhaust fluid from the motor **125** only if pilot lines **136** are pressurized on the opposite side of the motor. If fluid under pressure is not being delivered to the motor **125**, the valves **134** close, blocking the fluid flow from the pump and thus braking the tamper.

More conventional, hydraulically actuated brakes (not shown) are operatively associated with the drive axle **36** for use during off-track, highway travel, and these brakes are also useful in assisting the hydrostatic brake described above, particularly in holding the tamper **10** on a track grade.

As another aspect of the invention, a double pump **141** and **142** giving two independent outputs is arranged with one output going directly to the tamper drive motor circuit **126** and the other output going to the circuit **126** under the control of an unloading valve **143**. The pump **141, 142** is driven by the tamper engine **44** and draws fluid from the sump tamp **45**. The pump **141** delivers fluid to a circuit **144** including a pair of three-way valves **145** and **146** which, when centered, allow fluid to go directly

to the circuit 126. The pump 142 delivers fluid to a circuit 147 including a pair of three-way valves 148 and 149 which, when centered, allow fluid to reach the unloading valve 143. Both circuits 144, 147 include system pressure limiting valves 149.

The unloading valve 143 is controlled by a pilot line 151 which is open to pressure in the circuit 144. When the tamper is stopped and one of the valves 127, 128 is moved to start the motor 125, there is relatively high pressure in the circuits 144, 126 until the inertia of the tamper 10 is overcome and the machine begins moving. This high pressure, conveyed by the pilot line 151, keeps the unloading valve 143 open and dumping fluid from the circuit 147 to the sump manifold 48. Once the tamper is underway and pressure in the circuits 144, 126 drops, then the valve 143 is closed and the output of the circuit 147 is added to the circuit 126 so that the total volume of both pumps 141, 142 is available to drive the tamper. This gives a sort of two-speed transmission effect, preventing full power from being initially applied to the drive wheels, which would cause drive wheel slippage at start-up, and also avoiding the build-up in the system of excessive power, and heat, accompanied by undue laboring of the tamper engine 44.

As another feature of the hydraulic circuit, the workhead traversing motor 76 is controlled by the valve 148 in the circuit 147, while the alternate circuit 144 is used to start the tamper drive motor 125. Movement of the valve 148 up or down as seen in FIG. 10 causes rotation in the motor 76 in one direction or the other so as to drive the workhead 17 to one side or the other of the strongback 70. Since independent circuits traverse the workhead and drive the tamper in start-up operation, the tamper operator can index the tamper forward to the next tie to be tamped while simultaneously traversing the workhead to the opposite rail.

The workhead raising and lowering actuator 108 is controlled by the valve 146 and movement of this valve either up or down as seen in FIG. 10 causes the actuator 109 to be extended or retracted and thus raise or lower the tamping blades 25. The actuator 109 is protected by a relief valve 152. The valves 145, 149 are three-way valves which control the jacks 22 and the rail clamps 21 through sequence valves 153. The sequence valves 153 insure that the clamps 21 tightly grip the rails 11 before pressure in pilot lines 154 opens the valves 153 and drives the jacks 22 downward. Because of the series arrangement of the valves 145, 146 and 148, 149, simultaneous manipulation of the workhead and the track jacks is not possible. Also, operation of the tamper motor 125 is dependent upon the valves 145, 146 being centered.

In the preferred embodiment, an emergency pump 156 driven by an electric motor 157, which can be powered by the starting battery for the tamper engine 44, is arranged to draw fluid from the sump tank 45 and deliver the fluid, through control valves in an assembly 158, to supplement or replace the outputs of the pump 43 and the sections 141, 142 of the double pump.

We claim as our invention:

1. A tamper comprising, in combination, a frame having rubber-tired wheels gauged to ride the rails of railroad track, means on said frame for driving and steering said rubber-tired wheels, a tamping workhead at one end of said frame and adapted to tamp the track on which the tamper rides, a first pair of flanged wheels gauged to ride the track mounted on said frame at the workhead end, a second pair of flanged wheels mounted on said frame gauged to ride the track at the non-workhead end of the machine, a hydraulic actuator for each of said flanged wheels mounted on said frame and adapted to lift the flanged wheels from the track and force the wheels against the track so as to shift tamper weight from said rubber-tired wheels to said flanged wheels, a common hydraulic circuit for said actuators, and means for supplying hydraulic fluid to said circuit at a fixed pressure so that a predetermined fraction of the total tamper weight is floated onto said flanged wheels and maintained despite relative movement between said frame and said flanged wheels.

2. The combination of claim 1 in which said workhead makes the workhead end of said frame heavier than the non-workhead end, and said actuators for said first pair of flanged wheels are larger than the actuators for said second pair of flanged wheels so that with said fixed pressure said first pair of wheels carries a greater load than the second pair and said rubber-tired wheels are approximately equally loaded.

3. The combination of claim 1 including a first beam mounted for vertical movement on said frame, a second beam disposed parallel to said first beam, said second pair of flanged wheels being journalled at the ends of said second beam and said actuators for said second pair of flanged wheels being connected near the ends of said second beam, and said second beam being pivoted on said first beam for tilting movement about a fore-and-aft axis midway between the second pair of flanged wheels.

4. The combination of claim 1 in which said workhead includes a subframe suspending a plurality of tamping blades, a substantially vertical post secured to and extending upwardly of said subframe, a column mounted on said frame in substantially parallel relation to said post, a bell crank pivoted on said column and having one arm extending away from said frame to pivotally support said post, an actuator on said frame connected to the second arm of said bell crank so that said actuator can pivot the bell crank and thus raise and lower said subframe, and a link extending between pivots on said post and said column to create, with the post, column and bell crank, a parallelogram linkage keeping said tamping blades properly oriented during up and down movement of said subframe.

5. The combination of claim 1 in which said rubber-tired wheels include a pair of steering wheels journalled on opposite ends of an axle, said axle being pivoted on said frame for tilting movement about a fore-and-aft axis along the approximate center line of the frame.

6. The combination of claim 1 including an operator's platform on said frame, a reversible seat mounted centrally on said platform, a set of drive and workhead controls positioned on said frame between said seat and said workhead, and a set of drive and steering controls positioned on said frame between said seat and said non-workhead end of the frame.

7. The combination of claim 1 including track jacks mounted on said frame adjacent said workhead, a device for indicating the height of the track rails in an automatic control system, said device being mounted for up and down floating movement on said frame, and said device having bifurcated shoes adapted to ride on the axles of said first pair of flanged wheels so that these flanged wheels also serve as rail followers for said device.

8. The combination of claim 1 in which said workhead includes a strongback extending transversely of said frame, said strongback being mounted on the workhead end of said frame for vertical movement between a lowered working position and a raised travel position, one of said first pair of flanged wheels having an axle movably mounted on said frame, a support on said strongback having a lower portion adapted to ride on said axle so that raising or lowering said one flanged wheel shifts the strongback between said working and travel positions, means for releasably locking said strongback in travel position so that said first pair of flanged wheels can be lowered into track engaging, load bearing position with the strongback remaining in travel position.

9. The combination of claim 8 including jacks mounted at each end of said strongback so that the strongback serves as a track jack beam when lowered into working position.

10. In a tamper, the combination comprising, a frame mounted for movement along railroad track, a strongback mounted on one end of said frame transversely of the track, said strongback being formed as a thick generally rectangular body, a workhead carrier mounted on said strongback for movement along said strongback transversely of the track, said carrier having a portion embracing the top edges of the strongback, bearing members mounted on said portion in sliding engagement with the top, front and back of said strongback, a rail fixed to the lower portion of said strongback, said carrier having a lower portion embracing said rail, bearing members mounted on said lower portion in sliding engagement with the front and back of said rail, and means for positioning said carrier along said strongback.

11. The combination of claim 10 in which said bearing members are formed of a resinous composition with a low coefficient of friction and impregnated with lubricant.

12. The combination of claim 10 in which said rail is T-shaped and said bearing members on said lower portion also engage the horizontal portions of said rail to prevent upward movement of said carrier on said strongback.

13. The combination of claim 10 including a subframe suspending a plurality of tamping blades, a substantially vertical post secured to and extending upwardly of said subframe, said carrier including a column disposed in substantially parallel relation to said post, a bell crank pivoted on said column and having one arm extending away from said frame to pivotally support said post, an actuator on said carrier connected to the second arm of said bell crank so that said actuator can pivot the bell crank and thus raise and lower said subframe, and a link extending between pivots on said post and said column to create, with the post, column and bell crank, a parallelogram linkage keeping said tamping blades properly oriented during up and down movement of said subframe.

14. In a tamper having sets of both rubber-tired wheels and vertically movable flanged wheels riding on the track, the combination comprising, a two-way hydraulic actuator for each of said flanged wheels, a source of fluid under pressure, a first circuit for directing fluid from said source to the side of said actuators causing the flanged wheels to be raised, a second circuit for directing fluid from said source to the side of said actuators causing the flanged wheels to be driven against the rails, said second circuit being a common circuit so that the pressure remains the same in each actuator despite relative movement between the tamper and the flanged wheels, means for maintaining a predetermined pressure in said second circuit, and a valve for shutting off or directing a flow of fluid between said source and either said first or second circuits.

15. The combination of claim 14 in which said rubber-tired wheels include tamper driving wheels and said predetermined pressure is sufficient to cause the flanged wheels to bear approximately 20% of the tamper weight while the rubber-tired wheels bear the remaining approximately 80%.

16. The combination of claim 14 including a hydraulic actuator and control for steering said rubber-tired wheels, said valve being effective to direct fluid from said source to said actuator and control only when the valve is shutting off fluid flow to both said first and second circuits.

17. In a tamper having a first hydraulic motor for driving the tamper along the track and a single workhead movable transversely of the track under the power of a second hydraulic motor, the combination comprising, a source of hydraulic fluid under pressure including a double pump giving two independent outputs, a first circuit including a control valve connecting one of said outputs to said first motor, and a second circuit including a control valve connecting the other of said outputs to said second motor so that the tamper can be driven forward while the workhead is simultaneously moved transversely.

18. The combination of claim 17 in which said second circuit is connected to said first circuit through an unloading valve that dumps said other output to pump when said second motor is not being driven, said unloading valve being responsive to a drop in pressure in said first circuit so that both outputs are directed to said first motor at lower running pressures but only said first circuit drives said first motor at higher start-up pressures.

19. In a tamper having a hydraulic motor for driving the tamper, the combination comprising, a source of hydraulic fluid under pressure including a double pump giving two independent outputs, a first circuit connecting one of said outputs to said motor, and a second circuit including an unloading valve connecting said other output to said first circuit, said unloading valve being normally effective to discharge said second output to pump but responsive to a drop in pressure in said first circuit so that both outputs are directed to said motor at lower running pressures while only said one output drives the motor at higher start-up pressures.

20. The combination of claim 19 in which a pair of forward and reverse valves are interposed in said first circuit for controlling fluid flow to said motor, said valves being connected so that operation of either valve controls the motor independently of the other valve, one of said valves being spring biased to a neutral, motor-off position so that continuous manual pressure is required to operate the motor, and other of said valves being releasably held when manually shifted to an operating position so that continuous manual pressure is not required to operate the motor.

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