March 16, 1937. H. H. TALBOYS 2,073,816

TRACK GRINDER

Filed Nov. 16, 1935 6 Sheets-Sheet 1

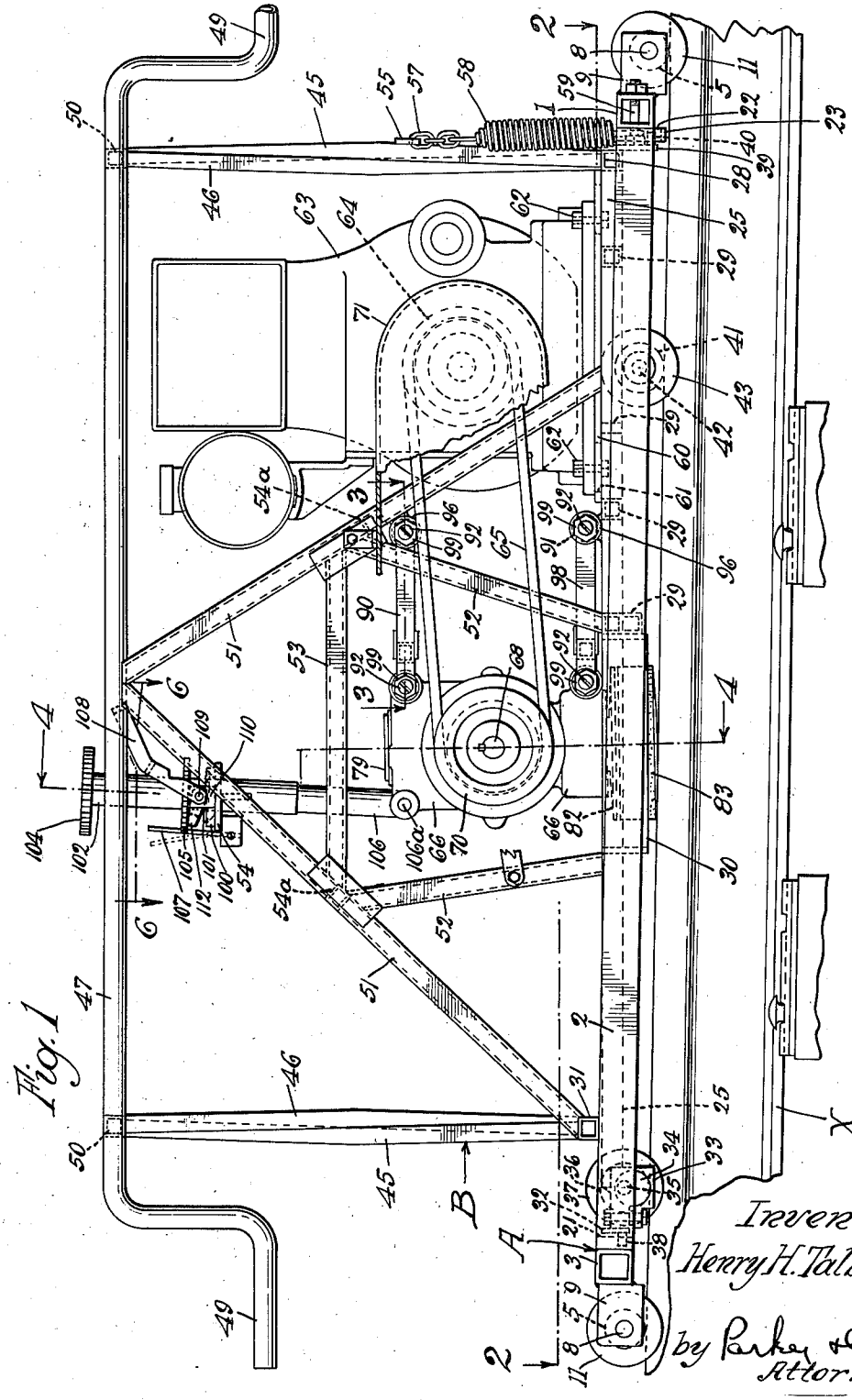


Fig. 1

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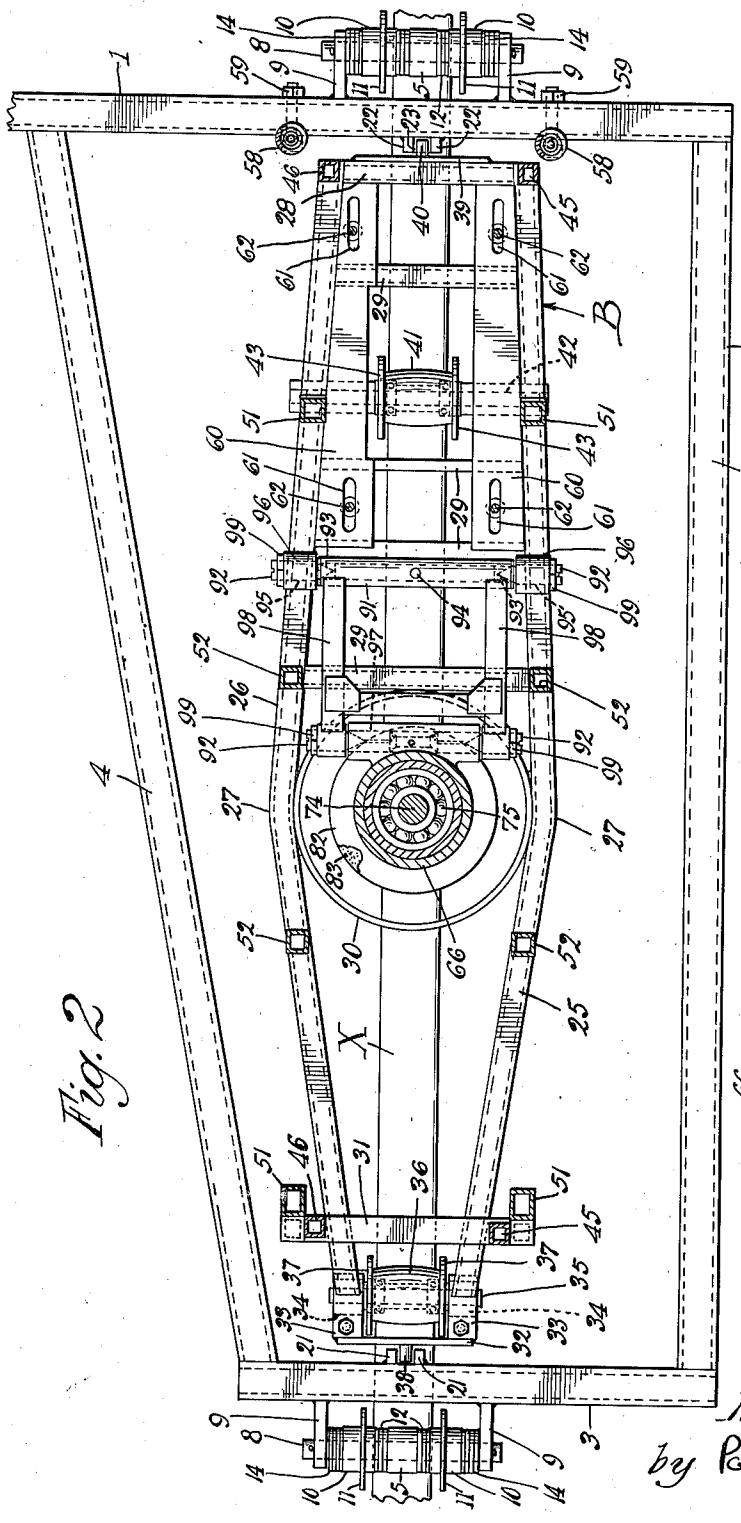


Fig. 2

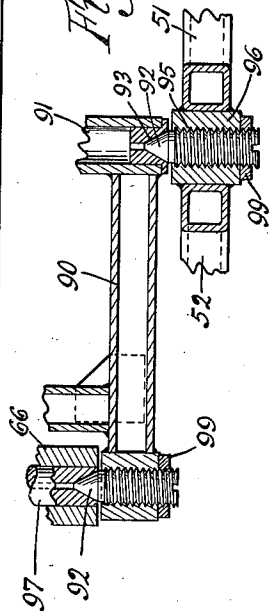


Fig. 3

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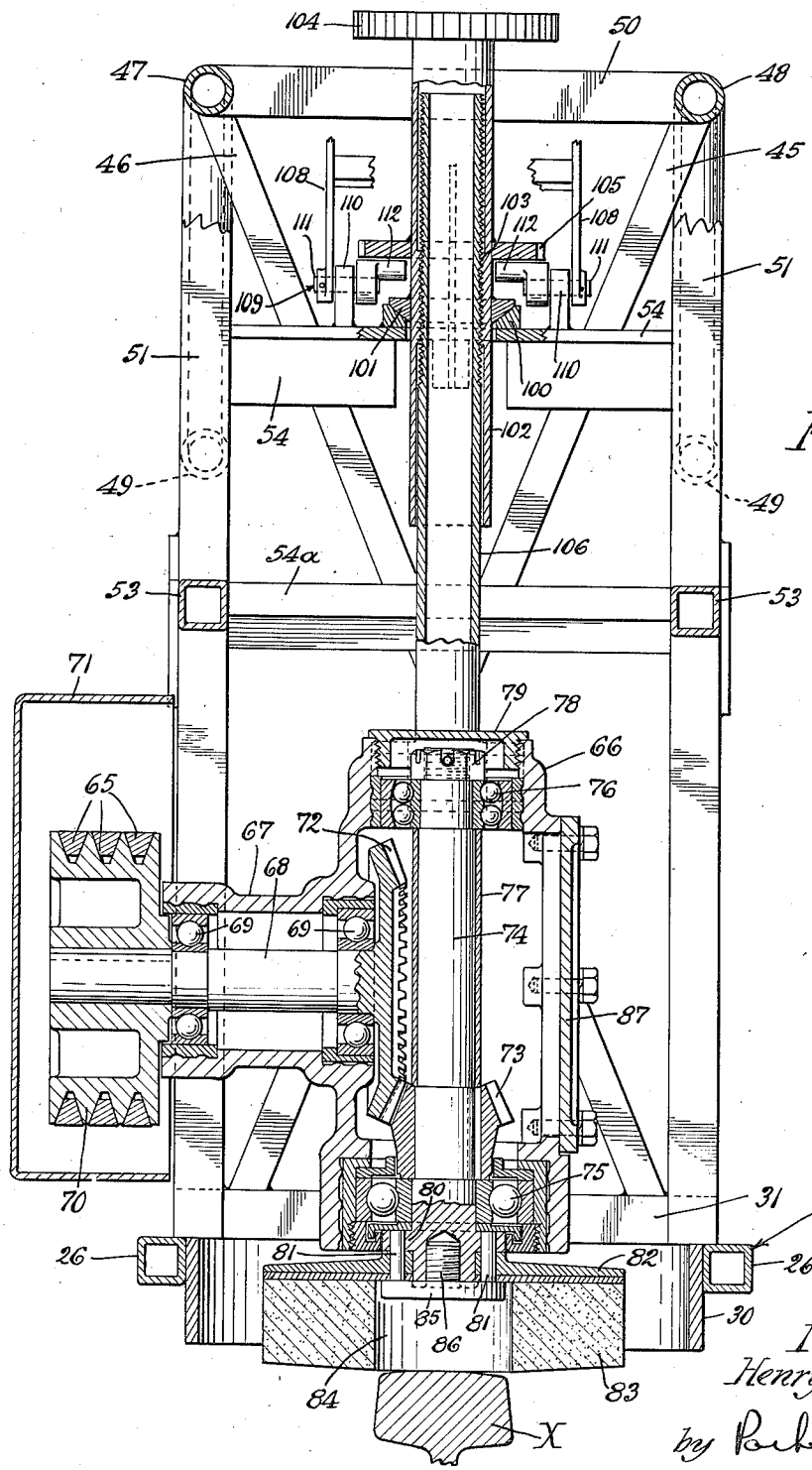


Fig. 4

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TRACK GRINDER

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Fig. 5

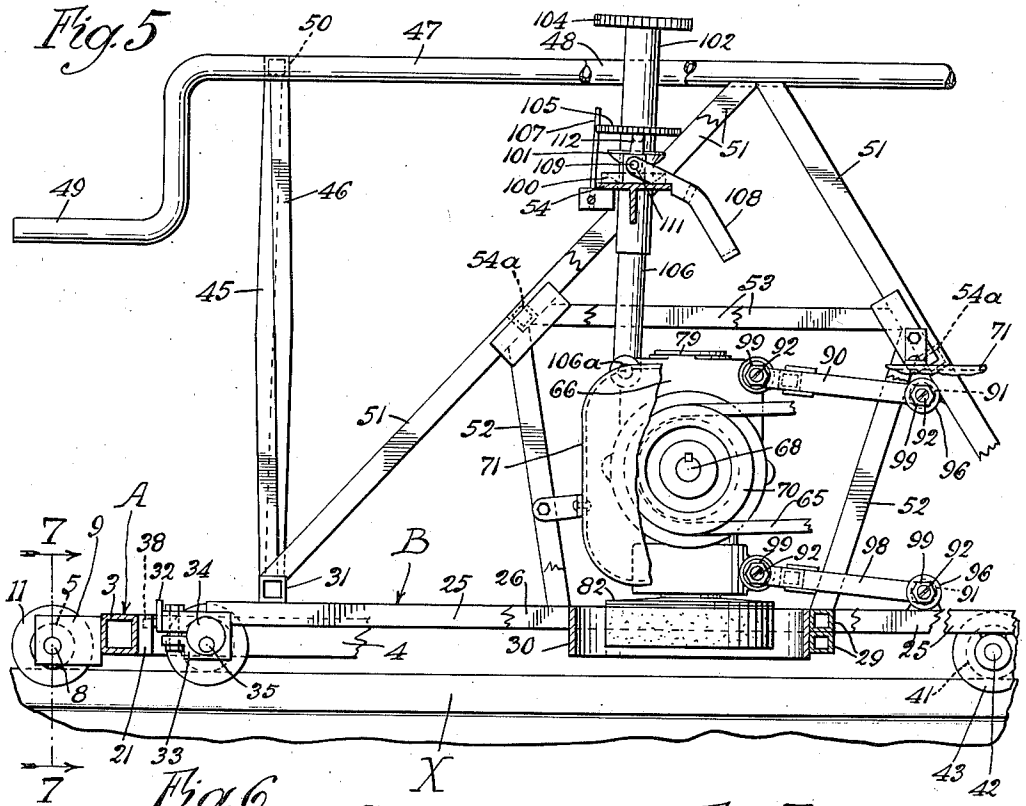


Fig. 6

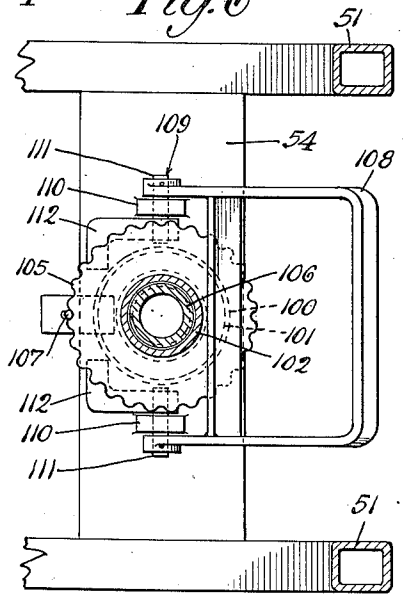
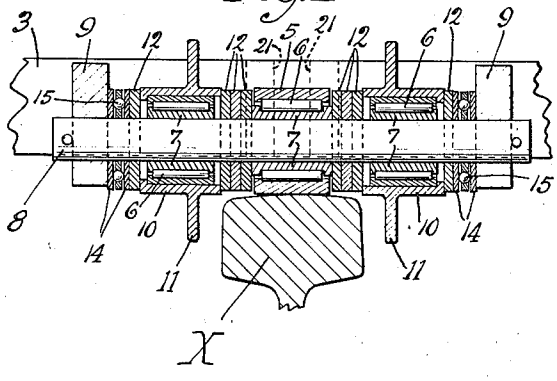


Fig. 7



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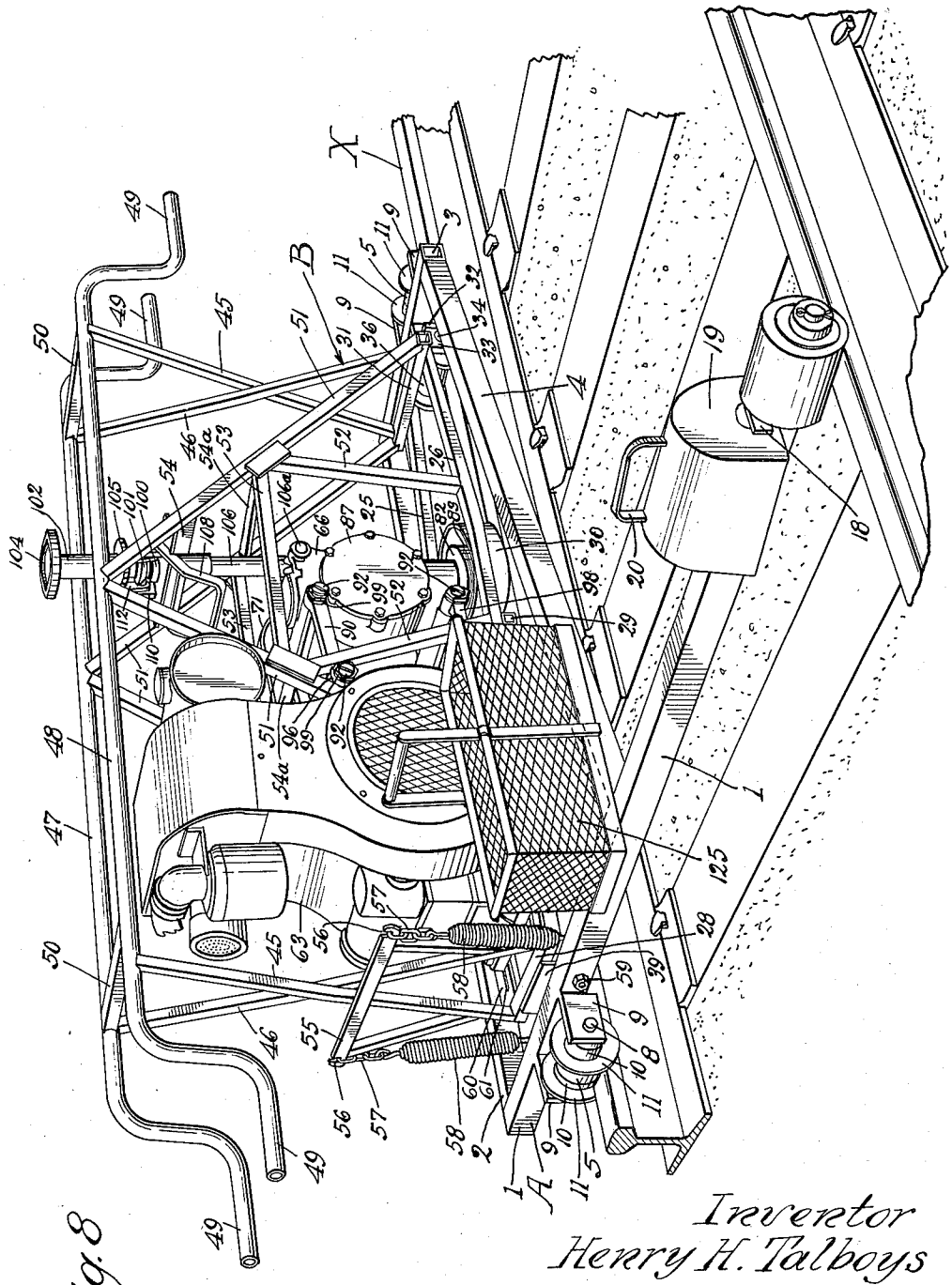


Fig. 8

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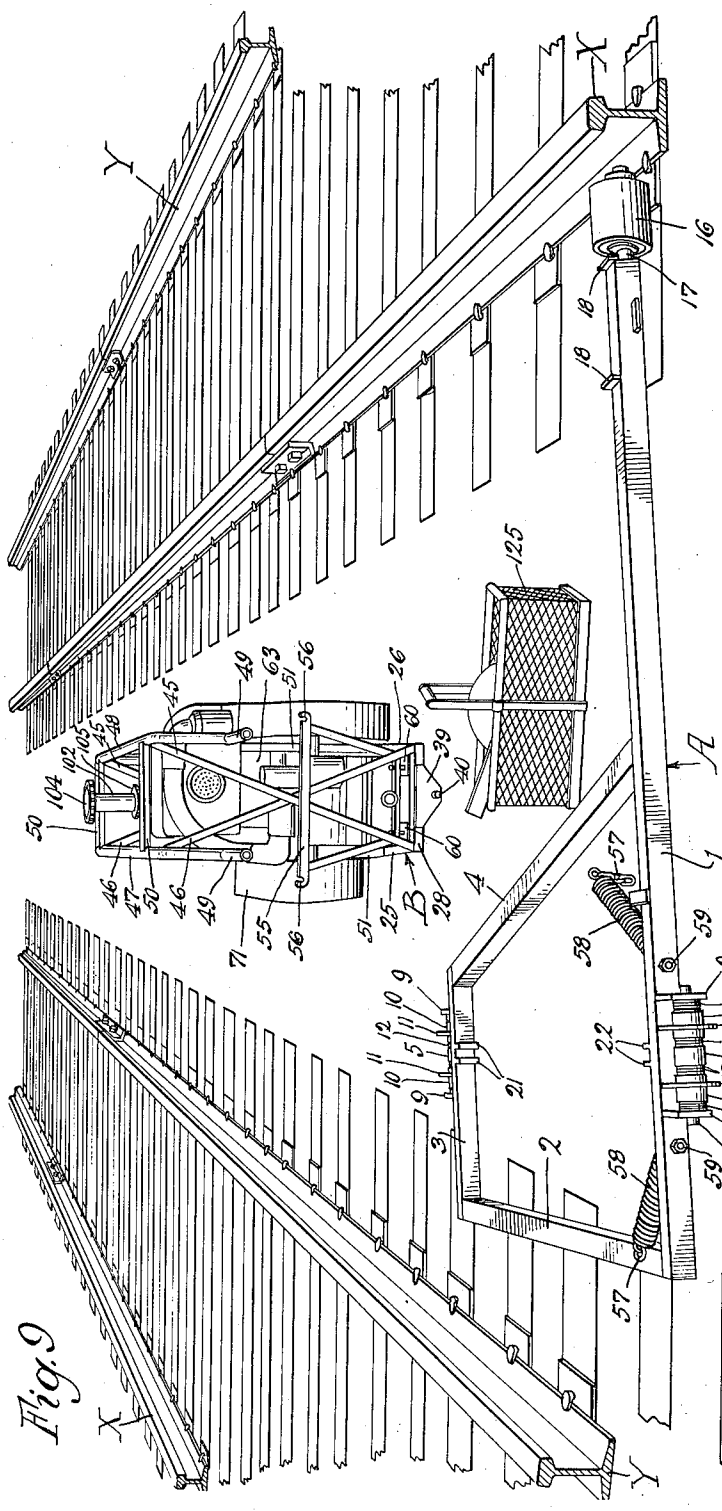


Fig. 9

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Patented Mar. 16, 1937 2,073,816

UNITED STATES PATENT OFFICE

2,073,816

TRACK GRINDER

Henry H. Talboys, Milwaukee, Wis., assignor to Nordberg Manufacturing Co., Milwaukee, Wis., a corporation of Wisconsin

Application November 16, 1935, Serial No. 50,093

20 Claims. (Cl. 51—178)

My invention relates to an improvement in track working machines, particularly applicable to track grinders. One purpose is the provision of a grinding machine for grinding off the built-up or hardened ends of rails at the joints, where the rail joints have been built up by welding or otherwise, following wear. Another object is the provision of means for grinding down inequalities of any kind on the tops of rails. Another object is the provision of means for grinding down or evening the abutting ends of rails where, for any reason, due to differences permitted by mill tolerances, etc., there is a difference in the height of abutting rail ends. Another object is the provision of means for grinding off the tops of rails to conform in contour to the adjacent rail parts. Another object is the provision of a rail grinding machine which shall be simple, easy and flexible to operate. Another object is the provision of a rail grinding machine or a track working machine in which the track working tool proper is readily oscillatable in relation to the main or outside frame. Another object is the provision of ready means for adjusting the angle of a rail grinder or rail tool. Another object is the provision of improved adjusting means for such a tool. Another object is to provide a machine that can be readily set off the rails between tracks so as to clear passing trains.

Other objects will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a side elevation;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a section on the line 4—4 of Figure 1;

Figure 5 is a fragmentary view with the grinder in horizontal and raised position, with parts shown in section;

Figure 6 is a section on the line 6—6 of Figure 1;

Figure 7 is a section on the line 7—7 of Figure 5;

Figure 8 is a perspective view; and

Figure 9 is another perspective illustrating the machine partially disassembled and located between the tracks.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, A generally indicates an outside or stabilizing frame which is shown as formed of a transverse member which may be an angle, channel or the like, indicated at 1, of a length sufficient to bridge two rails of a track but insufficient to bridge the entire space between adjacent tracks. This will be clear from Figure 9 where the parts are shown located between the tracks. 2 is a longitudinally extending member. 3 is a shorter transverse member and 4 is an inclined member extending from one end of the member 3 to an intermediate portion of the member 1. It will be noted that 3 and 1 are parallel and 2 is perpendicular to both 1 and 3. However, the shape of this outside frame may be varied to suit a variety of conditions and the specific form is indicated as a matter of illustration. The main frame A is supported over one rail by rail engaging rollers 5 shown in detail in Figure 7. One of these rollers is located on the member 1 and one on the member 3, but since they are substantially the same I will describe but one of them. The roller 5 is mounted upon roller bearings 6 which rotate upon an inner race or sleeve 7 mounted on a shaft 8. The shaft 8 is mounted at each end in lugs 9 extending outwardly from the members 1 or 3. They may, for example, be welded thereto.

In order to keep the device on the rails X, Y, I illustrate a pair of flanged rollers one on each side of the roller 5, indicated at 10 and having flanges 11. They are similarly mounted upon the shaft 8. The opposite flanges 11 may be spaced apart as by the employment of shims or spacers or washers 12 on each side thereof which may be threaded upon the shaft 8. In order to prevent friction between the roller assembly so described and the lugs 9 I provide a thrust bearing assembly generally indicated as 14 including the thrust balls 15. The outer end of the member 1 is supported upon a single roller generally indicated as 16 in Figure 9, which may be rotatably mounted upon any suitable shaft 17. A counterweight, to hold the structure down, may be received between the flanges 18 which are shown in Figure 9, the counterweight itself being indicated as 19 in Figure 8. It is readily removable and is provided with a lifting handle 20.

Facing inwardly from the members 1 and 3 are pairs of aligned vertical flanges 21, 22. These two pairs, as shown for example in Figure 1, is provided with a closure or cross piece 23 at the bottom, the purpose of which will later appear.

Mounted within the quadrilateral formed by

the frame members 1, 2, 3, and 4, is an inner or main frame generally indicated as B. It includes side frame members 25, 26, outwardly more or less inclined in relation to each other at their opposite ends but having connecting bends 27 at their point of maximum separation. At one end they are connected by an end frame member 28 and a plurality of intermediate transverse connections 29. An intermediate circular guard member 30 is also indicated, which is welded to the bends 27 and also to a pair of transverse supports 29, as will be clear from Figures 2 and 5. At the front there is a transverse cross piece 31 the ends of which extend outwardly beyond the members 25, 26. There is also an end plate 32 connected to bearing blocks 33 to which the ends of the members 25, 26, are also secured. Each one of these blocks 33 is provided with an eccentric 34, these eccentrics carrying a transverse shaft 35, upon which a rail engaging roller 36 is mounted with or without flanges 37. Any suitable anti-friction means may be employed between the shaft 35 and the roller 36. The surface of the roller is indicated as slightly convex, this convexity being rather exaggerated as in Figure 2, to make it apparent in the drawings. This roller also may have a straight tread or surface. It will be understood that rotation of the eccentric 34 will raise or lower the axis of the shaft 35 in relation to the main or inner frame as a whole, therefore raising or lowering the end of the frame in relation to the rail X. It will be observed that the plate 32 carries the pin 38 and the end member 28 carries a plate 39 with a similar pin 40. These pins 38 and 40, as will be seen in Figure 2, penetrate between the pairs of flanges 21 and 22 respectively, whereby lateral or longitudinal movement of the frame B in relation to the outer frame A is prevented, while tilting movement is readily permitted. Also, since the flanges 21, 22 are open at the tops, the inner frame B can readily be lifted out of the outer frame A. A second roller 41 is mounted upon any suitable shaft 42 and is provided with or without flanges 43. The rollers 36 and 41 between them support the inner frame B on the rail X and it will be understood that the outer frame A does not support the frame B but merely positions it and holds it against relative endwise or lateral movement, except for the freely permitted tilting and for the lifting movement.

Upon the base frame structure thus described, including the members 25 and 26 and their connecting portions, I illustrate an upwardly extending framework, including pairs of vertical frame members 45, 46 which, as will be clear, for example from Figures 8 and 9, cross each other. They may be welded together at the crossing points and therefore provide a firm reinforced frame. Secured to the upper ends of the members 45, 46, are longitudinally extending frame members, herein indicated as tubes or pipes 47, 48. These are provided with downwardly turned end handle members 49, located at the proper level for convenience in moving the device. The members 47 and 48 are connected by transverse end frame members 50. They are also intermediately connected to the lower frame members 25, 26, by inclined members generally indicated as 51 with further generally vertical braces 52 and horizontal braces 53, which structure will be clear, for example, from Figure 8. There is a further transverse support or frame member 54, connecting two of the members 51, which is also clearly shown in Figure 8, and additional similar bracing members 54a.

In order to center the frame B in relation to the frame A and to hold it in a predetermined neutral position from which it can be readily tilted, I provide a transverse frame member 55 which may be secured to the rear pair of members 45, 46, as by welding. It has notches at each end as at 56 and these notches are adapted to receive chains 57 to which are secured coil springs 58. The lower ends of these coil springs 58 are secured on the member 1 of the frame B as by bolts 59. These springs are closer together at their bottoms than at their top ends so that, when the device is tilted from central position, the tension does not vary substantially as the frame B is tilted laterally in relation to the frame A.

Referring to Figures 1 and 2, I illustrate power plant supporting means associated with the frame B in the form of a pair of longitudinally extending flat plates 60 which are slotted as at 61 to receive securing bolts 62 whereby any suitable power plant generally indicated as 63, having a driving pulley 64 about which passes any suitable belt 65, may be bolted adjustably in place. I more or less diagrammatically illustrate, as in Figure 1, an internal combustion engine.

A tool supporting casting is generally indicated at 66, as in Figure 1. It carries a lateral bearing sleeve 67 preferably formed integral therewith, as shown in detail in Figure 4, in which is rotatably mounted the shaft 68, as in the anti-friction bearing members 69. Secured to the outer end of the shaft 68 is the driven pulley 70 about which pass the driving belts 65. The belt is provided with any suitable guard 71. On the inner end of the shaft 68 is a bevel gear 72 which meshes with the bevel pinion 73 keyed to a vertical shaft 74. The shaft 74 is supported at its lower end by any suitable ball bearing 75 and at its upper end by any suitable bearings 76 the upper set of bearings being spaced from the lower as by the longitudinally extending spacing sleeve 77. The entire assembly may be held in position as by the upper nut 78 which in turn is protected by the screwthreaded removable cap 79, whereby access may be had to it. The bottom of the shaft 74 is provided with an outwardly extending flange 80 through which pass two pins 81 which interpenetrate with the back plates 82 for any suitable grinding member 83, herein shown as annular with a central aperture 84. 85 is the head of a screw 86, whereby the grinding member is firmly but readily removably held in position upon the lower end of the shaft 74. The pins 81 prevent relative rotation of the parts, without interfering with ready removal. 87 indicates any suitable side closure whereby access may be had to the interior.

The bearing structure above described is mounted upon the pantograph structure including the arms 90 and 98, as shown in Figure 3. The arms 90 are secured to a cross member 91 pivoted upon conic pins 92 which seat in conic bearing sockets 93. The entire hollow of the cross member 91 may be filled with oil or grease as through any suitable vent or oil fitting 94. The conic bearing member 92 is screwthreaded as at 95 for adjustment in the securing block 96 which is welded to the frame. The outer ends of the arms 90 are provided with similar conic bearing members 92 which penetrate conic end aperture of the cross shaft 97 which in turn is secured to the

member 66. The bottom of the member 66 is similarly mounted upon bottom arms 98. Lock nuts 99 may be employed for holding the various conic members in position when adjusted. It will be understood that the member 66, with its generally vertical grinding shaft may be readily raised and lowered with this pantograph structure. As controlling means for this raising and lowering I mount upon the cross member 54 the following structure. A socket 100 is weldled to the member 54 and receives a corresponding spherical surfaced convex member 101, the two being held gravitally in contact. Welded to the member 101 is the generally vertical sleeve 102 part of the interior of which is screwthreaded as at 103. It is also provided with a hand wheel at the top, 104, and an intermediate notched disc 105, the purpose of which will later appear. Screw-threaded to the interior of the member 102 is a sleeve or tube 106 which is pivoted to the member 66 as at 106a. It will be understood that a rotation of the handle 104, with a consequent rotation of the tube 102, will raise or lower the sleeve 106 depending upon the direction of rotation. This sets or adjusts the closest approach the grinding member can make to the rail X, without, however, preventing removal of the grinding member from the rail X by raising the entire structure upon the above described pantograph. Also, when grinding is taking place the grinder may alternately raise or lower and while it cannot drop lower than the level to which it is set it is not confined to that level and can rise upwardly as necessary during the grinding operation. However, the entire weight of the structure is allowed to rest upon the rail X during the grinding operation. In order to prevent unintended rotation of the shaft 102 I provide a spring rod 107 which penetrates the notches of the notch disc 105, as shown in Figure 6. Thus raising or lowering of the pantograph structure as a whole will not alter the adjustment of the permitted closest approach of the grinding wheel to the rail, as the spring 107 slides readily in the notches of the member 105.

In order to raise the whole assembly, to lift the grinding wheel entirely clear of the rail, I provide the following lifting structure. A double hand lever 108 is pivoted as at 109 to lugs 110, which are welded upon the member 54. The lever 108 controls short shafts 111, which have mounted thereon lifting arms 112 adapted to engage the bottom of the notched disc 105. It will be understood, therefore, that when the lever 108 is moved downwardly from the operative position in which it is shown in Figure 1 to the raising position in which it is shown in Figure 5 the effect of this rotation is to cause the lifting arms 112 to rise against the bottom of the notched disc 105. This results in lifting the entire grinding structure, causing the pantograph arms to rotate during the lift. Therefore, the entire grinding device is locked up out of contact with the top of the rail X. It will be observed from Figure 5 that when the lever 108 is in the depressed position the arms 112 pass over center and therefore are locked in this locking or raising position.

It will be realized that whereas I have described and shown a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and drawings to be taken in a broad sense illustrative and diagrammatic rather than as limiting me to my specific showing. For example, whereas I have described my device as applied to a grinder it will be understood that it may be applied to any other tool wherein a vertical or generally upright axis is desired.

The use and operation of my invention are as follows:

In current railroad practice there are a number of uses for a railroad track grinder. For example, it is customary to build up worn rail joint ends by welding. After the welding has been completed it is important to grind off the excess metal so that the contour of the rail and the height of the rail will be constant from end to end. It is also important to grind off opposite rail ends, where there is any slight inequality of height or contour. This may happen where new rails are put next to worn rails or where worn rails have had the worn ends cut off or due to allowable mill tolerance. Also, there are inequalities in hardness. Also, after re-welded rails have been used, the hardened ends often stand up above the balance of the rail and it is necessary actually to grind off somewhat of the hardened end portions in order to even the rail as a whole. It is also desirable to in effect "plane" off inequalities in rail surfaces known as corrugated rail, as worn rails sometimes tend to develop an undulating top surface, also for example where the wheels spin when the engine starts. For all of these various uses my tool is admirably adapted. In order to propel the device readily along a track which may include the rail X which is being operated on and the opposite rail Y, I find it useful to employ the outside frame A, which bridges both rails of the track. This frame is of sufficient length to bridge the two rails but is not of sufficient length to bridge adjacent tracks, which is important in working hot tracks, especially in four track territory.

My device has the great advantage of being readily partially disassembled for quick removal. Thus, as will be clear from Figure 9, the frame B can readily be lifted out and placed between two tracks of a four track system. The frame A can be separately removed and of course the counterweight 19 and the tool basket 125. The removal operation can be handled very quickly because all that is necessary to remove the frame B from the frame A is to disconnect the springs 58 and bodily lift the frame B, for example, by the handles 49 at each end. This is easily and quickly done.

Also, it is sometimes desirable, especially when working over switches and the like, to use the frame B alone, without the frame A, and two men can very readily move it along the rail of a track by the handles 49 and tilt it laterally when they wish and move it longitudinally when they wish. Inasmuch as the frame B is supported on its own rollers 36, 41, it can be very readily independently used. There are advantages in employing it with the outside frame A, however, as the springs 58 center the frame B in relation to the frame A and make it a machine which can be readily operated by one man. The one man pushes the entire frame along the tracks, along which it readily moves, and can at the same time and without help tilt it laterally as vertical flanges 21, 22, readily center the frame B for such tilting movement.

The frame A is readily adjustable for different rail widths, as by shifting the shims or washers 12.

The pantograph arrangement provides ready means for raising or lowering the setting of the grinding member proper. That is to say, the

closest approach of the grinding member to the rail is adjusted, while permitting wide latitude in upward lifting of the grinding member. Also, lifting the grinding member, either by employment of the lever 108 or in response to inequalities in the height of the rail, does not disturb the adjustment, as the spring rod 107 keeps its position in whatever notch of the disc 105 it is set to engage. The pantograph arrangement of the arms 90, 98 provides a substantially parallel movement.

Inasmuch as it is desirable in much of the track grinding, for example, where the contour of the track end at the weld is being ground to conform to the rest of the rail, it is desirable to have the grinding member engage the rail top at a slight angle. It will be seen, as in Figure 1, that the axis of the grinding member is slightly inclined from the vertical. Under some circumstances, however, as when the grinder is being moved longitudinally along a track to grind out inequalities or undulations, such as those caused by spinning locomotive wheels in starting it is desirable to have the axis substantially vertical, so as to grind simultaneously with both sides of the grinder. I can readily make this light adjustment by rotating the eccentric members 34 in their bearing blocks, this structure being shown in Figure 5.

It will be observed that the shape of the rollers on the second frame, where they are opposed to the rail X is slightly convex. The result is that when the second frame B is tilted in relation to the outside frame A the roller in question rides laterally on the track X and the parts are so proportioned that the grinding member describes a contour substantially the same as the desired track contour to which the track is to be ground.

When the operator tilts the inner frame laterally, for example by thrusting laterally against the handles 49, the effect is to impart to the grinding tool 83 a movement in a path corresponding generally to the desired contour of the rail being ground. This results from the fact that the inner fame is held against bodily lateral movement in relation to the outer frame by the penetration of the pins 38 and 40 between the flanges 21 and 22. These flanges constrain the inner frame to a tilting movement. In practice, the rounded contour of the roller 36 controls the movement of the grinding member 83, and as the inner frame as a whole is tilted, the surface of the grinding wheel 83 will tend to cut the rail to the contour of the portion on which the roller 36 is located. As the roller 36 normally engages a portion of the rail which is of correct contour, the portion of the rail actually engaged by the grinding wheel 83 is cut or formed to the same contour. No manual control is necessary, beyond the mere lateral manual thrust against the handles 49, and the wheel 83 is constrained to cut the opposed portion of the rail to the desired contour.

I claim:

1. In a track working tool, an outside frame, supporting means on said frame adapted to engage both rails of a track, an inside frame, held against horizontal bodily movement in relation to the outside frame, and tiltable, in relation thereto, means for supporting it directly upon a rail of said track, and a track working member mounted on said inside frame, and means for actuating it.

2. In a track working tool, an outside frame, supporting means on said frame adapted to engage both rails of a track, an inside frame, held against horizontal bodily movement in relation to the outside frame, and tiltable, in relation thereto, means for supporting it directly upon a rail of said track, and a track working member mounted on said inside frame, and means for actuating it, said inside frame being tiltable in relation to said outside frame, about an axis generally parallel with the rails of the track on which the tool is mounted.

3. In a track working tool, an outside frame, supporting means on said frame adapted to engage both rails of a track, an inside frame, held against horizontal bodily movement in relation to the outside frame, and tiltable, in relation thereto, means for supporting it directly upon a rail of said track, and a track working member mounted on said inside frame and means for actuating it, and means tending normally to return said inside frame to a predetermined intermediate position, in relation to said outside frame, when it has been tilted therefrom.

4. In a track working tool, a frame, supporting means on said frame adapted to engage the rails of a track, a second frame tiltably mounted in relation to said first frame, and a tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, and yielding means tending to hold said second frame normally in a predetermined intermediate position, including a plurality of springs interposed between said frames and located at opposite sides of the rail over which the second frame is positioned.

5. In a track working tool, an outside frame adapted to span two rails of a track, and including a relatively extended portion aligned along one rail of said track, rail engaging rollers at the opposite end of said extended portion, an inside frame surrounded by said extended portion and tiltable in relation thereto, rail engaging rollers associated with said inside frame, mating pivot members extending outwardly from the ends of said inside frame and inwardly from the opposite ends of the outside frame, means tending normally to hold said inner frame in a predetermined intermediate relation to said outer frame, and a track working tool mounted upon said inner frame and means for actuating it.

6. In a track grinding tool, a frame adapted to span two rails of a track, a second frame, a tilting connection interposed between the two frames, and adapted to hold the second frame for tilting movement about an axis generally parallel with the longitudinal extension of said rails, the center of gravity of said second frame and the axis about which it tilts, being generally vertically alined with one of said rails, means for holding said second frame against bodily horizontal movement in relation to said first mentioned frame, a grinding tool, mounted for rotation upon said second frame, and means for driving it, said tool being alined with the rail over which said second frame is alined, and means for moving it into and out of contact with said rail, and yielding means interposed between the two frames, adapted to hold the second frame in a predetermined intermediate position in relation to the first.

7. In a track grinding tool, a frame adapted to span two rails of a track, a second frame, a tilting connection interposed between the two frames, and adapted to hold the second frame for tilting movement about an axis generally parallel with the longitudinal extension of said rails, the center of gravity of said second frame and the

axis about which it tilts, being generally vertically alined with one of said rails, means for holding said second frame against bodily horizontal movement in relation to said first mentioned frame, a grinding tool, mounted for rotation upon said second frame, and means for driving it, said tool being alined with the rail over which said second frame is alined, and means for moving it into and out of contact with said rail, manual handle means for tilting said second frame, and yielding means, interposed between said first and second frames, and adapted normally to hold said second frame in intermediate position, with the axis of said tool generally perpendicular to the track.

8. In a track grinding tool, a frame adapted to span two rails of a track, a second frame, a tilting connection interposed between the two frames, and adapted to hold the second frame for tilting movement about an axis generally parallel with the longitudinal extension of said rails, the center of gravity of said second frame and the axis about which it tilts, being generally vertically alined with one of said rails, means for holding said second frame against bodily horizontal movement in relation to said first mentioned frame, a grinding tool, mounted for rotation upon said second frame, and means for driving it, said tool being alined with the rail over which said second frame is alined, and means for moving it into and out of contact with said rail, and independent supporting means for said second frame, in contact with the rail of the track over which said second frame is alined, and yielding means interposed between the two frames, adapted to hold the second frame in a predetermined intermediate position in relation to the first.

9. In a track grinding tool, a frame adapted to span two rails of a track, a second frame, a tilting connection interposed between the two frames, and adapted to hold the second frame for tilting movement about an axis generally parallel with the longitudinal extension of said rails, the center of gravity of said second frame and the axis about which it tilts, being generally vertically alined with one of said rails, means for holding said second frame against bodily horizontal movement in relation to said first mentioned frame, a grinding tool, mounted for rotation upon said second frame, and means for driving it, said tool being alined with the rail over which said second frame is alined, and means for moving it into and out of contact with said rail, and means for guiding said tool in a predetermined path in relation to the top of the rail, in response to lateral tilting of said second frame, and yielding means interposed between the two frames, adapted to hold the second frame in a predetermined intermediate position in relation to the first.

10. In a track working tool, a frame, supporting means on said frame adapted to engage both rails of a track, a second frame, means for holding said second frame against horizontal movement in relation to said first mentioned frame, including a tiltable connection between said two frames, the axis of said tiltable connection being parallel with the rails of the track, a tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, and supporting means for said second frame interposed directly between said second frame and one rail only of said track.

11. In a track working tool, a frame, supporting means on said frame adapted to engage both rails of a track, a second frame, means for holding said second frame against horizontal movement in relation to said first mentioned frame, including a tiltable connection between said two frames, the axis of said tiltable connection being parallel with the rails of the track, a tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, and supporting means for said second frame interposed directly between said second frame and one rail only of said track, and means interposed between said two frames, tending to hold said second frame in a predetermined intermediate position.

12. In a track working tool, a frame, supporting means on said frame adapted to engage both rails of a track, a second frame, means for holding said second frame against horizontal movement in relation to said first mentioned frame, including a tiltable connection between said two frames, the axis of said tiltable connection being parallel with the rails of the track, a tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, and supporting means for said second frame interposed directly between said second frame and one rail only of said track, and means interposed between said two frames, tending to hold said second frame in a predetermined intermediate position, said means including springs normally connecting said two frames, at opposite sides of the second frame.

13. In a track working tool, a frame, supporting means on said frame adapted to engage both rails of a track, a second frame, means for holding said second frame against horizontal movement in relation to said first mentioned frame, including a tiltable connection between said two frames, the axis of said tiltable connection being parallel with the rails of the track, a tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, and supporting means for said second frame interposed directly between said second frame and one rail only of said track, the center of gravity of said second frame being vertically aligned above the rail of the track upon which it is supported.

14. In a track working tool, a frame, supporting means on said frame adapted to engage both rails of a track, a second frame, means for holding said second frame against horizontal movement in relation to said first mentioned frame, including a tiltable connection between said two frames, the axis of said tiltable connection being parallel with the rails of the track, a grinding tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, and supporting means for said second frame interposed directly between said second frame and one rail only of said track, and means for causing said grinding tool to move in a path corresponding generally to the desired contour of the rail to be ground, in response to tilting of the second frame about its axis.

15. In a track working tool, a movable base, a power source on said base, a grinding tool mounted on said base, a vertical shaft for said tool, and supporting means therefor, a movable connection between said supporting means and said base adapted to permit a generally vertical bodily movement of said tool and supporting means, a driving connection between said motor and said tool, means for raising and lowering said tool in relation to said base, including a

screw threaded member associated with said tool, and a rotary member supported on said base, in screw threaded relation therewith, and manual means for rotating it, a notched disc on said rotary member, means adapted to engage the notches of said disc whereby to prevent its unintended rotation, and means for bodily lifting said disc, and for thereby lifting said tool.

16. In a track working tool, a movable base, a power source on said base, a grinding tool mounted on said base, a vertical shaft for said tool, and supporting means therefor, a movable connection between said supporting means and said base adapted to permit a generally vertical bodily movement of said tool and supporting means, a driving connection between said motor and said tool, means for raising and lowering said tool in relation to said base, including a screw threaded member associated with said tool, a rotary member supported on said base, in screw threaded relation therewith, and manual means for rotating it, a notched disc on said rotary member, means adapted to engage the notches of said disc whereby to prevent its unintended rotation, means for bodily lifting said disc, and for thereby lifting said tool, and a ball and socket supporting connection between said rotary member and said base.

17. In a track working tool, a movable base, a power source on said base, a grinding tool mounted on said base, a vertical shaft for said tool, and supporting means therefor, a movable connection between said supporting means and said base adapted to permit a generally vertical bodily movement of said tool and supporting means, a driving connection between said motor and said tool, means for raising and lowering said tool in relation to said base, including a screw threaded member associated with said tool, a rotary member supported on said base, in screw threaded relation therewith, and manual means for rotating it, a notched disc on said rotary member, means adapted to engage the notches of said disc whereby to prevent its unintended rotation, means for bodily lifting said disc and for thereby lifting said tool, including a lever mounted on said base and having a portion opposed to the bottom of said disc, and a manually operable handle for said lever.

18. In a track working tool, a frame, supporting means on said frame adapted to engage both rails of a track, a second frame, means for holding said second frame against horizontal movement in relation to said first mentioned frame, including a tiltable connection between said two frames, the axis of said tiltable connection being parallel with the rails of the track, a tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, bearing means for said tool, a pantograph support for said bearing means, and means for raising and lowering said bearing means with relation to said second frame, and supporting means for said second frame interposed directly between said second frame and one rail only of said track.

19. In a track working tool, a frame, supporting means on said frame adapted to engage both rails of a track, a second frame, means for holding said second frame against horizontal movement in relation to said first mentioned frame, including a tiltable connection between said two frames, the axis of said tiltable connection being parallel with the rails of the track, a tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, bearing means for said tool, a pantograph support for said bearing means, means for raising and lowering said bearing means with relation to said second frame, including a shaft pivoted to and extending upwardly from said bearing means and provided with screw threads, a shaft mounted on said second frame and screw-threaded in mesh with said first mentioned shaft, and means for rotating said second, and supporting means for said second frame interposed directly between said second frame and one rail only of said track.

20. In a track working tool, a frame, supporting means on said frame adapted to engage both rails of a track, a second frame, means for holding said second frame against horizontal movement in relation to said first mentioned frame, including a tiltable connection between said two frames, the axis of said tiltable connection being parallel with the rails of the track, a tool positioned upon said second frame, for rotation about a generally upright axis, and means for rotating it, bearing means for said tool, a pantograph support for said bearing means, means for raising and lowering said bearing means with relation to said second frame, including a shaft pivoted to and extending upwardly from said bearing means and provided with screw threads, a shaft mounted on said second frame and screw-threaded in mesh with said first mentioned shaft, means for rotating said second shaft, a ball and socket connection between said second shaft and said second frame, and supporting means for said second frame interposed directly between said second frame and one rail only of said track.

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