Nov. 12, 1929. C. W. PITMAN 1,735,693

TRACK GRINDER

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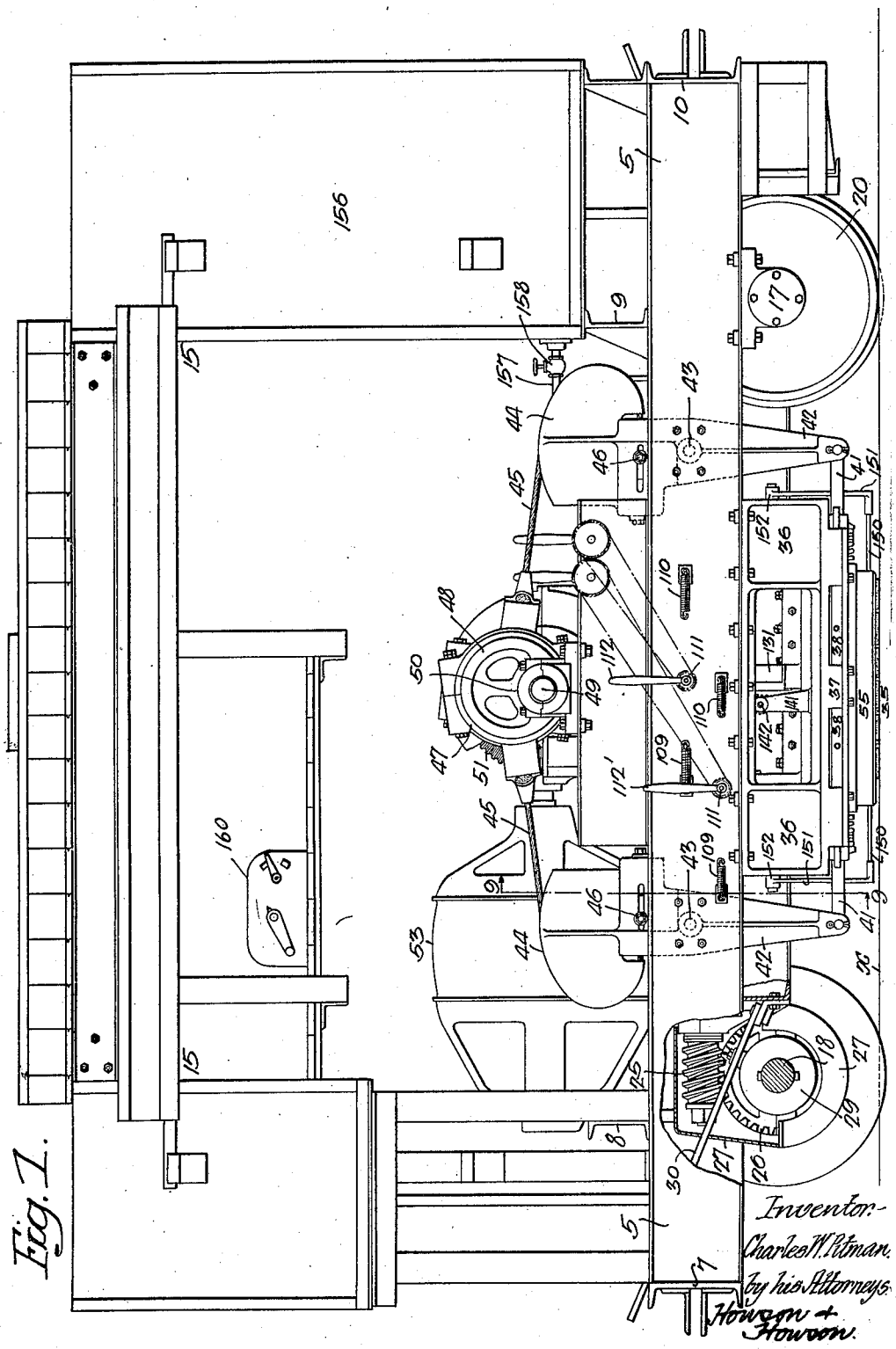


Fig. 1.

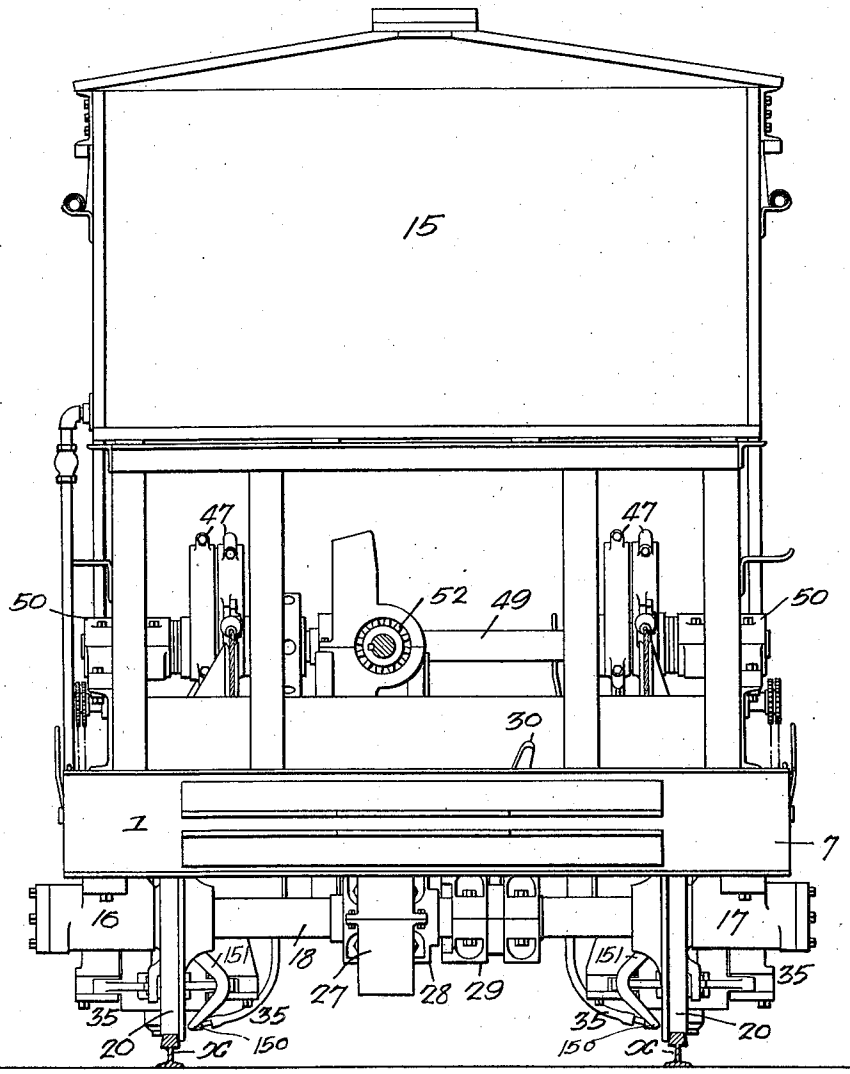
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By his Attorneys.
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TRACK GRINDER

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Fig. 2.



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TRACK GRINDER

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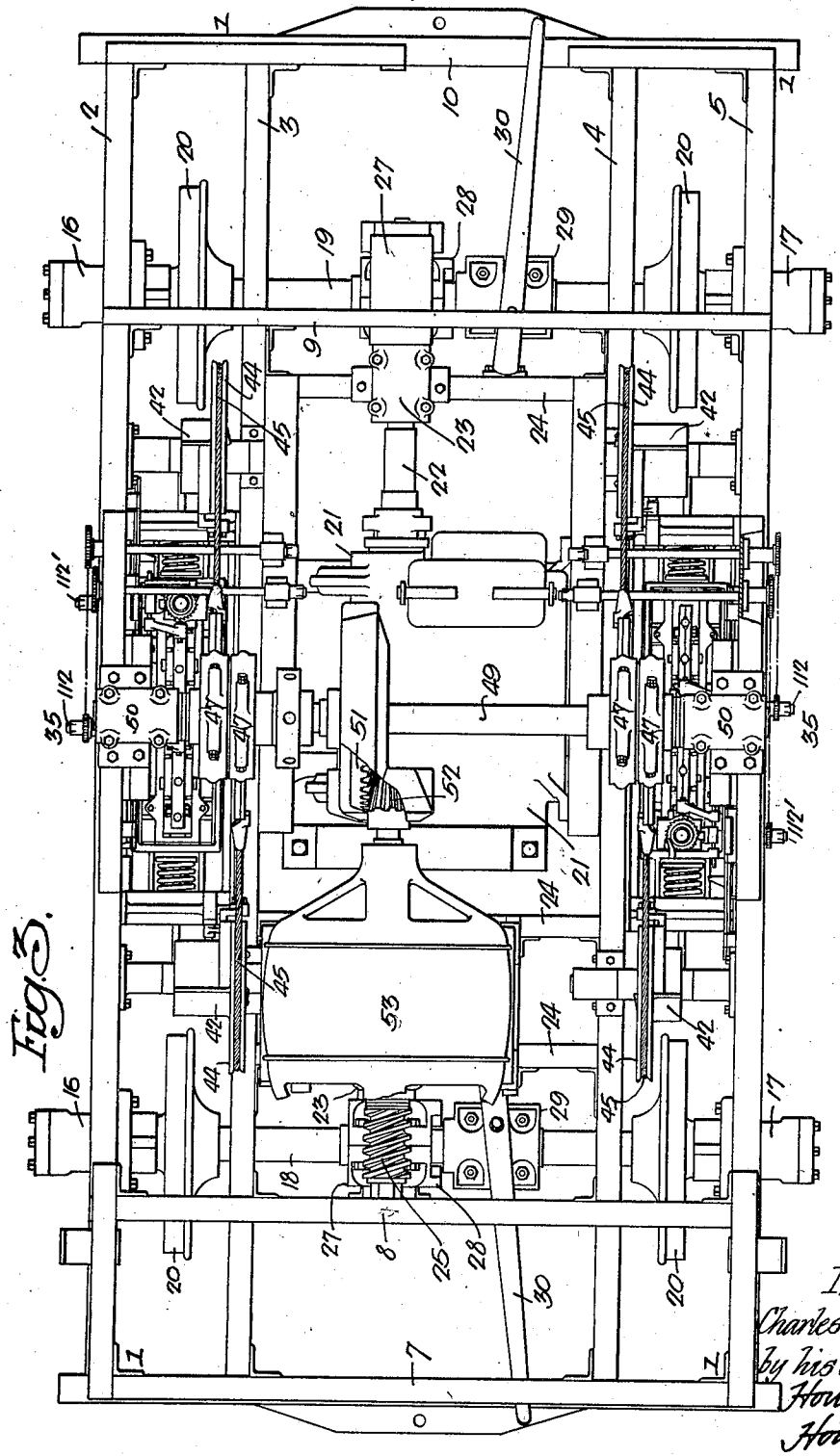


Fig. 3.

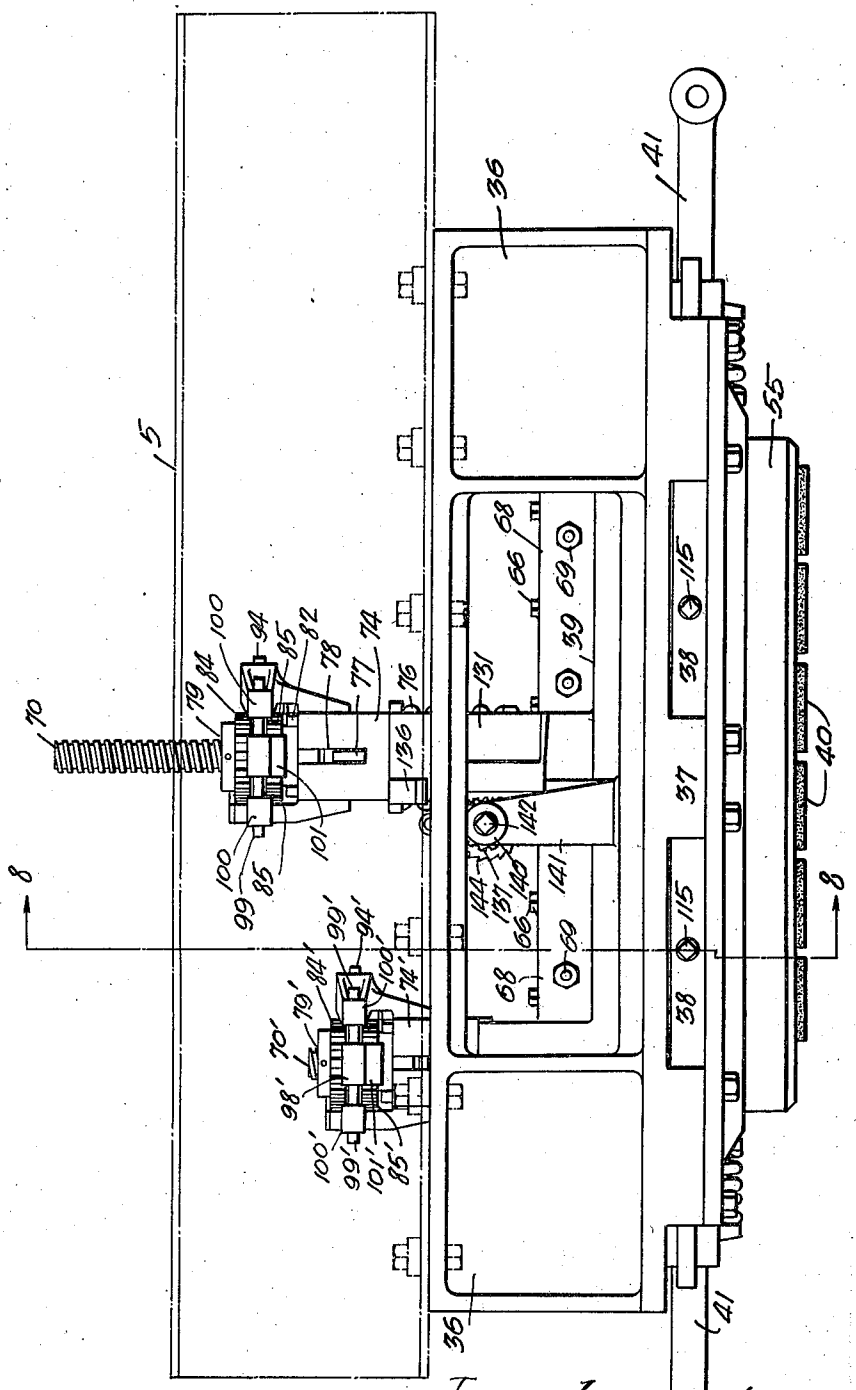
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TRACK GRINDER

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Fig. 4.



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Fig. 5.

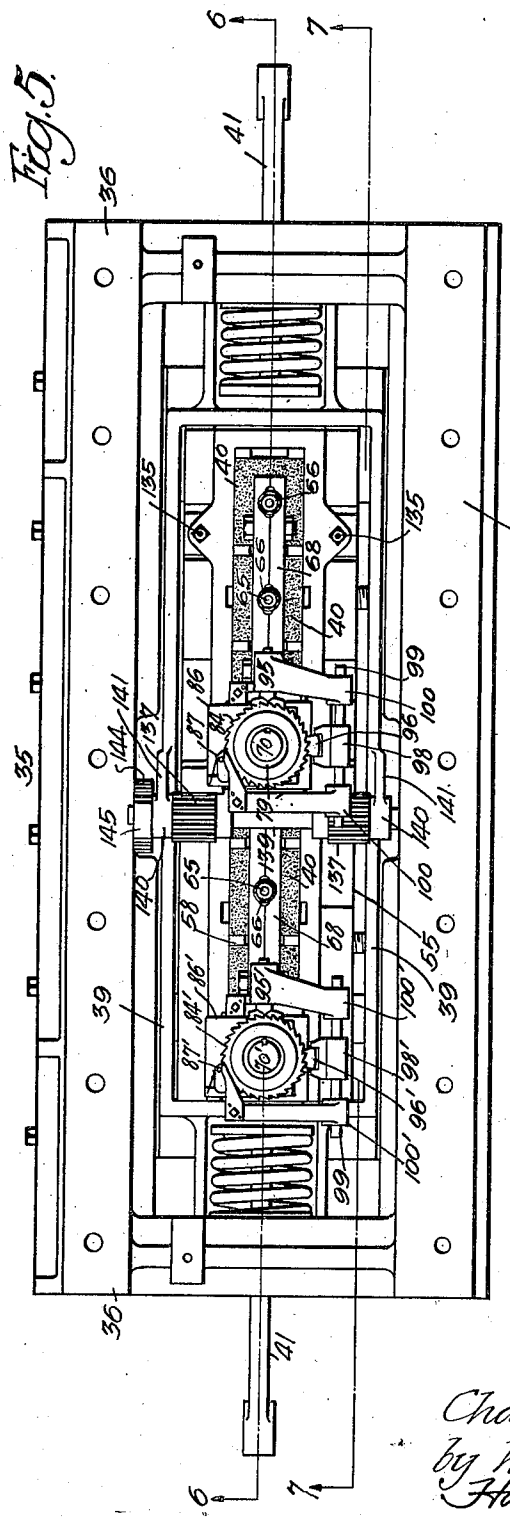
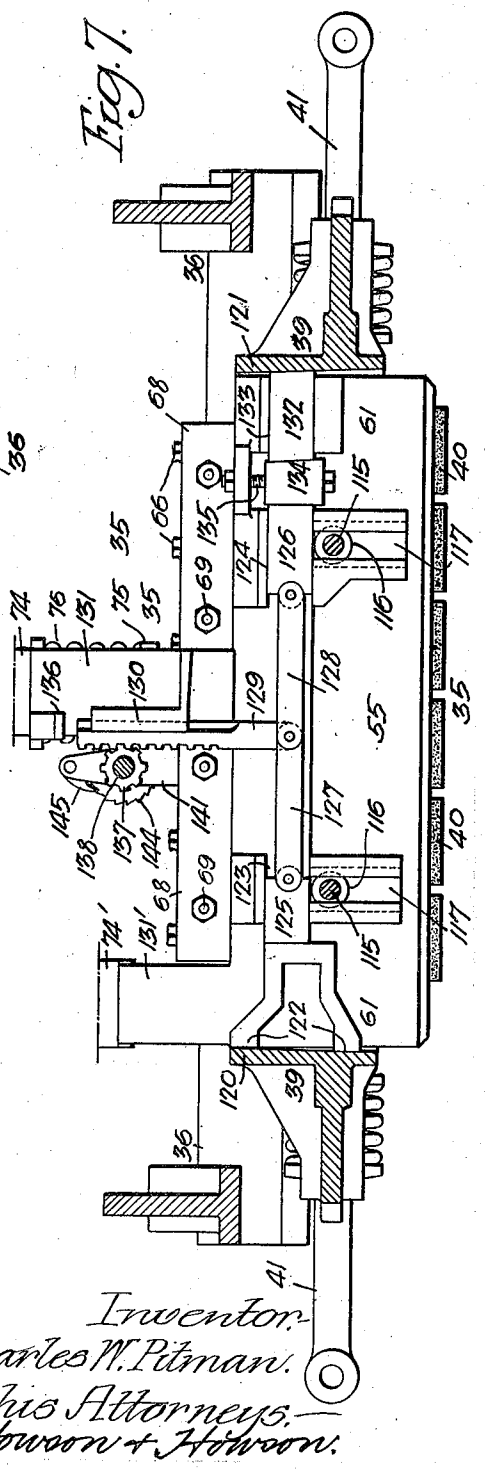


Fig. 7.



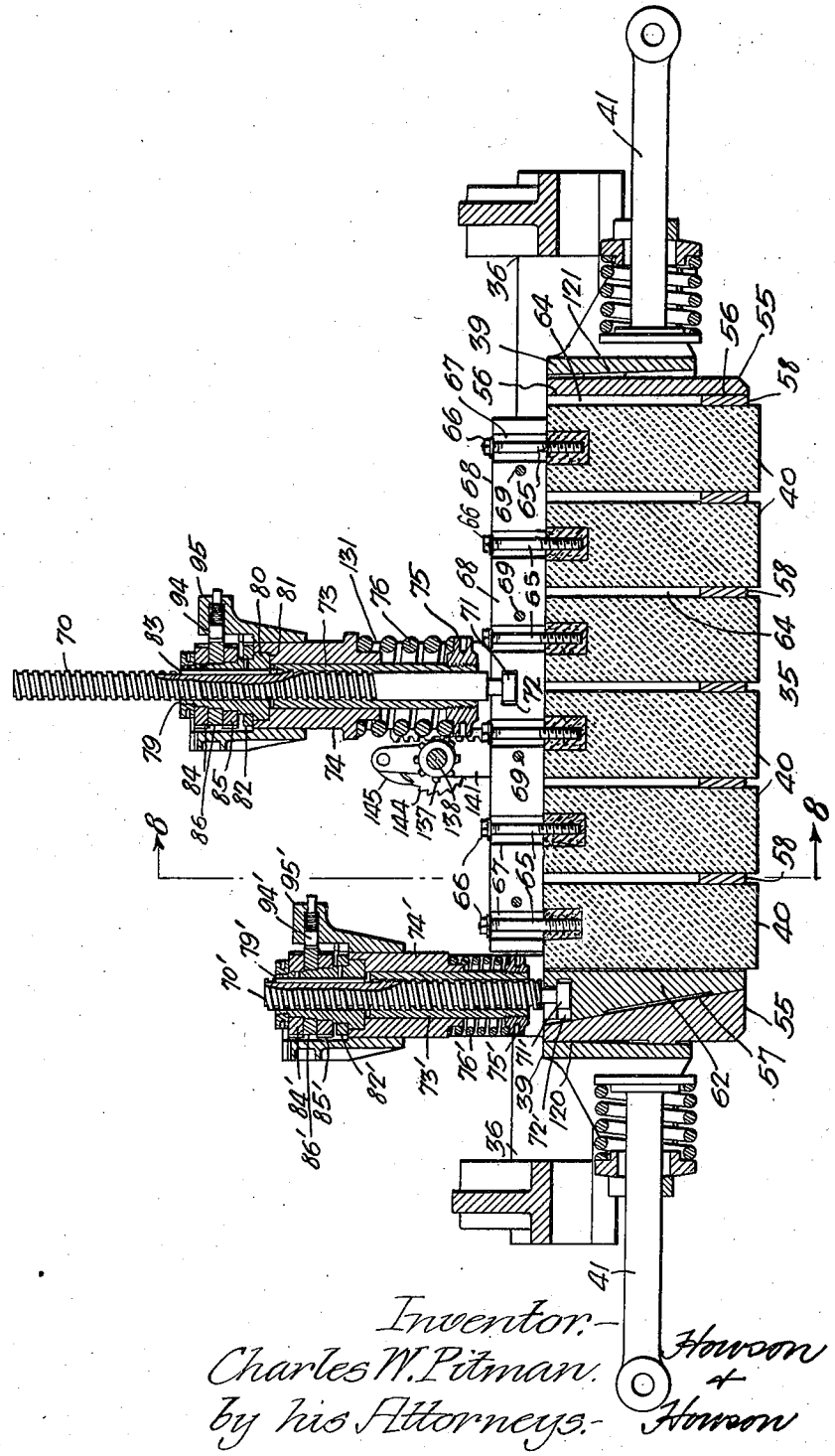
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Fig. 6.



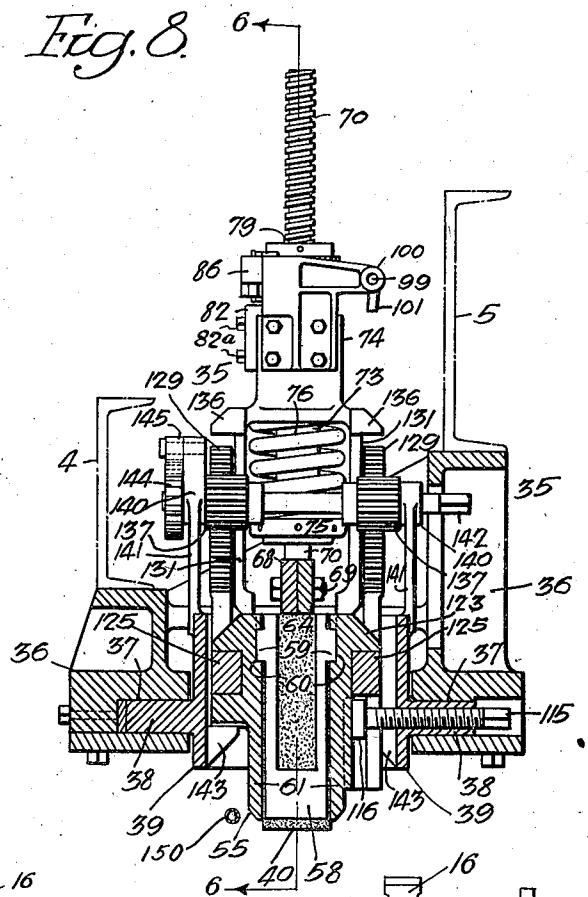
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Fig. 8.



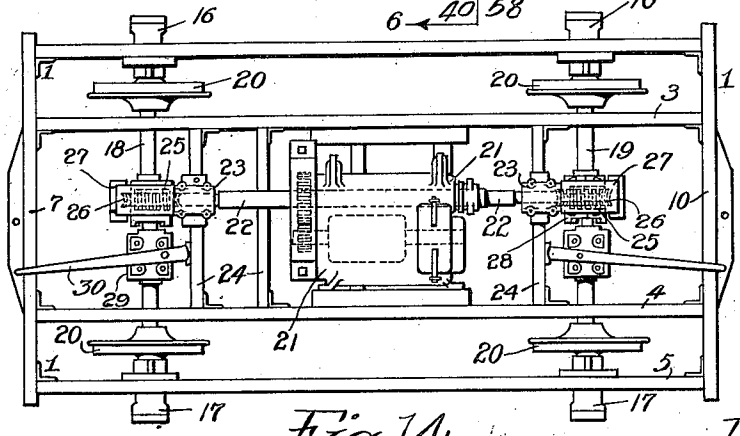


Fig. 14.

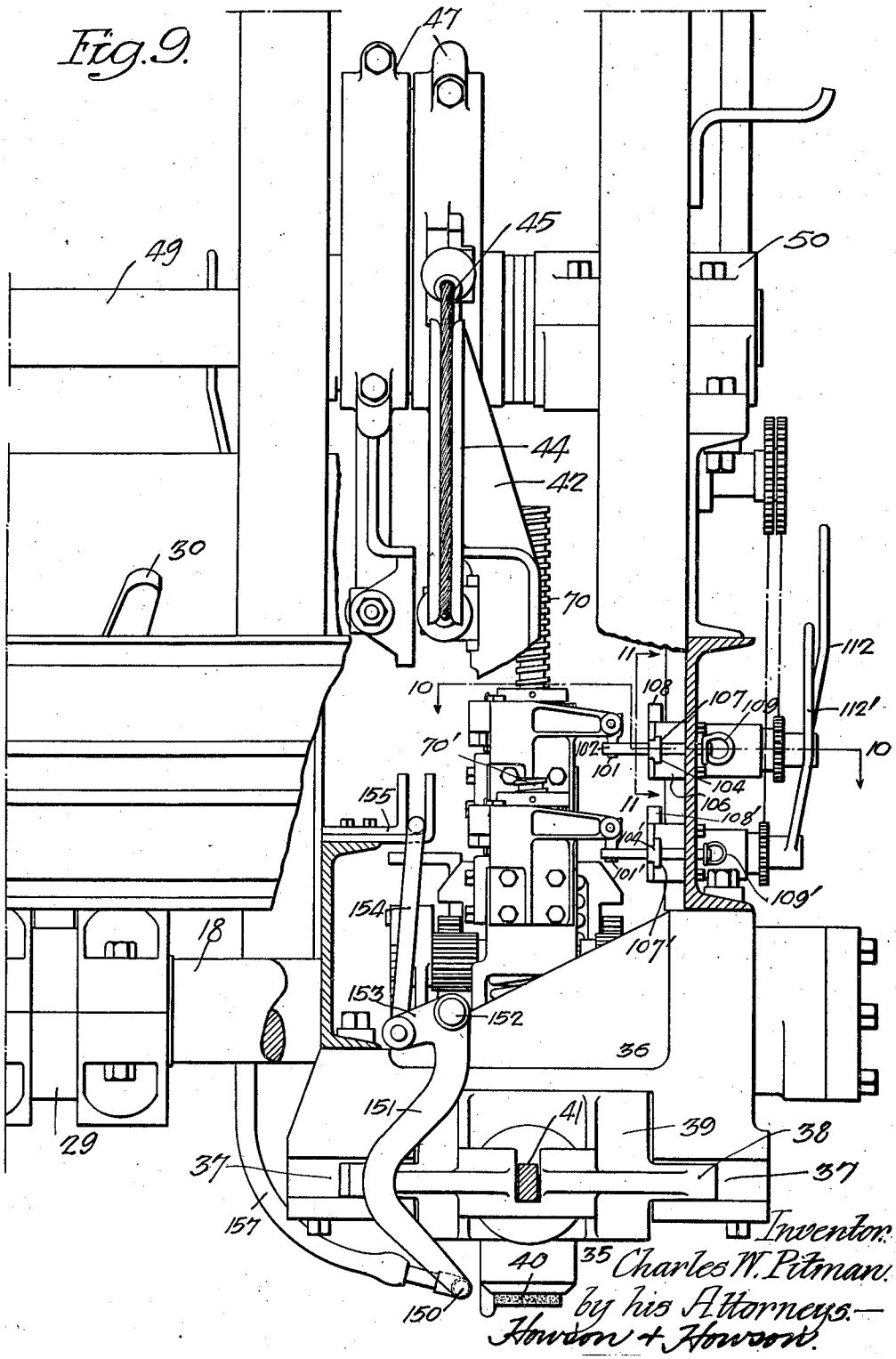
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Fig. 9.



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Fig. 11.

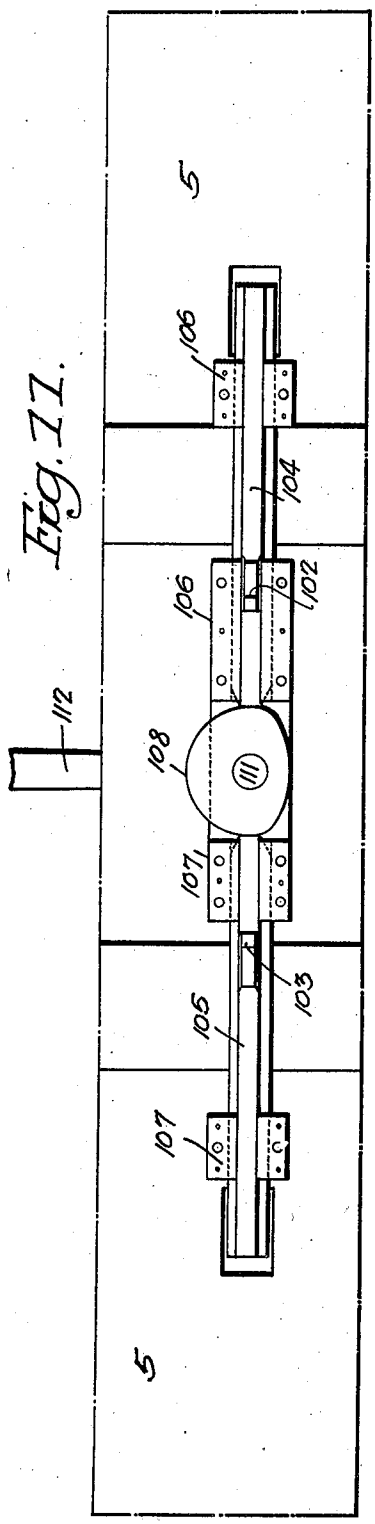
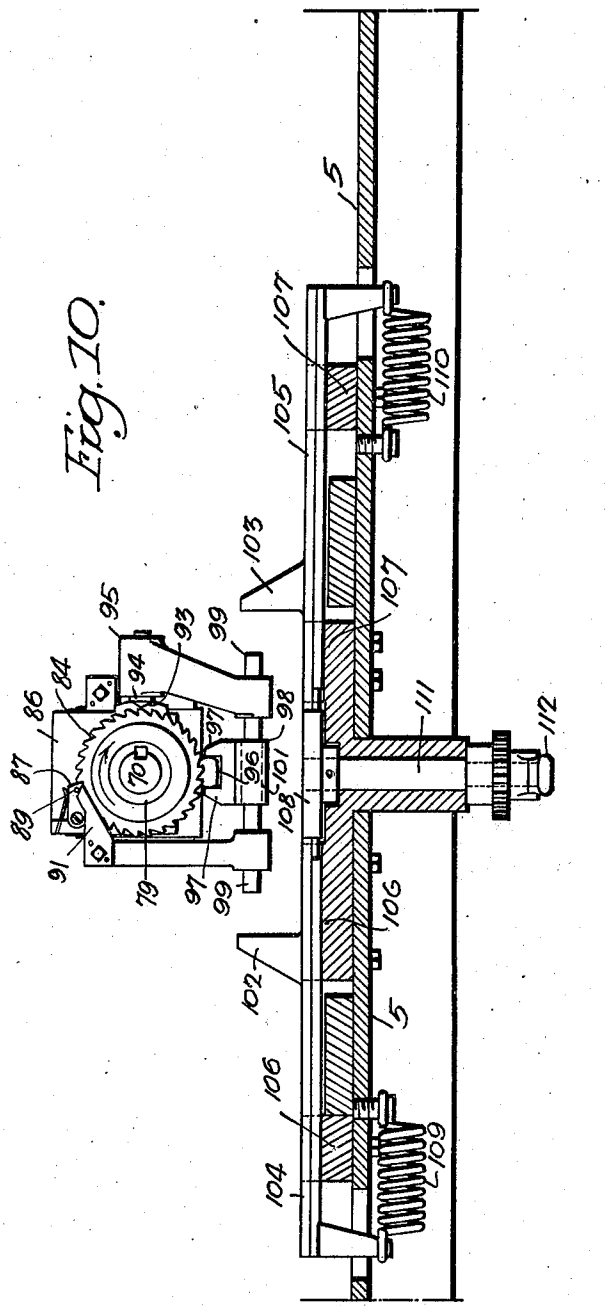


Fig. 10.



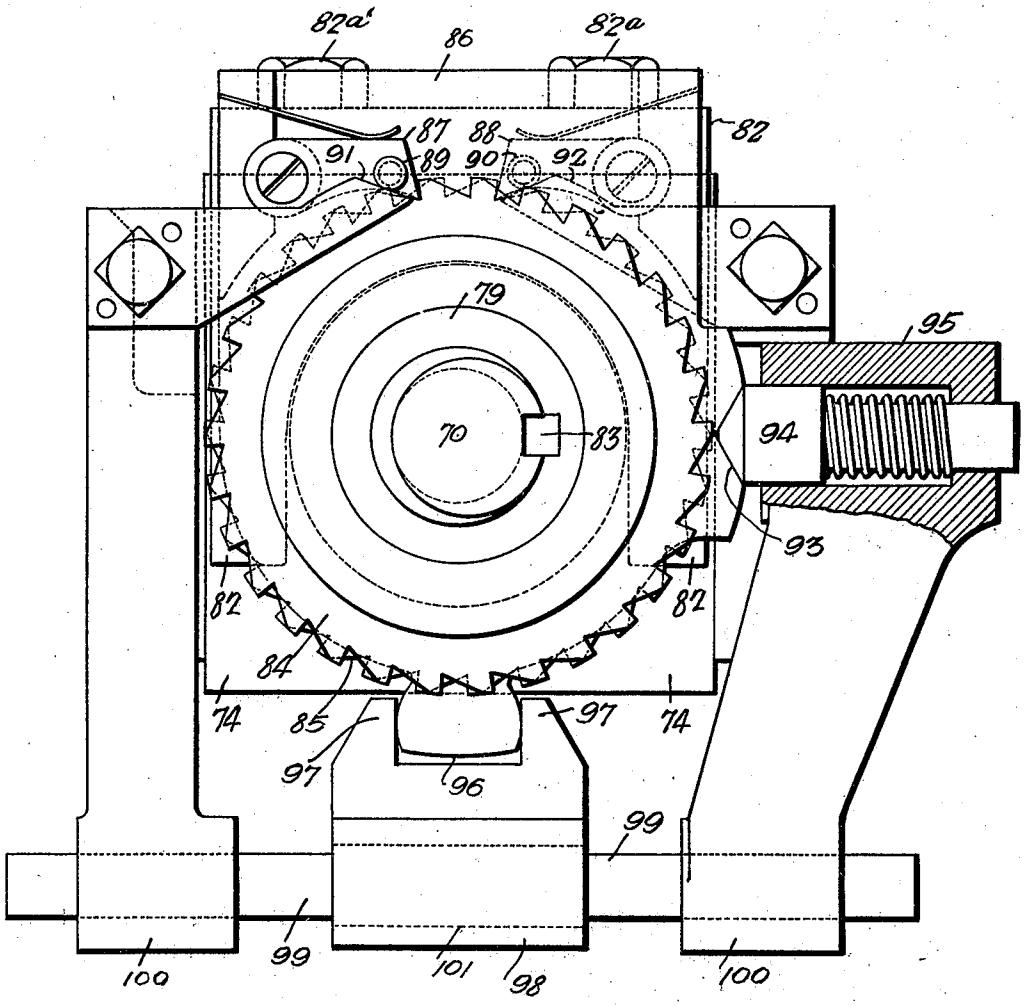
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Nov. 12, 1929. C. W. PITMAN 1,735,693

TRACK GRINDER

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Fig. 12.



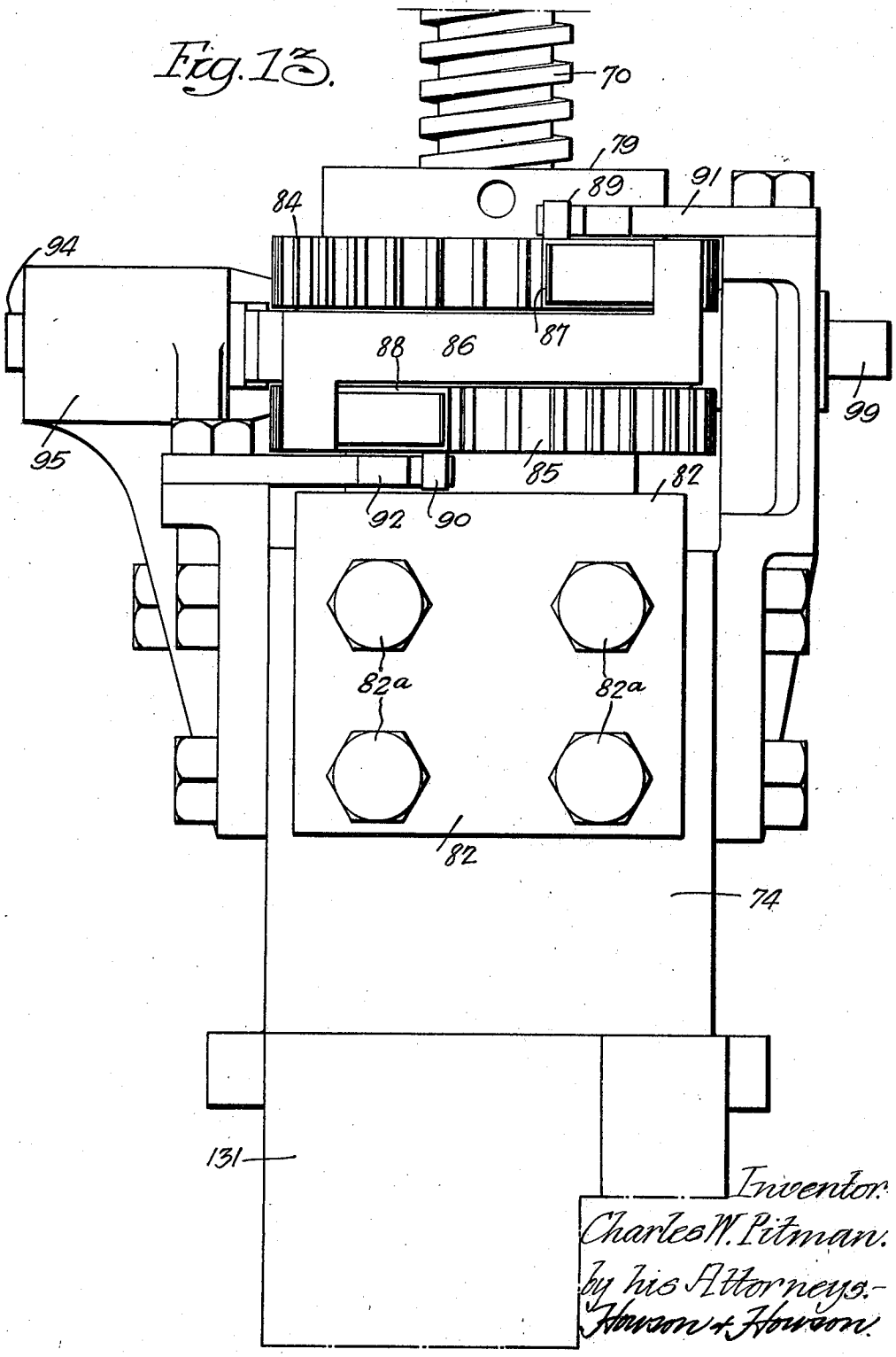
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TRACK GRINDER

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Fig. 13.



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Patented Nov. 12, 1929 1,735,693

UNITED STATES PATENT OFFICE

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TRACK GRINDER

Application filed February 25, 1925. Serial No. 11,556.

One object of my invention is to produce a mobile track grinding machine which is capable of continuous movement along a railway track and simultaneously therewith to grind one or both of the rails composing the track.

Another object of the invention is to provide the machine with controlling mechanism whereby the machine may be moved backward and forward over a limited and predetermined portion of the track and simultaneously therewith operate to grind that portion of one or both of the rails underlying the machine during this movement of the machine.

Another object of the invention is to so construct the grinding units thereof that, in addition to its above described capabilities, the machine proper may be stopped at any desired point along the track and the grinding units will operate to grind an extremely small portion of the rails.

The machine is also provided with power units for producing the above described propelling and grinding operations.

The propelling mechanism of the machine includes worm gearing, by which the machine is steadily propelled along the rails during the above described operations. The pitch of the worm relative to the worm wheel is such that rotation is imparted to the worm wheel only when the worm is rotated and the worm therefore cannot be rotated by the worm wheel. The traction wheels of the machine are adapted to be rigidly connected to the worm wheel and due to the weight of the machine obtain a firm purchase on the rails, thus the machine is propelled along the rails steadily and effectively resists the retardative contra-directional and the accelerative co-directional tendencies of the machine as produced by the action of grinding units against the rails.

The grinding elements of the machine may be raised a sufficient distance above the rails to permit of the free movement of the machine along the rails, either by virtue of the traction power unit therein confined or, upon release of the clutch elements on the axles, by manual operation.

Another object of the invention is to automatically maintain a constant and predetermined pressure of the abrasive units, employed in the grinding process, on the rails during the period of time in which the process of grinding is in operation.

Another object of the invention is to provide the grinding machine with two separate grinding units, one overlying each rail of the track undergoing reconditioning, either or both of which may be lowered into contact with the respective underlying rail and thereafter to be locked in such position, such lowering and locking operations of each individual unit being performed by a single operating shaft.

Still another object of the invention is to supply a continuous flow of cooling medium to the rail at the point undergoing the grinding operation, by mechanism which is resiliently mounted, so that the same may be moved away from but which will return automatically to a predetermined position with respect to the adjacent grinding unit.

Other advantages of the invention and the improved constructional details thereof will be more fully set forth in the following description and are clearly shown in the accompanying drawings, wherein:

Figure 1 is a side elevation of my improved track grinding machine;

Fig. 2 is an end elevation;

Fig. 3 is a plan view with the superstructure of the machine removed;

Fig. 4 is a side elevation of one of the grinding units drawn on an enlarged scale;

Fig. 5 is a plan view of the structure shown in Fig. 4;

Fig. 6 is a longitudinal sectional elevation on the line 6—6, Fig. 5;

Fig. 7 is a longitudinal sectional elevation on the line 7—7, Fig. 5;

Fig. 8 is a transverse sectional elevation on the line 8—8, Fig. 4;

Fig. 9 is a transverse sectional elevation on the line 9—9, Fig. 1;

Fig. 10 is a sectional plan view on the line 10—10, Fig. 9;

Fig. 11 is a sectional elevation on the line 11—11, Fig. 9;

Fig. 12 is an enlarged plan view of certain of the elements of the invention;

Fig. 13 is a rear elevation of the structure shown in Fig. 12; and

Fig. 14 is a plan view of the machine frame and the traction elements thereon.

Referring to Figs. 1, 2 and 3, my invention consists of a main frame 1 comprising longitudinally extending channel beams 2, 3, 4 and 5, and transversely extending channel beams 7, 8, 9 and 10, which extend from side to side of the frame 1. A superstructure 15 is mounted on the frame 1 for the purpose of protecting the mechanism of my grinding machine from the elements and for the purpose of supporting and housing the power controlling units. A container for a cooling medium is also confined in the superstructure.

Secured to the under side of the longitudinal beams 2 and 5 are journal boxes 16, 16, and 17, 17, respectively, in which are rotatably mounted transversely extending axles 18 and 19, to which are secured supporting and traction wheels 20, 20.

A traction motor 21 is secured to and intermediate the longitudinal beams 3 and 4 as shown in Fig. 3 and Fig. 14, and serves to drive a longitudinally extending shaft 22 which is supported, adjacent its ends, in bearings 23 secured to transverse beams 24, 24, extending between and secured at their ends to the longitudinal beams 3 and 4. The opposite ends of the shaft 22 are provided with worm gears 25, 25, which mesh with worm wheels 26, 26, mounted on the axles 18 and 19 respectively. One of the worm gearings 25—26 is illustrated clearly in Figs. 1 and 3, wherein is also illustrated a housing 27 which encloses said worm gearing and is loosely mounted on the respective axle and adjacent end of the shaft 22.

Each of the worm wheels 26 is loosely mounted on its respective axle and is provided at one of its sides with a jaw clutch element 28 adapted to be engaged by a movable clutch element 29 splined to its respective axle 18 or 19. Each of the clutch elements 29 is controlled by an independent hand lever 30 pivoted to the frame and operated in the usual manner.

The traction wheels 20, 20, travel on rails x—x, all or portions of which it is desired to grind. Intermediate each pair of longitudinally aligned wheels 20, 20, is a grinding unit 35. Each grinding unit 35 comprises a main casting or housing 36 which is secured to each pair 2—3 or 4—5 of the longitudinal extending beams composing the frame 1, one of said grinding units being clearly shown in Figs. 4, 5, 6, 7 and 8.

Each of the main castings 36 is provided with longitudinally extending guideways 37, 37, (Fig. 8), in which are slidably mounted laterally extending ribs 38, 38, of a cross-head 39, in which is adjustably mounted a series of abrasive units 40 for the purpose of contacting with and grinding the respective rails x—x.

Yieldably attached to each end of the cross-heads 39 is a draw bar 41, which is pivotally attached at its outer end to a lever 42.

Each lever of a pair of the levers 42, 42, is pivoted to, and intermediate, a pair 2—3 or 4—5, respectively, of the longitudinal beams composing the frame 1, as illustrated at 43, Fig. 1. Each lever 42 has an upper end in the form of a semi-elliptical grooved faced sheave 44 around and within the grooved face of which passes a flexible cable 45.

Each of the cables 45 is adjustably secured to its respective lever 42 at 46 and is provided, at its opposite end, with an eccentric strap 47 mounted in the face of a flanged eccentric 48.

Each of the eccentrics 48, 48, is secured to a transversely extending shaft 49. There is one eccentric 48 for each lever 42 and a pair of levers 42 for each grinding unit 35; therefore the shaft 49 will have a pair of eccentrics 48, 48, at each of its ends. The shaft 49 is rotatably mounted in bearings 50, 50, secured to the beams 2 and 5 respectively, and has a bevel gear 51 secured thereto adjacent the beam 3.

A bevel pinion 52 meshes with the bevel wheel 51 and is secured to the projecting end of the armature shaft of a motor 53. The motor 53 is securely mounted on the transverse beams 24, 24, and when energized effectively reciprocates the abrasive units 40 with respect to and in contact with the rails x, x.

The abrasive units 40 are capable of being manually placed in contact with the rails x and therein maintained at a uniform pressure automatically applied, or they may be raised clear of the rails by said manually operated mechanisms.

It will be apparent from the above description that my improved grinding machine may be effectively propelled or may be ineffectively moved from place to place, along the rails to be operated upon, by the energization of the traction motor 21 and the operation of the clutch levers 30, 30. When the machine has been brought to a position on the rails, above a portion thereof to be especially operated upon, the motor 21 is intermittently reversed, and if the clutch elements 28—29 are permitted to remain in engagement with each other, the machine will be moved backward and forward, alternately, and at a steady even speed due to locking tendencies of the worm gearing 25—26 and the tractive potency of the traction wheels 20, 20 on the rails as above described. If the motor 21 be de-energized, the machine proper will remain quiescent while the abrasive units are

reciprocated with respect thereto and to the rail *x*.

Upon operating the motor 53, the shaft 49 is rotated and therewith the eccentrics 48, 48. Each pair of eccentrics at the opposite ends of the shaft 49 is so positioned thereon with respect to each other that upon rotation of the shaft 49, the cables 45 are alternately pulled and slackened, causing a corresponding oscillation of the levers 42 which, through the draw bars 41, 41, causes the cross heads 39 to be reciprocated, causing a corresponding reciprocation of the abrasive units 40 over the surface of the rail *x*.

Each series of abrasive units 40 is supported in a hollow carrier 55, the interior surface of one end 56 of which lies in a vertical plane, the opposite end 57 thereof lying at an angle with respect to the vertical plane of the opposite end.

Lying between the vertical end 56 of the carrier 55 and the first of the abrasive units 40, and between each of the succeeding said units, is a separating plate 58. On each side of each of the said plates 58 is a projection 59 supported in a groove 60 provided in the inside of the longitudinal walls 61, 61, of the carrier 55.

A wedge member 62 is provided between the last or end abrasive unit and the inclined end wall 57 of the carrier 55 for the purpose of clamping all the said abrasive units 40 together and against the vertical wall 56 of said carrier to insure rigidity between said units and the carrier.

Each of the abrasive units 40 has secured, by sulphuring, in its upper end a threaded retaining stud 65. The retaining studs 65 pass through elongated apertures 67 in a bar 68 which extends longitudinally of the series of abrasive units 40 and to which the said abrasive units are secured by nuts 66 on the studs 65. The bar 68 is composed of two identical sections which are secured together by bolts 69 and serves to apply equal pressure to all the abrasive units 40 simultaneously.

Each of the separators 58 is open at one end as indicated at 64 for the passage of the bar 68 as the same is fed downward, due to the diminishing of the units 40.

A pressure screw 70 is provided by which the abrasive units 40 are advanced in the carrier 55 and through which a uniform pressure is maintained between said abrasive units and the rail being ground as the said abrasive units are worn away during such grinding.

The screw 70 is provided with a head 71 adapted to a socket 72 in the bar 68 which will permit rotation of said screw 70 therein but which causes a cooperative movement vertically of the abrasive units 40 and the screw 70 when said screw is moved axially.

The screw 70 is adapted to an internally threaded sleeve 73 slidably mounted in a bearing 74 secured, as will be described later, to the carrier 55. The sleeve 73 is provided with an annular element 75 at its lower end which is threaded thereon and functions as a flange. Between the lower side of the bearing 74 and the upper side of the flange 75 is mounted a spring 76 which provides the pressure, aforesaid, on the abrasive units 40. A lug 77, (Fig. 4), on the sleeve 73 is adapted to a slot 78 in the bearing 74 and prevents rotation of the sleeve 73 while permitting axial movement thereof.

A sleeve 79 is rotatably mounted on the upper end of the bearing 74, a flange 80 thereof being adapted to a counter-bored portion 81 of said bearing. A plate 82 is secured to the bearing 74 by means of screws 82^a and is adapted to surround the sleeve 79 above the flange 80 for the purpose of retaining said sleeve against axial movement with respect to the bearing 74. The screw 70 passes through a plain bore in said sleeve 79 and is splined thereto, as shown at 83, Fig. 6.

Ratchet wheels 84 and 85 are secured to the sleeve 79, and intermediate said ratchet wheels is loosely mounted a pawl carrier 86. A nut is adapted to threads on the upper end of the sleeve 79 and serves to retain the ratchet wheels 84 and 85 and the pawl carrier 86 in position on the sleeve 79.

The pawl carrier 86, Figs. 10, 11, 12 and 13, has pivoted thereto spring-pressed pawls 87 and 88 which cooperate with the said ratchet wheels 84 and 85 respectively. Pins 89 and 90 project from the pawls 87 and 88 respectively and are adapted to engage cam plates 91 and 92 secured to the bearing 74.

The pawl carrier 86 is provided with a notch 93 adapted to receive a spring-pressed plunger 94 mounted in a bracket 95 secured to the bearing 74 for the purpose of retaining the carrier 86 in a central position wherein the said carrier 86, the sleeve 79, and the screw 70 are held against rotation.

A projection 96 is provided on the carrier 86 and is adapted to be engaged by lugs 97, 97, projecting from a block 98 integral with a reciprocable rod 99 mounted in bearings 100, 100, rigidly attached to the bearing 74.

As shown in Fig. 12, the elements are in a neutral position. As will be apparent from said figure, a reciprocation of the rod 99 and block 98 between the neutral position and a position adjacent the left hand bearing 100 will cause an intermittent rotation of the screw 70 in such a direction as to cause a pressure to be exerted on the abrasive units 40 by means of the pawl 87 on the pawl carrier 86 engaging and moving the ratchet wheel 84 and the cam plate 92 disengaging the pawl 88 from the ratchet 85 to permit said movement of the ratchet wheel 84. A reciprocation of the rod 99 between the neutral position and a position adjacent the right hand bearing 100 will cause a rotation of the screw 70

in an opposite direction and relieve the pressure on the abrasive units 40, the pawl 88 at such time engaging and moving the ratchet wheel 85 and the cam plate 91 disengaging the pawl 87 from the ratchet wheel 84 to permot such movement of the ratchet wheel 85.

To accomplish the above mentioned reciprocation of the rod 99, the block 98 is provided with a depending lug 101 adapted to be engaged by arms 102 and 103 of tripping heads 104 and 105 respectively, Figs. 10 and 11.

The tripping heads 104 and 105 are slidably mounted in guideways 106 and 107. Intermediate the said guideways 106 and 107 is rotatably mounted a cam 108, against the opposite sides of which the tripping heads 104 and 105 are maintained by springs 109 and 110. The cam 108 is mounted on the inner end of a shaft 111 which projects outwardly through the channel beam 5 and has mounted on its projecting end a hand lever 112.

When in the neutral position, as shown in Fig. 10, and considering the crosshead 39 as receiving a reciprocating motion, the trip heads 104 and 105 are engaging opposite sides of the cam 108 at the high portion of the periphery thereof whereby the arms 102 and 103 are held in such positions that they merely engage the lug 101 at the extreme limit of its outward movement during the aforesaid reciprocation of the crosshead 39.

When it is desired to increase the pressure on the abrasive units 40, the shaft 111 is rotated to bring the low portion of the cam 108 in alignment with the trip head 105, which causes the arm 103 to move inwardly so that it will be engaged by the lug 101 immediately preceding the limit of its movement in one direction during said reciprocation.

Engagement of the lug 101 with the arm 103 causes the rod 99 and the block 98 to be moved longitudinally, causing a slight rotation of the pawl carrier 86 in the direction of the arrow x, Fig. 10. Such rotation of the carrier 86 causes the pawl 87 to move the ratchet wheel 84 and consequently the sleeve 79 in a like direction. The pin 90 on the pawl 88 engages the cam 92 and withdraws the pawl 88 from the ratchet wheel 85. The plunger 94 is forced out of the notch 93 in said carrier, by the cam-like side of the notch 93 being pressed against the angular or conical shaped engaging face of the plunger 94.

The above mentioned rotation of the sleeve 79 causes a like rotation of the screw 70, which produces an upward axial movement of the sleeve 73, thereby increasing the compression of the spring 76 which in turn produces an increased downward pressure on the screw 70, pressure bar 68, and the abrasive units 40.

As the cross head 39 approaches the limit of its movement in the direction opposite to that just described, the arm 102 engages the lug 101 and returns the elements to their neutral positions, as shown in said Figure 10.

If the pressure on the abrasive units 40 is equal to the predetermined operating pressure as determined by the tension of the spring 110, said spring will yield when the lug 101 engages the arm 103 and no rotation of the screw 70 will be registered.

Should it be desirable to reduce the pressure on the abrasive units 40, the lever 112 will be moved in the opposite direction to that just described with a corresponding reverse operation of the above described elements and a consequent reduction of the pressure aforesaid.

As shown in Fig. 6, pressure on the end wedge 62 of the grinding unit 35 is controlled by mechanism identical with that just described in connection with the abrasive units 40, and may be externally operated by a lever 112′, as shown in Fig. 1. The pressure on the wedge 62 is applied for the purpose of preventing the abrasive units 40 from becoming loose longitudinally of the carrier 55.

To provide lateral adjustment for the carrier 55 with respect to the crosshead 39, one of the ribs 38 is provided with screw members 115 having heads 116 adapted to undercut slots 117 vertically arranged in the side wall 61 of the carrier 55, as clearly shown in Figs. 4, 7 and 8.

In order to secure the carrier 55 against vertical movement relative to the crosshead 39 during the grinding process, said carrier is provided with toggle-operated locks, one on either side thereof. The end walls 120 and 121 of the hollow interior portion of the crosshead 39 are inclined inwardly from the bottom and upwardly therefrom. Integral with each of the side walls 61, 61, of the carrier 55 is a projecting abutment 122, Fig. 7, which normally lies in contact with the inside of the wall 120 of the crosshead 39. Slidably mounted in guideways 123 and 124 are blocks 125 and 126 respectively. Toggle links 127 and 128 are connected to the respective blocks at one end thereof, the opposite ends of said toggle links being pivotally secured together and to vertically slidable racks 129 adapted to guideways 130 integral with uprights 131 which support and rigidly connect the bearing 74 with the carrier 55. A movable abutment 132 is slidably mounted in guideways 133 integral with the side wall 61 of the carrier 55, one end of said movable abutment normally engaging the inside of the wall 121, the opposite end of said abutment engaging a tapered block 134 vertically adjustable, by means of a bolt 135, (Fig. 7), between the adjacent ends of the block 126 and abutment 132 respectively. As shown in Fig. 7, the elements are shown in a locked position against vertical movement of the carrier 55 relative to the crosshead 39.

In order to raise the carrier 55 and its associated abrasive units 40 clear of the rail being ground that the grinding machine may be inoperatively moved from place to place along said rail, the standards 131 are provided with outwardly extending lugs 136, 136, in vertical alignment with and a slight distance above the racks 129, 129. Meshing with the teeth of said racks 129, 129, are pinions 137, 137, secured to a transversely extending shaft 138 which is mounted in bearings 140, 140, formed on the upper ends of upright brackets 141, 141, integral with the side walls of the crosshead 39. The shaft 138 has a squared end 142 for the accommodation of a socket wrench or head of a crank (not shown) by which the carrier 55 may be raised.

The operation of unlocking and raising the carrier 55 and its associated abrasive units 40 will be apparent upon reference to Fig. 7. By application of a crank or wrench to the squared end 142 of the shaft 138 and a subsequent turning of said shaft, the pinions 137 will raise the racks 129. The first effect of such raising of the racks 129 will be to collapse the toggles 127—128, thereby moving the blocks 125 and 126 toward each other and releasing the abutments 122 and 132 from rigid contact with the end walls 120 and 121 of the crosshead 39. The next step in the operation will be the engagement between the upper ends of the racks 129, 129, and the lower sides of the lugs 136, 136. Upon a continued rotation of the shaft 139, the carrier 55 and its associated elements will be raised to any desired extent.

The carrier 55 may be retained in its elevated position by providing a ratchet wheel 144 on the end of the shaft 138 and a pawl 145 pivoted to one of the integral brackets 141 for cooperative engagement with said ratchet wheel 144.

Reversal of the direction of rotation of the shaft 138 will lower the carrier 55 and its associated elements until the projecting under side of the guideways 133 and abutment 122 engage lugs 143 projecting inwardly from the side walls of the crosshead 39. Continued rotation of said shaft in this direction will operate the toggle links 127—128, thereby moving the blocks 125 and 126 outwardly against the abutment 122 and adjusting block 134 and the abutment 132 whereby the said abutments 122 and 132 are forced into rigid engagement with the inside of the inclined end walls 120 and 121 of the crosshead 39.

A cooling medium may be supplied to the abrasive units 40 during the grinding operation by a pipe 150 which normally lies adjacent the said abrasive units 40 and the rail being operated upon. The pipe 150 is so mounted at the ends of levers 151 pivoted at 152 to the casting 36 that the said pipe 150 may readily be moved toward or away from said abrasive units. The levers 150 have projecting arms 153 to which are pivoted rods 154, the upper ends of which are hook shaped and adapted to be positioned in forked brackets 155 secured to the frame of the grinding machine. By the above described arrangement of elements, each pipe 150 is held at a predetermined distance from the rail and the abrasive units by the hook end of the rod 154 engaging the base of the slot in the forked bracket 155, but may be manually swung away from the said position and will automatically return to said predetermined position by gravity when released, the arms 151 turning on their pivots 152. The cooling medium supplied by the pipe 150 is delivered thereto from a tank 156 mounted on the superstructure of the grinding machine and conveyed to said pipe through a flexible hose pipe connection 157 under control of a valve 158.

The mechanism for controlling the degree of pressure on the wedge member 62 being identical with that employed for controlling the pressure on the abrasive units 40, separate description thereof is deemed unnecessary, and the similar elements will be identified by similar reference characters with the addition of a prime (′) mark to those of the wedge control.

In Fig. 1, I have diagrammatically illustrated and designated by the reference character 160 a controlling unit for the traction motor 21 whereby the speed and direction of travel of the machine may be definitely controlled.

I claim:

1. In a mobile track grinding machine a grinding unit comprising a fixed element and a reciprocating element; abrasive units adjustably mounted in said reciprocating element; means, carried by said reciprocating element, for raising and lowering the said abrasive units, and means mounted on said fixed element for operating said raising and lowering means by reciprocation of said reciprocating element, whereby the degree of pressure between the abrasive units and the rails is controlled.

2. In a mobile track grinding machine, a grinding unit comprising a relatively fixed housing; a crosshead reciprocally mounted in said housing; a carrier adjustably mounted in said crosshead; abrasive units adjustably mounted in said carrier; means on said carrier for raising and lowering said abrasive units with respect to said carrier; means mounted on said fixed housings for operating said raising and lowering means, when said crosshead is reciprocated.

3. In a mobile track grinding machine, a grinding unit comprising a reciprocably mounted crosshead; an abrasive unit carrier suitably mounted in said crosshead; means

for raising and lowering said carrier with respect to said crosshead; means for retaining said carrier in its raised position, and means operable by the carrier raising and lowering means for retaining said carrier in its lower position.

4. The combination in a mobile grinding machine, of a frame comprising longitudinal and transverse beams; housings secured to said longitudinal beams; crossheads reciprocally mounted in said housings; a motor mounted on said transverse beams; a transversely extending shaft rotatably mounted on said frame and geared to said motor; eccentrics adjacent the opposite ends of said transverse shaft; levers pivoted to said longitudinal beams and having sheave-like upper ends; draw bars pivoted to the lower ends of said levers, the opposite ends of said draw bars being resiliently attached to the opposite ends of said crossheads; flexible connectors adjustably secured at one of their ends to and passing around the sheave-like ends of said levers and having their opposite ends secured to said eccentrics, all for the purpose of reciprocating said cross-heads; abrasive units adjustably mounted in said crossheads; and means for automatically maintaining the said abrasive units at a predetermined pressure against the rails being operated upon.

5. A mobile grinding machine comprising a frame; crossheads suitably mounted on said frame; abrasive units; carriers for said abrasive units; means for raising and lowering said carriers with respect to said crossheads and comprising integral brackets on said crossheads; transverse shafts mounted in said brackets; pinion gears on said shafts; integral brackets on said carriers; gear racks on said carriers and meshing with said pinions; laterally extending lugs on said carrier integral brackets and vertically aligned with said racks; carrier locking means on said carrier and operatively connected to said gear racks; and means for facilitating the rotation of said pinion gear shafts.

6. The combination in a mobile grinding machine, of a frame; crossheads reciprocally mounted on said frame; abrasive units; carriers for said abrasive units vertically movable in said crossheads; means for raising and lowering said carriers; means for locking said carriers in their lowered positions and comprising fixed abutments at either side of and adjacent one end of each of said carriers; movable abutments at either side of and adjacent the opposite ends of said carriers; blocks slidably mounted in guideways on the side walls of said carriers intermediate the said abutments; vertically movable adjusting blocks intermediate the movable abutments and one of each pair of said slidable blocks; toggle links pivoted at one of their ends to the inner end of each of said slidable blocks and having their opposite ends pivotally attached to each other; vertically movable gear racks, pivoted at their lower ends to the free and adjoining ends of said toggle links, slidably mounted in brackets integral with said carriers; brackets integral with said crossheads; transverse shafts each having a flat sided end, said shafts being rotatably mounted in said brackets; and pinions secured to said shafts and meshing with said gear racks.

7. The combination in a mobile grinding machine, of a frame; crossheads reciprocally mounted on said frame; abrasive units; carriers for said abrasive units movable in said crossheads; means for raising and lowering said carriers comprising gear racks on said carriers; pinion gears meshing with said gear racks and secured to transverse shafts; brackets, integral with said crossheads, in which said shafts are rotatably mounted; means providing lost motion between said gear racks and said carrier, means for retaining said carriers in their raised positions comprising ratchet wheels secured to said shafts, and pawls pivoted to said integral brackets and engaging said ratchet wheels and means for locking said carriers in their lower positions operable by said gear racks under said lost motion.

8. The combination in a mobile grinding machine, of a frame, crossheads reciprocally mounted on said frame; abrasive units; carriers for said abrasive units suitably mounted in said crossheads; means for adjusting said abrasive units vertically of said carriers, adjustable means for securing said abrasive units in said carriers against relative longitudinal movement therebetween; means mounted on said frame for automatically operating said vertical adjusting means; means on said frame for automatically operating said longitudinal securing means; and means for reciprocating said crossheads with respect to said frame.

9. A mobile grinding machine adaptable to the rails of a railway track for the purpose of operating thereon and comprising a frame; grinding units mounted on said frame and comprising abrasive units and carriers therefor so mounted as to be capable of reciprocal movement with respect to said rails and said frame; means for reciprocating said carriers and the abrasive units carried thereby; and means on said carriers for applying and maintaining a predetermined pressure of said abrasive units on said rails or releasing said pressure therefrom; operating means for said pressure maintaining means resiliently and adjustably mounted on said grinding machine frame for cooperative engagement with the said pressure maintaining means on the reciprocating carriers, and means for setting the said operating means in different positions to effect the application or release of said pressure, or in an ineffective

position with respect to said pressure maintaining means.

10. A mobile grinding machine, comprising a frame; crossheads reciprocally mounted in said frame; abrasive units; carriers for said abrasive units mounted in said crossheads; pressure bars attached to said abrasive units; upright bearings on said carriers; flanged and internally threaded sleeves slidably mounted in and axially aligned with said bearings; pressure screws adapted to said internally threaded sleeves and operatively connected to said pressure bars; springs confined between the lower ends of said upright bearings and the upper side of said flanges adapted to move said sleeves downwardly in said bearings, and means on said carrier for rotating said pressure screws with respect to said sleeves, whereby pressure may be applied to said abrasive units by said springs, and means on said frame adapted to engage and operate said screw rotating means during the reciprocation of said crossheads.

11. A mobile grinding machine, comprising a frame; crossheads reciprocally mounted in said frame; abrasive units; carriers for said abrasive units; bearings on said carriers; pressure screws suitably mounted in said bearings for applying pressure to said abrasive units; sleeves suitably mounted in the upper ends of said bearings and surrounding and being splined to said pressure screws; ratchet wheels secured to said sleeves; pawl carriers loosely mounted on said sleeves intermediate said ratchet wheels; resilient pawls pivoted to said pawl carriers and operatively engaging said ratchet wheels in opposed relationship to each other; cams secured to said bearings for releasing either of said pawls, means for oscillating said pawl carriers to turn said pressure screws; and means on said frame for resiliently operating said oscillating means upon reciprocation of said crossheads to maintain a predetermined degree of pressure of said abrasive units against said rails.

12. A mobile grinding machine comprising a frame; reciprocating members mounted on said frame; abrasive units adjustably mounted in said reciprocating members; compression springs for applying pressure on said abrasive units; pressure screws for controlling the degree of compression of said springs; oscillating means for controlling the rotation of said screws mounted on said reciprocating members; a projection on said oscillating means; slide rods on said reciprocating members; blocks integral with said rods; lugs on said blocks engaging said projections on said oscillating means; depending projections on said blocks; and resilient arms mounted on said grinding machine frame for engaging said depending projections on said blocks upon actuation of said reciprocating members for the purpose of maintaining a predetermined degree of pressure of said abrasive units upon the surface of the objects being ground.

13. A mobile grinding machine comprising a frame; reciprocating members on said frame; abrasive units adjustably mounted in said reciprocating members; pressure screws for controlling the degree of pressure applied to said abrasive units; oscillating means for rotating said screws; sliding rods for operating said oscillating means; depending projections on said sliding rods; trip heads slidably mounted on said frame; arms on said slide heads disposed at either side of said depending projections; cams intermediate of and engaging the adjacent ends of said trip heads; springs having one end secured to said trip heads and having their opposite ends secured to said frame; shafts on one end of each of which one of said cams is secured; levers on the opposite ends of said shafts for controlling the position of said cams; and means for reciprocating said depending projections into engagement with said projecting arms alternately.

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