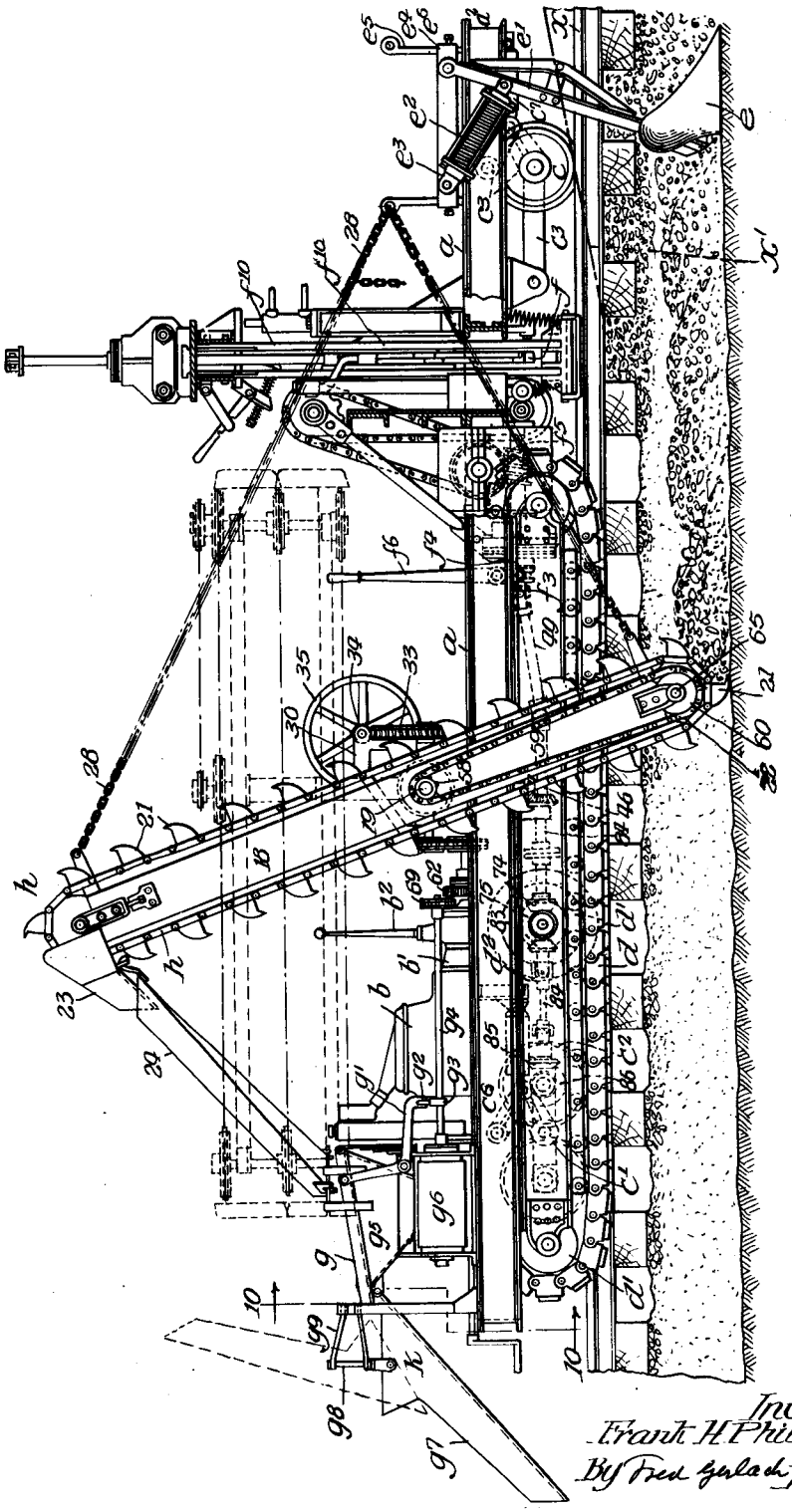
Feb. 2, 1943. F. H. PHILBRICK 2,309,712

APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

Filed March 22, 1940 9 Sheets-Sheet 1

Fig. 1



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APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

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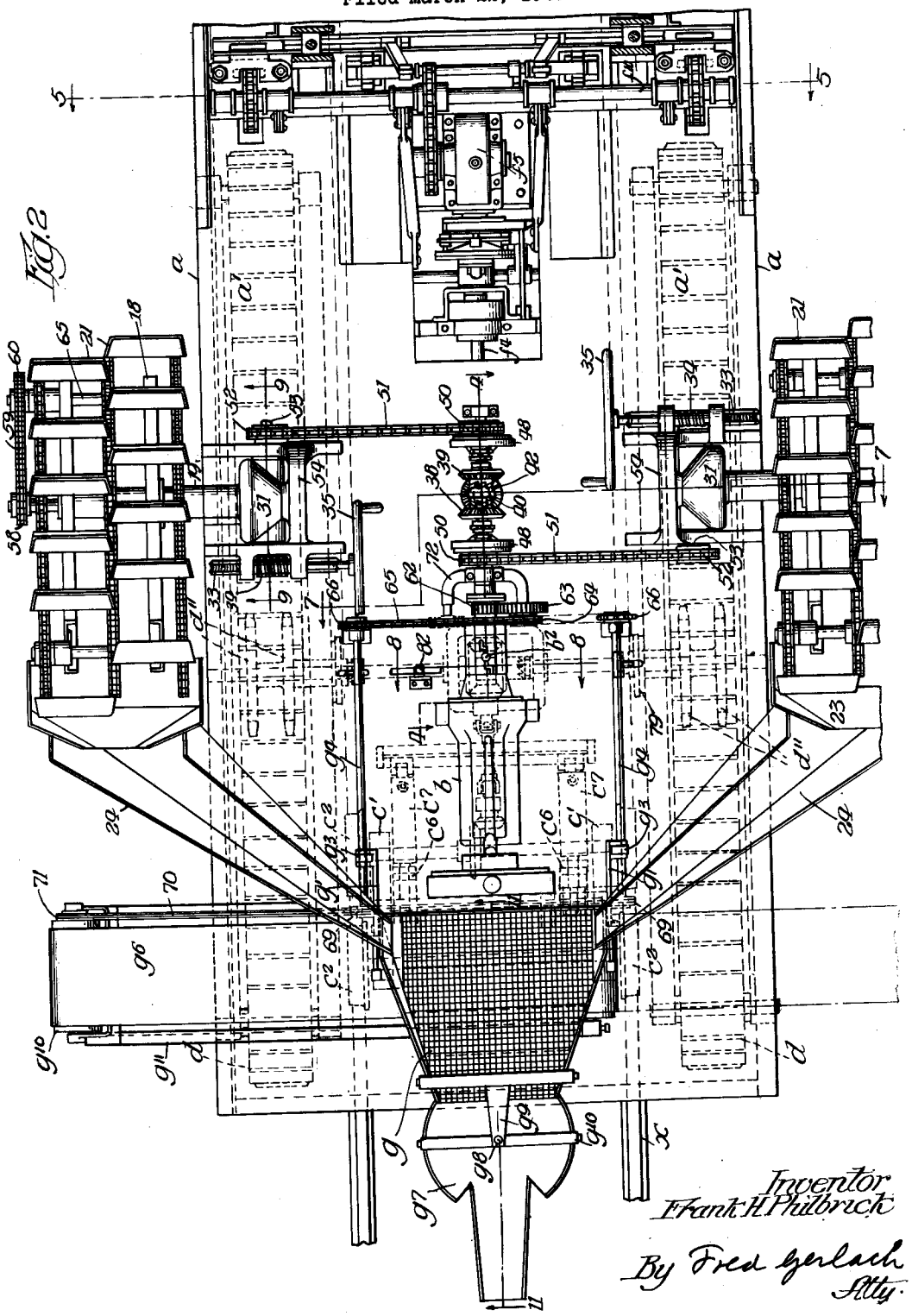


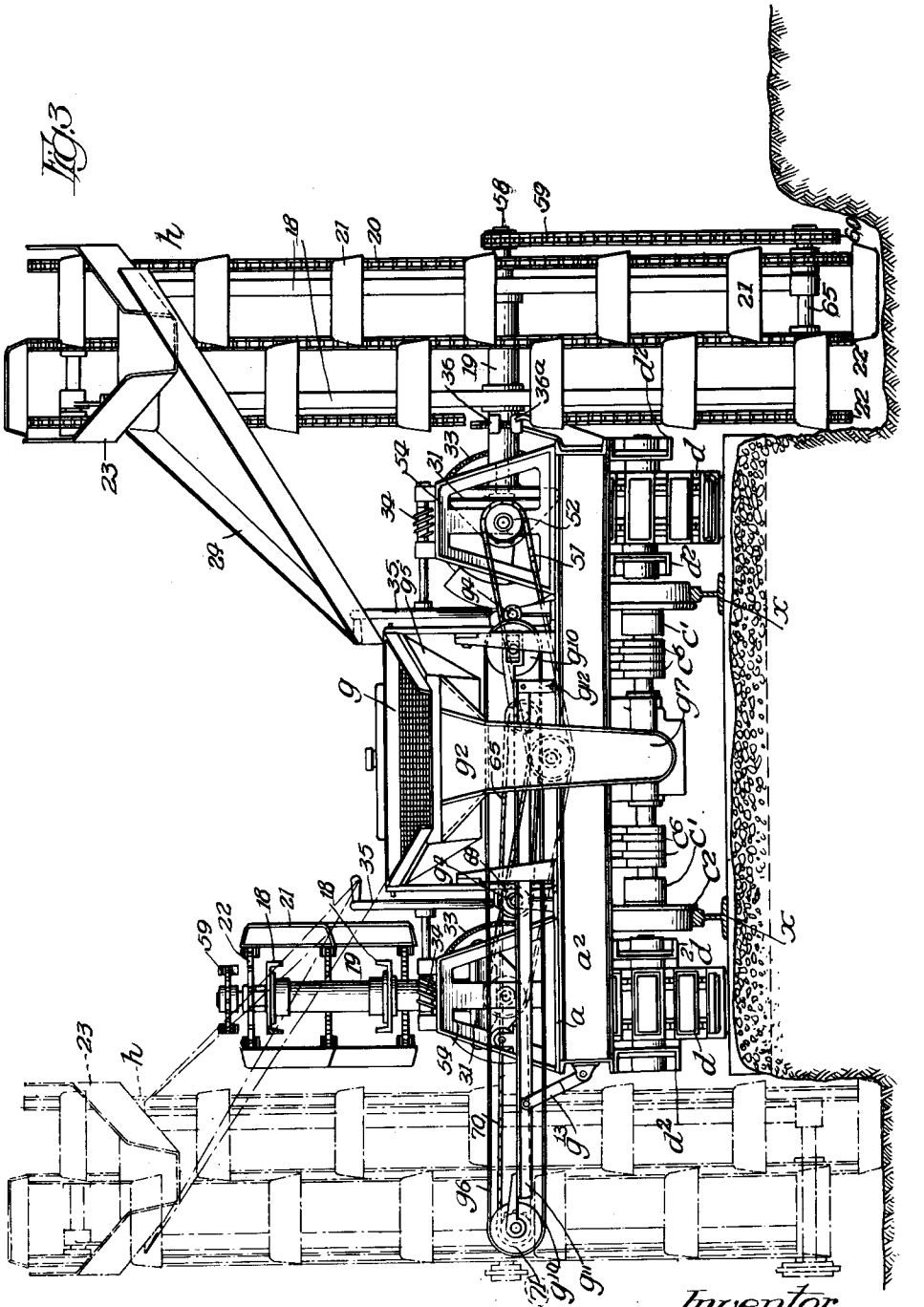
Fig. 2

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APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

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APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

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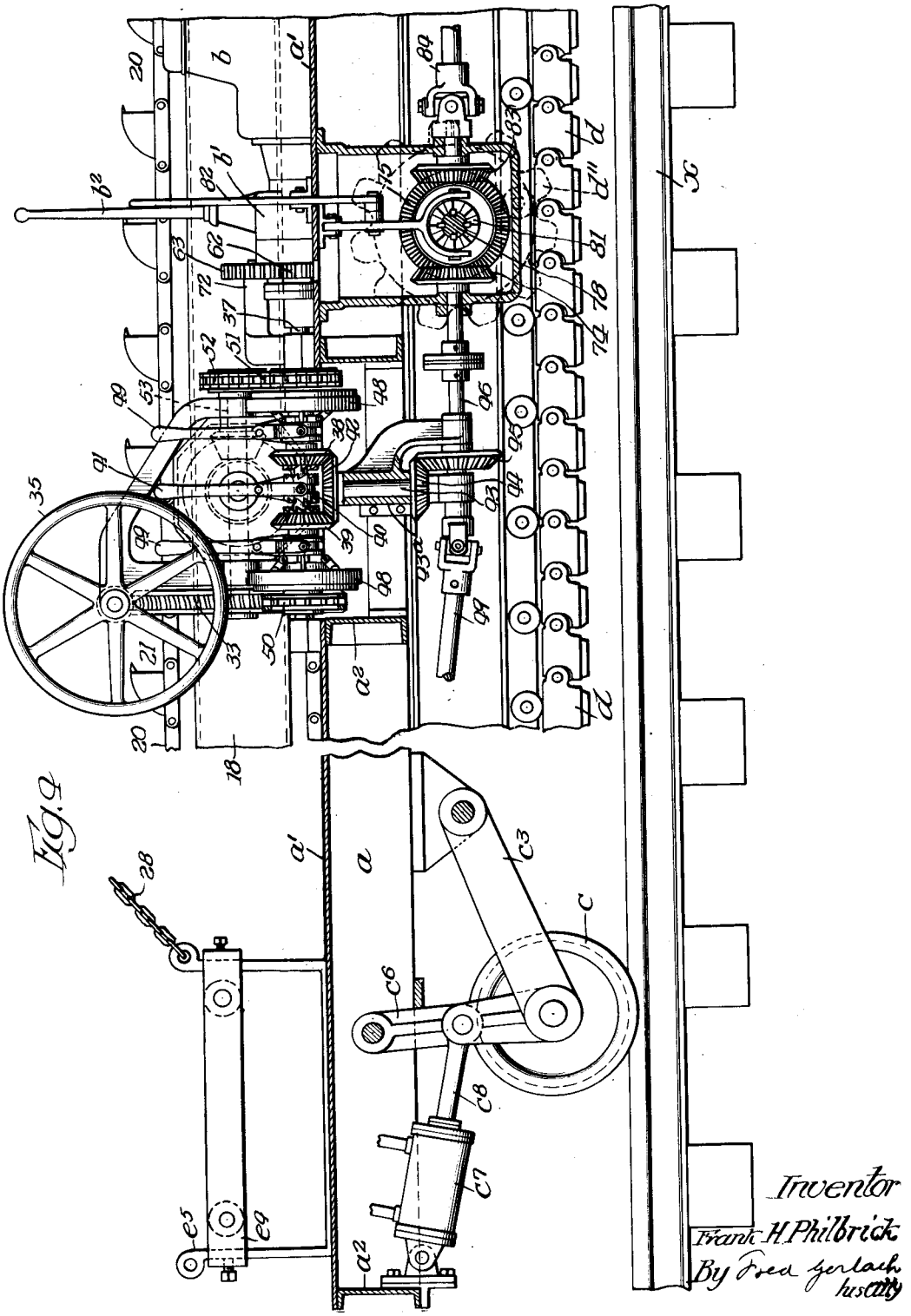


Fig. 9

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APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

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Fig. 6

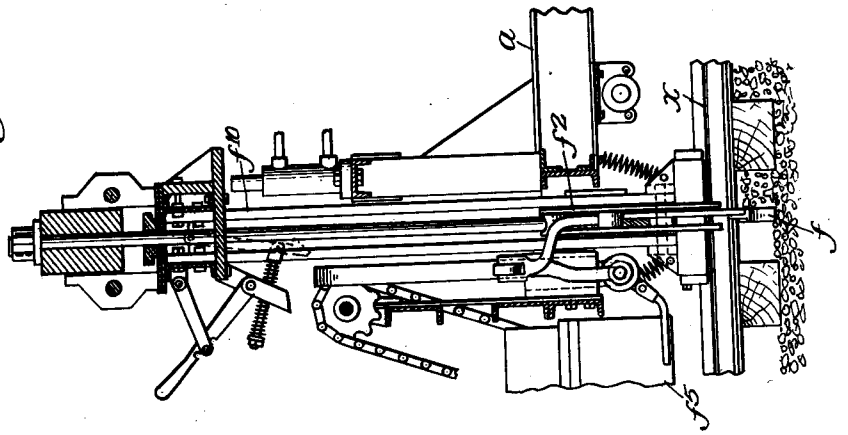
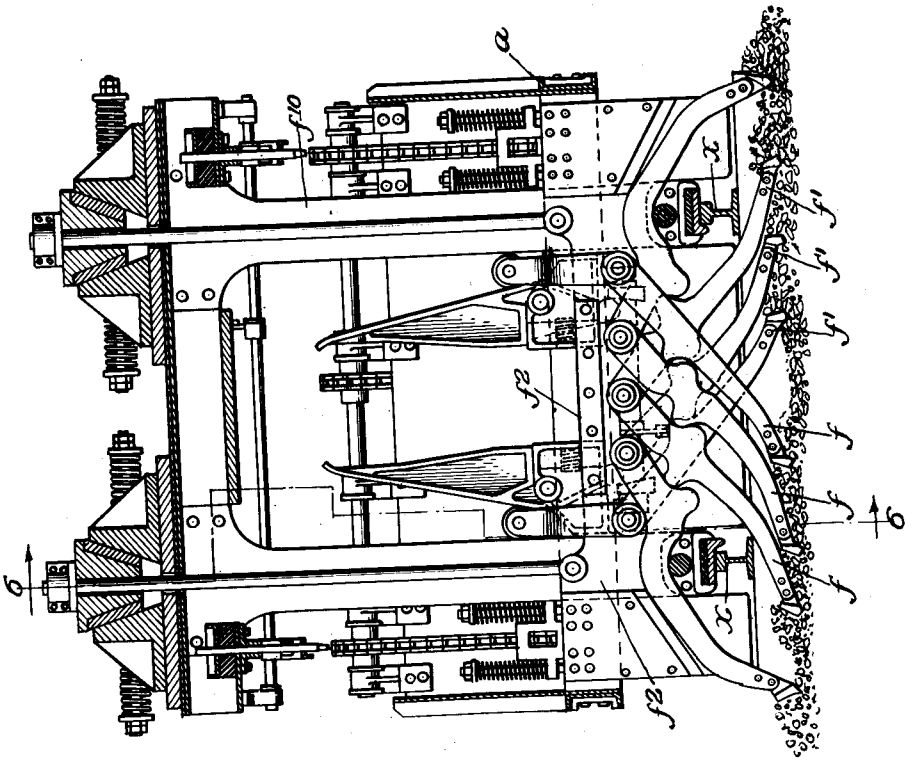


Fig. 5

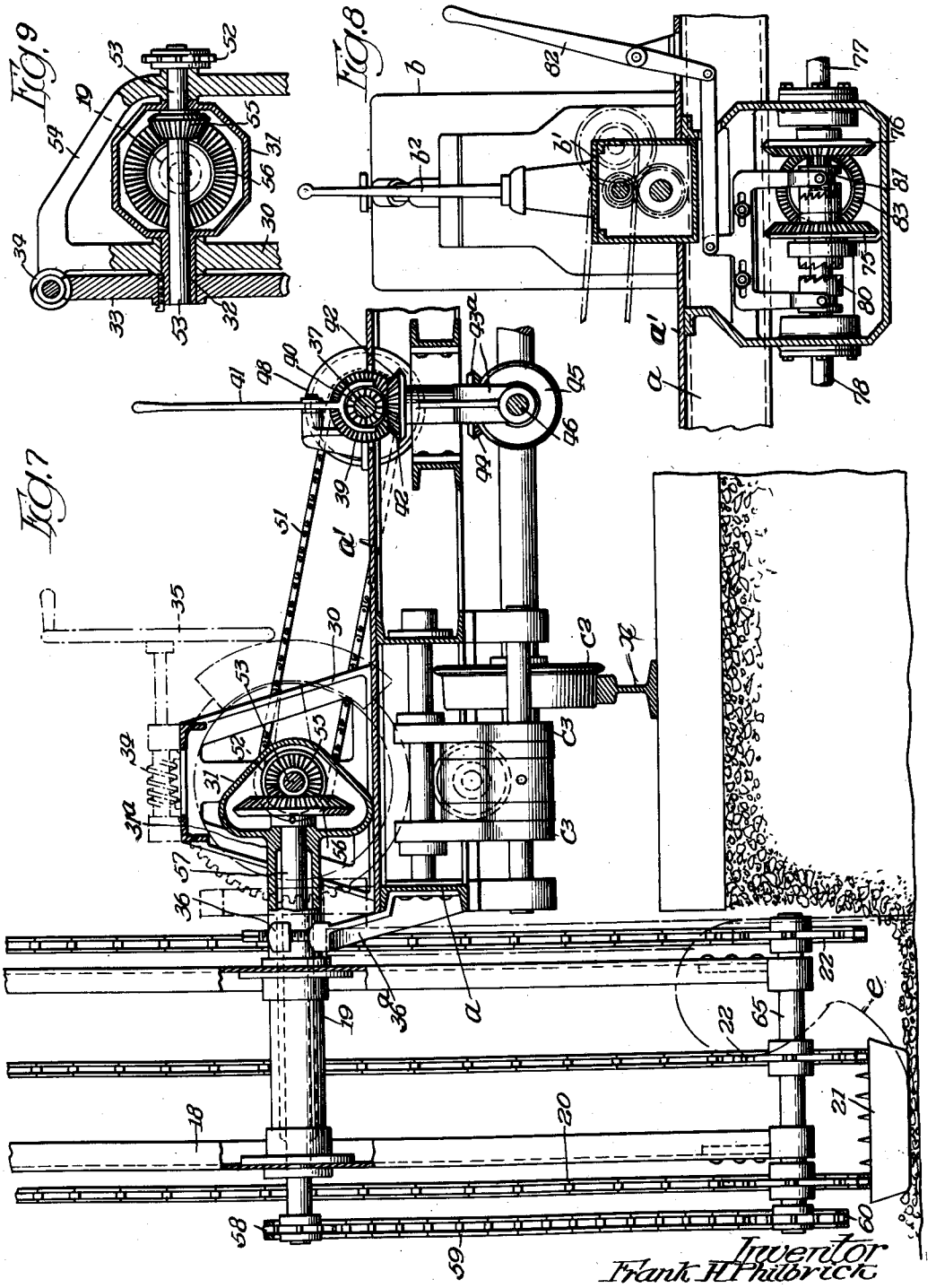


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APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

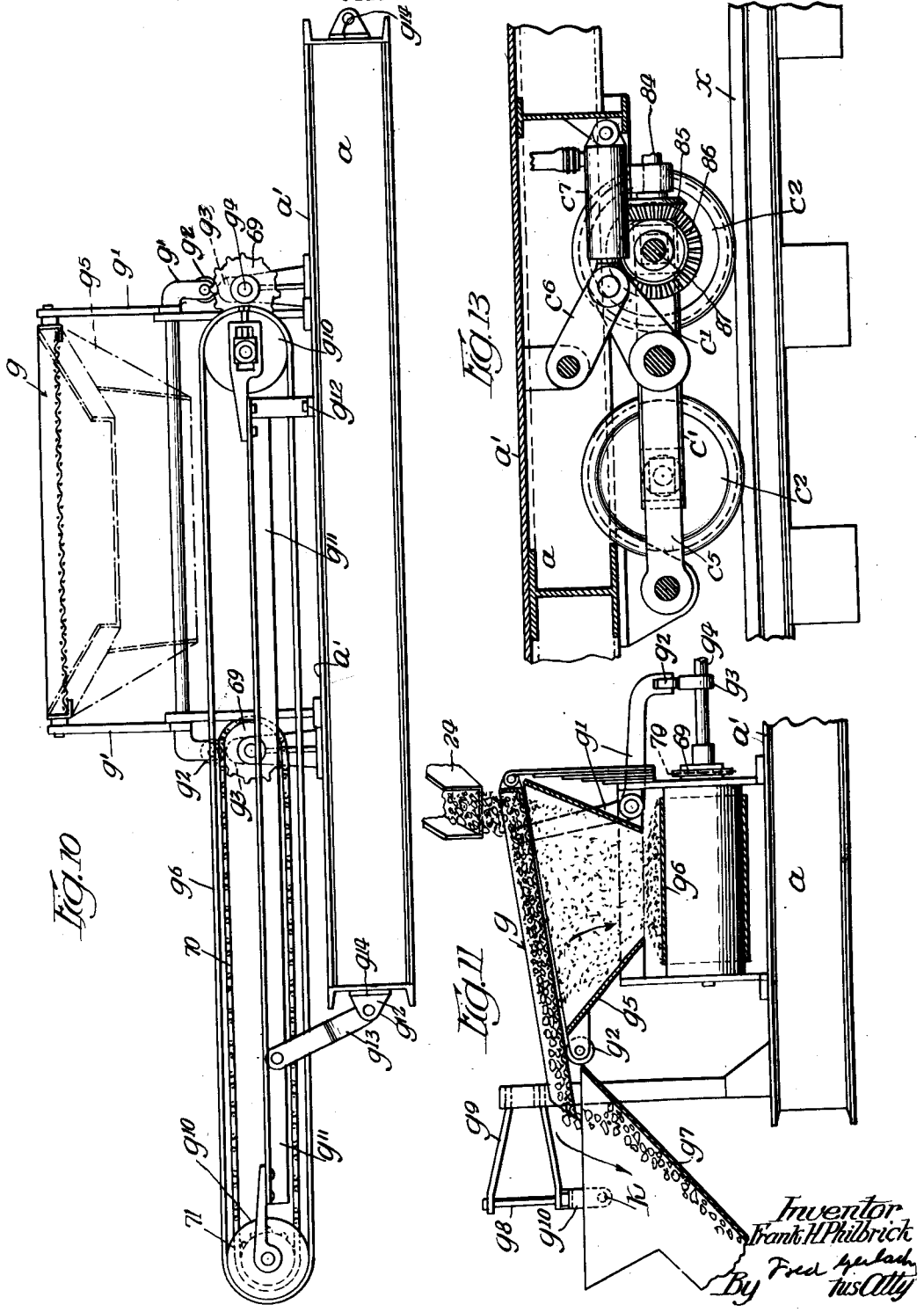
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APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

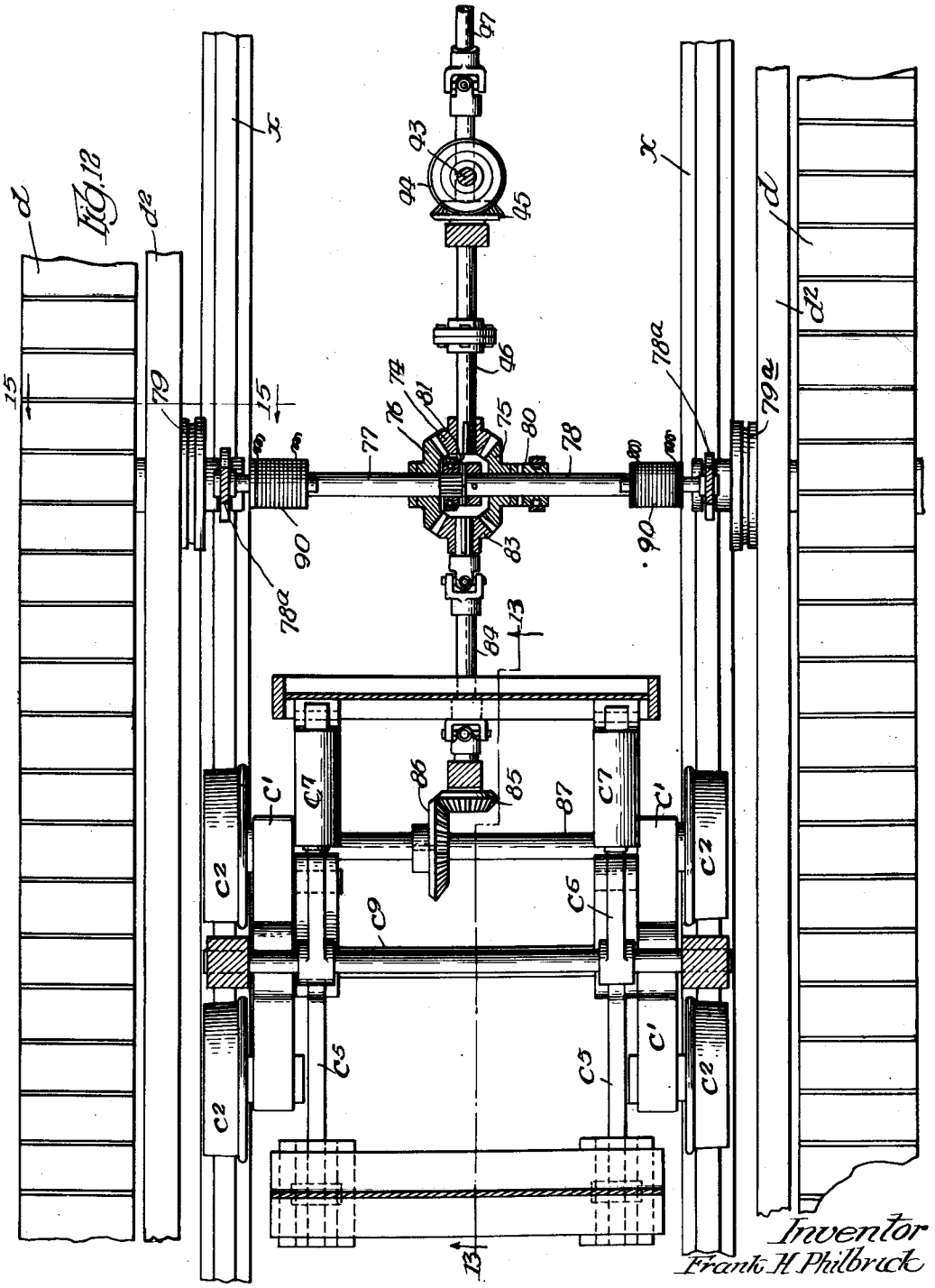
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APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

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APPARATUS FOR HANDLING BALLAST IN RAILWAY ROAD-BEDS

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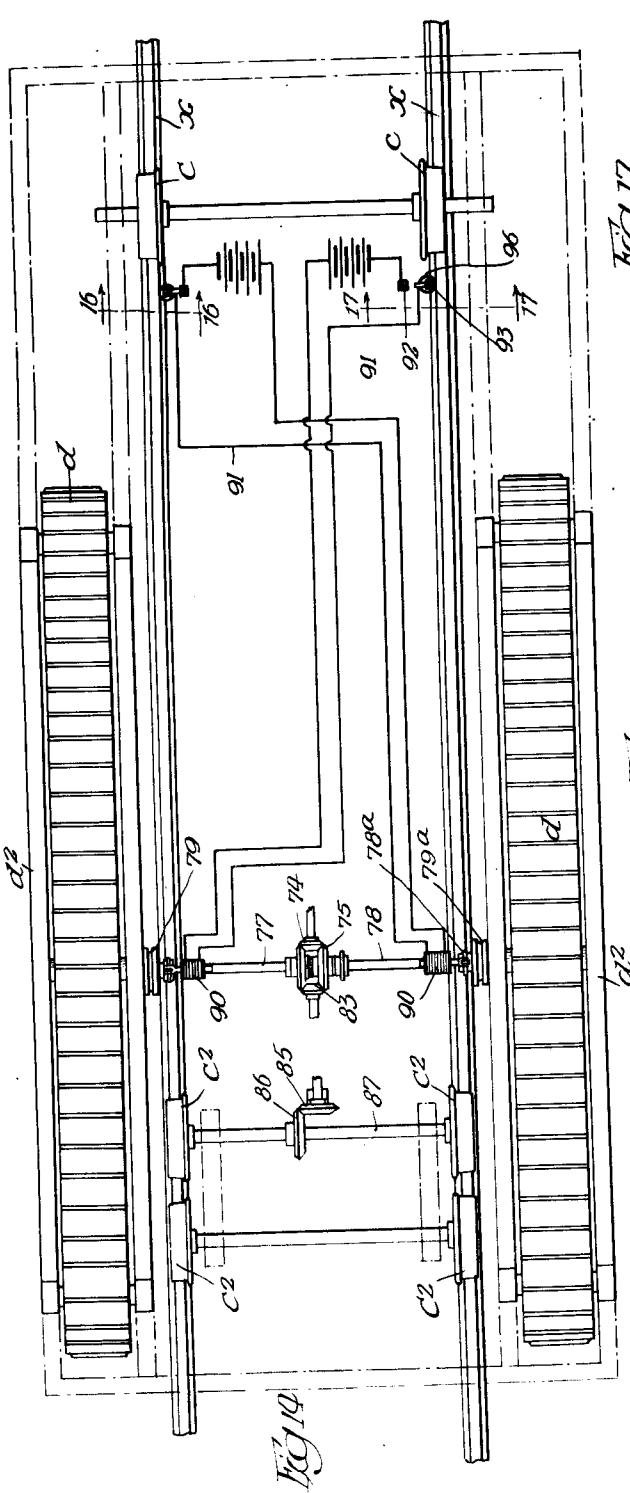


FIG. 14

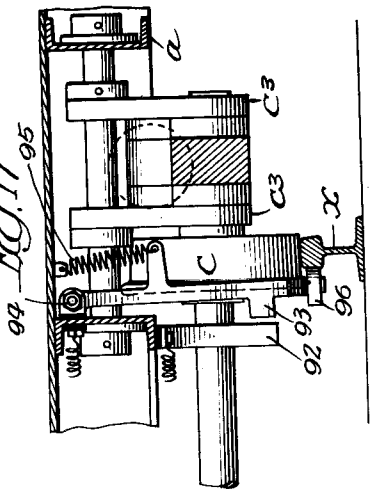


FIG. 17

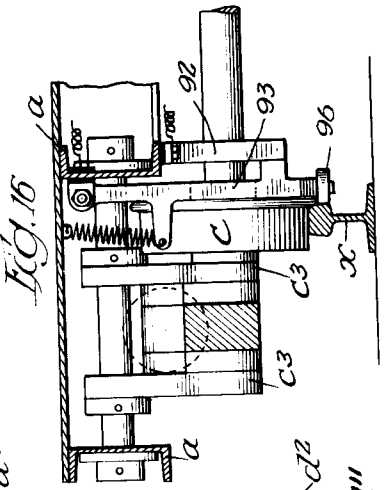


FIG. 16

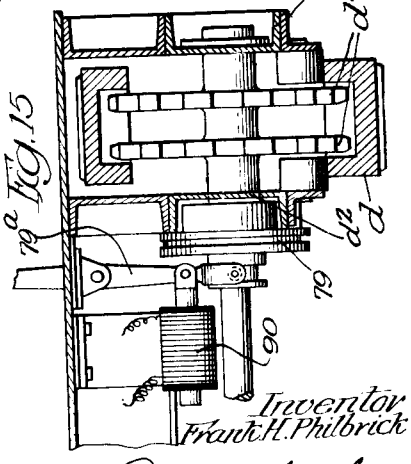


FIG. 15

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Patented Feb. 2, 1943 2,309,712

UNITED STATES PATENT OFFICE

2,309,712

APPARATUS FOR HANDLING BALLAST IN RAILWAY ROADBEDS

Frank H. Philbrick, Evanston, Ill.

Application March 22, 1940, Serial No. 325,349

7 Claims. (Cl. 37—104)

The invention relates to apparatus for handling ballast used in railway road beds.

One object of the invention is to provide a machine which is adapted to dig ballast from between the ties and rails to points beyond the ends of the ties, so that the ballast will become loosened, then convey the ballast to cleaning or screening apparatus for separating the dirt from the ballast, and then deliver the cleaned ballast back to the road bed.

Another object of the invention is to provide a machine of this class which is provided with endless chain traction elements for propelling the machine over the track during the digging and cleaning of the ballast with means for facilitating the removal of the machine to clear the track and permit trains to pass.

Another object of the invention is to provide a machine of this class with elevators and conveyors which can be folded over the truck for transportation of the machine on the rails of the track.

Another object of the invention is to provide a combined machine for digging the ballast from the cribs between the ties and replacing the ballast into the cribs after the ballast has been cleaned.

Other objects of the invention will appear from the detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a side elevation of a machine embodying the invention. Fig. 2 is a plan, the front portion of the machine being broken away. Fig. 3 is a rear elevation, one of the elevators being shown folded over the truck. Fig. 4 is a section on line 4—4 of Fig. 2, illustrating the caterpillar tread raised and the machine supported by the truck-wheels. Fig. 5 is a transverse section on line 5—5 of Fig. 2. Fig. 6 is a section on line 6—6 of Fig. 5. Fig. 7 is a section taken on line 7—7 of Fig. 2. Fig. 8 is a section taken on line 8—8 of Fig. 2. Fig. 9 is a section taken on line 9—9 of Fig. 2. Fig. 10 is a transverse section on line 10—10 of Fig. 1. Fig. 11 is a section on line 11—11 of Fig. 2. Fig. 12 is a plan of the traction chains, the rear traction, wheels and the driving mechanism for said chains and wheels. Fig. 13 is a vertical section on line 13—13 of Fig. 12. Fig. 14 is a diagrammatic plan illustrating the automatic means for controlling the drives for the chain-treads to keep the truck substantially aligned with the track-rails. Fig. 15 is a section taken on line 15—15 of Fig. 12. Fig. 16 is a section on line 16—16 of Fig. 14, showing one of the devices for controlling the chain-tread drives in its operative position. Fig. 17 is a section taken on line 17—17 of Fig. 14 illustrating said device in its inoperative position.

The invention is exemplified with a truck which comprises a frame a, built up of longitudinal and transverse beams, rigidly secured together to form a supporting structure and a platform a^1 on said frame. The truck is equipped with an internal combustion motor b and a variable speed transmission b^1 which may be of usual construction and controlled by a lever b^2. Motor b furnishes power for propelling the truck, operating the ballast-digging mechanism, driving the elevator-conveyors for the ballast, operating the cleaning apparatus, and driving the conveyors for delivering the cleaned ballast to the road-bed.

The truck is equipped with a pair of flanged front-wheels c and at each side with a pair of flanged rear wheels c^2 for travelling on the rails x of the track. The axles of each pair of wheels c^2 are journalled in side-frames c^1. For supporting the truck from the road-bed at the outer sides of the track-rails, and propelling the machine while digging and cleaning the ballast, the truck is equipped adjacent each of its sides with an endless chain or caterpillar tread d which is carried by front and rear sprockets d^1 which are rotatably supported in a frame d^2 which is fixed to the truck-frame a. The treads d are spaced apart to travel on the end ties or road-bed on the outer sides of the rails. For raising the treads d off the road-bed when the truck is to be propelled on the track-rails and for lowering the treads d when the machine is to be propelled for digging and handling the ballast, wheels c, c^2 are movably connected to frame a. The axle of the front carrying wheels c (Fig. 4) is connected to the truck-frame a by a pair of links c. The wheel-frames c^1 for the rear wheels c^2 are cross-connected by a shaft c^9 which is connected to the truck-frame a by a pair of links c^5 (Figs. 1 and 12). A pair of toggle-links c^6 (Fig. 4) between the axle of wheels c and the truck-frame a, is adapted to raise and lower the said wheels to raise and lower the front of the truck-frame a. A similar pair of toggle-links c^6 between shaft c^9 between side-frames c^1 which carry the axles of wheels c^2 is adapted to raise and lower the rear of frame a. Each pair of toggle-links c^6 is operable to raise and lower frame a by a fluid-

pressure cylinder c^7, which is pivoted to frame a and provided with a piston which has its stem c^8 pivoted to the connecting pivot between toggle-links c^6. Hydraulic, or other suitable fluid pressure is supplied to cylinders c^7 through suitable controlling mechanism (not shown) to simultaneously or separately control the operation of toggle-links c^6 for the front and rear wheels c, c^2. When the toggle-links c^6 are extended, as shown in Fig. 4, the truck-frame a will be raised a sufficient distance to lift the traction-chains d off the road-bed. When links c^6 are folded, the wheels c, c^2 will be raised and said chains will carry the truck-frame and its load so that treads of wheels c, c^2 will be lifted off the track-rails sufficiently to relieve them of the weight of the truck.

The traction-chains d may be run onto inclined planks x^1 and lifted above track-level (Fig. 4) and planks may be laid crosswise of, and over, the track rails so the treads can be turned to run transversely off the track. After the links c^6 are shifted into folded position to lower chain-treads onto the road-bed the flanges of wheels c, c^2 may partially lap the track-rails to assist in guiding the machine lengthwise of the track. By manipulating the driving-mechanism for the traction-chains hereinafter described, the entire machine can be swung to a transverse position and propelled off the track.

A plow e is supported from frame a at each side and adjacent the front of the machine. These plows are located to travel adjacent and beyond the ends of the ties and are provided to loosen the ballast and dirt in the road-bed in advance of the elevators for conveying them to the cleaning apparatus. Each plow e is supported by a bracket e^1 which is pivoted to frame a and is yieldingly held in lowered position by a link e^3 which comprises a compression-spring e^2 to permit the plow to yield when obstructions are encountered. Each link e^3 is pivotally connected to a frame e^4 which is vertically slidable on vertical bars e^5. When the frame e^4 is lowered and secured in locked position by screws e^6, arms e^1 will be lowered to cause the plow carried thereby to penetrate the road-bed to the desired level. When the plows are not in use or the machine is being transported, frame e^4 can be raised to swing arm e^1 backwardly and upwardly and support the plows above and clear of the road-bed.

Mechanism for displacing the ballast in the cribs between the ties transversely to the outer sides of the track is mounted on the truck frame a rearwardly of the plows e. This mechanism comprises a series of transversely working tools f (Fig. 5) for digging into the ballast in the cribs and forcing some of the ballast transversely to one side of the track and where the material has been loosened by plow e at that side of the track, and an oppositely working series of tools f^1 for displacing the remainder of the ballast in the cribs to the opposite side of the track. These tools are pivoted to swing transversely of the track and mounted on a vertically reciprocable cross-head f^2, which raises and lowers the tools to produce their swinging movements and is guided in a frame f^{10}. The operation and construction of these tools and cross-heads are the same as that set forth in my Patent No. 2,062,594 to which reference may be had for a more detailed description thereof. The mechanism for operating the cross-head f^2 to operate the digging tools f, f^1 comprises suitable gearing f^5 which is driven from a shaft f^3 and is controlled by a clutch f^4 and lever f^6. The construction and operation of this mechanism are set forth in said patent. This exemplifies digging mechanism for displacing the ballast in the cribs between the ties transversely to the sides of the track beyond the ties and into the furrows cut by the plows e.

The machine comprises mechanism for elevating and conveying the ballast which has been displaced to the sides of the track beyond the ties to a suitable cleaning or separating apparatus, such as a vibratory sieve g before it is returned to the cribs between the ties and behind the machine. This mechanism comprises an endless chain-and-bucket elevator h at each side of the machine. Each elevator h comprises a suitable frame 18 which is fixed to a sleeve 19 which is pivotally supported so said frame can swing vertically and longitudinally of the track, a set of three endless chains 20, two series of relatively staggered buckets or scoops 21 carried by the chains, and sprockets 22 for chains 20 at both ends of frame 18. These buckets scoop up and elevate the ballast which has been displaced from the cribs beyond the ends of the ties and any dirt which may be mixed with it and the material into discharge spouts 23 which are supported on the upper ends of the elevator-frames 18. The buckets clear a furrow at each edge of the ties as the machine is propelled along the track for the deposit of the cleaned ballast. Each spout 23 discharges material into a chute 24 which conveys it rearwardly and inwardly to the screen g located at the rear of the truck. This screen (Fig. 11) is supported by a pair of arms g^1 and a roller g^2 and is vibrated by cams g^3 on shafts g^4 which are driven from motor b by mechanism hereinafter set forth. The dirt and fine material passes through the screen g into a stationary hopper g^5. From hopper g^5 the screenings pass onto a transverse endless conveyor-belt g^6 for delivery to the right-of-way outwardly of the track-bed. The ballast which has been cleaned and from which the dirt has been separated is discharged from the rear end of screen g which is inclined downwardly and rearwardly into a downwardly and rearwardly inclined chute g^7 which is adapted to discharge the cleaned ballast into the cribs from which the ballast has been displaced by tools f, f^1. Chute g is pivoted to swing laterally so that the ballast can be distributed into all portions of the cribs between the rails and the projecting portions of the ties. A vertical pivot-pin g^8 on a bail g^{10} supports chute g^7 and is supported in a bracket g^9 which is fixedly supported on the truck-frame a. Chute g^7 is pivoted at g^{11} to bail g^{10} so it can be folded upwardly when it is not in use.

Endless belt g^6 is carried by rolls g^{10} which are supported in a frame g^{11}. Frame g^{11} is removably supported on the platform a^1 of the frame a so it can discharge the screenings at either side by brackets g^{12} and links g^{13} which are adapted to be connected to lugs g^{14} on frame a. When it is desired to discharge the screenings from belt g^6 at the opposite side of the machine, the frame g^{11} may be turned around horizontally after uncoupling links g^{13} from lugs g^{14} and unbolting brackets g^{12} from the frame a and then attaching said links to the lugs g^{14} on the opposite side and securing brackets g^{12} in reversed position on frame a.

Elevators 18 are fixedly held by chains 28 and 29 at the desired angles for operation and to

cause the buckets to penetrate the road-bed the desired depth. These elevators are pivotally supported so they can swing into horizontal position and be folded transversely to overlie the truck-frame when the machine is being transported on the track. The sleeves 19 which are attached to the frames 18 (Fig. 7) are pivotally supported to swing vertically on shafts 57 which are journaled in gear-housings 31 which are each provided with an integral hollow trunnion 32 (Fig. 9) which passes through, and is journaled in, a bracket 30 which is fixed on frame *a*. A clamp 36 is adapted to secure a sleeve-extension 31ª on gear-housing 31 in a saddle 36ª to secure the housing 31 to support shaft 57 and sleeve 19 when the elevator is in its operative position. Each housing 31 is adapted to be swung transversely of the track on its trunnion 32 by a worm-gear 33 fixed to said trunnion and a worm 34 which is operable by a handwheel 35. When the clamps 36 are removed, the sleeves 19 and the elevators can be swung upwardly and inwardly to fold the elevators over the truck and into position illustrated at the left-hand side of Fig. 3. The elevator frames 18 are pivotally movable longitudinally of the truck on shafts 57 to a horizontal position when chains 28, 29 are uncoupled from said frames or from frame *a*, for folding the elevators over the truck-frame. This exemplifies endless chain-and-bucket elevators which are adapted to convey the material from the roadbed outside of the ties to the cleaning apparatus and which are readily foldable over the truck-frame during idle transportation of the machine on the railroad track.

The driving mechanism for the several elements of the machine comprises a shaft 37 (Fig. 4) which is driven by the variable speed transmission b^1; a pair of bevelled gears 38 and 39 loosely mounted on shaft 37 and adapted to be alternately driven by and coupled to said shaft by a double-faced clutch collar 40 which is splined to said shaft and controlled by a hand-lever 41; a gear 42 meshing with both gears 38, 39 and fixed to a vertical shaft 43 which is journaled in a fixed bracket 43ª; a bevelled gear 44 fixed to the lower end of shaft 43; a bevelled gear 45 meshing with gear 44; and a horizontal shaft 46 to which gear 45 is fixed.

The shaft f^3 for driving the digging mechanism through gearing f^5 under control of clutch f^4 is driven by a universal shaft 49 which is connected to and driven by shaft 46.

Each elevator *h* may be driven from shaft 37 by a mechanism comprising a clutch 48 on said shaft and controlled by a hand-lever 49 and adapted to be coupled to said shaft; a sprocket-wheel 50 driven by clutch 48; a sprocket-chain 51 driven by the sprocket 50; a sprocket-wheel 52 on a shaft 53 which is journaled in a bracket 54 and extends through the trunnion 32 of a housing 31 (Fig. 9); a bevelled pinion 55 fixed to shaft 53; a bevelled gear 56 meshing with pinion 55 and fixed to shaft 57 (Fig. 7) which is journaled in and extends through sleeve 19; a sprocket 58 fixed to the outer end of shaft 57; a sprocket-chain 59 driven by sprocket 58 and a sprocket 60 driven by chain 59 and fixed to the shaft 65 of the sprockets 22 at the lower end of the elevator *h*.

Either of the shafts g^4 may be connected to drive the endless belt conveyor g^6 through a sprocket 69, one of which is fixed to each of said shafts, a sprocket-chain 70 driven by sprocket 69, and a sprocket 71 on one of the belt-rolls g^{10} and driven by chain 70. A shaft g^4 is provided at each side of engine *b* for driving the endless belt g^6 when it is mounted to discharge the screenings to either side of the track. Each shaft g^4 carries a cam g^3 for vibrating the screen so that when either of said shafts is driven the screen will be vibrated. The chain 70 may be connected to either of the sprockets 69 to drive the roll g^{10} at the projecting end of the conveyor g^6, and in accordance with the setting of said conveyor. The mechanism for alternately driving either of the shafts g^4 and cams g^3 comprises: a gear 62 fixed on shaft 37 (Fig. 2); a gear 63 meshing with gear 62; a sprocket-wheel 64 fixed to gear 63 and journaled on one of the arms of a bracket 72; a sprocket-chain 65 driven by sprocket 64; and a sprocket 66 fixed to shaft g^4 and driven by chain 65. Sprocket-wheel 64 and gear 63 are shiftable from one arm of bracket 72 to the other so that chain 65 may be connected to either of the sprockets 66 on the shafts g^4, respectively, to drive conveyor-belt g^6 when it is in either of its positions.

The mechanism for driving the chain-treads *d* to propel the machine during its operation for digging and cleaning the ballast, or when the machine is to be removed from the track, is driven from shaft 46 and comprises: a bevelled gear 74 fixed to the rear end of shaft 46; a pair of bevelled gears 75, 76, (Figs. 8 and 12) meshing with gear 74; separably rotatable cross-shafts 77, 78, manual clutches 79, 79ª on the shafts 77, 78, respectively, and which are separately shiftable by hand-levers 78ª. Each clutch is connected to drive the central drive sprocket d^{11} of one of the chain-treads *d*; a clutch 81 which is adapted to alternately couple shafts 77 and 78 together to drive both shafts in the same direction from gear 76 while gear 75 is idle; and a clutch 80 which is adapted to couple gear 75 to shaft 78 to drive the latter shaft in the opposite direction to shaft 78. Clutches 80 and 81 are simultaneously operable from a single lever 82 so they will be simultaneously shifted to either drive both shafts 77, 78 in the same direction from gear 76 and allow gear 75 to idle or to permit rotation of said shafts in opposite directions when clutch 81 is uncoupled from shaft 78 and clutch 80 couples gear 75 to shaft 78. This gearing makes it possible to drive the chain-treads in the same direction for propelling the machine. By means of clutches 79 either of the chain-treads may be driven independently of the other for turning the machine.

The mechanism for propelling the machine on the rails of the track comprises a gear 83 which meshes with gears 75, 76; a universal shaft 84 driven by gear 83; a bevel-gear 85 at the rear of shaft 84; and a gear 86 meshing with gear 85 and fixed to the axle 87 of the front pair of traction-wheels c^2. When wheels c^2 are being driven, clutches 79 are uncoupled to idle the chain-treads *d*.

The machine is equipped with means for automatically uncoupling either of the clutches 79, 79ª which are adapted to drive the chain-treads *d* in the event there is any tendency from unequal resistance, to swerve the front end of the truck laterally to either side of the track during the operation of the digging and elevating mechanisms while the machine is being propelled by the chain-treads *d*. For this purpose, the armature of an electromagnet 90 is connected to shift the hand-lever 78ª for clutch 79 and another magnet 90 is similarly connected to

the lever 78ª for clutch 79ª (Figs. 14 and 15). When either of these magnets is energized it will shift the lever to which it is connected and uncouple one of the clutches 79, 79ª and discontinue the driving of the chain-tread *d* at one side of the truck according to the direction in which the machine is swerved. Each of the magnets 90 is included in a suitable electric circuit 91 and each circuit is controlled by a switch which comprises a contact 92 which is fixed to and moves laterally with frame *a*, and a lever 93. Each lever 93 is pivotally supported at 94 on the frame *a*, is normally held disconnected from contact 92 by a spring 95, and is controlled by the track-rails. Each switch-lever 93 is provided at its lower end with a roller 96 which is adapted to ride on the inner side of the head of one of the rails *x*. The magnet 90 for the clutch 78 for driving the chain-tread *d* at the right side, is connected to the switch 92, 93 at the left side of the truck and the magnet 90 for controlling the clutch 79 which drives the left-hand chain-tread *d* is controlled by a switch 92, 93 at the right side of the truck. These switches are disposed adjacent the front of the truck. If the front of the machine, from any cause, is deflected to the left, the transverse movement of frame *a* will shift contact 92 into engagement with the lower end of the switch-lever 93 on the left side of the truck, which is held against lateral movement by its roller 96 and the left hand track-rail. This will close the circuit through the magnet 90 at the right side of the machine which will shift lever 78ª to uncouple clutch 78 and disconnect the right-hand chain-tread *d* from drive-shaft 78. The left-hand chain-tread will then continue to be driven alone to swerve the front of the truck toward the right until the chain-treads have been brought into substantial alignment with the rails, at which time the switch-lever 93 at the left-side of the machine will be disengaged from its contact 92 to interrupt the circuit through the magnet 90 for the clutch 78 at the right-hand side of the machine. The latter clutch will then be again coupled to drive the right-hand chain-tread *b* so that the machine will be propelled from both of the chain-treads. If the machine is swerved to the right, from any cause, the switch-lever 93 at the right-side of the machine will engage its associated contact 92, and close the circuit for the magnet 90 at the left-side of the truck and is connected to clutch 79. This will disconnect clutch 79 from the drive-shaft 77 so that the left-hand chain-tread will idle and the right-hand chain-tread will be driven alone until the truck is shifted back substantially into longitudinal alignment with the track-rails and then the circuit through magnet 90 for clutch 79 will be interrupted and power will again be applied to the left-hand chain-tread. This exemplifies means for automatically controlling the chain-treads to operate independently of one another when the machine travels out of alignment with the track-rails during the propulsion of the machine by the chain-treads.

The operation of the machine will be as follows:

In operation, the plows *e* will be lowered and the elevators *h* will be secured in operative position by chains 28, 29, as illustrated in Fig. 1 of the drawings. The truck-frame will be lowered to bring the chain-treads into position for traction with the road-bed at the outer sides of the rail to slowly propel the machine along the track. The plows *e* will cut or loosen the material at the outer ends of the ties. The digging mechanism will displace the ballast from the cribs beyond the outer ends of the ties where the road-bed has been dug up by the plows. The elevators following the digging mechanism will elevate the ballast and any dirt with it and cut a furrow at each end of the ties. This material will be delivered onto the vibrator screen *g* where the ballast will be cleaned and the dirt separated from the material. The ballast will be discharged through chute g^7 which will be manually turned laterally to return the cleaned ballast into the cribs. The screenings will be delivered onto the conveyor g^6 and discharged at one side of the track beyond the ties and ballasted portion of the road-bed.

In advancing the machine while it is operating to displace the ballast and convey it to the cleaning apparatus, substantially the entire weight of the machine is carried by the chain-treads, thus providing effective traction for propelling the machine. At that time the weight may be taken off the wheels *c*, c^2, leaving their flanges effective to guide the machine along the track.

When the machine is to be transported on the rails, the frame *a* will be raised and wheels *c*, c^2 will be engaged with the rails to lift the chain-treads off the road-bed and the elevators will be folded over the truck platform. By manipulation of the driving mechanism for wheels c^2 the operator may control the travel of the machine over the track. When the machine is to be removed from the track the frame *a* will be raised to lift the chain-tread *d* above track-level sufficiently to permit the chain-treads to run onto planking laid on the rails and on which the treads can travel transversely across the track, or the treads while lowered can be run onto planking placed in front of them.

The invention exemplifies a machine which is adapted to displace the ballast from the cribbing and to convey the displaced ballast to apparatus for cleaning the ballast and then discharging the clean ballast back into the cribs as the machine is advanced over the road-bed.

The invention also exemplifies a machine of this type which can be readily removed from the track when it is necessary to clear the track.

The invention also exemplifies a ballast-handling machine which includes elevators which can be readily folded over the truck when the machine is being transported over the track.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

What I regard as new and desire to claim by Letters Patent is:

1. In a machine of the class described, the combination of a wheeled truck, power-driven mechanism for displacing the ballast transversely to the sides of the track, means for conveying the ballast, comprising endless elevators, mechanism for driving the elevators comprising transverse shafts around which the elevators can swing vertically and longitudinally of the truck, and pivotal supports for the shafts whereby the elevators may be folded transversely so as to overlie the truck.

2. In a machine of the class described, the combination of a truck-frame, chain-treads adapted to travel on the road-bed and at the

sides of the rails, elevating mechanism mounted on the frame, mechanism for driving the chain-treads, and means for automatically controlling the driving mechanism to drive the chain-treads so the machine will travel in substantially parallel relation with the track-rails.

3. In a machine of the class described, the combination of a truck-frame, chain-treads adapted to travel on the road-bed and at the sides of the rails, digging mechanism mounted on the frame, mechanism for driving the chain-treads, and means for automatically controlling the driving mechanism to drive the chain-treads so the machine will travel in substantially parallel relation with the track-rails.

4. In a machine of the class described, the combination of a truck-frame provided with wheels for running on rails, digging mechanism for displacing the ballast, power-driven endless chain-treads for propelling the machine, mounted to move vertically with the frame and adapted to travel on the road-bed at the sides of the rails, toggle linkages between the frame and the wheels and means for operating the toggle links for raising and lowering the chain-treads and the truck-frame.

5. In a machine of the class described, the combination with a wheeled truck, power-driven mechanism for displacing the ballast transversely to the sides of the track, endless elevators for the ballast, operative at the sides of the track, and pivotally supported adjacent their longitudinal centers to swing longitudinally of the truck and to swing transversely so they may be folded over, and to extend longitudinally of, the truck, and mechanism on the truck for driving the elevators.

6. In a machine of the class described, the combination with a wheeled truck, power-driven mechanism for displacing the ballast transversely to the sides of the track, endless elevators for the ballast, operative at the sides of the track, shafts adjacent the longitudinal centers of the elevators for permitting them to swing longitudinally of the truck, said shafts being pivoted to swing transversely so the elevators may be folded over, and to extend longitudinally of, the truck, mechanism for driving the elevators from said shafts and mechanism on the truck for driving the elevators.

7. In a machine of the class described, the combination of a truck-frame provided with wheels adapted to run on the rails of a track, power means for driving the wheels to propel the frame along the track, digging mechanism for displacing ballast between the rails beyond the outer sides of the rails, endless conveyors supported on and for vertical movement with the frame and adapted to travel in vertical planes substantially parallel to the rails for elevating the ballast which has been displaced to the outer sides of the rails, power driven endless chain-treads mounted on the truck frame, adapted to engage the road-bed between the elevators and the rails, and extending longitudinally of the rails for propelling the frame along the track while the elevators and the digging mechanism are operative, and means for raising and lowering the wheels for selective propulsion of the frame along the track by the wheels or the chain-treads.

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