Aug. 11, 1925.

1,548,964

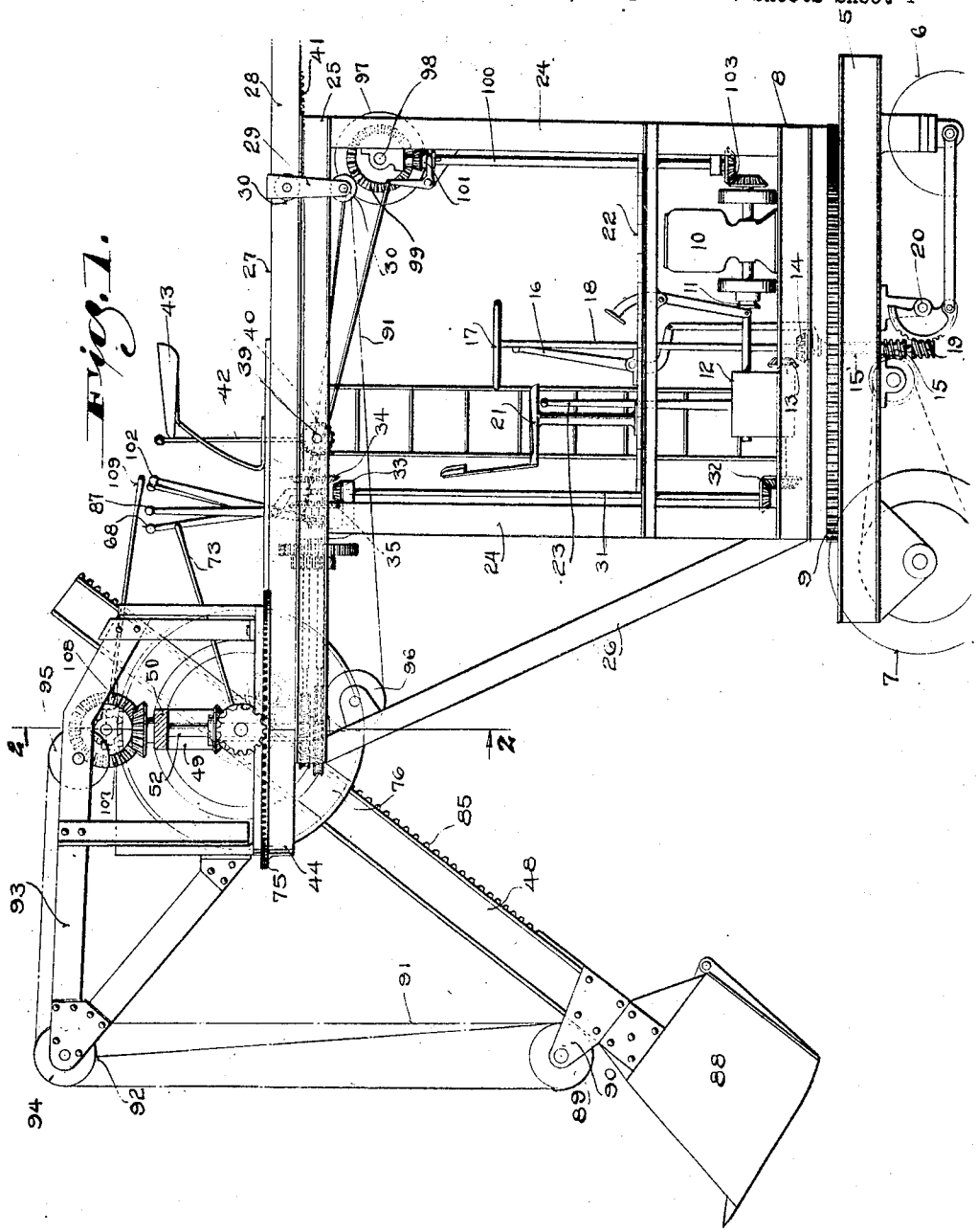
H. F. VOLLMER

COMBINED EXCAVATOR AND CAR UNLOADER

Filed Sept. 12, 1921

2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

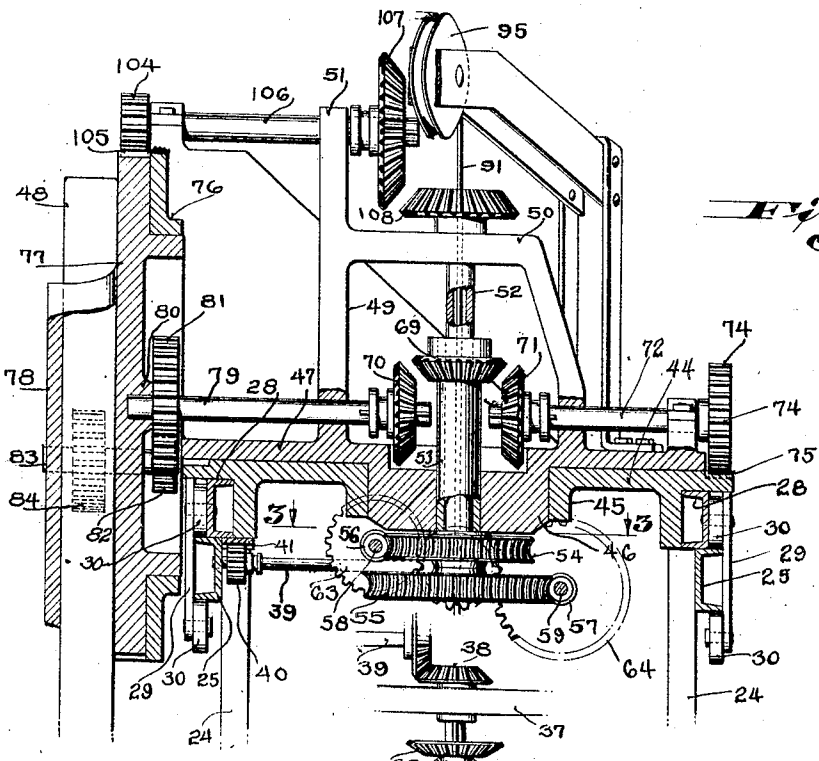


Fig. 3.

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UNITED STATES PATENT OFFICE.

HENRY F. VOLLMER, OF MILWAUKEE, WISCONSIN.

COMBINED EXCAVATOR AND CAR UNLOADER.

Application filed September 12, 1921. Serial No. 500,047.

To all whom it may concern:

Be it known that I, HENRY F. VOLLMER, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Combined Excavators and Car Unloaders, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to certain new and useful improvements in excavators and has for one of its objects to provide what may be termed a combined excavator and car unloader.

In car unloading devices it is essential that the unloading machine be capable of reaching into all the corners of the car and it is, therefore, another object of my invention to provide a combined excavator and car unloader in which the material handling bucket is carried by a boom mounted on a super-structure which protrudes beyond the main frame to enable the bucket to be projected into the corners of the car, or the like, being unloaded.

It is a further object of this invention to provide a machine of the class described in which the bucket carrying boom is permitted substantially a universal movement in order to permit the economical and efficient operation of the machine.

It is a still further object of this invention to provide a machine of the class described designed for operation with any suitable type of motor power and one which may be commercially produced.

A still further object of this invention is to provide a machine of the class described in which all of the controls are centralized whereby but one operator can manipulate the machine in lieu of the several operators as required by the excavating machines now in general use.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a side view of a combined car loader and excavator employing my invention;

Figure 2 is an enlarged fragmentary view, part in section and part in elevation taken through the boom carrying mechanism on the plane of line 2—2 of Figure 1, and

Figure 3 is a view part in section and part in elevation taken on the plane of line 3—3 of Fig. 2 and illustrating the manner of drivingly connecting the boom actuating devices.

Referring now more particularly to the accompanying drawings in which like numerals designate like parts throughout the several views:

The numeral 5 designates the frame of a portable truck member mounted on front steering wheels 6 and rear drive wheels 7, a main frame 8 being rotatably mounted on the truck and provided with a large gear 9 with which suitable power means connect for pivoting the same.

Mounted on the main frame is a power plant 10 which may be of any desired type and which is connected through a clutch 11 with transmission 12. The transmission is connected through gears 13 and 14 with the truck drive worm 15, the gear 14 being slidable by a controlling handle 16 to connect and disconnect the wheel 7 with the power plant. The truck is steered by a hand wheel 17, the shaft 18 of which is freely rotatably mounted in the truck drive shaft 15′ and has a worm 19 on the lower end thereof in connection with suitable steering mechanism 20, which may be of any desired design. The lever 16 and wheel 17 are positioned adjacent a seat 21 mounted on a main frame carried platform 22 and a transmission gear shift lever 23 is also positioned adjacent the seat for the use of the operator in transporting the excavator from place to place.

Connected adjacent the corner beams 24 of the main frame are two longitudinal I-beams 25, the outer ends of which project beyond the rear end of the main frame and are braced by diagonal beams 26. Slidably mounted longitudinally on the beams 25 is a supplemental or super-frame 27 having two side I-beams 28 slidably engaging the upper faces of the beams 25. Se-

cured to each beam 28 is a bracket 29 carrying two spaced rollers 30 which engage the opposite faces of the adjacent beam 25 to prevent disengagement of the rear end of the supplemental frame when the forward end thereof is projected beyond the extended end of the main frame.

The supplemental frame is longitudinally moved on the main frame by power derived from the plant 10 through a vertical shaft 31 journaled in the main frame and having its lower end connected with the power take off shaft of the transmission 12 by gears 32 and carrying at its upper end a beveled gear 33 adapted to have gears 34 and 35 selectively engaged therewith. Gears 34 and 35 are slidably splined upon a counter shaft 36 journaled in bearings carried by a transverse beams 37 which connect beams 28, one end of said shaft carrying a beveled gear 38 in geared connection with a shaft 39 having a pinion gear 40 mounted on its outer end and meshing with a gear rack 41 carried by the adjacent beam 28. The gear 40 is slidably splined on its shaft 39 and is engageable with rack 41 by a lever 42 positioned adjacent a seat 43 made fast to a platform carried by the main frame. Thus it will be seen that when either of the gears 34 or 35 are engaged with gear 33, the supplemental frame will be moved when lever 42 is shifted to mesh gear 40 with rack 41.

Fixed between the outer ends of beams 28 is a mounting 44 having a central bearing portion 45 in which is journaled the centrally enlarged part 46 of a rotatable base member 47, said base member carrying the excavator boom 48 to be later described. The base mamber 47 has a central standard or bracket member 49 provided with a horizontal support 50 and a vertical support 51, the support 50 having a bore in axial alignment with a bore within the base member part 46 and in which is journaled the upper end of a tubular shaft 52, the lower portion of shaft 52 being freely rotatably mounted within a larger tubular shaft 53 journaled in the bore of base member part 46. Fixed to the lower end of shaft 53 is a worm wheel 54 and fixed to the end of shaft 52 projected beyond the lower end of the shaft 53 is a worm wheel 55, said wheels having worm gears 56 and 57, respectively, engaged therewith, and carried by shafts 58 and 59, respectively, having their outer ends journaled in parts 60 carried by the supplemental frame and their inner ends slidably but non-rotatably telescoped within tubular shafts 61 and 62, respectively carried by the main frame. Shafts 61 and 62 have drive gears 63 and 64, respectively mounted thereon for engagement with a common gear 65 slidably splined on the adjacent end of shaft 36, gear 65 having a collar 66 fixed thereto with which an operating lever 68 is engaged.

Mounted on the upper end of shaft 53 is a beveled pinion gear 69 adapted to be selectively engaged by pinion gears 70 and 71, gear 71 being slidably splined on the inner end of a shaft 72 journaled in bearings carried by the base member and is movable to engage with gear 69 by a lever 73. The outer end of shaft 72 has a gear wheel 74 fixed thereto which meshes with a circular gear rack 75 formed on the periphery of support 44 to rotate base member 47 when gears 69 and 71 are meshed.

Carried by one side of the base member 47 is an enlarged bracket or bearing member 76 in which is journaled a boom carrying member 77 which has a slide bearing 78 intersecting the axis thereof to longitudinally slidably mount the boom 48. A shaft 79 is journaled in the base member 78 and has a gear 81 mounted on the outer end thereof and meshed with a gear 82 mounted on a counter shaft 83 and carrying a gear wheel 84 which projects into the interior of bearing slide 78 to mesh with the teeth of a gear rack 85 carried by boom 48. The gear 70 is slidably splined on the inner end shaft 79 and is movable by a lever similar to lever 73 (not shown) to mesh with gear 69 and move the boom 48 longitudinally, the direction in which the boom 48 is moved and the base member 47 is rotated being controlled by gears 34 and 35. The gears 34 and 35 have a common collar 86 with which a lever 87 is engaged for shifting the same.

The boom 48 carries a bucket 88 of any desired construction on the outer end thereof and has a part of pulleys 89 journaled in a bracket 90 around which trains a cable 91 having one end 92 secured to a fixed boom or bracket construction 93 carried by the base member 47, and in the outer end of which is journaled a part of pulleys 94, the cable 91 passing downwardly from its fixed end 92 around one pulley 89, around one pulley 94, then downwardly and around the other pulley 89 and thence up over the other pulley 94, thence rearwardly over a pulley 95, thence downwardly through tubular shaft 52, around a pulley 96 carried by the diagonal beams 26, and thence rearwardly and having its other end made fast to a drum 97. The drum 97 is mounted on a shaft 98 journaled in the main frame and having a gear wheel 99 fixed thereto and adapted to be operatively connected with a shaft 100 by a sliding gear 101 through the medium of a hand lever 102. Shaft 100 is connected with the drive shaft of the power plant 10 as at 103.

The boom carrying member 77 is rotated in its bearing 76 either by winding the cable 91 on its drum or else by a gear 104 meshing with gear teeth 105 on the periphery of

member 77, which gear 104 is carried by a shaft 106 having a gear 107 slidably splined on the inner end thereof to mesh with a gear 108 carried by the upper end of shaft 52. Gear 107 is moved to and from engagement with gear 108 by a lever 109.

From the foregoing description taken in connection with the accompanying drawings it will be readily apparent that I provide an excavator in which all the controls are so arranged and centralized as to require but a single operator and that the boom may be swung in all directions and be further permitted to swing beneath its carrying frame to permit its efficient use in unloading freight cars, in that the bucket 88 may be engaged in all the corners thereof to thoroughly remove materials therefrom.

What I claim as my invention is:

1. In an excavator, a main frame a supplemental frame mounted thereon, means operable to project the outer end portion of the supplemental frame beyond the main frame, and a substantially universally swingingly mounted bucket carrying boom mounted on the outer end portion of the supplemental frame.

2. In an excavator, a supporting truck, a main frame pivotally mounted on said truck, a supplemental frame slidably mounted on the main frame, an excavator member carrying boom mounted on the supplemental frame, means for pivoting the main frame, means for sliding said supplemental frame on the main frame, and means for substantially universally swinging said boom with respect to the supplemental frame.

3. In an excavator, a supporting frame, a base longitudinally slidably mounted thereon and arranged for rotation on a vertical axis, a boom carrying member mounted on the base and arranged for rotation on a horizontal axis, a boom longitudinally slidably mounted in said boom carrying member, means for rotating the base, means for rotating the boom carrying member, and means for sliding the boom in said boom carrying member.

4. In an excavator, a main frame, a slidable frame mounted thereon, a base mounted on the slidable frame and arranged for rotation on a vertical axis, a boom carrying member mounted on the base for rotation on a horizontal axis, and a boom slidably mounted in said boom carrying member.

5. In an excavator, a main frame, a slidable frame mounted thereon, a base mounted on the slidable frame and arranged for rotation on a vertical axis, a boom carrying member mounted on the base for rotation on a horizontal axis, a boom slidably mounted in said boom carrying member, and drive means mounted on the main frame and connected with the base, boom carrying member and boom for actuating the same.

6. In an excavator, a supporting frame, a turn-table mounted on said frame for rotation about a vertical axis, a boom carrying member carried by said turn-table and mounted for rotation on a horizontal axis substantially intersecting the axis of the turn-table, and an excavator carrying boom member longitudinally slidably mounted in the boom carrying member.

7. In an excavator of the character described, a supporting truck, a supporting frame mounted on the truck for rotation about a vertical axis, a supplemental frame slidably mounted on the supporting frame and adapted to have its outer end projected beyond the supporting frame, a base mounted on the upper end portion of the supplemental frame and arranged for rotation on a vertical axis, a boom carrying member mounted on the base and arranged for rotation on a horizontal axis, and a boom longitudinally slidably mounted in the boom carrying member.

In testimony whereof I affix my signature.

HENRY F. VOLLMER.