June 7, 1949. L. R. RUSSELL 2,472,726

EXCAVATING AND LOAD HANDLING MACHINE

Filed Nov. 19, 1945 2 Sheets-Sheet 1

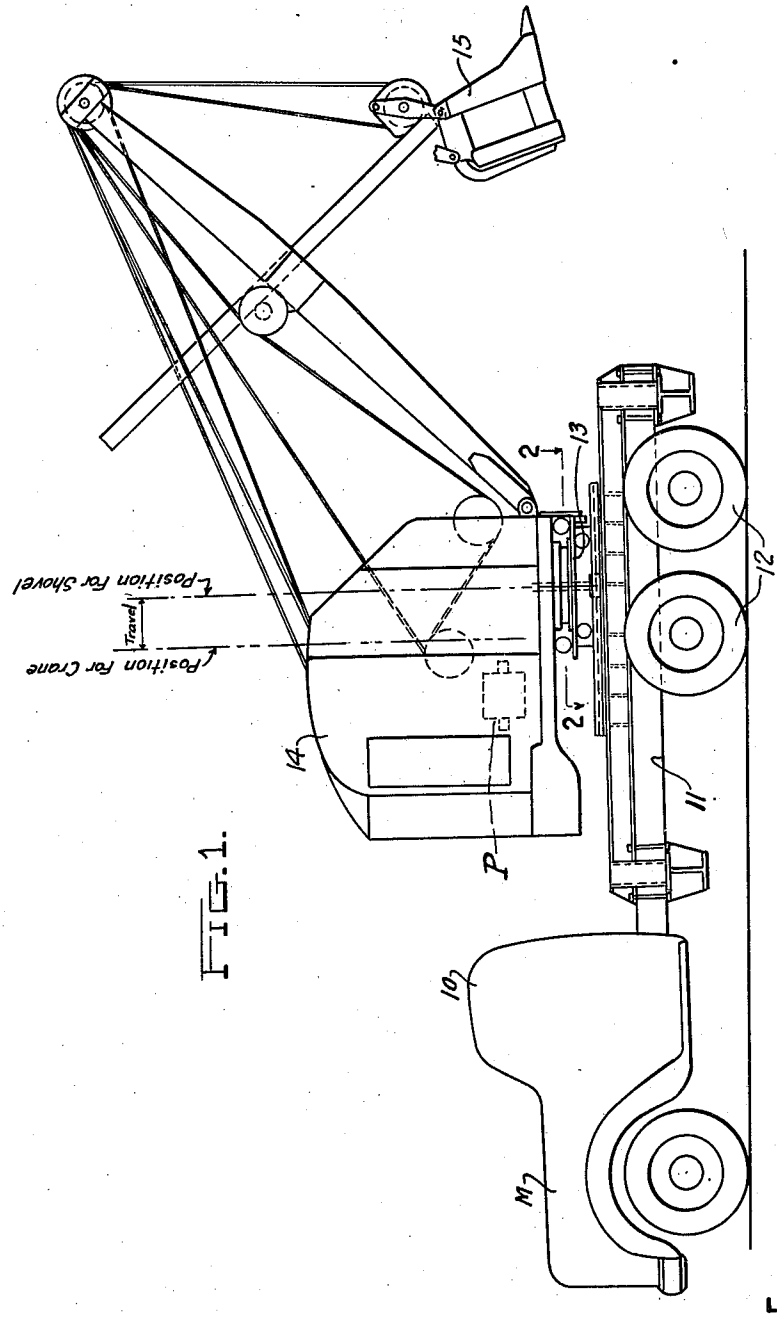


FIG. 1.

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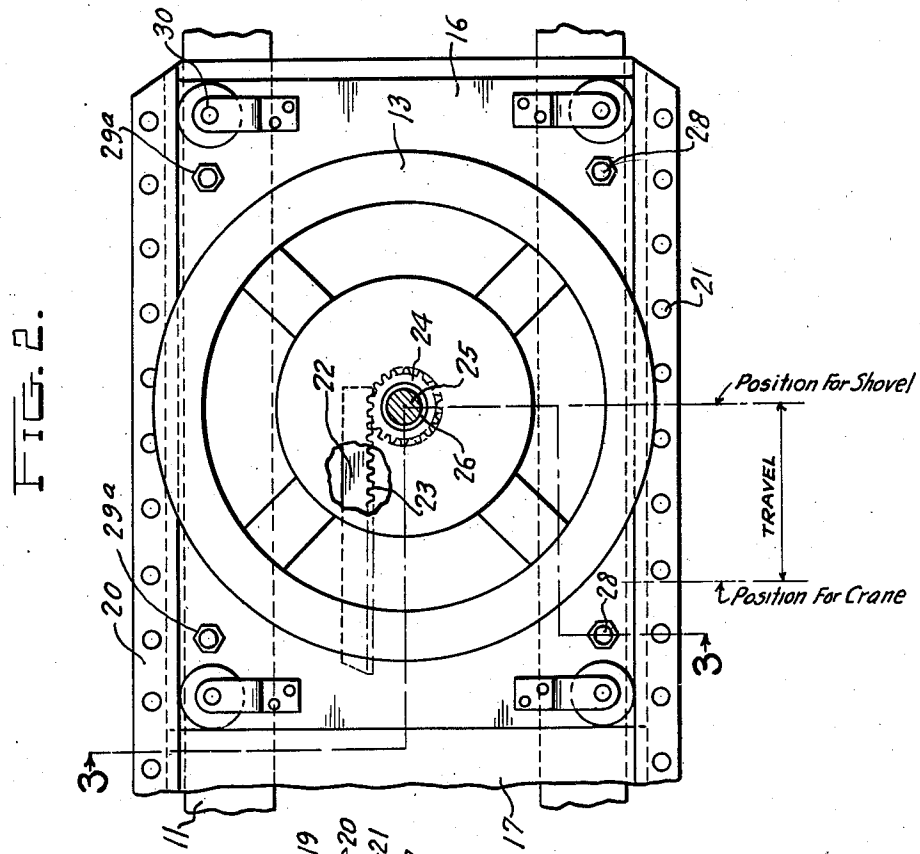


FIG. 2.

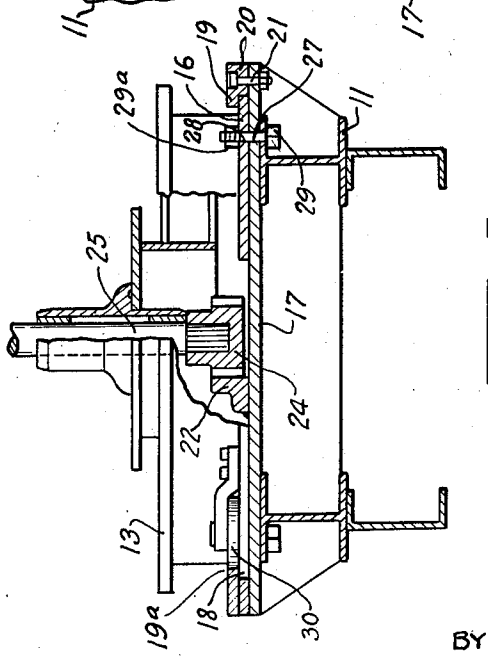


FIG. 3.

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EXCAVATING AND LOAD HANDLING MACHINE

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Application November 19, 1945, Serial No. 629,461

10 Claims. (Cl. 212—28)

1

This invention relates to excavating and load handling machines having a vehicular chassis and a rotatable superstructure mounted thereon, and more particularly to an improved mounting for said superstructure.

The usefulness of machines of this type can be greatly increased with added stability and working range. Therefore, when machines of this type are used for load handling, it is desirable to improve the stability by moving the center of rotation of the crane forward of the center of the vehicle chassis. However, when machines of this type are used as an excavator, it is desirable that the center of rotation of the shovel be moved nearer the rear of the vehicle chassis where greater working range is available.

An object of this invention is to produce an interchangeable load handling and excavating machine of the type described, in which the rotatable superstructure may be shifted longitudinally in relation to the supporting chassis for more efficient use and safer operation.

Another object of this invention is to produce an excavating and load handling machine of the type described having an improved superstructure mounting.

Another object of this invention is to produce an improved mounting for load handling and excavating machines of the type described, in which anti-friction means are used to guide the longitudinal movement of the superstructure relative to the vehicular chassis.

Another object of this invention is to produce a power operated load handling and excavating machine of the type described, in which available power means are adapted to effect the longitudinal movement of the superstructure relative to the chassis.

Another object of this invention is to produce interconnecting spur pinion and rack bar means operable by available power to effect the desired longitudinal adjustment.

Another object is to produce improved means for locking the adjusted superstructure in the desired longitudinal position relative to the chassis.

Other objects of this invention will appear in the following description and claims, and for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawings in which

Figure 1 is a side elevation of the machine comprising the invention, showing the rotatable superstructure in the rearwardly position for use as an excavator;

2

Figure 2 is a detailed view taken along the line 2—2 of Figure 1, showing the elements which comprise the invention; and

Figure 3 is a sectional view taken along the line 3—3 of Figure 2.

The illustrated embodiment of the invention shows a cab 10 and motor M with an attached truck chassis 11 mounted upon a pair of tandem rubber-tired driving wheels 12. Figure 1 further shows a turntable 13 mounted upon the truck chassis 11 and supporting a superstructure 14 which, as illustrated, is adapted with power means P and attachments 15 for excavating purposes, but may interchangeably be adapted for power operated load handling upon substitution of the crane attachments for the illustrated shovel attachments 15.

The turntable 13 is secured to a rectangular shaped base plate 16 which is movable upon a mounting plate 17 which in turn is secured to the chassis 11. As shown in Figure 3, the lateral edge portions of the base plate are disposed within longitudinal guide slots 18 formed between the overhanging flanges 19 of guide members 20 and the mounting plate 17 to which said guide members are attached. Numerous bolt and nut units 21 are used to secure the guide members 20 to the lateral edges of the mounting plate 17, and thereby the base plate 16 is limited solely to longitudinal movements relative to said mounting plate. Anti-friction means adapted to assist and guide the longitudinal movement of the base plate relative to the stationary mounting, thereby to prevent binding, are shown in Figures 2 and 3, said anti-friction means comprising multiple laterally disposed rollers 30 secured to the base plate 16 and bearing against the side walls 19a of the flanged guide members 20.

Interconnecting means for effecting the movement of the base plate 16 and its associated superstructure 14 relative to the mounting plate 17 and its associated chassis 11, are illustrated in Figures 2 and 3, said means including an elongate rack bar 22 secured to the intermediate portion of the mounting plate 17 with teeth 23 disposed in a line paralleling the desired superstructure movement, an enmeshed spur pinion 24 located concentrically with and below the turntable, said spur pinion being concentrically mounted upon the lower end of a propel shaft 25 extending vertically through a central aperture in the turntable in which it is freely rotatable. The propel shaft may be actuated by a power take-off deriving its power from the power unit P in the superstructure.

Thus, it is obvious that rotation of the propel shaft in the clockwise direction will result in sufficient force being generated between the stationary rack bar and the spur pinion to cause said spur pinion and its associated base plate, turntable and superstructure to move forwardly in relation to the chassis. Likewise, rotation of the propel shaft in the opposite direction will result in rearward movement of the superstructure and associated elements.

It is expedient to provide for locking means to retain the elements in their adjusted position during the operation of the machine as an excavator or crane. For this purpose, the mounting plate **17** is provided with multiple sets of bolt apertures **27**, a set of which becomes registered with a set of similarly spaced bolt apertures **28** in the base plate **16** when the adjoining plates **16** and **17** are in the desired adjusted position. Bolt **29** and nut **29a** may then be adapted to secure the positioned elements. In view of the fact that the longitudinally disposed guide members prevent the lateral or vertical movement of the base plate **16** in relation to the mounting plate **17**, it may be desirable to adapt other means for locking the element in the desired position of adjustment.

It is manifest from the above description that I have produced a novel, yet simple mechanical means for securing added balance and efficiency in interchangeable excavating and load handling machines which results from the proper adjustment of the turntable and superstructure in relation to its supporting chassis. The longitudinal movements are produced through the power means made available from within the superstructure. Thus the proper position is secured without the effort and difficulties heretofore required. It is to be understood that the described adjustable mounting may be used in other machines of the type having a superstructure supported upon a mounting.

It is to be further understood that other changes in construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:

1. An excavating and load handling machine comprising a trailer frame, a mounting plate on said frame, a guideway on said mounting plate extending longitudinally of said vehicle, a supporting plate on said mounting plate and adapted for longitudinal movement in relation to said mounting plate along said guideway between a rearwardly disposed excavating position and a forwardly disposed load handling position, a turntable and superstructure on said supporting plate, said superstructure including a crane and operating means therefor, and cooperating gearing on said plates, respectively, for driving said supporting plate longitudinally on said mounting plate.

2. A machine as claimed in claim 1, said cooperating gearing including a rack bar longitudinally disposed and attached to said mounting plate, a spur pinion rotatably mounted on said supporting plate and enmeshed with said rack bar, and means in said superstructure for rotating said spur pinion thereby to move said turntable and support longitudinally in relation to said mounting plate.

3. A machine as claimed in claim 1 said cooperating gearing including a rack bar longitudinally disposed and attached to said mounting plate, a spur pinion enmeshed with said rack bar, a vertical rotatable shaft concentric with and attached to said spur pinion, said shaft extending concentrically through said turntable, and means in said superstructure for rotating said shaft.

4. An excavating and load handling machine, comprising a truck chassis, an elongated guideway on said chassis extending longitudinally thereof, a turntable, bearing means on said turntable mounting the latter for longitudinal movement along said guideway, said guideway including means for limiting the vertical movement of said turntable with respect to said chassis, and a superstructure mounted on said turntable and movable therewith along said guideway between a rearwardly disposed excavating position and a forwardly disposed load-handling position.

5. An excavating and load handling machine comprising a trailer frame, a mounting plate, a supporting plate on said mounting plate and adapted for longitudinal movement in relation to said mounting plate between a rearwardly disposed excavating position and a forwardly disposed load handling position, a turntable and superstructure on said supporting plate, said superstructure including a crane and operating means therefor, and interconnecting means adapted for moving said supporting plate longitudinally in relation to said mounting plate, said mounting plate being rectangular and having flanged guides attached to the lateral edges thereof, said supporting plate being enclosed by said flanges thereby to restrict the lateral and vertical movement of said supporting plate.

6. An excavating and load handling machine comprising a trailer frame, a mounting plate, a supporting plate on said mounting plate and adapted for longitudinal movement in relation to said mounting plate between a rearwardly disposed excavating position and a forwardly disposed load handling position, a turntable and superstructure on said supporting plate, said superstructure including a crane and operating means therefor, interconnecting means adapted for moving said supporting plate longitudinally in relation to said mounting plate, and locking means for securing said supporting plate in its longitudinally adjusted position.

7. An excavating and load handling machine comprising a trailer frame, a mounting plate, a supporting plate on said mounting plate and adapted for longitudinal movement in relation to said mounting plate between a rearwardly disposed excavating position and a forwardly disposed load handling position, a turntable and superstructure on said supporting plate, said superstructure including a crane and operating means therefor, interconnecting means adapted for moving said supporting plate longitudinally in relation to said mounting plate, said mounting plate having multiple sets of spaced apertures therein, said supporting plate having a set of similarly spaced apertures therein, and means adapted for connecting the apertures which are in registry when the supporting plate is in the desired longitudinally adjusted position.

8. An excavating and load handling machine comprising a trailer frame, a mounting plate, a supporting plate on said mounting plate and adapted for longitudinal movement in relation to said mounting plate between a rearwardly disposed excavating position and a forwardly disposed load handling position, a turntable and superstructure on said supporting plate, said

superstructure including a crane and operating means therefor, interconnecting means adapted for moving said supporting plate longitudinally in relation to said mounting plate, said mounting plate being rectangular and having a pair of flanged guides attached to the lateral edges thereof, and multiple laterally disposed rollers attached to the edge portions of the supporting plate and bearing against the flanged portions of said guides, thereby to serve as anti-fraction means.

9. An excavating and load handling machine comprising a rubber tired vehicle, a mounting plate on said vehicle, a guideway on said mounting plate extending longitudinally of said vehicle, a supporting plate movably mounted on said mounting plate and engaging said guideway, a turntable and superstructure assembly on said supporting plate, motor means on said vehicle for moving said supporting plate and the assembly thereon between two longitudinal positions, the first of which positions constituting a load handling position and the second of which constituting an excavating position, and locking means operatively engaging between said plates for holding the supporting plate and the assembly thereon selectively in either of said positions.

10. An excavating and load handling machine comprising a rubber-tired vehicle, a mounting plate on said vehicle, a supporting plate movably mounted on said mounting plate, a guideway

on one of said plates extending longitudinally of said vehicle, bearing means on the other of said plates engaging said guideway whereby to prevent lateral movements of said supporting plate with respect to said mounting plate, a turntable and superstructure assembly on said supporting plate, a power supply means in said superstructure, power transmission means in said superstructure for driving excavating and load handling equipment, drive gearing mounted on said plates for effecting longitudinal movement of said supporting plate and the assembly thereon between load handling and excavating portions, respectively upon operation of said drive gearing, and power take-off means connecting said power supply means and said gearing.

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