

Sept. 15, 1936.

R. W. KALTENBACH

2,054,199

CAR DUMPER

Filed Feb. 18, 1932

3 Sheets-Sheet 1

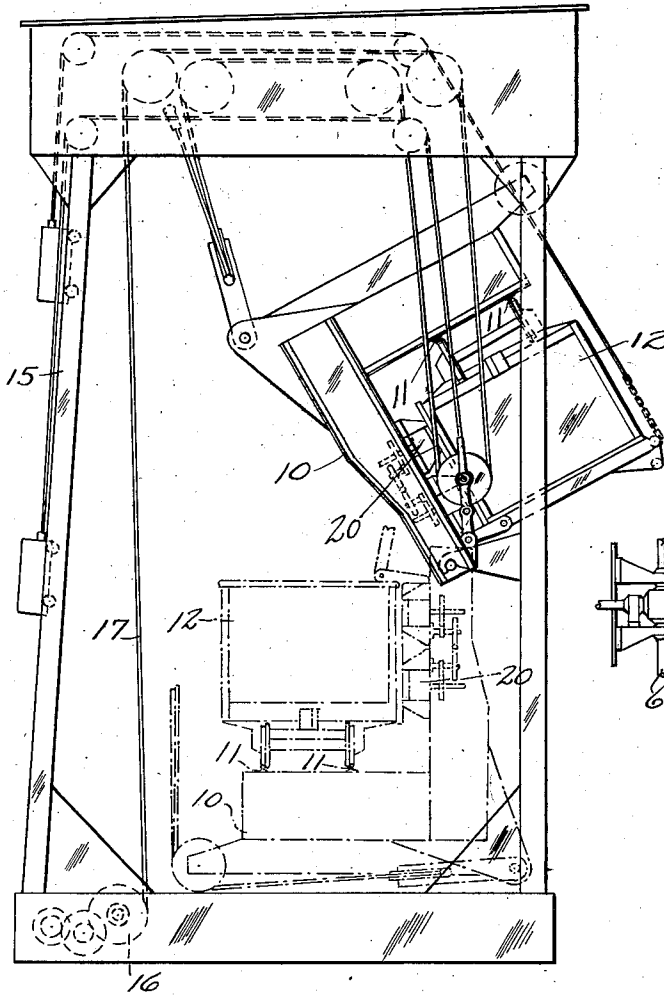


FIG. 1

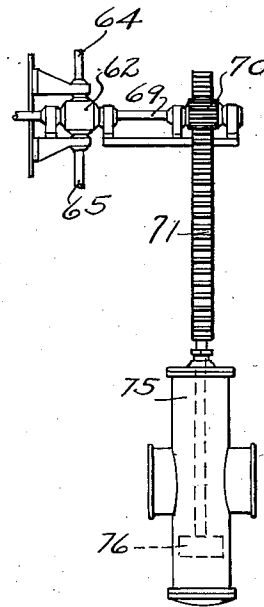


FIG. 7

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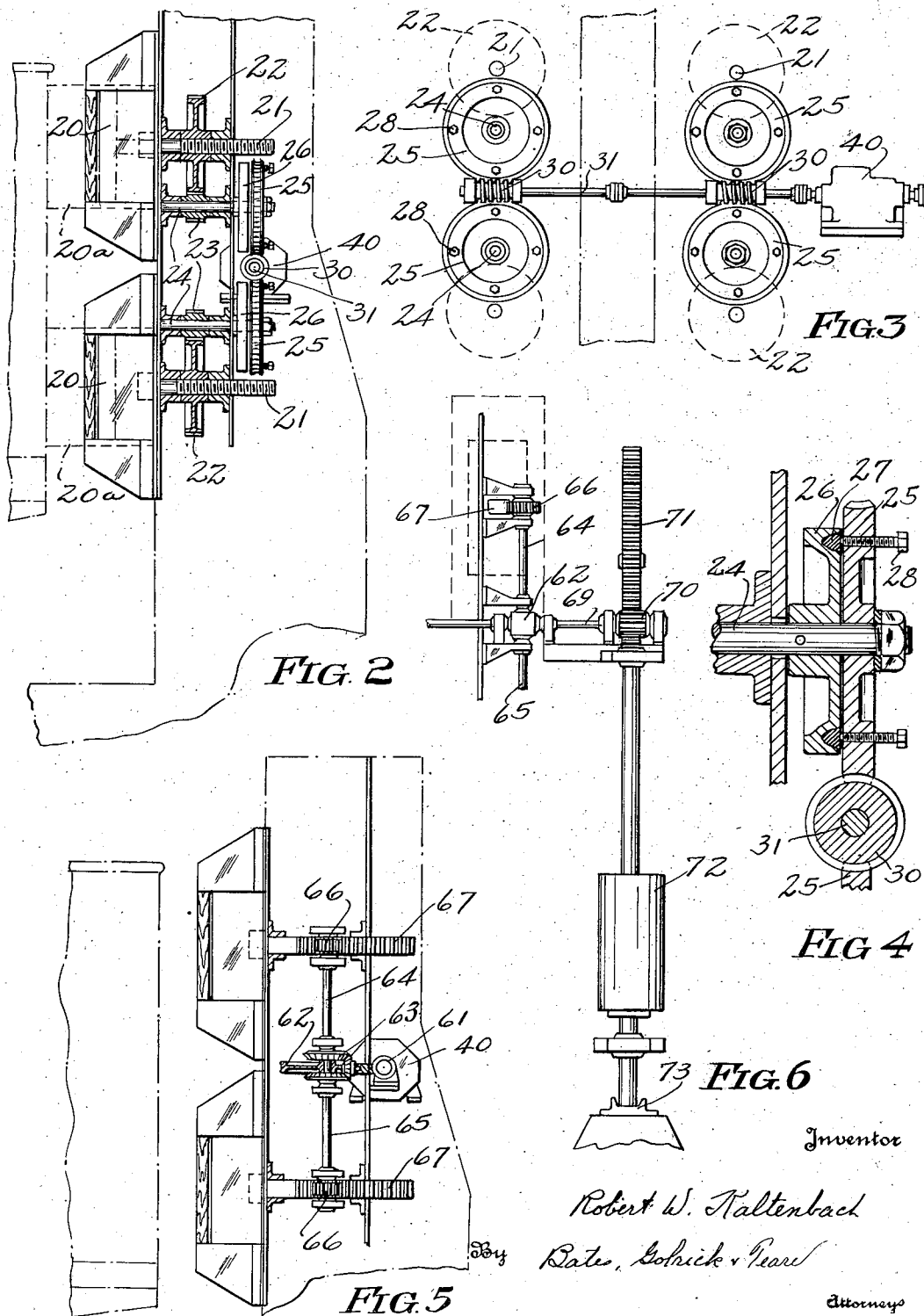
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3 Sheets-Sheet 3

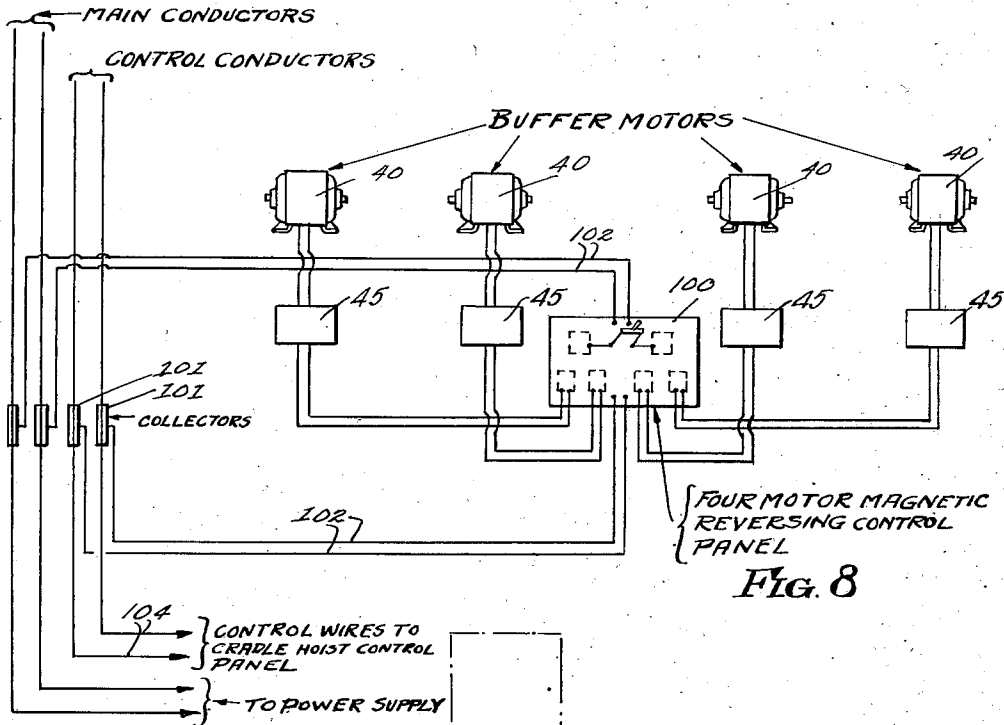


FIG. 8

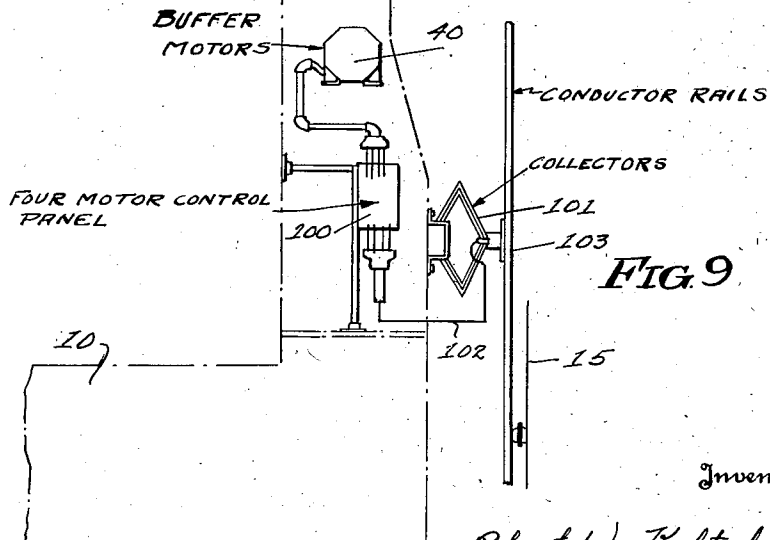


FIG. 9

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UNITED STATES PATENT OFFICE

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Application February 18, 1932, Serial No. 593,822

7 Claims. (Cl. 214-123)

This case is a continuation in part of my application Serial No. 385,736, filed August 14th, 1929, Patent No. 1,846,970, dated Feb. 23, 1932, and relates to car dumpers and particularly to those which have a cradle into which the car is shunted and which is provided with suitable mechanism for clamping the car onto the tracks during the dumping operation. With apparatus, which has been used heretofore, a car enters the cradle, and is moved laterally during the initial movement of the cradle. The lateral movement is continued until the car strikes wooden buffer blocks, which heretofore have been bolted or otherwise affixed to the side of the cradle, and which function to absorb most of the weight of the car when it has been turned on its side during the emptying operation. After the dumping operation is completed, the final motion of the cradle is accompanied by a lateral movement of the car out of contact with the buffer blocks until the tracks on which the car is mounted are in alignment with the approach and run-off tracks respectively.

To effect such lateral movement of the car in the cradle, the practice has been to utilize a platen on which the car is placed, and to mount the platen on rollers which are arranged to move in trackways extending transversely of the cradle. On large installations, the weight of the platen is about 26,000 pounds, which is usually counterweighted by a like amount. Thus, it is apparent that considerable power must be expended to move the platen and the car. Apart from this consideration, attention must be given at frequent intervals to the condition of the platen, as wear of the operating parts causes misalignment of the tracks. Furthermore, engagement of the car with the buffer blocks produces an impact of considerable force that wears the blocks quickly and tends to damage the car. In addition, it produces tremendous working stresses, which necessitate the use of heavy structural members to withstand the severe impact stresses.

The principal object of the present invention is to provide means for enabling a car to move freely into a cradle, and so arrange the buffer blocks, on the side of the cradle that they may be operated to move into contact with the car and thereby eliminate the use of a platen. A further object is to provide a buffer mechanism which may readily be caused to move toward and contact with the side of the car, by the operator of the car dumper, and so arrange the mechanism as to prevent inadvertent displacement of the buffers. By providing a motor driven mecha-

nism self-contained on the swinger member of the car dumper, and so arrange such mechanism that it may be controlled by the operator of the car dumper and at the same time eliminate the necessity of moving of such heavy bodies as the loaded car and its supporting platform, I can increase the capacity of a given dumper for a definite unit of time, and shorten the period of time during which a barge or boat must remain idle during the loading operation.

I carry out the above objects by maintaining the car supporting tracks in stationary position upon the cradle, and by moving the buffer blocks toward the car during the initial movement of the cradle until they engage the car. Thereafter, in the form of my invention, illustrated and described and claimed in my prior application heretofore referred to, I use the force exerted by the counterweights to maintain the blocks in engagement with the side of the car. However, in the forms of mechanism shown in the present application, I provide a cradle with a power unit arranged to laterally contact with the load. I find this advantageous in some instances, as it permits the operator to move the buffers into contact with the side of the car before any movement has been imparted to the cradle.

In the drawings, Fig. 1 is an end elevation of a car dumping apparatus embodying one form of my invention, and showing in full lines the cradle and car in the dumped position and in dotted lines the same parts after the preliminary elevation but immediately before the rocking movement takes place; Fig. 2 is a fragmentary vertical section; Fig. 3 is a front view of the mechanism shown in Fig. 2; Fig. 4 is a sectional view on an enlarged scale through part of the driving mechanism shown in Fig. 3; Fig. 5 is a vertical section through a cradle showing a modified form of buffer operating mechanism, and Figs. 6 and 7 are views of different forms of motive power for operating the buffer blocks shown in Fig. 2. Figs. 8 and 9 are electrical diagrams illustrating a circuit to automatically control the movement of the buffers.

Referring now to the form of apparatus illustrated in Fig. 1, 10 indicates a cradle, 11 tracks carried thereby, and 12 a car which is supported upon the tracks. A frame for supporting the counterweights and providing a guideway for the cradle is illustrated in general at 15, while a hoisting drum is shown in general at 16 adjacent the base of the frame. Hoisting cables 17 lead from the drum over suitable sheaves on the frame

and cradle to effect a raising and lowering of the cradle in the usual way.

The present invention is concerned with the provision of means for effecting lateral movements of suitable buffer blocks arranged to engage the side of the car and support it as the car is turned. The apparatus illustrated comprises means for moving buffer blocks 20 from the full-line position to the broken line position 20a as indicated in Fig. 2. In the full line position, the buffers are out of contact with the car to a sufficient extent to permit the car to be moved onto and away from the cradle. This position represents the normal or "rest" position of the cradle.

The apparatus for moving the buffers into contact with the car is arranged to be operated by the car dumper attendant before or during the initial movement of the dumping operation, and preferably to effect contact before the clamps 21 engage the top of the car. If desired, however, this may be accomplished automatically by contactors properly located in the path of movement of the cradle.

To insure engagement of the buffers 20 with uniform pressure against the side of the car, I prefer to provide a pair of buffer blocks which are disposed in superimposed relationship and are adapted to be actuated simultaneously by a single source of power. In Fig. 2 this comprises an electric motor 40, in Fig. 6 a weighted member 71 and in Fig. 7 a fluid actuated member 75. If desired, a source of power such as that indicated may be used for operating a single buffer block, but I prefer to actuate a plurality of blocks, as a group by each source of power.

Considering now those which are actuated by an electric motor, and referring particularly to Figs. 2, 3 and 4, the buffer blocks are shown as having shanks 21 which are suitably threaded to engage a correspondingly internally threaded portion on the rotatable member 22. These members are illustrated as being gears which are adapted to be driven by pinions 23 on shafts 24. These last named shafts are then in turn arranged to be driven by the motor through a pressure equalizing or differential device. The pressure equalizing device in the preferred form is shown as a driving member 25 and a driven member 26, which are adapted to be frictionally connected through a pressure ring 27. The member 26 is shown, as being fixed to the shaft 24, while the member 25 is rotatable thereon. The force exerted by a ring against the driven member may be adjustably controlled by set screws 28. The driving members are illustrated as being worm gears which are actuated by worms 30 on shafts 31 which may comprise a continuation of a motor shaft.

In Figs. 8 and 9 I illustrate, diagrammatically, one method of automatic control for the buffer block motors 40. As shown, this control comprises a motor control panel 100 and a series of collectors 101. The panel and collectors are carried by the cradle and joined electrically by lines 102. The collectors are arranged to slidably contact with conductor rails 103 which are rigidly secured to the main frame 15 and are electrically connected to the cradle hoist controller by conductors 104.

The operation is as follows: When the cradle hoist controller is operated to initiate the movement of the cradle, it will also set contactors on the control panel which will set the buffer motors 40 in motion. When the buffers have made contact with the car, their respective motors 40 will be

disconnected or thrown out of circuit by means of overload relays 45, Fig. 8, (one for each motor), each of which comprises a suitable circuit breaker operating to stop the motor in case of overload for either direction of movement of the motor, but serving to close the circuit when the motor is reversed. Such overload occurs when the buffers are forced tightly against the car side or when they are withdrawn to their extreme position. In this connection, each motor and overload mechanism operates independently of the other. With the buffers in this position, in contact with the car, the motors remain disconnected until the return or lowering movement of the cradle.

In bringing the cradle back from the position in which the coal is discharged, the cradle hoist control is reversed in the usual manner, which, in turn, reverses the circuits through the control panel 100. The motors are then thrown into operation when the cradle reaches its vertical position and the collectors 101 again make contact with the main conductor rails 103. The motors thus operate in a reverse direction and bring the buffer blocks back to their original position, at which time they are disconnected from their source of power through the overload switch member, previously mentioned. This completes the cycle and the operation is repeated for the following cycles.

It is to be noted that after the cradle reaches the turning point and turns a slight distance on its pivot, the current to the buffer motors is entirely disconnected, as the collectors 101 are thus carried out of contact with the conductor rails 103. While the above method of automatic control is preferred, I do not desire to be limited to its details, as the same operating results may be obtained by different electrical and mechanical arrangements.

In the mechanism described, the blocks are prevented from lateral movement away from the side of the car in the cradle by a non-reversing connection as employed in the screw and nut couple formed by the threaded shank 21 and the coacting gear 22. Thus, the blocks are locked in position regardless of the weight exerted upon them by the car during the tilting movement of the cradle.

In Fig. 5 I have shown a modification of my invention wherein the electric motor 40 mounted on the cradle drives a worm 61 which, in turn, operates a worm wheel 62. Such worm wheel comprises the ring gear of a differential indicated in general at 63. The differential actuates a shaft 64 which extends upwardly to operate the upper buffer block, and another shaft 65 which extends downwardly to operate the lower buffer block. Each of the last named shafts carries a pinion 66, arranged to mesh with respective racks 67. The racks 67 are fastened to the buffer blocks 138, which are arranged to move laterally in guideways in the same manner as that illustrated and explained in connection with Fig. 2.

Fig. 6 shows a different form of motive power for operating the mechanism illustrated in Fig. 5. In such illustration, like parts carry the same reference characters, while the shaft on which the worm 61 of the differential mechanism is carried is indicated at 69. Such shaft carries a pinion 70 which meshes with a vertically extending rack 71. The lower end of the rack is weighted as at 72 and is intended normally to be in engagement with an abutment 73 rigid with the stationary frame when the cradle is in the normal "rest" position. When the cradle is

raised preliminary to its tilting, the action of gravity holds the rack stationary, thus causing the pinion 70 to rotate and to actuate the gear mechanism to move the blocks 20 toward the car. During the operation, the differential acts to insure the application of uniform pressure against the car. When engagement is effected, the weighted rack is tilted with the cradle, during which movement the bumpers in engagement with the car prevent further rotation of the gears 70 and thereby hold the racks and weights against further descent.

A modification illustrated in Fig. 7 shows a similar arrangement wherein the rack 71 is arranged to be actuated by fluid pressure within a cylinder 75. In such case, the cylinder is mounted on a cradle and the fluid pressure, acting upon a piston 76 at the end of the rack, may be readily controlled to effect the desired buffer block operation in each direction.

In view of the foregoing description, it is apparent that I have provided a novel means of effecting side contact with the car without necessitating the use of a platen upon which the car rests, and which is intended to be moved laterally on the cradle. I have shown different ways in which this result can be accomplished, and have hereinafter pointed out the essential characteristics in the appended claims.

I claim:

1. In a car dumper, the combination with a car supporting cradle, of a buffer, a frame arranged to support the cradle, means to raise the cradle in the frame, electric motors to move the buffer into and out of engagement with the car, and control means to cause said motors to move the buffers toward or away from the car consequent upon the movement of the cradle in the frame.

2. In a car dumper, the combination with a car supporting cradle, of a buffer, a frame arranged to support the cradle, means to raise the cradle in the frame, electric motors to move the buffer into and out of engagement with the car, control means to cause said motors to move the buffers toward or away from the car consequent upon the movement of the cradle in the frame, and means dependent upon the movement of the buffers toward and away from the car to stop the operation of said motors.

3. In a car dumper, the combination of a stationary frame, a cradle, mechanism for raising the cradle in the frame and tilting it after it has been raised a certain distance, a buffer block movably carried by the cradle and adapted to coact with the side of the car, an electric motor carried by the cradle for operating the buffer block, a conductor rail carried by the frame, a contact carried by the cradle adapted to engage the conductor rail during the vertical movement of the cradle and to swing away from it when the

cradle is tilted, and an electric connection between the contact and the motor.

4. In a car dumper, the combination of a stationary frame, a cradle, mechanism for tilting the cradle, a buffer block movably carried by the cradle and adapted to coact with the side of the car, an electric motor carried by the cradle for operating the buffer block, an overload circuit breaker for the motor, contactors in circuit with the motor and carried by the frame and cradle respectively, said contactors being disconnected by movement of the cradle after it has moved a predetermined distance, and adapted to be reconnected upon return of the cradle, and means for reestablishing the circuit through the motor in a reverse direction upon reconnection of the contactors.

5. In a car dumper the combination of a stationary frame, a cradle, mechanism for tilting the cradle, a buffer block movably carried by the cradle and adapted to coact with the side of the car, an electric motor carried by the cradle for operating the buffer block, a conductor carried by the frame, a contact carried by the cradle adapted to engage the conductor and to swing away from it when the cradle is tilted, an electric connection between the contact and the motor, an overload circuit breaker for the motor, and means for energizing the motor in the reversed direction consequent upon the contact reengaging the conductor upon the return movement of the cradle.

6. In a car dumper, the combination of a frame, a cradle, cable mechanism for raising the cradle, motor mechanism for operating the cable mechanism, said cradle being provided with means for carrying a car, a plurality of movable buffer blocks carried by the cradle and adapted to coact with the car side in various regions, motors on the cradle for operating the buffer blocks, means for automatically reversing the last mentioned motors consequent upon the reversing of the lifting motor, and circuit breakers associated with the buffer motors and acting consequent upon the buffer reaching its extreme movement in either direction, said circuit breakers being automatically restored consequent upon the reversal of the lifting motor.

7. In a car dumper, a buffer block, a threaded shank extending rearwardly therefrom, a nut rotatably mounted on the shank and having a spur gear associated therewith, a pinion meshing with the gear, a shaft rigid with the pinion, a friction couple having one member fixed to the shaft, and a second member rotatably mounted on the shaft, means for adjusting the degree of friction between said members, a worm wheel associated with the second named member, a worm meshing with said worm wheel, and an electric motor for operating the worm.

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