Jan. 6, 1942. R. C. OSGOOD 2,268,569

MATERIAL LOADING APPARATUS

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Fig. 1.

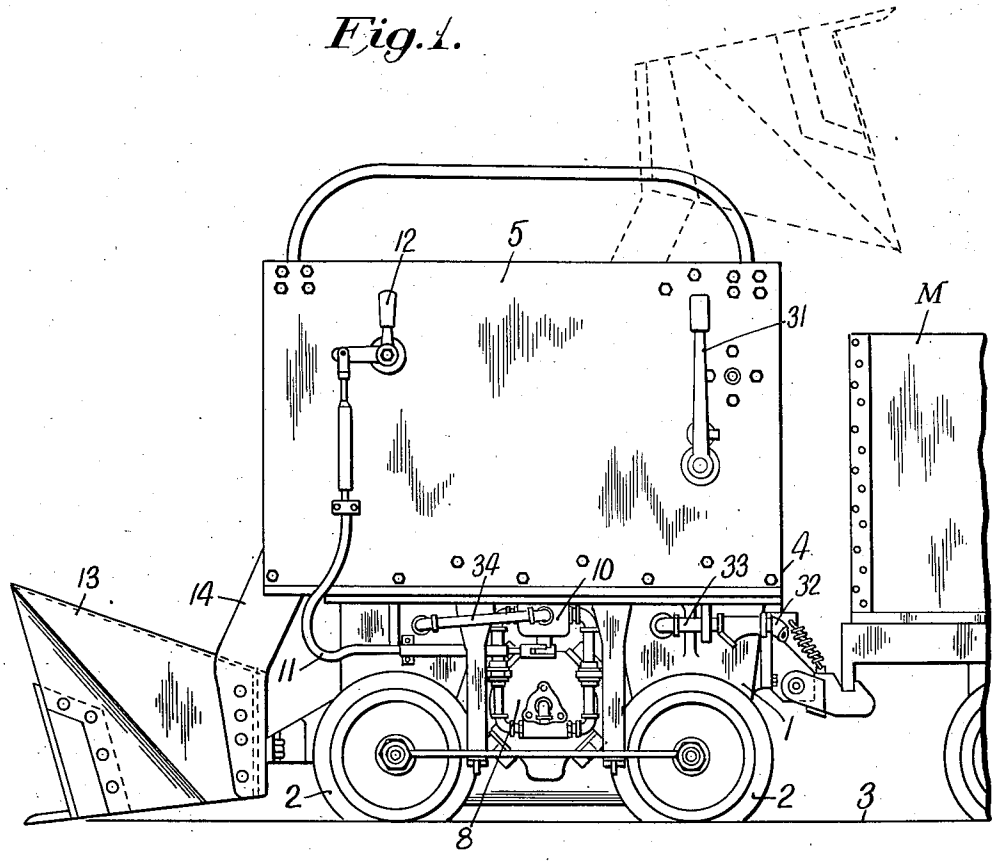
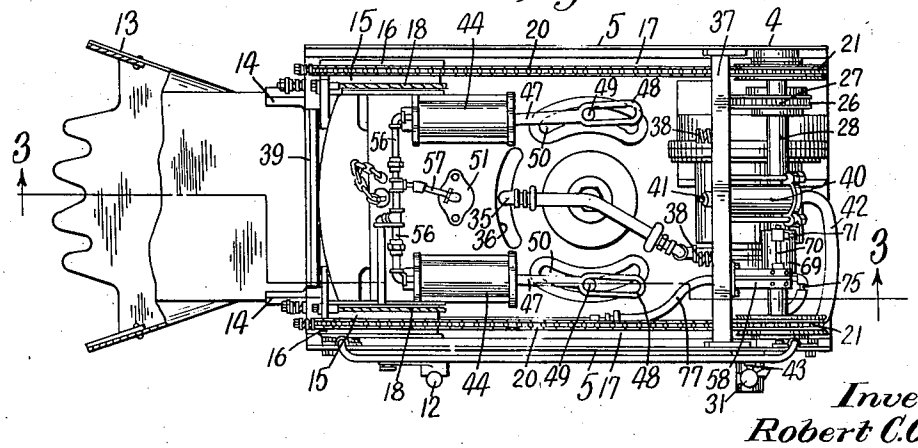


Fig. 2.



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Fig. 3.

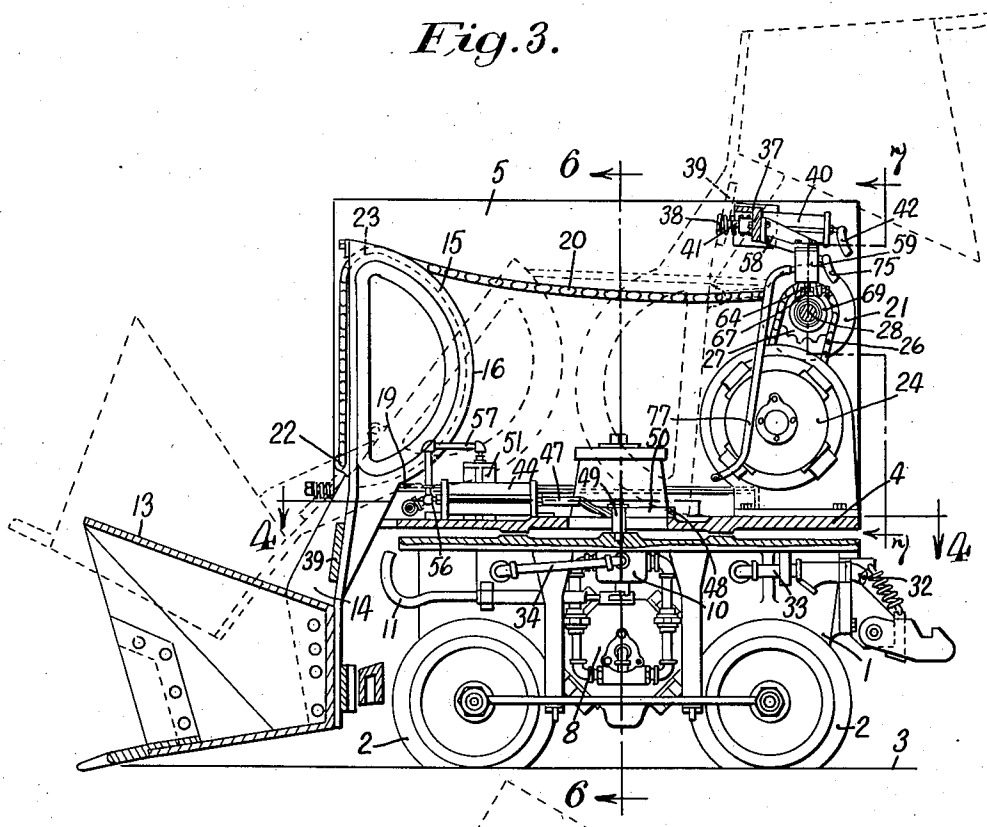


Fig. 4.

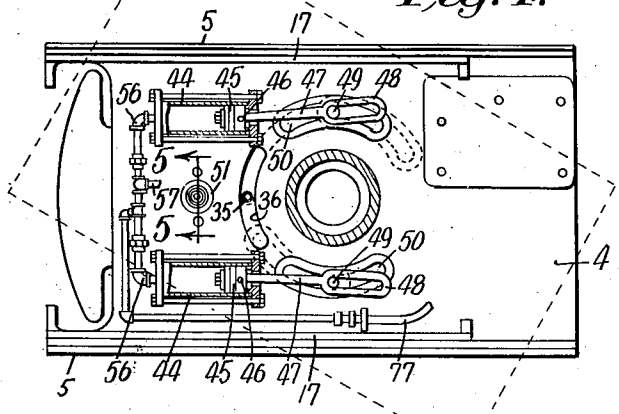
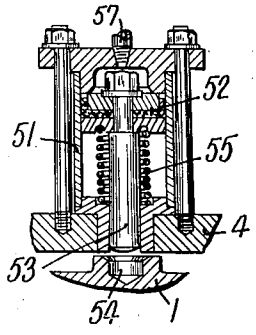


Fig. 5.



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Fig.6.

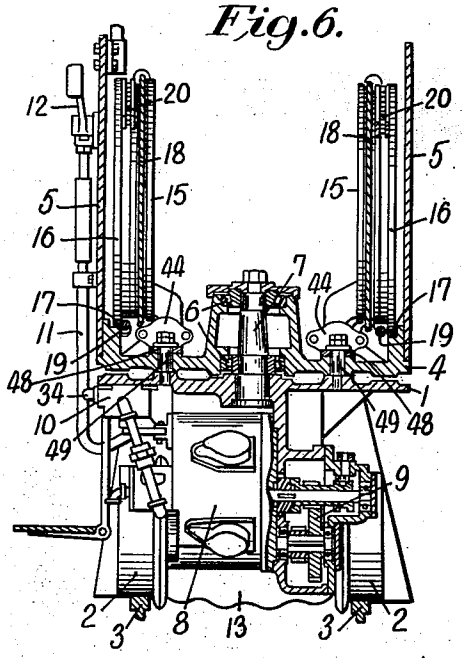


Fig.8.

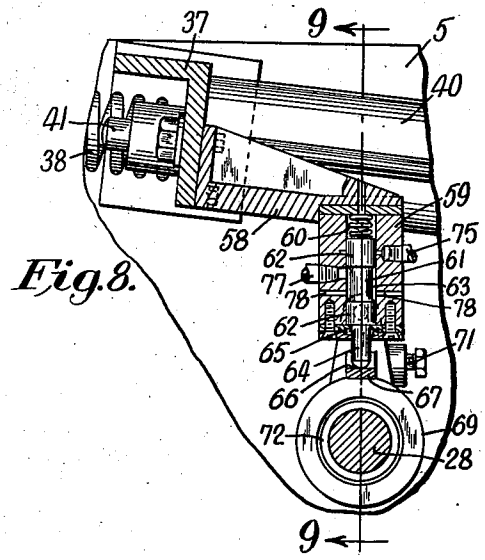


Fig.9.

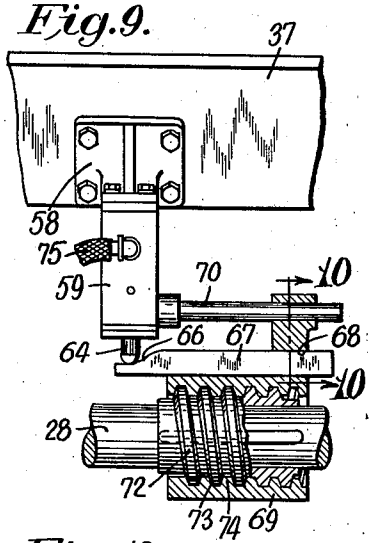


Fig.7.

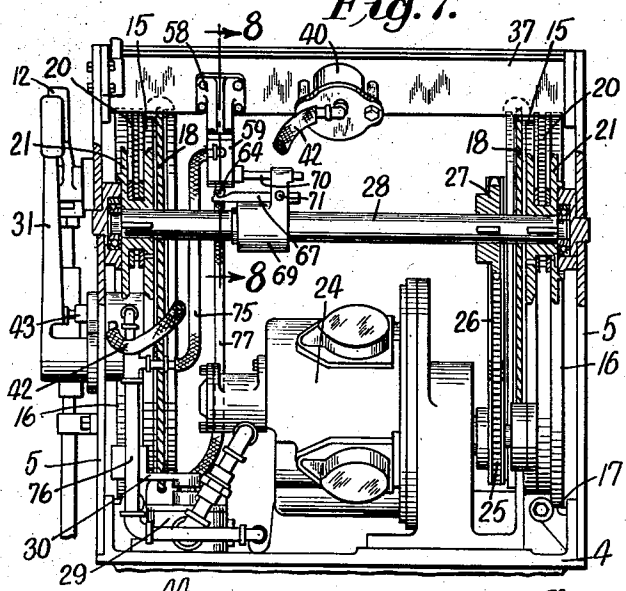


Fig.10.

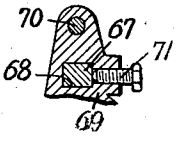
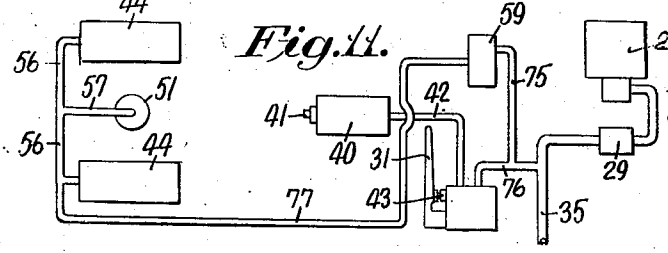


Fig.11.



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UNITED STATES PATENT OFFICE

2,268,569

MATERIAL LOADING APPARATUS

Robert C. Osgood, Claremont, N. H., assignor to Sullivan Machinery Company, a corporation of Massachusetts

Application February 16, 1940, Serial No. 319,184

15 Claims. (Cl. 214—132)

This invention relates to material loading apparatus, and more particularly to improvements in the self-centering means for the shovel of a mine car loader, commonly known as a muck loader.

In material loading apparatus of the type known as a mine car loader, the shovel of the loader is usually swivelly mounted on the loader base to swing horizontally into material digging positions at either side of the path of movement of the base. The shovel of such loaders is usually manually moved horizontally relative to the base into its lateral digging position, and when the shovel has been advanced into the material to be loaded so that it is substantially filled with material, it is swung upwardly a short distance to clear the pile of material and thereafter, as the shovel continues to move upwardly, means is ofttimes provided for automatically swinging the shovel from its lateral digging position relative to the loader base so that as the shovel swings upwardly toward its discharging position, the shovel will always aline with the loader base. Such automatic centering means for the shovel assures proper discharge of the shovel contents into a mine car located immediately at the rear of the loader. Known types of such automatic self-centering means for the shovel are usually actuated directly by the shovel so that when the shovel swings upwardly one of its supporting arms engages an element of the centering means whereby the centering action is automatically effected by swinging movement of the shovel. Such automatic shovel centering means are usually relatively complicated, and in certain known forms embody a cam roller engageable with cam surfaces so that when the shovel swings upwardly toward its material discharging position, the cam roller moves relative to the cam surfaces to effect automatic centering of the shovel with respect to the loader base.

An object of this invention is to provide an improved material loading apparatus. Another object is to provide an improved mine car loader having automatic centering means for the shovel embodying advantages over known types of devices. Another object is to provide an improved loading apparatus having improved means for automatically centering the loading element thereof from a lateral position with respect to the loader base during movement of the loading element from its gathering position toward its material discharging position. Still another object is to provide an improved mine car loader having improved means for automatically alining the shovel relative to the loader base as the shovel moves from its lowered digging position toward its raised dumping position. A further object is to provide an improved mine car loader of the pivoted shovel type having improved means controlled by an element of the shovel swinging means for automatically effecting alinement of the shovel relative to the loader base, so that proper discharge of the shovel contents into a mine car located at the rear of the loader, is assured. A still further object is to provide an improved automatic centering means for centering the shovel of a mine car loader, during its loading movement, so that discharge of the shovel contents into a mine car is assured. Yet another object is to provide an improved self-centering means of the fluid operated type for automatically centering the shovel from a lateral digging position, during its loading movement, and having improved means for controlling the fluid supply thereto. Other objects and advantages of the invention will, however, hereinafter more fully appear in the course of the following description.

In the accompanying drawings there is shown for purposes of illustration one form which the invention may assume in practice.

In these drawings:

Fig. 1 is a side elevational view of a mine car loader in which an illustrative embodiment of the invention is incorporated.

Fig. 2 is a plan view of the mine car loader shown in Fig. 1, with a portion of the shovel broken away.

Fig. 3 is a view in longitudinal vertical section taken substantially on line 3—3 of Fig. 2.

Fig. 4 is a horizontal sectional view taken substantially on line 4—4 of Fig. 3, with parts omitted to facilitate illustration.

Fig. 5 is an enlarged detail vertical sectional view taken on line 5—5 of Fig. 4.

Fig. 6 is a cross sectional view taken substantially on line 6—6 of Fig. 3.

Fig. 7 is an enlarged cross sectional view, with parts shown in elevation, taken substantially on line 7—7 of Fig. 3.

Fig. 8 is an enlarged detail vertical sectional view taken on line 8—8 of Fig. 7.

Fig. 9 is a detail cross sectional view taken on line 9—9 of Fig. 8, with parts shown in elevation.

Fig. 10 is a detail vertical sectional view taken on line 10—10 of Fig. 9.

Fig. 11 is a diagrammatic view showing the fluid system and the associated control means.

In this illustrative embodiment of the invention there is shown a mine car loader of the type commonly known as a muck loader for loading loose rock or muck in metal mines. It will be evident, however, that the invention may be embodied in loading apparatus of various other types.

The mine car loader disclosed herein may be of the same general character as that described in my copending application Serial No. 184,447, filed Jan. 11, 1938, now matured into Patent No. 2,201,671, granted May 21, 1940, and comprises a self-propelled base, herein a truck frame 1, mounted on wheels 2 adapted to travel along a trackway 3 laid on the mine floor. The wheeled truck frame 1 has swivelly mounted thereon, for horizontal swinging movement relative thereto, an upper frame 4 on which the shoveling mechanism is mounted. This swivelled upper frame 4 has upstanding side walls 5, 5 and is swivelled on bearings 6 supported by a stationary vertical shaft 7 fixed to the truck frame. The driving means for the truck wheels comprises a conventional reversible fluid-operated motor 8 arranged on the truck frame beneath the swivelled frame 4 and suitably operatively connected through clutch-controlled gearing 9 to the truck wheels, so that the loader may be propelled in either of opposite directions along the trackway. This motor is controlled by a conventional reversing valve 10 operated through a flexible shaft 11 by a conveniently located control handle 12.

The shoveling mechanism includes a shovel or dipper 13 supported by parallel supporting arms 14 mounted on semi-circular rockers 15. These rockers are provided with arcuate bearing surfaces 16 supported by and adapted to roll along parallel horizontal trackways 17 extending longitudinally of the swivelled frame 4. As described in the copending application above referred to, the rockers are yieldingly retained on the trackways 17 by pairs of cables 18 and 19, the cables passing around arcuate guide grooves on the rockers 15 and secured at one end to the swivelled frame 4 and at their opposite ends by yielding spring connections to the rockers. These pairs of cables serve to retain the rockers 15 against displacement from the trackways 17 while at the same time compelling rolling movement of the rockers along the trackways, thereby affording a shifting pivot for the shovel upon swinging of the shovel supporting arms.

Means is provided for raising and lowering the shovel on its rocker mounting means comprising flexible chains 20 adapted to be wound on flanged drums 21, one end of each chain being fastened to a drum while the other ends of the chains are secured at 22 to the rockers at the ends of the latter nearer the supporting arms 14. The intermediate portions of the shovel raising chains 20, when the shovel is in its lowered digging position as shown in full lines in Fig. 3, pass around arcuate guiding surfaces 23 on the rockers at points most remote from the shovel so that when the chains are wound in by the drums the shovel is swung upwardly from its digging position and rearwardly toward its raised dumping position. A conventional reversible fluid-operated motor 24, similar to the motor 8, is mounted on the swivelled frame 4 for rotating the chain winding drums 21, and the motor power shaft has fixed thereto a drive sprocket 25 connected by an endless drive chain 26 to a sprocket 27 keyed to a shaft 28 to which the drums are likewise keyed. The drive shaft 28 is horizontally disposed and extends transversely between the vertical side walls 5 of the swivelled frame and is suitably journaled in bearings supported by the frame side walls, in the manner shown in Fig. 7. The motor 24 may be controlled by a conventional reversing valve 29 similar to the reversing valve 10 and controlled through lever connections 30 by a lever 31, in the manner likewise fully described in the copending application above mentioned.

Pressure fluid may be supplied to the motors 8 and 24 through a supply hose 32 coupled to pipe connections 33 arranged on the truck frame beneath the swivelled frame 4 and connected through a branched pipe 34 to the reversing valve 10 of the motor 8. The pipe connections 33 have a branched pipe connection 35 extending vertically through an arcuate slot 36 in the swivelled frame 4, this slot permitting turning movement of the swivelled frame relative to the relatively stationary pipe connections on the truck frame. The pipe connection 35 is connected to the reversing valve 29 of the shovel swinging motor 24. It will thus be seen that pressure fluid may be supplied to the motors 8 and 24 under the control of the valves 10 and 29 respectively, irrespective of the swivelled position of the swivelled frame relative to the truck frame.

Secured to the vertical side walls 5 of the swivelled frame 4, near the rear ends thereof, is a transverse member 37 carrying shock absorbing buffer springs 38, and when the shovel is swung upwardly on its rocker mounting past its center of gravity, a cross plate 39 secured to the rocker arms 14 engages the buffer springs, and this plate and the buffer springs cooperate to provide a stop for the shovel. When the rearward swinging movement of the shovel is abruptly stopped by the buffer springs, the material in the shovel is discharged into a waiting mine car M (Fig. 1) located on the trackway 3 immediately at the rear of the loader and preferably coupled to the latter.

When the shovel assumes its rearmost dumping position against the buffer springs, as indicated in dotted lines in Figs. 1 and 3, and it is desired to return the shovel to its lowered digging position, as indicated in full lines in those figures, the shovel must be initially moved forward past its center of gravity before it will drop down under its own weight, and for initiating this return movement, a fluid-operated return cylinder 40 is supported by the transverse member 37, and this cylinder contains a reciprocable piston (not shown) having a plunger-like piston rod 41 extending forwardly through the front cylinder head. Pressure fluid may be supplied to the rear end of the cylinder through a pipe 42 connected to the casing of a valve device 43, likewise operated by the lever 31. This return cylinder 40 and the valve device 43 are fully described in the copending application above referred to. When pressure fluid is supplied to the rear end of the cylinder 40, the piston contained therein is moved forwardly to bring the piston rod into engagement with the cross plate 39 on the shovel arms, and upon continued forward movement of the piston the shovel is moved forwardly past its center of gravity, the shovel thereafter swinging downwardly by the initial velocity derived from the thrust of the piston and the acceleration imparted by gravity, toward its lowered digging position under the control of the drums 21 and chains 20. Prior to the return movement of the shovel, the reversing valve 29 is, of course, operated to

reverse the shovel swinging motor 24, and by properly controlling the motor 24, the downward swinging movement of the shovel may be controlled. As described in the above mentioned copending application, when the lever 31 is moved to actuate the reverse valve 29 to effect reversal of the motor 24, the valve device 43 is concurrently actuated to effect a supply of pressure fluid to the return cylinder 40.

The automatic means for centering the shovel relative to the truck frame as the shovel swings upwardly from its lowered digging position toward its raised dumping position comprises parallel fluid cylinders 44, 44 mounted on the swivelled frame 4 and respectively containing reciprocable pistons 45, 45. Each of these pistons has pivotally connected thereto at 46 a connecting rod 47 provided with a slotted end 48. Projecting within the slots in the connecting rods are vertical pins 49 fixed to the truck frame and projecting upwardly through arcuate slots 50 in the swivelled frame 4, these slots permitting turning of the swivelled frame relative to the relatively stationary pins. It will thus be seen that when the shovel is in a laterally located digging position, with the swivelled frame 4 in the position indicated in dotted lines in Fig. 4, and pressure fluid is supplied to the forward ends of the cylinders, the effective one of the pistons acts through its connecting rod and pin to move the swivelled frame 4, together with the shovel supported thereby, into alinement with the truck frame, so that when the shovel is raised from its lowered digging position toward its raised dumping position, it may be automatically brought, through the fluid control means soon to be described, into alinement with the mine car M, to assure proper discharge of the shovel contents into the mine car. A fluid-operated lock is provided for automatically locking the swivelled frame against movement with respect to the truck frame when the shovel is in its alined position, and this lock comprises a vertical cylinder 51 (see Fig. 5) carried by the swivelled frame and containing a reciprocable piston 52 having a locking pin 53 extending downwardly through the bottom cylinder head. This locking pin is adapted to enter a locking recess 54 on the truck frame when the locking pin is brought into registry therewith. A spring 55 is interposed between the lower surface of the piston 52 and the bottom cylinder head for urging the locking pin toward its uppermost released position. Pressure fluid may be supplied to the forward ends of the centering cylinders 44 through pipe connections 56, and a branched pipe 57 is connected to the upper head of the cylinder 51. Whenever pressure fluid is supplied to the centering cylinders 44 it is concurrently supplied to the locking cylinder 51.

Now referring to the improved control means for the centering and locking cylinders, it will be noted that mounted on a bracket 58 secured to the transverse member 36 is a valve casing 59 having a vertical bore 60 (Fig. 8) containing a plunger valve 61. This valve has spaced spools 62 connected by a reduced portion 63 and has a valve stem 64 extending downwardly through the packed lower head 65 of the valve casing. The valve stem 64 is engageable with a cam surface 66 of a reciprocable cam member 67. This cam member is mounted for endwise adjustment in an opening 68 in a reciprocable member 69 guided on a rod 70 secured to the valve casing. A set screw 71 (see Fig. 10) is provided for securing the member 67 in its adjusted position with respect to the member 69. By adjusting the position of the cam member 67, the time of opening of the valve may be varied so that the valve centering action may take place at different times during raising of the shovel. The cam member 67 may be actuated by various elements of the shovel raising means but herein is preferably actuated by the drum drive shaft 28 which is more conveniently located for this purpose. It will be noted that keyed to the drive shaft 28 of the shovel raising means is a screw 72 threadedly connected at 73 to a nut 74 formed integral with the reciprocable member 69, so that when the screw is rotated the nut member is moved longitudinally of the shaft. A pipe 75 connects the valve casing bore with a pipe connection 76 in turn connected to the supply pipe connection 35, and a pipe 77 leads from the valve casing bore to the pipe connection 56. The valve casing 59 has vent ports 78 so that when the valve is in its lowered position, as shown in Fig. 8, the supply of pressure fluid to the centering and locking cylinders is cut off and the centering and locking cylinders are concurrently vented to atmosphere.

The mode of operation of the improved mine car loader is as follows. The loader is propelled along the trackway by the motor 8 under the control of the reversing valve 10. When the loader is located with respect to the muck pile and it is desired to effect loading at one side of the trackway 3, the operator may manually turn the swivelled frame 4 relative to the truck frame 1 into the dotted line position indicated in Fig. 4. The shovel 13 is then advanced into the muck pile by advancing the loader bodily along the trackway, and when the shovel is substantially filled, the motor 24 is operated to effect swinging of the shovel upwardly on its rocker mounting 15, 17 through the chains 20 and chain drums 21 under the control of the valve 29 operated by the hand lever 31. After the shovel has been swung upwardly a distance sufficient to clear the muck pile, as indicated in the lower dotted line position shown in Fig. 3, the screw 72, driven by the chain drum drive shaft 28, effects movement of the cam member 67 to the left in Fig. 9, thereby lifting the valve 61 to admit pressure fluid from the pipe 75 through the space between the spools 62 on the valve and through the pipe connections 77, 56 and 57 to the forward ends of the centering cylinders 44 and the upper end of the locking cylinder 51. The effective one of the pistons 45 in the centering cylinders acts through its connecting rod 47 and pin 49 to move the shovel from its laterally located position horizontally into alinement with the truck frame so that as the shovel is swung upwardly toward its dumping position, discharge of the shovel contents into the mine car M is assured. Concurrently, pressure fluid is supplied to the locking cylinder 51, and when the shovel is centered with respect to the truck frame the locking pin 53 enters the locking recess 54, thereby locking the swivelled frame 4 to the truck frame 1. As the shovel approaches its raised dumping position, as indicated in dotted lines in Figs. 1 and 3, the shovel arm cross plate 39 engages the buffer springs 38 and as a result the shovel is abruptly stopped, thereby effecting discharge of the shovel contents into the mine car. When the shovel reaches its raised dumping position, the operator operates the reversing valve 29 by manipulating the hand lever 31, to effect reversal of the motor 24, and as the hand lever 31 is moved to effect reversal of the

motor the valve device 43 is operated to effect a supply of pressure fluid to the return cylinder 40 to initiate return movement of the shovel to its lowered digging position. As the shovel moves downwardly, the chain drum drive shaft 28 rotates in the reverse direction, thereby causing the cam member 67 through the screw and nut to move to the right in Fig. 9, and as a result the valve 61 is released and moves into a position to cut off the supply of pressure fluid to the centering and locking cylinders 44 and 51 and to vent these cylinders to atmosphere. The shovel may then be moved laterally to the desired digging position.

It will be evident that when the shovel is in a laterally located digging position to effect loading at the side of the trackway, the shovel is first advanced toward the muck pile to effect filling of the shovel, the shovel is then raised slightly to clear the muck pile, and thereafter, upon continued raising of the shovel, automatic horizontal centering of the shovel with respect to the truck frame takes place. When the shovel is in alinement with the truck frame, raising of the shovel is continued and when the shovel approaches its dumping position, it engages the shock absorbing springs, which act to check rearward shovel movement, and the shovel contents are discharged into the mine car. The shovel raising motor is then reversed and concurrently the return cylinder 40 is operated to initiate return shovel movement, and as the shovel swings downwardly toward its lowered digging position, the centering and locking cylinders are automatically vented. The shovel may be positioned at either side of the trackway simply by manually swinging the swivelled frame 4 relative to the truck frame 1, and irrespective of the laterally swung position of the shovel the latter is always automatically centered as it is swung upwardly toward its dumping position. Should loading on a curve be desired, the screw 71 may be released and the cam 67 be made ineffective.

As a result of this invention it will be noted that an improved mine car loader is provided having improved means for automatically centering the shovel with respect to the loader base as the shovel moves upwardly toward its dumping position. It will further be noted that by operating the control means for the centering means by an element of the shovel swinging means, automatic alinement of the shovel with respect to the loader base is assured. It will still further be evident that by the provision of the adjustable cam member for operating the centering control valve, the time that centering takes place may be varied and at times the cam member may be entirely released so that the automatic centering action may be interrupted, for instance when the loader is operating on a curved trackway. By the provision of the fluid actuated centering cylinders and the automatic control valve, the means for centering the shovel is simplified and made more flexible than previously known devices, while at the same time a positive and automatic centering action is attained. Other uses and advantages of the improved mine car loader will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

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

1. In a material loading apparatus, the combination comprising a portable base, a frame swivelled on said base to turn horizontally relative thereto about a vertical axis, a shovel mounted on said swivelled frame to swing in a vertical direction relative thereto from its lowered material-digging position to its raised dumping position, means for swinging said shovel in a vertical direction as aforesaid relative to said frame, power-operated self-centering means for said shovel automatically rendered effective when said shovel is swung upwardly a predetermined distance with respect to said frame for turning said swivelled frame horizontally relative to said base automatically to aline said shovel with said base as said shovel swings upwardly toward its dumping position, said centering means automatically becoming ineffective further to turn said swivelled frame when said shovel is alined with said base, and means actuated by an element of said shovel swinging means for automatically controlling said self-centering means.

2. In a material loading apparatus, the combination comprising a portable base, material loading means mounted on said base to swing horizontally relative thereto into a laterally located position at one side of said base, means for moving said loading means relative to said base to effect its loading functions, power-operated self-centering means for said loading means rendered effective by the horizontal swinging movement of said loading means relative to said base and operative to impart to said loading means a horizontal centering movement irrespective of the horizontally swung position of said loading means relative to said base, said centering means being automatically rendered ineffective further to swing said loading means when the latter assumes its centered position with respect to said base, and means actuated by an element of said means for moving said loading means for automatically controlling said centering means.

3. In a material loading apparatus, the combination comprising a portable base, loading means pivotally mounted on said base to swing both horizontally and vertically relative to said base, means for swinging said loading means vertically relative to said base from its lowered material-receiving position to its raised material-discharging position, said loading means being swingable horizontally relative to said base into a material-loading position at one side of the path of movement of said base, power-operated self-centering means for said loading means operable irrespective of the horizontally swung position of said loading means relative to said base including means for imparting to said loading means a horizontal swinging torque automatically discontinued at approximately the centered position of said loading means with reference to horizontal swing relative to said base, and means actuated by an element of said means for vertically swinging said loading means for controlling said torque imparting means.

4. In a material loading apparatus, the combination comprising a portable base, material loading means swivelly mounted on said base to swing horizontally relative thereto, said loading means being swingable horizontally relative to said base into a laterally located position at one

side of the path of movement of said base, means for operating said loading means to effect its loading functions, power-operated centering means for said loading means for swinging the latter from its laterally located position at one side of said base into its centered position with reference to horizontal swing with respect to said base, said centering means including means for imparting to said loading means a centering torque discontinued automatically at approximately the centered position of said loading means with reference to horizontal swing with respect to said base, and means actuated by an element of said operating means for said loading means for automatically controlling said torque imparting means.

5. In a material loading apparatus, the combination comprising a portable base, material loading means swivelly mounted on said base to swing horizontally relative thereto, said loading means being swingable horizontally relative to said base into a laterally located position at one side of the path of movement of said base, means for operating said loading means to effect its loading functions; power-operated centering means for said loading means for swinging the latter from its laterally located position at one side of said base into its centered position with reference to horizontal swing with respect to said base, said centering means including means for imparting to said loading means a centering torque discontinued automatically at approximately the centered position of said loading means with reference to horizontal swing with respect to said base, said centering means including a fluid actuated cylinder and piston device operatively connected to said base and said loading means and moved into its effective centering-movement-imparting position by horizontal swinging movement of said loading means into its laterally located position at one side of said base and reaching its limit of effective centering-imparting movement when said loading means assumes its central position with reference to horizontal swing with respect to said base, and means actuated by an element of said means for operating said loading means for automatically controlling said torque imparting means, said controlling means including means for controlling the supply of pressure fluid to said cylinder and piston device.

6. In a material loading apparatus, the combination comprising a portable base, loading means mounted on said base to swing both horizontally and vertically relative thereto, said loading means being swingable vertically relative to said base from its lowered material-receiving position to its raised material-discharging position and said loading means being swingable horizontally relative to said base into a laterally located position at one side of the path of movement of said base, means for vertically swinging said loading means, power-operated self-centering means for said loading means operable irrespective of the horizontally swung position of said loading means relative to said base, for swinging said loading means horizontally relative to said base, automatically, upon continued supply of motive power thereto, to aline said loading means, with reference to swing horizontally relative to said base, with respect to said base during the vertical swinging movement of said loading means, said self-centering means embodying means for automatically interrupting the horizontal swinging force imparted to said loading means when said loading means assumes said alined position, and means actuated by an element of said means for vertically swinging said loading means for automatically controlling said centering means.

7. In a material loading apparatus, the combination comprising a portable base, material loading means mounted on said base to swing horizontally relative thereto into a laterally located position at one side of said base, means for moving said loading means in a vertical direction relative to said base to effect its loading functions, power-operated self-centering means for said loading means operative to impart to said loading means a horizontal centering movement irrespective of the horizontally swung position of said loading means relative to said base for automatically alining said loading means relative to said base during movement of said loading means in a vertical direction, and means actuated by an element of said means for vertically moving said loading means for automatically controlling said centering means.

8. In a material loading apparatus, the combination comprising a portable base, loading means pivotally mounted on said base to swing both horizontally and vertically relative thereto, means for swinging said loading means vertically relative to said base from its lowered material-receiving position to its raised material-discharging position, said loading means being swingable horizontally relative to said base into a material-loading position at one side of the path of movement of said base, power-operated self-centering means for said loading means for swinging said loading means horizontally relative to said base for automatically alining said loading means relative to said base during vertical swinging movement of said loading means, and means actuated by an element of said means for vertically swinging said loading means for automatically controlling said centering means.

9. In a material loading apparatus, the combination comprising a portable base, loading means pivotally mounted on said base to swing both horizontally and vertically relative thereto, means for swinging said loading means vertically relative to said base from its lowered material-receiving position to its raised material-discharging position, said loading means being swingable horizontally relative to said base into a material-loading position at one side of the path of movement of said base, fluid actuated self-centering means for said loading means for swinging said loading means horizontally relative to said base to aline said loading means relative to said base during vertical swinging of said loading means, and means actuated by an element of said means for vertically swinging said loading means for controlling the flow of pressure fluid to said centering means.

10. In a material loading apparatus, the combination comprising a portable base, loading means pivotally mounted on said base to swing both horizontally and vertically relative thereto, means for swinging said loading means vertically relative to said base from its lowered material-receiving position to its raised material-discharging position, said loading means being swingable horizontally relative to said base into a material-loading position at one side of the path of movement of said base, fluid actuated self-centering means for said loading means for swinging said loading means horizontally relative to said base to aline said loading means relative to said base

during vertical swinging of said loading means, said self-centering means including cylinder and piston centering devices, and means actuated by an element of said means for vertically swinging said loading means for controlling the flow of pressure fluid to said cylinder and piston centering devices.

11. In a material loading apparatus, the combination comprising a portable base, loading means pivotally mounted on said base to swing both horizontally and vertically relative thereto, means for swinging said loading means vertically relative to said base from its lowered material-receiving position to its raised material-discharging position including winding means, a flexible element operatively connected between said winding means and said loading means and a driving element for said winding means, said loading means being swingable horizontally relative to said base into a material-loading position at one side of the path of movement of said base, power-operated self-centering means for said loading means for swinging said loading means horizontally relative to said base automatically to aline said loading means relative to said base during vertical swinging of said loading means, and means actuated by said driving element for said winding means for automatically controlling said self-centering means.

12. In a material loading apparatus, the combination comprising a portable base, a frame swiveled on said base to turn relative thereto about a vertical axis, a shovel pivotally mounted on said swiveled frame to swing in a vertical direction relative thereto, means for swinging said shovel in a vertical direction relative to said frame including a rotatable member operatively connected to said shovel and a driving element for said rotatable member, power-operated means for turning said frame about its vertical axis relative to said base, and means actuated by said driving element for automatically controlling said turning means.

13. In a material loading apparatus, the combination comprising a portable base, a frame swiveled on said base to turn relative thereto about a vertical axis, a loading member mounted on said swiveled frame to move from material-receiving position to material-dumping position relative thereto, means for moving said loading member as aforesaid relative to said frame including a driven member operatively connected to said loading member and a driving element for said driven member, power operated means for turning said frame about its vertical axis relative to said base, and means actuated by said driving element for automatically controlling said turning means.

14. In a material loading apparatus, the combination comprising a portable base, loading means mounted on said base to move both in horizontal and vertical directions relative to said base, means for moving said loading means in a vertical direction relative to said base from its material-receiving position to its material-discharging position, said loading means being movable in a horizontal direction relative to said base into a material-loading position at one side of the path of movement of said base, self-centering means for said loading means for moving the latter in a horizontal direction into alinement with said base during movement of said loading means in a vertical direction relative to said base, and means actuated by an element of said means for vertically moving said loading means for controlling said self-centering means.

15. In a material loading apparatus, the combination comprising a portable base, loading means mounted on said base to move both in horizontal and vertical directions relative to said base, means for moving said loading means in a vertical direction relative to said base from its material-receiving position to its material-discharging position, said loading means being movable in a horizontal direction relative to said base into a material-loading position at one side of the path of movement of said base, power operated means for moving said loading means in a horizontal direction relative to said base, and means actuated by an element of said means for moving said loading means in a vertical direction for automatically controlling said power operated moving means.

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