Oct. 26, 1943. L. A. MAXSON 2,332,522

MATERIAL LOADING APPARATUS

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Fig. 1.

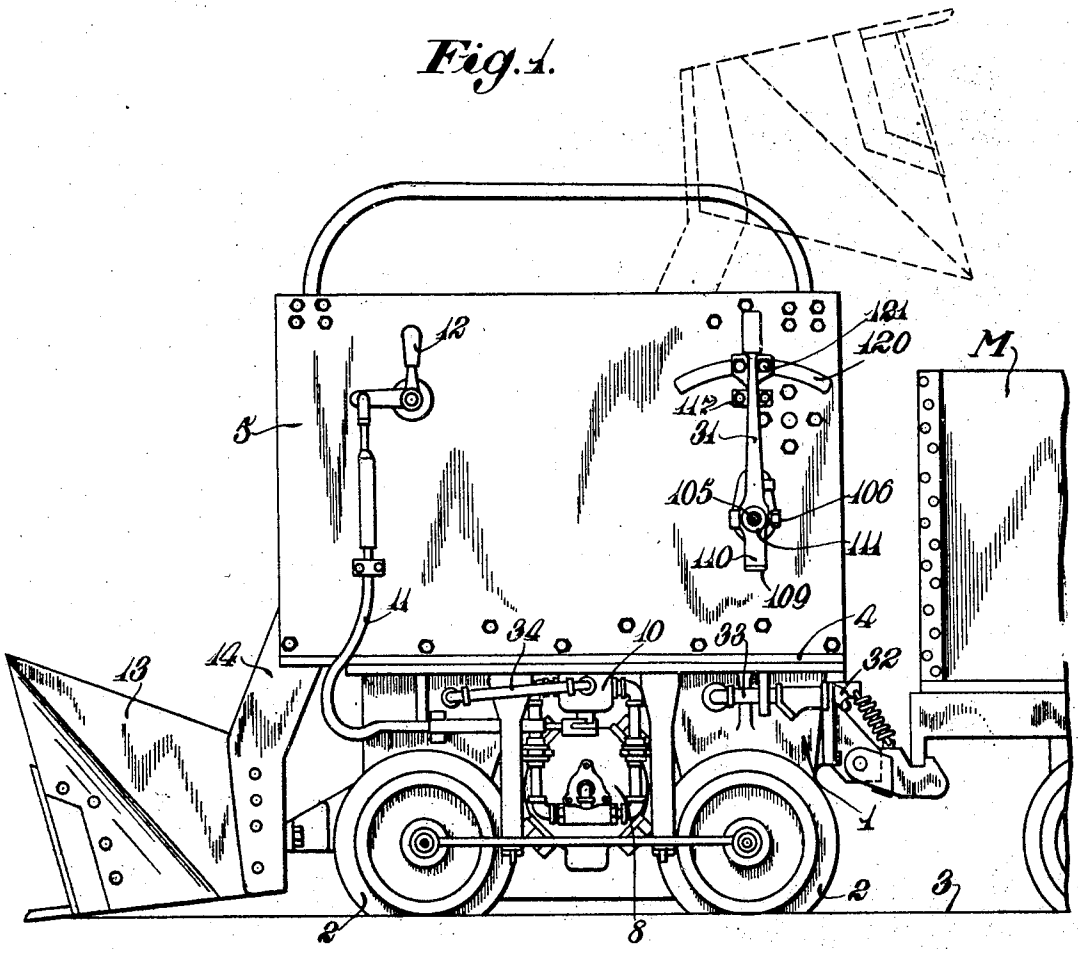
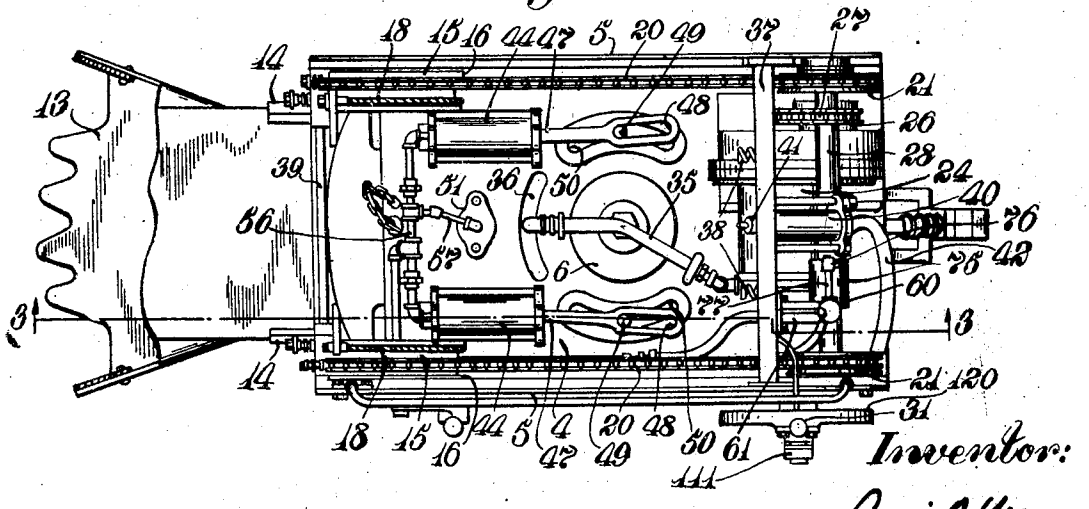


Fig. 2.



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Fig. 3.

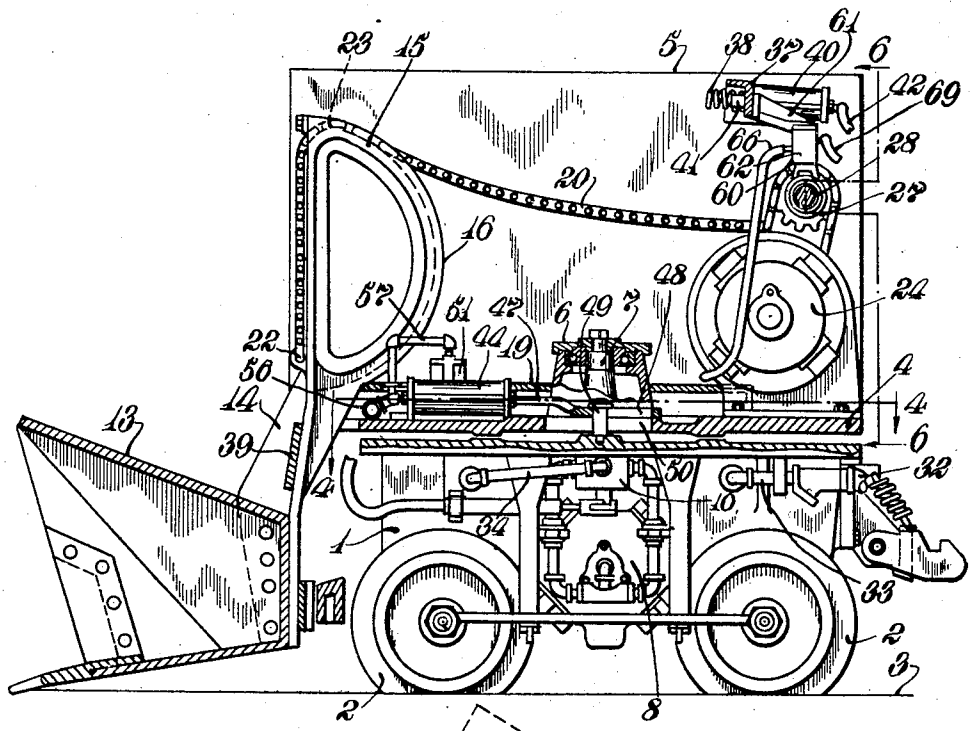


Fig. 4.

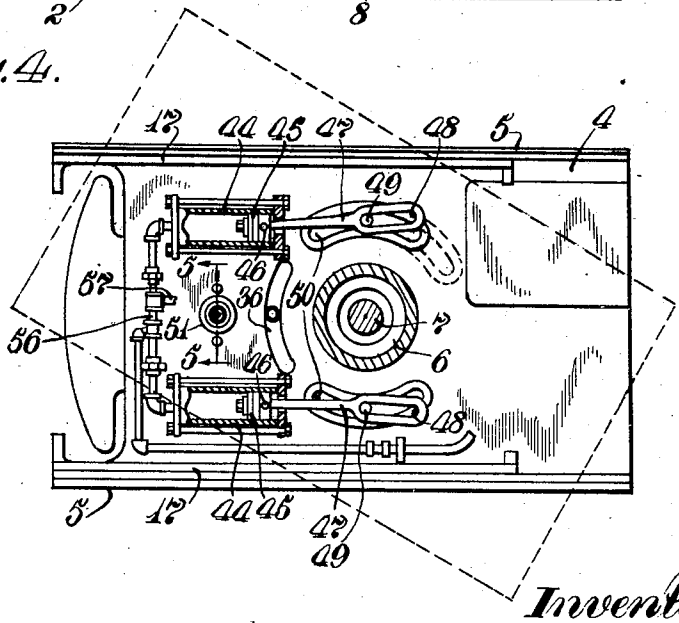
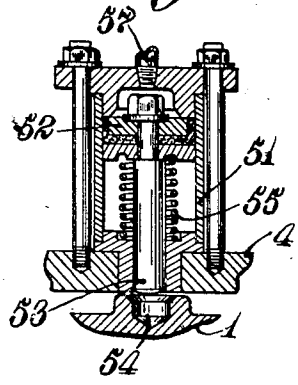


Fig. 5.



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Fig. 6.

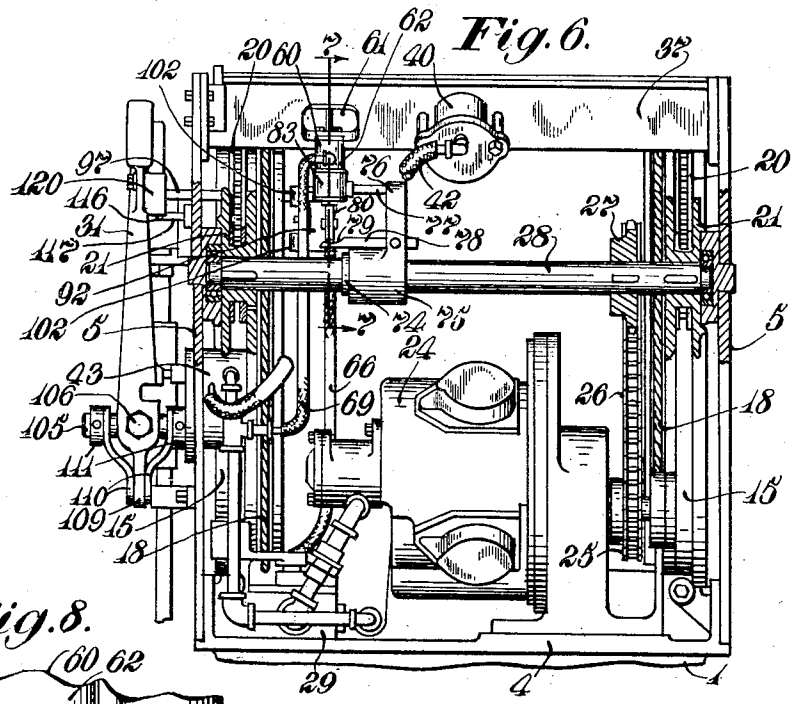


Fig. 8.

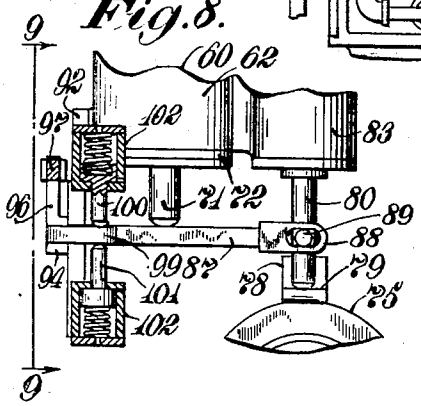


Fig. 7.

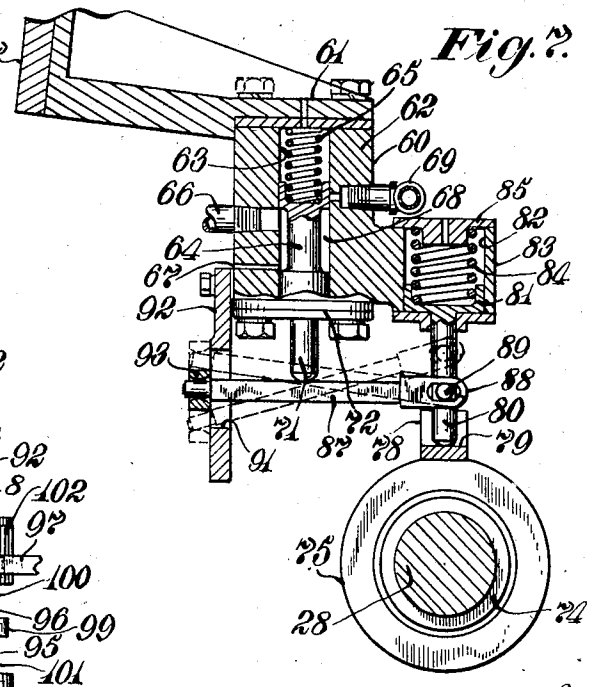
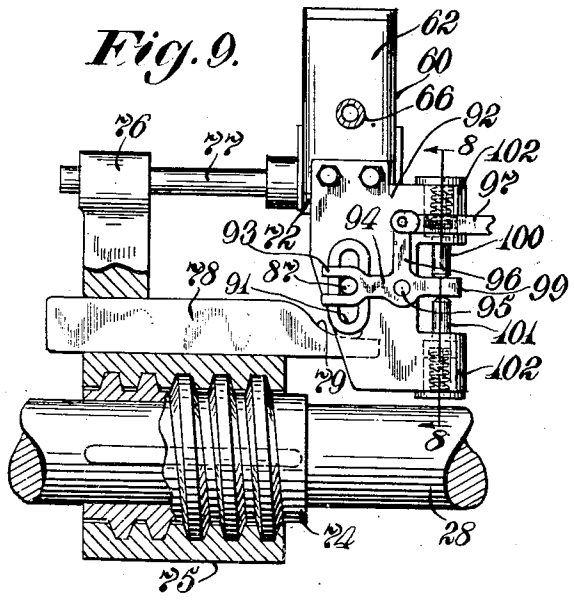


Fig. 9.



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Fig. 10.

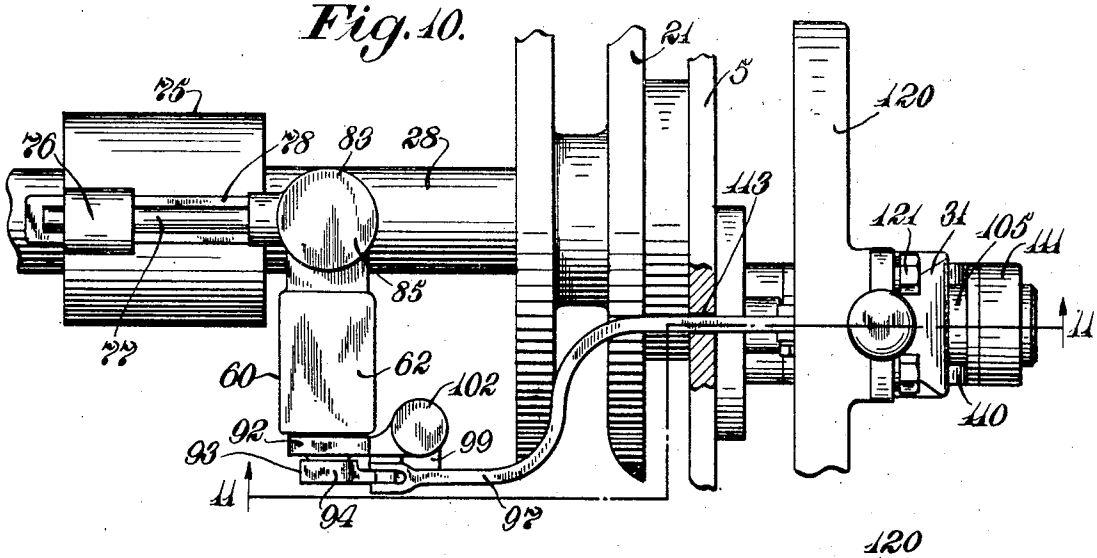


Fig. 11.

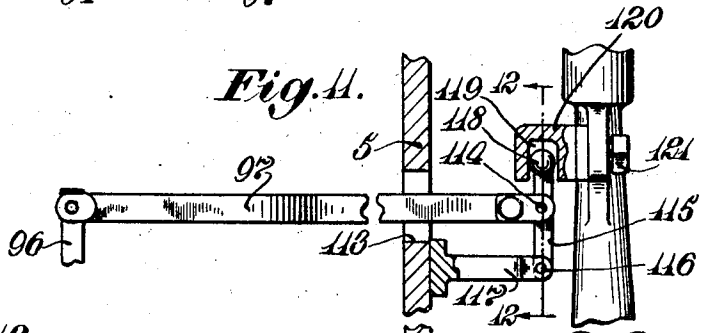
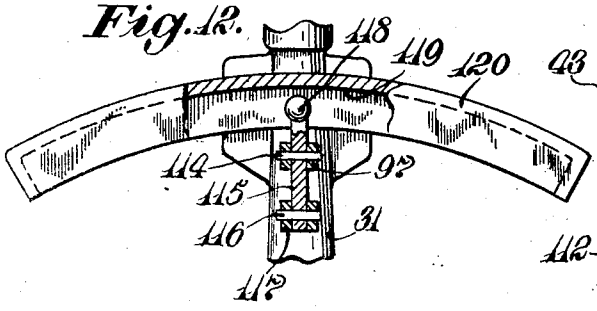


Fig. 12.



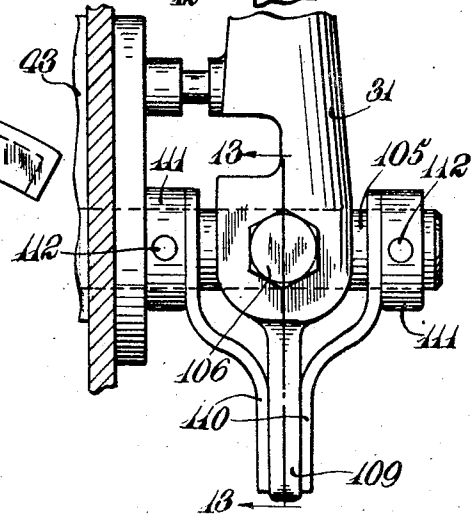
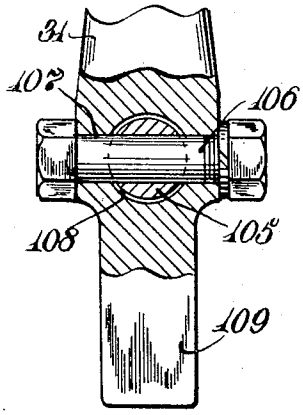


Fig. 13.



Inventor:

Louis A. Maxson

Patented Oct. 26, 1943

2,332,522

UNITED STATES PATENT OFFICE

2,332,522

MATERIAL-LOADING APPARATUS

Louis A. Maxson, Claremont, N. H., assignor to Sullivan Machinery Company, a corporation of Massachusetts

Application August 13, 1941, Serial No. 406,645

16 Claims. (Cl. 214—132)

My invention relates to material-loading apparatus, and more particularly to improvements in the self-centering means for the shovel of a mine car loader. From another aspect it relates to combined automatic and manual control means of general application.

In material-loading apparatus of the mine car loader type, the shovel mechanism of the loader is usually swivelly mounted on the loader base to permit adjustment horizontally into material digging positions, either in line with the path of travel of the base or at either side of the latter. The shovel of such loaders is usually moved manually horizontally relative to the base to the desired digging position, and when the shovel has been advanced into the material to be loaded so that it is filled to the desired degree with material, it is swung upwardly a short distance to clear the pile of material, and thereafter as the shovel continues its upward movement it is quite commonly automatically moved laterally during its upward swinging movement so that by the time it reaches discharge position it will be moving in upright planes parallel to the longitudinal center line of the loader base. The provision of automatic self-centering means usually involves, as a necessary result, centering each time the shovel approaches dumping position. As a result, when an automatic self-centering device is provided, loading on sharp curves may be made difficult because the car to receive the shovel contents may be out of line with the shovel base. Moreover, the time of self-centering is relatively fixed.

It is an object of my invention to provide an improved material-loading apparatus. It is another object of my invention to provide an improved material-loading apparatus having automatic self-centering means which is free from the disadvantages hereinabove stated. It is a further object of my invention to provide an improved material-loading apparatus having automatic self-centering means operative to effect self-centering at a predetermined time but equipped with auxiliary control means so that self-centering at any time by power shall be possible—either self-centering ahead of the time when this would be automatically effected or self-centering at a later time. It is still a further object of my invention to provide an improved material-loading apparatus in which improved means is provided for rendering instantly inoperative the automatic self-centering means with which the apparatus is equipped. Yet another object is to provide an improved combined manual and automatic control means for the shovel-centering means of a material-loading apparatus. Other objects and advantages of the invention will hereinafter more fully appear.

In the accompanying drawings in which for purposes of illustration one form which my invention may assume in practice is disclosed:

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 the line 3—3 of Fig. 2, and with parts broken away and others omitted.

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

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

Fig. 6 is a cross sectional view, with parts broken away, taken substantially on the line 6—6 of Fig. 3.

Fig. 7 is an enlarged detail vertical sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary view, with parts shown in section, on the plane of the line 8—8 of Fig. 9.

Fig. 9 is a detail elevational view taken on the line 9—9 of Fig. 8, with parts shown in section.

Fig. 10 is a plan view of portions of the controlling means.

Fig. 11 is a view with parts shown in section on the plane of the line 11—11 of Fig. 10 and with other parts shown in elevation.

Fig. 12 is a fragmentary view of a portion of the control mechanism shown in part in elevation and in part on the plane of the section line 12—12 of Fig. 11.

Fig. 13 is an enlarged fragmentary sectional view on the plane of the line 13—13 of Fig. 11.

The illustrative embodiment of the invention is shown in a mine car loader of a type commonly known as muck loader for loading loose muck or the like in metal mines. It will be evident that the invention may be embodied in loading apparatus of other types.

The mine car loader in which my invention is shown incorporated may be of the same general character as that disclosed in the copending application, owned by my assignee, Serial No. 319,184, filed Feb. 16, 1940, now Patent No. 2,268,569, dated Jan. 16, 1942, in the name of Robert C. Osgood, and comprises a self-propelled base, herein a truck frame 1 mounted on wheels 2

adapted to run along a trackway 3 laid on the mine floor. The 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 horizontally swiveled upper frame 4 has upstanding side walls 5, 5 and is mounted to turn by means of a bearing device 6 supported on a vertical shaft 7 fixed to the truck frame. The truck wheels may be driven by means of a reversible fluid operated motor 8 arranged on the truck frame beneath the swivel frame 4 and suitably connected in driving relation with the truck wheels so that the loader may be propelled in either of opposite directions along the trackway. The motor 8 is controlled by a conventional reversing valve 10 operated through a flexible push-pull connection 11 by means of a conveniently located handle 12.

The shovel mechanism includes a shovel or dipper 13 supported by parallel supporting arms 14 mounted on semi-circular rockers 15. These rockers have arcuate bearing surfaces 16 supported by and adapted to roll along a trackway provided by parallel horizontal guideways 17 extending longitudinally of the swivel frame 4. These rockers are yieldingly retained on the trackway guideways 17 by pairs of cables 18, 19, these cables passing around arcuate guiding grooves on the rockers 15 and each being secured at one end to the swivel frame 4, while its opposite end is connected by yielding spring connections to the rockers. These cables operate to retain the rockers 15 against displacement from the guideways 17 while at the same time compelling rolling movement of the rockers along the guideways and causing the shovel to travel through the desired path. To cause the shovel to undergo swinging movement between filling and emptying position, shovel-moving means is provided herein in the form of flexible chains 20 adapted to be wound on flanged drums 21, one end of each chain being fastened to the 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 lower digging position shown in full lines in Fig. 3, pass around arcuate guiding surfaces 23 on the rockers at points on the latter 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 towards its raised dumping position. Any suitable reversible fluid operated motor 24 mounted on the swivel frame 4 is operatively connected to rotate the chain winding drums 21, the motor power shaft herein having fixed thereto a drive sprocket 25 connected by an endless drive chain 26 and a sprocket 27 keyed to a shaft 28 to which the drums 21 are likewise keyed.

The drive shaft 28 is horizontally disposed and extends transversely between the vertical side walls 5 of the swivel frame and is appropriately journaled in bearings supported by the frame side walls in the manner shown in Fig. 6. The motor 24 may be controlled by a conventional reversing valve 29 similar to the reversing valve 10 and controlled through lever connections clearly disclosed in the Robert C. Osgood Patent 2,201,671, granted May 21, 1940, the lever connections being operable by a handle 31 in a manner also clearly described in the copending application above mentioned, though, as will be noted, the lever structure is modified in particulars which do not affect its control of the reversing valve 29.

The fluid supply to the motors 8 and 24 is delivered through a supply hose 32 connected to pipe connections 33 arranged on the truck frame beneath the swivel frame 4, and connected through a branch connection 34 to the reversing valve 10 of the motor 8. The pipe connections 33 also have a branch connection 35 extending vertically through an arcuate slot 36 in the swivel frame 4, this slot permitting turning movement of the swivel frame relative to the 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, 24 under the control of the valves 10 and 29 respectively irrespective of the swivelled position of the swivel frame 4 relative to the truck frame 1. A transverse member 37 extending between the vertical side walls 5 of the swivel frame 4 near the rear end of the latter carries 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 thus this plate and the buffer springs provide a yielding stop for the shovel. Upon the relatively abrupt stopping of the rearward swinging movement of the shovel by the buffer springs, the material in the shovel is discharged into a waiting mine car M shown in Fig. 1, located on the trackway 3 immediately to the rear of the loader and preferably coupled with the latter.

To initiate the return movement of the shovel to its lower digging position, the shovel must be initially moved forwardly past its center of gravity before it will drop down under its own weight, and to initiate this return movement a fluid operated return cylinder 40 is mounted on the transverse member 37, this cylinder containing 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 in like manner operated by the handle 31, and this return cylinder and the valve device 43 and the mode of operation described are all clearly set forth in the Patent 2,201,671 above mentioned. Upon pressure fluid supply to the rear end of the cylinder 40, the piston contained therein is moved upwardly 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 to bring its center of gravity ahead of its point of support, and the shovel thereafter swings downwardly under the action of the initial impetus derived from the thrust of the piston and the acceleration of gravity towards its lower digging position under the control of the drums 21 and the chains 20. Prior to the return movement of the shovel, the reversing valve 29 is of course manipulated to reverse the shovel swinging motor 24, and by the proper control of the motor 24 the downward swinging movement of the shovel may be controlled. As disclosed in Patent No. 2,201,671, when the lever is moved to actuate the reversing valve 29 to effect reversal of the motor 24, the valve device 43 is concurrently moved to effect a supply of pressure fluid to the return cylinder 40.

The automatic means herein disclosed for centering the shovel relative to the truck frame as the shovel swings upwardly from its lower digging position towards its raised dumping position comprises parallel fluid cylinders 44, 44 supported on the swivel frame 4 and each containing a reciprocable piston 45. Each of the pistons 45 has pivotally connected thereto at 46 a connecting rod 47 having a slotted end 48. Extending into the slots of the connecting rods are vertical pins 49 fixed to the truck frame 1 and projecting upwardly through arcuate slots 50 in the swivel frame 4, these latter slots permitting turning of the swivel frame relative to the relatively stationary pins. It will be noted that when the shovel is in a laterally located digging position with the swivel frame 4 in the position indicated in dotted lines in Fig. 4, a supplying of pressure fluid to the forward ends of the cylinders will cause that one of the cylinders which has moved rearwardly relative to its piston during the lateral swinging of the frame 4 to act to return the frame 4, together with the shovel mechanism, into alinement with the mine car M, thus assuring proper discharge of the shovel contents into the mine car. A fluid operated lock is provided for automatically locking the swivel 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 (Fig. 5) carried by the swivel 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 interposed between the lower surface of the piston 52 and the lower cylinder head normally maintains the locking pin in 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 locking cylinder 51 so that whenever pressure fluid is supplied to the centering cylinders 44, it is also supplied to the locking cylinder 51.

The immediate control of the fluid supply to the centering and locking cylinders is accomplished by means of a valve mechanism 60 which corresponds in some details of construction, though not in its control, with the valve mechanism illustrated, described and claimed in the copending application of Robert C. Osgood hereinbefore mentioned. The valve mechanism 60 is supported, as indicated in Fig. 7, by a bracket 61 secured to the transverse member 37, and comprises a valve casing 62 having therein an upright cylindrical bore 63 in which a piston type valve 64 is reciprocable. The valve 64 is normally held in its lowermost position by a spring 65, and in that position connects a line 66 which communicates with the pipe connections 56 and 57 with a vent 67 by means of a circumferential valve groove 68. When the valve 64 is in raised position, it connects a supply line 69 with the line 66. The valve 64 has an operating plunger 71 extending through an opening (not shown) in a lower cylinder head 72 secured to the bottom of the casing 62.

Means for automatically raising and permitting lowering of the plunger 71 is provided, this means being generally illustrated at the right hand side of Fig. 7, while at the other side of the valve mechanism from the automatic control means therefor there is arranged manual control means for the valve 64 effective selectively to preclude actuation thereof by the automatic means, or to permit manual operation of the valve 64 at any desired time.

Referring to Fig. 9, it will be observed that the transverse shaft 28 carries a screw 74 which is surrounded by a traveling nut 75, the nut being prevented from rotation by the coaction of a bored tang 76 thereon with a guide rod 77, and the nut carries adjustably secured thereto a cam member 78 having a cam portion 79 operative in certain positions of the nut 75 to act upon a plunger 80 and raise the latter to effect, as will shortly be described, the upward movement of the valve 64. The plunger 80 has an enlarged head 81 guided in a bore 82 formed in a lateral projection 83 integral with the casing 62. A spring 84 confined by a top head 85 for the bore 82 normally maintains the plunger 80 depressed. An actuating lever 87 is connected by means of a forked and slotted fitting 88 to a cross pin 89 carried by the plunger 80 so that the right hand end of the lever 87 shown in Fig. 7 will be raised and will swing the lever 87 counterclockwise about its left hand end when the cam 79 raises the plunger 80. The left hand end of the lever 87 projects through a slot 91 in a depending arm 92 fastened to the casing 62, and this left hand extremity is received in a fork 93 carried at the end of a pivoted bell crank lever 94 swingable about a pivot pin 95 mounted on the plate 92. The upper end of the upright arm 96 of the bell crank lever is adapted to be swung by a push and pull connection 97. The bell crank lever has a third arm 99 which is adapted normally to maintain the arm 94 in a horizontal position, a position in which the lever 87 will be horizontal unless the plunger 80 is raised by the cam 79. The arm 99 is engaged by the stems 100 and 101 of opposed spring pressed plunger devices 102, these devices being so constructed that each is adapted to return the left hand end of the lever 87 to a predetermined position when it is displaced in one direction therefrom, but so that when the lever 87 is horizontal the net effect of the plungers 100 and 101 is to hold the rod stationary in that position.

For the purpose of operating the push-pull connection, so-called, the lever 87 may be controlled by the handle 31. The construction of the handle is materially modified from that which is disclosed in the copending application of Robert C. Osgood above mentioned. The reversing valve 29 has an operating shaft or rod 105 by which it may be rotated, and the handle 31 is pivotable about a transverse pivot 106, herein a bolt, extending through the shaft 105 and through openings 107 formed in the handle 31 at opposite sides of an opening 108 therein. The lower end of the handle 31 terminates in the depending projection 109 which is engaged at its opposite sides by spring fingers 110 carried by collars 111 pinned as at 112 on the valve operating shaft 105. These spring fingers normally maintain the handle 31 vertical, but the handle may be swung about the pivot bolt 106 in planes extending transversely of the apparatus. The push-pull rod 97 passes through an opening 113 in the side plate 5 and is pivotally connected at 114 to an upright lever 115 which is fulcrumed at its lower end at 116 on a bracket 117 projecting outwardly from the side wall 5 of the swivel frame. The upper end of the lever 115 has herein a ball head 118 which is received in an arcuate

slot 119 formed in an arcuate member 120 secured to the handle 31 as by bolts 121 near the upper end of the handle. The provision of the arcuate member 120 enables transverse swinging movement of the handle 31 to take place while maintaining an operative connection between the handle and the push-pull rod 97.

The mode of operation of the apparatus above described will be clearly apparent from what has been said. It will be evident, referring particularly to Figs. 7 to 13, that the lever 31 may be swung in planes perpendicular to the axis of the valve operating shaft 105 to control the reversing valve device 29 and thereby control the raising and lowering of the shovel without in any way affecting the operation of the self-centering means, and if the swing of the handle 31 is in planes perpendicular to the axis of the valve operating shaft 105, the control of the self-centering will be wholly automatic, for the lever 87 will pivot about a stationary fulcrum at its left hand end within the fork 93 of the then stationary bell crank lever, as seen in Fig. 7, and upon the movement of the cam 79 beneath the stem 80 the right hand end of the lever 87 will be raised and the valve 64 moved upwardly to a position to supply air to the self-centering cylinders 44 at a predetermined point in the elevation of the shovel. Should it be desired to prevent the centering of the shovel altogether by the automatic means, the handle 31 may be thrust laterally towards the side frame 5 and through the connection 118, 119, the lever 115, the push rod 97 and the bell crank lever 94, the left hand end of the lever 87 may be depressed to the lower dotted line position shown in Fig. 7, under which condition full upward movement of the plunger 80 will be inadequate to move the intermediate portion of the lever 87 which engages with the stem 71 upwardly enough to lift the valve 64 to a position to connect the supply line 69 and the control line 66. It will be noted, moreover, that if it were desired to initiate self-centering under manual control before this would occur automatically, the handle 31 may be pulled outwardly at its top and through the linkage and lever mechanism described, the left hand end, referring to Fig. 7, of the lever 87 could be raised and the valve 64 moved upwardly to connect the supply line 69 and the control line 66 even while the plunger 80 is in its lowermost position with respect to the cam.

As a result of this invention, an improved centering means is provided for the shovel mechanism of a material-loading apparatus whereby the shovel may be centered with respect to the loader base as the shovel swings upwardly toward its discharging position, either under automatic or manual control. It will further be evident that by associating the manual control with the automatic control the control connections are rendered comparatively simple and foolproof. Also by the provision of the improved control means the automatic centering action may be interrupted at the will of the operator, this being extremely desirable when the apparatus is operating on a curved trackway. It will further be evident that I have provided an improved automatic and manual control device adaptable to other purposes and in which an automatic control can be anticipated in its control function, rendered incapable of performing its control function, or put out of operation after its control function is initiated, all under manual control. This control per se is being claimed in my copending application, Serial No. 443,776, which is a division of this present application. Other uses and advantages of the improved shovel-centering means 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, material-loading means mounted on said base to swing vertically relative thereto and to swing horizontally relative thereto into a laterally located position at one side of said base, power operated self-centering means for said loading means rendered effective when said loading means is swung horizontally out of alinement with said base and operative to impart to said loading means a horizontal centering movement irrespective of the horizontally swung uncentered 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 control means for said self-centering means for automatically rendering said centering means operative at a predetermined point in the vertical swinging movement of said loading means and embodying a control device operable either prior to or during the raising movement of said loading means for rendering said automatic control ineffective at the operator's will.

2. 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 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 uncentered 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 a horizontal centered position of said loading means relative to said base, and combined automatic and manual control means for said self-centering means embodying means for automatically rendering said self-centering means active at a predetermined point in the vertical swinging movement of said loading means and embodying a control device operable either prior to or during the raising movement of said loading means for rendering said automatic control ineffective at the will of the operator.

3. 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, power oper-

ated centering means for said loading means for swinging the latter from its laterally located position at one side of said base into its horizontally centered position with respect to said base, said centering means including means for imparting to said loading means a centering torque discontinued automatically at approximately the horizontal centered position of said loading means with respect to said base, automatic control means for said centering means for automatically rendering said centering means effective at a predetermined point in the loading movement of said loading means, and manually operable means for rendering said automatic control ineffective at the will of the operator and for effecting centering of said loading means with respect to said base at any desired time in the operation of said loading means.

4. In a material-loading apparatus, the combination comprising a portable base, a frame swivelled on said base to turn relative thereto about a vertical axis, a loading member mounted on said swivelled 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 to effect centering of said loading member relative to said base as the latter moves as aforesaid, means actuated by said driving element for automatically controlling said turning means, and a manually operable control device associated with said automatic control means for manually controlling said power operated means to effect centering of said loading member wholly independently of any control by said automatic means.

5. 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, means actuated by an element of said means for vertically moving said loading means for automatically controlling said self-centering means, and manually operable means for rendering said automatic controlling means ineffective at the operator's will and for rendering said self-centering means active at any time.

6. 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 to 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, means automatically actuated by an element of said means for moving said loading means in a vertical direction for automatically controlling said power operated means, and associated control means operable at will for rendering said power operated means effective independently of any actuation by said element.

7. 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, automatic control means for initiating operation of said self-centering means at a certain point in the path of vertical movement of said loading means, and a manually operable control device controllable at the operator's will for effecting operation of said self-centering means independently of initiation by said automatic control.

8. 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 to center said loading means relative to said base as said loading means approaches its material-discharging position, automatic means for controlling said power operated means automatically to initiate operation of said power operated means when said loading means reaches a predetermined point as it moves in a vertical direction as aforesaid, and a manually operable control device operable at will for initiating operation of said power operated means wholly independently of said automatic means whereby the centering action may take place at any desired time.

9. 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 to center said loading means relative to said base as said loading means approaches its material-discharging position, automatic means actuated by an element of said means for moving said loading means in a vertical direction for controlling said power operated means automatically to initiate operation of said

power operated means when said loading means reaches a predetermined point as it moves in a vertical direction as aforesaid, and manually operable means operable at will for initiating operation of said power operated means wholly independently of said automatic means whereby the centering action may take place at any desired time.

10. In a material-loading apparatus, the combination comprising a portable base, material-loading means mounted on said base for movement with respect thereto to effect the material loading function, said material-loading means being swivelly mounted on said base to swing horizontally relative to said base into a laterally located position at one side of the path of movement of said base, 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 horizontally centered position with respect to said base, said centering means including means for imparting to said loading means a centering torque discontinued automatically at approximately the horizontal centered position of said loading means with respect to said base, means for automatically initiating operation of said self-centering means at a predetermined point in the loading operation, and a control device operable at will for initiating operation of said self-centering means prior to the time said automatic control comes into effect.

11. In a material-loading apparatus, the combination comprising a portable base, material-loading means mounted on said base for movement with respect thereto to effect the material loading function, said material-loading means being swivelly mounted on said base to swing horizontally relative to said base into a laterally located position at one side of the path of movement of said base, 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 horizontally centered position with respect to said base, said centering means including means for imparting to said loading means a centering torque discontinued automatically at approximately the horizontal centered position of said loading means with respect to said base, means for automatically initiating operation of said self-centering means at a predetermined point in the loading operation, and manual control means operable at will for initiating operation of said self-centering means prior to the time said automatic control comes into effect, said manual control means being operable at will to render said automatic means wholly ineffective.

12. In a material-loading apparatus, the combination comprising a portable base, a frame swivelled on said base to turn about a vertical axis, a shovel mechanism mounted on said swivelled frame and including a shovel movable in a vertical direction from a lowered digging position to a raised dumping position, said frame being turnable about its swivel to locate said shovel in a digging position at one side of the path of movement of said base, centering means for turning said frame about its swivel to aline said shovel with said base as said shovel moves toward its raised dumping position, automatic control means for said centering means for effecting operation of the latter at a predetermined point in the path of movement of said shovel, at will to effect operation of said centering means prior to the time said automatic control comes into effect.

13. In a material-loading apparatus, the combination comprising a portable base, a frame swivelled on said base to turn about a vertical axis, a shovel mechanism mounted on said swivelled frame and including a shovel movable in a vertical direction from a lowered digging position to a raised dumping position, said frame being turnable about its swivel to locate said shovel in a digging position at one side of the path of movement of said base, centering means for turning said frame about its swivel to aline said shovel with said base as said shovel moves toward its raised dumping position, automatic control means for said centering means for effecting operation of the latter at a predetermined point in the path of movement of said shovel, and manually operable control means operable at will to effect operation of said centering means prior to the time said automatic control comes into effect, said manually operable control means being operable to render said automatic control wholly ineffective.

14. In a material-loading apparatus, the combination comprising a portable base, a frame swivelled on said base to turn about a vertical axis, a shovel mechanism mounted on said swivelled frame and including a shovel movable in a vertical direction from a lowered digging position to a raised dumping position, said frame being turnable about its swivel to locate said shovel in a digging position at one side of the path of movement of said base, centering means for turning said frame about its swivel to aline said shovel with said base as said shovel moves toward its raised dumping position, automatic control means for said centering means for effecting operation of the latter at a predetermined point in the path of movement of said shovel, and manually operable control means operable at will to effect operation of said centering means prior to the time said automatic control comes into effect, said automatic and manually operable control means including a common control element operable either automatically or manually.

15. 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 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 horizontal centered position of said loading means relative to said base, and combined automatic and manual control means for said self-centering means embodying means for automatically rendering said self-centering means active at a predetermined point in the vertical swinging movement of said loading means and embodying a control device for rendering said self-centering means effective at the will of the operator

point by the vertically swinging loading means.

16. 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 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, means normally automatically actuated by an element of said means for vertically moving said loading means for effecting an actuation of said centering means whenever said loading means is swung above a predetermined level, and a manually operable control device operable either prior to or during the raising movement of said loading means for rendering said automatic control by said loading means ineffective at the operator's will.

LOUIS A. MAXSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,332,522. October 26, 1943.

LOUIS A. MAXSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, second column, line 53, for "Jan. 16, 1942" read --Jan. 6, 1942--; page 2, second column, line 60, for "point" read --points--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of February, A. D. 1944.

Henry Van Arsdale,

(Seal) Acting Commissioner of Patents.