Jan. 13, 1953 R. C. OSGOOD ET AL 2,625,281

FLUID SUPPLY CONNECTION FOR SHOVEL CENTERING MEANS

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Fig. 1.

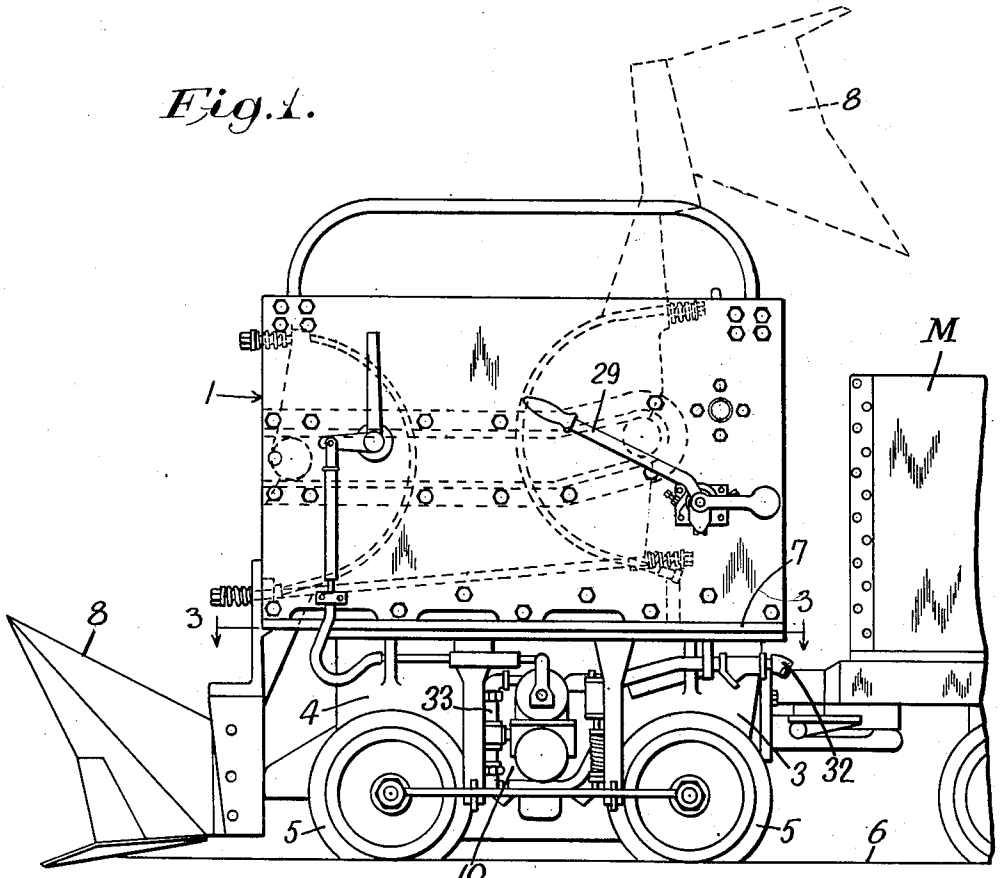
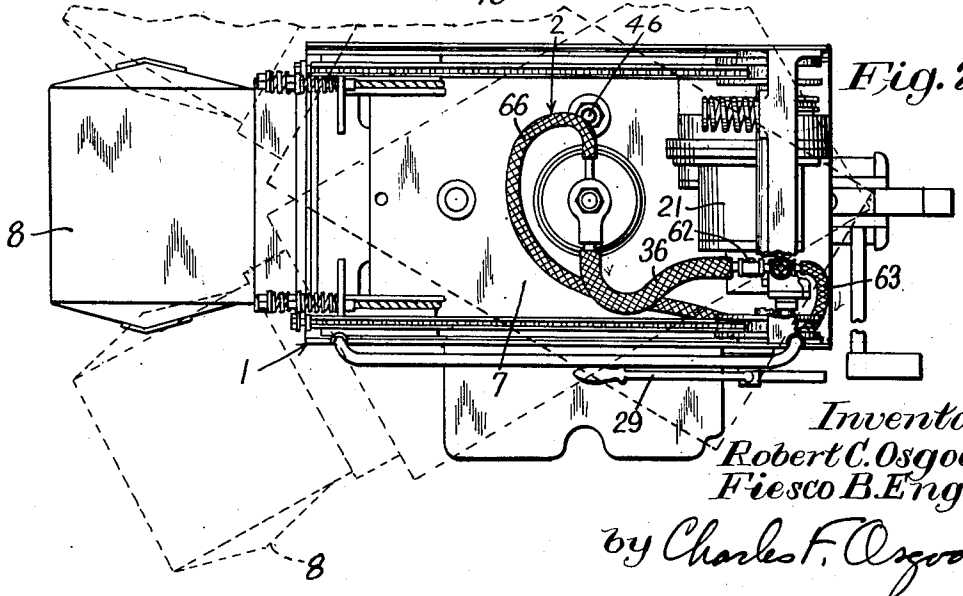


Fig. 2.



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Fig. 3

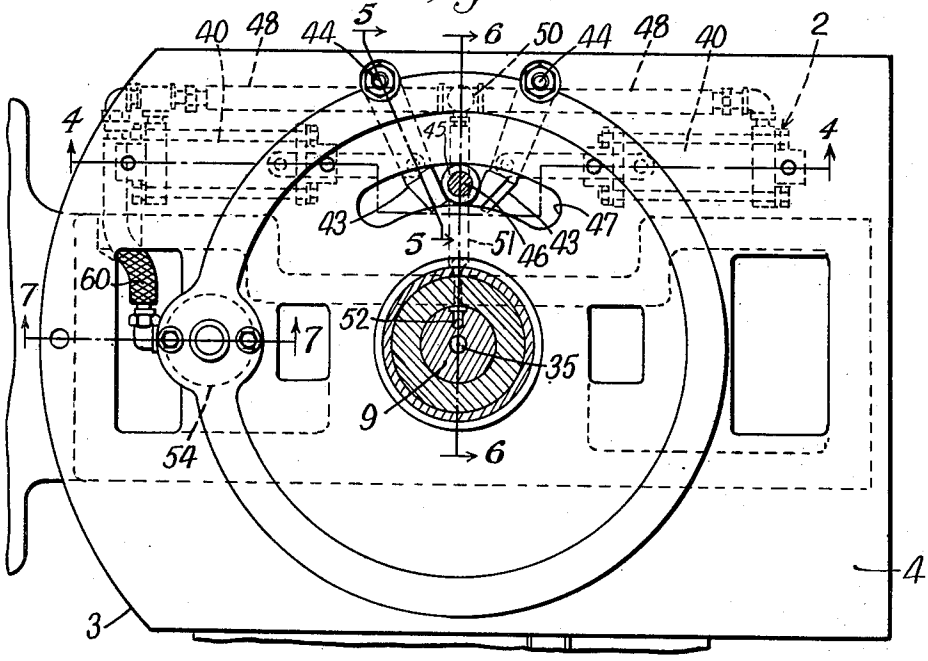


Fig. 4

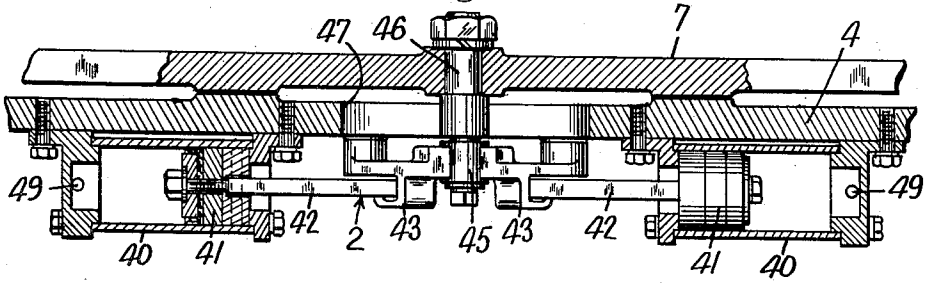
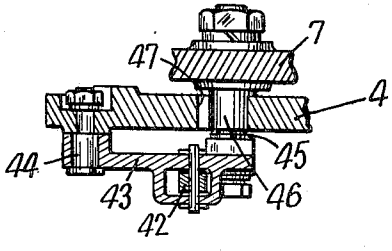


Fig. 5



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Fig. 6

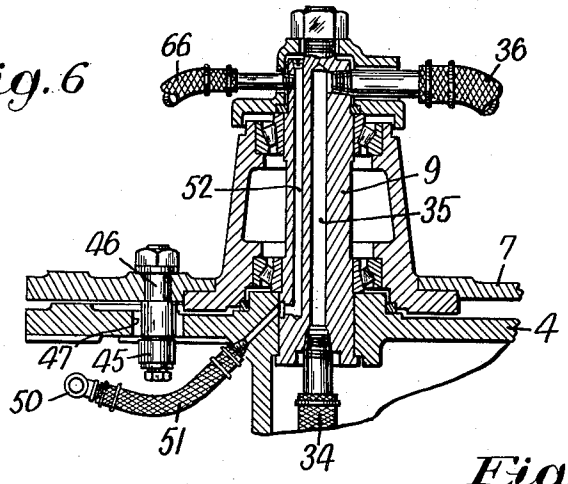


Fig. 7

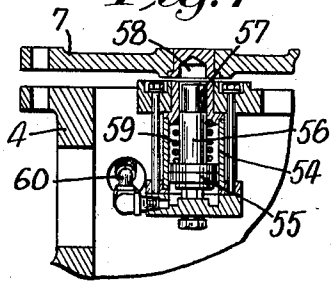
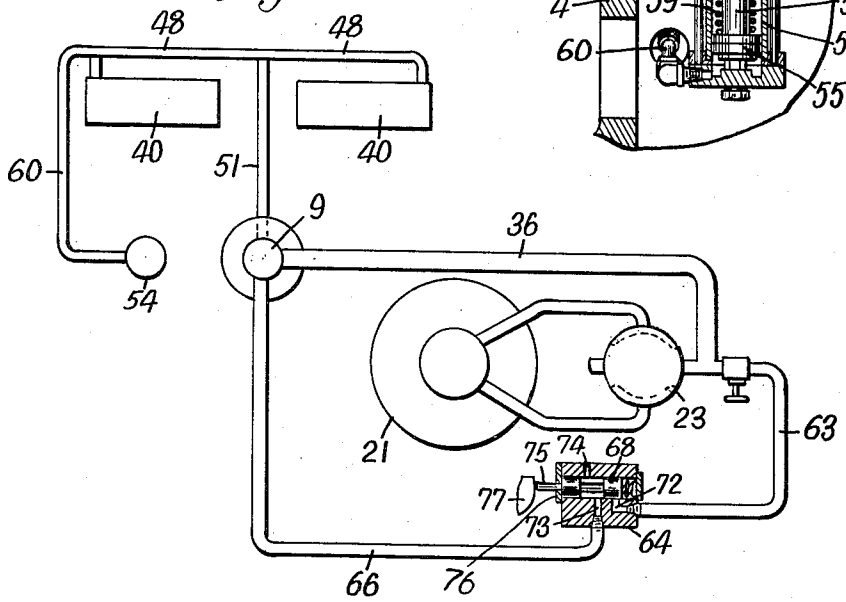


Fig. 8



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UNITED STATES PATENT OFFICE

2,625,281

FLUID SUPPLY CONNECTION FOR SHOVEL CENTERING MEANS

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Application November 6, 1945, Serial No. 626,954

2 Claims. (Cl. 214—132)

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This invention relates to material loading apparatus and more particularly to an improved shovel loader having improved fluid supply means associated with the vertical swivel of the shovel on the base.

It is an object of the present invention to provide an improved material loading apparatus. Another object is to provide an improved fluid conducting means between a fluid supply connection on the turntable and the centering cylinders on the loader base and embodying a fluid conducting passage extending downwardly through the turntable swivel. These and other objects and advantages of the invention will, however, hereinafter more fully appear.

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 shovel loader in which an illustrative form of the invention is embodied, and showing a mine care coupled to the rear end of the loader.

Fig. 2 is a plan view of the shovel loader shown in Fig. 1.

Fig. 3 is an enlarged horizontal sectional view taken substantially on line 3—3 of Fig. 1.

Fig. 4 is an enlarged longitudinal vertical sectional view taken substantially on line 4—4 of Fig. 3, illustrating the centering cylinders.

Fig. 5 is a detail vertical sectional view taken on line 5—5 of Fig. 3.

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

Fig. 7 is a longitudinal vertical sectional view taken substantially on line 7—7 of Fig. 3.

Fig. 8 is a diagrammatic view showing the control valves and associated fluid connections, with the valves in shovel raising and centering positions.

In this illustrative embodiment of the invention there is shown a material loading apparatus of the shovel loader type, generally designated 1, in which the improved automatic shovel centering means, generally designated 2, is embodied. The shovel loader may be of the same general character as that disclosed in the R. C. Osgood Patent No. 2,268,570, dated January 6, 1942, and comprises a portable base 3 having a base frame 4 mounted on wheels 5 adapted to travel along a trackway 6. Swivelled on the base is a turntable 7 on which a vertically swingable shovel or bucket 8 is mounted. The base frame 4 has fixed thereto a vertical shaft 9 supporting bearings on which the turntable is journaled, and the turntable

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may be turned on its bearing mounting into positions to locate the shovel laterally at either side of the base so that the shovel may dig into the material to be loaded at either side of the trackway. As disclosed in the patent above referred to, a conventional reversible fluid motor 10 on the base frame 4 beneath the turntable is operatively connected to the wheels 5 for propelling the loader back and forth along the trackway, and the traction of the wheels is utilized to effect digging of the shovel forwardly into the material to be loaded. A reversible fluid motor 21 mounted on the turntable effects upward swinging of the shovel and permits controlled lowering of the shovel. The motor 21 is controlled by a conventional reversing valve 23 provided with an operating lever 29. Coupled to the rear end of the loader base is a mine car M, having its wheels guided on the trackway.

Pressure fluid may be supplied to the motors 10 and 21 through a supply hose 32 on the base coupled to branched pipe connections 33 and 34 arranged on the base frame beneath the turntable. The pipe connection 34 is connected to the lower end of an axial passage 35 in the stationary vertical shaft 9 (Fig. 6) and the upper end of the passage 35 is connected by a flexible hose 36 to the fluid supply for the shovel motor 21. Pressure fluid may flow to the automatic centering mechanism 2 for the shovel also under the control of the operating lever 29 for the motor reversing valve in an improved manner as will hereinafter be fully described.

The automatic centering mechanism 2 serves to aline the shovel with respect to the loader base as the shovel moves upwardly from a laterally located digging position so that discharge of the shovel contents into the mine car M is assured. This centering mechanism may be generally similar to that shown in the R. C. Osgood Patent No. 2,365,773, dated December 26, 1944, and comprises alined fluid motors preferably in the form of fluid cylinders 40, 40 extending longitudinally along one side of the base frame beneath the turntable and containing oppositely acting reciprocable pistons 41, 41. These pistons are pivotally connected by links 42 to horizontally swingable arms 43, 43 pivoted on vertical pivot pins 44 secured to the top of the base frame. These arms are swingable horizontally into engagement with a roller 45 (Fig. 3) journalled on the lower end of a vertical pin 46 (Fig. 4) secured to the swivelled turntable 7. This pin projects vertically through an arcuate slot 47 struck on a radius from the turntable axis in the top

of the base frame. The pin and roller 45 are movable horizontally with the turntable relative to the base frame and the arcuate slot in the top of the base frame permits such movement. Pressure fluid may be supplied to the centering cylinders 40 at the remote ends of the pistons through hoses 48, 48 connected to passages 49 in the outer cylinder heads and connected at their adjacent ends by a T 50 to a hose 51, the latter having communication with an axial passage 52 in the shaft 9. The passage 52 has fluid supplied thereto as will later be described. It will thus be seen that pressure fluid may flow from the passage 52 in the shaft 9, through hose 51, T 50, hoses 48, 48 and the passages 49 in the cylinder heads, concurrently to the cylinder bores. Arranged on the base frame beneath the turntable is a vertically disposed fluid cylinder 54 (Figs. 3 and 7) containing a reciprocable piston 55 having its piston rod 56 extending upwardly within the top cylinder head, and the upper end of this piston rod has formed thereon a locking pin 57 which is receivable in a locking recess 58 formed in the turntable 7. A coil spring 59 urges the piston downwardly toward its released position. A hose 60 communicates with the lower end of the cylinder 54 for supplying pressure fluid to the cylinder, and this hose is connected to one of the hoses 48 so that when pressure fluid is supplied to the centering cylinders, it is supplied concurrently to the locking cylinder. It will thus be seen that when the shovel supporting turntable is power-swung from a lateral position into alinement with the loader base, it is automatically locked in such position by the locking pin 57. When the centering cylinders are vented to atmosphere, the locking cylinder 54 is concurrently vented.

Now referring to the improved means for rendering the centering means automatic so that the shovel is brought into alinement with the base whenever the shovel raising motor is operated to raise the shovel at a normal loading speed from its digging position to its dumping position, it will be noted that the fluid supply hose 36 is connected by a T 62 to a supply passage of the reversing valve 23 for the motor 21, and leading from the T 62 is a hose 63 (Figs. 2 and 8) connected to a casing 64 of an auxiliary control valve 65 for the centering means, and leading from the control valve casing 64 is a flexible hose 66 connected to the upper end of the passage 52 in the shaft 9 (Fig. 6). The casing 64 for the control valve 65 is secured to the inner side of the adjacent vertical side plate 14 and has a horizontal bore 67 receiving a reciprocable spool valve 68. This valve has end spools 69 connected by a reduced portion 70, the latter being surrounded by an annular groove 71. The supply hose 63 is connected by a passage 72 to the valve-receiving bore and a passage 73 leads from the valve-receiving bore to the hose 66. The valve-receiving bore is connected to atmosphere by a vent port 74. The valve has a stem 75 extending through a packing in a detachable cap 76 and a cam 77 on the lever 26 is engageable with the valve stem 75 for effecting valve movement. A coil spring 78 constantly urges the valve toward the left, as viewed in Fig. 8, with the valve abutting the inner surface of the cap 76. When the operating lever 29 for the reversing valve 23 is swung forwardly to the left in Fig. 1 the reversing valve 23 is positioned to supply pressure fluid from the supply hose 36 to the shovel raising motor 21 to effect running of the shovel motor in a direction to raise the shovel

from its digging position as shown in Fig. 1. Concurrently with operation of the motor at a normal loading speed, the cam 77 on the lever 26 moves the spool valve 68 toward the left as viewed in Fig. 7, to connect the passage 72 with the passage 73 through the valve groove 71 and pressure fluid may then flow from the supply hose 63 through the hose 66, through the passage 52 in the shaft 9, and through hose 51, hoses 48 and passages 49 concurrently to the remote ends of the centering cylinders 40, 40 and through hose 60 to the locking cylinder 54, so that if the shovel is in a laterally located position, as indicated in dotted lines in Fig. 2, it will be automatically brought into alinement with the base and locked as the shovel moves upwardly toward its raised dumping position as indicated in dotted lines in Fig. 1. When the shovel reaches its dumping position, it has been abruptly stopped, the shovel contents are discharged into the mine car M and the shovel moves forwardly past its center of gravity so that it may drop back into its digging position. As the shovel starts forwardly, the operator may swing the lever 29 to the right in Fig. 1 to position the reversing valve 23 to reverse the shovel motor 21 to permit the shovel to drop quickly down into its digging position. When the shovel motor 21 is reversed, the cam 77 is positioned to permit movement of the valve under the influence of the spring 78 to the position shown in Fig. 8, cutting off the fluid supply passage 72 and connecting the passage 73 through the valve groove 71, to the exhaust port 74, thereby concurrently exhausting the fluid from the locking and centering cylinders, through the hoses 48, 60, 51, the passage 52 in the shaft 9, and the hose 66, and as the shovel descends, the turntable may be freely and quickly turned manually with respect to the base to locate the shovel in a digging position at the side of the trackway. When the lever 29 is in its central or neutral position as shown in Fig. 1, the reversing valve 23 is positioned to cut off the fluid supply to the shovel raising motor 21 and with the auxiliary valve 65 in its position shown in Fig. 7 and the centering and locking cylinders are connected to exhaust. As the general mode of operation of a shovel loader of the type disclosed is well known to those skilled in the art and is fully described in the patents above referred to, further description thereof herein is unnecessary. Other uses and advantages of the invention 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 we claim as new and desire to secure by Letters Patent is:

1. In a material loading apparatus, the combination comprising a base having a vertical swivel element, said swivel element having a pair of fluid passages therethrough, a frame swivelled on said base and swivelly engaging said swivel element, fluid actuated centering means on said base and operatively connected to said frame for centering the latter relative to said base, a fluid supply connection on said base leading to one of said passages, a valve means on said swivelled frame for controlling said centering means and

connected to said one passage, a fluid supply connection on said frame for conducting fluid from said valve means to said other passage, and a fluid supply connection leading from said other passage to said centering means.

2. In a material loading apparatus, the combination comprising a base element, a frame element swivelled on said base element to swing horizontally with respect thereto about a vertical axis, one of said elements having a vertical shaft fixed thereto and on which said frame element is swivelled, said shaft having a pair of fluid conducting passages therethrough, fluid actuated self-centering means on said base element and operatively connected to said frame element for swivelling said frame element relative to said base element to bring said elements into alinement, a fluid supply connection on said base element and connected to the lower end of one of said passages, a valve means on said frame element for controlling said centering means and connected to the upper end of said one passage,

a fluid supply connection on said frame element and connected to the upper end of said other passage in said shaft for conducting fluid thereto from said valve means, and a fluid connection for conducting fluid from the lower end of said other shaft-passage to said self-centering means.

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