Sept. 13, 1932. S. W. FARNHAM 1,877,286

LOADING DEVICE

Filed Dec. 19, 1928 6 Sheets-Sheet 1

Fig. 1

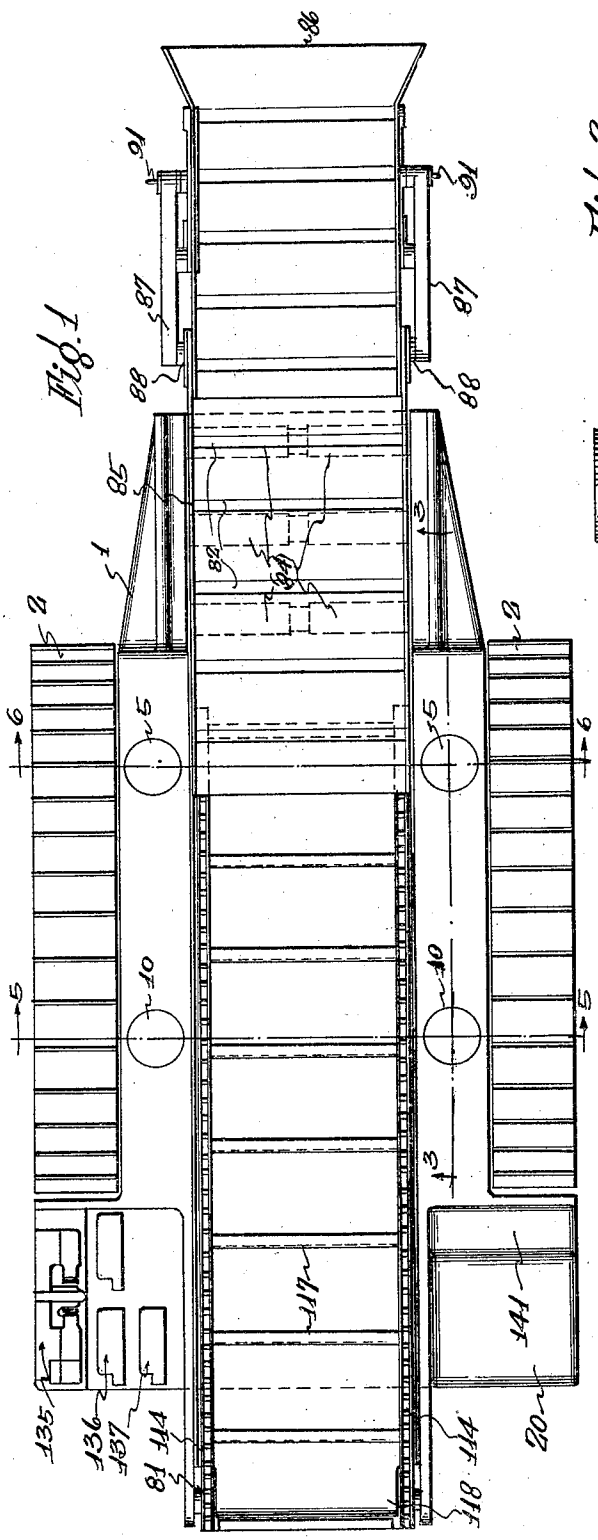
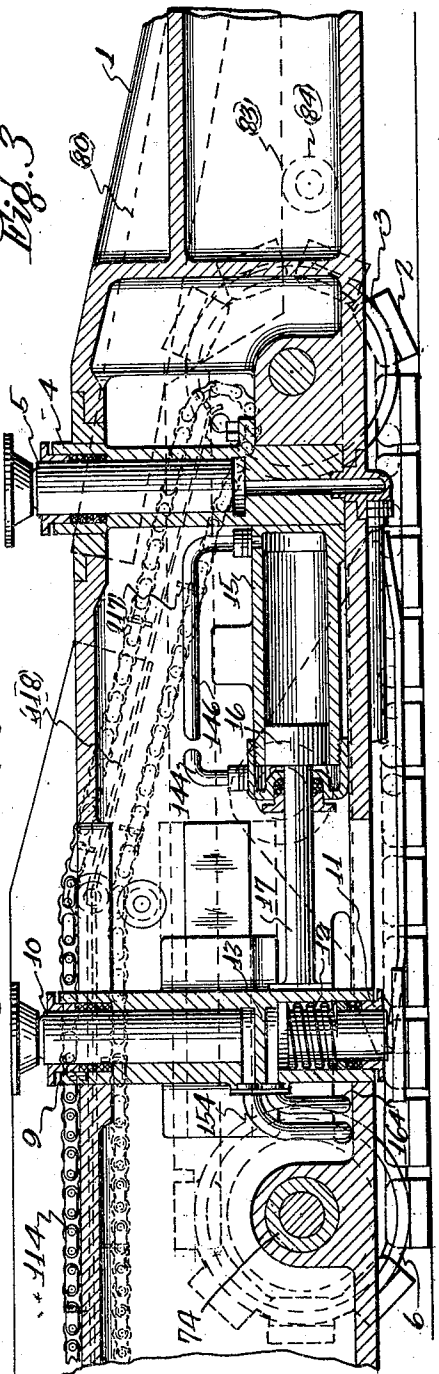


Fig. 3



Inventor
Sidney W Farnham
Clarence J. Poole
Attorney

Sept. 13, 1932. S. W. FARNHAM 1,877,286

LOADING DEVICE

Filed Dec. 19, 1928 6 Sheets-Sheet 2

Fig. 2

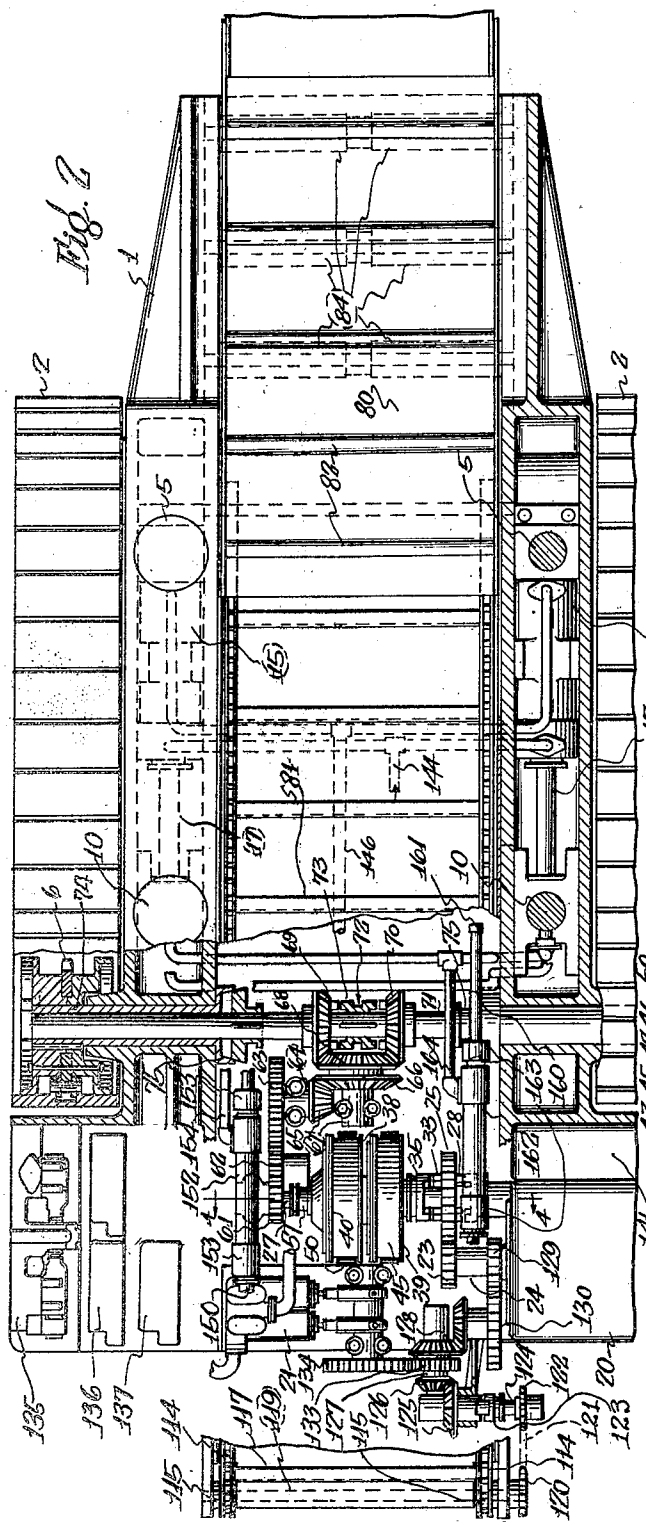
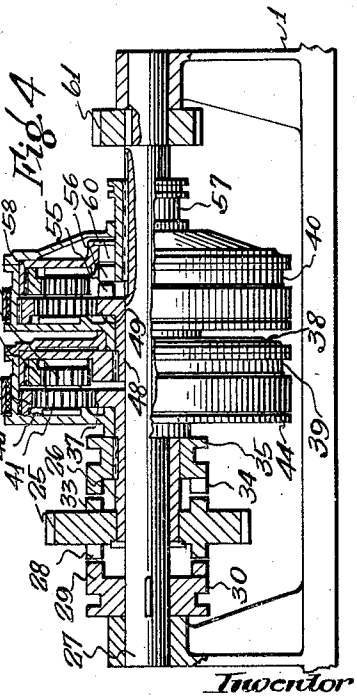


Fig. 4



Inventor
Sidney W. Farnham
Clarence F. Poole
Attorney

Sept. 13, 1932. S. W. FARNHAM 1,877,286

LOADING DEVICE

Filed Dec. 19, 1928 6 Sheets-Sheet 3

Fig. 5

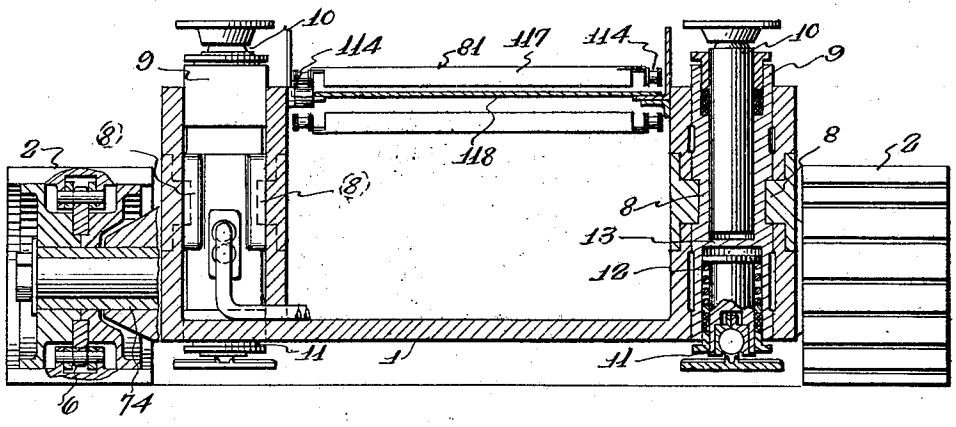
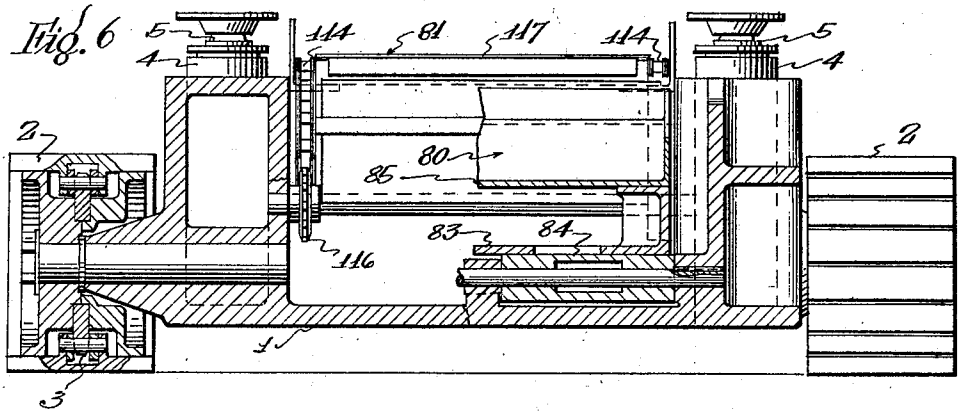


Fig. 6



Inventor
Sidney W. Farnham
Clarence J. Poole
Attorney.

Sept. 13, 1932. S. W. FARNHAM 1,877,286

LOADING DEVICE

Filed Dec. 19, 1928 6 Sheets-Sheet 4

Fig. 7

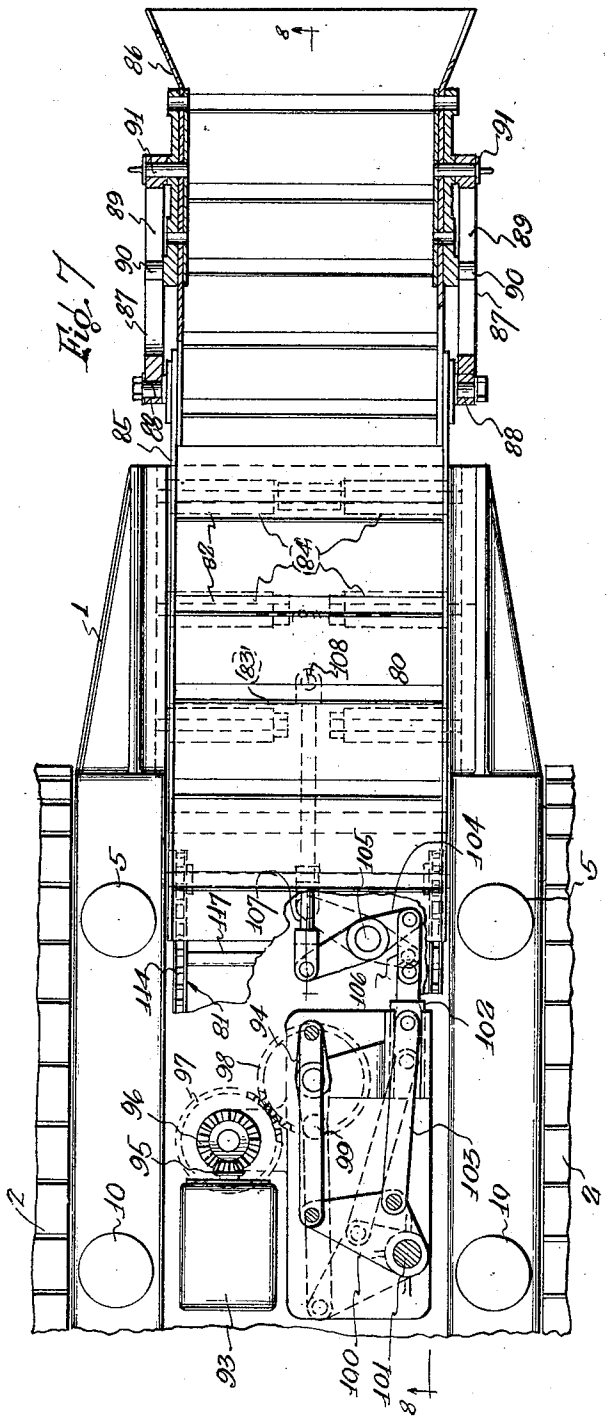
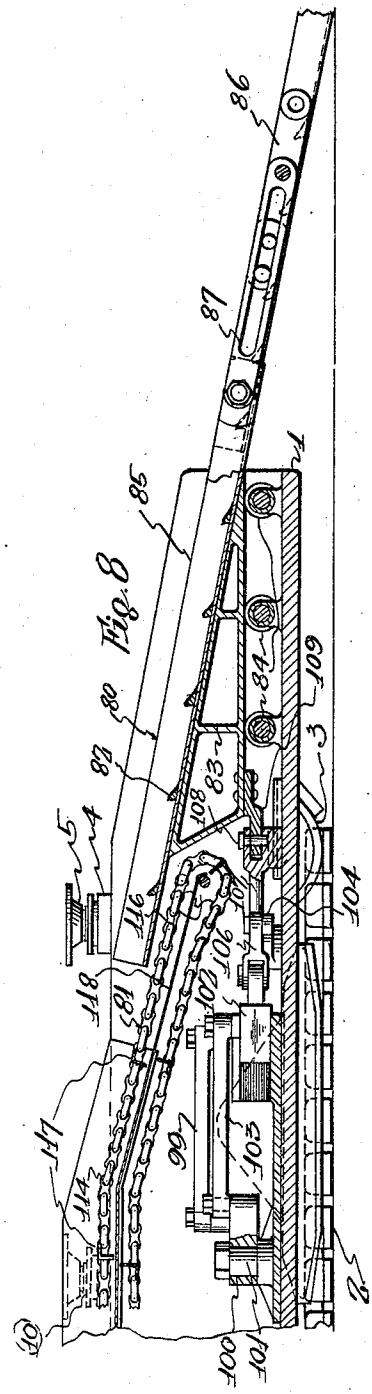


Fig. 8



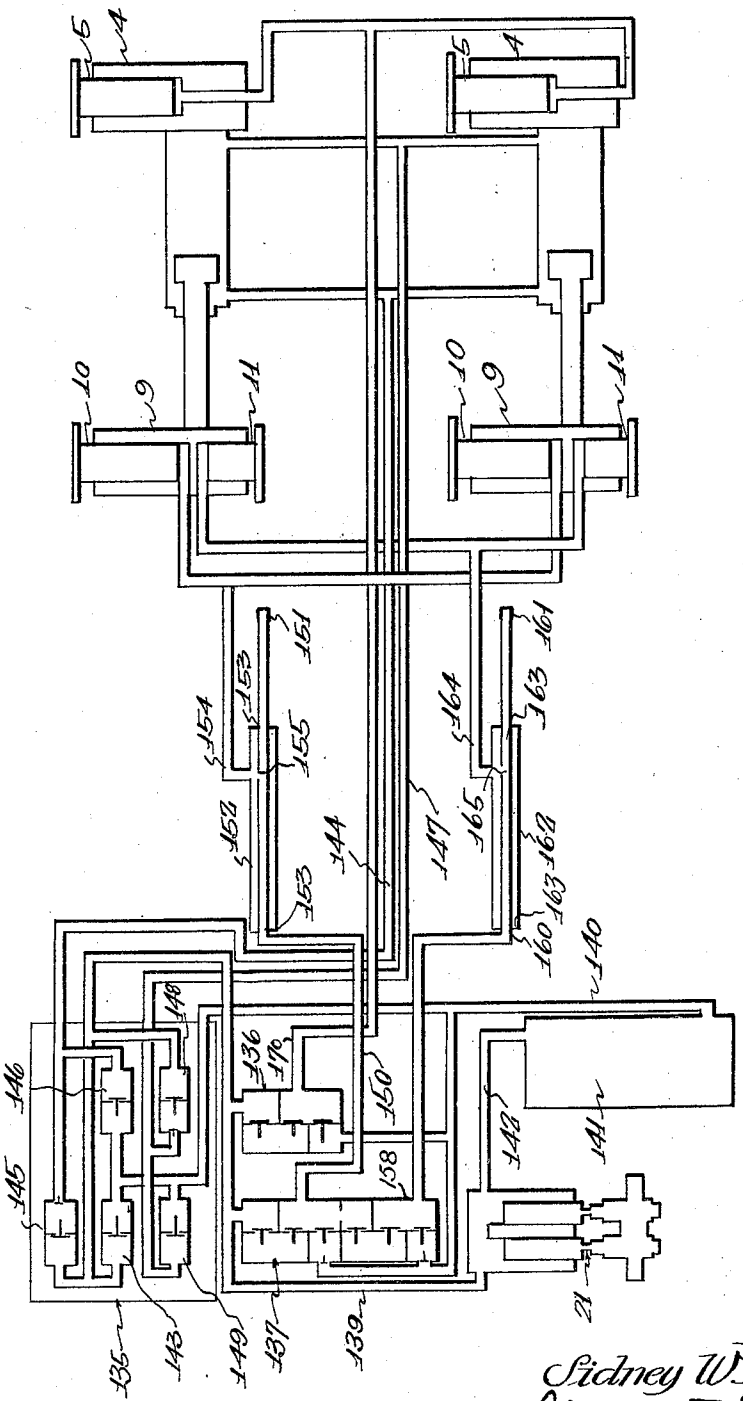
Inventor
Sidney W. Farnham
Clarence Poole
Attorney

Sept. 13, 1932. S. W. FARNHAM 1,877,286

LOADING DEVICE

Filed Dec. 19, 1928 6 Sheets-Sheet 5

Fig. 9

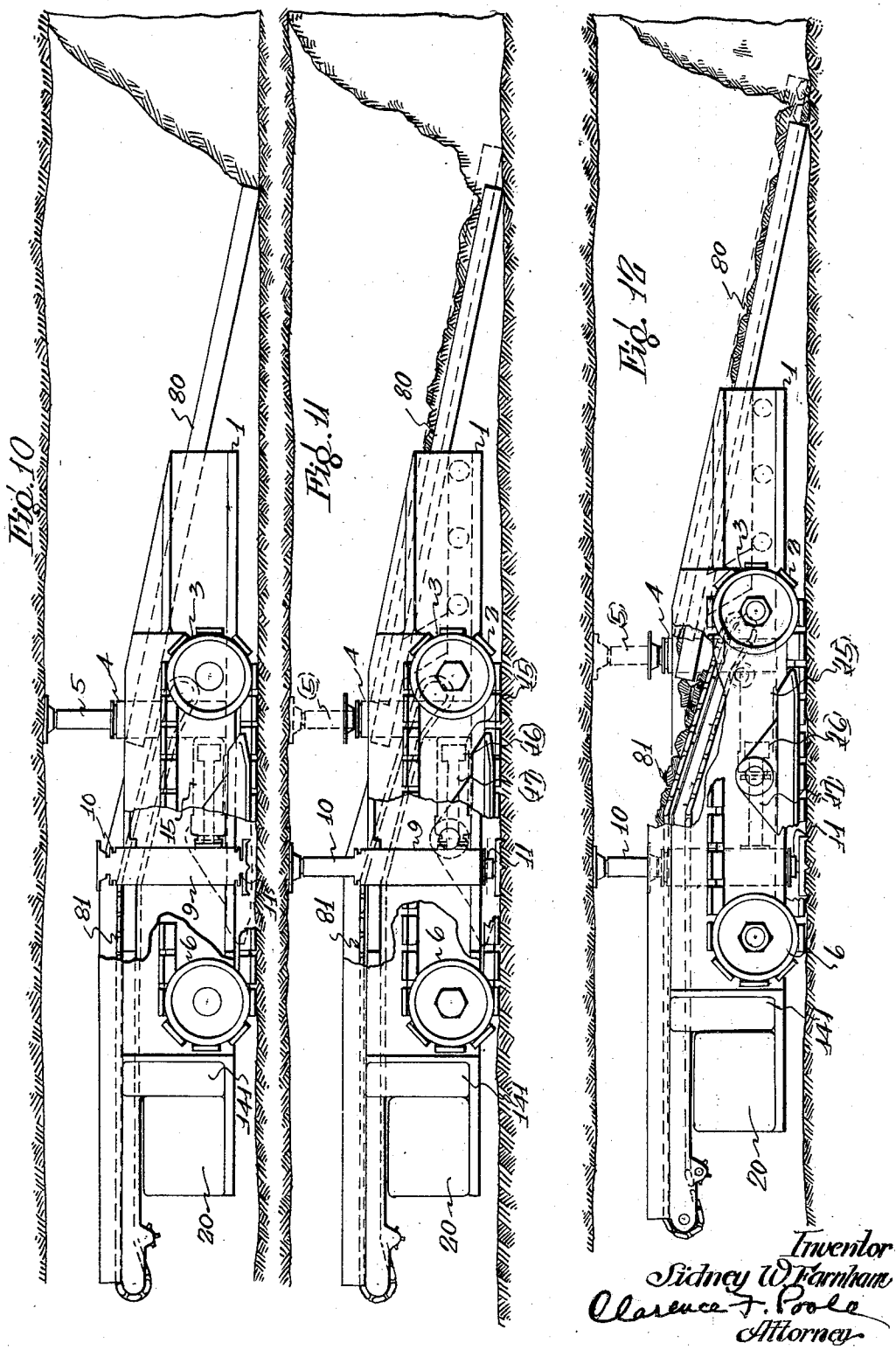


Inventor
Sidney W. Farnham
Clarence J. Poole
Attorney

Sept. 13, 1932. S. W. FARNHAM 1,877,286

LOADING DEVICE

Filed Dec. 19, 1928 6 Sheets-Sheet 6



Patented Sept. 13, 1932 1,877,286

UNITED STATES PATENT OFFICE

SIDNEY W. FARNHAM, OF CHICAGO, ILLINOIS, ASSIGNOR TO GOODMAN MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

LOADING DEVICE

Application filed December 19, 1928. Serial No. 326,927.

This invention relates to improvements in loading devices and has for its object to provide a new and improved loading device of the class described for use in thin seams of coal and in narrow passageways.

The invention has among other objects to provide a loading device to gather and handle loose material and transport said loose material into a mine car or other suitable receptacle and to provide a new and novel means for feeding said loading device into the material to be loaded and simultaneously holding said loading device from lateral movement.

Referring now to the drawings:

Figure 1 is a top plan view of the device embodying my invention;

Figure 2 is an enlarged fragmentary top plan view of the device shown in Figure 1 with parts broken away and in section to more clearly show the details of my invention;

Figure 3 is an enlarged fragmentary sectional view taken on line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary sectional view taken on line 4—4 of Figure 2;

Figure 5 is an enlarged sectional view taken on line 5—5 of Figure 1;

Figure 6 is an enlarged fragmentary sectional view taken on line 6—6 of Figure 1;

Figure 7 is an enlarged fragmentary top plan view of the device shown in Figure 1 with parts broken away and in section to more clearly show the details of my invention;

Figure 8 is an enlarged fragmentary sectional view taken on line 8—8 of Figure 7;

Figure 9 is a diagrammatic view of the fluid pressure system; and

Figures 10, 11 and 12 are side elevations of the device shown in Figure 1 with parts broken away showing said loading device in various stages of the loading operation.

Like numerals refer to like parts throughout the several figures.

Referring now to the drawings, 1 designates a main frame which is carried on a pair of continuous tread mechanisms 2 of the usual construction which are adapted for the propulsion of the loading device.

Mounted rearwardly of idler sprockets 3, 3, for the continuous tread mechanisms 2, 2 on the forward portion of the main frame 1 and on each side thereof are vertically disposed cylinders 4, 4, containing pistons 5, 5, arranged so that said pistons may be raised by fluid pressure to engage a fixed part such as a mine roof.

Mounted forwardly of driving sprockets 6, 6, for the continuous tread mechanisms 2, 2, on the rearward portion of the main frame 1 and on each side thereof are vertically disposed cylinders 9, 9, slidable longitudinally of the main frame 1 in guides 8, 8. Each cylinder 9 contains an upper piston 10 arranged so that said piston may be raised by fluid pressure to engage a fixed part such as a mine roof and a lower piston 11 arranged so that said piston may be lowered by fluid pressure to engage a fixed part such as a mine floor.

A compression spring 12 is provided to disengage the piston 11 from the mine floor when fluid pressure is released from said piston and a partition 13 is provided in the cylinder 9 so that fluid pressure to the piston 10 will not operate the piston 11 and vice versa.

A horizontally disposed cylinder 15 abuts the rearward portion of each cylinder 4 and has a piston 16 therein having a piston rod 17 projecting rearwardly therefrom having its rearward end attached to the cylinder 9 so that fluid pressure on one end or the other of the piston 16 may cause longitudinal movement of the cylinder 9 in the guides 8 in the main frame 1. Therefore, when the pistons, 10, 10, and 11, 11, engage the mine roof and mine bottom, respectively, fluid pressure on the head end of the pistons 16,

16, may cause forward movement of the main frame 1 to feed said main frame and loading mechanism into the loose material it is desired to gather. Further details of the construction of said cylinders and pistons and the means for allowing fluid pressure to enter said cylinders will hereinafter more fully be described as this specification proceeds.

An electric motor 20 is mounted on the rearward portion of the main frame 1 at the right hand side thereof and provides a means for driving a fluid pump 21 and the continuous tread mechanisms 2, 2. A motor pinion 23 on the end of an armature shaft 24 of the electric motor 20 drives a spur gear 25 freely mounted on a sleeve 26 which in turn is freely mounted on a transverse shaft 27. Clutch jaws 28 are provided on the outer side of the gear 25 and are engageable with clutch jaws 29 on a clutch collar 30 splined to the shaft 27 for driving said shaft. Similarly clutch jaws 33 are provided on the opposite side of the spur gear 25 for driving the sleeve 26 through clutch jaws 34 and a clutch collar 35.

The clutch collars 30 and 35 are moved along the shaft 27 and sleeve 26 by means of a suitable system of levers (not shown) in a manner well known to the art. The shifting mechanism for the clutch collars 30 and 35 is interlocked so the clutch jaws 29 and 34 cannot both engage the clutch jaws 28 and 33 on the spur gear 25 at the same time.

The sleeve 26 has a gear 37 integral therewith which is the sun gear of one unit of a double reduction planetary gear mechanism 38. The double reduction planetary gear mechanism 38 is provided to rotate the shaft 27 at a slow speed to drive the continuous tread devices 2, 2, at the same speed as the speed of advance of the main frame 1 through the piston 16 and piston rod 17. The planetary gear mechanism 38 includes a planetary gear mechanism 39 and a planetary gear mechanism 40 driven by said first mentioned planetary gear mechanism. Said planetary gear mechanisms are of an ordinary construction so will not herein be described in detail. The gear 37 meshes with planetary pinions 41 journaled in a cage 42 and meshing with an internal gear 43 keyed to the inner periphery of a casing 44 for the planetary gear mechanism 39. A friction band 45 surrounds the casing 44 to hold said casing from rotation or to allow said casing to rotate upon overload of the planetary gear mechanism 39 and is controlled in the usual manner (not shown). Planetary pinions 46 are integral with the planetary pinions 41 and drive an internal gear 47 adjacent the internal gear 43 and rotatable within the casing 44.

The internal gear 47 is keyed on a sleeve 48 to drive said sleeve. A gear 49 is integral with the opposite end of said sleeve. Said gear forms the sun gear for the planetary gear mechanism 40. The planetary gear mechanism 40 is substantially the same as the planetary gear mechanism 39 and is frictionally controlled by means of a friction band 50 as is the planetary gear mechanism 39 so need not be described in detail. The sun gear 49 is provided with clutch jaws 55 engageable with clutch jaws 56 on a clutch sleeve 57 feathered on the shaft 27 for driving said shaft. An internal gear 58 corresponding to the internal gear 47 in the planetary gear mechanism 39 has clutch jaws 60 thereon engageable by the clutch jaws 56 on the clutch sleeve 57. The clutch sleeve 57 is moved along the shaft 27 to engage the clutch jaws 56 with either the clutch jaws 55 or the clutch jaws 60 by means of a suitable system of levers in the usual manner (not shown). It may now be seen that the shaft 27 may be driven at three different speeds, one of which is the relatively high speed of the gear 25, another of which is the speed reduction obtained through the planetary gear mechanism 39 and the third of which is the reduction through the planetary gear mechanisms 39 and 40.

The speed reduction in the planetary gear mechanism 38 is so arranged that the speed of rotation of the sun gear 49 is twenty times slower than the speed of rotation of the spur gear 25 and the speed of rotation of the internal gear 58 is four hundred times slower than the speed of rotation of the spur gear 25.

Said speed reduction is frictionally controlled and may be varied by changing the gear ratio or allowing either of the friction bands 45 or 50 to slip but the ratio herein mentioned is used so as to drive the continuous tread devices 2, 2, to propel the main frame 1 at the feeding speed of said main frame through the pistons 16, 16, or to drive said main frame at a higher speed when travelling about a mine.

A spur pinion 61 is keyed on the shaft 27 and drives a gear 62 which in turn drives a gear 63 on one end of a shaft 64. A bevel pinion 65 is keyed to the opposite end of the shaft 64 and meshes with and drives a bevel gear 66 on a shaft 67. A bevel gear 68 on the shaft 67 is rotated by said shaft and in turn meshes with and drives bevel gears 69 and 70 freely mounted on a transverse drive shaft 71. Suitable clutch means generally indicated at 72 are provided to connect either the bevel gear 69 or 70 with the drive shaft 71 to drive said shaft from either of said bevel gears to reverse the direction of rotation of said shaft. Said clutch means may be of any well known type but is herein shown as a jaw clutch including a collar 73 slidable on the shaft 71 and having jaws on each end thereof adapted to engage corre-

sponding jaws on either the bevel gear 69 or the bevel gear 70 and is operated by a suitable system of levers in the usual manner (not shown).

The sprockets 6, 6, for the continuous tread devices 2, 2, are keyed on sleeves 74, 74, freely mounted on the transverse shaft 71 and driven thereby through suitable friction clutch means herein shown as friction cone clutches 75, 75, of an ordinary type.

The friction cone clutches 75, 75 are operable through a suitable system of levers of the usual type (not shown) so that either continuous tread device 2 may be driven from the shaft 71, or so that both of said continuous tread devices may be simultaneously driven from said shaft thus providing a means for steering the main frame 1 when driven by the continuous treads 2, 2, said main frame being turned in one direction or the other when power is released from one continuous tread 2 and applied to the other of said continuous treads and driven in a straight line when power is applied to both continuous tread devices 2, 2, simultaneously.

It may now be seen that I have provided a means for driving the continuous tread devices 2, 2, at two relatively fast travelling speeds and at a slow working or feeding speed which is substantially the same as the feeding speed of the pistons 16, 16, so that the main frame 1 and loading device may be fed into the loose material by both the pistons 16, 16, and continuous tread devices 2, 2, simultaneously. This provides a more powerful means for feeding the loading device into the loose material than could otherwise be obtained, and also provides a means for holding said loading device from lateral movement while it is being fed into said loose material, the pistons 10, 10, and 11, 11, holding said loading device while feeding, and the pistons 5, 5, holding said loading device while stationary and the pistons 16, 16, are moving the cylinders 9, 9, into a position whereby said pistons may move the main frame forward into the loose material for the length of their stroke.

A jigging chute 80 is provided to gather the loose coal and move said coal along said chute where it is discharged into a suitable conveyor 81 of an ordinary construction. The jigging chute 80 operates on a well known principle whereby a quick reciprocable motion consisting of a relatively fast forward motion and a slower return motion of said chute picks up the loose material and forces it along said chute where it is discharged into the conveyor 81. The jigging chute 80 has a plurality of corrugations 82 thereon to prevent any of the loose material from sliding back on said chute. (See Figures 7 and 8.)

The jigging chute 80 is mounted on a frame member 83 which is slidable longitudinally of the main frame 1 on a plurality of rollers 84, 84. Said jigging chute comprises an upper chute member 85 and a lower chute member 86 pivotally connected to said upper chute member and adapted to engage a mine floor. Arms 87, 87, are provided to pivotally connect the lower chute member 86 with the upper chute member 85, at 88, 88, and have slots 89, 89, therein adapted to receive pivotal pins 90, 90, projecting from each side of the lower chute member 86. The forward portion of the arms 87, 87, may be connected to the lower chute member 86 by means of removable pins 91, 91, so that said lower chute member may be moved about the pivotal axis 88 of the arms 87 on the upper chute member 85 to allow for irregularities in the mine bottom.

When the pins 91, 91, are removed from the arms 87, 87, the lower chute member 86 may be moved rearwardly along the upper chute member 85 until the pins 90, 90, abut the rearward portion of the slots 89, 89, in the arms 87, 87. The arms 87, 87, may then be moved about their pivotal axes in a rearward direction to move the lower chute member 86 upwardly on the upper chute member 85 and provide clearance between the lower portion of the lower chute member 86 and the mine bottom so the loading device may be moved about the mine bottom from loading place to loading place, and clear obstructions on the mine bottom.

Referring now to the means for jigging the chute 80, as shown in Figures 7 and 8, a motor 93 rotates a crank 94 through a bevel motor pinion 95, bevel gear 96 and spur gears 97 and 98. A connecting rod 99 connects the crank 94 with one corner of a bell crank 100 pivoted to the main frame 1 at 101. The other corner of the bell crank 100 is connected to a cross head 102 by means of a connecting rod 103. The cross head 102 has connection with one end of a lever 104 fulcrumed at 105 by means of a rod 106. A connecting rod 107 is pivoted to the opposite end of the lever 104 and connects the lever with the frame member 83 to reciprocate said frame member and the jigging chute 80 through a pivotal pin 108 which passes through a forked end of the connecting rod 107 and a tongue 109 fixed to the frame member 83.

It may here be observed that rotational movement of the crank 94 is transferred to translational movement by the connecting rod 99 and bell crank 100 and that the angular variation of speed at the end of each stroke of the bell crank 100 is such as to cause a fast forward movement and a slower return movement to force the loose material up the jigging chute 80.

The conveyor 81 may be of any type but is herein shown as a flight conveyor of an ordinary construction having endless chains 114, 114, on each side thereof passing around driv-

ing sprockets 115, 115, and driven sprockets 116, 116, and having a plurality of flights 117 therebetween riding over a pan 118. The driving sprockets 115, 115, are keyed to a shaft 119 and are driven by the motor 20 through a suitable gear train which includes a driven sprocket 120, drive chain 121, driving sprocket 122 and clutch mechanism 123 on a shaft 124. The shaft 124 is rotated by a bevel gear 125 through the clutch mechanism 123, which bevel gear is rotated by a bevel pinion 126 on a shaft 127. The shaft 127 is rotated by mitre gears 128, which gears are driven by the motor 20 through a motor pinion 129 rearwardly of the motor pinion 23 which drives a spur gear 130.

Referring now to the hydraulic system for controlling the various movements of the hydraulically operated parts, the pump 21 serves to effect pressure in the system and is driven by the motor 20 through the motor pinion 129, spur gear 130, mitre gears 128, shaft 127 and spur gears 133 and 134.

The connections from the pump 21 to the various fluid actuated parts of the system are effected through valve means, which as shown consist of feeding cylinder valves 135, front jack valves 136 and rear jack valves 137. Said valves are mounted on the left hand rearward end of the main frame 1 and are manually controlled in the usual manner which need not herein be described in detail. The feeding cylinder valves 135 are employed to apply pressure to either the head end or rear end of the feeding cylinders 15, 15, to move the cylinder 9 in its guides 8 in the main frame 1 or to move the main frame 1 forwardly when the pistons 10, 10, and 11, 11, engage the mine roof and mine bottom, respectively. The front jack valves 136 are employed to engage the pistons 5, 5, with the mine roof to hold the main frame 1 stationary while loading, while the rear jack valves 137 are provided to engage the pistons 10, 10, and 11, 11, with the mine roof and mine bottom, respectively, to hold the main frame 1 from lateral movement while said main frame is being fed into the loose material by means of the feeding pistons 16, 16. Figure 9 shows a diagrammatic view of the connections from the valves 135, 136 and 137 to the pump 21 and the above mentioned jack and feeding cylinders.

A high pressure pipe 139 leads from the outlet of the pump 21 to the jack valves 136 and 137 and the feeding cylinder valves 135 while a return pipe 140 leads from said valves to a tank 141 adjacent the forward end of the motor 20, the pump 21 drawing fluid from the tank 141 through a pipe 142. A throttle valve 143 is provided in the system and is herein shown as incorporated with the feeding cylinder valves 135 to regulate the pressure into the feeding and jack cylinders and to provide an outlet so that fluid may flow in a continuous circuit through the pump 21 and tank 141 when the hydraulic system is not in use but when the pump 21 is in operation.

A pipe 144 leads from the feeding cylinder valves 135 to the rearward end of the feeding cylinders 15, 15, to apply fluid pressure to the rearward end of the piston 16, 16, to move the cylinders 9, 9, forwardly in the main frame 1. Pressure is applied to the pipe 144 from the pump 21 through a valve 145 and is released through a valve 146 to allow the fluid to return to the tank 141 through the low pressure line 140. A pipe 147 leads from the feeding cylinder valves 135 to the head end of the feeding cylinders 15, 15, to apply pressure to the head end of the pistons 16, 16, to feed the main frame 1 forwardly by means of said pistons when the pistons 10, 10 and 11, 11, are engaging the mine roof and mine bottom, respectively. Pressure is applied to the pipe 147 and cylinder 15 through a valve 148 and is released through a vale 149 to allow the fluid to return through the low pressure line 140 to the tank 141.

Fluid pressure is applied to the pistons 10, 10, by means of a pipe 150 which extends forwardly from the rearward jack cylinder valves 137. The pipe 150 has its front end closed by a cap 151. See Figure 2. Another pipe 152 surrounds the aforementioned forwardly extending portion of the pipe 150 and is provided with bearing and packing structures 153 which engage the pipe 150 for sliding movement to permit movement of the pipe 152 along the pipe 150. A pipe 154 leads from the pipe 152 and provides a connection to the portion of the cylinders 9, 9, which have the pistons 10, 10, slidable therein to provide a means for allowing fluid pressure to enter said cylinders to raise the pistons 10, 10, so they may engage a mine roof. The pipe 150 is provided with an aperture 155 which is so disposed that it lies between the bearing and packing structures 153 in all relative positions of the cylinders 9, 9 with respect to the main frame 1 and thus provides a sliding joint to permit movement of the cylinders 9, 9, in the main frame 1.

Fluid pressure is applied to the pistons 11, 11, in a manner similar to that which it is applied to the pistons 10, 10.

A pipe 160 extends forwardly from a portion 158 of the rearward jack cylinder valves 137 and has its front end closed by a cap 161. Another pipe 162 surrounds the pipe 160 and has suitable bearing and packing means 163 at its forward and rearward ends thereof. A pipe 164 leads from the pipe 162 to the lower portion of the cylinders 9, 9, to allow fluid pressure to enter said cylinders to engage the pistons 11, 11, with the mine floor. An aperture 165 is provided in the pipe 160

to provide a sliding joint permitting movement of the jack cylinders 9, 9, in the main frame 1. The valves in the rear jack cylinder valve mechanism 137 are connected together so as to simultaneously apply fluid pressure to the jack pistons 10, 10, and 11, 11, so that said pistons may simultaneously engage the mine roof and mine bottom.

Fluid pressure is applied to the forward jack cylinders 4, 4, through the front jack cylinder valves 136, and a pipe 170 which extends forwardly from said jack cylinder valves to said jack cylinders. The front jack cylinder valves 136 are of the usual construction and allow pressure to enter the jack cylinders 4, 4, to engage the pistons 5, 5, with a mine roof in the usual manner, allowing said fluid to return to the low pressure line 140 and tank 141 when pressure is released from the pistons 5, 5.

It may now be seen that I have provided a loading device including a material gathering unit, a conveying unit, a feeding and holding unit and a travelling unit which is capable of travelling about a mine at a plurality of high speeds or of feeding itself into the loose material it is desired to load at a slow speed, that the travelling unit may be used to aid the feeding unit in feeding the loading device into the loose material and in manipulating said loading device so loose material may be gathered from corners in the mine, and that said units are so arranged as to provide a loading machine of a minimum height so that said machine may travel and load in low seams of coal. Also since the material gathering unit gathers the loose material and forces it rearwardly into a conveying unit and requires no lateral movement to gather said loose material it may be seen that the loading device described in my invention may be advantageously used to load coal in narrow entries or in rooms where the roof props are closely spaced.

Figures 10, 11 and 12 show the different stages of a loading operation in a mine entry. The loading device is moved on its continuous tread devices 2, 2, until the forward end of the material gathering or jigging chute 80 is adjacent the mined coal it is desired to load. The forward pistons 5, 5, are engaged with the mine roof and the motor 93 is started which jigs the chute 80 so said chute may dig into the loose coal and force said coal rearwardly along said chute.

At the same time pressure is applied on the rearward end of the pistons 16, 16, to move the rearward jack cylinders 9, 9, forwardly in the guides 8, 8, in the main frame 1. The pistons 10, 10, and 11, 11, are then engaged with the mine roof and mine bottom, respectively, and fluid pressure is released from the pistons 5, 5, to disengage said pistons from the mine roof. Fluid pressure is then applied to the head end of the feeding pistons 16, 16, to move the main frame 1 and jigging chute 80 into the loose material so that the loading operation may be continuous, the jigging chute 80 being in operation during the feeding operations and the feeding operation continued until the loose coal is gathered by means of the jigging chute 80. The loading device may be turned to one side or the other of the mine entry or room by means of the continuous tread devices 2, 2, which tread devices may also be used to aid in the feeding of said loading device when necessary or in cases where the mine bottom is soft or where the coal is tightly packed.

While I have herein shown and described one form of my invention, I do not wish to be limited to the precise details of construction or arrangement of parts herein shown and described except as specifically limited in the appended claims.

I claim as my invention:

1. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, a stationary holding jack on said main frame engageable with a mine roof, a movable holding jack on said main frame engageable with both a mine roof and mine bottom, hydraulically actuated means operated independently of said movable holding jack for moving said movable holding jack longitudinaly of said main frame, said means moving said main frame into the material to be loaded when said movable holding jack is engaging both a mine roof and mine bottom, and mechanically operated means for moving said main frame through said continuous tread devices independently of said hydraulically actuated means at the speed of advance of said main frame moved by said hydraulically actuated means so said loading device may be moved into the material to be loaded at a slow feeding speed either by means of said hydraulic actuated means or said continuous tread devices.

2. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, a plurality of stationary holding jacks engageable with a mine roof, a plurality of movable holding jacks on said main frame engageable with both a mine roof and mine bottom, means for moving said movable holding jacks longitudinally of said main frame, said means serving to move said main frame into the material to be loaded when said movable holding jacks are engaging both a mine roof and a mine bottom, and mechanically operated means for moving said main frame through said continuous tread devices independently of said means for moving said main frame when said movable holding jacks engage both a mine roof and mine bottom and

at the same speed of advance as the speed of advance of said main frame when moved by said aforementioned moving means so said loading device may be moved into the material to be loaded at a slow feeding speed either by means of said continuous tread devices or said means for moving said main frame when said movable holding jacks engage both a mine roof and mine bottom or by a combination of both of said aforementioned means.

3. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, a plurality of stationary holding jacks engageable with a mine roof, a plurality of movable holding jacks on said main frame engageable with both a mine roof and a mine bottom, hydraulically actuated means for moving said movable holding jacks longitudinally of said main frame, said means feeding said main frame into the material to be loaded when said movable holding jacks are engaging both a mine roof and mine bottom, and mechanically operated means for moving said main frame independently of said hydraulic actuated means at the speed of advance of said main frame when moved by said hydraulic actuated means so said loading device may be fed into the material to be loaded at a slow feeding speed either by means of said hydraulic actuated means or said continuous tread devices or by a combination of said hydraulic actuated means and said continuous tread devices.

4. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, an inclined jigging chute on the forward portion of said main frame having its forward portion engageable with a mine bottom, a conveying element rearwardly of said jigging chute, a plurality of stationary holding jacks on said main frame, a plurality of movable holding jacks on said main frame, and means for moving said movable jacks longitudinally of said main frame.

5. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, an inclined jigging chute reciprocably movable on said main frame, a conveying element rearwardly of said jigging chute, a plurality of hydraulic holding jacks on the forward portion of said main frame, a plurality of movable hydraulic holding jacks on the rearward portion of said main frame and hydraulic means for moving said movable hydraulic holding jacks longitudinally of said main frame.

6. In a loading device, the combination with a main frame of a gathering unit comprising an inclined jigging chute reciprocably movable on the forward portion of said main frame, a conveying unit rearwardly of said gathering unit, a propelling unit comprising a plurality of frictionally controlled continuous tread devices for supporting said main frame, a holding unit comprising a plurality of stationary holding jacks on the forward portion of said main frame, a plurality of movable holding jacks rearwardly of said stationary holding jacks, and a feeding unit comprising a hydraulically actuated means for moving said main frame when said movable holding jacks are held from movement between a mine roof and mine bottom, and a suitable geared reduction providing a means whereby said continuous tread devices may propel said main frame at the same rate of speed as the feeding speed of said main frame through said hydraulically actuated feeding means.

7. In a loading device, the combination of a main frame, a motor, a gathering unit comprising an inclined chute reciprocably movable on the forward portion of said main frame, a conveying unit rearwardly of said gathering unit, a propelling unit comprising a plurality of frictionally controlled laterally spaced continuous tread devices for supporting said main frame, a holding unit comprising a plurality of stationary holding jacks on the forward portion of said main frame engageable with a mine roof, a plurality of movable holding jacks rearwardly of said stationary holding jacks engageable with a mine roof and mine bottom and a feeding unit comprising a hydraulic actuated means for moving said main frame when said movable holding jacks are held from movement between a mine roof and mine bottom, and a plurality of planetary reduction gear mechanisms connectible with said continuous tread devices and driven by said motor for driving said continuous tread devices at a plurality of speeds including a slow speed which is the same as the speed of advance of said main frame through said hydraulically actuated feeding means whereby said main frame may be fed into the material to be loaded by said hydraulically actuated feeding means and said continuous tread devices simultaneously.

8. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, an inclined jigging chute reciprocably movable on said main frame, a conveying element rearwardly of said jigging chute, a stationary holding jack engageable with a mine roof for holding said main frame from movement, another hydraulic holding jack movable in said main frame and engageable with a mine roof and mine floor for holding said main frame from lateral movement while said main frame and loading device is fed into the material to be loaded, and hydraulic actuated means oper-

ated independently of said movable holding jack for moving said movable holding jack longitudinally of said main frame, said means providing a means for feeding said main frame into the material to be loaded when said movable holding jack is engaging a mine roof and mine floor, and said stationary holding jack is disengaged from said mine roof.

9. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, an inclined jigging chute reciprocably movable on said main frame, a conveying element rearwardly of said jigging chute, a plurality of stationary holding jacks engageable with a mine roof for holding said main frame from movement, a plurality of holding jacks movable in said main frame engageable with a mine roof and mine floor for holding said main frame from lateral movement while said main frame and loading device is being fed into the material to be loaded, and means operated independently of said movable holding jacks for moving said movable holding jacks longitudinally of said main frame, said means providing a means for feeding said main frame into the material to be loaded when said movable holding jacks are engaging a mine roof and mine floor and said stationary holding jacks are disengaged from said mine roof.

10. In a loading device, the combination of a main frame, a motor, a gathering unit comprising an inclined chute reciprocably movable on the forward portion of said main frame, a conveying unit rearwardly of said gathering unit, a propelling unit comprising a plurality of frictionally controlled laterally spaced continuous tread devices for supporting said main frame, a holding unit comprising a plurality of stationary holding jacks on the forward portion of said main frame engageable with a mine roof, a plurality of holding jacks movable in said main frame and engageable with a mine roof and mine bottom and a feeding unit comprising a hydraulic actuated piston connected with each of said movable holding jacks, but operated independently therefrom, for moving said main frame when said movable holding jacks are engaged with a mine roof and a mine bottom and said stationary holding jacks are disengaged from a mine roof.

11. In a loading device, the combination of a main frame, a motor, a gathering unit comprising an inclined chute reciprocably movable on the forward portion of said main frame, a conveying unit rearwardly of said gathering unit, a propelling unit comprising a plurality of frictionally controlled laterally spaced continuous tread devices for supporting said main frame, a holding unit comprising a plurality of stationary holding jacks on the forward portion of said main frame engageable with a mine roof, a plurality of holding jacks movable in said main frame and engageable with a mine roof and mine bottom and a feeding unit comprising a hydraulic actuated piston connected with each of said movable holding jacks, but operated independently therefrom, for moving said main frame when said movable holding jacks are engaged with a mine roof and a mine bottom and said stationary holding jacks are disengaged from a mine roof, and a plurality of planetary reduction gear mechanisms operatively connected together for driving said continuous tread devices from said motor at a plurality of speeds including a slow speed equal to the speed of advance of said main frame through said hydraulically actuated feeding means whereby said main frame may be fed into the material to be loaded by said hydraulically actuated feeding means or said continuous tread devices simultaneously or independently.

12. In a loading device, the combination with a main frame, gathering means supported on said main frame comprising an inclined conveyor, a holding jack engageable with the mine roof for holding said main frame from movement, another holding jack mounted in said main frame for longitudinal movement with respect thereto, said holding jack having oppositely disposed bottom and roof engaging means thereon adapted to be simultaneously moved in opposite directions to be engaged with or disengaged from the mine floor and mine roof, and means for moving said last mentioned holding jack longitudinally of said main frame, said means providing a means for feeding said main frame into the material to be loaded when said second mentioned holding jack is engaging the mine roof and mine floor and said first mentioned holding jack is disengaged from said mine roof.

13. In a loading device, the combination with a main frame, gathering means supported on said main frame comprising an inclined conveyor extending forwardly of said main frame, a holding jack engageable with the mine roof for holding said main frame from movement, another holding jack mounted in said main frame for longitudinal movement with respect thereto, said holding jack having oppositely disposed bottom and roof engaging means thereon adapted to be simultaneously moved in opposite directions to be engaged with or disengaged from the mine floor and mine roof, and means for moving said last mentioned holding jack longitudinally of said main frame, said means providing a means for feeding said main frame into the material to be loaded when said last mentioned holding jack is engaging the mine roof and mine floor and said first mentioned holding jack is disengaged from said mine roof.

14. In a loading device, the combination with a main frame, an inclined chute extending forwardly of said main frame and reciprocably movable with respect thereto, a stationary holding jack engageable with a mine roof for holding said main frame from movement, another holding jack movable in said main frame, said holding jack having oppositely disposed bottom and roof engaging means thereon adapted to be simultaneously moved in opposite directions to be engaged with or disengaged from the mine roof and mine floor for holding said main frame from lateral movement while said main frame and loading device is fed into the material to be loaded, and hydraulic actuated means operable independently of said movable holding jack for moving said movable holding jack longitudinally of said main frame, said means providing a means for feeding said main frame into the material to be loaded when said movable holding jack is engaging a mine roof and mine floor and said stationary holding jack is disengaged from said mine roof.

15. In a loading device, the combination with a main frame, gathering means supported on said main frame comprising an inclined conveyor, a plurality of holding jacks disposed adjacent the forward end of said main frame engageable with the mine roof for holding said main frame from movement, a plurality of holding jacks disposed adjacent the rearward end of said main frame for longitudinal movement with respect thereto adapted to be interposed between the mine floor and mine roof, and means for moving said last mentioned holding jacks longitudinally of said main frame, said means providing a means for feeding said main frame into the material to be loaded when said movable holding jacks are engaging the mine roof and mine floor and said first mentioned holding jacks are disengaged from the mine roof.

16. In a loading device, the combination with a main frame, gathering means supported on said main frame comprising an inclined jigging conveyor extending forwardly of said main frame, a plurality of holding jacks disposed adjacent the forward end of said main frame engageable with the mine roof for holding said main frame from movement, a plurality of holding jacks mounted on said main frame adjacent the rearward end thereof for longitudinal movement with respect thereto adapted to be interposed between the mine floor and mine roof, and means for moving said last mentioned holding jacks longitudinally of said main frame, said means providing a means for feeding said main frame into the material to be loaded when said movable holding jacks are engaging the mine roof and mine floor and said first mentioned holding jacks are disengaged from the mine roof.

17. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, an inclined jigging chute on the forward portion of said main frame having its forward portion engageable with a mine bottom, a conveying element rearwardly of said jigging chute, a stationary holding jack on said main frame, a movable holding jack on said main frame, and a means for moving said movable jack longitudinally of said main frame.

18. In a loading device, the combination with a main frame, continuous tread devices for supporting said main frame and moving said main frame about a mine, an inclined jigging chute reciprocably movable on said main frame, a conveying element rearwardly of said jigging chute, a hydraulic holding jack on the forward portion of said main frame, a movable hydraulic holding jack on the rearward portion of said main frame and hydraulic means for moving said movable hydraulic holding jack longitudinally of said main frame.

19. In a loading device, the combination with a main frame of a gathering unit comprising an inclined jigging chute reciprocably movable on the forward portion of said main frame, a conveying unit rearwardly of said gathering unit, a propelling unit comprising a plurality of frictionally controlled continuous tread devices for supporting said main frame, a holding unit comprising a stationary holding jack on the forward portion of said main frame, a movable holding jack rearwardly of said stationary holding jack, and a feeding unit comprising a hydraulically actuated means for moving said main frame when said movable holding jack is held from movement between a mine roof and mine bottom, and a suitable geared reduction providing a means whereby said continuous tread devices may propel said main frame at the same rate of speed as the feeding speed of said main frame through said hydraulically actuated feeding means.

20. In a loading device, the combination of a main frame, a motor, a gathering unit comprising an inclined chute reciprocably movable on the forward portion of said main frame, a conveying unit rearwardly of said gathering unit, a propelling unit comprising a plurality of frictionally controlled laterally spaced continuous tread devices for supporting said main frame, a holding unit comprising a stationary holding jack on the forward portion of said main frame engageable with a mine roof, a movable holding jack rearwardly of said stationary holding jack engageable with a mine roof and mine bottom and a feeding unit comprising a hydraulic actuated means for moving said main frame when said movable holding jack is held from movement between a mine roof and

mine bottom, and a plurality of planetary reduction gear mechanisms connectible with said continuous tread devices and driven by said motor for driving said continuous tread devices at a plurality of speeds including a slow speed which is the same as the speed of advance of said main frame through said hydraulically actuated feeding means whereby said main frame may be fed into the material to be loaded by said hydraulically actuated feeding means and said continuous tread devices simultaneously.

Signed in the city of Chicago, county of Cook and State of Illinois, this 10th day of December, A. D. 1928.

SIDNEY W. FARNHAM.