July 26, 1938. S. F. OSSING 2,125,007

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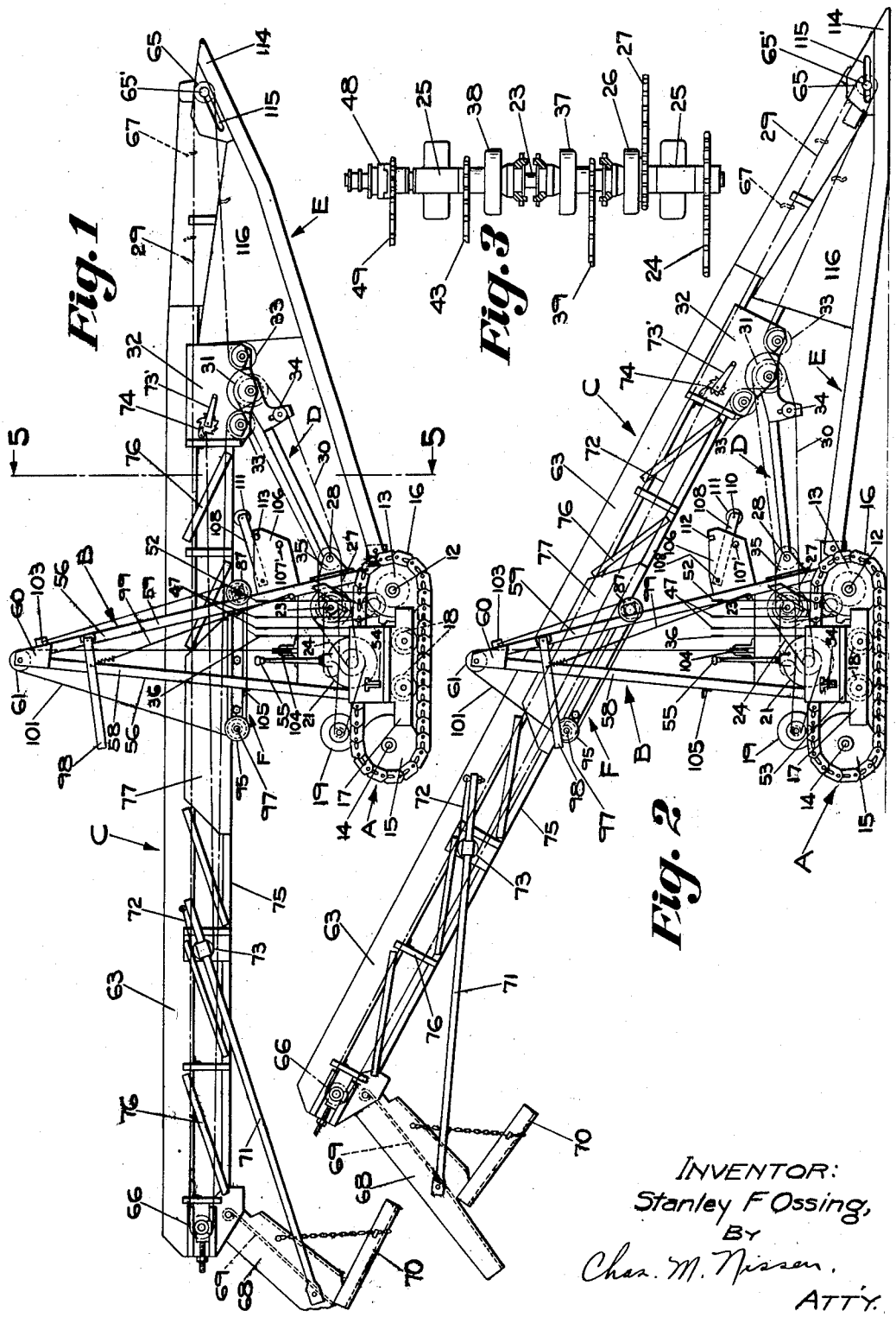


Fig. 1

Fig. 3

Fig. 2

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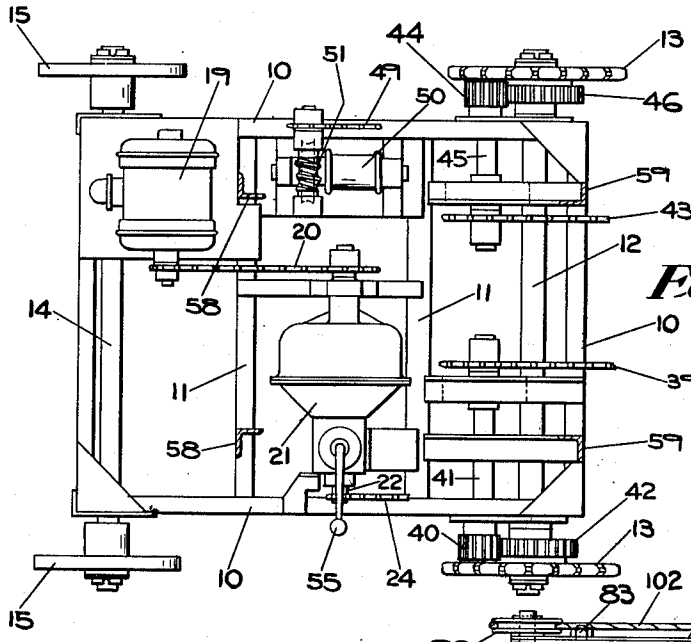


Fig. 4

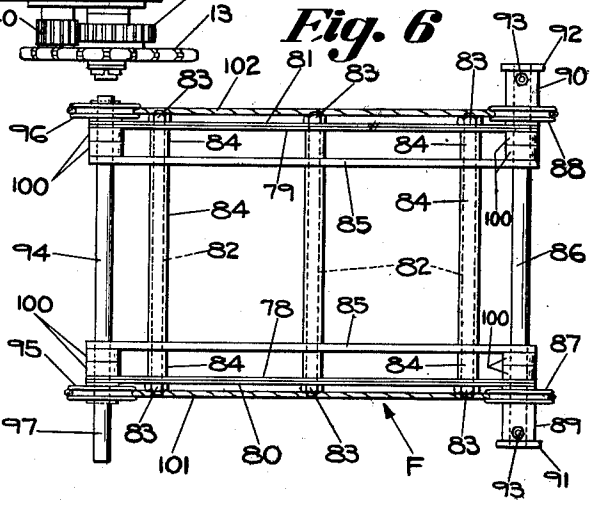


Fig. 6

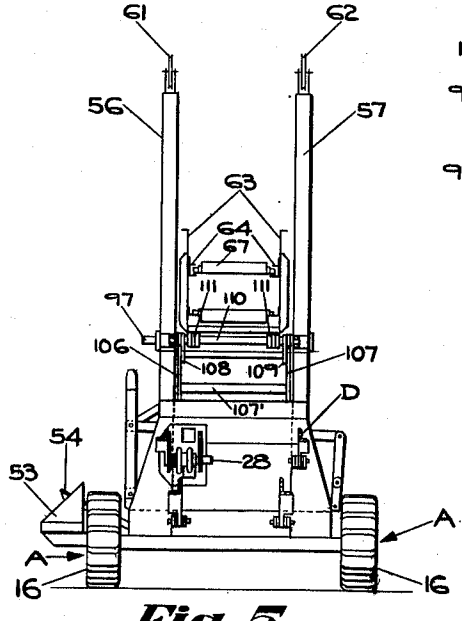


Fig. 5

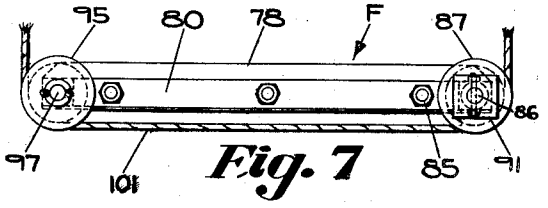


Fig. 7

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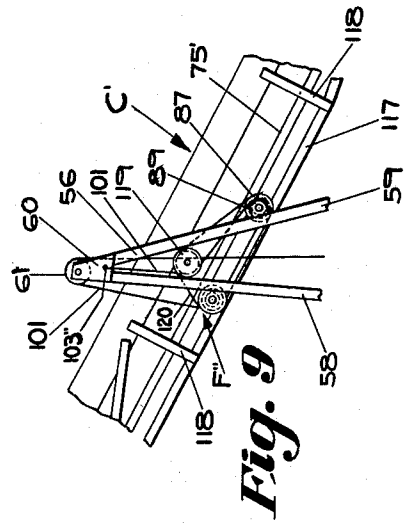


Fig. 9

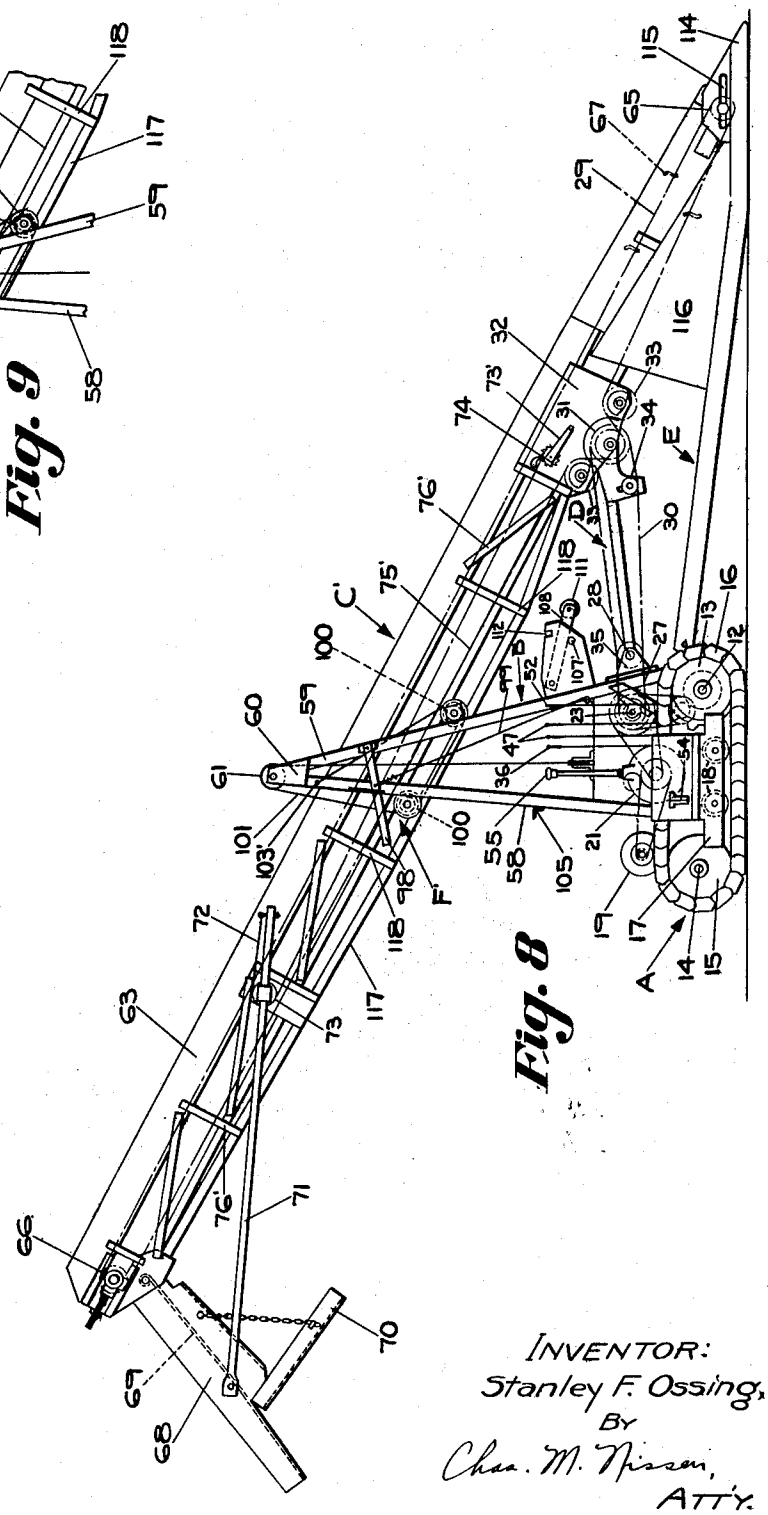


Fig. 8

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UNITED STATES PATENT OFFICE

2,125,007

LOADER

Stanley F. Ossing, Columbus, Ohio, assignor to The Jeffrey Manufacturing Company, a corporation of Ohio

Application April 20, 1935, Serial No. 17,422

13 Claims. (Cl. 198—233)

This invention relates to a loader, and particularly to a self-propelled loader of the type generally employed to load coal, coke or like materials from ground storage into a truck.

An object of the invention is to provide an improved loader of the above general type and particularly to provide means for varying the height of the discharge end thereof in small increments and within a wide range.

Another object of the invention is to mount the loading boom of a loader of the above mentioned type so it is free to move longitudinally with respect to the derrick thereof and to increase the downward thrust on the fore part of the supporting truck as the longitudinal force on the loading boom increases.

Another object of the invention is to provide an improved means for supporting a loader boom while it is in operating position.

Still another object of the invention is to provide an improved supporting means for a loader boom when it is in non-operating or in transporting position whereby the boom hoisting cables are slack and the boom is carried in a substantially horizontal position.

Other objects of the invention will appear hereinafter, the novel features and combinations being set forth in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevational view of one form of my invention with the conveying boom in a transporting position;

Fig. 2 is a side elevational view of the device of Fig. 1 with the conveying boom in a material conveying position;

Fig. 3 is a detail view, showing the counter shaft and various drive means driven thereby;

Fig. 4 is a plan view of the truck-mounted operating means with numerous parts not showing;

Fig. 5 is a front elevational view of the device of Figs. 1 and 2 (taken on line 5—5 of Fig. 1) with the conveying boom in the position illustrated in Fig. 1;

Fig. 6 is a plan view of the conveying boom carriage;

Fig. 7 is an elevational view of the carriage of Fig. 7;

Fig. 8 is a side elevational view of a modified form of my invention; and

Fig. 9 is a further modified form of my invention.

Referring particularly to Figs. 1 and 2 of the drawings, there is illustrated a loader comprising my invention. Said loader comprises a truck A which has both lateral and longitudinal stability and is therefore capable of supporting the entire operating mechanism without further aid. Mounted upon said truck A is a derrick B with which cooperates an appropriate elevating mechanism for adjusting the position of the loading boom C. The loading boom C is attached to the derrick by an appropriate attaching and thrust receiving strut D. A crowding and limiting strut E is also provided. By virtue of the self-contained nature of the loader, the truck A may be operated to propel said loader to any desired position where it is to be operated and perform a loading function. By elevating the loading boom C with respect to the derrick B, the material receiving end of said loading boom is automatically lowered while the material discharging end thereof is automatically elevated. When the loader is in the position illustrated in Fig. 2, it is ready to perform a loading operation and the lowered material receiving end of said loading boom C may be forced into a pile of material to be loaded, such as a pile of coal, gravel or any other similar material. During such loading operation, the material is gathered by the loading boom C and discharged into an appropriate conveyor, such as a truck. The thrust receiving strut D is so positioned that in any operating position of the loader the end thereof which is attached to the derrick B is lower than the end which is attached to the loading boom C. This maintains the forward end of the truck A in close contact with the ground. The central portion of the loading boom C floats with respect to the derrick B and thus there is no appreciable thrust transmitted from the loading boom C to the derrick B except that through the strut D. One of the principal features of my invention relates to the carriage F which supports the loading boom C with respect to the derrick B, which carriage allows free relative movement between said loading boom C and said derrick B adjacent the supporting position.

Referring more to the details of the loader of my invention, the truck A comprises a frame 10 (Fig. 4) formed of appropriate side and end plates rigidly attached together by appropriate gusset plates with reinforcing lateral channel members, as seen at 11. Adjacent the forward end of said truck A, there is provided a shaft 12 which projects laterally to each side of the frame 10 and supports loosely journaled crawler drive sprockets 13. Adjacent the rear end of said frame 10 is a shaft 14 which also projects laterally of the frame 10 to each side thereof and carries loosely journaled crawler guide discs 15. Be-

tween the sprockets 13 and the discs 15 on each side of the truck A, there is provided an endless articulated crawler 16. A supporting plate 17 (Figs. 1 and 2) is provided adjacent each side of the frame 10 and attached rigidly therewith which plate is provided with a pair of idler rollers 18 cooperating with the crawlers 16 to aid in supporting the frame 10 therefrom.

Mounted upon said frame 10 is a motor 19 which may be either of a gasoline or an electric type and which is employed to perform a number of functions, as will be hereinafter described. Motor 19 is directly connected through chain and sprocket mechanism 20 to a clutch and gear transmission mechanism 21 from which extends a drive shaft 22 which is directly connected to a counter shaft 23 (Fig. 3) through chain and sprocket mechanism 24.

The counter shaft 23 is mounted upon the truck A by appropriate journal bearings 25 (Fig. 3). Co-operating with said counter shaft 23 is a friction clutch mechanism 26 with which co-operates a chain and sprocket mechanism 27 for driving a stub shaft 28 which stub shaft 28 drives an endless conveyor belt 29 on the loading boom C, through a chain and sprocket mechanism 30. Said chain and sprocket mechanism 30 drives said conveyor belt 29 through a roller 31 carried between side plates 32 on said loading boom C. Idler rollers 33 are provided to increase the friction between said conveyor belt 29 and said roller 31. A chain tensioning mechanism 34 is carried by the strut D for maintaining proper tension in the chain of the said chain and sprocket mechanism 30.

It may be noted that the strut D comprises a pair of spaced angle members mounted upon brackets 35, one of which brackets also supports the chain and sprocket mechanism 27. The rear pivotal point of the strut D is in alignment with the axis of the stub shaft 28 where each is mounted on said brackets 35. This maintains the chain and sprocket mechanism 30 in proper tension regardless of the position of said strut D. The friction clutch 26 for driving the conveyor belt 29 is operated through an operating lever 36.

Also co-operating with said counter shaft 23 is a pair of friction clutches 37 and 38. Friction clutch 37 co-operates with chain and sprocket mechanism 39 to drive pinion gear 40 through drive shaft 41, which pinion gear 40 co-operates with the master gear 42 rigidly attached to one of the crawler drive sprockets 13. Friction clutch 38 co-operates with a similar chain and sprocket mechanism 43 to drive pinion 44 through drive shaft 45, which pinion 44 co-operates with a master gear 46 to drive the other crawler drive sprocket 13. Operating levers 47 are provided, one for the clutch 37 and one for the clutch 38, for operating the crawlers 16 individually. It is manifest that by operating the two crawlers at the same speed, the loading mechanism may be transported in a substantially straight line. By operating one of said clutches while the other is rendered inoperative, only one of the crawlers will be driven and the loader may effect a turn.

Also co-operating with the counter shaft 23 is a jaw clutch 8 which, through appropriate chain and sprocket mechanism 49, drives an elevating winch 50 through a self-locking worm drive 51. This jaw clutch mechanism is operated by an appropriate lever 52. The complete function of this mechanism will be described more in detail hereinafter.

Adjacent one side of the truck A, there is provided a stand 53 (Fig. 5) upon which an operator can stand and operate the device. Easily reached by the foot of the operator is a foot-operated clutch pedal 54 for controlling the clutch of the mechanism 21. A gear shift lever 55 is provided for changing the drive ratio between the motor 19 and the drive shaft 22 and also for changing the direction of rotation of said shaft 22.

The derrick B, which is supported by the truck A, comprises a pair of spaced masts 56 and 57 (Fig. 5) each formed by a pair of upwardly extending angle members 58 and 59 (Figs. 2 and 4), which are spaced apart adjacent their bottoms where they are rigidly attached to the truck A and are attached together by an appropriate gusset plate 60 adjacent their tops. Adjacent the tops of said masts 56 and 57 are provided pulleys 61 and 62, respectively, the function of which will be described more in detail hereinafter.

In the form of my invention, as illustrated in Figs. 1 and 2, the boom C is formed by a pair of upper side plates 63, which are spaced apart, from which extend inwardly projecting guide flanges 64 (Fig. 5) for guiding the upper run of the conveyor belt 29. A head pulley 65 is provided adjacent the material receiving end of said boom C and an adjustable tail pulley 66 is provided adjacent the material discharge end thereof. The conveyor belt 29 is preferably provided with upwardly extending cleats 67 to aid in maintaining the material on said conveyor belt.

Adjacent the discharge end of the conveyor boom C, there is provided a discharge and screening chute comprising a trough 68, the upper portion of which has a screen bottom 69 through which fine materials may pass and be discharged forwardly into an auxiliary chute 70. The trough 68 is adjustable in position by adjusting rods 71 which are adjustable relative to the boom C by an appropriate mechanism which may comprise cables 72 attached to one of the ends of the rods 71 and reeved about pulleys 73 from whence they are attached to an appropriate winding drum operated by a crank 73' which may be maintained in any desired position by pawl and ratchet mechanism 74.

The loading boom C is also provided adjacent its bottom portion with a pair of laterally spaced longitudinally extending angle members 75 which are rigidly attached to the upper side plates 63 by appropriate reinforcing angle members 76 whereby the boom C comprises a rigid structure. Adjacent the central portion of said boom and on each side thereof, there is also provided a pair of plates 77, which plates are rigidly attached to both the angle members 75 and the upper side plates 63.

One of the important features of my invention comprises the cradle F illustrated in detail in Figs. 6 and 7, and shown in its operative position in Figs. 1, 2, 8 and 9. This cradle is adapted to support the boom C with respect to the derrick B and to provide relatively free longitudinal movement of said boom with respect to said derrick. It is effective, however, to adjust the height of the discharge end of said boom C and aids in supporting said boom when it is in a transporting position. Said carriage F comprises a frame forming a pair of side plates 78

and 79 to the outsides of which are welded reinforcing plates 80 and 81. Extending laterally between said side plates 78 and 79 and said reinforcing plates 80 and 81 is a plurality of elongated rods 82 which have their ends threaded to receive appropriate nuts 83. Said rods 82 are provided with spaced sleeves 84 which are effective to space said side plates and a pair of reinforcing and guide plates 85 which are spaced inwardly of said side plates.

Adjacent its forward end, the carriage is provided with a laterally extending shaft 86 which projects laterally to each side of the side plates 80 and 81 and carries a pair of pulleys 87 and 88 which are loosely journaled on said shaft 86. Carried at the extreme ends of said shaft 86 is a pair of friction blocks 89 and 90 which have end flanges 91 and 92, respectively. Said blocks are rigidly attached to said shaft 86 by appropriate nut and bolt means 93. Said blocks 89 and 90 are provided with squared faces and are adapted to ride upon the angle members 59 of the masts 56 and 57 and to have friction engagement therewith.

Adjacent to its rear end, the carriage F is provided with a transverse shaft 94 which carries a pair of pulleys 95 and 96 adjacent the outer plates 80 and 81. The shaft 94 may be secured to the guide plates 85 against rotation relatively thereto and thereby serve as an axle for the pulleys 95 and 96 journaled thereon. The front shaft 86, however, should be journaled in the guide plates 85 to have a rocking movement relatively thereto since the slide blocks 89 and 90 are secured to the ends of the shaft 86 in position to ride up and down the front sides of the derrick B.

The shaft 94 is provided with an extension 97 in position to strike against the lever 98 (Figs. 1 and 2) so as to exert an upward pull on the rope 99 and shift the lever 52 laterally, thereby limiting the possible upward travel of the carriage or cradle F with respect to the derrick B. That is, when said carriage F approaches its upward limit of travel, extension 97 will contact the lever 98 which is operative through an appropriate cable mechanism 99 to operate the lever 52, thereby disengaging the winch clutch 48 to prevent any further upward travel of the carriage F.

Spaced between the side plates 78 and 79 and the reinforcing plates 85 and mounted on the shafts 86 and 94 is a plurality of anti-friction rollers 100. These rollers 100 are adapted to cooperate with the angle members 75 of the loading boom C to provide anti-friction support for said boom C by the carriage F, whereby said boom C may move longitudinally of said carriage F with a minimum of friction. It is also to be noted that the side plates 78 and 79 have sufficient height that they project upwardly and adjacent the sides of said boom C. That is, these side plates form guides on the carriage F between which the boom sides are adapted to be guided.

The means for adjusting the elevation of the discharge end of the loading boom C and the lowering of the material receiving end thereof comprises a pair of cables 101 and 102. As each of these cables is operative in substantially the same way except that they are on opposite sides of the derrick B, a description of one will suffice for both.

The cable 101 is anchored to the mast 56 adjacent the top thereof by an anchor mechanism 103 from which it extends downwardly to the pulley 87 of the carriage F, then rearwardly to the pulley 95 of said carriage, then up to the pulley 61 on the mast 56, then down over a guide pulley 104 from whence it is directed to the winch 50. It is evident that by rotating the winch mechanism 50 in one direction, the carriage F will be raised, and by rotating it in the opposite direction, said carriage will be lowered. The cables 101 and 102 are also effective to keep the bearing blocks 89 and 90 in frictional engagement with the angle members 59 of the masts 56 and 57.

Extending laterally between the masts 56 and 57 is a transverse supporting angle cross-piece 105 on which the carriage F is adapted to rest when in its horizontal and lowermost position as illustrated in Fig. 1. The center of gravity of the loading boom C is forward of the cross-piece 105 or to the right thereof as viewed in Fig. 1. The front angle members 59 of the spaced apart masts 56 and 57 are each provided with forwardly extending plates 106 and 107, respectively, as shown in Figs. 1, 2 and 5. Extending between the plates 106 and 107 is a transverse rod 107' the ends of which may be bolted to the plates 106 and 107.

To the rear portions of the plates 106 and 107 are pivotally connected arms 108 and 109 at 108' (Fig. 2). Between the outer ends of the arms 108, 109 extends a transverse rod 110 carrying at each end a plurality of anti-friction rollers 111 in position to co-operate with the angle members 75 at the lower sides of the loading boom C when the latter is in its transportation position shown in Fig. 1.

The spaced-apart plates 106 and 107 are provided adjacent their forward ends with open slots 112 which are adapted to receive removably a transverse rod 113 which is adapted to support the arms 108 and 109 to hold the rollers 111 in a position to support the loading boom C.

The rollers 111 when in operative position for supporting the loading boom C, which is the transporting position as illustrated in Fig. 1, are positioned in advance of the center of gravity of the loading boom C. It is thus evident that the center of gravity of the loading boom C will fall between the rollers 111 and the cross-piece 105, and consequently the weight of the boom C will be distributed between the cross-piece 105 and the rollers 111 when the machine is being transported. Under these circumstances the tension on the cables 101 and 102 may be relieved.

When the machine reaches the place where it is to be operated, the winch 50 of Fig. 4 may be rotated by power to exert sufficient tension on the cables 101 and 102 to lift the boom thereby to relieve the weight on the anti-friction rollers 111 as hereinafter described in more detail, whereupon the rod 113 may be removed so that the arms 108, 109 will descend and rest against the cross rod 107' as shown in Fig. 2.

The connection of the struts D and E at their outer ends to the bottom of the boom C adds to the weight of the latter and should be taken into consideration in locating the effective center of gravity. The effective center of gravity of the boom C and the parts connected thereto is preferably between the shaft 86 and the rollers 111 when the boom is in its transportation position shown in Fig. 1. Upon operating the hoisting mechanism to lift the boom C, the rollers 111 will act as a fulcrum for movement of the boom C, as directed by the struts D and E, to

the position shown in Fig. 2. When the shoes 114 abut against the ground the latter will act as a fulcrum to enable the boom C to be lifted off the rollers 111, whereupon the rod 113 may easily be removed to permit the arms 108, 109 and the rollers 111 to descend to the positions thereof shown in Fig. 2. When it is desired to effect automatic movement of the receiving end of the boom C to its transportation position shown in Fig. 1, the rod 113 is replaced under the arms 108, 109 and the boom C let down on the rollers 111, whereupon the effective center of gravity being to the left of the rollers 111, as viewed in Fig. 1, the overbalancing weight at the left-hand portion of the boom C will effect an automatic lifting of the forward end of the boom together with the forward end of the struts D and E to their upper positions shown in Fig. 1.

After the rod 113 has been removed and the anti-friction rollers together with the arms 108 and 109 have been located as indicated in Fig. 2, further hoisting of the carriage F will effect shifting of the center of gravity of the loading boom C toward the right as viewed in Fig. 1, relatively to the derrick B and relatively to the carriage F. Consequently the front end of the boom C will move automaticaly by gravity to its operating position shown in Fig. 2 while the carriage F is being hoisted to its position shown in Fig. 2.

The lower spaced-apart strut bars E are pivoted at their rear ends to the front end of the crawler tractor as shown in Figs. 1 and 2, and at their forward ends the strut bars E are provided with pointed shoes or wedges 114 which are provided with longitudinal elongated slots 115 into which extend the ends of the shaft 65' of the head pulley 65. The wedges 114 afford an efficient means for entering the bottom of a pile of loose material, such as coal, and holding the receiving end of the conveyor C in its lowermost position adjacent the surface on which the pile of loose material is supported, thereby preventing the receiving end of the conveyor C from riding up on the hill of coal. In other words, the wedging action of the shoes 114 keeps the receiving end of the conveyor C nosed into the hill of loose material for efficient gathering thereof. However, the ends of shaft 65' by riding along the slots 115 afford an efficient support for the forward end of the conveyor C at various elevations of the shoes 114 relative to the level on which the crawler tractor rests. During operation of the loading machine the side skirts 116 prevent material of the loose pile from flowing laterally into the space below the forward end of the conveyor C.

It should also be noted that the ends of the shaft 65' of the head pulley 65 co-operate with the outer ends of the slots 115 to limit the upward movement of the receiving end of the conveyor C to its transportation position shown in Fig. 1. In a similar manner the rear ends of the slots 115 may be taken advantage of to limit the lowering movement of the receiving end of the conveyor so that assurance may be had at all times during operation over various surfaces supporting piles of loose material, that the strut D will be inclined upwardly forwardly from its pivot point 28, relative to the horizontal.

After the receiving end of the conveyor C has been moved to its gathering position shown in Fig. 2, the hoisting mechanism may be relied on to adjust the elevation of the rear or discharging end of the conveyor boom C. After the conveyor boom C has been adjusted with its receiving end in a gathering position and its discharging end at the desired elevation, the clutch 48 of Fig. 3 may be released so as to permit the self-locking worm gearing 51 of Fig. 4 to lock the winch 50 and the hoisting ropes 101, 102 in their adjusted positions, whereupon the conveyor boom C will be supported relative to the derrick B as shown in Fig. 2. During operation of loading material from the loose pile the crawler tractor A is operated to move the whole machine forwardly to nose the wedge shaped shoes 114 into the material and thereby hold down by the pin and slot connections 65', 115 the receiving end of the conveyor C. During the forward movement into the pile of material the endless conveyor 29 is operated by power from the motor 19 to elevate the material along the conveyor chute to the discharge chute 68 where the screening may pass through at 69 to the auxiliary chute 70.

In order to maintain ample traction of the crawler tractor with the ground over which it travels, it is desirable to prevent the operation of nosing into the pile of material, from tilting upwardly the forward end portion of the crawler 16 from the ground. As above explained, the strut D is pivotally connected at its rear end to the derrick B at 28 and is pivotally connected at its forward end to the underside of the conveyor boom C at a higher elevation than the pivot 28, as shown in Fig. 2, so that the strut D will always be inclined upwardly and forwardly when the machine is in operation. That is to say, the strut D is always upwardly inclined from the tractor A during operation so that the rearward thrust during operation will keep the front end of the tractor A always in contact with the ground. The main thrust during operation on a pile of material is on the receiving end of the conveyor boom above the shoes 114, since the width of the conveyor boom between the shoes 114 is considerable while the shoes 114 are vertical plates and consequently the rearward thrust on the side bars E is relatively small. Whatever tendency there might be for the side bars E to tilt the forward end of the tractor A upwardly is counteracted by only a small portion of the thrust on the strut D.

It should be particularly noted, however, that the relation between the boom C and the derrick B above the strut D is such as to eliminate any tendency of rearward longitudinal thrust on the conveyor boom C to tilt the derrick B and in turn tilt upwardly the forward end of the tractor A. In other words, the mounting of the boom C on the anti-friction rollers 100 of the carriage F affords ample freedom of movement of the boom C relatively to the derrick B during operation of the tractor A to thrust the receiving end of the conveyor C into the pile of loose material to be loaded.

Therefore any force transmitted to the boom C due to the pushing of the loading machine into a pile of loose material on the ground, will be transmitted to the tractor A entirely through the strut D. This necessarily follows because the boom is free to slide longitudinally on the anti-friction rollers 100 of the carriage F. The latter is suspended by the ropes 101, 102 from the top of the derrick B and therefore almost the entire weight of the boom C is sustained by the hoisting ropes 101, 102 which are so arranged as to exert a downward pull on the derrick B. One component of this downward pull on the hoisting ropes is substantially parallel to the front angle irons

59, by reason of the slide blocks 89 and 90, and consequently the weight of the conveyor boom is so distributed as to exert a downward thrust on the front angle irons 59 at the front end of the tractor A. This downward thrust adds to the downward thrust exerted by the strut D. Furthermore, there is no appreciable tendency for the rearward thrust on the conveyor boom C during loading operation to tilt the derrick B so as to lift the front end of the tractor A, for the reason that the boom C is free to slide longitudinally on its carrying rollers 100.

From the foregoing explanation it will be seen that what little tendency there is for the side bars E to tilt the forward end of the tractor A upwardly is more than counteracted by the downward thrust exerted by the strut D. The pulls exerted on the hoisting ropes at the anchorages 103 are caused to be exerted downwardly parallel to the angle irons 59 by reason of the pulleys 87 and 88 being confined to the axis of the shaft 86 which is held in front of the angle irons 59 by the slide blocks 89, 90. There is no appreciable tendency for rearward longitudinal thrusts on the conveyor C to tilt the derrick B rearwardly because the conveyor C is free to slide on the carriage. Therefore the thrust exerted on the strut D and the downward weight of the conveyor C on the front portion of the derrick will effectively hold the front end of the tractor A in efficient traction contact with the ground during all operations of the machine in loading coal from the pile of loose material.

Referring to Fig. 8 of the drawings, there is disclosed a modification of the loading boom hoisting mechanism in that the anchorages for the hoisting ropes are located at 103' on the rear angle irons 58, and a confining track is afforded for the carriage F'. This track is formed by adding a pair of angle members 117 adjacent the bottom of the loading boom in spaced relation to the bottom angle irons 75' of the loading boom. In Fig. 8 the plates 77 of Fig. 1 have been omitted.

The loading boom C' of Fig. 8 includes the lower angle members 75' as well as the reinforcing members 76'. The lower angle members 117 co-operate with the angle members 75' to form a cage within which the rollers 100 of the carriage F' are confined. It is thus evident that the carriage F' always moves vertically with the loading boom C' and has a limited longitudinal movement relatively thereto. The carriage F' is allowed to move freely in a vertical direction with respect to the loading boom C' but this movement is limited by the upright reinforcing angle members 118 acting as limit stops. This form of invention therefore differs from the form illustrated in Figs. 1 and 2, principally in that the carriage F' is confined to the loading boom C' for limited movement relatively thereto rather than being removable therefrom. It may also be noted that the cable 101 by being anchored at 103' exerts a downward pull on the upper end of the derrick B in a direction to more effectively prevent upward tilting of the front end of the tractor A.

In Fig. 9 there is illustrated a further modification of my invention comprising a pulley 119 mounted on spaced-apart side bracket plates 120 which may be upward extensions from the side plates 78 and 79 shown in Fig. 6, to form part of the cradle or carriage F''. The cable 101 is anchored at 103'' to the gusset plate 60 and extends downwardly so as to be reeved about the pulley 119 which occupies the relative position shown in Fig. 9 when the boom C' is in its operating position shown in Fig. 8. The cradle or carriage F'' is of the same type as that shown at F' in Fig. 8 in that it is confined to move along the rails 75' and 117 between the limit stops 118, 118, but in Fig. 9 the vertical bracket plates 120 are added.

It should be understood that there is one pulley 119 on each side of the conveyor C' on the cradle F'' and that the rope 102 of Fig. 6 engages the pulley 119 on the opposite side from that shown in Fig. 9, the rope 102 being arranged in the same way that rope 101 is arranged in Fig. 9.

The pulleys 119 are for the purpose of increasing the forces acting on the pulleys 87, 88, thereby assuring a more intimate contact between the friction blocks 89 and 90 and the front angle iron members 59 of the derrick B, when such additional frictional contact is desirable. What is shown in Fig. 9 is in addition to the construction shown in Fig. 8 in that the strut D, the side bars E and the mechanism connected therewith are retained.

In connection with the three forms of cradle or carriage F, F' and F'', shown respectively in Figs. 2, 8 and 9, the friction blocks 89 and 90 are automatically elevated and lowered whenever the winch 50 of Fig. 4 is operated to lift or lower the discharge end of the conveyor boom C'.

Obviously those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the claims hereto appended, and I therefore wish not to be restricted to the precise construction herein disclosed.

Having thus described and shown an embodiment of my invention, what I desire to secure by Letters Patent of the United States is:

1. In a portable loader, the combination with a truck, of a derrick on said truck comprising spaced masts, a conveyor boom carried between said masts, and having an end adapted to be thrust into a pile of material, a carriage for supporting said boom and permitting sliding of said boom relative thereto, said carriage having laterally projecting shafts forwardly and rearwardly thereof, pulleys on said shafts, bearing blocks on said forward shafts adapted to bear against said masts, pulleys adjacent the tops of said masts, and cable means cooperating with said carriage pulleys and said mast pulleys for adjusting the height of said carriage on said derrick.

2. In a portable loader, the combination with a truck, of a derrick on said truck comprising spaced masts, a conveyor boom carried between said masts and having an end adapted to be thrust into a pile of material, a carriage for supporting said boom, said carriage having laterally projecting shafts forwardly and rearwardly thereof, pulleys on said shafts, pulleys adjacent the tops of said masts, cable means cooperating with said carriage pulleys and said mast pulleys for adjusting the height of said carriage on said derrick.

3. In a loader, the combination with a truck, of a derrick on said truck comprising spaced masts, a loading boom carried between said masts, a strut pivotally attached at one end to said truck and at the other end to the forward portion of said boom, brackets extending from said mast, a boom support comprising spaced arms pivotally attached to said brackets, a roller

extending between said arms, and a removable rod extending between said brackets spaced from the pivot points of said arms, said arms resting on said rod and thereby held in boom supporting position.

4. In a loader, the combination with a truck, of a derrick on said truck comprising spaced masts, a loading boom carried between said masts, brackets extending from said mast, a boom support comprising spaced arms pivotally attached to said brackets, a roller extending between said arms, and a removable rod extending between said brackets spaced from the pivot points of said arms, said arms resting on said rod and thereby held in boom supporting position.

5. In a loader, the combination with a truck, of a derrick on said truck comprising spaced masts, a loading boom carried between said masts, a strut pivotally attached at one end to said truck and at the other end to the forward portion of said boom, brackets extending forwardly of said mast, a boom support comprising spaced arms pivotally attached to said brackets, a cross member extending between said arms upon which said boom rests when in transportating position, a rod extending between said brackets upon which said arms rest when said boom support is in non-operating position, a second rod extending between said brackets above said first mentioned rod for supporting said boom support in operative position, said second rod being removable.

6. In a loader, the combination with a truck, of a derrick on said truck comprising spaced masts, a loading boom carried between said masts, a strut pivotally attached at one end to said truck and at the other end to the forward portion of said boom, brackets extending forwardly of said mast, a boom support comprising spaced arms pivotally attached to said brackets, a cross member extending between said arms upon which said boom rests when in transporting position, a rod extending between said brackets upon which said arms rest when said boom support is in non-operating position, a second rod extending between said brackets above said first mentioned rod for supporting said boom support in operative position.

7. A carriage for a loader boom comprising side frame members, flanges extending upwardly from said frame members, lateral members rigidly attached to said frame members, shafts extending laterally between said frame members, adjacent the front and rear of said carriage, non-friction rollers on said shafts adjacent each end thereof, pulleys on said shafts adjacent each end thereof, and flat faced bearing blocks carried on one of said shafts and extending laterally of said side frames.

8. A carriage for a loader boom comprising side frame members, lateral members rigidly attached to said frame members, shafts extending laterally between said frame members adjacent the front and rear of said carriage, non-friction rollers on said shafts adjacent each end thereof, pulleys on said shafts adjacent each end thereof, and flat faced bearing blocks carried on one of said shafts and extending laterally of said side frames.

9. A carriage for a loader boom comprising side frame members, flanges extending upwardly from said frame members, lateral members rigidly attached to said frame members, shafts extending laterally between said frame members adjacent the front and rear of said carriage, pulleys on said shafts adjacent each end thereof, and flat faced bearing blocks carried on one of said shafts and extending laterally of said side frames.

10. A carriage for a loader boom comprising side frame members, flanges extending upwardly from said frame members, lateral members rigidly attached to said frame members, shafts extending laterally between said frame members adjacent the front and rear of said carriage, non-friction rollers on said shafts adjacent each end thereof, pulleys on said shafts adjacent each end thereof, and bearing blocks carried on one of said shafts and extending laterally of said side frames.

11. A carriage for a loader boom comprising side frame members, lateral members rigidly attached to said frame members, shafts extending laterally between said frame members adjacent the front and rear of said carriage, non-friction rollers on said shafts adjacent each end thereof, pulleys on said shafts adjacent each end thereof, and bearing blocks carried on one of said shafts and extending laterally of said side frames.

12. In a loading machine, the combination with a supporting frame, of conveying mechanism comprising a conveyor frame having an end adapted to be thrust into a pile of material, a carriage confined to said conveyor frame for limited movement relatively thereto, limit stops on said conveyor frame for said carriage, and hoisting mechanism connected to said carriage to move the same along said supporting frame while said conveyor frame has a limited movement longitudinally of itself along said carriage and relatively thereto as permitted by said limit stops.

13. In a loader, the combination with a supporting frame, of a carriage having bearing blocks and three pairs of pulleys, one pair at each end and one pair between and above the end pairs, conveyor mechanism comprising a conveyor frame associated with said carriage, and hoisting mechanism comprising hoisting ropes connected to said carriage by being reeved around said pulleys to effect adjustment of said conveyor frame relative to said supporting frame and to urge said bearing blocks against said supporting frame when adjacent said carriage and said conveyor frame.

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