Nov. 26, 1935. S. F. OSSING 2,022,145

SCRAPER LOADER

Filed June 25, 1931 2 Sheets-Sheet 1

Fig. 4

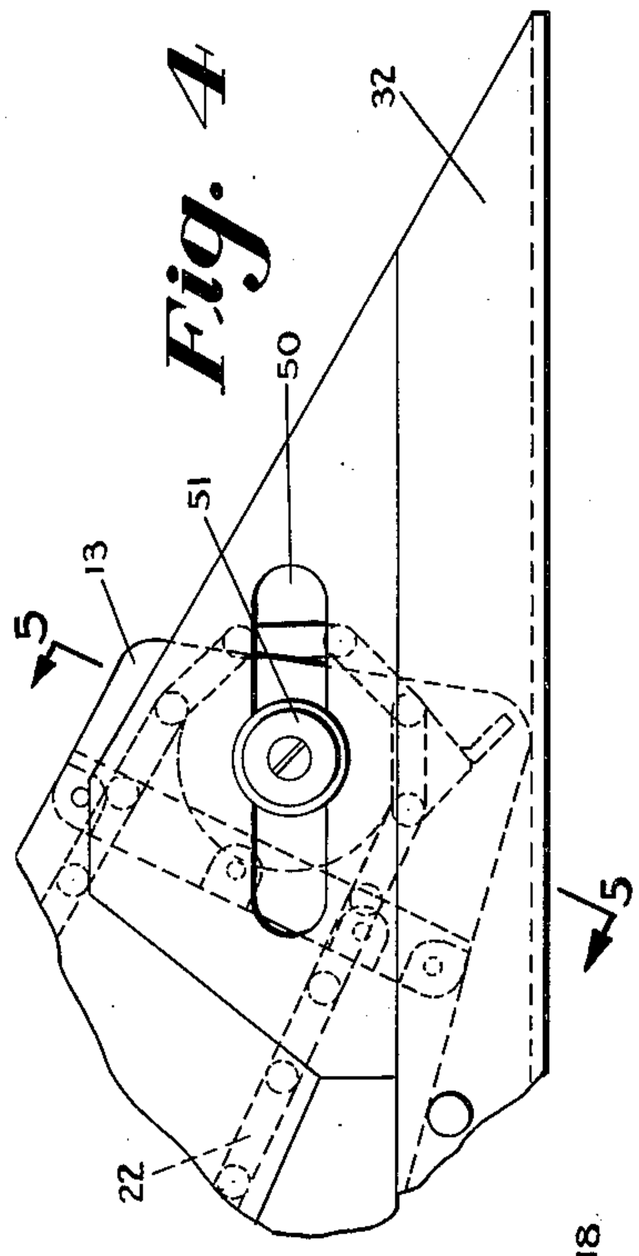

Fig. 1

Fig. 5

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Fig. 2

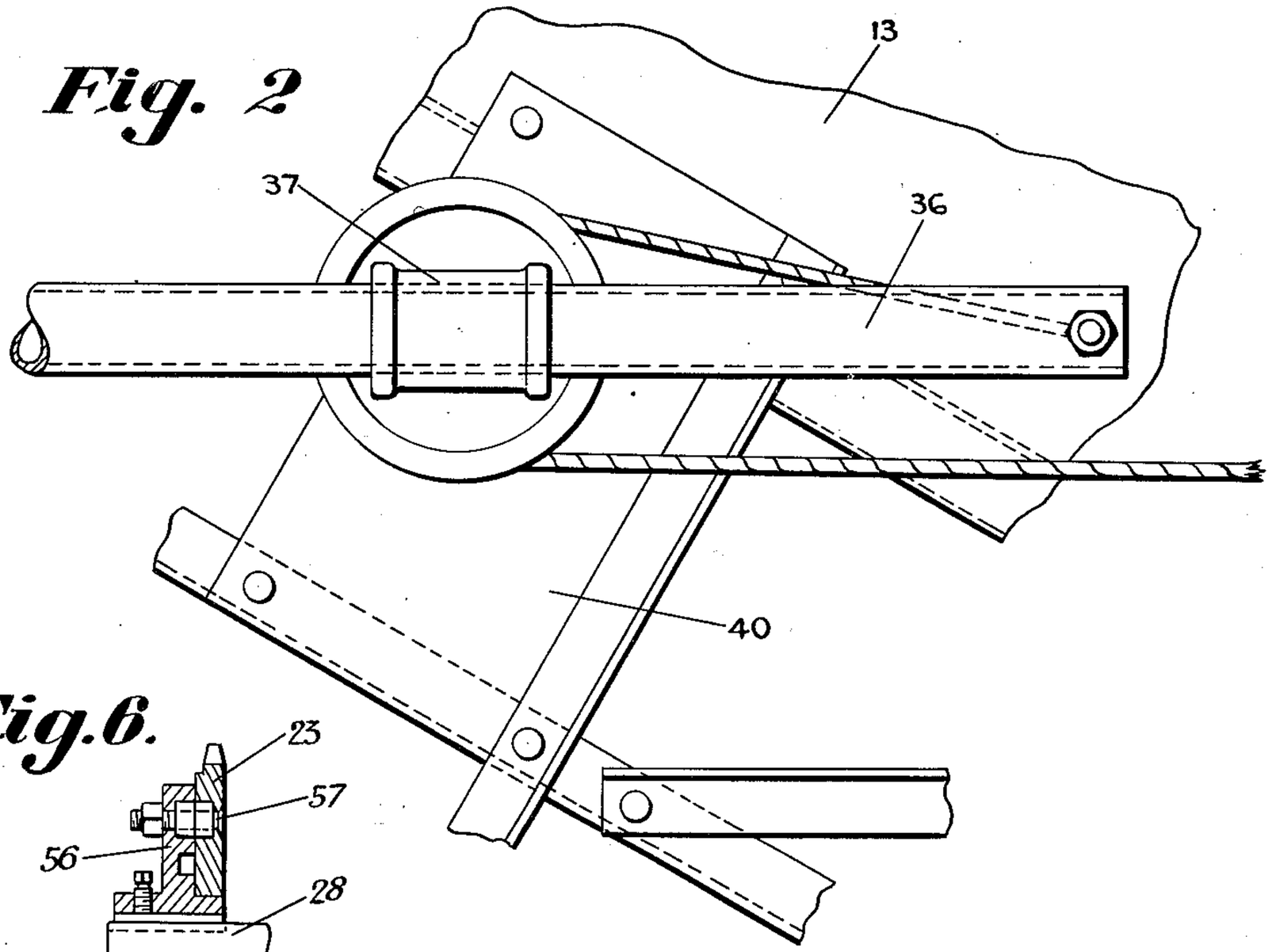
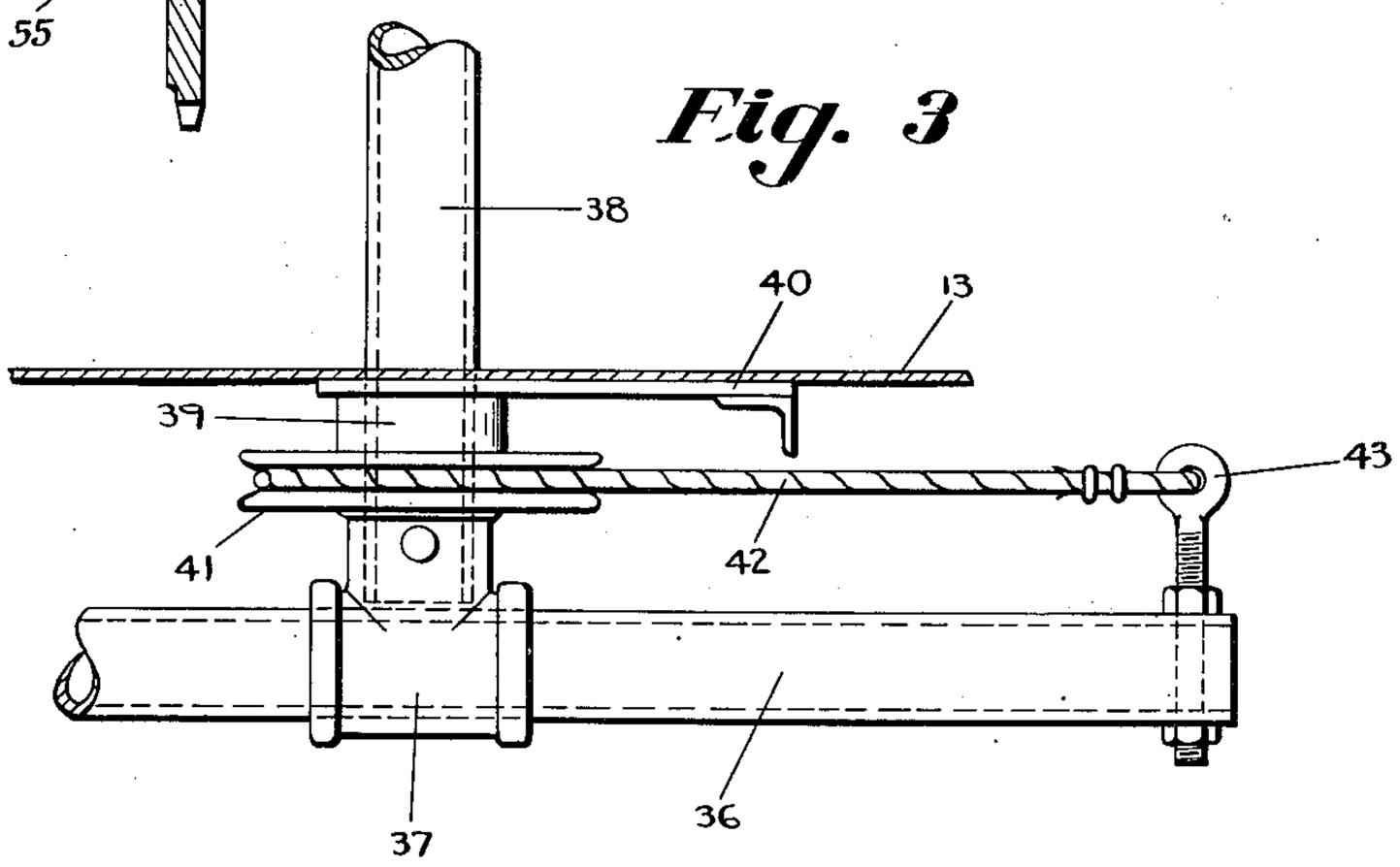


Fig. 6.

Fig. 3



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2,022,145

SCRAPER LOADER

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28 Claims. (Cl. 198—233)

The present invention relates to loaders, and, as here described, is shown in connection with a loader of the scraper type, characterized by a conveyor boom on which the conveyor is mounted and a foot scraper adapted to be thrust into the pile of material to be elevated by the conveyor and gradually fed forward into the pile as the loading operation progresses.

Broadly, this type of loader is old and well-known, and the present invention has to do with means for adjusting and positioning, relative to the point of delivery, the skip or auxiliary chute which receives the material from the conveyor and directs it to the point of delivery.

It has also to do with a construction which permits the conveyor to be readily tilted from its operative loading position to its inoperative travelling position without the necessity of uncoupling or dismantling the connected parts of the machine when it is to be transported from place to place.

In the drawings is illustrated one embodiment of the invention, but it will be obvious that mechanical expedients other than those disclosed may be adopted, and the illustration is not, therefore, to be taken as restrictive.

In the drawings:

Figure 1 is a view in side elevation of the loader.

Figure 2 is an enlarged view in elevation of a portion of the machine to illustrate the adjusting mechanism for the feeder chute.

Figure 3 is a view in plan of the parts shown in Figure 2.

Figure 4 is an enlarged view of the foot of the conveyor frame to show the sliding adjustment of the conveyor proper relative to the scraper foot.

Figure 5 is a view in section substantially upon the line 5—5 of Figure 4, looking in the direction of the arrows, and

Figure 6 is a view in section of a detail.

Referring to the drawings by numbers, like numbers indicating like parts in the several views, 10 indicates a crawler tractor of not unusual construction, upon which the conveyor is supported and by which it is transported, any suitable power device, as motor 11, being provided to drive the tractor, and, through suitable connections, diagrammatically shown, actuate the conveyor and raise and lower the conveyor frame.

Mounted upon the tractor frame is the derrick 12, which forms the support for the conveyor frame 13, said conveyor frame being suspended by means of a cable 14, passing from a suitable winding device 15 and guide sheave 15' on the tractor frame over a sheave 16 at the top of the derrick 12, and thence over a sheave 17 on the conveyor frame 13, from which the end of the cable 14 passes to an anchor or holding device 18 on the derrick 12.

Suitable control devices, not shown in detail, will be provided for actuating the winding mechanism 15 from the motor through any suitable connections, so that by paying out or hauling in the cable 14 the conveyor 13 may be lowered or raised to any desired inclination.

The conveyor frame 13 comprises a suitable trough structure made up of sides and bottom suitably braced to give a rigid construction, the conveyor frame 13 being provided at its lower end with a foot shaft 19, which carries chain sprockets 20, and at its upper end with an adjustable head shaft 21, provided also with chain sprockets similar to those on the foot shaft. The conveyor chain 22 may be of any usual construction adapted to carry the material along the trough and deliver it at the upper end, said chain being driven by sprockets as at 28', Figure 1, which are fixed on a shaft 28 journaled in side plates as at 30. Shaft 28 is driven from a sprocket 23 mounted on a hub 55, fixed to the shaft, the hub having an integral arm 56 connected to sprocket 23 through a shearing pin 57. The motor 11 is coupled through suitable connections with a shaft 24 upon which is fixed a sprocket 25 connected by means of chain 26 with sprocket 23. Struts as at 27 are pivotally connected at their ends to the main frame and to the conveyor frame and normally lie substantially in a plane which includes the axes of shafts 24 and 28. The struts serve to maintain the proper spaced relation of the shafts so that chain 26 is always suitably tensioned.

The support 30 on the conveyor frame carrying the drive pulley 23 supports also the idlers 31 over which the conveyor chain 22 passes.

With the parts in the position shown in Figure 1, with the conveyor frame elevated and positioned at the proper angle and the foot 32 thrust into the material, conveyor 22 will pick up and carry the material along the conveyor trough and deliver it at the upper end. As the work progresses, the tractor will move the conveyor forward, thrusting the foot further into the pile.

It is customary with this type of conveyor to provide a feeder chute 34 at the upper or delivery end so as to direct the material more certainly to a delivery point, and where the delivery is to trucks or cars, they may be positioned under the chute 34 so as to deliver the material brought up by the conveyor chain. It is frequently desirable to move this loading chute so as to give it different angles of inclination, such chute being pref-

erably pivoted at 35 to the conveyor frame. For example, it may be desirable to load at different points in a truck or car, and by changing the inclination of the feeder chute 34, the point of delivery can be changed without the necessity of either shifting the truck or car, or changing the angle of inclination of the feeder frame. It is also desirable that means be provided for conveniently shifting the angle of the feeder chute 34 without the necessity of loosening and tightening up any fixed adjusting devices by which the chute 34 is held. This is accomplished in the present invention in a very simple way, and by means of devices which may be readily manipulated from the ground and by the operator of the machine. The feeder chute 34, as stated, is freely pivoted at 35 on the upper end of the conveyor frame, and pivotally connected with said feeder chute is a slide bar 36 of any suitable make-up, which slide bar traverses a sleeve 37 mounted on a cross shaft 38 rotatable in a bearing 39, carried by a plate 40 secured to the conveyor frame: the shaft 38 passing across, below the conveyor frame, to the other side and being there provided with a similar sleeve 37, it being understood that the mechanism is duplicated on both sides of the frame. Mounted against each bearing member 39 on the shaft 38, is a sheave 41 freely rotatable and adapted to receive a rope 42, which is anchored in any suitable manner, as by the eye bolt 43, to the end of the sliding bar 36. The ropes 42 at opposite sides of the frame, after passing around the sheaves 41, extending longitudinally along the side of the conveyor trough, over supporting idlers 43', to a winding drum or shaft 44 provided with an operating handle 45 for manual manipulation and a ratchet mechanism 46 by which the ropes may be held in any adjusted position.

The operator of the machine may very quickly and readily shift the feeder chute by rotating the winding shaft 44, which, if driven in a direction to wind up the rope 42, will slide the bars 36 in an outward direction, tending to elevate the feeder chute 34 and change its point of delivery. When the proper inclination of the chute 34 is secured, the ratchet and pawl mechanism will maintain it in that position. If it be desired to lower the chute and cause it to move toward a perpendicular position, the ratchet and pawl mechanism will be released and due to the weight of the chute, the rope 42 will unwind from the winding drum or shaft 44 and allow the bars 36 to slide inwardly through the sleeves 37.

The feeder chute 34 is equipped with a screening bottom and is provided with the usual auxiliary chute 47, directed rearwardly and adjustable by means of the chain support 48, so that fines can be directed rearwardly, and coarser material down the main chute 34.

The ends of the foot shaft 19 project beyond the sides of the conveyor frame and through slots 50 in the side plates of the foot 32 to pivotally and slidably connect the lower end of the conveyor frame in the foot for permissible relative movement. The ends of the shaft are capped by removable plates 51 secured to the shaft by screws as shown in Figures 4 and 5. The slots 50 allow limited play between the foot 32 and the conveyor frame when the latter is raised or lowered. The foot 32 is provided with rearwardly projecting bars 52, as shown in Figure 1, pivotally connected at their rear ends to the forward end of the tractor.

It has been explained that the conveyor frame and main frame are pivotally connected by bars 27, and in order to compensate for the different radii and the offset pivotal centers of the bars 52, 27 when the parts are swung about these separated pivots, the compensating connection, formed by the slot 50 and the foot shaft 19 of the conveyor frame, is necessary. As the conveyor frame is tilted, together with the foot, they may move relative to one another, by reason of this connection, and the parts brought to transporting position without any danger of breakage. As the conveyor unit is brought to transporting position, the pins constituted by the ends of shaft 19 abut the outer ends of slots 50 so that tilting of the conveyor unit relative to the supporting frame is limited.

I claim:—

1. In a loader, the combination of a support, a motor on said support, a movable frame mounted on said support, a conveyor on said frame, conveyor driving means extending from said motor to said conveyor, a pivoted strut connecting said support and said frame adjacent said driving means, a frame-receiving foot pivotally connected with said support, and a movable pivotal connection between said foot and said frame to permit relative movement, the axis of said pivotal connection being movable relative to said foot into different positions parallel to each other.

2. In a loader, the combination of a support, a motor on said support, a movable frame mounted on said support, a conveyor on said frame, conveyor driving means extending from said motor to said conveyor, a pivoted strut connecting said support and said frame adjacent said driving means, a frame-receiving foot pivotally connected with said support, and a sliding pivot connection between said foot and said frame to permit relative movement.

3. In a loader, the combination of a support, a motor on said support, a frame mounted to tilt on said support, a conveyor on said frame, conveyor driving means extending from said motor to said conveyor, a pivoted strut connecting said support and said frame adjacent said driving means, a frame-receiving foot pivotally connected with said support and having longitudinally extending slideways, and projections on said frame engaging said slideways to permit relative movement between said foot and frame.

4. In a loader, the combination of a support, a motor on said support, a frame mounted to tilt on said support, a conveyor and a conveyor foot shaft on said frame, conveyor driving means extending from said motor to said conveyor, a pivoted strut connecting said support and said frame adjacent said driving means, and a frame-receiving foot pivotally connected with said support and having slots in its side walls to engage the ends of the foot shaft of the conveyor to permit relative movement between said foot and frame.

5. In a loader, the combination of a movable base having supporting means providing fore and aft and lateral stability, an elongated conveyor frame extending over the base in the fore and aft direction of the latter, a bar in pivotal connection at one end with said frame on a transverse horizontal axis adjacent the receiving end of the frame and at its other end with the base on an axis parallel to the first named axis, an upright frame on the base supporting the conveyor frame at a point remote from its receiving end for vertical adjustment, an endless propelling device

circulatory on the conveyor frame, a motor fixed on the base, and drive means between said motor and said propelling device, said drive means including a portion extending substantially along the line of said bar.

6. In a loader, the combination of a movable base having supporting means providing fore and aft and lateral stability, an elongated conveyor frame extending over the base in the fore and aft direction of the latter, a bar in pivotal connection at one end with said frame on a transverse horizontal axis adjacent the receiving end of the frame and at its other end with the base on an axis parallel to the first named axis, an upright frame on the base supporting the conveyor frame at a point remote from its receiving end for vertical adjustment, an endless propelling device circulatory on the conveyor frame, a motor fixed on the base at the opposite side of the said upright frame from the receiving end of the conveyor frame, and drive means between said motor and said propelling device, said drive means including a portion extending substantially along the line of said bar.

7. In a loader, the combination of a movable base having supporting means providing fore and aft and lateral stability, an upright frame mounted on said base, an elongated conveyor frame extending over the base in the fore and aft direction of the latter, a bar in pivotal connection at one end with said conveyor frame on a transverse axis adjacent the receiving end of said conveyor frame and at its other end with said upright frame on an axis parallel to the first named axis, means supporting the conveyor frame on said upright frame at a point remote from the receiving end of said conveyor frame for vertical adjustment, an endless propelling device circulatory on said conveyor frame, a motor fixed on said base, and drive connections between said motor and said propelling device, said drive connections including a portion extending substantially along the line of said bar.

8. In a loader, the combination of a movable base having supporting means providing fore and aft and lateral stability, an upright frame mounted on said base, an elongated conveyor frame extending over the base in the fore and aft direction of the latter, a bar in pivotal connection at one end with said conveyor frame on a transverse axis adjacent the receiving end of said conveyor frame and at its other end with said upright frame on an axis parallel to the first named axis, means supporting the conveyor frame on said upright frame at a point remote from the receiving end of said conveyor frame for vertical adjustment, an endless propelling device circulatory on said conveyor frame, a motor fixed on said base at the opposite side of said upright frame from said bar, and drive connections between said motor and said propelling device, said drive connections including a portion extending substantially along the line of said bar.

9. In a loader, the combination of a movable base, an elongated conveyor frame extending over said base, a plurality of bars pivotally connected at one end to the conveyor frame on transverse horizontal axes spaced longitudinally of said frame at the receiving end thereof and at their other ends to said base on axes parallel to the first named axes, means on the base supporting said frame towards its delivery end, means for adjusting said supporting means to vertically adjust said frame, an endless material propelling device circulatory on said frame, a motor on said base, and drive means between the motor and propelling device, said drive means including a portion extending between the base and frame substantially along the line of one of said bars.

10. In a loader, the combination of a movable base, an elongated conveyor frame extending over said base, a pair of bars of different length pivotally connected at one end to the conveyor frame on transverse horizontal axes spaced longitudinally of said frame at the receiving end thereof and at their other ends to said base on axes parallel to the first named axes, the pivoting axis at one end of one of said bars having a limited range of displacement, means on the base supporting said frame towards its delivery end, and means for adjusting said supporting means to vertically adjust the delivery end of said frame.

11. In a loader, the combination of a movable base, an elongated conveyor frame extending over said base, a pair of bars of different length pivotally connected at one end to the conveyor frame on transverse horizontal axes spaced longitudinally of said frame at the receiving end thereof and at their other ends to said base on axes parallel to the first named axes, the pivoting axis at one end of one of said bars having a limited range of displacement, means on the base supporting said frame towards its delivery end, means for adjusting said supporting means to vertically adjust the delivery end of said frame, an endless material propelling device circulatory on said frame, a motor on said base, and drive means between the motor and propelling device, said drive means including a portion extending between the base and frame substantially along the line of the other of said bars.

12. In a loader, a movable base, an elongated conveyor frame extending over the base with its receiving end adjacent the ground, a support for the receiving end of said frame with which the latter is in pivotal connection on a transverse horizontal axis, a bar connecting said support and base and pivoted to the latter on an axis parallel to the first named axis, means on the base engaging said frame towards its delivery end for supporting the frame in various angular relations to said first named axis, a second bar above the first in pivotal connection with the frame and base on axes parallel to the first named axis, an endless propelling device circulatory on said frame a motor on the base, and drive connections between said motor and said propelling device, said connections including a portion extending between the base and frame substantially along the line of said second bar.

13. In a loader, the combination with a portable base, of a frame mounted thereon to move therewith, an elongated conveyor, means connected between said frame and said conveyor intermediate the ends of the latter for supporting said conveyor with its receiving end at the surface from which the material is to be loaded and with its discharge end in elevated position, a supplemental frame pivoted at its rear end to said portable base and extending at its forward end beyond the front end of said conveyor and connected to the latter, a strut pivoted at its rear end to the lower portion of said frame and at its forward end to said conveyor to occupy a position in advance of said frame and downwardly inclined from said conveyor to said frame when the receiving end of the conveyor rests on a horizontal surface, and means for operating said conveyor.

14. In a loader, the combination with a portable base, of a derrick mounted on said base to

move therewith, an elongated conveyor, rope hoisting mechanism comprising a rope extending from said base to the top of said derrick and thence to said conveyor to support the same at adjusted elevation by said derrick with the receiving end of the conveyor at the surface from which the material is to be loaded and with its discharge end in elevated position, a supplemental frame pivoted at its rear end to said portable base and extending at its forward end beyond the front end of said conveyor and connected to the latter, spaced-apart struts pivoted at their rear ends to the lower portions of said derrick to occupy positions downwardly inclined from said conveyor to said derrick when the receiving end of said conveyor rests on a horizontal surface, and means for operating said conveyor.

15. In a loading machine, the combination with a supporting frame, of an elongated conveyor unit, a supplemental frame connected to said supporting frame to extend forwardly therefrom with its forward end adapted to rest on and slide over the surface from which the material is to be loaded, mechanism for supporting the receiving end of said conveyor unit on the forward end of said supplemental frame for reciprocating movements forwardly and rearwardly relatively thereto, thrust mechanism connected between said supporting frame and said conveyor unit rearwardly of the receiving end of the latter to occupy a downwardly inclined position from the conveyor unit to said frame in advance of the latter during loading operations, and means for tilting the conveyor unit to adjust the elevation of the discharge end thereof.

16. In a loading machine, the combination with a supporting frame, of an elongated conveyor unit, thrust mechanism pivotally connected to said frame and to said conveyor unit in position to extend downwardly from said conveyor unit to said frame during operation of the machine, a supplemental frame pivoted at its rear end to said frame, mechanism connecting the outer end of said supplemental frame to the receiving end of said conveyor unit to permit to and fro movements of the outer end of said receiving end but compelling the outer end of said supplemental frame to move up and down with the receiving end, and means for effecting tilting movements of said conveyor unit relatively to said frame.

17. In a loading machine, the combination with a supporting frame, of a supplemental frame pivoted thereto and extending forwardly therefrom with its outer end adapted to rest on and slide over the surface from which the material is to be loaded, an elongated conveyor unit, pin and slot connections between the receiving end of said conveyor unit and the outer end of said supplemental frame, strut mechanism connecting said elongated conveyor unit to said frame in operative relation, and means for effecting tilting movements of said conveyor unit relatively to said frame.

18. In conveyor apparatus, a movable base having supporting means providing fore and aft and lateral stability, an upright frame rigidly supported on said base, an elongated conveyor frame extending over the base in the fore and aft direction of the latter, suspension means between said upright frame and a medial portion of said conveyor frame, said suspension means being adjustable to effect vertical adjustment of said conveyor frame, said suspension means supporting said conveyor frame for fore and aft tilting movement and free longitudinal displacement relative to said rigid frame with the forward end of said conveyor frame substantially at the supporting surface for said base, a pair of bars of different length in pivotal connection at one end with the conveyor frame on transverse horizontal axes spaced longitudinally of said conveyor frame at the forward end thereof, said bars being in pivotal connection at their other ends with said base on axes parallel to the first named axes, the pivoting axis at one end of one of said bars having a limited range of displacement, circulatory material moving means on said conveyor frame, and means for driving said last named means.

19. In conveyor apparatus, a movable base having supporting means providing fore and aft and lateral stability, an upright frame rigidly supported on said base, an elongated conveyor frame extending over the base in the fore and aft direction of the latter, suspension means between said upright frame and a medial portion of said conveyor frame, said suspension means being adjustable to effect vertical adjustment of said conveyor frame, said suspension means supporting said conveyor frame for fore and aft tilting movement and free longitudinal displacement relative to said rigid frame with the forward end of said conveyor frame substantially at the supporting surface for said base, a pair of bars of different length in pivotal connection at one end with the conveyor frame on transverse horizontal axes spaced longitudinally of said conveyor frame at the forward end thereof, said bars being in pivotal connection at their other ends with said base on axes parallel to the first named axes, the pivoting axis at one end of one of said bars having a limited range of displacement, the pivoting axes of the other of said bars being in fixed spaced relation, circulatory material having means on said conveyor frame, means for driving said last named means comprising a motor on said base, and transmission means including a portion extending between the base and frame substantially along the line of said last named bar.

20. In conveyor apparatus, a movable base having supporting means providing fore and aft and lateral stability, an upright frame rigidly supported on said base, an elongated conveyor frame extending over the base in the fore and aft direction of the latter, adjustable rope gearing extending downwardly from said upright frame and engaged with a medial portion of said conveyor frame whereby the latter is suspended for vertical adjustment and for fore and aft tilting movement and free longitudinal displacement relative to said rigid frame with the forward end of said conveyor frame substantially at the supporting surface for said base, a pair of bars of different length in pivotal connection at one end with the conveyor frame on transverse horizontal axes spaced longitudinally of said conveyor frame at the forward end thereof, said bars being in pivotal connection at their other ends with said base on axes parallel to the first named axes, the pivoting axis at one end of one of said bars having a limited range of displacement, circulatory material moving means on said conveyor frame, and means for driving said last named means.

21. In conveyor apparatus, a movable base having supporting means providing fore and aft and lateral stability, an upright frame rigidly supported on said base, an elongated conveyor frame extending over the base in the fore and aft di-

rection of the latter, adjustable rope gearing extending downwardly from said upright frame and engaged with a medial portion of said conveyor frame whereby the latter is suspended for vertical adjustment and for fore and aft tilting movement and free longitudinal displacement relative to said rigid frame with the forward end of said conveyor frame substantially at the supporting surface for said base, a pair of bars of different length in pivotal connection at one end with the conveyor frame on transverse horizontal axes spaced longitudinally of said conveyor frame at the forward end thereof, said bars being in pivotal connection at their other ends with said base on axes parallel to the first named axes, the pivoting axis at one end of one of said bars having a limited range of displacement, the pivoting axes of the other of said bars being in fixed spaced relation, circulatory material moving means on said conveyor frame, means for driving said last named means comprising a motor on said base and transmission means including a portion extending between the base and frame substantially along the line of said last named bar.

22. In a loading machine, the combination with a supporting frame, of an elongated conveyor unit, a supplemental frame for slidably supporting the receiving end of said conveyor unit, wedging shoes at the forward end of said supplemental frame to hold said receiving end down when pushed into a pile of loose material to be loaded, mechanism for imparting thrust to said frame when said receiving end and said shoes are pushed into such material, and mechanism for operating said conveyor unit.

23. In a loading machine, the combination with a supporting frame, of an elongated conveyor unit, a supplemental frame pivotally connected to the receiving end of said conveyor unit to slidably support such receiving end, wedging mechanism at the forward end of said supplemental frame to hold said receiving end down when pushed into a pile of loose material to be loaded, thrust mechanism connecting said conveyor unit to said frame, and means for operating said conveyor unit.

24. In conveyor apparatus, the combination with a supporting frame, of an elongated conveyor unit mounted thereon for tilting adjustments relatively thereto, a thrust rod pivotally connected at its rear end to said frame and at its forward end to said conveyor unit intermediate the receiving end of the latter and said frame, and mechanism connected between said frame and the receiving end of said conveyor unit to coact with said thrust rod to limit tilting of said conveyor unit relatively to said supporting frame, the said mechanism including a pin and slot connection at the receiving end of the conveyor unit.

25. In a loading machine, the combination with a supporting frame, of an elongated conveyor unit, a supplemental frame connected to said supporting frame to extend forwardly therefrom with its forward end adapted to rest on and slide over the surface from which material is to be loaded, mechanism for supporting the receiving end of said conveyor unit on the forward end of said supplemental frame for reciprocating movements forwardly and rearwardly relatively thereto, thrust mechanism connected between said supporting frame and said conveyor unit rearwardly of the receiving end of the latter, and means for tilting said conveyor unit to adjust the discharge end thereof.

26. In conveyor apparatus, the combination with a supporting frame, of an elongated conveyor unit, thrust mechanism pivotally connected to said frame and to said conveyor unit intermediate the discharge end and the receiving end of said conveyor unit, a supplemental frame pivoted at its rear end to said frame, mechanism connecting the outer end of said supplemental frame to the receiving end of said conveyor unit to permit to and fro movements of the outer end of said receiving end but compelling the outer end of said supplemental frame to move up and down with said receiving end, and means for effecting tilting movements of said conveyor unit relatively to said frame.

27. In a loading machine, the combination with a supporting frame, of a supplemental frame pivoted thereto and extending forwardly therefrom with its outer end adapted to rest on and slide over the surface from which the material is to be loaded, an elongated conveyor unit, pin and slot connections between the receiving end of said conveyor unit and the outer end of said supplemental frame, mechanism connecting said elongated conveyor unit to said frame in predetermined relation thereto, and means for effecting tilting movements of said conveyor unit relatively to said frame.

28. In a conveyor apparatus, the combination with a supporting frame, of a conveyor unit, means for adjusting the elevation of the discharge end of the said conveyor unit, a fulcrum support embracing pins extending transversely of the conveyor unit, and means for limiting the elevation of the said receiving end, the said means comprising a supplemental frame connecting the supporting frame and the receiving end of the conveyor unit and provided with slots into which the said pins project and slide longitudinally thereof responsively to vertical movements of the conveyor unit, engagement of the pins with the ends of the slots limiting the said vertical movements of the conveyor unit.

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