

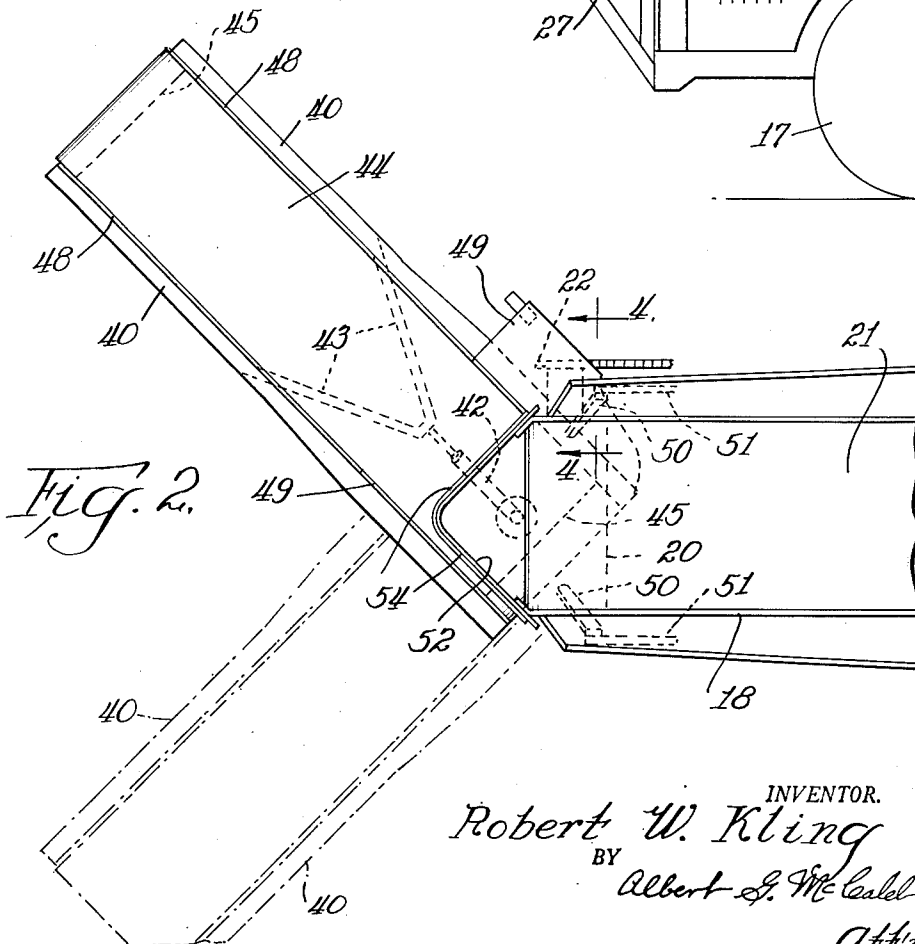
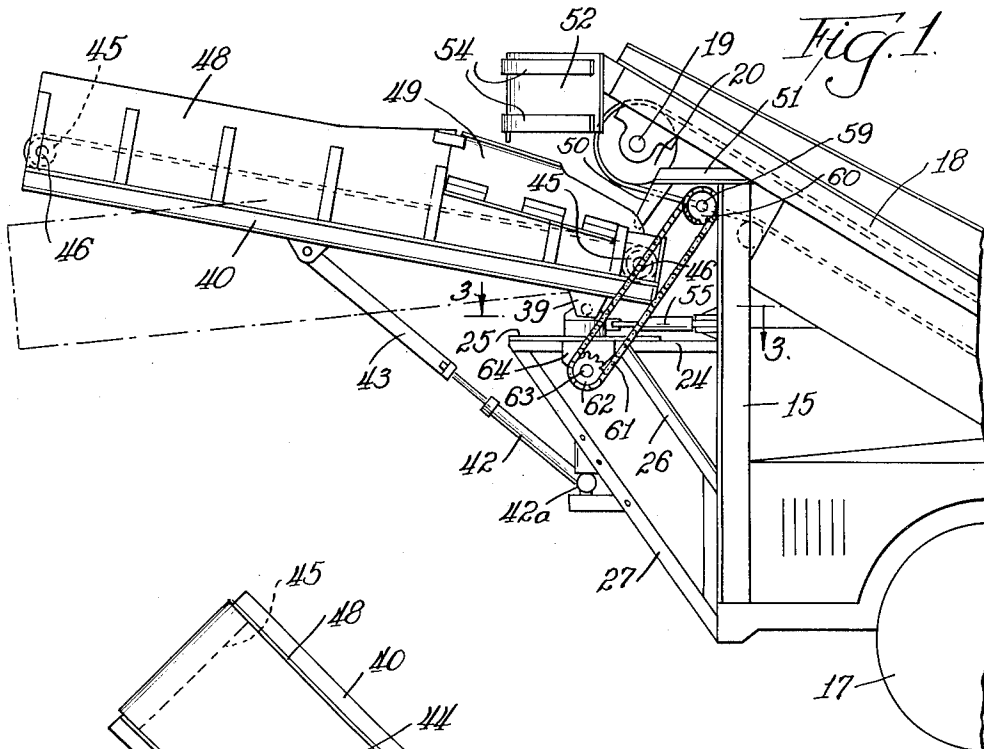
Aug. 11, 1953

R. W. KLING
SWIVEL CONVEYER AND MEANS FOR
MOUNTING AND DRIVING THE SAME

2,648,422

Filed July 28, 1950

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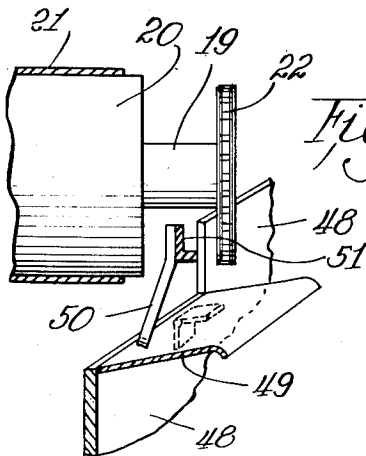


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4 Sheets-Sheet 2



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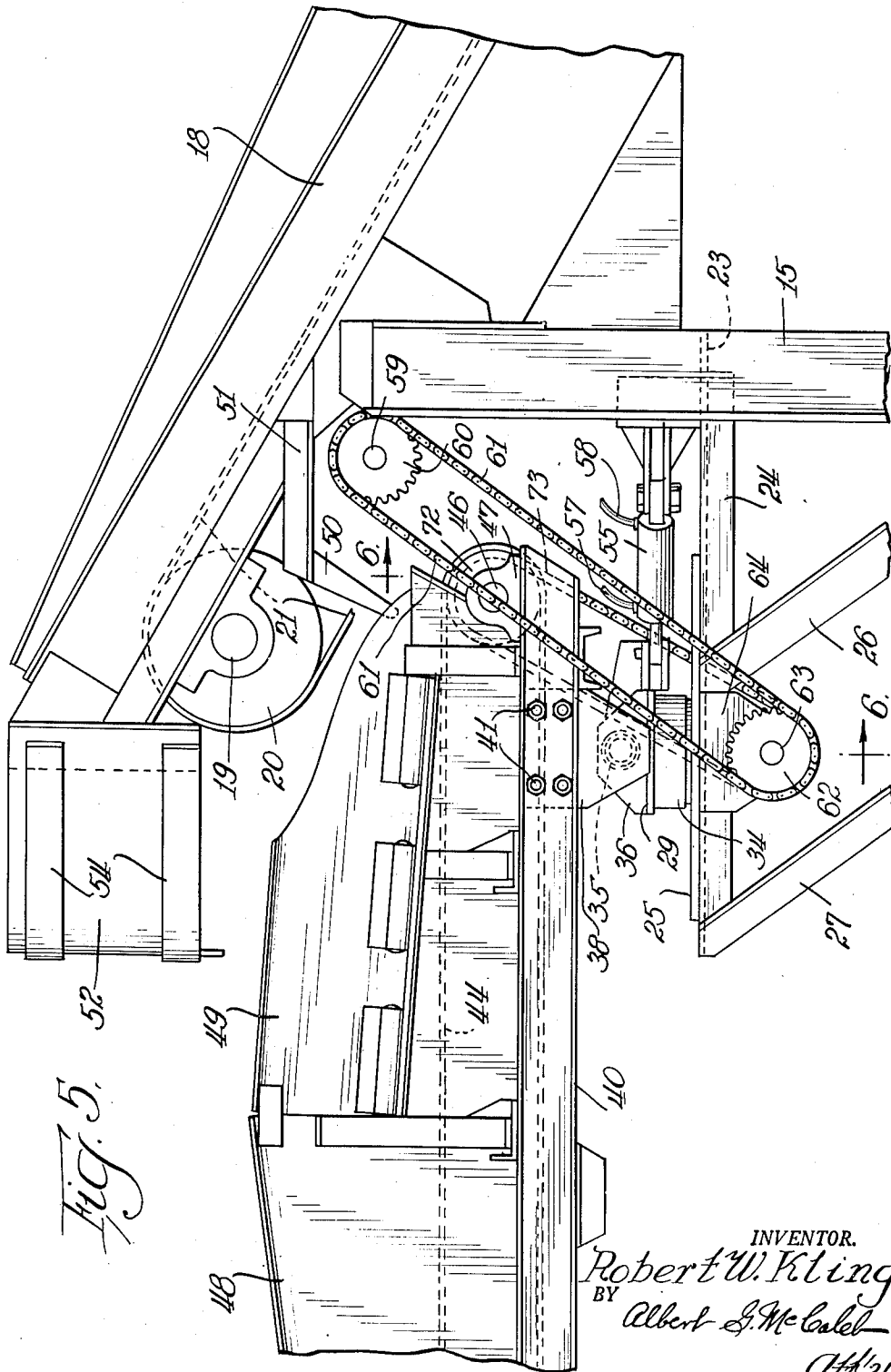
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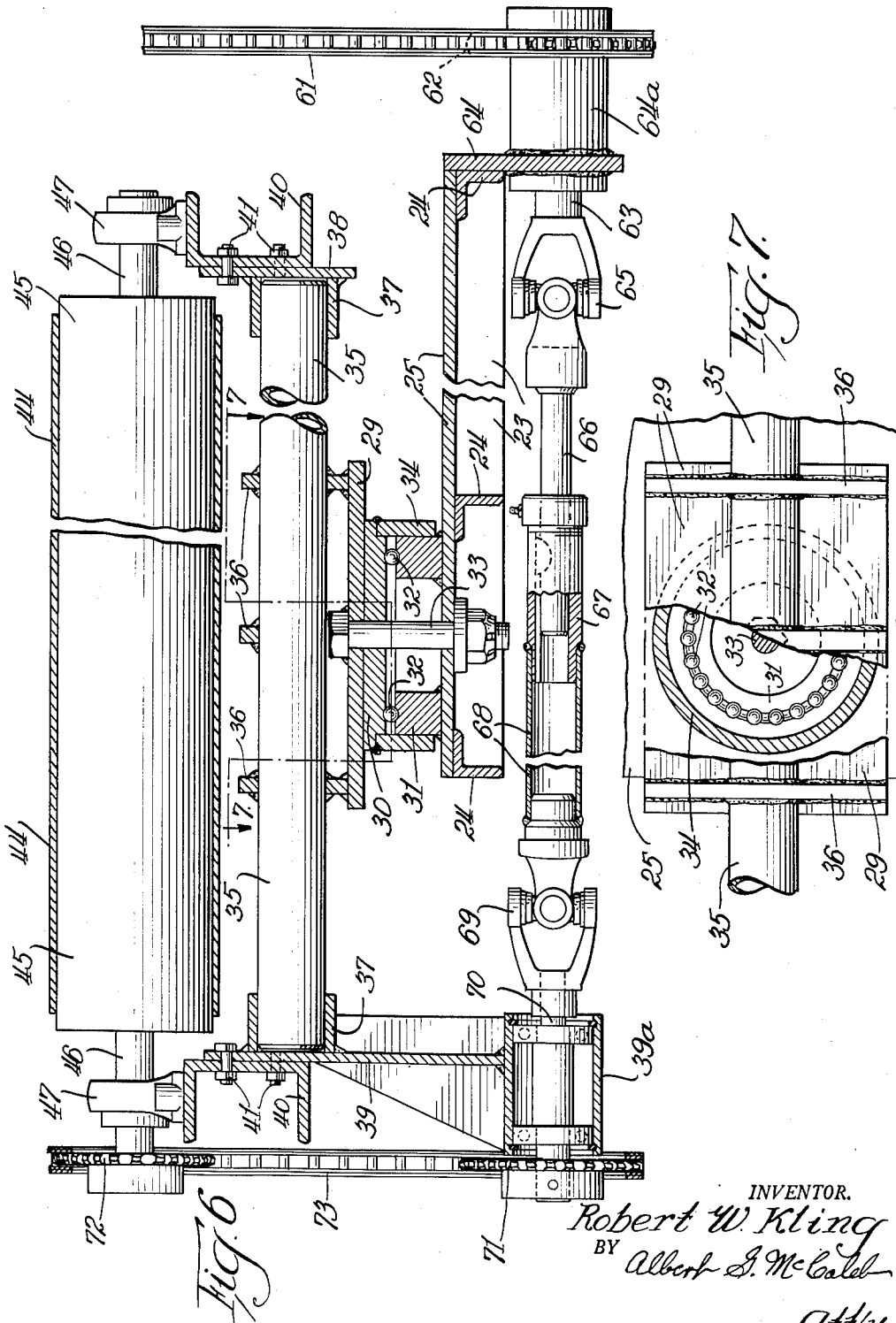
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UNITED STATES PATENT OFFICE

2,648,422

SWIVEL CONVEYER AND MEANS FOR
MOUNTING AND DRIVING THE SAMERobert W. Kling, Chicago, Ill., assignor to Athey
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Application July 28, 1950, Serial No. 176,336

3 Claims. (Cl. 198—99)

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This invention relates to a new and improved form and arrangement of a swivel conveyor and the means for adjustably mounting it on a loader, or the like, and for driving such conveyor in its various adjusted positions, such conveyor being of a type adapted to be swung horizontally to either side of the machine or to be swung vertically into a position of adjusted elevation.

It is the principal object of the invention to provide improved mounting and driving means for such a swivel conveyor, which shall be of very simple arrangement, easily and cheaply manufactured, highly effective in operation, and of great strength and durability.

To this end, I have provided driving means for the conveyor comprising two universal joints, together with means for supporting said universal joints independently of each other, with one of said universal joints supported from the machine on which the swivel conveyor is mounted, and the other universal joint supported from said conveyor. In this improved construction, the universal joints are connected together for the transmission of power to the conveyor in its various adjusted positions by means of driving connections of variable length, such for example as two telescopically connected shafts keyed for rotation together. The arrangement is such that the universal joints automatically move to their proper positions both horizontally and vertically for the desired smooth driving effect.

It is another object of my invention to provide improved side boards for my conveyor, together with improved means for controlling the position of such side boards, so as to make them effective in the different positions of the conveyor as it is swung horizontally; to provide improved means for supporting the conveyor in adjusted angular position vertically; to provide improved means for swinging the conveyor horizontally to the various desired adjusted positions; and to improve the construction and arrangement with respect to various features as may be hereinafter pointed out.

Other objects and advantages of the invention will be apparent from the following description in connection with the accompanying drawings in which similar reference characters indicate similar parts throughout the several views.

In the four sheets of drawings:

Fig. 1 is a side elevational view of a portion of a loader equipped with my improved swivel conveyor structure, wherein the swivel conveyor is in a position extending longitudinally of the machine upon which it is used;

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Fig. 2 is a top plan view of the apparatus as shown in Fig. 1, but with the swivel conveyor in angled position swung toward one side, and showing by dotted lines a changed angular position of the swivel conveyor;

Fig. 3 is a horizontal sectional view taken substantially at the line 3—3 in Fig. 1, but with the swivel conveyor indicated by dotted lines in a position swung to one side, as shown by solid lines in Fig. 2, and with two universal joints and associated conveyor driving parts indicated diagrammatically by dot and dash lines;

Fig. 4 is a vertical sectional view taken substantially at the line 4—4 in Fig. 2;

Fig. 5 is an enlarged view of a portion of the structure as shown in Fig. 1;

Fig. 6 is a vertical sectional view taken substantially at the line 6—6 in Fig. 5; and

Fig. 7 is a horizontal sectional view taken substantially at the line 7—7 in Fig. 6, with a portion broken away to show details of the structure.

Referring now to the exemplary embodiment of the invention as disclosed in the accompanying drawings for purposes of illustration, 15 and 16 indicate upright frame members of a machine adapted to pick up and elevate materials for loading into trucks, or the like, the machine being supported by carrying wheels 17, only one of which is shown, and including an elevating conveyor structure 18 of any approved type adapted for handling materials. In the construction illustrated, the elevating conveyor structure 18 embodies a heavy shaft 19 having a supporting cylinder or drum 20 mounted thereon so as to support a wide conveyor belt 21 of rubber or other suitable material; such shaft 19 being driven by a sprocket wheel 22 (see Fig. 4) from a suitable source of power on the loading machine.

As is shown in Fig. 3, a beam 23 connects the mid-portions of frame members 15 and 16, with parallel beams 24 secured thereto and extending rearwardly from the loading machine to provide support for a platform 25 at the rear end to one side of the machine. An obliquely positioned brace bar 26, connected at its lower end with the upright frame member 15 and connected at its upper end with one of the beams 24, serves to reinforce the platform for holding it rigidly in position. At about the middle of the machine transversely thereof, a heavy brace beam 27 is provided in oblique position connected at its upper end with the beams 24 and connected at its lower end with the framework of the loader at a point between the uprights 15 and 16.

On the platform 25, a turntable 29 is mounted (see Fig. 6) so as to be rotatable about a vertical axis, supported by a plate 30 and heavy ring 31, with a series of bearing balls 32 interposed therebetween and running in opposed circular grooves; a heavy bolt or pin 33 serving to hold the parts in their aligned working positions. A collar 34 carried by a plate 30 assists in holding the parts in centered position with respect to each other and serves to protect the bearing against the entrance of dust or the like.

On the turntable 29, a heavy shaft 35 is fixedly mounted in a horizontal position, with plates 36 interposed between the turntable and the shaft for enabling the shaft to be secured readily by welding at positions spaced longitudinally thereof. On opposite ends of the shaft 35 in its fixed position on the turntable, I have bearing sleeves 37 mounted for rotational movement; said bearing sleeves having plates 38 and 39 welded to their outer ends so as to form cap members providing pivotal supports for vertical swinging movements of the swivel conveyor, and the side bars 40 of the conveyor being secured by bolts 41 to said plates 38 and 39.

As is shown in Fig. 1, a jack 42 of any approved type has its lower end connected through a universally movable joint 42a to an intermediate portion of the obliquely positioned brace beam 27; the vertical axis of the joint 42a being in alignment with the axis of the turntable 29. The upper end of the jack 42 is pivotally connected by diverging bars 43 with intermediate portions of the side bars or beams 40 of the swivel conveyor; the arrangement being such that an adjustment of the jack 42 serves to swing the swivel conveyor upwardly or downwardly about the shaft 35. Such vertical adjustment of the swivel conveyor may be made without regard to the angular position of the conveyor laterally of the machine, by reason of the fact that the vertical axis of the turntable is aligned with the vertical axis of the joint 42a on which the jack is connected to the machine frame. The jack 42 is preferably of a type adapted to be adjusted manually.

As shown in Figs. 2 and 5, the swivel conveyor embodies a wide endless belt 44 of rubber or other suitable material carried by rotatable cylindrical supporting rollers 45 rotatably mounted on shafts 46 adapted to turn freely in pillow blocks 47 secured to the upper surfaces of the side beams 40 of the conveyor. At opposite sides, the conveyor is provided with side boards 48 including portions 49 at the inner ends thereof, as shown in Figs. 1, 2 and 4, which are mounted to open outwardly from the general plane of the side boards. For permitting the outward movement of the portions 49, while normally retaining their upright positions in the general plane of the side boards, they are mounted relative to the side boards by spring hinges of any suitable type which are arranged to resiliently bias the portions to their raised positions.

In my improved construction, arms 50 are mounted at opposite sides of the rear end of the elevating conveyor; the arm at either side of the conveyor being in position to engage the inner face of the adjacent movable side board portion 49 when the conveyor is swung toward either side, and being adapted by such engagement to swing such side board portion downwardly in an amount dependent upon the extent to which the conveyor is swung toward its extreme position of lateral movement in one direction. The arms

50 are supported rigidly in position by angle bars 51 fixedly mounted on the framework of the machine, as shown in Fig. 5.

In my improved construction, it is important that the front end of the swivel conveyor be positioned at only a short distance below the rear end of the elevating conveyor 18 so as to keep to a minimum the height to which the elevating conveyor must extend and to keep to a minimum the distance through which the material is thrown in its movement from the elevating conveyor to the swivel conveyor and thus cutting down the force of the impact of the material on the swivel conveyor. This close positioning of the two conveyors as shown in Fig. 1 is made possible by the use of the hingedly mounted side board portions 49. When said side portions 49 are held in their raised positions by the spring hinges, they tend to prevent passage of material over the sides of the swivel conveyor as such material is discharged from the elevating conveyor. When the swivel conveyor is swung to a substantial distance toward either side of the machine, said side board portions are lowered out of the way so as not to interfere with the movement of any of the parts.

At the upper end of the main elevating conveyor of the machine and above the end of the swivel conveyor, I have provided a baffle plate comprising a rubber sheet 52 with its end portions held at substantially right angles and secured to the end of the elevating conveyor in position to deflect the material being delivered from the end of the elevating conveyor 21 and to direct such material effectively to the underlying end of the swivel conveyor 44. The rubber sheet 52 of the disclosed structure is reinforced on its outer face by bars 54.

The means, as shown, for swinging the swivel conveyor horizontally about the axis of the turntable 29 comprises a cylinder 55 having a piston rod 56 and piston 56a slidably mounted therein, said cylinder being pivotally connected at one end to the upright beam 15, as shown in Fig. 3. The end of the piston rod 56 is pivotally connected to the turntable at a substantial distance from the axis of turning movement thereof. Flexible tubes 57 and 58 operatively connected with opposite end portions of the cylinder 55 are adapted to receive fluid under pressure selectively from any suitable source for extending or retracting the piston rod 56 with respect to the cylinder 55 for swinging the turntable and the swivel conveyor to the desired angular position with respect to the machine as a whole. In the construction illustrated, the swivel conveyor is adapted to be swung through an angle of about 45° to either side of the longitudinal center line of the elevating conveyor.

The means illustrated for driving the swivel conveyor belt 44 comprises a short shaft 59 (Figs. 1 and 5) rotatably mounted on the framework of the machine adjacent to the upright beam 15. This shaft is driven from the drive mechanism for the main elevating conveyor and is provided with a sprocket 60 drivingly connected by a chain 61 and sprocket 62 with a short shaft 63, which latter shaft is rotatably supported on the platform 25 by a plate 64 and attached bearing support sleeve 64a. The short shaft 63 is connected by a universal joint 65 with another shaft 66 which is slidably mounted in and keyed to a sleeve 67 so as to cause the sleeve to rotate with the shaft. The sleeve 67 is rigidly connected with a second sleeve 68, which in turn is rigidly

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connected with a second universal joint 69 rigidly connected with a short shaft 70 journaled by anti-friction bearings in a bearing support sleeve 39a secured to the plate 39 which is supported by the heavy shaft 35, as described. The shaft 70 is drivingly connected with the shaft 46 of the endless conveyor belt 44 such driving connection being effected by sprockets 71 and 72 rigidly mounted on the shafts 70 and 46 respectively, and connected together by a chain 73.

In the preparation for operation of my improved apparatus, the jack 42 is adjusted for moving the swivel conveyor vertically to the desired angular position. Fluid under pressure is then admitted to one or the other of the flexible connections 57 or 58 as may be required for causing the conveyor to swing to the desired angular position horizontally, whereupon the machine is ready for action.

This preliminary adjustment of the parts is effected without disturbing the adaptability of the machine for operation. When the swivel conveyor is swung either upwardly or downwardly, or is swung horizontally in either direction to the desired angular position with respect to the elevating conveyor, the short shaft 70 carried by the swivel conveyor at one side of the machine is maintained at all times in proper driving relationship to the short shaft 63 carried by the platform 25 on the loader at the opposite side of the machine. The changes in the angular positions of the shafts 63 and 70 with respect to each other as brought about by the adjustments of the swivel conveyor with respect to the loader are small enough that the drive through the two connected universal joints is maintained at all times smooth and effective for efficient operation of the machine including the swivel conveyor, even when the conveyor is moved to the limit of its adjustment either vertically or horizontally. Any change in the distance from one universal joint to the other is taken care of automatically by the longitudinally-extensible connection comprising the parts 66, 67 and 68 as above described.

By the use of my invention, a very useful and desirable construction is produced, without the use of complicated structures or structural arrangements; my improved structure being readily understandable and easily controlled by the workers handling this type of machinery. The parts are simple to manufacture and are easy to maintain in proper working condition, and highly effective results have been obtained by the use of the improved construction.

Certain features of the drive mechanism for the conveyor are disclosed and claimed in my copending application Serial No. 314,303, filed October 11, 1952, for Swivel Conveyors and Means for Mounting and Driving the Same.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an apparatus of the type described, the

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combination of a conveyor for carrying materials longitudinally of the apparatus into elevated position thereon, a second conveyor swingingly mounted on a vertical axis with its receiving end positioned underneath the delivery end of said first-named conveyor, upwardly-positioned side board members pivotally mounted on axes extending longitudinally of said second conveyor and normally held yieldingly in raised position, and means adapted when said second conveyor is swung toward one side to give the side board member at that side a swinging movement downwardly out of the way against the action of the resilient holding means.

2. In an apparatus of the type described, the combination of a conveyor for carrying materials longitudinally of the apparatus into elevated position thereon, a second conveyor swingingly mounted on a vertical axis with its receiving end positioned underneath the delivery end of said first-named conveyor, upwardly-positioned side board members pivotally mounted on axes extending longitudinally of said second conveyor and normally held yieldingly in raised position, and means adapted by engagement with the inner face of the pivotally mounted side board member at one side of said second conveyor to give said side board member a downwardly and outwardly swinging movement out of the way against the action of the resilient holding means when said second conveyor is given a substantial swinging movement toward that side of the apparatus.

3. In an apparatus of the type described, the combination of a conveyor for carrying materials longitudinally of the apparatus and into elevated position thereon, a turntable rotatably mounted on a vertical axis on said apparatus, a second conveyor pivotally mounted on a horizontal axis on said turntable, upwardly positioned side board members pivotally mounted on axes extending longitudinally of said second conveyor and normally held yieldingly in raised position, means for giving said second conveyor swinging movements about the axis of said turntable, and arms carried by said machine at opposite sides thereof in position to engage the side board member at either side of the apparatus when the second conveyor is swung toward that side whereby said side board member is swung downwardly out of the way.

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