July 28, 1953 R. C. LUNDQUIST 2,646,871

ARTICULATED CONVEYER FOR MINING MACHINES

Filed Oct. 12, 1951 6 Sheets-Sheet 1

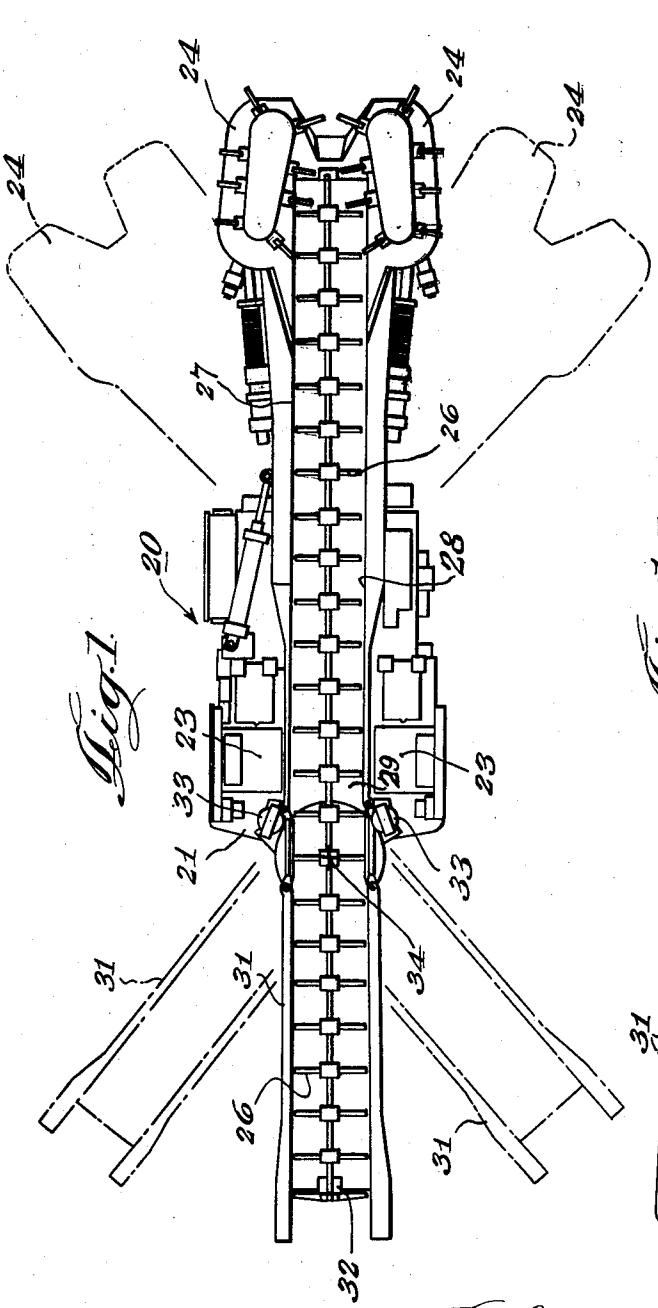

Fig. 1.

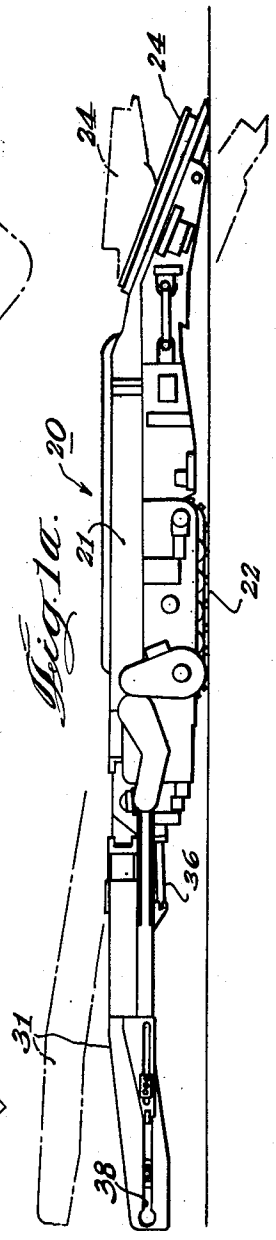

Fig. 1a.

Inventor
Richard C. Lundquist
By Murray A. Gleeson
Attorney

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ARTICULATED CONVEYER FOR MINING MACHINES

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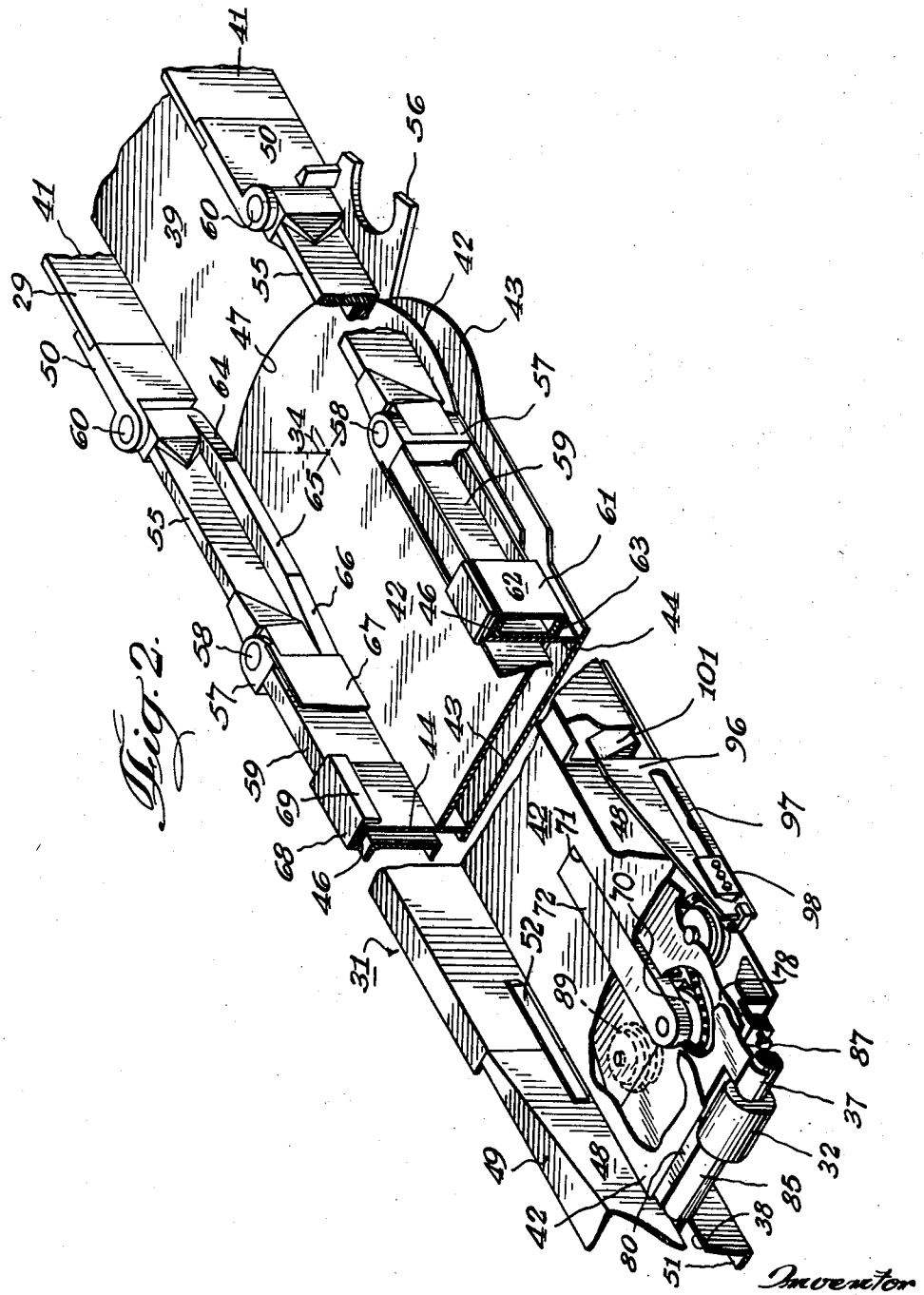

Fig. 2.

Inventor
Richard C. Lundquist
By Murray A. Gleason
Attorney

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ARTICULATED CONVEYER FOR MINING MACHINES

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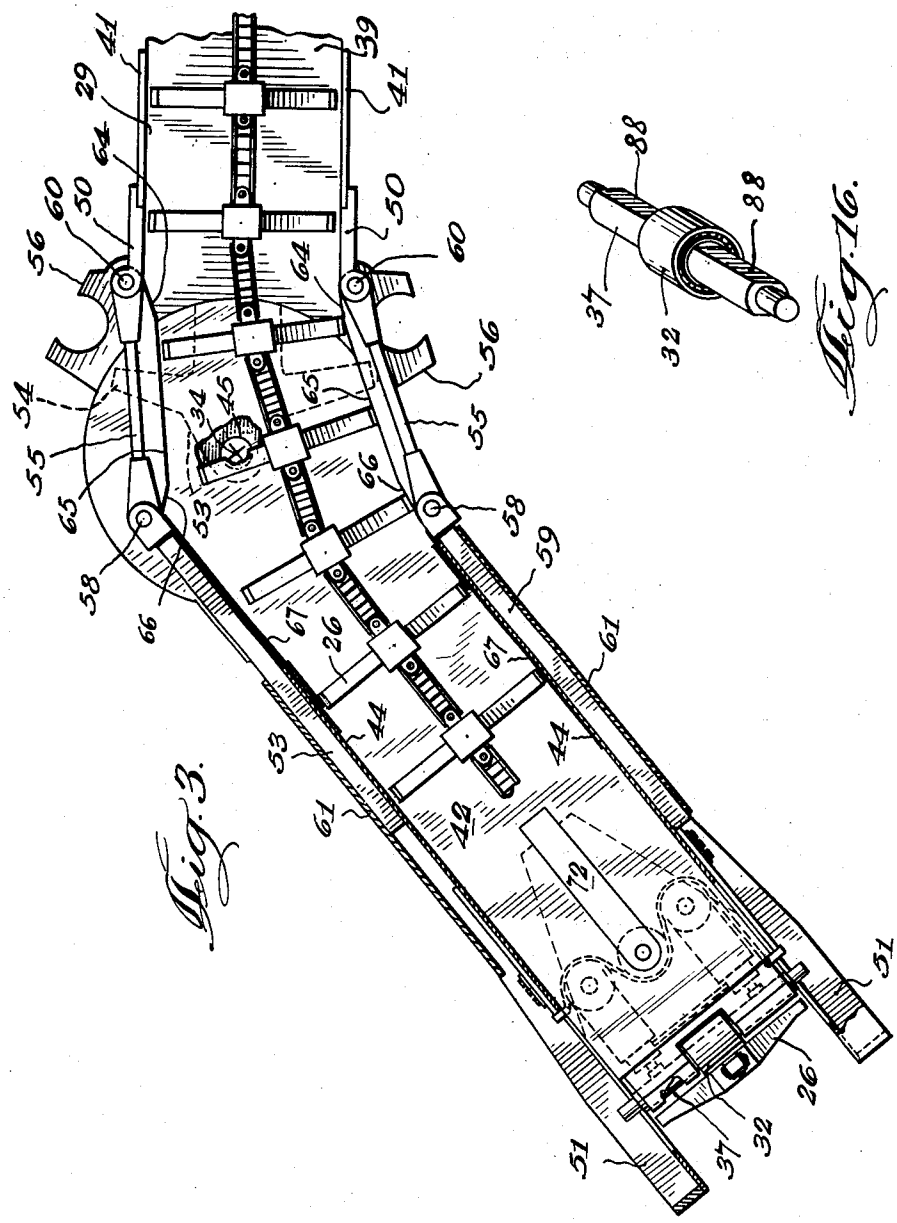

Fig. 3.

Fig. 16.

Inventor
Richard C. Lundquist
By Murray A. Gleeson
Attorneys

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Fig. 9.

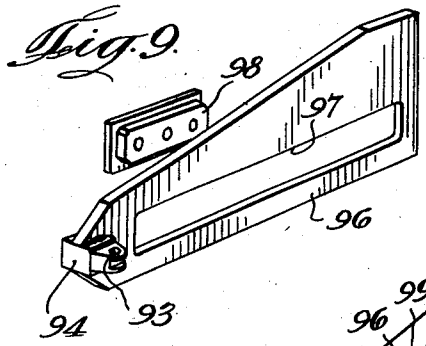

Fig. 4.

Fig. 10.

Fig. 11.

Inventor
Richard C. Lundquist
By Murray A. Gleason
attorney

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Fig. 5

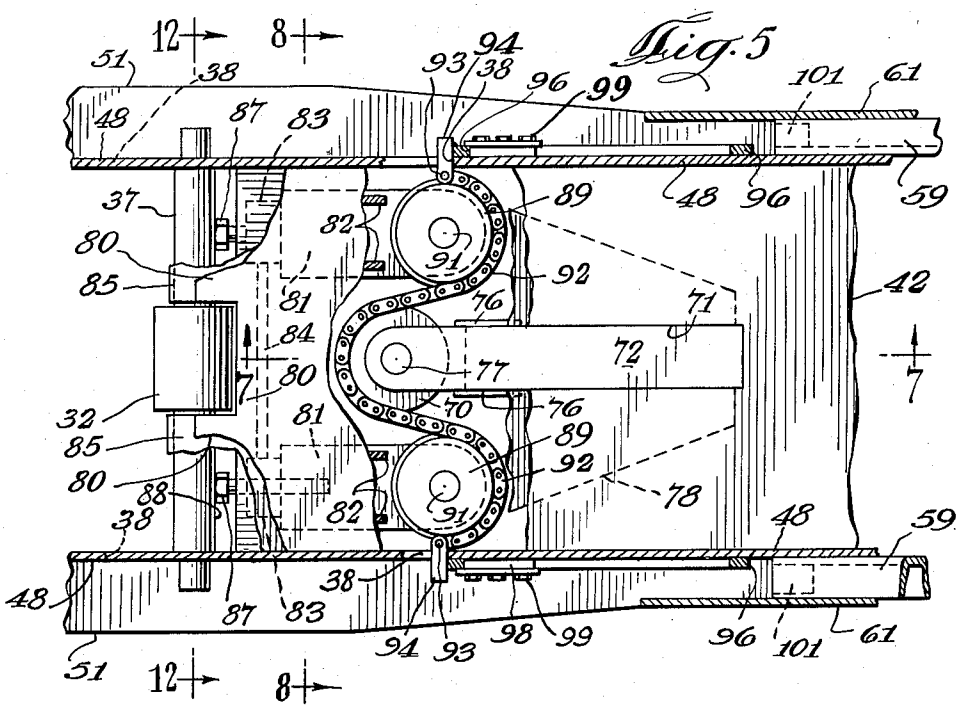


Fig. 12.

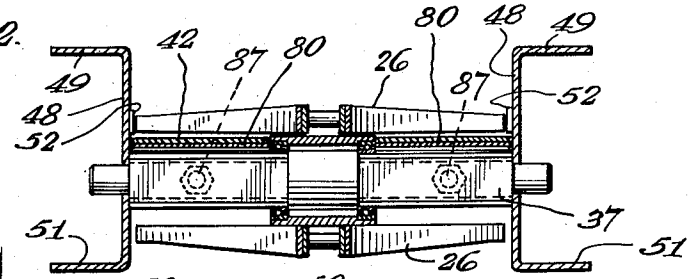


Fig. 13

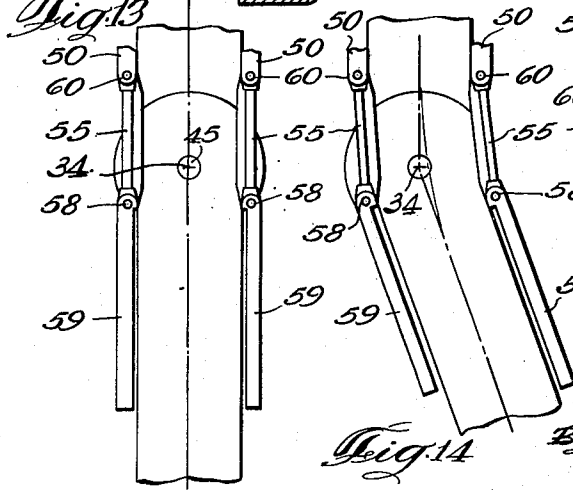
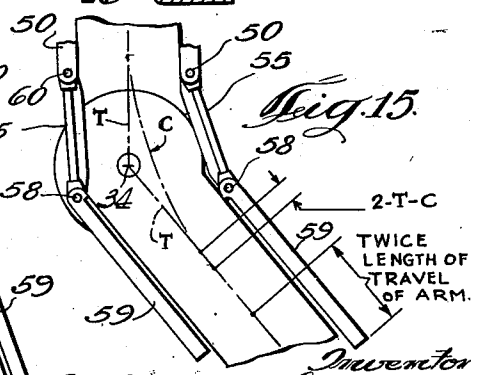


Fig. 14

Fig. 15.



Inventor
Richard C. Lundquist
By Murray A. Gleason
Attorney

July 28, 1953 R. C. LUNDQUIST 2,646,871

ARTICULATED CONVEYER FOR MINING MACHINES

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Fig. 6.

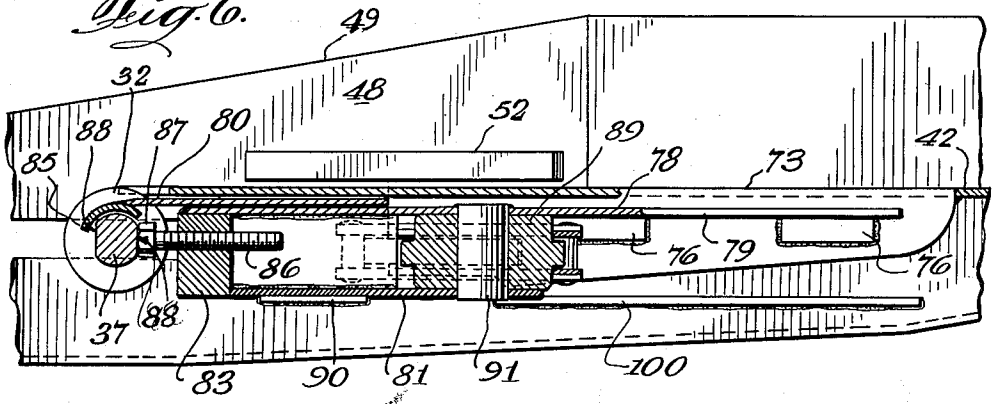
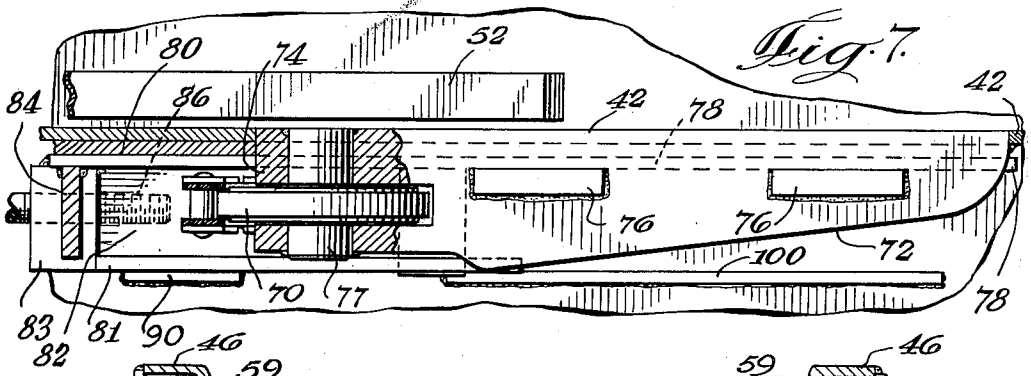


Fig. 7.



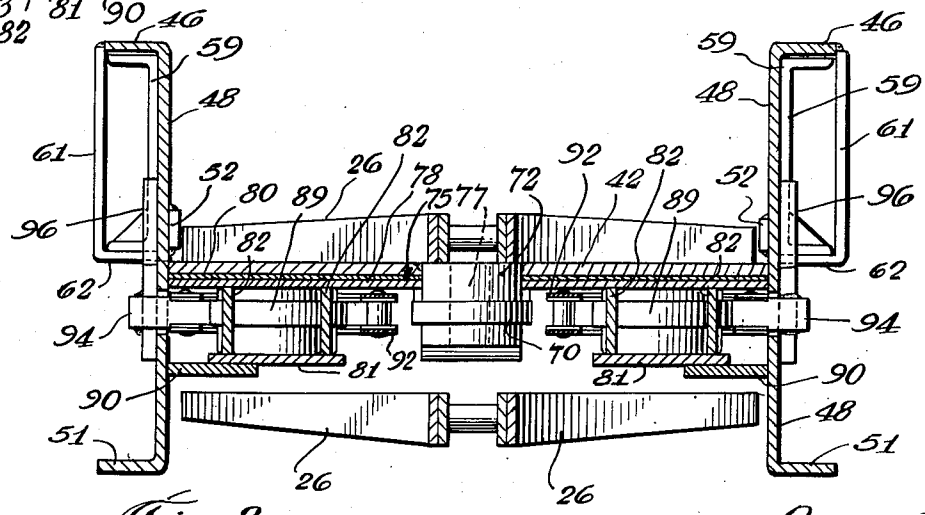


Fig. 8.

Inventor

Richard C. Lundquist

By Murray A. Gleeson

Attorney

Patented July 28, 1953

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UNITED STATES PATENT OFFICE

2,646,871

ARTICULATED CONVEYER FOR MINING MACHINES

Richard C. Lundquist, Chicago, Ill., assignor to Goodman Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application October 12, 1951, Serial No. 251,075

8 Claims. (Cl. 198—109)

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This invention relates generally to improvements in machines for conveying material and more particularly to improvements in devices for taking up the slack in an endless chain flight conveyor occasioned by the articulation of the conveyor sections with respect to each other.

Machines for gathering and loading material in underground mines have been characterized by the use of chain flight conveyors for moving the material from the gathering head to the discharge end of the discharge boom. Both the discharge boom and the gathering head are arranged to articulate with respect to the main frame portions of the machine, and in such articulation undue slackening of the chain conveyor has occurred, such slackening being caused by the shorter length of travel necessary for the chain flight conveyor to describe in positions of articulation of the discharge boom and the gathering head, more particularly the discharge boom.

According to the present invention use is made of the articulating movement of the discharge boom to vary the position of an idler roller having the chain flight conveyor trained thereabout, the shaft supporting the idler roller moving in an extensible direction which varies depending upon the amount of articulation. The shift in position of the idler roller is achieved by a carriage and sheave assembly abutting the idler shaft, the sheaves having a flexible strand trained therearound so arranged as to move the carriage and the idler shaft in an extensible direction as increased swinging movement of the discharge boom takes place. The ends of the flexible strand are anchored to sliding blocks or plates disposed near the discharge end of the boom, which sliding plates are moved by pusher members moving with respect to the boom as swinging movement thereof takes place.

The invention, while not so limited, is particularly adapted for use in a discharge boom for an articulated conveyor of a material gathering and loading machine of the kind as disclosed in an application of Robert A. McCallum, Serial No. 253,245, filed October 26, 1951, for improvements in Rear Boom Support for Loading Machines.

With the foregoing considerations in mind it is a principal object of this invention to afford a new and improved slack take up device for an articulated conveyor.

Other objects and important features of the invention will be apparent from a study of the following description taken with the drawings

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which together illustrate a preferred embodiment of the invention, and what is now considered to be the best mode of practicing the principles thereof. Other embodiments of the invention will be suggested to those having the benefit of the teachings herein, and it is therefore intended that the scope of the invention not be limited by the precise embodiment shown herein, and only by the spirit and scope of the appended claims.

In the drawings:

Fig. 1 is a general plan view of a material gathering and loading machine having embodied therein a slack take up device according to the present invention;

Fig. 1A is a side view thereof;

Fig. 2 is an isometric view of the discharge boom and the slack take up device of the material gathering and loading machine shown in Figs. 1 and 1A;

Fig. 3 is a plan view of the discharge boom shown in Fig. 2, showing certain details of construction of the slack take up device;

Fig. 4 is a more detailed plan view of the slack take up device shown in Figs. 2 and 3;

Fig. 5 is a view similar to Fig. 4 but showing the position of the slack take up device when the discharge boom is in the straightaway position seen in Fig. 2;

Fig. 6 is a section taken along the line 6—6 of Fig. 4, showing certain details of the carrier assembly for the slack take up device and the arrangement of an idler sprocket thereon;

Fig. 7 is a longitudinal sectional view, taken along line 7—7 of Fig. 5, certain parts thereof being shown in side elevation, showing certain details of the support for the movable carrier assembly for adjusting the position of the idler roller;

Fig. 8 is a transverse sectional view taken along the line 8—8 of Fig. 5 looking in the direction of the arrows and showing certain other details of the movable carrier assembly;

Fig. 9 is a perspective view of a side plate for moving the flexible chain seen in Figs. 4 and 5, and also showing a guide for supporting and guiding the movable side plate;

Fig. 10 is an isometric view of the movable carrier assembly for moving the idler and take up roller seen in Figs. 2, 3, 4 and 5;

Fig. 11 is an isometric view of a fixed shoe mounted in the discharge boom and adapted to support the movable carriage;

Fig. 12 is a transverse sectional view taken along the line 12—12 of Fig. 5 and looking in the

direction of the arrows, certain details of the idler and take up roller being shown in elevation view;

Fig. 13 is a more or less schematic view of the discharge boom shown in Figs. 2 and 3, showing the position of the support links and the support arms when the discharge boom is in the straightaway position;

Fig. 14 is a view similar to Fig. 13 showing the shift of the support arms relative to each other upon articulation of the discharge boom;

Fig. 15 is a view similar to Fig. 14, showing schematically the shortened length of travel required of the chain flight conveyor in moving past the point of articulation of the discharge boom, and showing the relative movement of the support arms in swinging the discharge boom to the position shown in Fig. 15; and

Fig. 16 is a perspective view of the idler and take up roller shown in Figs. 4, 5 and 12.

Referring particularly to Figs. 1, 1A, 2 and 3 of the drawings, the present invention is shown as embodied in a gathering and loading machine indicated generally by the reference numeral 20. Such a machine may consist of a main frame 21 mounted upon crawler treads 22 which are supplied with motive power by electric motors 23 mounted on each side of the main frame 21, each of said motors being adapted independently to supply power to the individual crawler treads 22. Said machine includes a gathering head 24 adapted to swivel with respect to the main frame 21 in both a vertical and horizontal direction to the positions shown in phantom outline seen in Figs. 1 and 1A. Material gathered by the gathering head 24 is moved by a conveyor 26 of the chain flight type, the conveyor 26 moving longitudinally along a swivelable trough portion 27, a fixed main trough portion 28, a vertically movable trough portion 29 and a discharge boom portion 31, whence the chain flight conveyor is trained around an idler roller 32 in the fashion known in the art.

The vertically movable trough section 29 is adapted to be raised and lowered by lifting cylinders 33 mounted on each side of the trough portion 29, and the discharge boom 31 is adapted to pivot about a point of articulation 34 by fluid operated motors 36 mounted under the discharge boom section 31 and the vertically movable trough portion 29 and extending across the point of articulation 34. The discharge boom portion 31 is thus adapted to move in a vertical plane to positions as shown in phantom outline in Fig. 1A and to positions in a horizontal plane as seen in phantom outline in Fig. 1.

The general details of construction of such a gathering and loading machine may be in part as disclosed in Cartlidge Patent No. 2,388,385, issued November 6, 1945, for "Material Gathering and Loading Machine."

As seen with particular reference to Figs. 2 and 3 the chain conveyor thus moves longitudinally of the vertically movable trough section 29 and the discharge boom 31 past the point of articulation 34 and around the idler roller 32, which is mounted upon a dead shaft 37 movable in a slot 38 near the discharge end of the discharge boom 31.

The vertically movable trough section 29 consists of an upper chain support plate 39, and a lower chain support plate, not shown, which are flanked by vertical side plates 41. As seen in more detail with respect to an application of Robert A. McCallum, Serial No. 253,245, filed October 26, 1951, for improvements in Rear Boom Support for Loading Machine, the upper chain support plate 39 and the lower chain support plate, not shown, are spaced vertically from each other to provide clearance for the return run of the chain flight conveyor 26. The discharge boom 31 is likewise composed of an upper chain support plate 42 and a lower chain support plate 43 similarly spaced vertically from each other to provide clearance for the return run of the chain flight conveyor 26. The sides of the spaced chain support plates 42 and 43 are welded to a vertical leg 44 of an angle member having an outwardly extending horizontal flange 46. The chain support plates 42 and 43 and the chain support plates of the vertically movable trough portion 29 are cut on an arc 47 with the pivot point 34 as a center so that a smooth surface will be presented for both the forward and return runs of the chain flight conveyor 26 in all positions of articulation of the discharge boom 31 with respect to the vertically movable trough portion 29.

The vertical leg 44 is welded to plates 48 forming the discharge end of the discharge boom 31. The plates 48 are provided with stiffener flanges 49 and 51, the plate 48 being provided with the slot 38 for support of the dead shaft 37 of the idler roller 32. The plates 48 are additionally secured to the vertical leg 44 by straps 52 welded to the inside faces of the vertical plates 48.

The discharge boom 31 turns upon a pivot bearing indicated generally by the reference numeral 45, said pivot bearing 45 being supported on a spider 53, see Fig. 3, which is welded to the underside of the bottom support plate, not shown, of the vertically movable trough section 29. Details of the pivot bearing 45 are more clearly shown with reference to the aforesaid McCallum application. The spider 53 has arms 54 welded to brackets 56 for the raising and lowering cylinders 33, the brackets 56 being secured, as by welding, to the underside of the vertically movable trough section 29.

In order to maintain the pivot bearing 45 free from thrusts incident to the weight of the discharge boom 31, and to maintain the power means 36 for swinging the boom 31 in a position beneath both the discharge section 31 and the vertically movable trough section 29, means are provided for supporting the discharge boom 31 substantially as a cantilever whilst at all times providing for free swinging movement thereof. To this end the weight of the discharge boom 31 is taken by the vertical side plates 41 of the vertically movable trough section 29, and as seen with particular reference to Figs. 2 and 3 vertical side plates 41 are additionally stiffened by gudgeon members 50, having hingedly connected thereto load support links 55, the loads on the links 55 being taken by vertical hinge pins 60. The load supporting links 55 extend across the point or axis of articulation 34 of the discharge boom 31 on each side thereof, and are hingedly connected to gudgeon members 57 by vertical hinge pins 58. The gudgeons 57 are welded to the ends of channel shaped load supporting arms 59 which are in bearing engagement with the underside of the horizontal flanges 46, the channels 59 being guided by angle members 61 having a vertical leg 62 welded to the flange 46 and a turned in flange 63 welded to the vertical leg 44 on the outside faces thereof to define a box section for guiding the channel members 59.

Each of the load supporting links 55 is pro-

vided with feet 65 having a chain-flight-engaged surface 64 which fairs back toward the gudgeon member 50, and a chain flight engaged surface 66 which fairs back to a chain flight guide plate 67, which is movable with the load supporting arm 59 and guided by an angle shaped guide 68 secured to the top of the flange 46, the guide 68 having a downward extending leg 69 which is spaced from the inside face of the vertical leg 44 of the support angle.

As the discharge boom 31 is moved articulately with respect to the vertical movable portion 29, about the pivot bearing 45, the support links 55 will move to positions as indicated generally in Fig. 3, the chain flight surfaces 64, 65 and 66 engaging the ends of the chain flights on the "inside" of the "curve" thus effecting a gradual change in direction of the chain flight conveyor 26. In such movement of the discharge boom 31, the load support arms 59 move telescopically within the box section defined by the vertical angles 44 and the angles 61, one of said load support arms 59 moving toward the end of the discharge boom 31 in such telescopic movement, the opposite load supporting arm 59 being withdrawn from the discharge end of the discharge boom, the guide plates 67 on each side of the discharge boom section 31 being concomitantly guided by the guides 68 and moving with their associated load supporting arms 59.

According to the present invention, the telescopic movement of the load supporting arms 59 just described is employed to vary the position of the idler roller 32 so that the slack in the chain flight conveyor 26 occasioned by the shorter length of travel required when moving past the pivot point 34 in a position, for example, as seen in Fig. 3, is taken up by moving the idler roller 32 toward the discharge end of the discharge boom 31. As seen in Fig. 15, the chain flight conveyor 26 in moving past the pivot point 34 may be considered as describing a curve having approximately a length C with two tangents each of length T. In the straightaway position of the discharge boom 31 with respect to the vertically movable trough 29 as seen in Fig. 13, the chain flight conveyor 26 may be considered as moving through a distance equal to twice the length of the tangent T, while in the position seen in Fig. 15 in describing the approximate curve C, the amount of slack developed in the chain flight conveyor may be considered as $2T-C$, which must approximately equal within satisfactory limits the movement of the idler roller 32 toward the discharge end of the discharge boom 31. The movement to the position as in Fig. 15 is accompanied by a relative movement of the two load supporting arms 59 with respect to each other, which movement is equal to twice the amount of travel of the pistons of the fluid motors 36 accomplishing such movement, see also Fig. 1A. This relative movement of the load supporting arms 59 is employed to control the movement of the idler roller 32 so that it will have a movement approximating the value $2T-C$.

As seen with particular reference with Figs. 4, 5, and 11, the upper chain support plate 42 is provided with an opening 71 to receive a shoe 72, see also Fig. 11, which is welded into position with a top surface 73 of the shoe 72 flush with the top surface of the upper chain support plate 42. The shoe 72 is formed with a clevis 74 to receive an idler roller 70 held in position to the clevis 74 by a pin 77. The shoe 72 is formed with guides 76 on each side thereof spaced below the underside of the upper chain support plate 42 to provide a guideway for a movable carriage 75, see Fig. 10. A movable plate 80, see Figs. 4, 5, 7 and 8, rests upon a top plate 78 of the movable carriage 75 and is interposed between said top plate 78 and the underside of the upper chain support plate 42. The movable plate 80 is welded to a pair of semi-cylindrical members 85 which overlie and embrace the idler roller shaft 37 and which are positioned on each side of the roller 32 in such a fashion that upon extensible movement of the roller shaft 37 there will be no gap between the end of the upper chain support plate 42 and the idler roller shaft 37. The movable plate 80 thus provides a surface over which material may be moved by the chain flight conveyor 26. The carriage 75 is formed of the upper plate 78 having a slot 79 therein so that the carriage 75 is guided by the shoe 72 and the guides 76 and the underside of the upper chain flight support plate 42.

A pair of roller support plates 81 are disposed on each side of the slot 79 and are spaced below the upper plate 78, and are held in spaced relationship with respect to the upper plate 78 by vertical webs 82 welded respectively to the upper plate 78 and the roller plates 81, see also Fig. 8. Blocks 83 are welded to the upper carriage plate 78 and also to the roller support plates 81 and a vertical web 84 is welded to the spaced blocks 83. The blocks 83 are each tapped to receive bolts 86 having heads 87 which bear against flat surfaces 88 formed on the idler roller shaft 37. As seen with particular reference to Figs. 4 and 6, rollers 89 are mounted to turn between the upper carriage plate 78 and the lower roller plates 81 upon pin shafts 91.

A flexible chain 92 is trained around the rollers 89 and the idler roller 70 as seen more clearly with reference to Figs. 4 and 5, and the opposite ends of the chain 92 are fastened as at 93 to a lug 94 extending through the slot 38 in the vertical plate 48 and welded to a sliding plate 96 guided along the outer side of the vertical plates 48. As seen also with reference to Fig. 9 the sliding plate 96 is formed with a rectangular slot 97 extending substantially for the length thereof, which slot 97 is adapted to cooperate with a guide 98 having a T-shaped cross-section and held in position to the outside of the plate 48 by cap screws 99. As seen particularly with reference to Figs. 4 and 5, the slide 96 is adapted to be contacted by the ends of the channel shaped support arms 59 at the ends thereof nearest the discharge end of the discharge boom 31 when the discharge boom 31 is in the straightaway position seen in Fig. 5. The ends of the support arms 59 are provided with additional contact members 101 to insure that the end of the sliding shoe 96 is maintained in contact with the end of the load support arms 59 upon swinging movement of the discharge boom 31.

As seen with particular reference to Fig. 8, the movable carriage 75 is supported additionally upon flange-like extensions 90 from the inside faces of the vertical plates 48 adjacent the end of the discharge boom 31. The flanges 90 also serve to maintain the carriage 75 in position away from interference by the return run of the chain flight conveyor 26, and as also seen in Fig. 6 the roller plates 81 of the movable carriage 75 are also guided and supported upon flanges 100 extending from the inside of the vertical legs 44 also pre-

venting interference with the carriage 75 by the return run of the chain flight conveyor 26.

As previously described with reference to Fig. 15, the movable carriage 75 is adapted to move in an extensible direction to move the idler roller 32 outwardly to take up the slack in the chain flight conveyor occasioned by articulation of the discharge boom 31. The articulation thereof is generally limited to a total swing of about 40° to either side of the center line of the gathering and loading machine 20, and for all positions of such articulation the carriage 75 will move approximately one-fourth of the total travel of one of the load supporting arms 59. It will be noted from Fig. 5 that the lugs 94 are disposed at the inner end of the slot 38 when the discharge boom 31 is in the straightaway position. As the boom 31 moves articulately to the position seen in Fig. 4 one of the lugs 94 and its associated slide 96 will be held in position at the end of the slot 38, the end of the support arm 59 thereat withdrawing from the inner end of the slide 96, while the other slide 96 will be moved by its associated arm 59. The arrangement of the single fixed pulley 78 and the pair of movable pulleys 89 mounted on the movable carriage 75 together with the flexible chain 92 trained therearound thus provides for approximately one unit of movement of the carriage 75 for four units of movement along the length of the flexible chain. Such an approximation of movement of the carriage 75 will serve to maintain the proper amount of take up of the slack in the chain flight conveyor 26 in all positions of articulation of the discharge boom 31.

From the description foregoing it will be apparent that a simple and effective device has been provided for taking up the slack in the chain flight conveyor occasioned by articulation of the discharge boom. In the embodiment of the invention described herein use is made of the relative movement of a pair of load supporting arms for a cantilever mounted discharge boom of a material gathering and loading machine such as is commonly employed in mining underground. While the slack take up device according to the present invention is particularly adaptable to such form of a material gathering and loading machine as is more clearly described and claimed in the aforesaid McCallum application, the slack take up device may quite readily be used in connection with other forms of articulating trough sections of any articulated conveyor, there being necessary in such case, however, means for providing relative movement between members mounted on the discharge boom so as to provide movement of two members fixed to the end of the chain trained around the fixed pulley and the movable sheaves. While the invention has been described with the use of a chain trained around movable pulleys and a fixed pulley, it is obvious that any flexible strand may be employed and trained around a pair of movable sheaves and a fixed pulley.

While the invention has been described in terms of preferred embodiment thereof which it has assumed in practice, the scope thereof is not intended to be limited by the precise embodiment described herein, other embodiments being capable of modification by those skilled in the art, and it is intended therefore that the invention be limited only by the terms of the claims here appended.

I claim:

1. In an articulated conveyor, a pair of aligned trough sections, one of said trough sections being movable with respect to the other about a substantially vertical axis, each of said trough sections having substantially vertical side walls with vertically spaced upper and lower support plates extending between said vertical side walls for the forward and return runs of an endless conveyor extending longitudinally of said trough sections, an idler mounted at one end of said movable trough section, a pair of support arms hingedly connected to the other trough section and in bearing contact with the movable trough section for support thereof in all positions of articulation thereof, said support arms being adapted to move telescopically with respect to said movable trough section during articulation, a support shoe secured to the upper support plate of said movable trough section and a carriage movable on said support shoe longitudinally of said movable trough section, said movable carriage contacting said idler and adapted to move said idler in a direction to take up the slack in said conveyor occasioned by the articulation of said trough sections, a pulley mounted on said support shoe, a pair of pulleys mounted on said movable carriage, sliding members guided by the side walls of said movable trough section, one of said sliding members being in contact with the end of one of said support arms during articulation of said trough sections, and a flexible strand trained around said pulleys and connected at each end to said sliding members for moving said carriage in a direction to adjust the position of said idler upon telescoping movement of said support arms in accordance with the amount of articulation of said trough sections.

2. In an articulated conveyor, a pair of aligned trough sections, one of said trough sections being movable with respect to the other about a substantially vertical axis, each of said trough sections having substantially vertical side walls with vertically spaced upper and lower support plates extending between said vertical side walls for the forward and return runs of an endless conveyor extending longitudinally of said trough sections, an idler mounted at one end of said movable trough section, a pair of support arms hingedly connected to the other trough section and in bearing contact with the movable trough section for support thereof in all positions of articulation thereof, said support arms being adapted to move telescopically with respect to said movable trough section during articulation, a support shoe secured to the upper support plate of said movable trough section and a carriage movable on said support shoe longitudinally of said movable trough section, said movable carriage contacting said idler and being adapted to move said idler in a direction to take up the slack in said conveyor occasioned by the articulation of said trough sections, a pulley mounted on said support shoe, a pair of pulleys mounted on said movable carriage, and a flexible strand trained around said pulleys and having an operative connection with said support arms for moving said carriage in a direction to adjust the position of said idler in accordance with the amount of articulation of said trough sections.

3. In an articulated conveyor, a pair of aligned trough sections, one of said trough sections being movable with respect to the other about a substantially vertical axis, each of said trough sections having substantially vertical side walls with vertically spaced upper and lower support plates extending between said vertical side walls for the forward and return runs of an endless conveyor extending longitudinally of said trough sections,

an idler mounted at one end of said movable trough section, a pair of support arms hingedly connected to the other trough section and in bearing contact with the movable trough section for support thereof in all positions of articulation thereof, said support arms being adapted to move telescopically with respect to said movable trough section during articulation, a support shoe secured to the upper support plate of said movable trough section and a carriage movable on said support shoe longitudinally of said movable trough section, said movable carriage contacting said idler and adapted to move said idler in a direction to take up the slack in said conveyor occasioned by the articulation of said trough sections; and an operative connection between said carriage and said support arms for moving said carriage in a direction to adjust the position of said idler in accordance with the amount of articulation of said trough sections.

4. In an articulated conveyor, a pair of aligned trough sections, one of which is movable with respect to the other in a substantially horizontal plane, an endless conveyor extending along said troughs, an idler mounted at one end of said swingable trough section, a pair of support arms hingedly connected to the other of said trough sections and in bearing contact with the swingable trough section for support of said swingable trough section in all positions of articulation thereof, said support arms being adapted to move telescopically with respect to said swingable trough section during articulation thereof, a support and a pulley turning thereon mounted in fixed position on said swingable trough section, a carriage movable with respect to said support and supported, said movable carriage being adapted to contact said idler and move said idler in a direction to take up the slack in said conveyor occasioned by the articulation of said trough sections, a pair of pulleys mounted on said movable carriage, and a flexible strand trained around said pulleys and having an operative connection with said support arms for moving said carriage in a direction to adjust the position of said idler in accordance with the amount of articulation of said trough sections.

5. In an articulated conveyor, a pair of aligned trough sections, one of which is movable with respect to the other in a substantially horizontal plane, an endless conveyor extending along said troughs, an idler mounted at one end of said swingable trough section, a pair of support arms hingedly connected to the other of said trough sections and in bearing contact with the swingable trough section for support of said swingable trough section in all positions of articulation thereof, said support arms being adapted to move telescopically with respect to said swingable trough section during articulation, a fixed pulley mounted on said movable trough section, a carriage movable with respect to said fixed pulley and said movable trough section, said movable carriage contacting said idler and adapted to move said idler in a direction to take up the slack in said conveyor occasioned by the articulation of said trough sections, at least one pulley mounted on said movable carriage, and a flexible strand trained around said pulleys and having an operative connection with said load supporting arms for moving said carriage in a direction to adjust the position of said idler in accordance with the amount of articulation of said trough sections.

6. In an articulated conveyor, a pair of aligned trough sections, one of which is movable with respect to the other in a substantially horizontal plane, an endless conveyor extending along said troughs, an idler mounted at one end of said swingable trough section, a pair of support arms hingedly connected to the other of said trough sections and in bearing contact with the swingable trough section for support of said swingable trough section in all positions of articulation thereof, said support arms being adapted to move telescopically with respect to said swingable trough section during articulation, a movable carriage contacting said idler and adapted to move said idler in a direction to take up the slack in said conveyor occasioned by the articulation of said trough sections, and an operative connection between said carriage and said support arms for moving said carriage in a direction to adjust the position of said idler in accordance with the amount of articulation of said trough sections.

7. In an articulated conveyor, a pair of aligned trough sections, one of which is swingable with respect to the other in a substantially horizontal plane, an endless conveyor extending along said troughs, an idler mounted at one end of said swingable trough section, a pair of members adapted to move telescopically with respect to said swingable trough section, a support and a flexible strand guide mounted thereon mounted in fixed position on said swingable trough section, a carriage movable with respect to said support and supported thereby, a pair of flexible strand guides mounted on said movable carriage, and a flexible strand trained around said flexible strand guides and having an operative connection with said telescoping members for moving said carriage in a direction to adjust the position of said idler in accordance with the amount of articulation of said trough sections.

8. In an articulated conveyor, a pair of aligned trough sections, one of which is swingable with respect to the other in a substantially horizontal plane, an endless conveyor extending along said troughs, an idler mounted at one end of said swingable trough section, a pair of members adapted to move telescopically with respect to said swingable trough section, a movable carriage contacting said idler and adapted to move said idler in a direction to take up the slack in said conveyor occasioned by the articulation of said trough sections, a guide for a flexible strand mounted on said movable trough section, a pair of guides for a flexible strand mounted on said movable carriage, and a flexible strand trained around said guides for said flexible strand and having an operative connection with said telescoping members for moving said carriage in a direction to adjust the position of said idler in accordance with the amount of articulation of said trough sections.

RICHARD C. LUNDQUIST.

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