This invention relates generally to shaker conveyors and more particularly to an improved form of swivel connection for shaker conveyor trough line.

Hereinafter in shaker conveyor trough systems having a swivel frame at the inby end cooperating with a loading device for gathering material from all parts of a mine room or the like, the trough sections at the swivel frame and base have been nested in each other with aruncate sides and pin connections so that the pivoting trough sections are capable of taking the stresses incident to the shaking motion of the trough conveyor line.

According to the present invention the swivel trough at the inby end of the swivel connection is caused to discharge its contents onto the outby trough of the swivel connection. The outby trough is flared so as to accommodate the discharge of the inby trough for all swiveling positions thereof, and is additionally provided with spring steel sides which are deformed in movement of the swivel trough so that it may discharge its contents well away from the inby end thereof. In carrying out the invention the swivel trough is supported on a swivel frame pivoted to a base supporting the inby end of the outby shaker trough, and a drive link connection is afforded between the two troughs, and so arranged that motion may be transmitted between the two troughs irrespective of varying contours of the ground upon which the troughing is supported. As an adjunct to the invention a simple means is afforded for centering the base supporting the swivel connection prior to holding the base in position by jacks bearing against a mine roof or like.

With the foregoing considerations in mind, it is a principal object of this invention to provide an improved form of swivel trough connection for shaker conveyors characterized by extreme simplicity and reduced weight.

Another object is to afford a swivel trough connection characterized particularly by troughing which is not required to be nested one in another in effecting the swivel connection.

Still another object comprehends the provision of a simple linkage extending across the point of articulation of the trough sections and constructed in such a fashion as not to interfere with the movement of material on the trough sections and so as to transmit motion between the trough sections efficiently.

Other objects and important features of the invention will be apparent from a study of the following specification taken with the drawings 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 apparent to those having the benefits of the teachings herein, and it is therefore intended that the invention not be limited by the precise embodiment herein shown but only by the scope and terms of the appended claims.

In the drawings:

Figure 1 is a plan view of a swivel trough connection for a shaker conveyor having embodied therein the improvements according to the present invention;

Fig. 2 is a side view thereof parts being broken away to show certain details of construction;

Fig. 3 is an enlarged transverse section taken along the line 3—3 of Fig. 1 looking in the direction of the arrows, and showing details of the pivotal connection of the swivel frame with the base;

Fig. 4 is a section taken along the line 4—4 of Fig. 1 looking in the direction of the arrows, showing the swivel trough connection base held in position by roof jacks; and

Fig. 5 is a perspective view of the swivel connection base together with the swivel frame and the swivel trough reciprocating support.

Referring now to the drawings, the improved swivel trough connection is indicated generally by the reference numeral 10 and includes a base plate 11 overlying a pair of laterally spaced jack pads 12 and 13, pad 12 being shown with a recess 14 for a roof jack 16, the pad 13 having a similar recess 15 for a roof jack 17, the two jacks 16 and 17 holding their respective pads in position. As has been stated, the base plate 11 overlies the jack pads 12 and 13, and springs 18 encircling studs 19 passing through the base plate 11, and held between the base plate 11 and stud nuts 21, are arranged to provide movement of the jack pads 12 and 13 with respect to the base plate 11 to accommodate irregularities in the mine floor.

An outby trough 22 is bolted at 23 to a flared trough section 24 supported on a V-shaped frame 25 having laterally extending arms 27, 27 each terminating in a clevis 28 to receive a beveled roller 29 which travels with the frame 25 and the trough sections 22 and 24 in laterally spaced V-rails 31, 31, each supported on spaced vertical standards 32, 32 secured to the base plate 11.

In Fig. 5 the bevel rollers 29 are shown disengaged from the V-rails 31 for the purpose of clarity, but the rollers 29 are designed to ride
in the rails 31 on reciprocating movement of the shaker trough sections 22 and 24. In order that the base 11 supporting the rails 31 may be properly centered prior to placing of the jacks 16 and 17, the frame 36 is arranged with depending stops or abutments 33 and 34 which engage centering members 36 disposed on each side of centering blocks 37 laterally disposed on top of the base plate 11, and extending laterally under the V-rails 31. Each centering member 36 is provided with an hole 38 cooperating with stub pins 39, see Fig. 4, extending from the supports 32 and toward each other to guide the centering members 36. A handle 41 is connected to the centering members 36 and enables them to be pulled outwardly together from the dotted line position and then to be rocked on pins 39 to the position seen in Fig. 4. The operation just described is performed during a few initial strokes of the conveyor, which centers the blocks 37 and the base plate 11, the centering members being then rocked as described to make way for the roof jacks 16 and 17.

An inby trough 42 is mounted on a reciprocating trough support 43 which is guided within and supported upon a swivel frame 44 arranged to swivel with respect to the base plate 11. The inby trough 42 is arranged so that its out-by end overlies the flared trough section 24 to discharge its contents therein. In order to accommodate the swivelling movement of the inby trough 42, the inby end of the flared trough section 24 is provided with spring steel sides 46 which deform as seen in Fig. 3, during the swivel position shown of the inby trough 42.

The swivel frame 44 is arranged to turn on a pedestal 47, see also Fig. 3, welded to the base plate 11, and has a hub 48 with laterally extending arms 49, 49. A circular wear plate 51 is interposed between the pedestal 47 and the hub 48, and a flanged retainer plate 52 bears against the hub 48 and is bolted to the pedal centered thereon to hold the swivel frame 44 in position for swiveling movement with respect to the base plate 11.

The reciprocating trough support 43 may be fabricated as a casting or formed by welding plate members together, and comprises a generally horizontal stepped support plate 53 which is bent to provide a support 54 for the inby trough section 42 which support plate is bent down to define a vertical wall 55 and a further horizontal plate portion 56 extending toward the out-by end of the trough section 24 and spaced therebelow for a purpose as will appear. The support plate 53 is stiffened by vertical flanking ribs 57 depending therefrom. A V-shaped guide rail 58 is secured to each outer side of the ribs 57 at the inby end thereof.

As seen in Fig. 5 particularly, the swivel frame 44 is essentially T-shaped, and the extending arms 49, 49 thereof are each provided with a beveled roller 59 which rides in the V-shaped guide rail 58. The swivel frame 44 has a central tongue 61 having a clevis 62 at the end thereof of which forms a support for a roller 63. The inner sides of the flanking ribs 57 are engaged by the rollers 63, through the roller 63, so that the rollers 63 and the roller 63 together guide the reciprocating trough support 43 as it is swiveled about the base plate 11.

It may be noted that the trough 42 may be connected to other inby trough sections, not shown, which may be supported on non-reciprocating trough frame supports adapted to be 28 drawn back and forth across the working face by any convenient draft means such as is conventional with such devices, and in such a fashion that the reciprocating trough section 42, its reciprocating support frame 43, and the swivel frame 44 are engaged with a drive which functions to transmit such motion for all initial positions of angular displacement of the inby trough section 24. As shown particularly with reference to Figs. 1 and 5, the two trough sections 42 and 24 are connected by a drive rod 64 pivoted at one end to the frame 26 underlying the out-by trough section 24 and to the other end to the reciprocating trough support 43.

The reciprocating trough support 43 is additionally strengthened to take the forces induced by the drive rod 64 in transmitting the reciprocating movement of the out-by shaker trough pan 24 and to this end the vertical plate 55 and the horizontal plate portion 56 are stiffened by laterally disposed gusset plates 65 connected by a web 67 spaced above the horizontal plate portion 56.

A pin 68, see also Fig. 2, extends through both the web 67 and the horizontal plate portion 56 and forms a pivotal connection for the drive rod 64 which is anchored below the web 67 and is provided with a ball and socket end 69. As seen more particularly in Fig. 5, the pin 68 is held in position by a locking bar 71 screwed to an iron arm 72 of one of the gusset plates 65 and extending across a slot 73 in the pin 68.

The drive rod 64 is pivotally connected to the out-by trough section 24 by a headed pin 74 which passes through the frame 26 and a clevis extension 76, see Fig. 4, extending from a transverse web 77 of the V-shaped frame 28, the drive rod 64 bearing a ball and socket 76 at the end thereof similar to the ball and socket 69.

It will be seen that the ball and socket ends 69 and 76 of the drive rod 64 provide for a driving connection between the trough sections 24 and 42 in spite of irregularities in the mine floor upon which the trough connection 10 is located. It will be noted from the description foregoing that the drive rod 64 is located underneath the inby trough pan 42 and the out-by trough pan 24 during all positions of swiveling of the frame 44. It will be seen that in extreme positions of swiveling movement the reciprocating trough support 64 will be moved relative to its swiveling frame to accommodate the shortening by the pivotal movement of the drive rod 64. Such movement of the inby trough section 42 is in a direction towards the out-by flared trough pan 24.

It will also be seen that the inby trough section 42 is always in a position overlapping the flared trough section 24 so that the contents of the inby trough section 42 may discharge thereon at all times, all without the need of any attached and nested troughing sections. By the provision of the spring steel sides 46 on the out-by trough section 24 extremely wide angles of swiveling movement of the inby trough 42 may readily be accommodated.

The end portion of the flared trough section 24 is surrounded by a relatively low, upstanding wall 106 underlying the inby trough section 42 which facilitates retention of material being conveyed. As shown in Fig. 1, one of the spring steel sides 46 lies alongside the corresponding
5 side portion of wall 108, to form in effect a vertical continuation of the latter, whenever the inby trough section is turned out of engagement with the particular side 46.

While the invention has been shown and described in terms of a preferred embodiment thereof, the scope of the invention is intended to be limited only by the terms of the claims here appended.

I claim:

1. In an articulated connection for a shaker conveyor, a base, a support on said base for a reciprocable trough frame, a trough pan mounted upon said trough frame and movable therewith, a swivel support mounted on said base for a reciprocable swivel trough frame, a swivel trough pan mounted on said reciprocable swivel trough frame, said swivel trough pan having its discharge end in position overlying said first named trough pan for discharge thereon in all positions of swiveling movement of said swivel trough pan, said first named trough pan having sides which are flared and resiliently deformable in accordance with the amount of swiveling movement of said swivel trough pan.

2. In an articulated connection for a shaker conveyor, a base, a support on said base for a reciprocable trough frame, a trough pan mounted upon said trough frame and movable therewith, a swivel support mounted on said base for a reciprocable swivel trough frame, a swivel trough pan mounted on said reciprocable swivel trough frame, said swivel trough pan having its discharge end in position overlying said first named trough pan for discharge thereon in all positions of swiveling movement of said swivel trough pan, said first named trough pan having sides which are flared and resiliently deformable in accordance with the amount of swiveling movement of said swivel trough pan, and a drive rod connecting said first named reciprocable trough frame to said reciprocable swivel trough frame, said drive rod extending beneath both of said trough pans for the uninterrupted flow of material from said swivel trough pan to said first named trough pan.

3. In an articulated connection for a shaker conveyor, a base, a support on said base for a reciprocable trough frame, a trough pan mounted upon said trough frame and movable therewith, a swivel support mounted on said base for a reciprocable swivel trough frame, a swivel trough pan mounted upon said reciprocable swivel trough frame, said swivel support comprising a T-shaped member having guide means in the arms thereof for the outer sides of said reciprocable swivel trough frame and having guide means at the end of the base thereof for the inner sides of said reciprocable swivel trough frame, said swivel trough pan having its discharge end in position overlying said first named shaker trough for discharge thereon in all positions of swiveling movement of said swivel trough pan, said first named trough pan having sides which are flared and resiliently deformable in accordance with the amount of swiveling movement of said swivel trough pan.

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