Oct. 13, 1953 G. BAECHLI 2,655,254

SWIVEL FOR CONVEYER TROUGHS

Filed Jan. 26, 1948 2 Sheets-Sheet 1

Fig. 1.

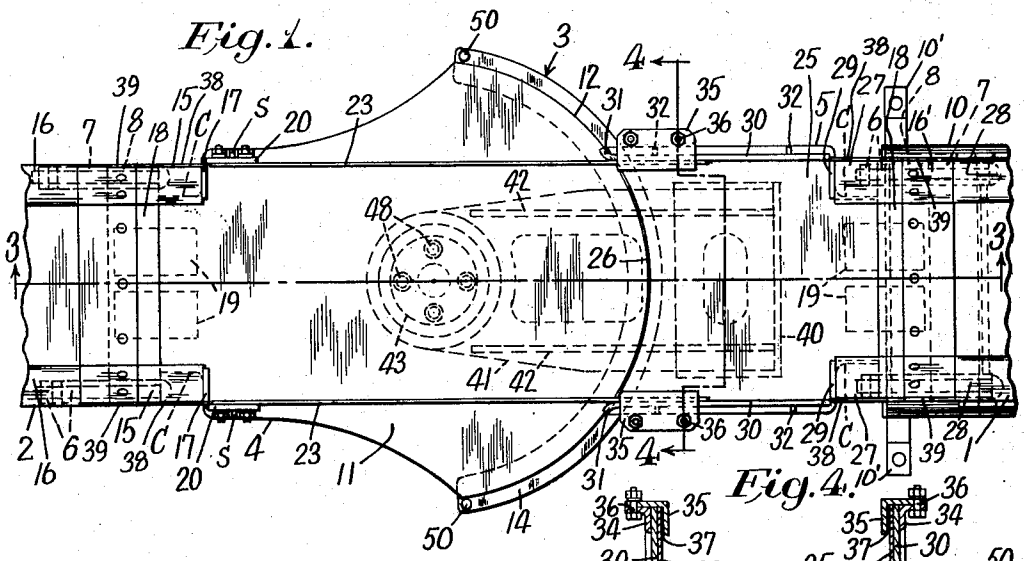


Fig. 4.

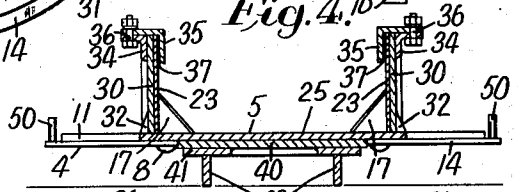


Fig. 2.

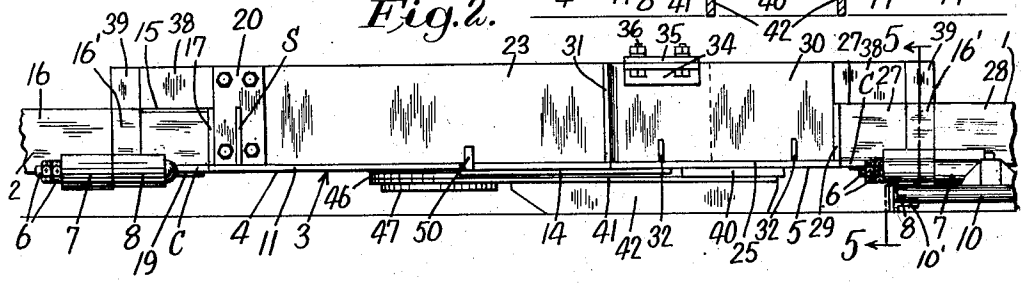


Fig. 3.

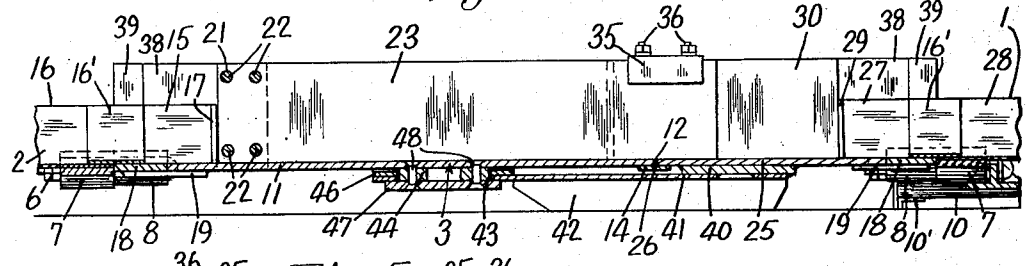
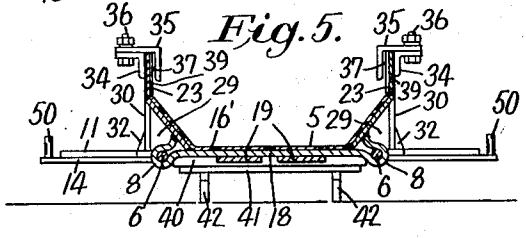


Fig. 5.



Inventor:
George Baechli

by Amis A. Mason.
Atty

Oct. 13, 1953 G. BAECHLI 2,655,254

SWIVEL FOR CONVEYER TROUGHS

Filed Jan. 26, 1948 2 Sheets-Sheet 2

Fig. 6.

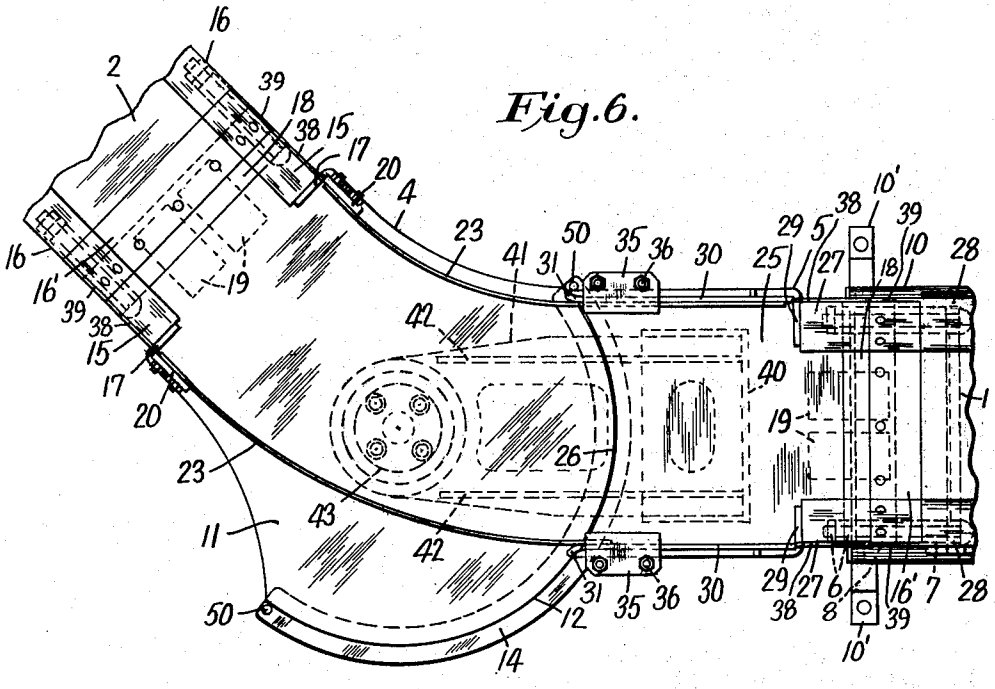
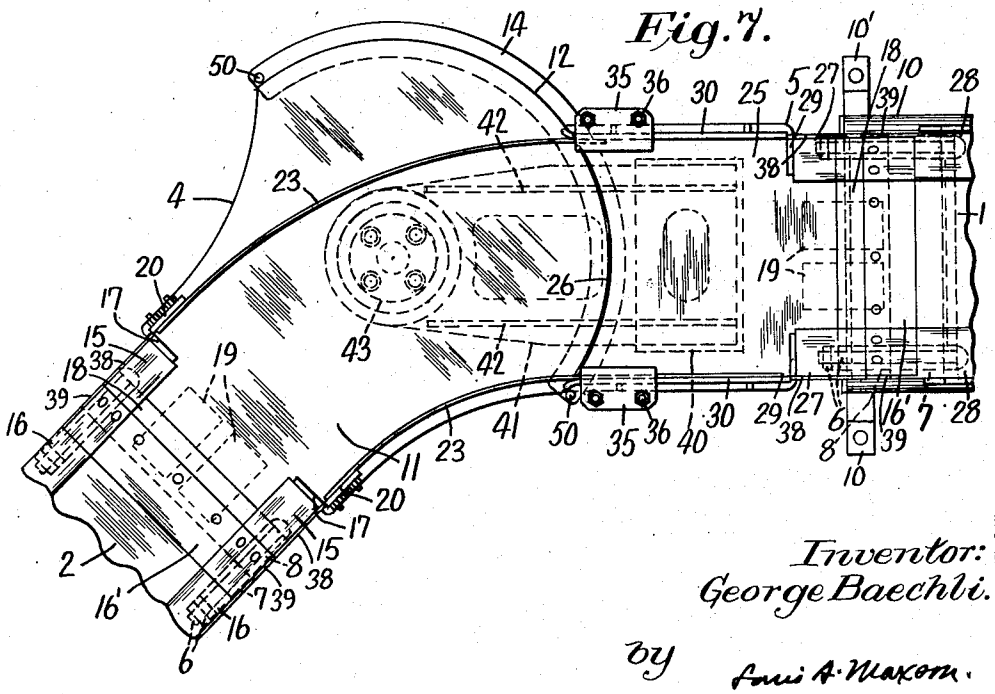


Fig. 7.



Inventor:
George Baechli.

by Louis A. Makom.

Atty.

Patented Oct. 13, 1953

2,655,254

UNITED STATES PATENT OFFICE

2,655,254

SWIVEL FOR CONVEYER TROUGHS

George Baechli, New Philadelphia, Ohio, assignor to Joy Manufacturing Company, Pittsburgh, Pa., a corporation of Pennsylvania

Application January 26, 1948, Serial No. 4,385

1 Claim. (Cl. 198—220)

1

My invention relates to swivels, in particular to swivels for shaker conveyor troughing for connecting and transmitting motion between a power actuated main trough line and a section which is adapted to be disposed at various angles to the main trough line and deliver material to it.

It is desirable to be able to turn sections of conveyor trough lines at various angles to the main pan line. In previous devices, provision has been made for turn through limited angles by having interengaging or nesting curved walled pan sections each having wall portions formed on arcs struck from the axis of pivoting of the connection, and the swivel trough has been anchored in desired position by means of a roof jack and a so-called pendulum. Because the curved wall sections of these swivels had to remain spaced at their closest points by substantially, at the least, the breadth of the adjacent pan sections, the potential swivel angle was limited, and the necessity of the roof jack and pendulum was a complication which might desirably be avoided if possible.

According to my invention, the necessity for nesting pairs of oppositely curving side walls is avoided; and the pendulum arm and jack are rendered unnecessary; and I have provided an improved arrangement by means of which wider angles of adjustment are practicable.

According to a preferred embodiment there is provided between the trough or pan sections between which angular adjustment is to be effected without interfering with movement of or permitting the spillage of material and with a maintenance of effective transmission of the shaking motion from one section to the other, a pair of pivotally connected sections, each adapted for connection to a trough or pan line section, one providing an underlying pivot mounting and the other a fan-like bottom portion of such arcuate extent as to permit a wide range of relative pivotal movement; and flexible side boards are extended between side walls on said members in such a manner as to flex and provide side walls for the maintenance of material in a desired path regardless of the relative angular position of said members; and desirably the member connected to the main pan line, preferably said first member, may have bottom engaging means for maintaining its motion at least substantially rectilinear and making the use of a jack and pendulum unnecessary.

An object of my invention is to provide an improved swivel trough. Another object of my invention is to provide an improved swivel trough providing for a wide range of angular adjustment between its pivotally connected elements. A further object of my invention is to provide an improved swivel trough having improved means for maintaining material against escape during its passage from one side of such trough to the other. Still another object of my invention is to provide an improved swivel trough having improved and simplified means for maintaining it in desired position and insuring that the desired motion be transmitted from one of its elements to the other. Other objects and advantages of the invention will appear hereinafter in the course of the specification and in the appended claim.

2

In the accompanying drawings, in which, for purposes of illustration, one form which my invention may assume in practice has been shown,

Fig. 1 is a plan view of the illustrative embodiment of my improved swivel trough, with the parts thereof in alined relation.

Fig. 2 is a side elevational view of the structure shown in Fig. 1.

Fig. 3 is a central longitudinal vertical section through the structure of Fig. 1, the section being taken on the line 3—3 of Fig. 1.

Fig. 4 is a transverse vertical sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a transverse vertical sectional view taken on line 5—5 of Fig. 2.

Fig. 6 is a top plan view, similar to Fig. 1 but with the sections of the swivel trough at one extreme angular position of relative adjustment.

Fig. 7 is a similar view, but with the sections of the swivel trough at the opposite extreme angular position of relative adjustment.

Referring to the drawings, it will be noted that an end of a main positively reciprocated pan line section is shown at 1, and that at 2 there is shown the end of a trough or pan section which is adjustable angularly relative to the main trough or pan line section 1 and actuated by the latter. The line 1 is moved with a shaker motion, that is with a relatively slower and more uniform motion in one direction, and with a sharply accelerated motion in the opposite direction, the material being moved with the pan line during the slower more uniform motions of the latter and having the pan line slide under it during the sharply accelerated opposite motions.

For the purpose of connecting the pan line 1

and the section 2 there is provided the swivel trough mechanism generally designated 3. This includes two sections 4 and 5, section 4 being connected to the angularly adjustable trough section 2 and being angularly adjustable with that section relative to the section 5, which is secured to the main pan line 1. Connections are made by bolt and nut means 6 extending through ears 7 and 8, the ears 7 connected to the sections of the pan line, and the ears 8 connected to the individual elements or sections of the swivel trough connection. The bolt and nut connection 6 which connects the section 5 to the main pan line 1 also connects a ball frame 10 in a position to underlie and support the end of the pan line 1 and the adjacent end of the swivel trough section 5. The ball frame 10 has projecting arms 10' for the reception of suitable jacks, not shown, for securing the lower portion of the ball frame against sliding movement relative to the ground. These jacks insure rectilinear reciprocation of the swivel section 5.

Referring now particularly to the swivel section 4, it will be observed that this includes a bottom plate 11, which may be described as generally fan shaped, and which has an arcuate end surface 12 of not much less than 180° arcuate extent. As will later be observed, this arcuate surface cooperates with a concave arcuate surface of similar radius formed on the adjacent end of the swivel section 5. Beneath the end of the section 4 which is formed with the arcuate surface 12 is an arcuate flange or plate 14 welded or otherwise suitably secured to the bottom of the plate 11 and adapted to underlie and support a bottom plate of the section 5 as will later be observed. At its end nearer the trough section 2, the plate 11 is cut in at its sides, as at C, to about the width of the bottom of the pan section 2, and has secured to it inclined plate sections 15 making angles with the plate 11 similar to the angles made by the inclined side flanges 16 of the trough section 2 with the bottom of the latter; and material is prevented from passing out beneath the inclined plates 15 by transverse triangular plate sections 17. A member 18 with which the ears 8 are integral is welded to the end of the plate 11, end underlying plates 19 welded to the member 18 and to the plate 11 lend rigidity and strength to the structure. A joint member 16' is spot welded to the member 18, and overlies the adjacent end of the trough section 2. Upright bracket members 20 are arranged at the narrow end of the plate member 11 adjacent the inclined plates 15 and plate sections 17, and are welded or otherwise suitably strongly and rigidly attached to the plate 11 and also to the plate sections 17 which are welded not only to the plate 11 but also to the inclined plates 15. Triangular stiffener plates S may be welded to the bracket members 20 and to the plate 11. The upright bracket members 20 are bored as at 21 for bolts 22 to pass through them, and flexible side plates 23 materially higher than the tops of the flanges 16 of the trough section 2 are bolted at one end to the upright bracket members. The other ends of these plates have sliding connections with guides, later described, carried by the swivel trough section 5.

The swivel trough section 5 includes a bottom plate 25, which is relatively rectangular except that it has a concave arcuate surface 26 at one end, and that it is cut away laterally as at C, similarly to the plate 11, at its other end. The surface 26 matches the surface 12 and overlies portions of the arcuate support plate 14. Thus a wide range of angular adjustments of the section 4 relative to the section 5 may be made about the axis of the pivot soon to be described, without any escape of material at the sliding joint between these sections. At its end toward the pan line 1, the swivel trough section 5 is provided with inclined plate sections 27 similar to the plate sections 15 and matching the slope of the side flanges 28 of the main pan line, and triangular plates 29, similar to the plates 17, are arranged to prevent the escape of material through the space underlying the inclined plate sections 27. A member 18 supports the ears 8 at this end also, and underlying plates 19 and a joint member 16' are provided as at the end of swivel section 4. Upright heavy parallel side members 30, suitably welded to the bottom plate 25, extend from the plates 29 to the extreme opposite edges of the arcuate surface 26, being bent slightly outwardly at their extremities as at 31. Strengthening ribs 32 further rigidly secure the side members 30 to the bottom plate 25. The side members 30 have secured to their tops pairs of angle members, small outer angle members 34 welded to the outside of the tops of the plates 30 and larger angle members 35 secured by bolts 36 to the angle members 34 in such a manner that a narrow vertical slot 37 is provided between the downwardly extending flange of the angle member 35 and the inner surfaces of the plates 30. Within these slots 37 there are guided the "free" ends of the flexible plate members 23. There are secured to the tops of the members 15 and 27 and to the tops of the members 18, 18, plate sections 38, 38 and 39, 39, each extending up to the same height as the top of the flexible side members 23, 23.

To the bottom of the plate 25 there is secured a transversely extending reinforcing plate 40. Secured as by welding to this plate there is a longitudinally extending plate 41 to which there are secured vertical downwardly extending runner-like plates 42 and which is perforated as at 43 to provide an eye through which an annular pivot member 44 may extend. A reinforcing ring 46 may be secured to the plate 41 so as to provide a thicker-walled eye surrounding the pivot member 44. This pivot member, and a cap plate 47 are riveted as at 48 to the bottom of the plate 11, the pivot member 44 and the eye 43 having their centers in the same straight line with the axis from which the convex and concave surfaces 12 and 26 are struck. It will be evident that the section 4 can be pivoted by rotation of the pivot member 44 in the eye 43, and that as this pivot movement is effected, the plates 23 will flex, as indicated in Figs. 6 and 7, and will slide in the slots 37, and will provide a guide channel for material moving from the trough section 2 to the pan line 1. It will be noted that the runner-like members 42 extend into the planes of the bottoms of the ball frame 10 and support much of the weight of the swivel connection. It will be noted that these are parallel to the axial line of the trough section 1, and that as this trough section is reciprocated, the coaction of the runners 42 with the bottom will reduce the tendency of the section 5 to move laterally as it thrusts the section 4 forwardly and to some degree laterally. Upright pins 50 may be secured to the arcuate flange or plate 14 as by welding, to limit the degree of angular movement of the section 4 relative to the section 5.

It will be observed that the structure described will permit a very wide range of angular adjust-

ment of the trough section 2 relative to the pan line 1—an adjustment of at least 45° in either direction from the central or alined position shown in Fig. 1. It will be observed that material cannot escape from the top of the plate 11 or from the top of the plate 25 regardless of the angles of relative adjustment. It will be observed that the runners 42 will aid in maintaining the motion of the trough section 5 rectilinear, notwithstanding the fact that there may be some lateral sliding of the end of the trough section 2 accompanying the longitudinal reciprocation of said trough section 2. It will be observed that it is not necessary to provide a roof jack and pendulum arm with the structure illustrated and described, and in general it will be noted that a very effective swivel trough construction is made available.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claim.

What I claim as new and desire to secure by Letters Patent is:

In combination, in a shaker conveyor, a positively reciprocated main pan line, an angularly adjustable extension of said pan line, and a swivel trough connecting said extension with said main pan line and transmitting shaker motion to the former from the latter including a pair of longitudinally abutting sections connected at their ends remote from each other one to said main pan line and the other to said extension, said one of said abutting sections having a horizontally concave end surface and said other having a horizontally convex end surface fitting said concave surface, means, including a longitudinally projecting, eye-providing plate secured to said one of said sections and a pivot member secured

to said other of said sections and received in the eye of said plate, for connecting said sections for relative pivotal movement about a single axis located at the center from which the arcs of said concave and convex surfaces are struck and for preventing radial movement of either of said sections relative to said pivot whereby the angle of the angularly adjustable extension of said pan line may be varied relative to the main pan line while the reciprocatory movements of the latter are transmitted undiminished to the one of said longitudinally abutting sections which is connected to said extension, mine bottom engaging runners secured to said projecting eye-providing member and fixed relative to the lower side of said section having a horizontally concave end surface and extending beneath the adjacent portion of said section having the horizontally convex end surface, and means for preventing spillage of material as it passes over said sections including oppositely disposed, upwardly extending attachment members on one of said sections, guide members on the other of said sections and flexible side plates secured to said attachment members and longitudinally slidable in said guides.

GEORGE BAECHLI.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,785,402	Arentzen	Dec. 16, 1930
1,850,582	Ernsbarger	Mar. 22, 1932
2,129,809	Bergmann	Sept. 13, 1938
2,131,867	Bergmann	Oct. 4, 1938
2,216,546	Cartlidge	Oct. 1, 1940
2,304,300	Brown	Dec. 8, 1942
2,338,704	Clarkson	Jan. 11, 1944
2,379,337	Bergmann	June 26, 1945
2,388,385	Cartlidge	Nov. 6, 1945
2,410,481	Doberstein	Nov. 5, 1946