

Sept. 20, 1932.

A. J. HATT ET AL

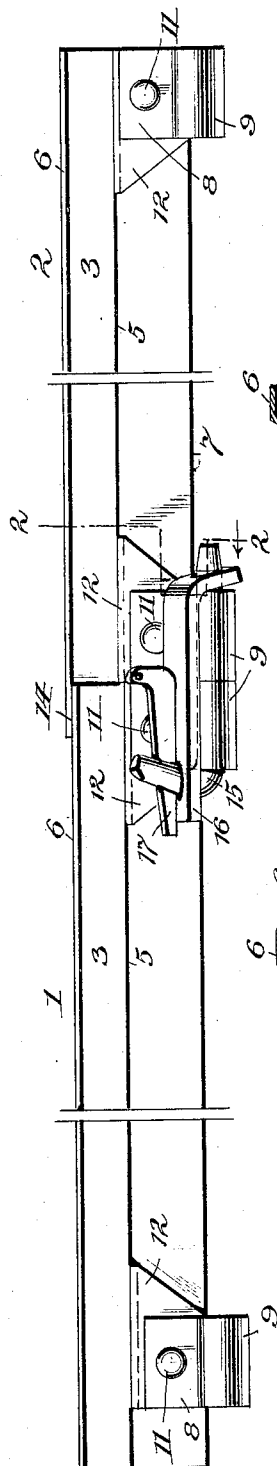
1,877,863

CONVEYER

Filed March 14, 1929

2 Sheets-Sheet 1

Fig. 1.



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Fig. 4.

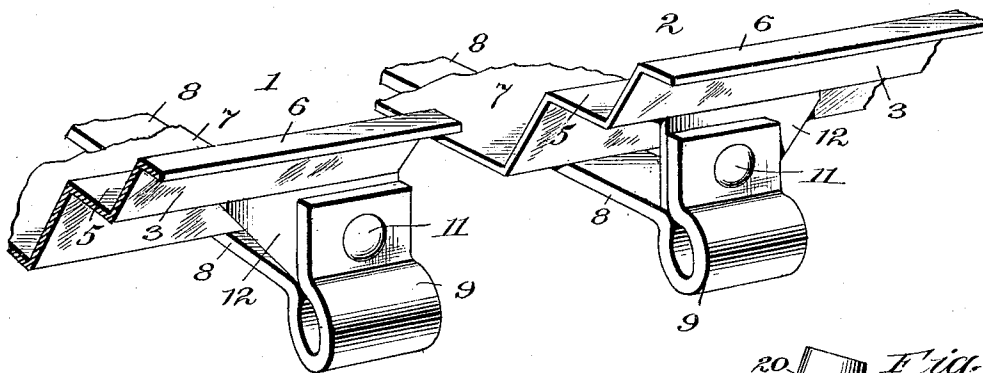


Fig. 6.

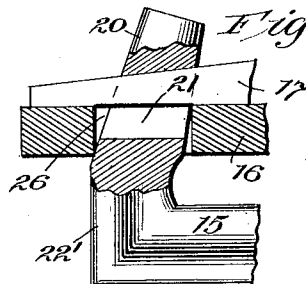
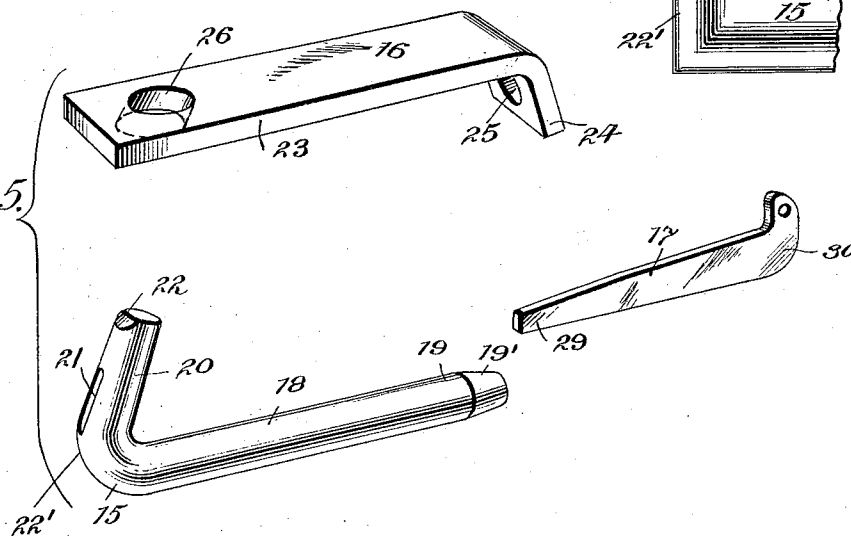


Fig. 5.



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CONVEYER

Application filed March 14, 1929. Serial No. 346,977.

This invention pertains to conveyers, especially sectional conveyers of the shaker or reciprocatory type.

The particular object of the invention is an improved conveyer construction of the character mentioned wherein means are provided for greatly facilitating connection and disconnection of adjoining conveyer troughs or sections.

It is desired at this point to make reference to an application for U. S. Letters Patent, Serial No. 346,650, filed on the 13th day of March, 1929 by Angus J. Hatt, covering a similar conveyer construction and fastening means on which the present invention is an improvement. Such features as these inventions have in common are claimed in said application and disclaimer thereto accordingly is made in the present application.

Heretofore, the common practice has been to connect the conveyer sections to each other by means of bolts and nuts, the bolts extending through corresponding pairs of perforate lugs or ears forming parts of bolt straps provided for the purpose at the ends of the troughs or sections. Obviously, placement of the bolts in the perforate lugs and screwing up the nuts draw the troughs or sections of the conveyer together when they are being assembled, or, unscrewing of the nuts and removal of the bolts when sections are being disconnected, takes considerable time. This results in undesirable delays, when, to suit the particular conditions under which the conveyer is being used, it is necessary to remove or add a conveyer section or sections. Such delays are particularly objectionable and costly in coal mining operations to which the shaker type of conveyer is especially adapted and in which field it is now in quite extensive use. With the present invention, it is sought to reduce to a minimum the time necessary to connect or disconnect the conveyer sections.

Where conveyer sections are to be joined together by the old nut and bolt connections above mentioned, it frequently is found difficult to assemble the sections properly and secure the bolts and nuts in place when the conveyer sections or the bolt straps are bent

or otherwise distorted. Under these conditions, proper alinement of the perforate fastening lugs in order to place the bolts in position therein without damaging them so that the nuts cannot be put in place, is not readily accomplished. With the present invention, it is intended that the fastening means used shall be unthreaded, and in fact, be adapted to be driven into place to aline the fastening lugs without danger of damaging the fastening device so that it cannot be readily removed or replaced when desired.

In the shaker type of conveyer, the adjoining troughs or sections, when assembled, overlap slightly at their ends, and, when the sections are properly positioned with reference to each other, the bolt straps and the perforate fastening lugs thereon should be in substantial alinement and abutting relation to each other. As stated before, the conveyer sections, which are subjected to very rough usage, are often bent out of shape and consequently the fastening lugs do not properly aline when the sections are assembled. In the proposed arrangement, it is intended that the fastening means used, when in place, shall serve not only to draw the fastening lugs closely together, but also to cause the lugs to be brought into proper alinement with reference to each other. In this manner proper overlapping and nesting of the ends of the conveyer sections will be assured.

A particular object of the invention is the provision of fastening means which may be used for connecting the conveyer sections without the necessity of changing the conventional construction of the sections or any of the usual parts mounted thereon. Thus, the connecting means may be applied to the many units of this and similar types already in use.

It is intended that the construction and mode of applying the fastening means shall be as simple as possible, so that they may be removed or put in place with great facility by unskilled help and without the use of special tools. The fastener parts are designed to be readily manufactured in large quantities from standard stock in order to

reduce the cost as much as possible. The parts also are designed to fully withstand the stresses to which they may be subjected in use, and, when in place provide a connection between the conveyer sections which is stronger than that furnished by the usual bolts and nuts. Other objects of the invention will appear hereinafter.

In the accompanying drawings, which illustrate a practical embodiment of the invention now in use,

Figure 1 represents a side elevational view of a pair of adjoining shaker conveyer sections or troughs of conventional construction with the improved joint or connection therebetween;

Fig. 2, a transverse section taken on the line 2—2 of Fig. 1, except that the fastening device on the right-hand side appears in full, showing the manner in which the perforate lugs or ears on the ends of the bolt straps are located on the conveyer sections;

Fig. 3, an enlarged side elevational view of one of the fastening devices for the conveyer sections as it appears when assembled, certain of the parts being broken away and the cooperating pair of lugs shown in longitudinal section, so as to make clear the relationship between the various parts when the device is in use;

Fig. 4, an enlarged, fragmentary perspective view of a pair of adjacent disassembled conveyer sections, showing the detailed construction thereof;

Fig. 5, an enlarged perspective view of the three parts which go to make up each of the fastening devices, the parts being disassembled in order to disclose the details thereof; and

Fig. 6, an enlarged, fragmentary side elevational view of a modified form of connection between the parts of the fastening device.

There is shown in Figs. 1, 2 and 4 a pair of adjoining shaker conveyer sections or troughs 1, 2 of conventional construction. Fig. 2 shows clearly the cross sectional form of the sections, from which it will be noted that each section, which is preferably made of heavy gage sheet metal, is provided with upwardly and outwardly inclined sides 3, 4. Both sides of each sections are stepped or offset between their top and bottom edges to provide a horizontal ledge or shoulder 5. Horizontal edge portions 6 are formed integral with the sides 3, 4, and the bottom of the conveyer trough or pan is flat, as shown at 7.

Suitably secured, as by welding, to each conveyer section or trough at each end thereof is the usual bolt strap 8. This member preferably is made of strap iron. Referring to Fig. 2, it will be noted that bolt strap 8 bears against the under side of the bottom 7 of the pan or conveyer section and near its

ends is bent so as to form outwardly and downwardly projecting lugs or ears 9, 10 having longitudinally-disposed openings there-through. The extremities of bolt strap 8 are bent upwardly and secured, as by rivets 11, to angle plates 12, 13. These plates are suitably mounted, as by welding, on the under side of the offsets 5 in the sides of the conveyer section.

It will be noted from Figs. 1 and 4 that a bolt strap 8 is provided at both ends of each of the conveyer troughs or pans. In the same figures, it will be seen that, where the adjoining conveyer sections are connected together, one of the bolt straps 8 included in this connection, is located at the extreme end of its section, so that its outer edge is flush with the end of the section. The cooperating bolt strap 8 on the adjoining conveyer section which is included in this connection however, is set back a short distance from the end of the section, to permit the conveyer sections, when assembled, to overlap somewhat and nest one within the other as shown at 14 in Fig. 1.

Bolt straps 8 on the several conveyer sections are so proportioned that, when two sections are properly assembled as shown in Fig. 1, the openings or perforations in fastening lugs 9, 10 of the bolt straps and the lugs themselves will be in alinement with each other. A pair of conveyer sections having been placed with their ends adjoining and in overlapping relation as shown in Fig. 1, the corresponding pairs of lugs 9, 10 now adjoin each other and are ready to receive the fastening means. A separate set of fastening means or separate fastening device is used for each pair of cooperating lugs, one for one side of the conveyer and another for the opposite side at the points of connection of the conveyer sections.

The improved fastening devices used for this purpose each comprises three members, viz., a pin 15, a link or strap 16 and a taper key or wedge 17. The preferred form and construction of these members appear clearly in Figs. 3 and 5. Pin 15, which is substantially circular in vertical cross-section throughout its length, is formed with an elongated straight body portion 18 the straight end 19 of which is slightly tapered as seen at 19'. At its opposite end pin 15 is bent upwardly and slightly over its straight body portion 18, so as to form a substantially straight end portion 20 which is disposed at an angle to the longitudinal axis of the body 18 of the pin. The inclined end 20 of the pin is provided with a transverse opening 21 extending therethrough, which is disposed longitudinally of the body of the pin. Preferably, opening 21 is substantially rectangular in vertical cross-section in order to properly coact with the other parts of the fastener. Attention is directed to the fact that although

the several portions of pin 15 are bent relative to each other as described, they all are disposed substantially in a single plane. It will be noted that the inclined end 20 of pin 15 tapers somewhat from its base toward its free end and the free end thereof is provided with an inclined surface 22. The purpose of these features will appear later.

When a pair of conveyer troughs or pans have been assembled substantially in the position shown in Fig. 1, the free end 19 of the pin 15 is inserted in the outer end of the opening through the left-hand ear or lug 9, and, with the aid of a hammer or any other suitable implement applied to the pin substantially at 22', Fig. 3, the pin is driven through the openings in this and the adjoining lug, until the inner surface of inclined end 20 of the pin is brought into contact with the outer end of the first-mentioned lug. The entering of the end 19 of the pin into the openings through the lugs and its passage there-through, particularly when the openings in the lugs are not in alinement with each other, will be facilitated by the presence of the tapered portion 19' at the extremity of the pin. In this manner, the straight body portion 18 of the pin 15 will serve to, at least partially align the lugs 9 and draw the conveyer sections or troughs into proper relation to each other.

Pin 15 is sufficiently long to enable the free end 19 thereof to project somewhat beyond the outer end of the right-hand lug, when the pin is driven into place, as appears in Fig. 3. The purpose of this will be explained shortly.

The next step is to secure the strap or link 16 in place. The body portion 23 of this member is substantially straight and of elongated form. Preferably, the member is rectangular in vertical cross-section, the width of the member being considerably greater than its thickness, as appears from Fig. 5. At its right-hand end link 16 is bent so as to form a downwardly and outwardly inclined end portion 24, and a circular opening 25 is formed therethrough. The opposite end of link 16 is provided with an inclined opening 26 extending from the under to the upper face thereof.

The inclined or bent end 24 of strap 16 is slipped over the tapered free end 19 of pin 15, previously placed in the fastening lugs, as shown in Fig. 3. The opening 25 in the end of link 16 is made sufficiently large, so that it freely or loosely receives the projecting end 19 of the pin. This arrangement permits the straight body portion 23 of link 16 now to be swung inwardly toward the lugs 9, whereby the inclined end 20 of pin 15 is caused to enter the circular opening 26 provided for this purpose in the opposite end of the link. Passage of inclined end 20 through opening 26 is facilitated by

the inclined surface 22 on the extremity of the pin.

The straight end of link 16 is shoved down over the inclined end of the pin until the lower portion of link 16 at the left-hand side of opening 26 is in contact at 27 with the downwardly and outwardly inclined surface 28 of the left-hand side of the inclined end 22 of the pin, see Fig. 3. Opening 26 is so located and proportioned as to permit the described movements of the parts. At this time, it will be noted too, the upper portion of opening 21 in the inclined end 20 of the pin extends somewhat above the upper surface of the body portion 23 of link 16.

The next and last step is the placing in position of the third member of the fastening device, namely, the tapered key or wedge 17. This member, as shown in Fig. 5, is preferably rectangular in vertical cross-section and tapers toward its free end 29, the opposite end thereof being turned substantially at right angles to the body of the member so as to form a head or driving portion 30. The free end 29 of key 17 is placed in the right-hand end of opening 21 in the inclined end 20 of the pin above link 16, as shown in Fig. 3, and, with the aid of a hammer or of a suitable tool applied to its head 30, wedge 17 is driven through the opening. Movement of the wedge through opening 21 results in the wedge forcing the straight body portion 23 of link 16 inwardly on the inclined end 20 of pin 15 towards the body thereof, the link swinging about point 31 as a pivot, Fig. 3. Upon reference to this figure, it will be obvious that this clamping of the straight under side of the body portion of the pivotally mounted link 16 against the outer surfaces of the adjoining fastening lugs 9, will cause accurate alinement of the lugs with each other. Therefore, the conveyer units will be properly positioned laterally with reference to each other, as a result of this clamping action of the fastener.

Opening 26 in the body portion of link 16 is made large enough to permit free movement of the inclined end 20 of pin 15 there-through, but the parts are proportioned so that the engagement of the link with the pin at 27 will continue as wedge 17 is driven into place. Thus, it will be clear that, due to this engagement of the link with the inclined surface 28 on the end of the pin, the inward swinging movement of the left-hand end of the link as the wedge is driven into place will result in a longitudinal drawing together or shortening of the over all length of these two interconnected, L-shaped members, namely, pin 15 and link 16. Consequently, since the bent ends of these members are in engagement with the outer ends of the adjoining fastening lugs 9, pin 15 at 32 and 33 and link 16 at 34 (Fig. 3), this clamping action of the members 15 and 16 will cause

the lugs 9 and the bolt straps 8 of which they form a part to be drawn rigidly together. Thus, with one of the fastening devices just described applied to either side of the conveyor, the cooperating pairs of lugs 9, 10 are drawn into their proper positions as shown in Fig. 1, and the pan or conveyor sections are held rigidly in correct relation to each other.

Alinement of the coacting lugs 9, 10 when the fastening means are in place is assured by the proper shaping and proportioning of the several parts, so that when in place they will assume the relationship to each other shown in Fig. 3.

When it is desired to disconnect adjoining sections of the conveyor, as for instance to shorten the conveyor, the fastening means described are readily removed by driving out the wedge 17, after which the straight end of link 16 is swung outwardly, and this member and pin 15 removed from the fastening lugs.

A modified form of the connection between the left-hand extremities of pin 15 and link 16 appears in Fig. 6. In this construction, the parts which go to make up the fastening device are to all intents and purposes the same as those of the principal form, except that the left-hand end of pin 15 is provided with a straight or flattened portion 22', to which the implement is applied to drive the pin into place in the lugs. In addition, opening 26 in the body of link 16 is formed at right angles to the upper and lower faces of the link, instead of at an incline to these surfaces as in the principal form of the invention.

The mode of applying and removing and functioning of the modified device are the same as described with reference to the form of the invention shown in Figs. 1-5, inclusive.

While the two forms of fastening means herein have been described with the pin or bolt element inserted at the left-hand side of the coacting fastening lugs, it will be obvious that the pin may be inserted from the right-hand side and the other parts reversed accordingly.

This invention provides a conveyor construction employing a highly desirable type of joint or connection between the pan sections or troughs of the conveyor thereby considerably facilitating assembly and disassembly of the conveyor. The fastening device used for connecting the conveyor sections together being of simple construction, it is particularly adapted for manufacture on a quantity production basis and consequently at low cost.

The embodiments of the invention herein illustrated and described have proved extremely efficient and satisfactory in practice. However, it will be obvious that various changes may be made therein without departing from the invention.

What is claimed is:

1. The combination in a conveyor of a pair of adjoining conveyor sections, said sections being provided with adjoining fastening lugs; and means mounted on said lugs and swingable longitudinally thereof to engage the outer surfaces of said lugs and force the lugs into alinement with each other.

2. In a conveyor the combination of a pair of adjoining conveyor sections, each of said sections being provided with a lug which is adjacent a similar lug on the other section; clamping means comprising two members having a combined sliding and hinging engagement with each other at one point and a wedging engagement with each other at another point; and means for forcing said members into such wedging engagement.

3. In a conveyor, the combination of a pair of conveyor sections disposed end to end, said sections being provided with cooperating perforate fastening lugs; a fastening member mounted on one of said lugs for swinging movement longitudinally thereof and for progressive engagement with said lug and an adjoining lug to aline the lugs with each other; and means for securing said member in adjusted position.

4. A conveyor comprising a pair of conveyor sections disposed end to end in overlapping relation; a plurality of perforate fastening lugs on each of said sections with corresponding lugs located adjacent each other; a main fastening member for each pair of corresponding lugs, the shank of said main member extending through and projecting somewhat beyond the openings in said pair of lugs; a secondary fastening member for each pair of corresponding lugs, both ends of said secondary member being perforated to receive the extremities of the main fastening member; and means for securing together each pair of main and secondary members.

5. The combination in a conveyor of a pair of adjoining conveyor troughs having corresponding perforate fastening lugs; a fastening pin having a substantially straight shank extending through the openings in a pair of adjoining lugs and projecting therefrom at one end, the opposite end of the pin being disposed at an angle to the body thereof and provided with an opening therein; a link swingably mounted on the projecting end of the pin and engaging with the outer surfaces of said pair of lugs to align them with each other, the opposite end of the link being provided with an opening through which the angularly-disposed end of the pin projects; and a wedge key driven into said opening in the pin between the link and the adjacent end of the pin.

6. In a conveyor the combination of a pair of adjoining conveyor sections, each of said sections being provided with an apertured lug which is adjacent a similar apertured lug

on the other section; and a pair of fastening members, one of which extends through the apertures in both lugs, and the other of which is external to said lugs, has a combined swinging and sliding engagement with one end of the first member, and also a wedging engagement with a portion of said first member, serving to stress the second member in tension.

7. The combination in a conveyer of a pair of sections disposed end to end, perforate fastening lugs on said sections; an L-shaped member having its longer arm extending through and projecting beyond the openings in said lugs, the shorter arm of said member being perforated; a second L-shaped member, the shorter arm of said member being perforated to receive the projecting end of the longer arm of said first L-shaped member and the longer arm of said member being perforated to receive the perforate shorter arm of said first L-shaped member; and a tapered pin in the perforation in the shorter arm of said first L-shaped member between the outer end of said arm and the longer arm of the second-mentioned L-shaped member.

8. In a conveyer construction, the combination of a pair of conveyer sections disposed end to end and having adjoining perforate fastening lugs; a pin having a substantially straight body portion disposed in the openings in a pair of said lugs and projecting beyond the lugs at one end, the opposite end of the pin being bent at an acute angle to the body of the pin and provided with an opening therethrough; a link one end of which is bent at an angle to the body portion thereof and provided with a perforation through which the projecting end of said pin extends loosely, the straight body portion of the link being in engagement with the exterior of said pair of lugs and provided at its free end with an opening through which the inclined end of the pin projects and engages with the link at one side of said opening; and a wedge pin driven into the opening in the inclined end beyond the link.

9. A fastener for adjoining conveyer sections having perforate fastening lugs, comprising a pair of L-shaped members one of which is perforated at both ends to receive the ends of the other member, said other member being perforated at one end; and a tapered pin in said last-mentioned perforation.

10. A fastener for adjoining conveyer sections having perforate fastening lugs, comprising a pair of L-shaped members one of which is perforated at both ends to receive the ends of the other member, and means for securing the members together.

11. A fastener for adjoining conveyer sections having perforate fastening lugs, comprising a pair of members adapted to be interconnected at both of their ends with one

of said members extending through the aligned openings of a pair of said lugs.

12. In a conveyer the combination of a pair of adjoining conveyer sections, each of said sections being provided with an apertured lug which is adjacent a similar apertured lug on the other section; a pair of fastening members, one of which extends through the apertures in both lugs, and the other of which is external to said lugs, has a combined swinging and sliding engagement with one end of the first member, and also a wedging engagement with a portion of said first member, serving to stress the second member in tension; and a wedge reacting between said members and serving to force them into said wedging engagement with one another.

13. A fastener for adjoining conveyer sections having apertured fastening lugs, comprising in combination a member adapted to be inserted through the apertures in a pair of adjacent lugs with its ends projecting therefrom; a member external to the lugs and provided with means for mounting one of its ends slidably on a projecting end of the first member; and means reacting between the other ends of said members and serving to stress the second member in tension to draw said lugs together.

14. A fastener for adjoining conveyer sections having apertured fastening lugs, comprising in combination a member adapted to be inserted through the apertures in a pair of adjacent lugs with its ends projecting therefrom; a second member external to said lugs having one of its ends slidably mounted on a projecting end of the first member, the engagement being such that the second member can swing toward and from the first member; and wedging means carried by the opposite ends of said members and adapted to interact to stress the second member in tension as the members are forced together.

15. A fastener for adjoining conveyer sections having apertured fastening lugs, comprising in combination a member adapted to be inserted through the apertures in a pair of adjacent lugs with its ends projecting therefrom; a second member external to said lugs having one of its ends slidably mounted on a projecting end of the first member, the engagement being such that the second member can swing toward and from the first member; wedging means carried by the opposite ends of said members and adapted to interact to stress the second member in tension as the members are forced together; and a wedge reacting between said members and serving to force them into said wedging engagement with each other.

16. A fastener for adjoining shaker conveyer troughs provided with bolt straps having openings therein, comprising a pin having a straight shank adapted for insertion through a pair of corresponding openings

in the bolt straps with its ends projecting therefrom, one of said ends being disposed at an angle to the shank of the pin; a link formed with a straight body portion having an opening at one end thereof through which the angularly-disposed end of the pin is adapted to be inserted, the opposite end of the link being disposed at an angle to its body portion and perforated to freely receive the straight end of the pin; and means for adjusting the link on the angularly-disposed end of the pin.

17. A fastener for adjoining conveyer sections having perforate fastening lugs, comprising a pin adapted for insertion through the openings in a pair of said lugs with the ends of the pin projecting therefrom, one end of the pin being bent at an acute angle to its body portion and provided with an opening therethrough; a link one end of which is bent at an obtuse angle to its body portion and provided with a perforation to loosely receive the straight end of the pin, the body portion of the link being provided at its opposite end with an opening through which the bent end of the pin is adapted to project in wedging engagement with the link; and a tapered key adapted for insertion in the opening in the bent end of the pin between the link and the adjacent extremity of the pin to adjust said wedging engagement between the pin and link.

18. A fastener for adjoining conveyer sections having perforate fastening lugs, comprising a member extending through the openings in a corresponding pair of lugs; a second member having a movable, pivotal engagement with one end of the first-mentioned member and wedging engagement with the opposite end of the first-mentioned member; and means for varying said wedging engagement between the members.

19. The combination with a pair of adjoining conveyer sections, each having an apertured fastening lug which is adjacent a similar lug on the other section, of a pin extending through the apertures in said lugs and projecting at both ends therefrom; and a tension clamping member external to said lugs and having a combined swinging and sliding engagement with one of said projecting ends, and a wedging engagement with the other of said ends to stress said second member in tension, the parts being so proportioned that at the limit of wedging motion portions of said lugs are clamped between said pin and tension member.

20. The combination with a pair of adjoining conveyer sections, each having an apertured fastening lug which is adjacent a similar lug on the other section, of a pin extending through the apertures in said lugs and projecting at both ends therefrom; a tension clamping member external to said lugs and having a combined swinging and sliding en-

gagement with one of said projecting ends, and a wedging engagement with the other of said ends to stress said second member in tension, the parts being so proportioned that at the limit of wedging motion portions of said lugs are clamped between said pin and tension member; and a wedge reacting between said pin and said tension member and serving to force the same into wedging engagement with each other and into clamping engagement with the intervening portions of said lugs.

In testimony whereof we have signed our names to this specification.

ANGUS J. HATT.
AXEL JOHNSON.
JAMES PRYDE.