Aug. 19, 1952 C. N. BEBINGER 2,607,466

SHAKER CONVEYER LOADING APPARATUS

Filed Dec. 17, 1949 3 Sheets-Sheet 1

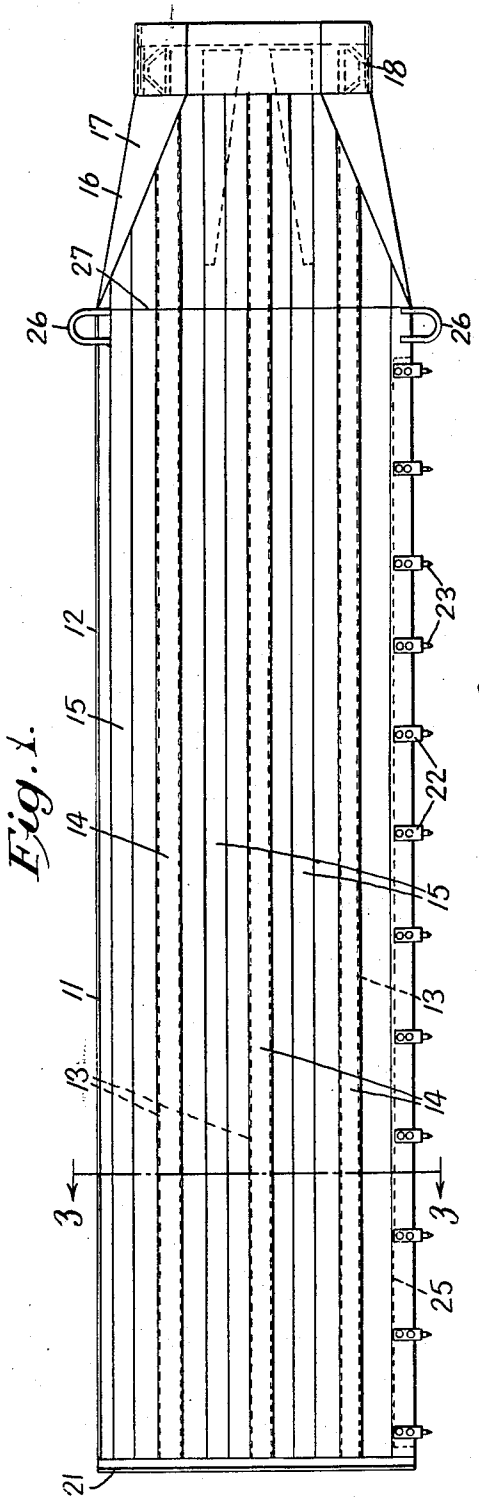


Fig. 1.

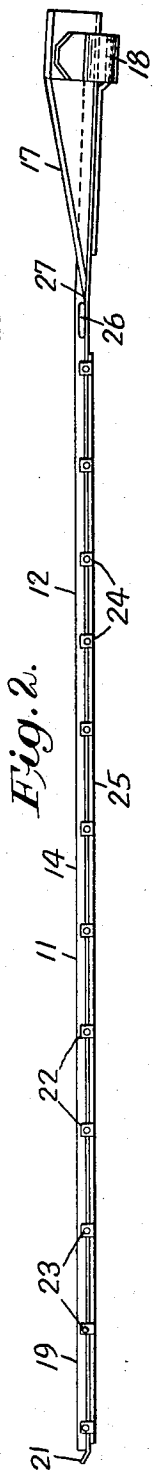


Fig. 2.

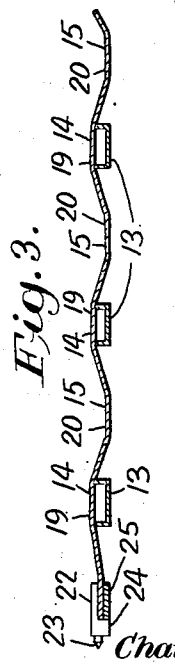


Fig. 3.

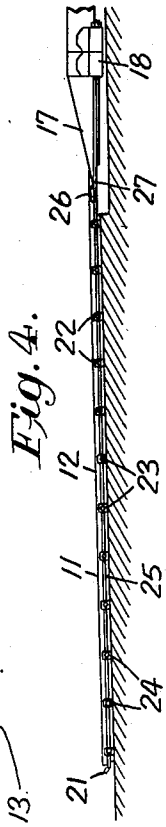


Fig. 4.

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SHAKER CONVEYER LOADING APPARATUS

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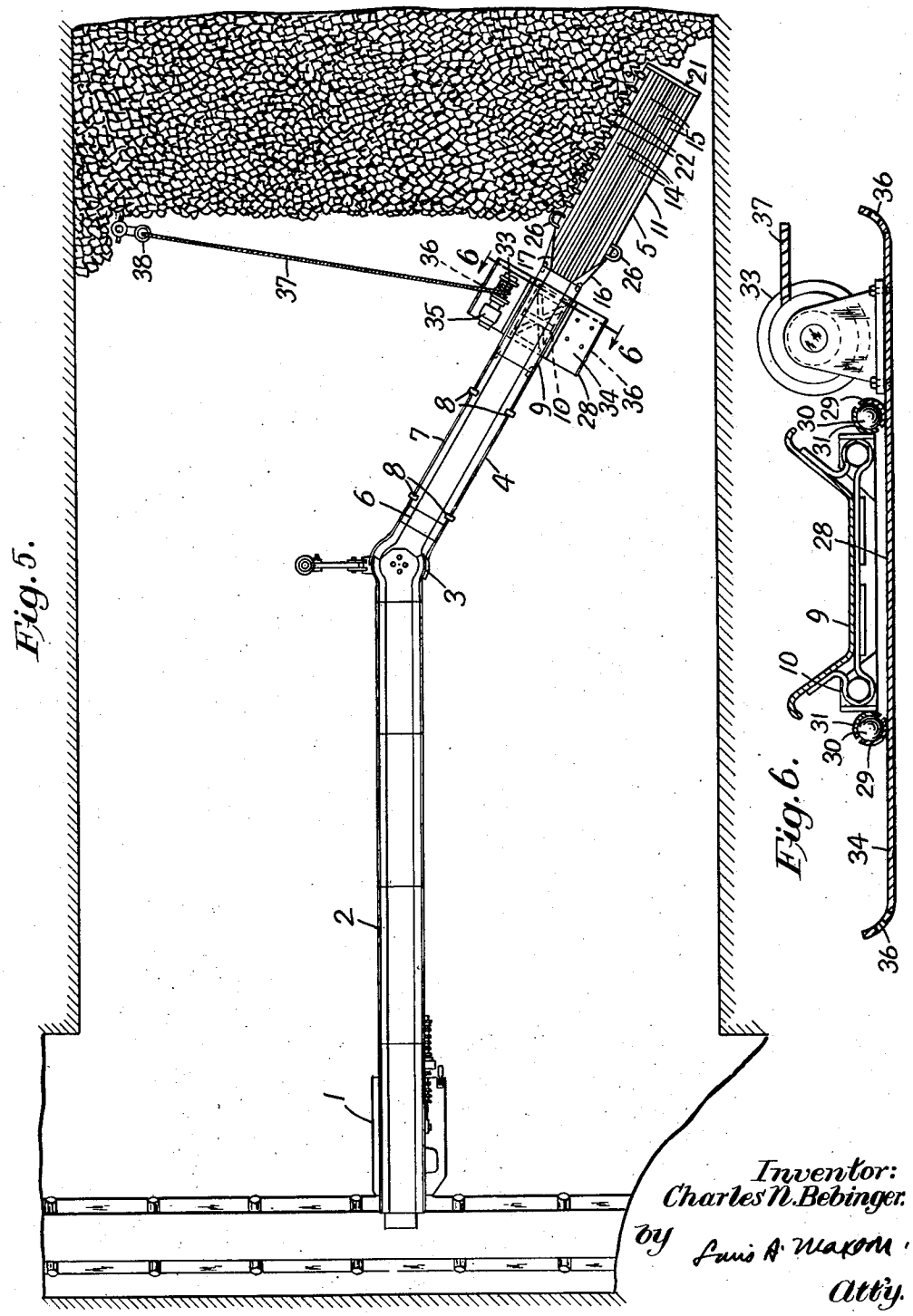


Fig. 5.

Fig. 6.

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SHAKER CONVEYER LOADING APPARATUS

Filed Dec. 17, 1949 3 Sheets-Sheet 3

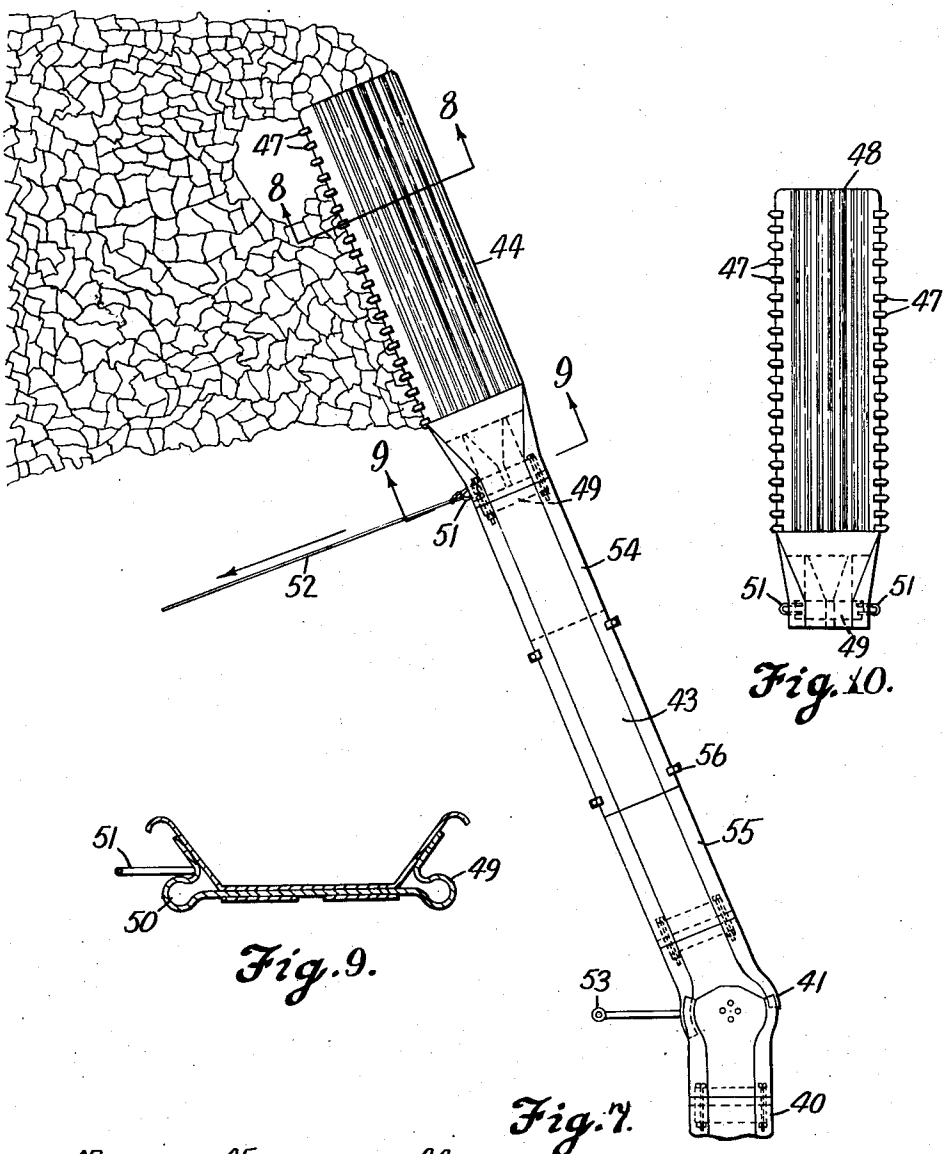


Fig. 10.

Fig. 9.

Fig. 7.

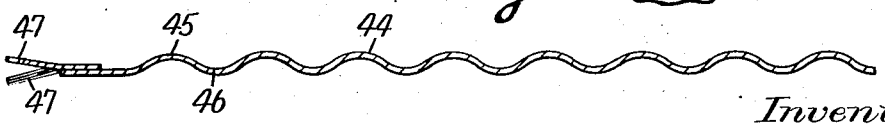


Fig. 8.

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Patented Aug. 19, 1952 2,607,466

UNITED STATES PATENT OFFICE

2,607,466

SHAKER CONVEYER LOADING APPARATUS

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Application December 17, 1949, Serial No. 133,594

15 Claims. (Cl. 198—14)

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My invention relates to shaker conveyors, and more particularly to loading devices operated by movement of the reciprocatory type which characterizes shaker conveyors.

In my applications, Serial No. 653,060, now abandoned, filed March 8, 1946, for Loading Apparatus, and Serial No. 730,673, now abandoned, filed February 25, 1947, for Shaker Conveyor Loading Apparatus, I disclosed and claimed improved loading devices operating by reciprocatory movement to load out shot coal which is shot down upon them or which may otherwise be caused to be superimposed upon them. This application is a continuation-in-part of each of said applications, both of which are now abandoned.

Loading devices for delivering shot coal to shaker conveyors are of various types. One type consists of a pan which is disposed in a kerf and which is carried at the end of a shaker conveyor trough line and which is adapted to have the coal shot down upon it. These devices need to be relatively thin in vertical dimension in order that they may be used in thin kerfs. This is because of the fact that twice as much coal is reduced to bug dust when a 6'' kerf is formed as would be formed if a 3'' kerf were cut. Thus, if a loading pan can be kept very low in overall height substantial advantages can be secured.

Loading pans inserted in kerfs and having coal shot down upon them are subjected to great weights of coal and it is highly important that they be constructed in such a manner that the heavy loads to which they are subjected may be withstood without damage. The fact that the overall height must be kept down while great strength is nevertheless incorporated, makes the problem a substantial one. It is also desirable that these loading pans be reversible so that they may be used to load out material across a face while traveling in either direction. In strengthening the pan it is important that constructions which will render its longitudinal reciprocation more difficult shall be avoided. Another important thing is that the pan shall be so constructed that little coal shall succeed in passing across the pan from its leading to its receding edge without being loaded out, and if this can be accomplished not only without interference with, but indeed in furtherance of, strengthening of the pan, a highly desirable construction will be had.

It is an object of my present invention to provide an improved loading apparatus of the character mentioned, having a strong construction and improved feeding arrangements, and further

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having improved means for enabling it to work its way under a mass of shot coal. More specifically, my invention has for one of its objects the provision of an improved loading pan. Another object is to provide an improved loading pan having improved feeding means.

Another object is to provide an improved loading device having a longitudinal edge adapted to be forced into a pile of material to be conveyed, and being corrugated with a series of ridges and grooves running longitudinally of the device to serve as a guide for the fines and lumps toward a conventional conveying trough.

Another object of my invention is to provide an improved loading device feeder head pan which is low in its over-all height and very strong and which may be inserted into a very thin kerf.

Another object of my invention is to provide an improved loading device feeding head pan having a feeding face on both longitudinal sides of the pan in order that the pan may become a reversible or universal loader that may be swung from left to right or right to left across the face of the coal.

A further object of my invention is to provide an improved loading pan having improved means for re-enforcing and arming a material pile-penetrating edge thereof. Yet another object of my invention is the provision of an improved loading device for a shaker conveyor comprising an elongated, longitudinally reciprocable member having a top surface in the form of a plurality of alternating crests and valleys extending in the direction of longitudinal reciprocation and having a bottom having engagement with a supporting surface along surfaces underlying said crests and also along surfaces underlying said valleys, which underlying surfaces are at least substantially in a common plane. Still another object of my invention is to provide an improved loading pan having an upper surface for supporting and moving material providing a series of longitudinally extending ridges with intermediate valleys and having a bottom-engaging surface having a plurality of surfaces underlying said valley portions and also a series of intermediate surfaces provided by re-enforcing elements underlying the ridges.

A further object of my invention is the provision of an improved loading pan having improved re-enforcing means.

Other objects and advantages of my invention will hereinafter more fully appear.

In the accompanying drawings there are shown for purposes of illustration two forms and a fur-

ther modification which the invention may assume in practice.

In these drawings:

Fig. 1 is a plan view of an improved loading device constructed in accordance with the preferred embodiment of my invention.

Fig. 2 is a side elevational view of the improved loading device shown in Fig. 1.

Fig. 3 is an enlarged transverse sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a diagrammatic view on a reduced scale showing the loading device resting on the mine bottom as when in use.

Fig. 5 is a diagrammatic plan view showing my improved loading device arranged in loading position in a mine room.

Fig. 6 is an enlarged transverse sectional view taken on line 6—6 of Fig. 5.

Fig. 7 is a plan view of a portion of a reciprocating shaker conveyor with an extensible loading device swivelly attached thereto and employing another loading pan constructed according to the principles of my invention.

Fig. 8 is an enlarged view of a cross-section along the line 8—8 of Fig. 7.

Fig. 9 is an enlarged cross-sectional view along the line 9—9 of Fig. 7; and

Fig. 10 shows a further modified loading pan.

The preferred embodiment of Figs. 1 to 6 will first be described.

Referring to the drawings, and first to Fig. 5, 1 indicates a shaker drive mechanism, which may desirably be of the form which forms the subject matter of my continuation-in-part application Serial No. 715,526, filed December 11, 1946 and now abandoned, and which moves the pan line 2 back and forth, forward—i. e. towards the point of discharge—with a relatively slow smooth movement, so that the material on the pans will move with the latter, and backwards—towards the point from which material is to be moved—with a sharply accelerated movement, so that due to the inertia of the material on the pans, the pans may slip backwardly under and relative to the material, with the result that each complete reciprocation of the pan line finds the material upon it displaced forwardly a short distance—normally a matter of some inches.

A swivel connection 3 is provided in the pan line at a point sufficiently spaced from the material to be loaded out, to permit the requisite movement laterally of my improved loading mechanism. Towards the face from this swivel connection there are shown an extensible section 4 of the pan line and my improved loading mechanism 5. The extensible section 4 and my improved loading mechanism 5 may, by virtue of the provision of the swivel 3, be swung to maintain suitable relation to the material to be loaded during the loading operation and to position the loading mechanism so that it may be in desired position when loading is to be commenced. The extensible section 4 comprises two pan sections 6 and 7 which are adapted to overlap one another and are held together in their various overlapping positions by a series of clamp members 8. These clamp members may be loosened and the amount of overlap between the pans 6 and 7 adjusted. By this adjustment, and by the addition, as needed, of further sections to the pan line 2, with relocation of the swivel 3, progressive relocation of the mechanism 5 as the coal face recedes, as mining out progresses, can be effected. A shorter pan section 9 is detachably connected between the pan section 7 and the

loading mechanism 5. The pan section 9 is attached to improved means 10, later described, for effecting lateral feeding movement of the mechanism 5 as loading takes place.

The mechanism 5 comprises an improved loading pan 11, the construction of which may be observed in Figs. 1, 2 and 3. In the preferred embodiment there shown, the pan 11 may be noted to comprise a longitudinally elongated member 12 of a "corrugated" cross sectional configuration and provided with guiding and re-enforcing members 13. The member 12 has a series of ridges 14 and intermediate grooves 15 extending longitudinally of it, for most of its length across its full width, though at its forward end it may be narrowed somewhat as at 16 and have lateral flanges 17 of progressively increasing height formed with their bottom edges converging so as to produce a structure of substantially the same cross section as the trough or pan section 9 to which it is connected by the eyes 18 and usual bolts, not shown. The grooves 15 and ridges 14 may be of varied cross section within the broad scope of my invention, but flat-topped ridges and flat-bottomed grooves, as shown, are particularly advantageous in that, by the use of channel shaped re-enforcing members 13 of a width substantially equal to the width of the flat tops 19 of the ridges 14 and the flat bottoms 20 of the grooves 15 and of a height equal to the depth of the grooves, a very strongly re-enforced and rigid construction will be had. The channels 13 in the construction shown approximately double the contact area of the pan with the underlying mine surface and so reduce unit wear.

The pan 11 may desirably be provided across its rearward end with an upturned lip 21 whose upper edge, as shown, falls just below the plane, extended, of the flat surfaces 19. This lends further rigidity to the free end of the pan and also reduces the possibility of material upon the latter failing to be advanced forwardly along its upper surface.

While I have shown the apparatus loading from right to left, it will be evident that loading regularly in either direction, or now in one direction and now in the other, may be desirable. The pan will be armed along the edge thereof which is to be in advance as the pan moves laterally during loading with blocks 22 equipped with pointed bits 23, the position of the blocks and their heights being such that their lower surfaces 24 may provide additional support for the pan upon the mine bottom. The distance intervening the bit-carrying blocks is desirably so chosen that during pan reciprocation the blocks and bits will level the bottom for the full length of the pan. The manner of bit mounting on the blocks, and of the block mounting on the pan may be varied, but riveting, with or without brazing or welding of the blocks to the pan, may be employed, and brazing of the bits in holes in the blocks is an effective method of mounting the former. If desired, a re-enforcing plate 25, whose lower surface is in the same plane, at least substantially, as the bottoms of the blocks 22 may be extended along the armed edge or edges of the pan 11, desirably being secured by welding, and also by riveting common to the bit blocks.

Eyes 26 are shown at opposite sides of the pan 11, near the forward end of the latter.

As the pan will normally be inserted in a kerf before shooting of the coal, so that the coal may be brought down upon it, the gauge of the pan 11

and the weight of the channels 13 will be chosen to secure adequate strength, but to avoid excessive over-all height or weight. The use of flat-bottomed ridges and grooves provides, especially with the use of inverted channels contacting the bottom between the lower surfaces of the wall portions forming the grooves, a most rigid and rugged structure with minimum weight.

As the mine bottom is very generally advanced in such a manner as to leave a series of sloping surfaces analogous to saw teeth, the pan is desirably, unless it is to be used in a mine where the bottom is maintained level, so shaped that the forward, connecting end is at an angle to the main pan portion equivalent to the angle made by the various undercuts to the general plane of advance of the mine bottom. This angle has its apex at 27, in Figs. 1 and 2, and Fig. 4 shows its utility when the pan is in use.

The mechanism 10 comprises a mine bottom-engaging support plate or skid 28 carrying in a very low position thereon horizontal guideways 29 for balls. In these guideways, balls 30 are received, and other guideways 31 ride upon the balls 30, the guideways and balls forming a very low "ball frame" which is mounted on the skid plate 28. The guideways 31 are secured to the pan or trough section 9.

The skid plate 28 is materially wider than the ball frame and near one side it may carry a reel mechanism 33, as in the preferred embodiment illustrated. This reel mechanism may be located on the other side of the skid plate, if the loading is to be from left to right, and an elongated portion 34 on the skid plate 28 is provided for this purpose. The reel mechanism may be of the manually operated type, or may be motor operated, as by the motor 35 shown. The skid plate 28 is provided with openings 36 for the attachment of a cable or other similar means for aiding in the moving of the skid over the mine floor and the positioning and feeding of the extensible section 4 and the improved loading pan 11, these openings 36 serving for the attachment of chains or cables from separate winch or chain block devices, and also being utilizable in a double reeve connection of the cable from the reel mechanism 33.

As shown in Fig. 5, a flexible cable 37 is led from the reel mechanism 33 to a jack 38 located at the rib, or if a double run connection be desired the cable may extend around a sheave supported by the jack 38 and led back to one of the openings 36 on the pan 11, as above suggested.

The mode of motor or manual feed control does not normally contemplate, with this mechanism, feed like that of a kerf-cutting machine, in accordance with which the working run of the cutter chain is fed continuously against the coal, but rather, here, the pan is desirably intermittently advanced laterally as the shot coal resting upon it is carried out and it is necessary to move the pan laterally to maintain it under the shot coal.

According to a preferred method of use of this embodiment of my invention, the pan 11 is placed in the kerf before the coal is shot, generally as near one back corner of the kerf as possible, and the pan is set in reciprocatory shaker motion before the shots are fired. Accordingly, when the coal falls, a considerable mass falls upon the pan 11 and more is ordinarily in a position to roll down onto it when the part which directly overlies it is loaded out. Thus while the smoke is clearing away from the working place, a substantial mass of coal is loaded out, several cars being filled in reasonably high coal before the men return to the face. If the pan has cleared itself of coal before the operator again takes over its control, he simply operates the feeding means to bring the pan under the coal again, the bits and their mounting enabling the pan to work its way under the shot coal. When it is again pretty well buried, it is caused to move at such a rate—or, better, in such steps—as will cause it to remain buried and in a position for the coal to continue to fall upon it, until it reaches the other side of the undercut and shot coal. A helper cleans out the fines with a shovel and throws any coal that may get across the pan before it reaches and passes onto the trough line, back into position to be loaded out. By applying the feeding force to the support plate or skid 28, the tension of the cable interferes to a minimum degree with the reciprocating motion of the pan 11.

When the operations have been completed after one undercutting and shooting, the mechanism may be returned to the side at which it started, and by releasing the clamps on the extension pan and/or by adding a section in the pan line 2 and changing the position of the swivel 3, the pan 11 may be placed in position for the next shooting. As the coal is loaded out, say from the right rib, the undercutter may be sumped in again, and the cutter can be caused to cross the face behind the pan 11, though with more setting of jacks than would be needed with complete separation of the cutting and loading operations.

Turning now to the embodiment of the invention illustrated in Figs. 7 to 9, it will be observed that a shaker conveyor pan line 40, corresponding to the pan line 2 of the first embodiment, has been shown. This pan line has, in illustration, relatively slow, smooth outward movements (away from the point of load reception) and rapidly accelerated opposite movements. A swivel connection 41 is provided to attach an extensible pan section 43 to the pan line 40, and another embodiment of my improved loading device or pan 44, is connected by the extensible pan section 43 to the swivel connection 41 and may be swung from left to right or right to left as desired to contact the material to be conveyed. The extensible section 43 permits the pan 44 to be carried relatively close to the shaker conveyor pan line 40 when the apparatus is first installed, and thereafter permits the pan 44 to be extended a distance further away as the coal face is worked back.

The construction of this embodiment of my improved loading pan 44 is illustrated in the Figures 7 to 9. In these figures, it will be noted that the pan comprises, in the embodiment shown, a longitudinal member of a corrugated cross-sectional configuration. That is, a series of ridges 45 and grooves 46 extend longitudinally of the pan 44. These ridges and grooves are, in this case, straight, parallel, and equally curved ridges and hollows extending substantially the entire length of the pan 44. It is of course obvious that in this particular cross-sectional configuration, a reversal of the pan by turning it upside down would cause a particular portion to be numbered and named oppositely i. e. a ridge would form a groove and vice versa. In this embodiment and in the preferred embodiment two configurations of corrugated cross-section are shown, and these are but illustrative, and others still fall within the broad concept of my invention which, from one aspect is the provision of a pan of relatively lightweight material and yet one which is exceedingly strong and rigid because of the reinforcing characteristics produced

by a corrugated or similar type cross-sectional configuration.

In Figure 7 of the drawings, I have illustrated a series of bits 47 located along one longitudinal side of the pan 44. In Figure 8, it will be seen that the bits 47 are staggered, or offset. As the pan 44 is reciprocated longitudinally, any small pieces of coal projecting from the floor will be contacted by these bits and broken or cut off. Therefore, these pieces will be removed from the way of the pan and will leave a smooth floor surface over which the pan can reciprocate.

Although generally the conveyor pan line 40 is brought into a mine room along one side thereof, and the loading pan 44 then moves from that side of the room to the opposite side of the room in loading the coal, there are often instances in which there is a reason for moving the pan in the opposite direction. Changing conditions, for example, might require the conveyor pan line 40 to be shifted from one side of the room to the other after once having been installed. Therefore, I have provided an alternative structure for the loading pan 44 as illustrated in the Figure 10. Here, I have illustrated a pan 48 having bits 47 on two longitudinal sides thereof. In other respects, the pan 48 is entirely similar to the pan 44.

A loading pan constructed according to the principles herein disclosed will require a relatively small amount of overhead clearance. That is, the pan may easily be inserted into a kerf cut by a mining machine which is only two or three inches high. There is no reinforcing member, lying outside the thickness thereof, that must be employed with any of the illustrated forms of improved pan and which would increase the thickness of the pan and consume extra space. The series of ridges and grooves illustrated and described will cause the material being conveyed to move longitudinally along the pan and enter into the extensible section 4 or 43, as the case may be, and subsequently into the shaker conveyor pan line, without the provision of a high backboard or other similar means to stop the movement of the coal across the face of the pan. Each unit of the material being conveyed will have a tendency to move along the pan rather than across the pan as it attempts to pass over each of the ridges. Thus, the material being conveyed is not simply scooped upon the pan as one would shovel coal into a coal shovel, but rather as the pan begins to move under the material, the material begins to be moved longitudinally of the pan as it contacts the first ridge. In a flat pan, there is nothing about the coaction of the pan with the material except the friction between the material and the pan to deter transverse material movement—until the material strikes an obstruction placed on the edge of the opposite side of the pan for that purpose. With my pans, maximum loading is obtained. That is, they may be fed into the coal at a rate to keep them loaded at all times. The coal may approach the opposite side of the pan, but will not ordinarily spill over. Therefore, it will readily be seen, that my improved pan construction eliminates the congestion that usually occurs on a flat pan type construction. Before the coal or other material being conveyed has had an opportunity to move across the width of the pan, it has in all probability been moved to the end of the pan and begins its journey along the extensible connection.

I have found that material substantially one-eighth of an inch thick is satisfactory for most purposes. The pans are able to withstand tremendous weight without being deformed or bent and yet are so low in overall height that they may easily be inserted into a kerf not over two or at most three inches in vertical dimension. Such pan constructions can be used therefore with much smaller kerfs and provide such a lightweight construction that the pan may readily be handled.

The second illustrative embodiment of my loading pan 44 is detachably mounted upon the extension member 43 by an attachment saddle 49 as illustrated in Figure 9. One of these saddles 49 is positioned near the end of the pan 44, and near the end of the extension member 43 as illustrated in Figure 7, and the pan sections are overlapped to allow the saddle members 49 to abut. Then, a bolt is put through the eye 50 of the saddle members and tightened. Thus, a strong detachable joint is provided. This method of attachment is employed throughout the various pan sections of the extensible member and shaker conveyor as illustrated.

I have also provided a loop member 51 at the side of the pan 44 to which a cable 52 may be attached to draw the pan 44 and the extension member 43 sideways to feed the pan 44 into the material to be conveyed. This cable may be pulled by any suitable means, hand or motor powered. In the construction illustrated in Figure 10, there are two such cable attachments provided.

As to the operation of this second embodiment and of the modification, little needs to be said. A jack 53 is secured between the roof and the floor of the mine and holds the shaker conveyor pan or trough line 40 in a relatively fixed lateral position in the mine. The extensible member 43 is attached, if the parts are being assembled for the first time, to the member 41 in its retracted position. This extensible section 43 comprises two pan or trough sections 54 and 55 which are adapted to overlap one another and are held in their overlap position by a series of clamp members 56. These clamps may be loosened and the amount of overlap between the pans or troughs 54 and 55 adjusted in order to extend the section 43 to a longer or shorter length. The loading pan 44 is attached to the extensible section 43 and the cable 52 is attached to the U-shaped loop 51. The loading device and conveyor is then ready to carry coal from the mine. Thereafter, the mode of operation is decided by the operator. A kerf is cut in the face of the coal before the coal is shot down upon the mine floor, and the operator may choose whether to insert the pan 44 into the kerf before the coal is shot down or not, according to the condition of the mine. It will usually be preferable to have the loading pan in the kerf before the coal is shot down. If the pan is to be inserted into the kerf, the clamp members 56 are loosened and the member 43 extended to position the pan 44 as far into the cut as possible. The clamps are then secured. After the coal is shot down upon the pan 44, cable 52 may be placed under tension so as to tend to move the pan 44 in a direction towards the far side of the mass of shot coal, and reciprocation of the shaker conveyor pan line 40 is started. Thus, the shaker conveyor pan line will impart a shaking motion through the swivel 41 and the extensible section 43 to the pan 44. The combination of reciprocating motion and the pull of the cable 52 will then cause the pan 44 to move under the coal and cause the coal to continue to be posi-

tioned upon the pan 44. Thereafter, the reciprocating motion of the pan 44 will cause the coal to feed along the face of the pan to the section 43 and ultimately to the conveyor pan line 40.

It will be evident that I have provided a simple, strong and rugged loading attachment, having improved means for effecting its lateral feed with minimum interference with iits reciprocation, and with complete flexibility of operation.

While there are in this application specifically described two forms and a modification which the invention may assume in practice, it will be understood that these are 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 claims.

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

1. A loading device for a shaker conveyor, comprising a longitudinally reciprocable member having a plurality of flat-topped ridges and intermediate flat-bottomed grooves extending in the direction of longitudinal reciprocation, and means to attach said member to the shaker conveyor, each of said grooves having beneath it an elongated bottom-engaging surface, and each of said ridges having fixed beneath it a hollow, trough-like reenforcing member of like length therewith and having a bottom-engaging surface, said several bottom-engaging surfaces being coplanar whereby they may concurrently contact with an underlying plane mine surface at points in lines transverse to the direction of reciprocation of said member.

2. In a shaker conveyor, a shaker conveyor pan line including a swivel and an extension pan connected to and extending forwardly of said swivel, and means insertable in a kerf in the coal seam for loading material therefrom comprising a loading pan having an advance agitating side edge and a retreating side and an intermediate portion connecting said edges and longitudinally corrugated throughout the length of said edges, said loading pan having neither of its edges projecting above the tops of said corrugations when said loading pan is level, and said loading pan having connection with said extension pan for extensible or retractable movement with respect thereto, and means for feeding said loading pan across the coal face while being reciprocated by said shaker conveyor pan line.

3. A mechanism for continuously loading coal comprising a shaker conveyor pan line having a swivel therein, and a loading pan having an advance cutting edge adapted to lie along the mine bottom and being adapted to be connected to the forward end of said shaker conveyor pan line and inserted in a kerf cut in the coal seam and be fed across the coal face after the coal has been shot down thereon while said pan is being reciprocated by said shaker conveyor, said loading pan having to the rear, with respect to its direction of feed, of said cutting edge a longitudinally corrugated body comprising a plurality of parallel ridges extending longitudinally of said pan and having their crests in a common plane, and further having a retreating lateral edge below the level of said common plane.

4. A loading device for a shaker conveyor, comprising a longitudinally reciprocable member having a plurality of ridges and intermediate grooves extending in the direction of longitudinal reciprocation, said member having longitudinally extending bottom-engaging supporting surfaces underlying said grooves, and a plurality of guiding and reenforcing channel members each arranged beneath one of said ridges and having bottom-engaging surfaces spaced laterally from but cooperating with said bottom-engaging supporting surfaces in the support of said member, and means to attach said member to a shaker conveyor.

5. A loading device for a shaker conveyor comprising a longitudinally reciprocable member having a plurality of flat-topped ridges and intermediate flat-bottomed grooves extending in the direction of longitudinal reciprocation, a plurality of flat-bottomed channels secured to said member in the spaces beneath the flat-topped ridges and adapted to rest, with the surfaces underlying said flat-bottomed grooves, upon the mine bottom, and means for attaching said member to a shaker conveyor.

6. A loading device for a shaker conveyor, comprising a longitudinally reciprocable member, having an advance, bit-armed, lateral edge and a plurality of ridges and intermediate grooves all extending in the direction of longitudinal reciprocation, and means to attach said member at one end thereof to a shaker conveyor, said member having, at the other end thereof, at the extreme end of said device, a transverse strip whose top is above the bottoms of said grooves and not higher than the tops of said ridges obstructing material movement from said grooves at the ends of the latter at said other end of said member.

7. A loading device for a reciprocable shaker conveyor, comprising a longitudinally corrugated pan having a plurality of mutually laterally separated, parallel, guide and support surfaces beneath the bottom thereof and a plurality of spaced ridges extending along its upper surface, bit mounting blocks in a spaced series along one edge of said pan with their bottoms substantially coplanar with said guide and support surfaces and their tops beneath the level of the tops of said ridges, and bits projecting laterally from said blocks.

8. In a loading device for a reciprocatory shaker conveyor, a load receiving element having an upper surface in the form of a series of longitudinally extending crests with intervening valleys and having at its lower side a plurality of substantially coplanar, mutually parallel, supporting surface-engaging surfaces underlying said crests and a further series of mutually parallel, supporting surface-engaging surfaces coplanar with said first mentioned supporting surface-engaging surfaces and beneath said valleys, said several supporting surface-engaging surfaces coextensive, longitudinally, with the crests and valleys they respectively underlie, all of said supporting surface-engaging surfaces laterally spaced from each other, and means to attach said pan to a reciprocatory, laterally shiftable shaker conveyor.

9. A loading device for a shaker conveyor comprising a longitudinally reciprocable, transversely feedable member having a portion formed with a plurality of ridges extending in the direction of the longitudinal reciprocation and having a free end, and means for attaching said member to a shaker conveyor including a portion rigid with said ridged portion and having converging side walls and further having a bottom in a plane making such an angle with the main portion of said member that the latter slopes progressively downwardly towards its free end

with reference to said second portion when the latter is horizontal.

10. A loading device for a reciprocable shaker conveyor, comprising a corrugated pan having a portion adapted to enter a kerf, the corrugations of said pan comprising straight and parallel ridges and grooves extending longitudinally of said pan in the direction of reciprocation, said ridges and grooves having their respective tops and underlying surfaces in parallel planes whose spacing vertically is the overall height of the portion of said pan which is adapted to enter a kerf, bit members arranged along the opposite longitudinal sides of said pan and below the top of the latter, means to attach said pan to said reciprocable shaker conveyor, and means to force either side of said pan selectively into a supply of material to be conveyed, said corrugations constituting the sole means associated with said pan for restraining material on said portion of said pan from movement across the same.

11. A loading device for a reciprocable shaker conveyor, comprising a corrugated pan having a portion adapted to extend within and during loading to rest directly upon the bottom of a kerf, the corrugations of said pan comprising ridges and grooves extending longitudinally of said pan in the direction of reciprocation and said pan having no portion of the portion thereof which is adapted to extend within a kerf extending above the tops of said ridges, bit members along at least one longitudinal side of said pan extending outwardly therefrom at an angle to the said direction of reciprocation, means to attach said pan to said reciprocable shaker conveyor, and means to force the said at least one longitudinal side of said pan having bits thereon into a supply of material to be conveyed.

12. A loading device for a shaker conveyor, comprising a longitudinally reciprocable member having a lateral edge for the penetration of material to be loaded and a plurality of grooves extending in the direction of the longitudinal reciprocation, said grooves constituting catch means to obstruct the free flow of large material across the said member and to induce the material to move longitudinally of the member, said grooves also constituting troughs for the reception of small pieces of materials and for the conveyance of such small pieces longitudinally thereof, means to attach said member to said shaker conveyor, and means to move it transversely to its path of reciprocation to effect feeding thereof under a mass of material to be loaded.

13. A conveying device, comprising a longitudinally reciprocable loading member having a side edge arranged to be forced into a supply of material to be conveyed, said loading member having a plurality of corrugation ridges and grooves extending longitudinally thereof and having its overall height throughout the length of said side edge determined by the distance between the tops of said ridges and the bottom surface of said member beneath said grooves, a longitudinally extensible trough member, said loading member and extensible member being detachably secured in end-to-end relation, a reciprocating driving trough, a swivel union attaching said extensible trough and loading member to said reciprocating driving trough, and means for sumping said loading member and extensible trough member laterally to effect the loading out of a pile of material.

14. A loading device for a reciprocable shaker conveyor, comprising a pan, having at least the upper surface thereof corrugated, said corrugations extending generally longitudinally of said pan and constituting the sole means for restricting relative transverse movement between material on the pan and said pan, bit members along at least one longitudinal side of said pan, means to attach said pan to the shaker conveyor, and means to force said pan, in a direction transverse to its length, into material to be loaded and conveyed.

15. A loading device for a reciprocable shaker conveyor comprising an elongated longitudinally reciprocated pan having bit members along its opposite side edges and, between said edges, to retard relative transverse movement between said pan and material thereon, a plurality of longitudinal corrugations which determine the overall height of said pan between said bitted side edges, the tops of said corrugations constituting the highest points upon said pan between said bitted side edges.

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