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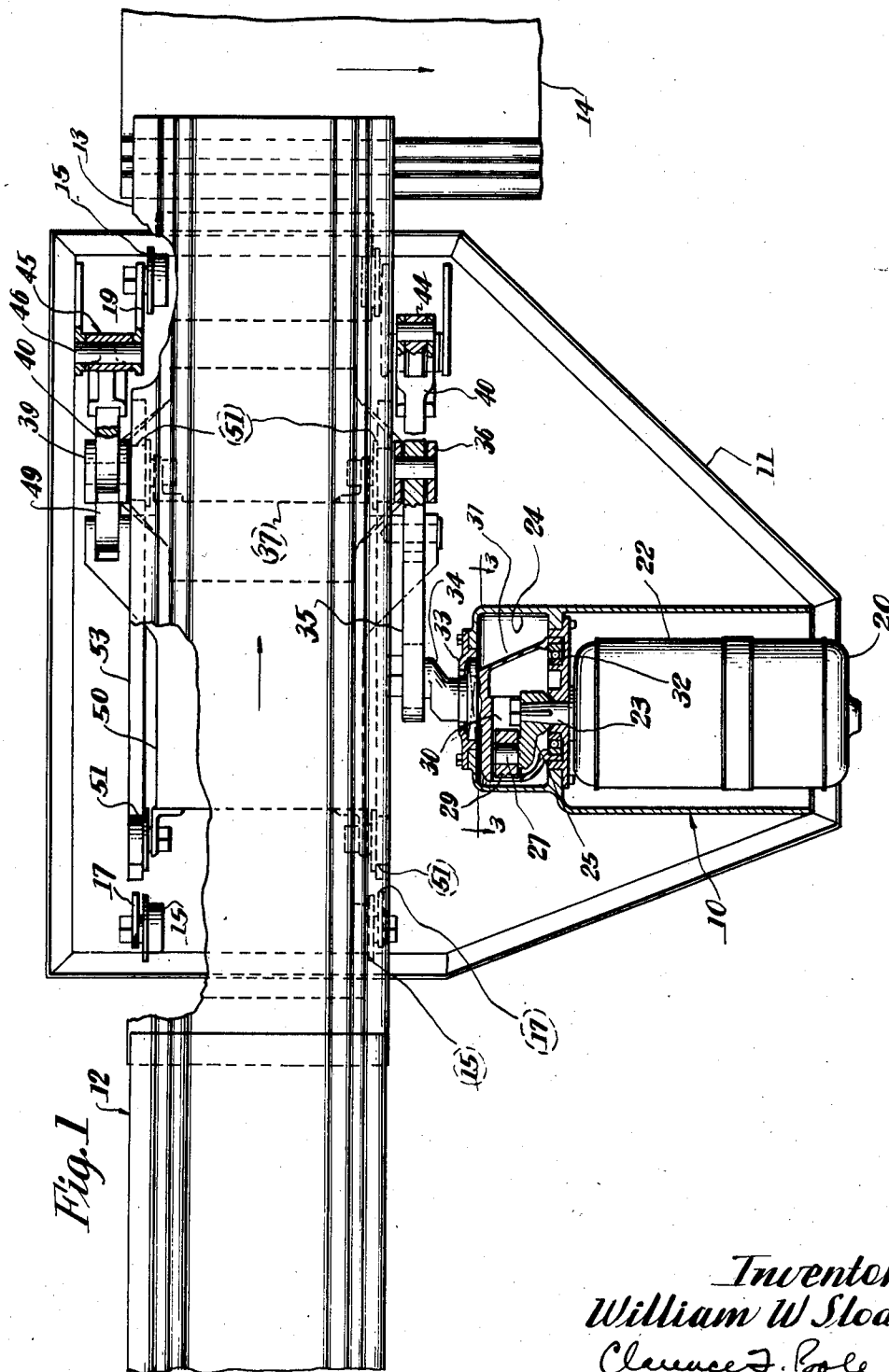
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2,200,136

SHAKER CONVEYER

Original Filed Nov. 20, 1936

2 Sheets-Sheet 1



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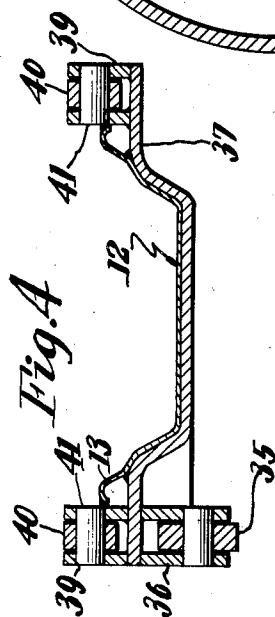
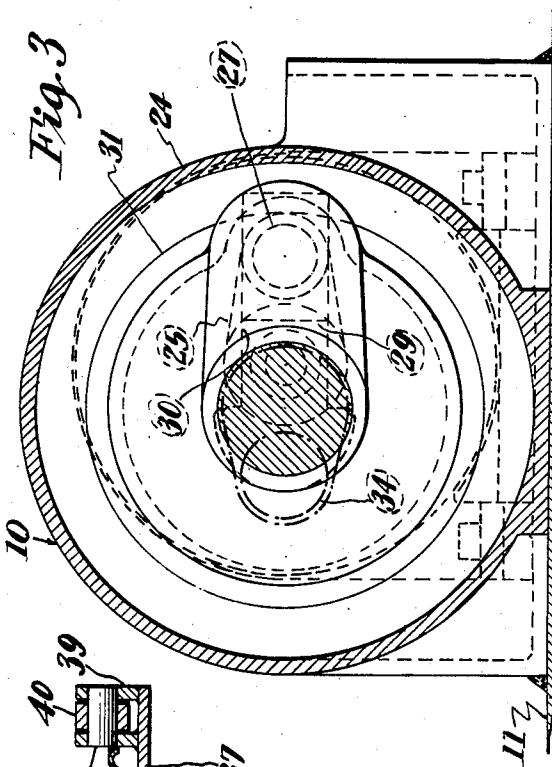
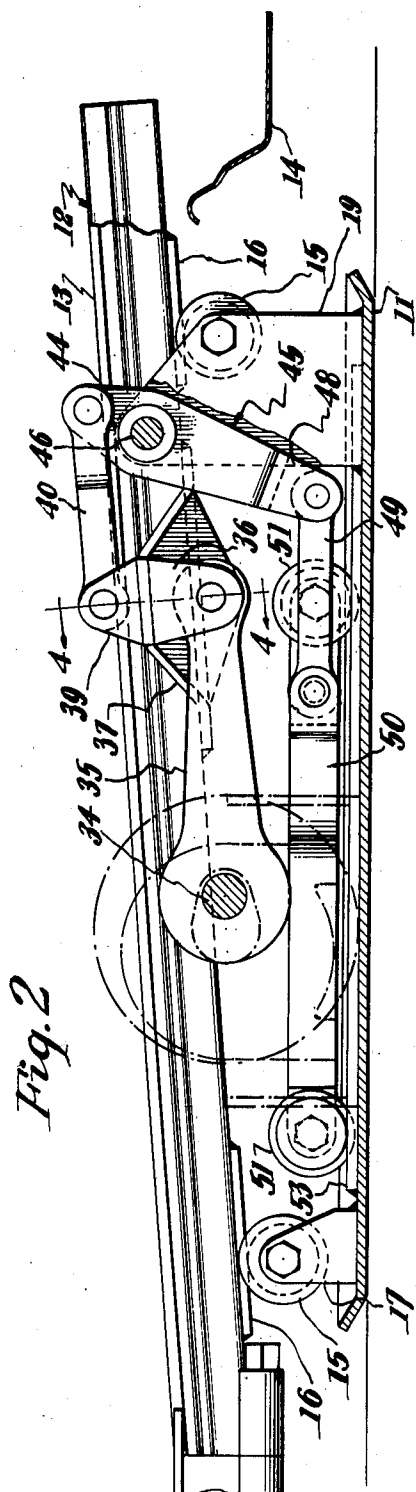
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SHAKER CONVEYER

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SHAKER CONVEYER

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6 Claims. (Cl. 198—220)

This invention relates to improvements in shaker conveyers and more particularly to a conveyer of the shaker type especially adapted for use at the working face of a mine.

One of the chief disadvantages in a shaker conveyer has been that its driving mechanism must be held firmly in position on the mine floor to prevent the mechanism from shifting. It is, accordingly, difficult to change the position of the conveyer as the working face is advanced and the conveyer cannot be used where the top is weak. My invention has as its principal objects to overcome these defects and provide a shaker conveyer of a simple and compact form which will remain in position at the working face of a mine without the use of auxiliary holding means such as jacks to prevent it from shifting, and which may readily be advanced with the working face.

Other objects of my invention will appear from time to time as the following specification proceeds.

My invention may be more clearly understood with reference to the accompanying drawings in which:

Figure 1 is a plan view of a shaker conveyer constructed in accordance with my invention with certain parts broken away and shown in section;

Figure 2 is a view in side elevation of the device shown in Figure 1 with certain parts shown in substantially longitudinal section in order to illustrate certain details of my invention not shown in Figure 1;

Figure 3 is an enlarged sectional view taken substantially along line 3—3 of Figure 1; and

Figure 4 is an enlarged fragmentary sectional view taken substantially along line 4—4 of Figure 2.

In the drawings the embodiment of my invention illustrated includes a reciprocable shaker drive mechanism, generally indicated by reference character 10, which is mounted on a base plate 11. Said drive mechanism is adapted to reciprocably drive a trough or pan line 12 at a velocity which varies at predetermined parts of the stroke in such a manner as to cause material to move therealong. Said pan line as usual is made up of a number of conveyer pan or trough sections detachably secured together and may be of a length substantially equal to the width of the working place and is adapted to discharge material loaded thereon into a conveyer 14 which is usually positioned along one side wall of the working place and extends to the mine entry for dis-

charging material into cars or a main line conveyer or the like.

The base plate 11, as herein shown, is of a relatively large area in proportion to the size of the drive mechanism so it may have a relatively large frictional bearing area on the ground. Said base plate also forms a supporting means for a conveyer trough 13 forming part of the pan line 12.

The trough 13 is mounted on two pairs of parallel spaced flanged rollers 15, 15 which are adapted to engage wearing strips 16, 16 secured to the bottom of said trough and extending therealong. One pair of said rollers is rotatably mounted on upstanding parallel spaced brackets 17, 17 secured to and projecting upwardly from the base 11 adjacent one end thereof. The other pair of said rollers is mounted on parallel spaced brackets 19, 19 secured to and projecting upwardly from said base adjacent the opposite end thereof. Said last mentioned rollers are disposed above said first mentioned rollers to elevate the trough 13 so that it may discharge into the conveyer 14.

The reciprocable drive mechanism 10 is herein shown as being of a relatively small compact construction to reduce the weight of the conveying unit to a minimum, and may safely be of such a size since the pan line 12 is necessarily short due to the usual limitations as to the width of a mine room. Said drive mechanism includes a motor 20 which drives a speed reducer, generally indicated by reference character 22. Said speed reducer may be of any well-known construction and, as herein shown, is directly connected to the motor to reduce the speed thereof and is not shown or described in detail since it is no portion of my present invention. Said speed reducer is provided with a shaft 23. Said shaft projects inwardly of a casing 24 which encloses the drive mechanism and has a crank 25 secured thereto. A crank pin 27 projects from said crank and has a block 29 journaled thereon. Said block is mounted for slidable movement along a rectilinear guide 30 which is formed in a rotatable cage 31. (See Figures 1 and 3.) Said cage encloses the crank 25 and is journaled at one of its ends in a plate 32 mounted in the casing 24 adjacent the speed reducer 22, and at its opposite end in an end plate 33 for said casing.

It should herein be noted that the center of the cage 31 is eccentric of the center of rotation of the crank 25 and that said cage is rotated by means of the block 29 which slides in the guide 30. This eccentricity of said cage with respect to

said crank will cause said crank to rotatably drive said cage at an angular velocity which varies in such a manner as to impart a reciprocable motion to the pan line 12, which varies at predetermined parts of its stroke, to cause material to efficiently move therealong.

As herein shown, the cage 31 has a crank 34 formed integral therewith which has a pitman 35 journaled thereon. The free end of said pitman is pivotally connected to a forked bracket 36 depending from a connecting member 37 which is secured to the bottom of the conveyer trough 13 and extends thereacross beyond opposite sides of said trough.

Referring now in particular to the novel means for counteracting the reaction of the pan line 12 against the drive mechanism 10 when being driven thereby to prevent shifting of the drive mechanism longitudinally of the pan line, a pair of parallel spaced bifurcated connecting brackets 38, 39 are herein shown as projecting upwardly from opposite sides of the connecting member 37. A connecting link 40 is pivotally connected to each of said brackets by means of a pivotal pin 41. Each of said links in turn is pivotally connected to an upper lever arm 44 of a rocking member 45. Each of said rocking members is mounted between the outer sides of a bracket 19, by means of a pivotal pin 46 which is secured at its ends to the sides of said bracket. (See Figures 1 and 2.) A lower lever arm 48 of said rocking member projects downwardly from the pivotal pin 46 in alignment with said upper lever arm and has a link 49 pivotally connected thereto, which is connected to a counterbalancing member 50 mounted on the base 11 for reciprocable movement therealong. Said lower lever arm is of a considerably greater length than said upper lever arm and serves to reciprocally move the counterbalancing member 50 in a direction opposite to that of said trough during operation of the conveyer. Said counterbalancing member is of a weighted and relatively heavy construction and is mounted on flanged rollers 51, 51 at each end thereof which are guided on parallel spaced guide strips or rails 53, 53 extending longitudinally of the trough line.

The proportion of the weight of the counterbalancing member 50 and length of the lever arm 48 to the weight of the trough line 12 and lever arm 44 may be such that the forces exerted on the base 11 through the brackets 19, 19 will tend to oppose each other to prevent shifting of the conveyer during operation.

It may now be seen that a new and improved conveyer of the shaker type, particularly adapted for use along the working face of a mine, has been provided which is of an efficient unitary construction and is arranged so as to remain stationary during the conveying operation without the use of additional holding means, which conveyer is so simply arranged and of such proportions that it may readily be advanced as the working face advances.

It should also be understood that while the device of my invention is particularly adapted for use at the working face of the mine, that it may also be advantageously used where the drive must frequently be shifted or for conveying material from the room or along the mine entry in places where the condition of the mine top or roof is such as to make it unsafe to hold the drive in position by means of jacks.

While I have herein shown and described one

form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting myself to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In a shaker conveyer and in combination with a conveyer trough line, means for driving said trough line including a variable motion drive mechanism and a reciprocably driven member driven thereby, a base on which said drive mechanism is mounted, a rocking member fulcrumed on said base intermediate its ends and having unequal lever arms, a connection from said reciprocably driven member to the shortest of said lever arms, a counterweight, and a connection from the other of said lever arms to said counterweight to reciprocally drive said counterweight in a direction opposite to said trough line, to prevent shifting movement of said base during reciprocation of said trough line.

2. In a face conveyer of the jiggling type, reciprocable drive mechanism including a base, a conveyer trough supported on said base for reciprocable movement therealong, a connection from said drive mechanism to said trough for reciprocally driving said trough, and means to balance the unbalanced forces of said drive and trough including a counterweight mounted beneath said trough for movement along said base, a rocking member fulcrumed on said base and rocked by said drive mechanism, and a connection from the lower end of said rocking member to said counterweight to reciprocally move said counterweight in opposite phase relationship to said conveyer trough and counteract the tendency of said base to shift during reciprocation of said trough.

3. In a face conveyer of the jiggling type, reciprocable drive mechanism including a base, a conveyer trough supported on said base for reciprocable movement therealong, a connection from said drive mechanism to said trough for reciprocally driving said trough, and means to balance the unbalanced forces of said drive and trough including a counterweight beneath said conveyer trough mounted for movement along said base, a lever fulcrumed on said base, a connection from said trough to one end of said lever for rocking said lever upon movement of said trough, and a connection from the lower end of said lever for reciprocally moving said counterweight along said base in opposite phase relationship to said conveyer trough, to counteract the tendency of said base to shift during reciprocation of said trough.

4. In a face conveyer of the jiggling type, a base, variable motion drive mechanism mounted on said base including a variably rotatable crank, a conveyer trough mounted on said base for reciprocable movement with respect thereto, a connection between said crank and conveyer trough for reciprocally driving said conveyer trough in such a manner as to cause material to move therealong, and means to balance the unbalanced forces of said drive and trough including a counterweight mounted beneath said conveyer trough for movement along said base, said counterweight being of a lesser weight than said conveyer trough, and a drive connection from said conveyer trough to said counterweight to drive said counterweight in opposite phase relationship

from said conveyer trough to prevent shifting movement of said base during reciprocation of said trough line including a rocking member pivoted adjacent one of its ends, and a connection from the longest lever arm of said rocking member to said counterweight.

5. In a face conveyer of the jiggling type, a base, variable motion drive mechanism mounted on said base including a variably rotatable crank, a conveyer trough mounted on said base for reciprocable movement with respect thereto, a connection between said crank and conveyer trough for reciprocably driving said conveyer trough in such a manner as to cause material to move therealong, a counterweight mounted beneath said conveyer trough for movement along said base and being of a lesser weight than said conveyer trough, and a drive connection from said conveyer trough to said counterweight to drive said counterweight in opposite phase relationship from said conveyer trough to prevent shifting movement of said base during reciprocation of said trough line including a rocking member pivoted for movement about an axis disposed intermediate its ends, said rocking member having an upwardly extending lever arm connected with said conveyer trough and having a depending le-

ver arm which is longer than said upwardly extending lever arm and forms a drive means for said counterweight.

6. In a face conveyer of the jiggling type, a base, variable motion drive mechanism mounted on said base including a variably rotatable crank, a conveyer trough mounted on said base for reciprocable movement with respect thereto, a connection between said crank and conveyer trough for reciprocably driving said conveyer trough in such a manner as to cause material to move therealong, a counterweight mounted beneath said conveyer trough for movement along said base, said counterweight being of a lesser weight than said conveyer trough, and a drive connection from said conveyer trough to said counterweight to drive said counterweight in opposite phase relationship from said conveyer trough to prevent shifting movement of said base during reciprocation of said trough line including a rocking member fulcrumed intermediate its ends so as to have two lever arms of unequal length, a link connecting the shortest of said lever arms with said conveyer trough and another link connecting the longest of said arms with said counterweight.

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