Nov. 29, 1938. W. A. WHITMIRE 2,138,200

MUCKING MACHINE AND CONVEYER SYSTEM

Filed Aug. 4, 1937

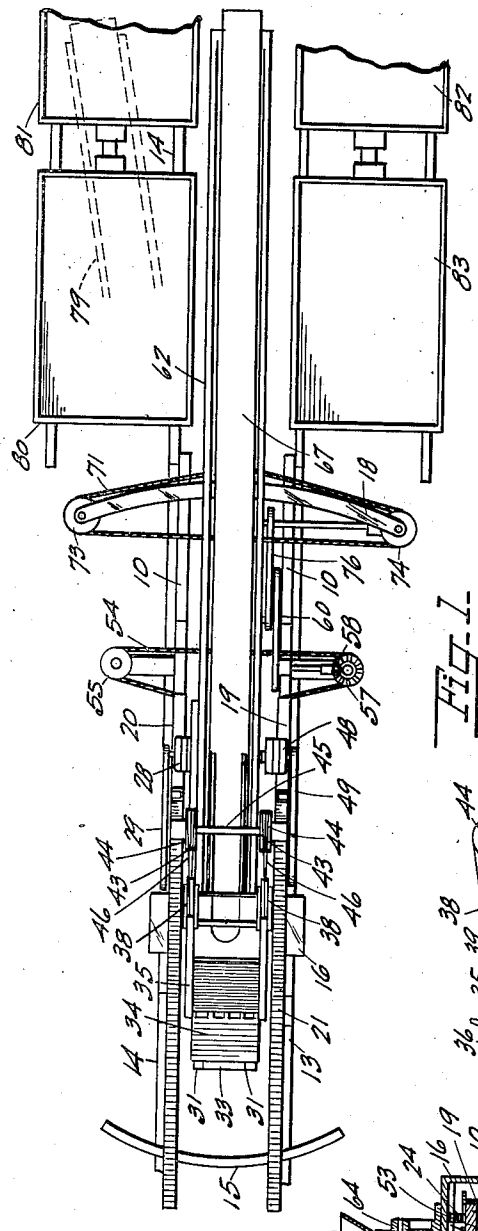


FIG. 1

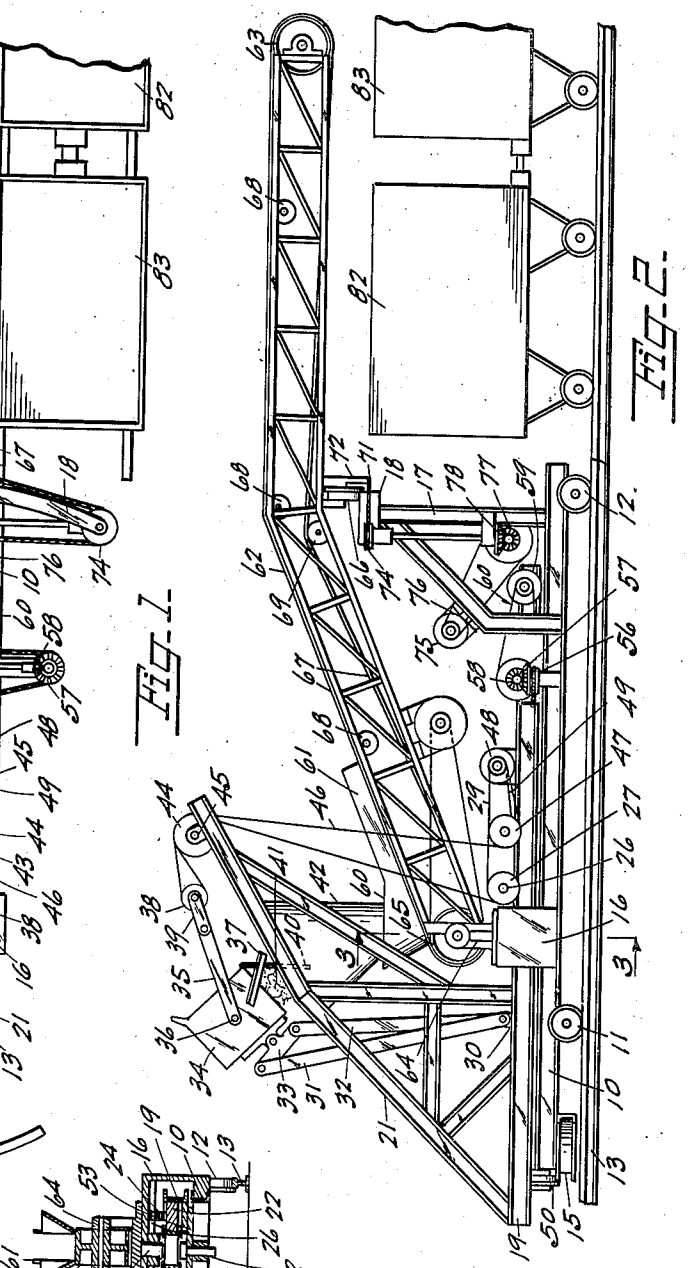


FIG. 2

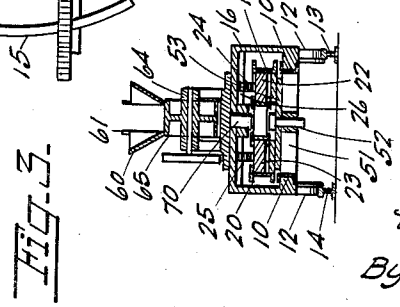


FIG. 3

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Patented Nov. 29, 1938 2,138,200

UNITED STATES PATENT OFFICE

2,138,200

MUCKING MACHINE AND CONVEYER SYSTEM

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Application August 4, 1937, Serial No. 157,332

2 Claims. (Cl. 214—91)

This invention, a mucking machine and conveyer system has as its principal feature, a conveyer which is radially adjustable in a horizontal plane relative to the mucking machine carriage and the mucking unit, to permit shifting the discharge from cars on one track to cars on another track parallel thereto, as also, in open cuts and excavations, to discharge muck to the sides of the cut or excavation, thus avoiding the time necessary to remove one string of cars and place another string on the same track.

With this arrangement of conveyer, cars may be placed on the same track on which the mucking machine is operating, and other strings of cars may be placed on other tracks parallel thereto, and the conveyer, after loading a first string of cars can be shifted radially to load a second string on another track while the first string is hauled away to dump, thus increasing the speed of mucking, cost of operation, and general efficiency.

This invention is an improvement over my Patent No. 2,086,687, isued July 13, 1937, and includes features which are disclosed in my Patent No. 2,067,879, issued January 12, 1937, as also in my copending applications, Serial No. 157,330, filed August 4, 1937, for Mucking machine dipper, and Serial No. 157,331, filed August 4, 1937, for Mucking machine dipper hoisting system, but can also be incorporated in other types of mucking and excavating machines.

The objects and advantages of the invention are as follows:

First: to provide a mucking machine or excavating machine with a conveyer system which is pivoted at its tail end, and in which the head end of the conveyer may be radially adjusted for discharging at will and selectively into cars located on a plurality of parallel tracks, whereby the mucking or excavating operations may be carried on without interruption.

Second: to provide a conveyer system as outlined which is radially adjustable independently of the operation or angular adjustment of the mucking unit and relative to the support or carriage.

Third: to provide power means for adjusting said conveyer system radially through a predetermined angle in either direction relative to the longitudinal axis of the mucking machine carriage.

Other objects and advantages of the invention will become apparent as the following description is read on the drawing forming a part of this specification, and in which similar reference characters are used to designate similar parts throughout the several views, of which:

Fig. 1 is a plan view of the invention.

Fig. 2 is a side elevation of Fig. 1.

Fig. 3 is a section through the swivel connections of the mucking unit and conveyer unit to the support or carriage and corresponds to a section taken on line 3—3 of Fig. 2.

The mucking machine consists of a carriage or truck which includes the side members 10 which are supported on the track wheels 11 and 12 which operate on the rails 13 and 14; and also includes, the arcuate rail 15 which is supported by the side members 10 and which forms the support for the front end of the mucking unit, the pivot bracket 16 which supports the tail end of the conveyer directly on the carriage, and shown as supported by the side members 10, and the structure 17 which carries and supports the arcuate track 18 which supports the conveyer intermediate its length and is itself supported by the carriage, as on the side members 10.

The mucking unit frame consists of the support or side members 19 and 20 and the superstructure 21 which carries the hoisting sheaves and main receiving hopper.

The mucking unit includes the crowds 22 and 23, (though a single crowd may be used if desired) which are slidable in or between the side members 19 and 20 and driven by the pinions 24 and 25 which cooperate with rack teeth formed in the top surfaces of the crowds or attached thereto in the form of a rack, these pinions being secured on a shaft 26, and which shaft has affixed thereon adjacent each end, a crowd payout compensating drum 27. A motor 28 or other suitable power means drives the shaft 26 through suitable speed reducing means, as a chain or belt 29 for advancing and retracting the crowd at suitable speed. Other types of power means for operation may in certain cases be desirable, however, motors are shown for purposes of simplicity. Compressed air engines are usually desirable for tunnel work.

Affixed to the front end of the crowd or crowds is a dipper-stick head 30 to the respective upper and lower ends of which are pivotally secured the respective dipper sticks 31 and 32 which have pivotally attached to their other ends the wrist connection 33 which connects the dipper sticks to the dipper 34.

This dipper 34 has a bail 35 which is pivoted to the sides of the dipper at 36, and a backstop 37 is affixed to the sides of the dipper and cooperates with the bail in lowered and partly lowered positions of the dipper, and prevents the bail from swinging back beyond a plane inclined forwardly from its pivotal connections.

A sheave 38 is associated with each side of the bail, as through the medium of links 39, and forms a part of the crowd movement compensating means for the hoisting system.

The dipper is shown in its dumping position, with the cover 40 released and the dipper dumping muck 41 into the main receiving hopper 42 which is supported by the superstructure 21.

A pair of sheaves, 43, 44 is mounted on each end of a shaft 45 for independent rotation, the shaft 45 being supported on the superstructure 21, and a cable 46 is provided for each side of the bail, each cable having one end secured and windable on a compensating drum 27, thence passing over the sheave 43, thence about sheave 38, thence over sheave 44 and down to the hoisting drum 47 to which its other end is attached and windable thereon.

For purposes of simplicity in illustration, the hoisting drums 47 are shown as driven by a motor 48 through a chain or belt 49, the motor and hoisting drums being supported on the mucking unit frame.

The mucking unit has its front end supported on rollers 50 which operate on the arcuate track 15, and has its other support on a bearing seat 51 which is supported by the side members 10 and swivelly secured to the seat 51 by means of a king pin or pivot 52 which is suitably secured in the cross member 53 which is supported by the side members 19 and 20 of the mucking unit frame, the mucking unit swiveling about the axis of the pivot to permit the dipper 34 to operate over a comparatively wide sweep.

The mucking unit is provided with power means for swinging the unit about its pivot in either direction through a predetermined angle, and is shown in its simplest form as consisting of a chain or cable 54 which operates around sprockets or sheaves 55 and 56 which are suitably supported by the carriage or truck, with the ends of the chain or cable respectively secured to the side members 19 and 20, one of the sheaves being driven, and the driving means therefor being shown as consisting of a bevel gear 57 and pinion 58, with the pinion driven by a motor 59 through a belt 60. Any other suitable type of drive however, can be substituted.

In this arrangement, the mucking unit is adjusted in opposite directions through reversal of the motor, suitable controls therefor being well known in the art and therefore requiring no description.

The lower end of the main receiving hopper 42 is preferably conical in form and feeds into the conical lower hopper 60 which is provided with aprons 61 to feed the material onto the conveyer, this lower hopper being supported on the conveyer frame or truss. With conical hoppers, the conveyer may be swung about its pivotal connection and will suitably receive material from the main hopper in any adjusted position. Cylindrical hoppers may also be used, as also, the hopper 60 alone.

The conveyer system consists of a suitable truss frame 62 which supports the head pulley 63 at the discharge end and is supported at the receiving end on the bearings 64 which support the tail pulley 65, and the truss is intermediately supported by the rollers 66 riding on the arcuate rail 18. The conveyer belt 67 extends about the head and tail pulleys and over suitable idlers 68 and 69 as may be required for suitable support of the belt.

The tail pulley bearings 64 are mounted on the frame or bracket 16 and have a pivotal connection thereto as indicated at 70, the pivot 70 being preferably coaxial with the pivot 52. Therefore, the mucking unit and conveyer unit pivot on the same axis and each can readily be adjusted radially independently of the other.

Power adjusting means is provided for the conveyer unit and is shown in simple form as consisting of an arrangement similar to that described for adjusting the mucking unit, and consists of a chain or cable 71 attached to the conveyer frame or truss as by a depending arm 72, the cable passing about sheaves 73 and 74, one of which is driven as by a motor 75 through a belt 76 and bevel gearing 77 and 78, reversal of the motor providing for adjustment in opposite directions.

As illustrated in Fig. 1, the conveyer is in position to discharge muck in cars located on the same track on which the mucking machine is located, and may radially be adjusted to any position within the limits defined by the arcuate track 18, as indicated by dotted lines 79 in an intermediate position of adjustment for loading cars 80 and 81 on the parallel track to one side of the main track, the cars being shifted as loading progresses. When car 80 is loaded, the conveyer can immediately be swung over to start loading car 82 and then 83 on the other side, while cars 80 and 81 are taken away to dump. Other tracks can be laid parallel if desired, and the limit of angular or side discharge is dependent only on the length of the conveyer and angular length of the arcuate track 18, and the conveyer can be adjusted to any desired angular relation to the truck or carriage irrespective of the angular adjustment of the mucking unit.

It will be understood that variations in construction and arrangement of parts, which variations are consistent with the appended claims, may be resorted to without detracting from the spirit or scope of the invention, or sacrificing any of the advantages thereof.

I claim:

1. In a mucking machine having a carriage including side members, a mucking unit having frame support members and pivotally mounted on said carriage in superposed relation to said side members for angular adjustment in a horizontal plane, and a crowd operating between said support members, and a conveyer; means for unobstructively mounting said conveyer comprising, a pivot bracket extending over and about said side members and said support members and having its opposite ends secured to the outside of the respective side members and having a central pivot bearing; a tail-pulley bearing bracket having a central vertical pivot supported in said pivot bearing, providing an obstructionless mounting for the tail end of said conveyer as related to angular movements of the mucking unit and advance and retractive movements of said crowd.

2. A structure as claimed in claim 1; an intermediate support for said conveyer comprising standards mounted adjacent the rear ends of said side members; an arcuate rail supported on said standards; and rollers on said conveyer supporting said conveyer on said rail; and means associated with said intermediate support and with said conveyer, operable at will for angularly adjusting said conveyer about its pivotal mounting and normally maintaining said conveyer in its angularly-adjusted position.

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