METHOD OF AND APPARATUS FOR LOADING.


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To all whom it may concern:

Be it known that I, WILLIAM L. SAUNDERS, a citizen of the United States, a resident of Plainfield, county of Union, and State of New Jersey, have invented a certain Method of and Apparatus for Loading, of which the following is a specification accompanied by drawings.

This invention relates to a method of removing broken material from the heading of an entry or tunnel by loading a train of cars from one end of the train and also apparatus for carrying out my improved method of loading.

In mine galleries, sub-levels, entries or tunnels, which are only wide enough to permit a single track for mine cars, but one car at a time can be loaded with ore or other material, because the loading by a mechanical shoveling or loading device, for instance, is done at the heading from the forward end of the car. The process is more or less slow, since the loaded car must be pushed or withdrawn from the loading device along the track to the tunnel entrance or other position, which will clear the track and permit another unfilled car, or the same car after dumping, to be moved into position for loading. The mechanical shoveling and loading machine, if one be used, is thus operated intermittently and valuable time is lost.

The objects of the present invention are to enable an extra train of cars to be mechanically loaded from the heading of the train so that when the loaded train is moved from the gallery or sub-level, another complete train to be loaded may take its place. In this way, the shoveling and loading machine is operated more continuously and the loading operations consume less time and are more economical to carry out.

Further objects of the invention will hereinafter appear and to all of these ends the invention consists of the mode of operation and apparatus for loading a train of cars substantially as hereinafter fully described and claimed in the specification and shown in the accompanying drawings, in which:

Figure 1 is a side elevation partly in longitudinal section of a portion of a train of flat cars and apparatus for carrying out my invention.

Figure 2 is a horizontal sectional plan view of the set of nested car hoppers on the line 2–2 of Figure 1, and

Figure 3 is an end elevation of the assembled hoppers looking from the back end of the train towards the hopper doors.

Referring to the drawings, it is to be assumed that the train of cars illustrated as flat cars A, B, C and D, or more if desired, has been run into the sub-level E of the mine, along the tracks F to the heading ready for loading. A mechanical shoveling and loading machine of any desired type (not shown) may be used for loading the car hoppers and such a machine would ordinarily operate in front of the first car A, since there is not sufficient space at the sides of the train in a narrow sub-level for the operation of a mechanical loading device.

In order to enable my method of loading the train of cars from one end of the train to be carried out, I arrange a set of car hoppers or buckets G, H, J and K, one within the other upon the first car A of the train. The uppermost hopper K is then filled with the ore or other broken material to be loaded and transported by suitable mechanical means to the opposite end of the train as indicated in the dotted lines in Figure 1 and deposited upon the end car, or upon a car at or near that end of the train. The method is then continued by filling each succeeding hopper or bucket of the set and transporting the filled hopper each time to a car adjacent the one to which the last preceding filled hopper was transported, until but one filled hopper G remains upon the first car A and the cars of the train are occupied by filled hoppers.

Any suitable power actuated means may be provided for transporting the hoppers along the train, and I prefer to drag or draw the hoppers along the car bodies by means of cable connections shown in the form of a rope L adapted to be coiled over the drum or drums of a suitable hoisting motor located in the gallery or sub-level at the farthermost end of the train and preferably hung from the roof, or supported in such position that the operation may be conveniently carried out. Such hoisting or transporting outfit is not shown but the lengths of the rope L are shown converging towards the point at which the power is applied.

In order to facilitate the assembling or nesting of the loose hoppers in a pile, one within the other, upon the first car A of the train, these hoppers are preferably con-
structured with converging or tapered sides as indicated in plan view in Figure 2, and the hoppers are provided with hinged end doors, O, P, Q and R, so that by leaving the hinged ends O, P and Q open as indicated in Figure 1, the hoppers may be assembled endwise one within the other with the door R of the uppermost hopper closed and latched by the latches S in readiness for filling. Lugs T at the sides of the hoppers permit the attachment of one end of the rope L for hauling purposes and lugs U at the opposite ends of the hoppers permit the attachment of the other end of the rope L, which rope passes over the pulley V. The attachment of the rope to a lug U of a lower hopper while an upper hopper is being withdrawn from the pile, serves to hold the remaining hoppers in position on the car A.

Each car body is preferably provided with a series of rollers W and the bottoms of the hoppers are preferably provided with longitudinal guides X and transverse rollers Y and Z at each end respectively. In drawing or dragging each filled hopper along the tops of the car bodies, the longitudinal guides X cooperate with the rollers W on the cars and the guide rollers Y and X on the hoppers facilitate the assembling of the hoppers and also permit the hoppers to roll one within the other.

In order to more firmly anchor the hopper G on the first car A, pins a may be inserted through the lugs b extending from the bottom of the hopper and into apertures in the car bolster c, and such pins may be utilized for anchoring filled hoppers upon cars of the train. Bridges in the form of plates d may be provided for bridging the spaces between the bolster of the cars. The ends or car doors, O, P and Q as shown, bridge across the space between the first and second cars and a removable shoe or block e is preferably provided on the car B to form an abutment for one or more of the car doors in order to further anchor and prevent the unfilled hoppers from moving when a filled hopper is withdrawn.

In the operation of the apparatus described, let it be assumed that the car hoppers, G, H, J and K have been assembled as indicated in Figure 1, and that the first or uppermost hopper K has been filled. Upon starting the winding or hoisting apparatus, adapted to be connected to the rope L, the filled hopper K will be withdrawn from the assembled set of hoppers and will be dragged or pulled along the rollers W on the tops of the cars and may be deposited upon a car at or near the opposite end of the train, as desired. The end gate or door Q of the last hopper J will then be closed, the hopper will be filled and the rope L will be adjusted to withdraw said hopper from the set. In such case the connection of one end of the rope L to the lug U of one hopper will be changed to another lower hopper. The operation of filling and withdrawing the hoppers is continued until the cars of the train are provided with filled hoppers and then the entire train is run out of the sub-level or gallery in filled condition. The cars may be dumped by a mechanical arrangement, and the empties and the hoppers may be assembled by hand or the operation of the power actuated device may be reversed and the hoppers drawn one within the other in assembled position by mechanical power. I claim:

1. The method substantially as herein described of removing broken material from the heading of an entry or tunnel by loading a train of cars from the heading end of the train, which consists in arranging a set of nested hoppers or buckets on the car nearest the heading in position to be loaded successively by a mechanically operated loading machine, and drawing the hoppers or buckets as loaded one by one from the heading end of the train to the rear of the train.

2. The method substantially as herein described of loading a train of cars from one end of the train, which consists of arranging a set of car hoppers one within the other upon the first car of the train, then filling the uppermost hopper with material to be loaded and transporting said filled hopper to a car at the opposite end of the train, and continuing to fill each next succeeding hopper of the set and transport the filled hopper each time to a car adjacent the one to which the last preceding filled hopper was transported, until but one filled hopper remains upon the first car and the cars of the train are occupied by filled hoppers.

3. The method substantially as herein described of loading a train of cars from one end of the train, which consists in arranging a set of car hoppers one within the other upon the first car of the train, then filling the uppermost hopper with material to be loaded and drawing said filled hopper along the tops of the car bodies to a car at the opposite end of the train and continuing to fill each next succeeding hopper of the set and draw the filled hopper each time along the tops of the car bodies to a car adjacent the one to which the last preceding filled hopper was drawn, until but one filled hopper remains on the first car and the cars of the train are occupied by filled hoppers.

4. The method substantially as herein described of loading a train of cars from one end of the train, which consists in arranging a set of car hoppers one within the other upon the first car of the train, the number of hoppers corresponding to the number of cars in the train, then filling the uppermost hop-
per with material to be loaded and transporting said filled hopper to a car at the opposite end of the train, and continuing to fill each next succeeding hopper of the set and transporting the filled hopper each time to a car adjacent the one to which the last preceding filled hopper was transported until but one filled hopper remains upon the first car and the cars of the train are occupied by filled hoppers.

5. The method substantially as herein described of loading a train of cars from one end of the train, which consists in arranging a set of car hoppers one within the other upon the first car of the train each hopper having a hinged end, the said hinged end of the uppermost hopper being closed and the said end of the remaining hoppers being open, and all facing to the rear in the direction of the length of the train, then filling the uppermost hopper with material to be loaded and drawing said filled hopper from the set along the tops of the car bodies to a car at the opposite end of the train, then continuing to close and fill each next succeeding hopper of the set and drawing the filled hopper each time along the tops of the car bodies to a car adjacent the one to which the last preceding filled hopper was drawn, until but one filled hopper remains upon the first car and the cars of the train are occupied by filled hoppers.

6. In apparatus for removing broken material from the heading end of an entry or tunnel, the combination of a train of empty cars, hoppers or buckets nested on the car nearest the heading in position to be loaded by a mechanically operated loading machine, and means for drawing said hoppers or buckets from the heading end to the rear of the train.

7. Loading apparatus for loading a train of cars from one end of the train, comprising a set of loose car hoppers each having a hinged end and adapted to be nested in a pile one within the other upon the first car of the train, and power actuated means for transporting the hoppers as filled one after another in succession from the set of cars along the train until the cars are occupied by filled hoppers.

8. Loading apparatus for loading a train of cars from one end of the train, comprising a set of loose car hoppers each having a hinged end and rollers at the bottom of the hopper, said hoppers being adapted to be nested in a pile one within the other upon the first car of the train with the upper hopper closed and the hinged ends of the remaining hoppers open, and power actuated means for dragging the hoppers as filled one after another in succession from the set to the cars along the train until the cars are occupied by filled hoppers.

9. Loading apparatus for loading a train of cars from one end of the train, comprising a set of loose car hoppers each having a hinged end and guides and rollers at the bottom of the hoppers, said hoppers being adapted to be nested in a pile one within the other upon the first car of the train with the upper hopper closed and the hinged ends of the remaining hoppers open, rollers on the car bodies, with which the guides on the hoppers are adapted to cooperate, and power actuated means for dragging the hoppers as filled one after another in succession from the set to the cars along the train until the cars are occupied by filled hoppers.

In testimony whereof I have signed this specification.

WILLIAM L. SAUNDERS.