

May 16, 1933.

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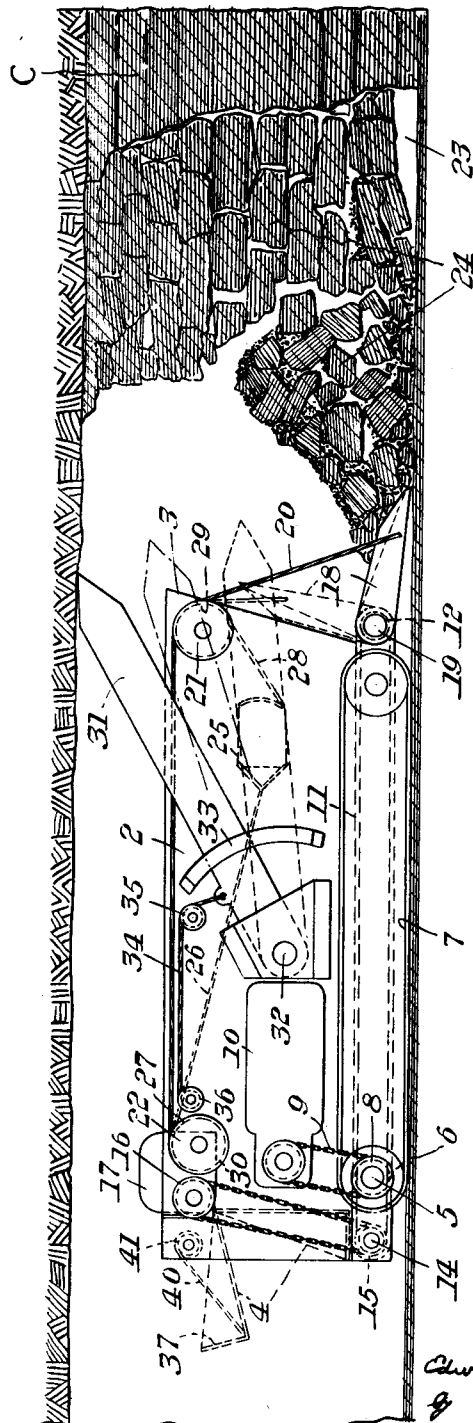
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MATERIAL HANDLING APPARATUS

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3 Sheets-Sheet 1

Fig. 1.



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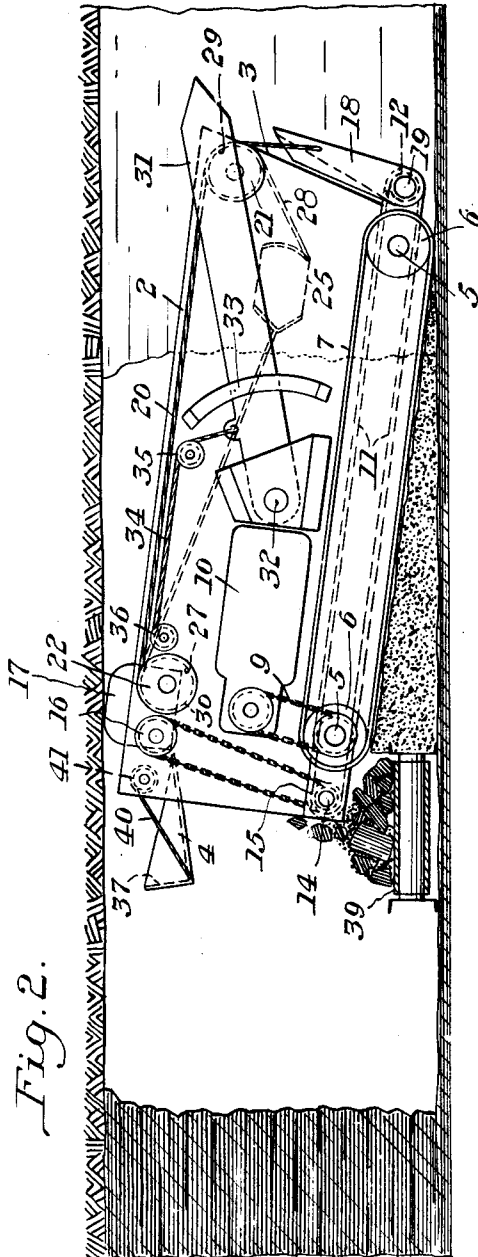
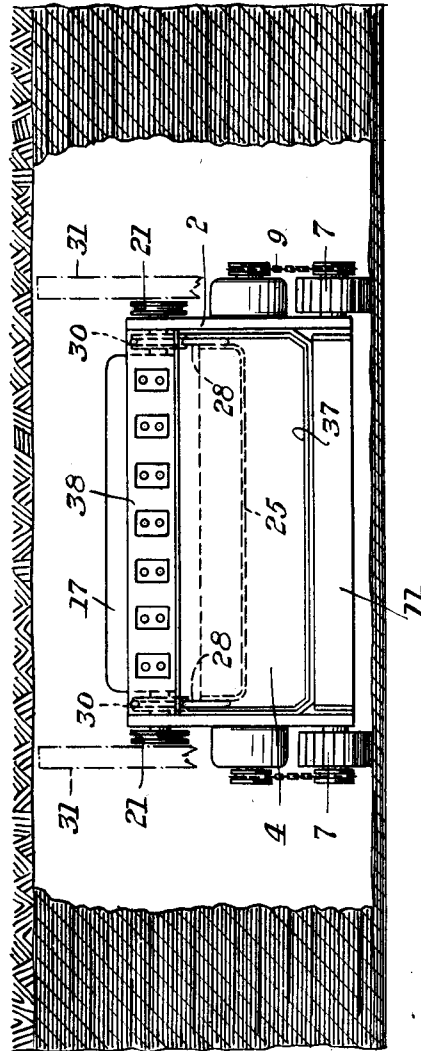


Fig. 2.

Fig. 3.



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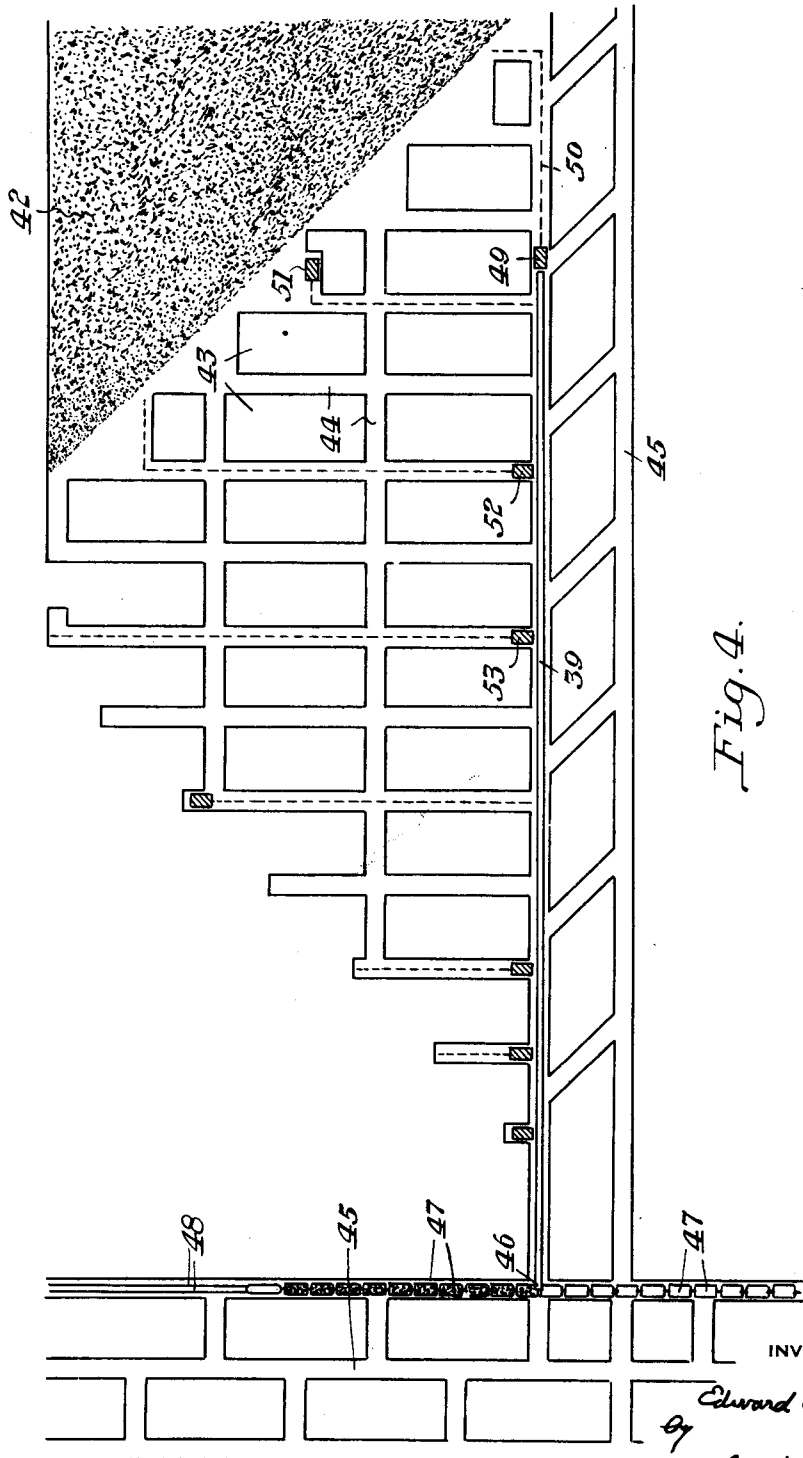


Fig. 4.

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MATERIAL HANDLING APPARATUS

Application filed September 30, 1930. Serial No. 485,377.

The present invention relates broadly to the art of material handling, and more particularly to handling apparatus of the loading type effective for the handling of bulk materials such as coal and the like.

It is customary in the art to which the present invention relates to effect the loading of the coal for example in a number of different ways. Most of the mechanical loaders operate on the principle of suitable collecting mechanism effective for collecting coal and discharging it into a car adjacent the loading point, the car being subsequently transported on rails to a convenient point at which it is unloaded and then returned for a fresh load. Such an operation, while effective in so far as the loading operations are concerned, is open to several objections. In the first place there is involved the expense incident to the laying of the tracks upon which the car may travel. In the second place it is necessary to provide employees for the purpose of effecting movements of the car, in addition to the operators in charge of the loading equipment. During periods of actual loading, the car operator or operators are idle, while during periods of car movement, the loader is idle. It will be apparent therefore that the general effect of the system is one characterized by expensive installation and periods of idleness at frequent intervals.

It is one of the objects of the present invention to provide an improved material handling apparatus of such character that it may be utilized for the handling of coal, for example, under such conditions that the objections incident to present day systems are largely if not entirely obviated.

In the accompanying drawings I have shown for purposes of illustration only, and more or less diagrammatically, a preferred embodiment of the present invention. In the drawings:

Figure 1 is a side elevational view of one form of loading apparatus constructed in accordance with the present invention in operative relation to coal to be loaded;

Figure 2 is a view of the apparatus illus-

trated in Figure 1, the apparatus, however, being in discharging position.

Figure 3 is a rear elevation of the apparatus illustrated in Figures 1 and 2; and

Figure 4 is a diagrammatic layout illustrating the flexibility of apparatus operating in accordance with the present invention.

In accordance with the present invention there is provided apparatus adapted to serve the combined functions of a loader as heretofore utilized and of a car as customarily provided. Such an apparatus may comprise a carrying compartment 2 having an open forward end 3 and a rear end normally closed by a tail gate 4. Extending through the frame of the carrying compartment, or otherwise suitably secured thereto, are axles 5 on which are wheels 6 cooperating with endless type tractor-like belts 7 by means of which the carrying compartment may be transported under its own power from place to place. For driving such tractor belts, one of the axles may have secured thereto suitable pulleys 8 cooperating with driving means 9 driven by a motor or the like 10.

Forming the bottom of the carrying compartment is an endless belt 11 extending over a suitable shaft 12 at the front end of the carrying compartment, and over a similar shaft 14 at the opposite end thereof. The shaft 14 may carry a pulley 15 cooperating with driving means in the form of a sprocket 16 driven by a motor 17. The mechanism thus far described enables the carrying compartment to be transported under its own power forwardly or rearwardly, while the motor 17 enables the entire bottom of the compartment to be moved in one direction or the other at the pleasure of the operator.

Pivotaly secured to the carrying compartment adjacent the front end thereof is a scoop 18, herein illustrated as pivotaly mounted on suitable extensions 19 on the shaft 12, and adapted to occupy either the full line position of Figure 1 or the dotted line position therein indicated. The position of the scoop is controlled by a cable 20 passing over a pulley 21 and thence extending to a scoop cable operating drum 22 driven by the motor 17 and effective for raising or lowering the scoop.

It may be assumed that a body of coal C as illustrated in Figure 1 has been undercut in any desired manner as indicated at 23, and the undercut portion partly or completely broken down to provide a pile 24 available for loading purposes. At this time the carrying compartment may be moved into a position adjacent the loosened coal, and the scoop 18 dropped to its full line position. Upon advancing the carrying compartment, the scoop will be filled, whereupon it may be swung into its dotted line position for discharging its contents into the carrying compartment. This operation may be repeated as often as required to effect a complete charging or filling of the carrying compartment, the charging operation being facilitated by proper operation of the belt 11 at required intervals for moving the contents of the carrying compartment toward and against the tail gate 4.

Since, however, the belt 11 has only a friction driving action on the material within the carrying compartment, it may be necessary or desirable to provide means for assisting in the complete charging of such compartment. This may be accomplished by the utilization of a suitable scraper or bucket 25 adapted to be pulled in one direction by a cable 26 passing over a scraper operating drum 27 driven by the motor 17, or in the opposite direction by a return cable 28 passing over a sheave 29 at each side of the carrying compartment adjacent the upper front portion thereof and thence extending rearwardly to drums 30 also adapted to be driven by the motor 17. The proper manipulation of the respective cables 26 and 28 enables the scraper to be moved in the desired direction and at the proper elevation for obtaining rearward movement of the contents of the carrying compartment. The scraper in addition to serving in the capacity indicated, is also preferably of such dimensions as to extend between the sheaves 29 in position above and adjacent to the scoop 18 when in its dotted line position and thereby form a substantially complete closure for the charging end of the carrying compartment.

It not infrequently happens that with carrying compartments of considerable capacity it is necessary to effect the loosening of additional coal in order to provide a sufficient available supply for properly filling the carrying compartment. This is accomplished in accordance with the present invention by the provision of a battering ram 31 having a pivotal mounting 32 on the side of the carrying compartment and extending forwardly through a guide 33 in such position as to engage a body of coal in advance of the carrying compartment. For controlling the positioning of the ram and thereby enabling it to occupy different positions as indicated in dotted lines, there may be provided a ram oper-

ating cable 34 secured to the ram and passing over a pulley 35 to a ram operating drum 36.

In accordance with the preferred construction of the apparatus, the tail gate 4 is provided with an operator's platform 37 at the lower portion thereof upon which an operator may stand in order to control the various movements of the loading device, a control panel 38 being provided in convenient relationship to the end gate. When in this position the operator has the advantage of being able to see over or around the carrying compartment and thus properly control the loading operation. He is also at a distance somewhat remote from the actual point of loading and therefore in no particular danger from falling coal, slate, etc.

The carrying compartment having been completely charged or filled, the operator may swing the scoop 18 into its inoperative position as illustrated in full lines in Figure 2 and move the scraper 25 rearwardly into cooperative relation thereto. At this time the carrying compartment is ready for a return travel to a point at which its contents may be discharged. In Figure 2, I have illustrated the discharge as being directly onto an endless conveyor 39, the discharging operation being accomplished by swinging the tail gate 4 upwardly to the position indicated in Figure 2 by means of a cable 40 and drum 41 driven by the motor 17. The tail gate having been raised, the bottom conveyor 11 may be operated to completely empty or discharge the carrying compartment.

In Figure 4, I have illustrated diagrammatically a system of material handling in accordance with the present invention. In this figure there is illustrated the gob or mined out area 42. The solid coil pillars are indicated at 43 with the passages 44 extending therebetween, these passages being accessible through mine entries 45. Extending along one face of the pillars 43 is the conveyor 39, whereby it is accessible from substantially all of the passages 44. This conveyor may be of any desired length and any preferred construction as well understood in the art. At its discharge end 46 the conveyor cooperates with cars 47 on a suitable track 48.

In the diagrammatic illustration just referred to, there are shown different pieces of loading apparatus each constructed in accordance with the present invention and located in different positions. The apparatus 49 is shown as having traveled along the path indicated by the dotted line 50 from a position adjacent the gob 42 into discharging relationship to the end of the conveyor 39. The apparatus 51 is illustrated as having traveled from the conveyor 39, after having discharged its contents onto the same, into a position adjacent the gob 42 preparatory to a loading operation. The loading apparatus

52, as well as the similar apparatus 53 are both in discharging relationship adjacent the side of the conveyor 39.

From the foregoing description it will be apparent that each apparatus under the control of an individual operator may be maintained in loading position until the carrying compartment is filled to the desired extent, and thereafter transported by the same operator into a discharging position. Thus one operator is enabled to effect the operations of loading, moving and discharging. This not only insures efficient operation of such operator, but it insures full time operation of each piece of apparatus. The bottom conveyor 11 of each carrying compartment not only assists in charging such compartment, but also in discharging the same, and the same may be true of the scraper 25 in case it is desired to supplement the rate of discharge as obtainable through the medium of the conveyor 11 alone.

The invention is further characterized by loading equipment of such nature that scraping or dragging of the coal does not result, the coal being bodily lifted and charged into the carrying compartment, and transported by such compartment to the point of discharge. These advantageous features of operation are obtained without the necessity of placing mine laborers in dangerous position to loosen the coal, the loosening being effected by the ram or rams 31 located on either one or both sides of the carrying compartment.

Further advantages of the invention arise from the fact that the time and expense in both material and labor incident to the laying of railroad tracks in rooms and other working places is obviated, as well as the loss of time incident to loading operations as heretofore described.

It will be apparent that while it is possible to continuously operate the conveyor 39 if desired, it is only necessary to intermittently drive the same as required to properly discharge the conveyor or to properly fill the cars 47.

While I have herein illustrated and described a preferred embodiment of the present invention, and have explained the operation thereof as incident more particularly to the handling of coal, it will be apparent that the utility of the invention is not so limited and that changes in the construction and operation of the parts may be made without departing either from the spirit of the invention or the scope of my broader claims.

I claim:

1. Material handling apparatus, comprising a carrying compartment having a movable bottom portion adapted to assist in loading and unloading thereof, scoop means located at all times within said compartment and movable along and in one direction of movement of said bottom portion for charging

material onto and along said bottom, and means for transporting said carrying compartment from loading position to discharging position.

2. A coal loader, comprising a compartment having a movable bottom, means for effecting travel of said bottom in either direction, a swinging scoop adjacent one end of said compartment for charging coal into the same, and a scraper cooperating with said scoop and said bottom for assisting in producing movement of material longitudinally of the compartment.

3. Coal handling apparatus, comprising a carrying compartment, a scoop for charging material into said compartment, a plurality of means within said compartment movable in different planes for effecting movement of the coal therein, one of said means being adapted to form a partial closure for one end of said compartment, and means for individually and simultaneously operating said means.

4. Coal handling apparatus, comprising a carrying compartment, tractor belts for supporting said compartment, means for driving said belts to transport the compartment from place to place, means for charging coal into said compartment and discharging the same therefrom, a combined tail gate and operator's platform cooperating with one end of the compartment, and means for swinging said tail gate and platform to inoperative position adjacent the upper edge of said compartment to permit the contents of said compartment to be discharged therefrom below said tail gate.

5. Coal handling apparatus, comprising a compartment having a movable bottom, and scoop and scraper mechanisms for charging material into said compartment.

6. Coal handling apparatus, comprising a compartment having a movable bottom, a scraper mechanism for moving material in said compartment along said bottom, and a scoop pivoted adjacent one end of said compartment for loading material onto said bottom and into the compartment.

7. Coal handling apparatus, comprising a compartment having a tail gate pivoted adjacent the upper edge of the compartment at one end thereof, a scoop pivoted adjacent the bottom of the compartment at the opposite end thereof, and means movable from end to end of said compartment for moving material from said scoop through said gate, said compartment having a movable bottom cooperating with said means.

In testimony whereof I have hereunto set my hand.

EDWARD C. FITZ SIMONS.