Nov. 13, 1945. J. F. LONGHWAY 2,389,068

DISPENSING APPARATUS

Filed Dec. 29, 1943 5 Sheets-Sheet 1

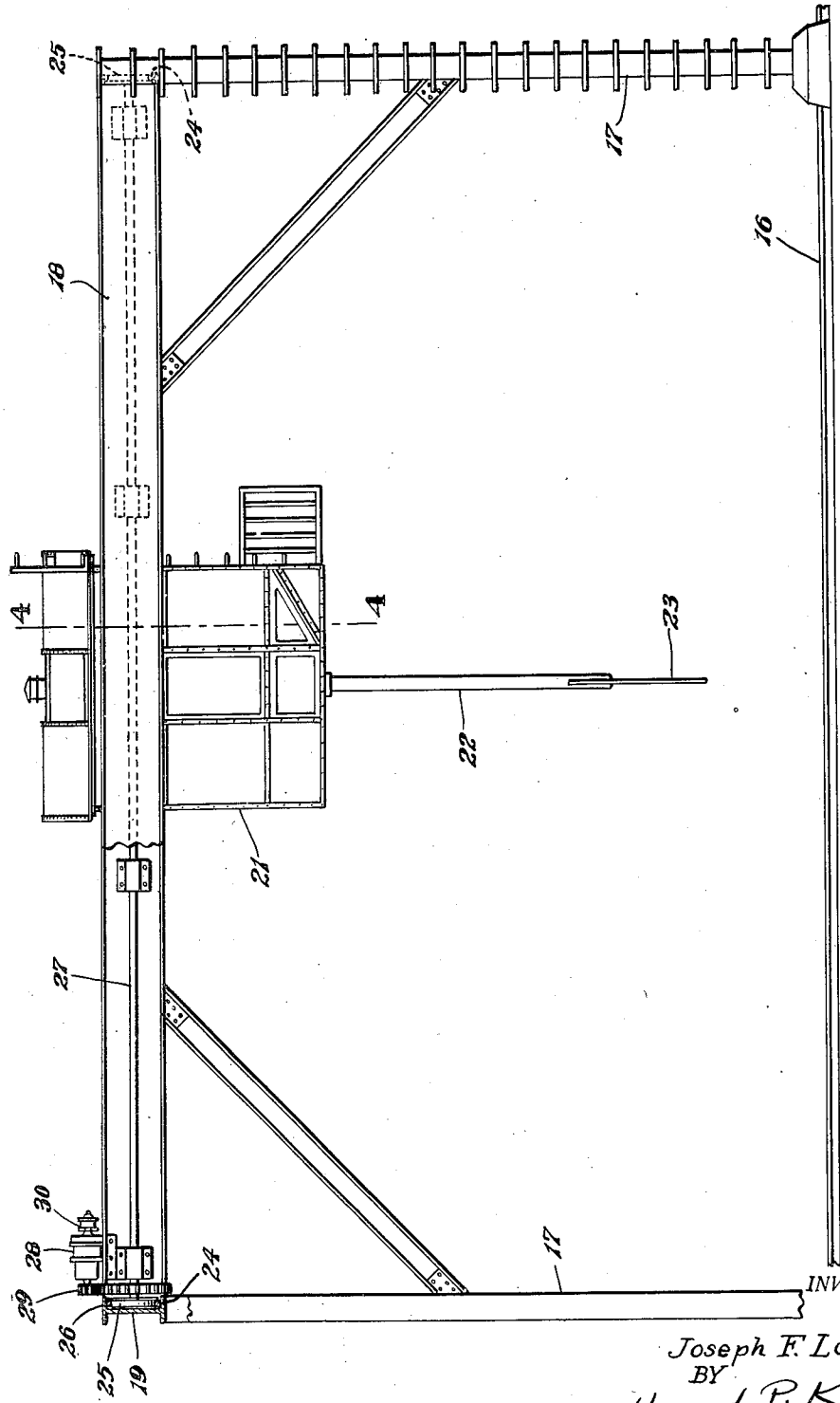


Fig. 1.

INVENTOR:

Joseph F. Longhway

BY

Howard P. King

ATTORNEY.

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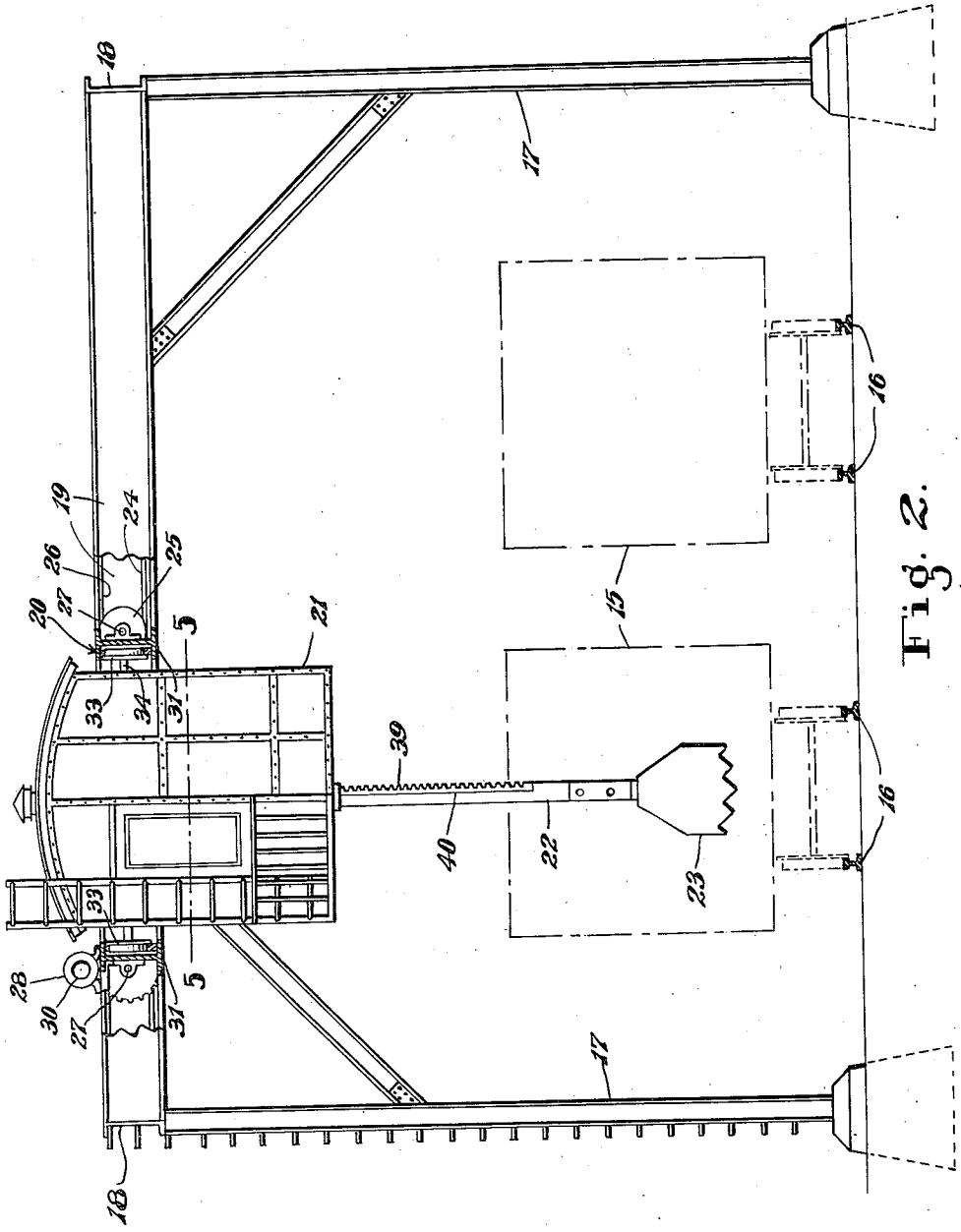


Fig. 2.

INVENTOR.
Joseph F Longhway
BY
Howard P. King
ATTORNEY.

Nov. 13, 1945. J. F. LONGHWAY 2,389,068

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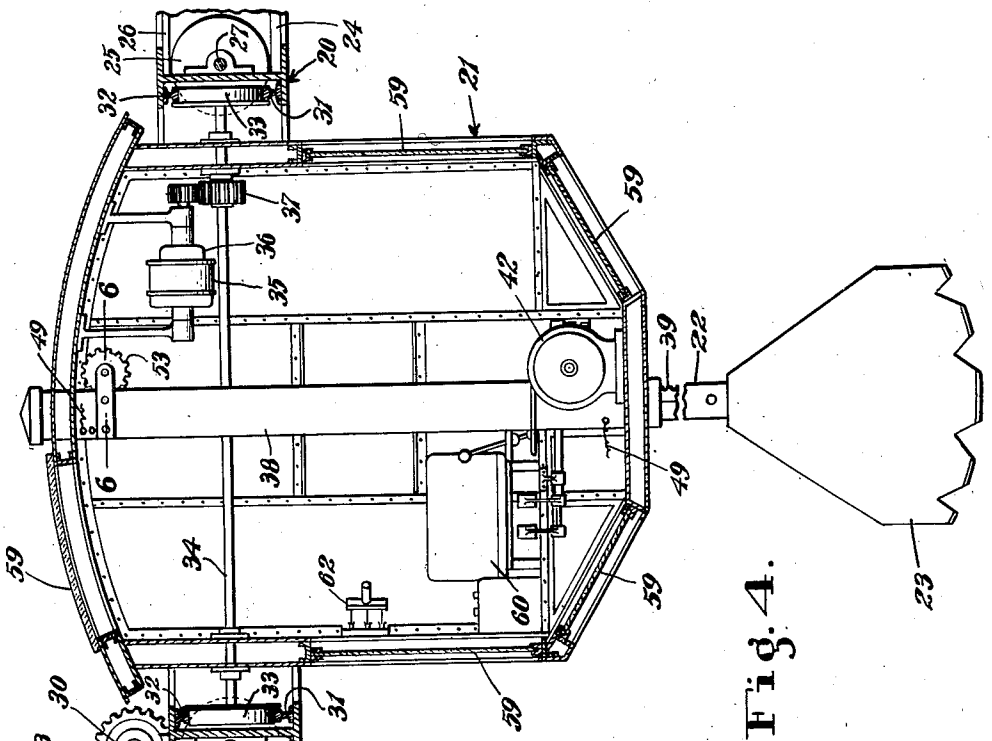


Fig. 4.

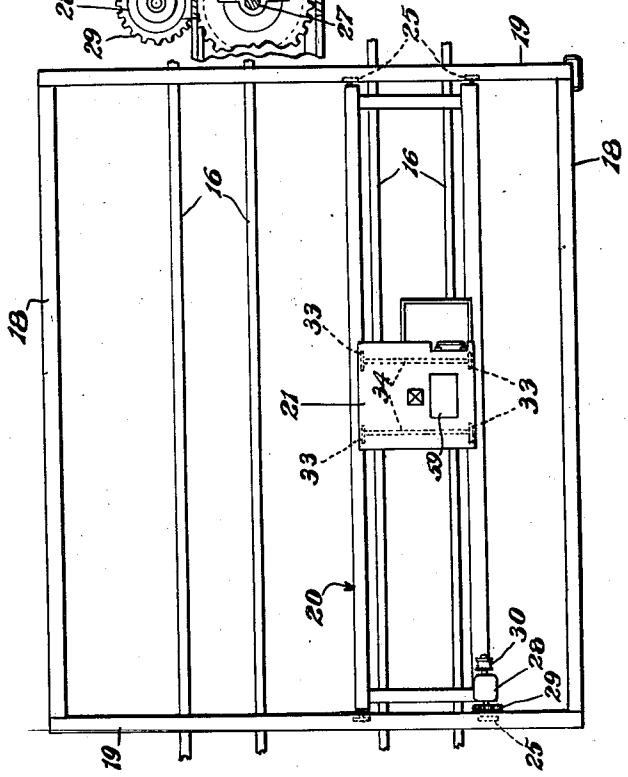


Fig. 3.

INVENTOR.
Joseph F. Longhway
BY
Howard P. King
ATTORNEY.

Nov. 13, 1945. J. F. LONGHWAY 2,389,068

DISPENSING APPARATUS

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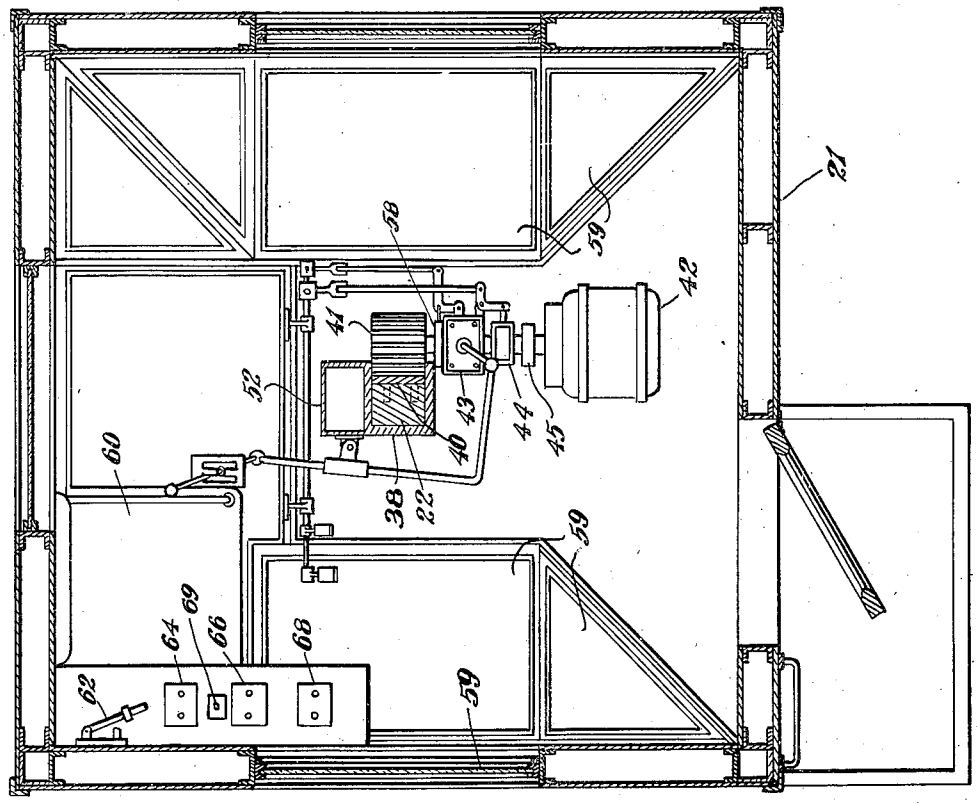


Fig. 5.

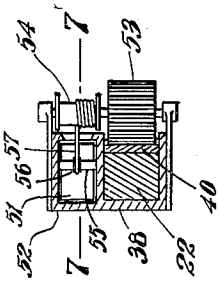


Fig. 6.

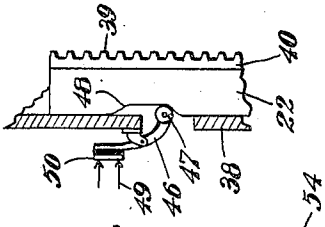


Fig. 8.

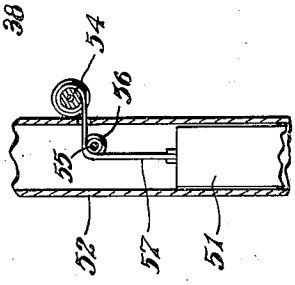


Fig. 7.

INVENTOR.
Joseph F Longhway
BY
Howard P. King
ATTORNEY.

Nov. 13, 1945. J. F. LONGHWAY 2,389,068

DISPENSING APPARATUS

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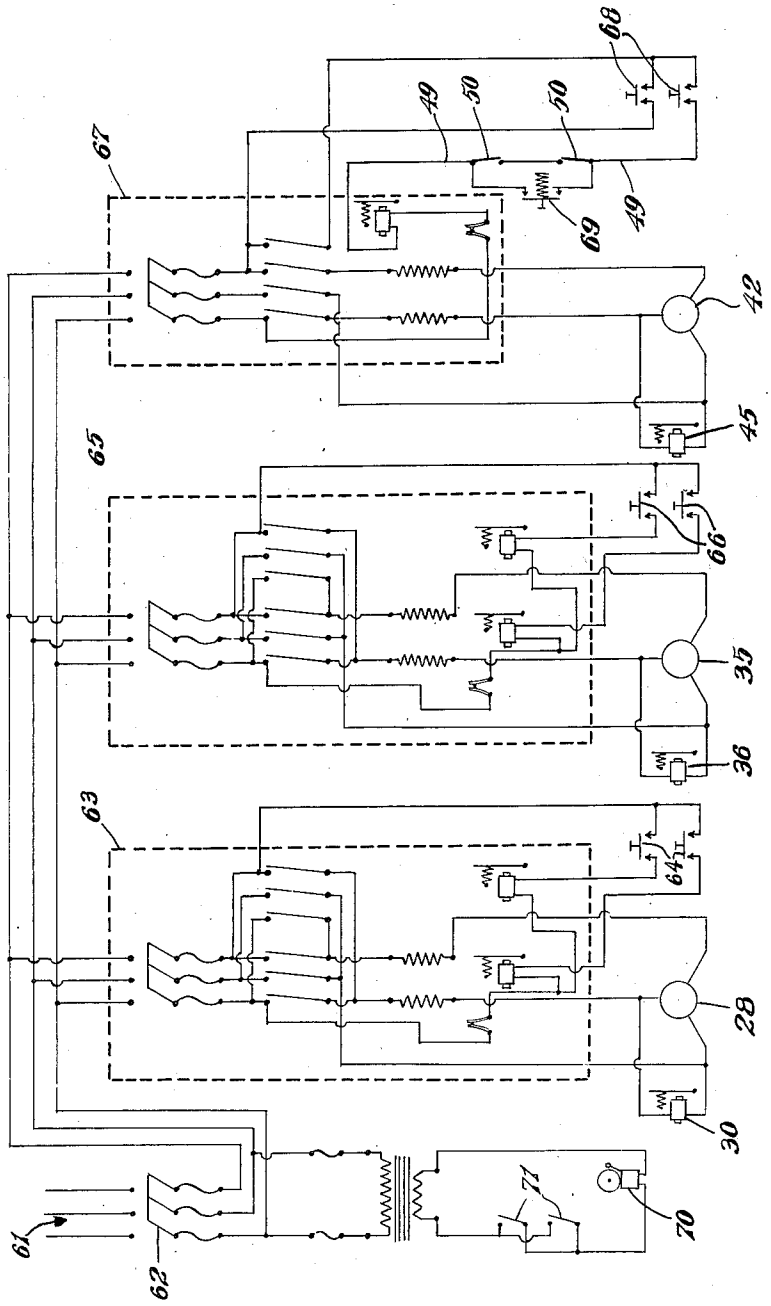


Fig. 9.

INVENTOR:
Joseph F. Longhway
BY
Howard P. King
ATTORNEY.

Patented Nov. 13, 1945

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UNITED STATES PATENT OFFICE

2,389,068

DISPENSING APPARATUS

Joseph F. Longhway, Oswego, N. Y.

Application December 29, 1943, Serial No. 516,101

4 Claims. (Cl. 262—13)

This invention relates to coal dispensers, and more particularly to dispensing of coal from hopper railroad cars through the bottoms of the cars.

Transportation and delivery of coal in railroad hopper cars is now the most prevalent mode of handling that commodity by rail. When the loaded car reaches its destination the coal is intended to be discharged through the bottom of the car upon opening the hopper gate. However, from various causes, of which wet and freezing weather may be mentioned as examples, the coal becomes packed or crusty to such extent that it forms an arch that will hold other coal as well as that which forms the arch, from movement toward and from the hopper. Furthermore, in winter the coal freezes more or less throughout the car and resists the anticipated gravitation to the outlet of the hopper. Common, but dangerous practice, has been to have workmen mount the cars and coal to use crow-bars and pneumatic drills on the top of the coal over the hoppers until the coal loosens and slides, often carrying the workmen down with the coal. Such process, aside from its danger, is slow, tedious and expensive, and unnecessarily delays the coal-transfer operation and ties up the railroad rolling stock for longer periods than desired.

According to the present invention, an object of the same is to relieve workmen from the dangerous and tedious labor heretofore required in unloading coal from hopper cars.

A further object of the invention is to avoid necessity for workmen to enter upon the coal in hopper cars after the hopper is opened.

More specifically an object of the invention is to provide mechanical means which may be employed both for breaking the coal jam or crust and for shifting coal in quantity within the car toward the hopper.

Yet another object of the invention is to provide means operable upon coal in one car while another car is being brought to position for immediate operation on the coal therein when the job has been completed with respect to the first car.

Furthermore, an object of the invention is to provide an apparatus having versatility of movement and yet capable of being held stationary and resist adverse forces.

Still further objects of the invention will be apparent as the description progresses, both by direct recitation thereof and by implication from the context.

Referring to the accompanying drawings in which like numerals of reference indicate the same parts throughout the several views:

Figure 1 is a side elevation of a coal dispenser constructed in accordance with the present invention;

Figure 2 is an end view of the same;

Figure 3 is a plan on scale reduced from the showing of Figs. 1 and 2;

Figure 4 is a sectional view on line 4—4 of Fig. 1;

Figure 5 is a sectional view on line 5—5 of Fig. 2;

Figure 6 is a sectional view on line 6—6 of Fig. 4;

Figure 7 is a sectional view on line 7—7 of Fig. 6;

Figure 8 is a detail sectional elevation of automatic cut-off or stopping switch for the plunger; and

Figure 9 is a general wiring diagram for the apparatus.

In the specific embodiment of the invention illustrated in said drawings, the reference numeral 15 designates conventional railroad dumping or hopper cars on railroad trackage 16, it being the desire to loosen the contents, such as coal, stone, sand or other material, in such cars and cause that material to gravitate to desired place of discharge. Spanning the railroad trackage, I prefer to erect a steel frame structure here shown as having four corner posts or pillars 17 in quadrangular disposition connected at their upper ends by horizontally disposed side header beams 18 longitudinally parallel to the railroad tracks, well above the same, and by end header beams 19 transversely situated with respect to said railroad trackage and likewise well above the same on said pillars. A carriage 20 is movably carried by the end header beams 19. Said carriage is horizontally rectangular and of open-frame character in turn supporting a cab 21 which may be propelled longitudinally thereof from end to end of the carriage and consequently from end to end of the fixed frame structure and in a direction longitudinally of the railroad trackage. While the railroad has been shown arranged for two cars side by side, with the frame structure spanning the double trackage of the railroad system, it is within the scope of the invention to employ as many tracks as desired and utilize an appropriate span of the frame structure to comply with the choice. By virtue of the mounting of the carriage movably on the end header beams, the carriage may be shifted to overlie cars on either of the railroad tracks. Likewise by movable support of the cab on the carriage, said cab may be

moved over any part of the length of the cars under the carriage.

Carried by the cab is a vertically movable plunger **22** which may be raised above the cars and their contents or may be lowered vertically into the cars as far as desired, the bottom of the plunger having a spade or other tool **23** affixed thereto for digging into the contents of the cars. By the general arrangement above described, three dimensional movement for the spade or tool is provided, enabling the same to be manipulated by an operator vertically and in horizontal directions longitudinal of or transverse to the cars, or combinations of those directions, so that the coal or other contents may be attacked where desired and moved or pushed in any desired direction within the car.

Describing the apparatus more in detail, it will be observed that the end header beams are shown with horizontally disposed flanges, the beams shown being I-beams with the inside lower flanges having rails **24** thereon, on which ride flanged wheels **25** carried by the carriage. Other rails **26** are carried on the under side of the upper inside flanges of the I-beams to hold the wheels from being lifted from the lower rails on which they ride. Said wheels are preferably near the end corners of the carriage and are connected in axially alined pairs by shafts **27** on which they are fixed thereby necessitating wheels at opposite ends of the shafts to both be rotated when the attached shaft rotates. One of these shafts **27** is driven by a motor **28** and train of gearing **29**, the motor being reversible and under control of the operator in the cab. The motor furthermore is preferably equipped with a solenoid brake **30** that the carriage may be stopped and held at desired position.

As indicated above, the carriage is horizontally rectangular, and is of frame formation utilizing I-beams for the purpose, the parallel longest pair of which, for convenience called the side frame members, provide lower rails **31** thereon for rolling support of the aforementioned cab. The wheels may be prevented from materially lifting from the lower rails by overlying upper rails **32**, said lower and upper rails **31**, **32** being carried by the inside lower and upper flanges of the I-beams. Wheels **33** connected in opposite axially alined pairs by mounting on shafts **34**, support the cab which has appropriate bearings for said shafts. One at least of said shafts is driven by a reversible electric motor **35** having a solenoid brake **36** and under control of the operator in the cab. Said motor is shown situated in the cab, being hung on brackets from the roof of the cab, and in driving connection with one shaft **34** by intervening gearing **37**.

Said vertically movable plunger **22** is preferably housed at the part thereof within the cab, in a guideway **38** which extends from floor to roof of the cab, with suitable bearings included as will be understood to obtain free sliding of the plunger. One face of said plunger is provided with rack-teeth **39**, which, for convenience of construction and replacement are formed in a rack **40** secured removably on the plunger. The plunger rack-teeth are shown engaged at an appropriate part of the length of the plunger by a pinion **41** representative of a gear train from an operating or driving motor **42**. Specifically said motor is shown inside the cab on the floor thereof, and intervening between the motor and pinion is a gear-box **43** and clutch **44**. The motor may accordingly be a one-way or non-reversing motor and by manipulation of controls handy to the operator, the clutch and gears, similar to and capable of similar control as in automobiles, may be manipulated to drive the plunger up or down at the will of the operator with the motor rotating continuously.

However, to automatically prevent the plunger from exceeding the maximum stroke in either direction, automatic means are provided to stop the same at limiting stroke positions. This means as shown includes a switch at top and bottom maximum stroke positions in series with the plunger motor to shut off the current to the motor at those positions, and also includes a solenoid brake **45** in the drive between the motor and pinion for stopping rotation thereof and to hold the plunger at the position where stopped as long as the pinion and motor are connected through the clutch and gear-box.

The automatic switch may assume any desired form, one of which is illustrated in Figure 8. According to that showing, a pivoted arm **46** carrying a roller **47** in engagement with one face of the plunger is permitted to swing into a recess **48** in the plunger at limiting position of the plunger. Such swinging of the arm breaks electrical circuit **49** to the motor by opening contacts **50**. In this instance as in previous mention of use of solenoid brakes, discontinuance of the current to drive the motor results in the solenoid brake applying its braking force to stop the motor and its connected driven instrumentality. Breaking circuit **49** by opening contacts **50**, accordingly both discontinues driving power to the motor and causes the braking moment to be applied by the solenoid brake.

Preferably the construction is such that the plunger will tend to drift to its upward position when not otherwise held. To accomplish this desideratum, an overbalancing counterbalance or weight **51** is connected to the plunger. This weight is shown housed in a vertical guideway **52** juxtaposed next the plunger guideway. At a top part of the housing constituting said guideways is provided a pinion **53** in mesh with teeth **39** of rack **40** and fast with respect to a drum or winch **54**. Across the weight guideway, parallel to said drum, is an axle **55** on which is rotatably and slidably mounted an idler pulley **56** which can therefore follow the position of the flexible member or cable **57** passing thereover and extending from the drum to the weight. As the plunger descends, the cable **57** is wound upon the drum and lifts the weight which accordingly exerts a constant and even lifting force to the plunger. The operator may stop the upward drift or movement of the plunger whenever desired by application of a foot brake **58** provided for the purpose between the motor **42** and pinion **41** operated thereby.

The cab is shown as having suitable transparent windows **59** therein at appropriate parts thereof, for instance, in the floor of the cab, that the operator may observe the cars and plunger tool beneath the cab for enabling the operator to have full observation of position and operation of all parts of the mechanism. The cab is equipped with a seat **60** and conveniently located switches and mechanical control levers and pedals for the several instrumentalities described and by which he maintains full control of all moving parts. The tool on the plunger is preferably removable therefrom for replacement as desired, the tool shown having a flaring flat vertical surface for pushing the coal or other contents of

the cars, and having a pronged lower edge for enabling the tool to imbed in the coal and break clots or other crusty or tenacious formations requiring disintegration.

That the showing may not be held inadequate, and as illustrative of one possible and practical wiring of the connections to control and supply current to the several electrical devices described, Figure 9 has been included as a wiring diagram. Polyphase current is derived from a line 61 on closing switch 62. For the reversible three-phase carriage motor 28, the diagrammatic showing within the heavy dotted oblong 63 is the usual representation of A. C. magnetic starter with thermal overload protection and self contained fuse with reversing arrangement. The showing of push buttons 64 is illustrative of means by which the operator controls direction and starting of the carriage motor. Similarly for the three-phase reversible cab motor 35 the diagrammatic showing within the heavy dotted oblong 65 is the representation of A. C. magnetic starter with thermal overload protection and self contained fuse with reversing arrangement for that motor. The showing of push buttons 66 is illustrative of means by which the operator controls direction and starting of the cab motor. The plunger motor 42 is indicated diagrammatically as three-phase non-reversing, and the diagram within the heavy dotted oblong 67 is the usual representation of A. C. starter with thermal overload protection for the motor. Push buttons 68 indicate means by which the operator controls starting. The automatic limiting switches 50, 50 are shown in the diagram, and shunted around them is a spring-loaded switch 69 by which the operator may re-start the plunger motor 42 even though one of the limiting switches may otherwise break the circuit. At the other end of the diagram of Fig. 9, is shown a warning bell 70 and two switches 71 indicative of switches which may be closed when one of the mechanisms, such as plunger, cab or carriage, approaches its limiting position, and thereby sound a warning.

I claim:

1. An apparatus of the character described, comprising a cab suspended with permissible movement in horizontal directions, a plunger carried from said cab and vertically movable therein, a motor for operating said plunger said motor being releasable from driving connection with said plunger, and means for actuating said plunger to its upward position on release of the motor from driving connection therewith.

2. An apparatus of the character described, comprising a cab suspended with permissible movement in horizontal directions, a plunger carried from said cab and vertically movable with respect thereto, a motor for driving said plunger, a clutch and reverse gear in the drive between said motor and plunger, and means for actuating said plunger to its upward position on releasing the driving connection from the motor thereto.

3. An apparatus of the character described, comprising a cab suspended with permissible movement in horizontal directions, a plunger carried from said cab and vertically movable with respect thereto, a motor for driving said plunger, and means for stopping the motor and plunger automatically at maximum stroke position of the plunger.

4. An apparatus as characterized, comprising a pair of fixed, parallel and spaced rails, a movable member having wheels on said rails, a cab suspended from the movable member, said cab having a floor and side walls and bearings fixed to the side walls of the cab at an upper part thereof distant from the floor, spaced and parallel shafts extending through said bearings, wheels outside the cab walls and on said shafts, said wheels and shafts supporting the cab with the greater portion of the cab depending below said tracks, said floor having vision openings therethrough, a tool-carrying plunger extending vertically through said floor, mechanism for operating the plunger and for moving said member on said tracks, all moving mechanism other than the depending portion of the plunger and tool being confined to a region above said vision openings whereby an operator in the cab will have constantly unobstructed view of the lower part of the plunger and of the tool during operation thereof.

JOSEPH F. LONGHWAY.