July 28, 1942. W. E. HALE 2,291,387

BULK MATERIAL TRANSPORTING EQUIPMENT

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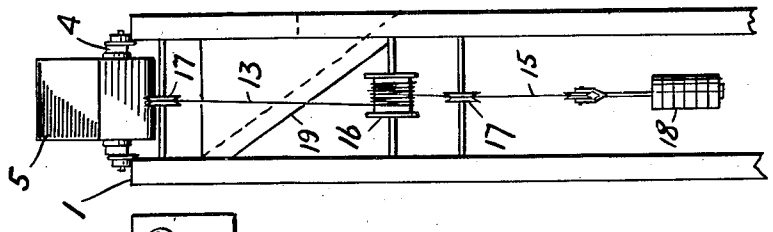


FIG. 2.

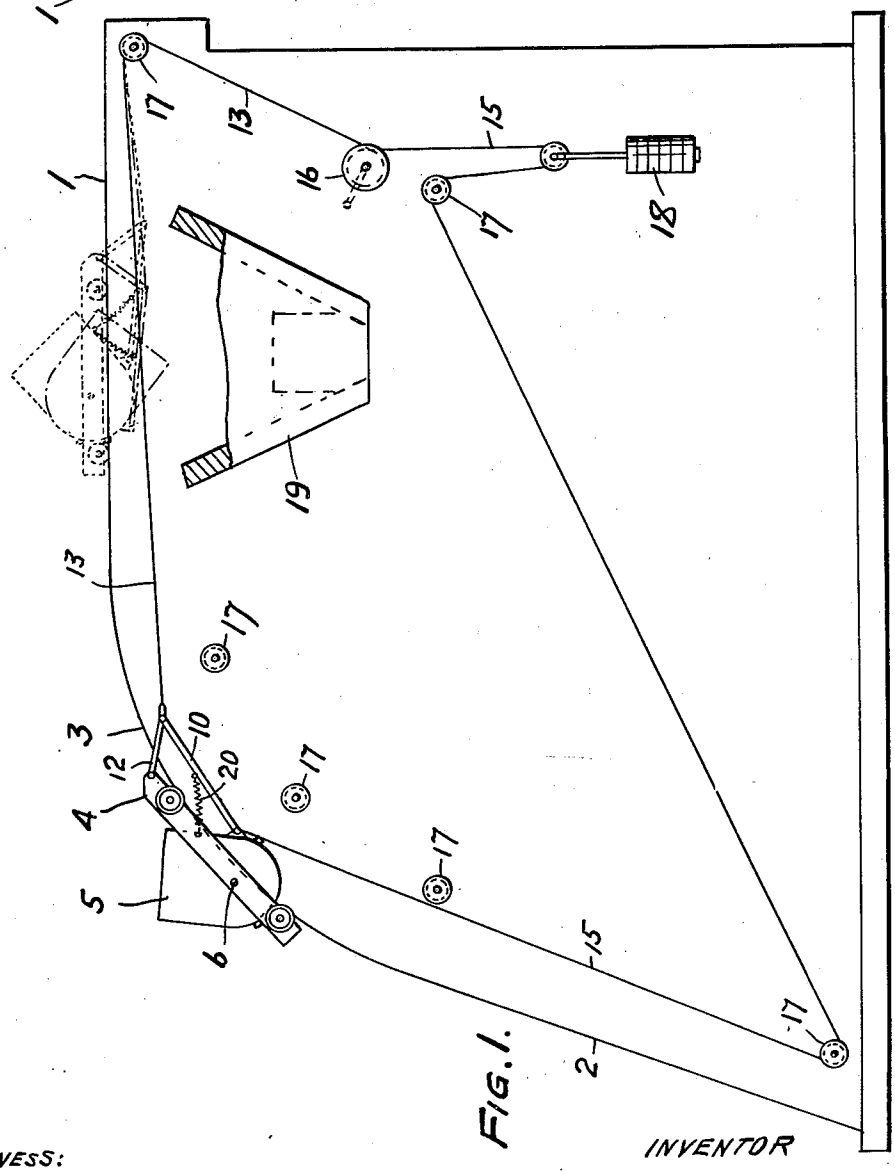


FIG. 1.

WITNESS:

Robt. R. Mitchell.

INVENTOR

William E. Hale

BY

Augustus B. Stoughton.

ATTORNEY.

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FIG. 4.

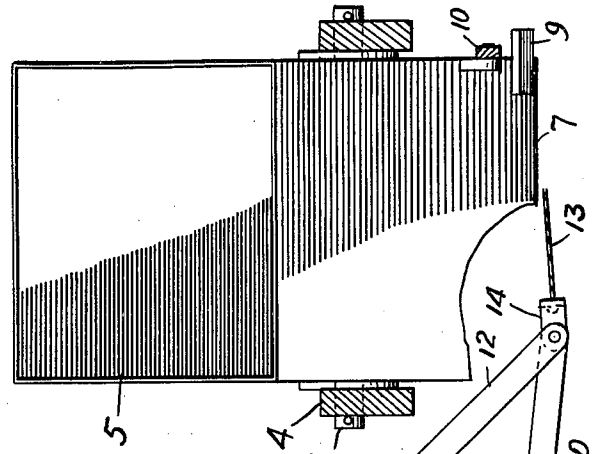
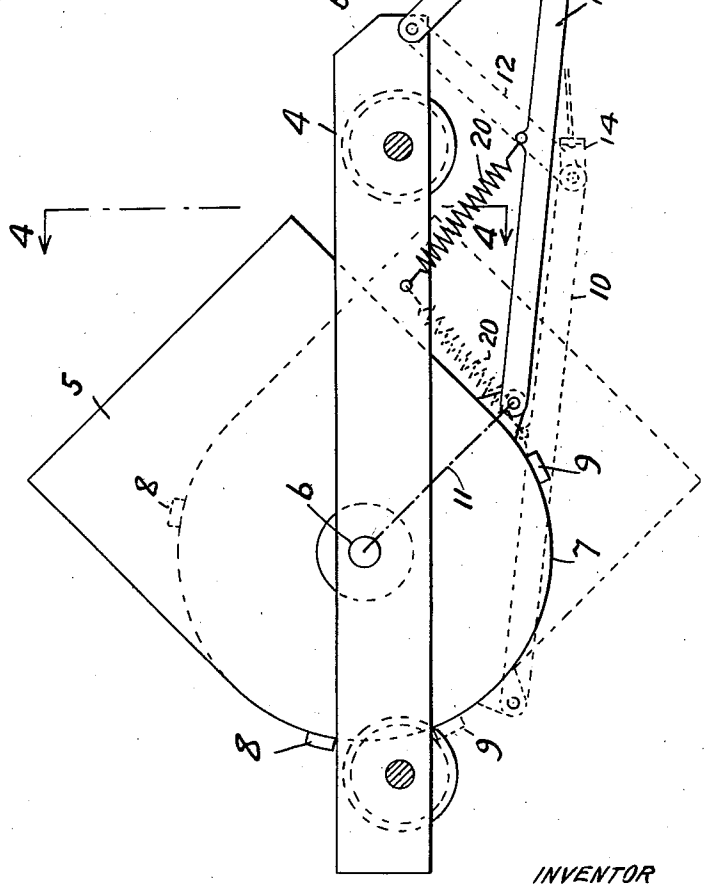


FIG. 3.



WITNESS:

Robt. P. Kitchel

INVENTOR

William E. Hale

BY

Augustus B. Stoughton

ATTORNEY.

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UNITED STATES PATENT OFFICE

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BULK MATERIAL TRANSPORTING EQUIPMENT

William E. Hale, Fort Washington, Pa., assignor to The Beaumont Birch Company, Philadelphia, Pa., a corporation of Pennsylvania

Application February 19, 1941, Serial No. 379,573

4 Claims. (Cl. 214—103)

The principal object of the present invention is to provide equipment for transporting fire hazardous materials on a tramway having a vertical path, an inclined path and a horizontal path and for dumping the same at any point along the horizontal pathway without the use of any impact or frictional discharge contacts which might cause mechanical or electrical sparking or mechanical heat which if it occurred would create hazard.

Another object of the invention is to provide equipment for dumping a tramway car at any point along the horizontal path of a tramway whilst the car is at rest and by the mere reversal of the pull on the forward and reverse reaches of the cable.

Other objects of the invention will appear from the following description at the end of which the invention will be claimed.

Generally stated the invention comprises a wheeled frame adapted to follow the vertical path and the inclined path and the horizontal path of a tramway, an open top container or bucket pivoted to the frame, a parallel motion linkage connected with the frame and with the bucket, a reach of forward draft cable connected to the linkage and moving it forward to position the bucket substantially upright and move it and the frame forward as a unit, and a reach of reverse cable attached to the bucket and moving the linkage backward to dump the bucket and to move the frame and bucket backward as a unit, the backward movement of the linkage providing a dwell in the movement of the frame during which the bucket is dumped at any selected point or points on the horizontal path by the mere reversal of pull on the cables and without the use of impact or frictional discharge contacts which if present might cause mechanical or electrical sparking or mechanical heat.

The invention also comprises the improvements to be presently described and finally claimed.

In the following description reference will be made to the accompanying drawings forming part hereof and in which

Figure 1 is a side view somewhat diagrammatic in character and illustrating material transporting equipment embodying features of the invention.

Figure 2 is an end view of the same.

Figure 3 is a view drawn to an enlarged scale and illustrating the wheeled frame, the open top receptacle or bucket pivoted thereto and one type of parallel motion linkage; and

Figure 4 is a sectional view taken on the line 4—4 of Figure 3.

Referring to the drawings, and more particularly Figure 1, there is a tramway having a horizontal path 1, a substantial vertical path 2 and an inclined path 3 shows as curved. 4 indicates a wheeled frame adapted to follow the path of the tramway. 5 indicates an open top container or bucket pivoted as at 6 to the frame and shown as having an arcuate portion 7 concentric with the pivot 6. In Figure 3 the bucket is shown as in upright position and as provided with stops 8 and 9 which by contact with the frame 4 serve as limit stops for ensuring substantially upright position of the bucket and for limiting its dumping movement. There is a parallel or loss motion linkage or mechanism shown to consist of a draft bar 10 and substantially parallel arms pivotally connected to the draft bar and respectively to the frame and to the bucket as a radius thereof indicated by the dash and dot line 11. The other arm is indicated at 12. There is a reach of forward cable 13 connected to the linkage and more specifically to the draft bar 10. This connection is shown as made by means of a yoke 14 that spans the draft bars. It being understood that the linkage is the same on each side of the bucket.

This cable 13 serves to move the linkage forward into the position shown by full lines in Figure 3 to position the bucket substantially upright and move it and the frame forward as a unit. 15 is a reach of reverse cable and it is attached to the bucket at 16 and cooperates with the arcuate portion 7 thereof and it serves to move the linkage backward into the dotted line position shown in Figure 3 to dump the bucket and to move the frame and bucket backward as a unit. The backward movement of the linkage from the position shown in full lines in Figure 3 to the position shown in dotted lines in Figure 3 provides a dwell in the movement of the frame during which the bucket is dumped at any selected point or points on the horizontal path 1 and this is accomplished without the use of impact or frictional discharge contacts which might cause mechanical or electrical sparking or mechanical heat and by a mere reversal of the pull on the respective reaches of cable. 16 indicates a driven drum onto which the cables 13 and 15 are wound in opposite directions so that pull may be exerted on either of these cables according to the direction in which the drum is turned.

17 are guide pulleys and 18 is a counterweight interposed in the reach of cable 15. 19

indicates a path chute or the like which is horizontal or slightly inclined and extends crosswise of the tramway and illustrates a device for receiving the final delivery of material from the receptacle or bucket.

The described transporting equipment is well adapted to handle material possessed of detonating or explosive properties for the reason that it can be conveyed over the tramway and dumped or delivered at any point along the horizontal portion **1** of the tramway without being subjected or exposed to sparks, heat or the like by the simple operation of reversing the direction of motion of the drum **16**. For the sake of further explanation it may be said that if the wheeled frame and bucket are proceeding toward the right in Figure 1 and the direction of motion of the drum is reversed the result is to permit the wheel frame and bucket to stand still while the pull on the cable **15** shifts the described linkage and dumps the bucket thereafter and, for example, on the curved portion of the tramway the weight of the frame and bucket is referred to the cable **13** and the bucket is returned to upright position.

20 indicates a coiled spring connected to the frame and draft bar and adapted to tend to hold the bucket in either upright or dumped position.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details of construction and arrangement and in matters of mere form without departing from the spirit of the invention which is not limited to such matters or otherwise than the appended claims may require.

I claim:

1. Bulk material transporting equipment comprising in combination a tramway having a vertical or inclined path and a horizontal path, a wheeled frame following the path of the tramway, an open top container or bucket pivoted to the frame and having an arcuate portion concentric with its pivot, a parallel motion linkage consisting of a draft bar and two substantially parallel arms pivotally connected to the draft bar and respectively to the frame and to the bucket as a radius thereof, a reach of forward draft cable connected to the draft bar and moving the linkage forward to position the bucket substantially upright and to move the bucket and the frame forward as a unit, and a reach of reverse cable attached to the bucket and cooperating with the arcuate portion thereof and moving the linkage backward to dump the bucket and move the frame and bucket backward as a unit, the backward movement of the linkage providing a dwell in the movement of the frame during which the bucket is dumped at any selected point or points on the horizontal path.

2. Bulk material transporting equipment comprising in combination a tramway having a vertical or inclined path and a horizontal path, a wheeled frame following the path of the tramway, an open top container or bucket pivoted to the frame, a parallel motion mechanism connected to the frame and to the bucket, a reach of forward draft cable connected to said mechanism and moving it forward to position the bucket substantially upright and move it and the frame forward as a unit, a reach of reverse cable attached to the bucket and moving the linkage backward to dump the bucket and move the frame and bucket backward as a unit, the backward movement of the linkage providing a dwell in the movement of the frame during which the bucket is dumped.

3. Bulk material transporting equipment comprising in combination a wheeled frame, an open top container or bucket pivoted to the frame, a parallel motion linkage mechanism interposed between the frame and bucket, a reach of forward and a reach of backward cable respectively connected to the ends of the linkage mechanism and means for reversing the pull on the cables, during which said linkage mechanism moves backward dumping the bucket while the frame remains at rest.

4. Bulk material transporting equipment comprising, in combination, a wheeled frame, an open top container or bucket pivoted to the frame and having a bottom generally arcuate in form and disposed substantially concentric with the pivot and having on each side stops located below the pivot and adapted to contact with the frame and respectively to position the bucket in upright and in dumping positions, a single reach of forward cable attached to the bucket below the pivot and when pulled adapted to position the bucket upright with one of its stops in contact with the frame and to pull the frame and bucket forward, and a single reach of reverse cable attached to the bucket below the pivot, and when first pulled adapted to dump the bucket without substantial movement of the frame and thereafter to engage the other bucket stop with the frame and pull the frame and bucket backwards.

WILLIAM E. HALE.