Dec. 1, 1925. 1,563,486

N. L. HELY

DUMPING HOIST

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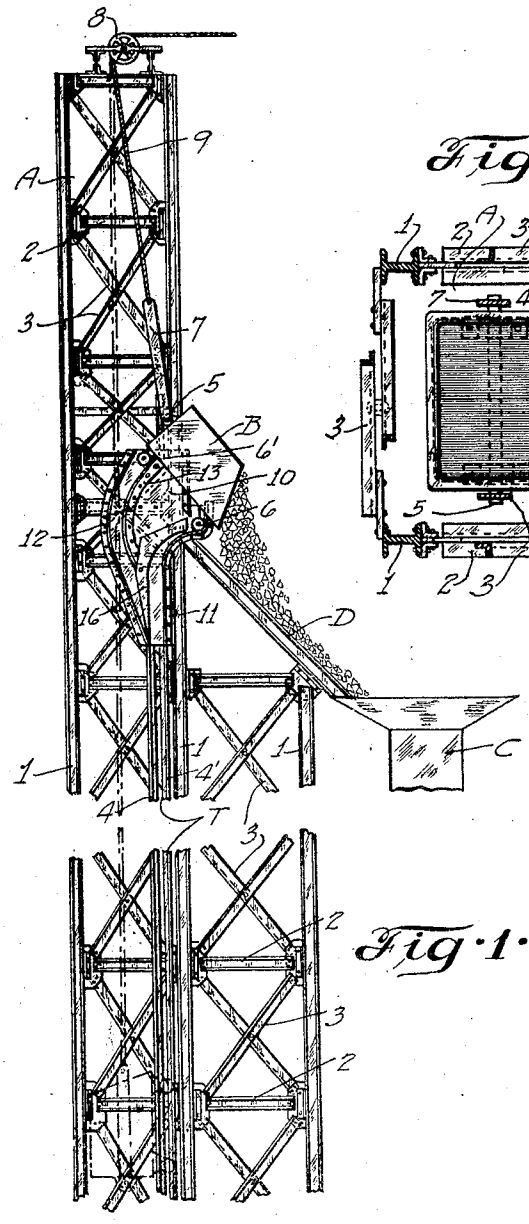


Fig. 1.

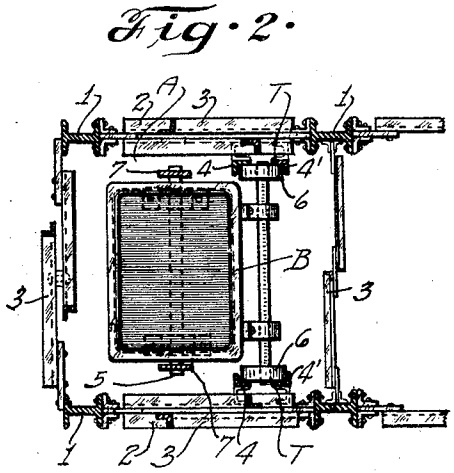


Fig. 2.

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Fig. 3.

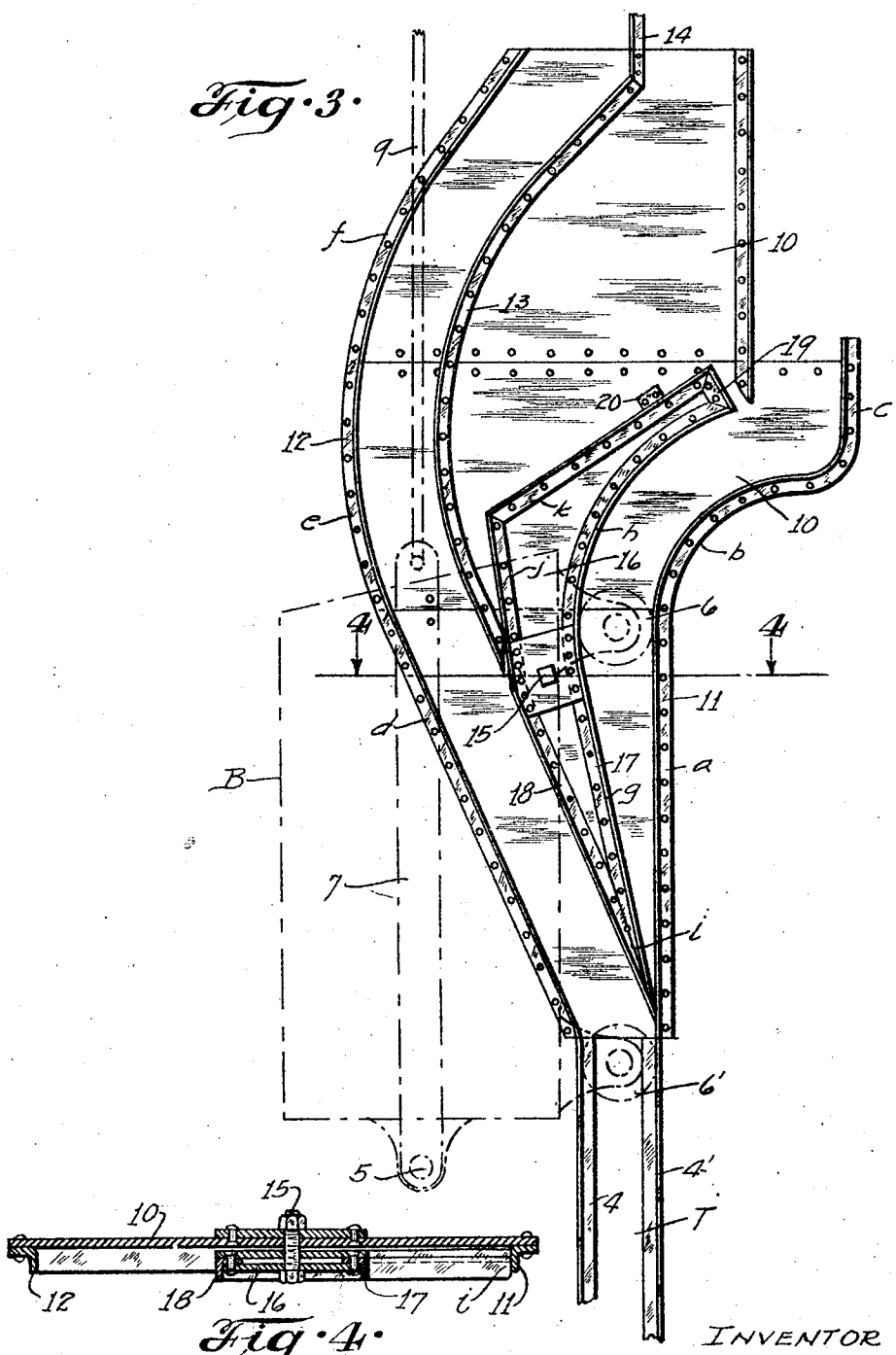






Fig. 4.

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Patented Dec. 1, 1925. 1,563,486

# UNITED STATES PATENT OFFICE.

NORMAN L. HELY, OF CAPE GIRARDEAU, MISSOURI.

## DUMPING HOIST.

Application filed September 29, 1924. Serial No. 740,531.

*To all whom it may concern:*

Be it known that I, NORMAN L. HELY, a citizen of the United States, residing at Cape Girardeau, county of Cape Girardeau, and State of Missouri, have invented a certain new and useful Improvement in Dumping Hoists, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates generally to hoisting apparatus and, more particularly, to a certain new and useful improvement in a type of hoisting apparatus that I may descriptively designate as a dumping-hoist.

My invention has for its chief object the provision of a dumping apparatus or hoist including a traveling bucket or car and trackways so constructed and co-operating to efficiently, positively, and automatically effect a dumping tilt of the bucket or car.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts hereinafter described and pointed out in the claims.

In the accompanying drawing,

Figure 1 is a reduced elevational view of a dumping apparatus or hoist constructed in accordance with and embodying my invention, portions of the shaft frame-work being omitted to more clearly show one set of the shaft trackways;

Figure 2 illustrates the hoisting or elevating-shaft and its trackways in transverse section and the hoisting and dumping bucket or car in plan;

Figure 3 is an enlarged fragmental elevational view of one set of the shaft trackways; and

Figure 4 is a detail section taken approximately on the line 4—4, Figure 3.

Referring now more in detail and by reference characters to the accompanying drawings, which illustrate a preferred embodiment of my invention, A designates the hoisting or elevating shaft proper, which, as best seen in Figures 1 and 2, is constructed preferably of suitable structural steel longitudinal or vertical members 1 and lateral or cross members 2 suitably riveted or otherwise rigidly fixed together and preferably re-enforced and braced by lacing-members 3. The shaft frame-work is rested and built upon a suitable foundation, is of suitable height, and is of suitable interior dimensions or cross area to accommodate a hoisting and dumping bucket or car B. Forming substantially a part of the shaft A and leading from the shaft A preferably at a point intermediate its ends to a rock-crusher or the like C, is a chute D. Rigidly fixed to and upon the inner faces of opposite walls of the frame-work of shaft A and disposed vertically in parallel registration are track-ways T each formed of suitably spaced opposed angle-members 4, 4′, as clearly shown in Figure 2, and I may here state that the track-ways T extend vertically within shaft A from a point adjacent its lower end to a point suitably adjacent the chute D.

The bucket or car B is also preferably of rigid steel construction, open at one or its so-called upper or front end, suitably provided at its other or so-called lower or rear end with a cross-shaft 5, and suitably provided upon one side with pairs of front and rear wheels or rollers 6, 6, and 6′ 6′, respectively, all of a diameter to more or less snugly fit for rolling movement upon and between the opposed angles 4, 4′ of the trackways T, as also clearly seen in Figure 2. Pivotally connected at one end to the ends of the bucket shaft 5, are links or bails 7, and reaved upon suitable pulleys or sheaves 8 mounted for rotation upon and at the upper end of the shaft frame-work, fastened at one end to the free ends of the links or bails 7, and suitably fastened at their other end to the drum or drums of a suitable hoisting engine, not shown, are hoisting cables 9. It will be obvious that, as the cables 9 are wound upon or permitted to unwind from the hoisting drum or drums, the bucket or car B will be hoisted or elevated or permitted to drop or descend in the shaft A, the trackways T, in their described engagement with the car rollers or wheels 6, 6′, maintaining the bucket in proper material-carrying position and facilitating smooth travel of the bucket up and down in the shaft A.

Riveted or otherwise rigidly fixed flatwise upon a wall of the shaft frame-work and at the upper end of the fixed trackway T, are plate-sections 10. In Figure 3, one

set of such plate-sections 10, and their associated parts, now to be described, are shown, and it will be understood that a second set of such plates 10 and their associated parts are in opposed relation duplicated and similarly located upon the opposite wall of the shaft A.

Riveted upon and preferably at one margin of the plate-sections 10, is an angle-member 11, which at its inwardly projecting or presented leg or portion forms a fixed continuation of the inwardly presented leg or portion of the angle 4′ of the trackway T. For substantially the greater part of its length, as at *a*, the angle 11 also aligns vertically with the angle 4′; adjacent its upper end, however, the angle 11 is arcuated or rounded, as at *b*, on an arc preferably of approximately 90° and then reversely arcuated and again continued vertically upwardly for a relatively short distance, as at *c*.

Riveted upon and preferably at an opposite margin of the plate-sections 10, is a second angle-member 12, which likewise at its inwardly projecting leg or portion forms a fixed continuation of the inwardly presented leg or portion of the opposed angle 4 of the trackway T. For a part of its length, the angle 12, as at *d*, extends obliquely upwardly from the angle 4 and away from the portion *a* of the angle 11. The angle 12 is then, beginning on a line substantially coincident with the base or lower-end of the arcuated portion *b* of angle 11, gently arcuated first outwardly, as at *e*, and then inwardly, as at *f*, throughout the remainder of its length, the upper end of the angle 12 being located upon the shaft frame-work at some suitable distance vertically above the plane of the upper end of the vertically projecting portion *c* of the angle 11.

13 designates a third angle-member, which is likewise gently arcuated substantially throughout its length in conformity with and corresponding to the curvature of the portions *e* and *f* of the angle 12, and which is also riveted or otherwise fixed upon the plate-sections 10 in suitably spaced and opposed trackway forming co-operation with said portions *e* and *f* of the angle 12 and in spaced or broken relation to the fixed trackway T. Projecting vertically from the upper end of the angle 13, is a relatively short continuation 14, for purposes shortly appearing, and to facilitate dumping and return movements of the car B, more fully hereinafter described, the angles 12 and 13 slightly flare oppositely outwardly at their upper ends only, as shown in Figure 3.

Pivoted intermediate its ends, as at 15, for swinging movement upon and relatively to the fixed plate-sections 10. is a switch plate-section 16 preferably having in elevation the form or configuration best seen in Figure 3.

Fixed upon and at one margin of the plate 16, is an angle 17 opposed to and adapted for trackway forming cooperation with the portions *a* and *b* of the fixed angle 11, the angle 17 similarly comprising a straight portion *g* and an arcuated portion *h*.

Fixed upon and at the opposite margin of the plate 16, is an angle 18 opposed to the portion *d* of fixed angle 12 and adapted in movable or switching continuation of the fixed angle 13 for trackway forming co-operation with said portion *d* of the angle 12. The angles 17 and 18 are disposed obliquely relatively to each other and at their lower ends converge and form the switch-point *i* of the switch-plate or member 16, as clearly seen in Figure 3. Preferably the angle 18 is continued, as at *j* and *k*, around the margin of the plate 16 and connected at its upper end to the upper end of the angle 17 by a cross-angle-piece 19 adapted, as more fully hereinafter appearing, to form a car or bucket stop.

Normally, as under the pull of gravity or other suitable means, the plates 16 occupy the position shown in Figure 1, with their switch-points *i* registering with the angles 4 of the fixed trackways T. As the car B is hoisted, its front pair of wheels 6 first pass from the trackways T and enter the continuation or branch track-ways formed by the opposed angles 11 and 17. As the hoisting of the car B continues, its front wheels 6 engage and roll upon the opposed portions *b* and *h* of the angles 11 and 17, whereupon the switch-plates 16 are automatically swung and their switch-points *i* thrown into registration with the opposite angles 4′ of the trackways T or into the position thereof illustrated in Figure 3, and I may here state that the track-ways and the space or dimension between the pairs of wheels 6 and 6′ of the car B are so relatively proportioned that the switch-points *i* are so thrown on the upward travel of the car approximately when the rear wheels 6′ of the car are about to leave the fixed shaft track-ways T. The switch points *i* being so thrown, the front wheels 6 of the car, on continued upward movement thereof, will travel in the track-ways formed by the portions *b* and *h* of the angles 11 and 17 and the rear wheels 6′ of the car will be shunted to travel in the track-ways formed by the angle 12 and its opposed angles 18 and 13, and in such continued upward travel, the car B, through and by the described formation of the track-ways and the hoisting links 7 and their connection with the cables 9, will be gradually tilted, swung, or upset into the dumping position thereof illustrated in Figure 1 or until further movement of the car is stopped

by the upward continuations *c* and 14 of the angles 11 and 13, respectively. With the car B in such tilted or dumping position, the switch-members 16 automatically swing or return to normal position, carrying their switch-points *i* again into registration with the angles 4 of the fixed trackways T and at the same time disposing the angles 19 immediately behind the bucket front-wheels 6. The car being so tilted and dumped and the cables 9 being now permitted to unwind from their hoisting drums, the rear wheels 6′ of the car B will now first reversely or downwardly travel in the trackway formed by the fixed portions *e* and *f* of the angles 12 and the opposed angles 13, the car at its front wheels 6 being held from movement by the angles 19 shifted or interposed to the rear thereof when the plate 16 is in normal position. The rear wheels 6′ continue to so travel downwardly until they enter the trackways formed by the portions *d* of the angles 12 and the opposed switch-angle 18, whereupon the plates 16 are again automatically swung and their switch points *i* thrown into registration with fixed track-angles 4′, when the front wheels 6 of the car are again free to move downwardly. As the car continues to move or travel downwardly, its front wheels 6 now again enter intermediate the opposed angles 11 and 17, and as the bucket continues to further travel downwardly and when both its pairs of wheels enter the fixed trackways T, the switch-plates 16 automatically return to normal position, with their switch-points *i* in registration with the angles 4 of the trackways T, ready for a second car-dumping operation.

Thus, my new dumping hoist or apparatus is automatic and positive in its action and works hand-in-hand with the load carrying car as the car is hoisted and, in turn, permitted to drop in the shaft. Preferably, stops 20 are fixed on the plate-sections 10 to limit the swinging movement of the plate-sections 16 when actuated by the rear car-wheels 6′ on downward travel of the car.

I am aware that changes in the form, construction, arrangement, and combination of the several parts of my new dumping apparatus may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A dumping-apparatus comprising, in combination, a car, means for effecting travel of the car, and car trackways including shiftable members actuable by the traveling car for effecting a tilting thereof.

2. A dumping-apparatus comprising, in combination with a car and means for effecting travel of the car, car trackways comprising branch sections including shiftable members actuable by the traveling car for effecting a tilting thereof.

3. A dumping-apparatus comprising, in combination with a car and means for effecting travel of the car, car trackways comprising diverging sets of branch sections including shiftable members actuable by the traveling car for effecting a tilting thereof, some of said sections being arcuated relatively to the other sections.

4. A dumping-apparatus comprising, in combination with a car and means for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including a first set of partly straight and partly arcuated branch sections, and a second set of branch sections arcuated to extend both from and towards the first set, and switch-members common for trackway co-operation with both said sets.

5. A dumping apparatus comprising, in combination with a car and means for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including diverging sets of branch sections, some of which are arcuated relatively to the other sections, and switch members common for trackway forming co-operation with said sections and actuable by the traveling car.

6. A dumping apparatus comprising, in combination with a car having pairs of front and rear wheels, and means for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including diverging sets of branch sections, one of which sets is arcuated relatively to the other set, and switch-members common for trackway forming cooperation with said sections and actuable by the wheels of the car.

7. A dumping apparatus comprising, in combination with a car having pairs of front and rear wheels, and means for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including diverging sets of branch sections, one of which sets is arcuated relatively to the other set, and switch-members common for trackway forming co-operation with said sections and actuable by the front wheels of the car as the same travel in one set of said sections for shunting the rear wheels of the car into the arcuated set of said sections.

8. A dumping apparatus comprising, in combination with a car having pairs of front and rear wheels, and means including members having pivoted connection with the car for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including diverging sets of branch sections, one of which sets is arcuated relatively to, and extends to a plane beyond

the plane of the end of, the other set, and switch-members common for trackway forming co-operation with said sections and actuable by the front wheels of the car as the same travel in one set of said sections for shunting the rear wheels of the car into the arcuated set of said sections.

9. A dumping apparatus comprising, in combination with a car having pairs of front and rear wheels, and means including members having pivoted connection with the car for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including fixed parallel sections, a fixed branch set of track-members extending in continuation partly in alignment with and then on an arc at right angles to the fixed sections, a second fixed branch set of track-members extending in continuation partly obliquely to the fixed sections and away from the first branch set and then arcuately first from and then towards and to a plane beyond the plane of the end of the first branch set, and switch-members common for trackway forming co-operation with both said branch sets of track-members and normally in trackway completing relation with said first branch set, said switch-members being actuable by the front wheels of the car as the same travel upon said first branch set for shunting the rear wheels of the car into the other branch set.

10. A dumping apparatus comprising, in combination with a car having pairs of front and rear wheels, and means comprising members having pivoted connection with the car for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including a pair of fixed parallel sections comprising first and second members, a branch set of fixed track-members extending in continuation partly in alignment with and then on an arc relatively to the first members of the fixed sections, a second branch set of fixed track-members extending in continuation partly obliquely from the second members of the fixed sections and away from said first branch set and then arcuately first from and then towards and to a plane beyond the plane of the end of said first branch set, a third branch set of fixed track-members arcuated in conformation and track-forming co-operation with the arcuated portions of the second branch set of track-members and spaced from the first-named fixed track-sections, and switch members common for track-forming co-operation with said three branch sets of track-members, said switch-members being normally in movable registration with the second members of the first-named fixed sections and actuable by the front wheels of the car as the same travel upon the first branch set of track-members for shunting the rear wheels of the car upon the second and third sets of branch sets of track-members.

11. A dumping-hoist including a pair of fixed parallel track-ways each including first and second members, branch trackways each including first members in fixed continuation of the first members of the fixed trackways and second members in fixed continuation of the second members of the fixed trackways, and switches having points normally in registration with the first members of the fixed trackways, in combination with a car, and means for effecting travel of the car, the car having traveling engagement with the switch members for pivotally actuating the same to throw their points alternately into track completing registration with the first and second members of the fixed trackways.

12. A dumping apparatus comprising, in combination with a car having pairs of front and rear wheels, and means for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including diverging sets of branch sections, one of which sets is arcuated relatively to the other set, switch-members common for trackway forming co-operation with said sections and actuable by the wheels of the car, and means for limiting the tilting movement of the car to dumping position.

13. A dumping apparatus comprising, in combination with a car having pairs of front and rear wheels, and means for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including diverging sets of branch sections, one of which sets is arcuated relatively to the other set, and switch-members common for trackway forming co-operation with said sections and actuable by the front wheels of the car as the same travel in one set of said sections for shunting the rear wheels of the car into the arcuated set of said sections, and means carried by the switch-members for preventing reverse travel of the front wheels of the car in advance of reverse travel of the rear wheels thereof.

14. A dumping apparatus comprising, in combination with a car having pairs of front and rear wheels and means for effecting travel of the car, car trackways for effecting a tilting of the traveling car, said trackways including diverging sets of branch sections, one of which sets is arcuated relatively to the other set, and switch-members common for trackway forming co-operation with said sections and actuable by the front wheels of the car as the same travel in one set of said sections for shunting the rear wheels of the car into the arcuated set of said sections, means for limiting the tilting movement of the car to dumping

position, and means carried by the switch-members for preventing reverse travel of the front wheels of the car in advance of reverse travel of the rear wheels thereof.

15. An apparatus comprising, in combination with a car and means for effecting travel of the car, straight trackways for the traveling car, and branch trackways including a switch actuable by the traveling car for effecting a swinging thereof on an angle relatively to the straight trackways.

16. An apparatus comprising, in combination with track-ways, diverging sets of branch track-ways and a switch common to, and adapted for actuation by a traveling car for trackway forming co-operation with, both branch trackways.

17. An apparatus comprising, in combination with track-ways, diverging sets of partly arcuated branch track-ways including a switch common to the branch track-ways and actuable by a traveling car for track-way completing co-operation with, both branch trackways.

In testimony whereof, I have signed my name to this specification.

NORMAN L. HELY.