June 17, 1947. P. ANDERSON 2,422,283

SELF-RIGHTING DUMP CAR

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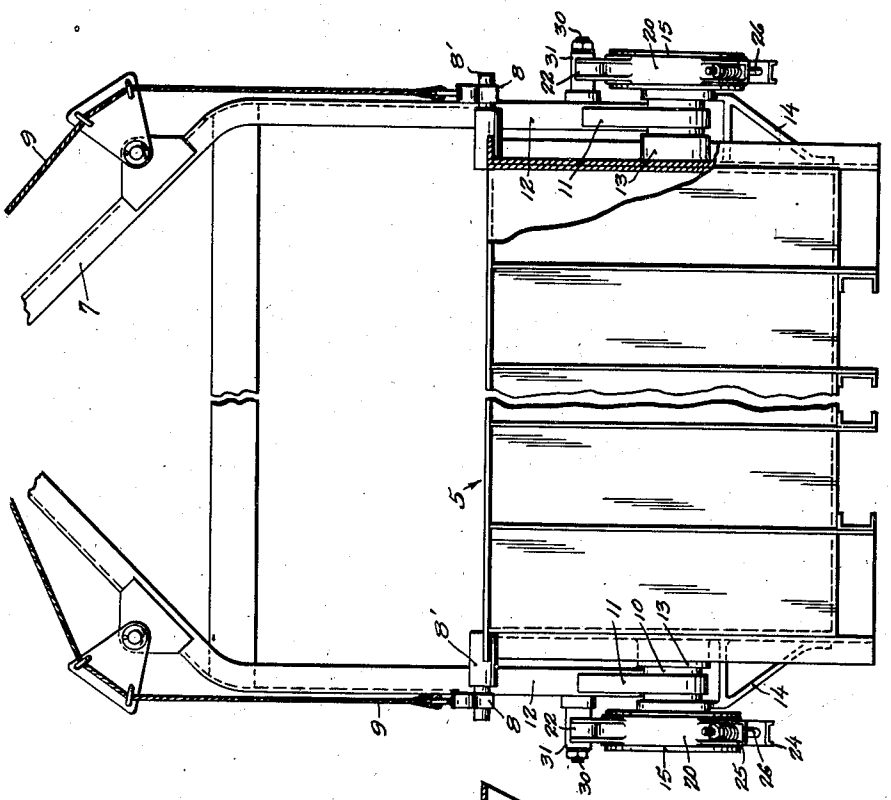


Fig. 2.

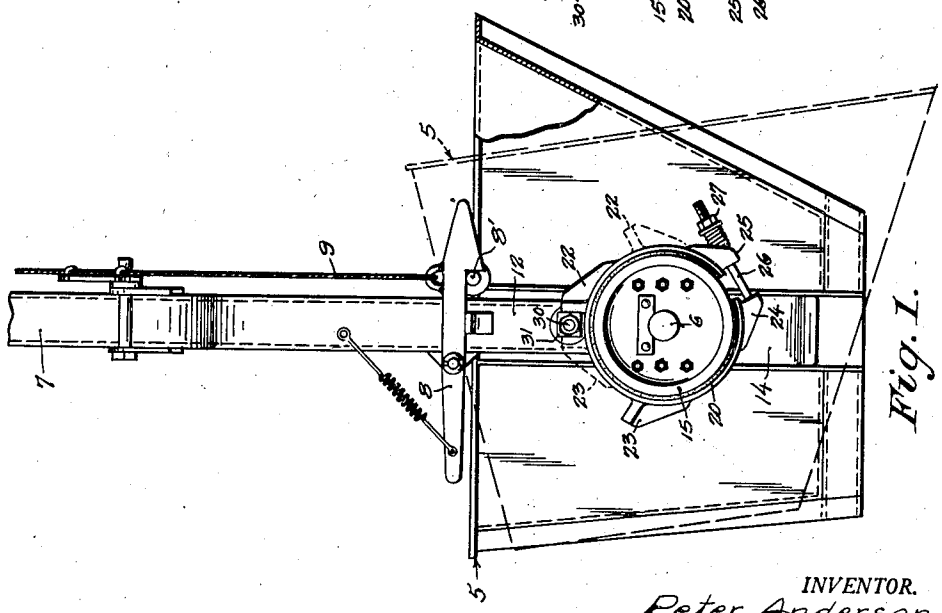


Fig. 1.

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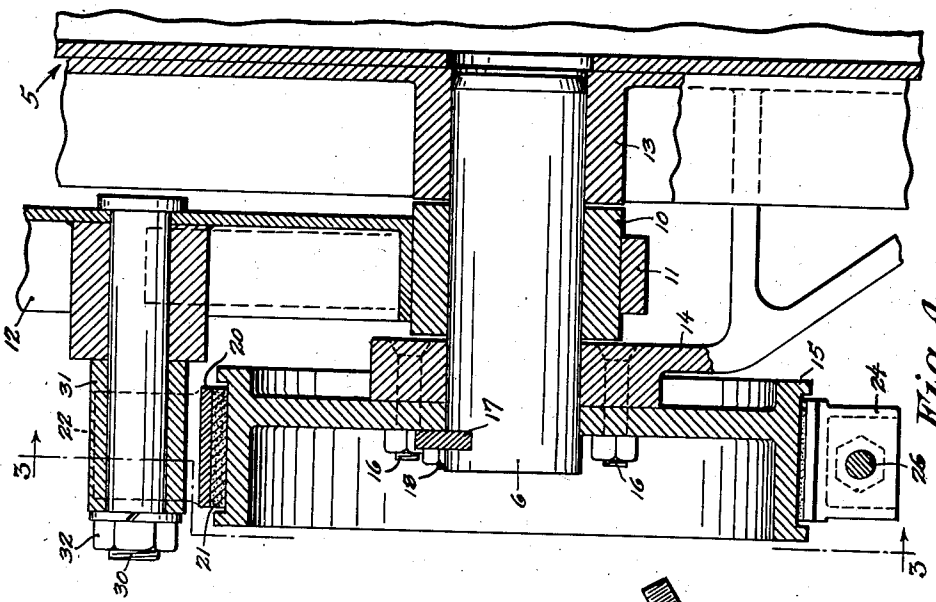


Fig. 4.

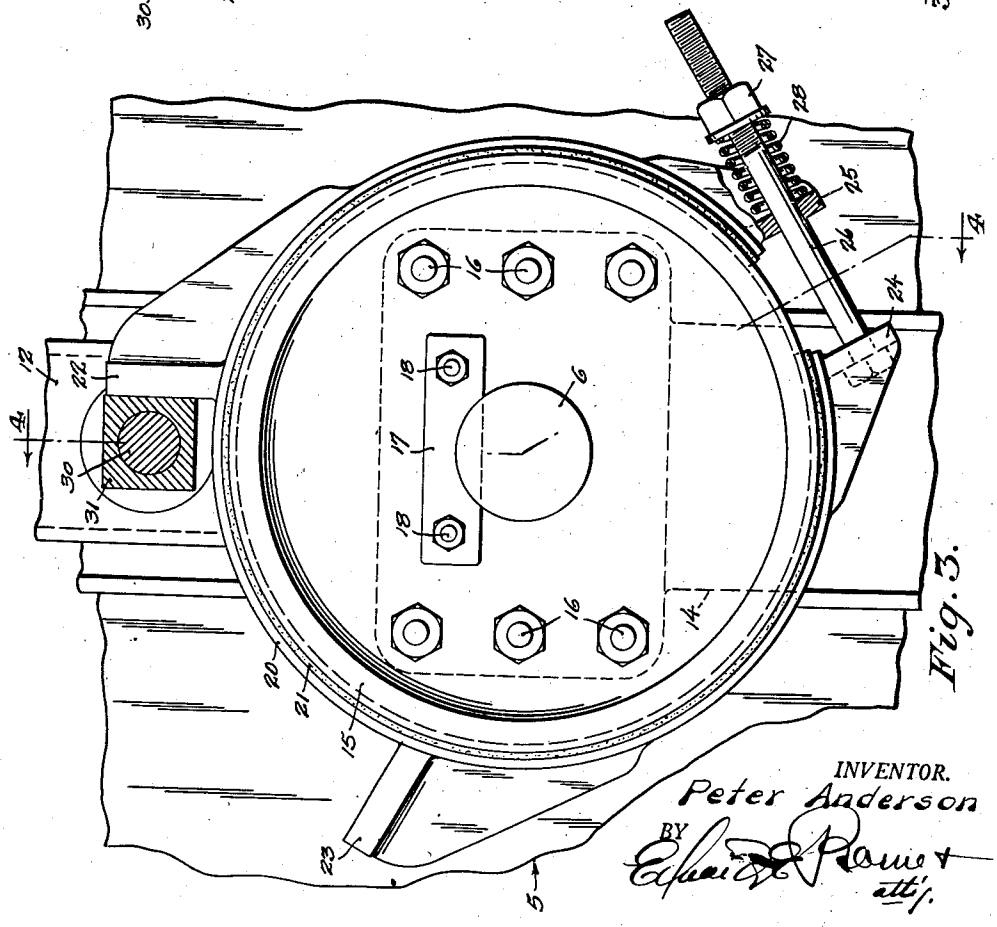


Fig. 3.

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SELF-RIGHTING DUMP CAR

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Application July 3, 1944, Serial No. 543,261

5 Claims. (Cl. 294—73)

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This invention relates to self-righting dump-cars, namely that character of car employing a swivel-mounted load-receiving body so designed as, when empty, to place the weight center in rearwardly offset relation to the swivel axis and, when loaded, to shift this weight center forwardly to the opposite side of the swivel axis, thus to cause the load-carrying body—when released from a normal righted position—to swing into a dump position and, following discharge of the load, to perform a return swing causing the body to right itself.

It is to be understood, and clarity in an understanding of the present invention will be advanced thereby, that there is a very appreciable impact force as the dump car, picking up momentum in the course of its righting swing, is brought into contact with the limit-stop customarily employed with self-righting dump-cars. This jarring impact causes considerable breakage and the cost of replacing damaged parts runs to a quite considerable figure. Aside from cost, the time loss incident to making repairs is a matter of considerable moment. The primary aim of the present invention is to devise simple and efficient means for obviating the said "clanging" jar as the dump-bucket reaches the limit-stop and, in the accomplishment thereof, the invention consists in the application to self-righting dump-cars of mechanism arranged to act momentarily in advance of the limit of swing-travel to subject the car to a retarding influence effective to rapidly decelerate the travelling speed.

The invention further consists in the novel construction and in the adaptation and combination of parts hereinafter described and claimed.

In the accompanying drawings:

Figure 1 is a view in side elevation illustrating a dump car embodying braking mechanism constructed in accordance with the present invention. The car which I have elected to illustrate is of that type used in aerial tramway systems, and full and dotted lines are employed to indicate the swingably mounted body in its loading and dumping positions, respectively.

Fig. 2 is a front elevational view thereof.

Fig. 3 is a fragmentary side elevational view taken to an enlarged scale to detail the brake structure and being partly in section as indicated by jogged line 3—3 of Fig. 4; and

Fig. 4 is a fragmentary transverse vertical section on jogged line 4—4 of Fig. 3.

Describing the car as it is shown in the drawings and which excludes the track-forming cables and the carriage running thereon, the numeral 5

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denotes a skip or bucket of ordinary design swivel-mounted by hinge-pins 6 from a bail-hanger 7. The skip embodies the usual sloping front wall facilitating the discharge of the contents and accomplishing a proper placing of the weight center—empty and loaded—at opposite sides of the hinge axis, and there is provided the customary hook-latch 8 actuated by trip-cords 9 and normally locking the skip in loading position.

The said hinge-pins receive their bearing in journal-bushings 10, with the bushings being made fast by U-straps 11 welded or otherwise fixedly secured to the lower ends of legs 12 of the bail, and the suspension, as respects the skip, is one in which the inner end of the hinge-pin fits a hub 13 while the outer end projects through and beyond an outrigger-stand 14 weld-joined by its foot to the skip.

According to the present invention there is provided at each side of the skip a brake drum 15 which, as indicated, slips over the exposed end of the hinge-pin to lie concentric thereto, and making this drum secure to the stand 14 and hence connecting the same for unitary movement with the skip are bolts 16. Indicated by 17 is a keeper bar bolted as at 18 to the drum and engaging the hinge-pin to hold the latter against end play.

A brake strap 20 carrying the usual friction lining 21 is applied to the drum, and presented upon the back side of this brake band and anchored thereto to lie in circumferentially spaced relation are lug-forming ears 22—23. The lugs are opposingly disposed and the spacing therebetween is somewhat less than the total run of the skip in the latter's travel between the two extremes of its swinging movement. Also provided as adjuncts of the band and located at the two extremities thereof are shoes 24 and 25, and functional thereto for contracting the band is a rod 26 bearing by its head end against one of the shoes and having its other end threaded to accommodate a nut 27, the nut working against a spring 28 which, in turn, bears against the other shoe and constituting a means of regulating the effective grip of the lining in resisting slippage of the drum relative to the band.

Reverting to the lugs 22 and 23 or, more especially, the complement thereof in a means functional to arrest movement of the brake band, the invention employs an anchor-pin 30—one for each drum assembly—supported by a related leg of the bail and fitted with a stop-sleeve 31 which is firmly clamped by a nut 32 to occupy

a position overlying the drum between and in interrupting relation to the lugs.

Describing the operation, and assuming that the skip with a load therein occupies the normal full-line position of Fig. 1, the brake band will then be located as shown, namely with the lug 22 bearing against the front face of the stop-sleeve 31. Tripping the latch which, in aerial tramway systems, is generally made automatic as the carriage arrives at an end of the cableway permits the dumping operation to take place and, in moving from the full-line to the dotted-line dumping position, the swing travel of the skip is allowed to be free-running for the greater part of the movement. Picking up momentum during this free-running travel, the swing-speed is relatively high as the skip approaches the extreme of its dumping travel and, at a point short of this extreme, lug 23 is brought into contact with the back face of the stop-sleeve 31. The brake band is thus arrested and, asserting its friction grip, the drum is decelerated, the adjustment of the nut 27 being such as, desirably, will permit a certain degree of slippage to first retard and then increasingly decelerate as the momentum force drops. Following the dumping of the skip, the return swing takes place and the free-running acceleration and following deceleration again occurs, the lug 22 acting in this instance to arrest the brake band and retard the drum's travel by its engagement with the front face of the stop-sleeve. In furtherance of the slippage which is referred to above, it should, perhaps, be pointed out that the degree to which the drum is permitted to move following the commencement of a braking action is such as would, in the absence of the limit-stops (made fast to the skip and indicated by 8'), permit the skip to slightly overrun the normal loading position.

Departures from the embodiment of the invention which I have illustrated and to which express reference has been had in the foregoing description will suggest themselves. It is my intention that no limitations be implied either from said illustration or the description as I consider all forms of construction and variation in detail coming within the scope of the hereto annexed claims to be comprehended by the invention.

What I claim is:

1. The combination with a swivel-mounted dump car operative to right itself automatically following a dumping operation, and with the supporting carrier therefor: a brake drum supported in concentric relation to the swivel axis of the car and movable in unison with the latter; a brake band for the drum gripping the latter with a relatively constant friction pressure and normally free to move in unison with the drum; and means providing a lost-motion connection between the carrier and the brake band functional in the course of the car's righting movement at a point short of the given swing-arc of the latter to arrest the brake band and place a decelerating influence upon the drum.

2. Structure according to claim 1 providing means for adjusting the brake band to govern the effective grip to which the drum is subjected.

3. In a dump-car, in combination with a supporting carrier, and with a load-receiving bucket swivel-mounted therefrom and, when loaded and empty, made self-acting by a fore-and-aft shifting of the weight center to cause the bucket to swing between two extremes of travel from a normal righted position into and from a dumping position: a brake drum supported in concentric relation to the swivel axis of the bucket and movable in unison with the latter; a brake band for the drum subjecting the latter to a relatively constant friction grip and made free to normally move in unison with the drum; and means providing a lost-motion connection between the carrier and the brake band functioning in each of the oppositely directed swinging movements of the bucket at a point approaching but short of the extreme travel to arrest the brake band and place a decelerating influence upon the drum.

4. Structure according to claim 3 in which said lost-motion connection comprises a pair of lugs anchored to the brake band to lie in circumferentially spaced relation, and a member fixedly associated with the carrier and disposed to occupy a position between and in the path of travel of the lugs for interrupting the latter.

5. The described self-righting dump-car comprising, in combination with a relatively stationary bail formed to present parallel spaced legs, and having co-axial bushings fixedly carried at the lower extremities of the legs: a load-carrying bucket received between the legs and providing, at each of its two sides, a hub disposed to lie interiorly and an outrigger-stand disposed to lie exteriorly of the related leg, said hubs and stands being co-axially bored to register with the bushings; hinge-pins journaled in the bushings with their inner ends fitted in the hubs and extending by their outer ends through and beyond the outrigger-stands; a brake drum for each side of the dump-car fitted over the exposed end of a hinge-pin and fixedly secured to a related outrigger-stand for unitary movement with the bucket; brake bands for the brake drums subjecting the drums to a relatively constant friction grip and normally free to move in unison with the drums; circumferentially spaced lugs made fast to each said band; and an anchor member for each said brake band fixedly carried by the bail to locate the same between and in the path of travel of the lugs for interrupting the latter, said dump-car having a stop limiting swing-travel of the bucket as the latter rights itself in swinging between two extremes of travel, and the said circumferential spacing as between the band-carried lugs being such as will, by the arresting action of the anchor member, cause a bucket-decelerating activation of the brakes at a point approaching but short of the bucket's extreme travel as the latter pivots in each of its oppositely directed swinging movements.

PETER ANDERSON.

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