March 10, 1959 R. G. SMITH 2,876,584

ANIMATED TOY FREIGHT HANDLING TRUCK

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Fig. 1

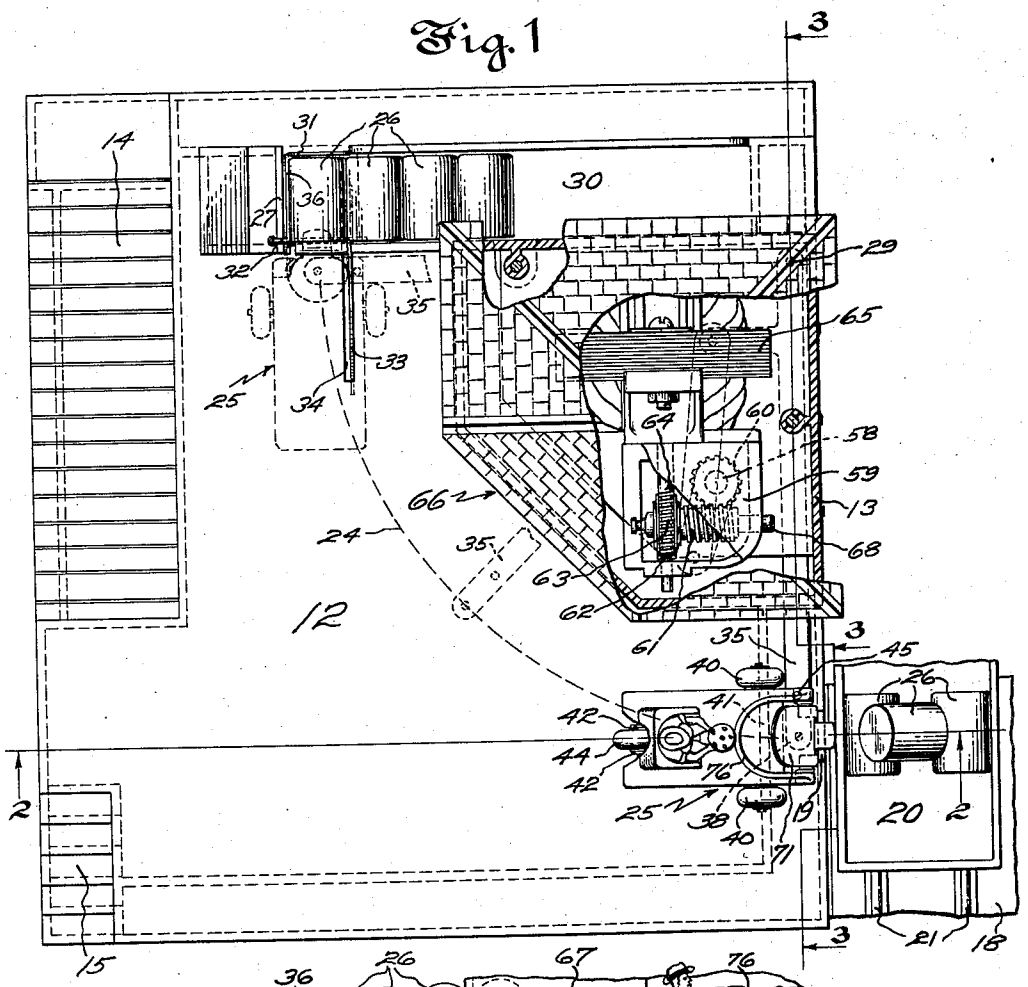
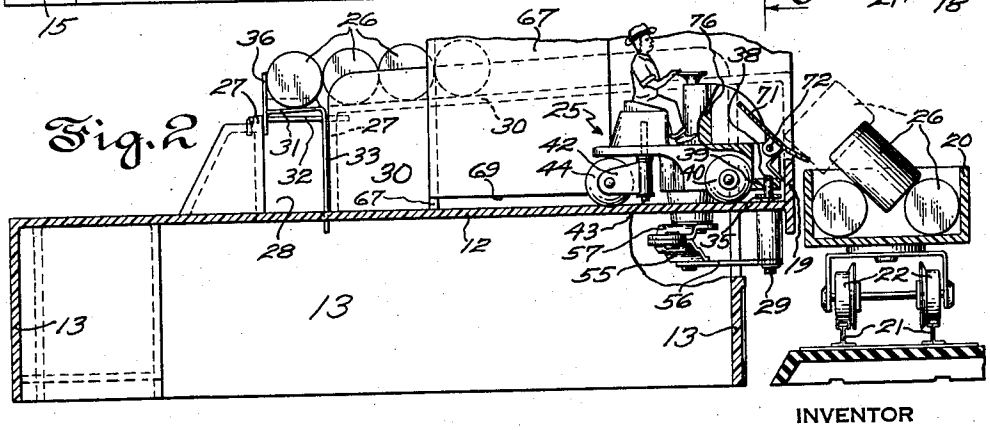


Fig. 2



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Fig. 4

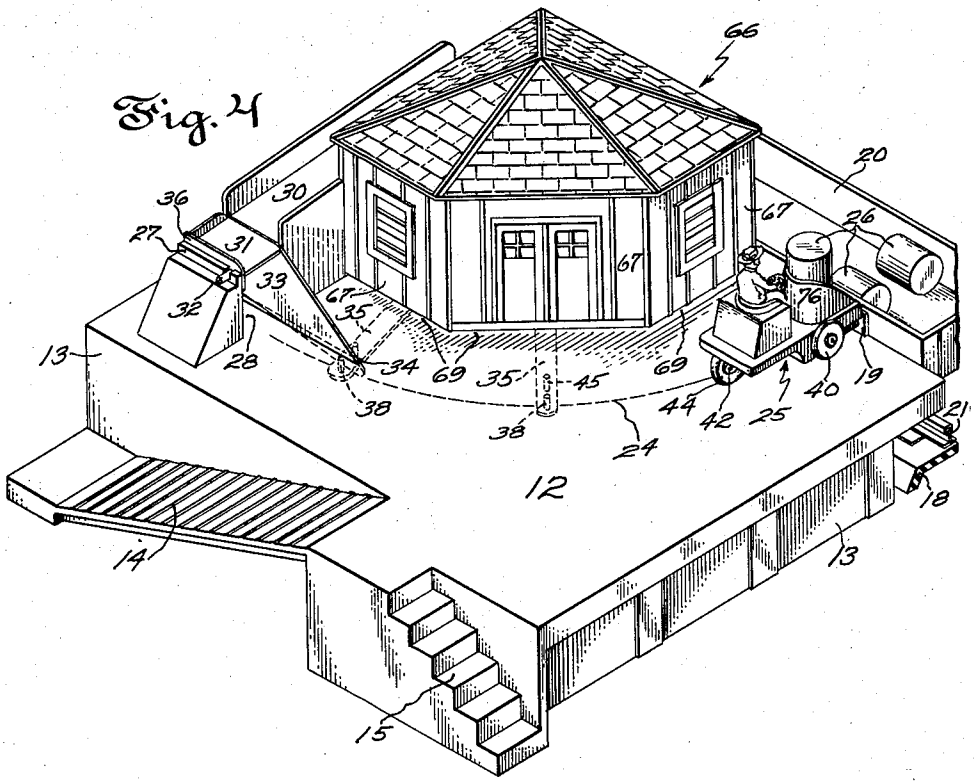
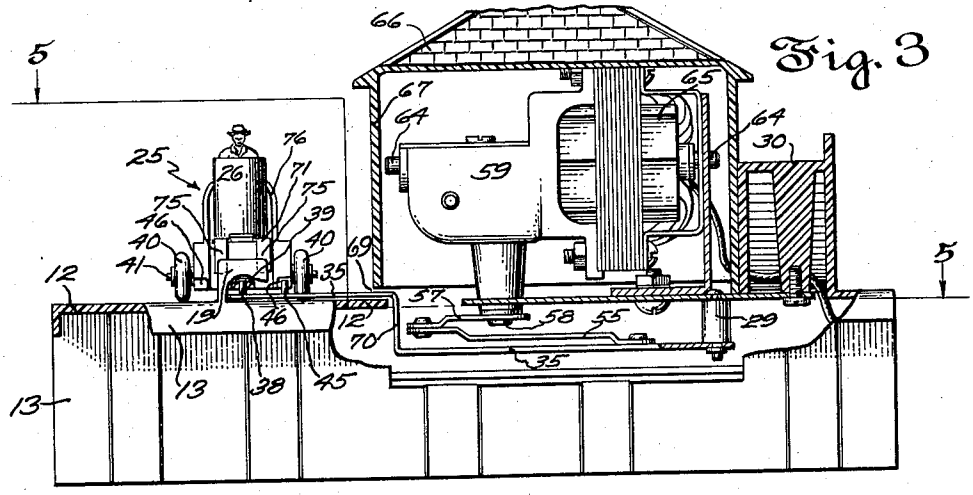


Fig. 3



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Fig. 5

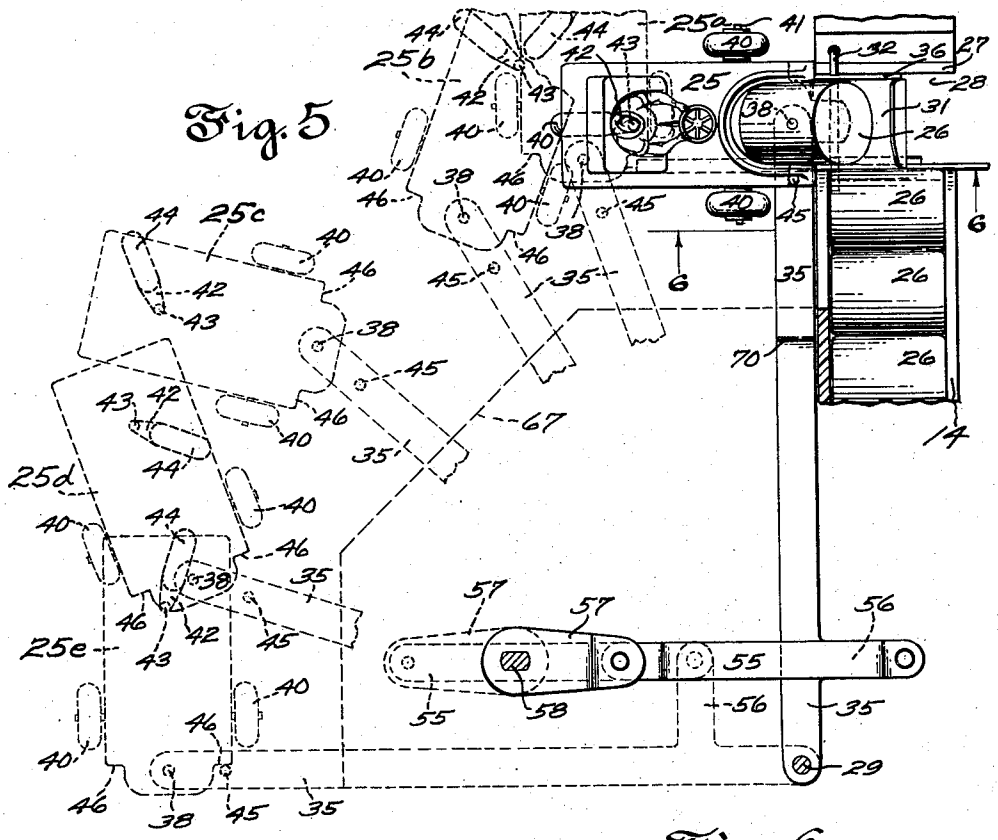


Fig. 6

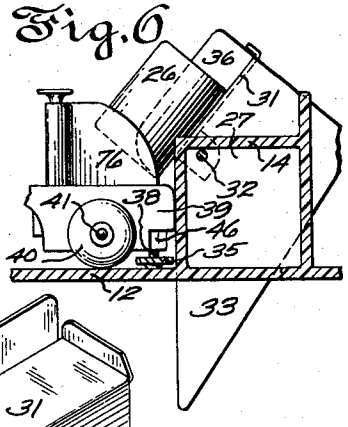


Fig. 7

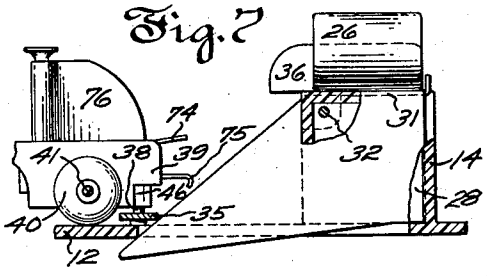


Fig. 10

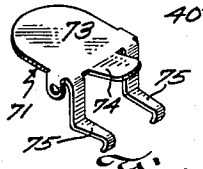


Fig. 9

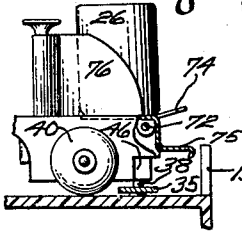


Fig. 11

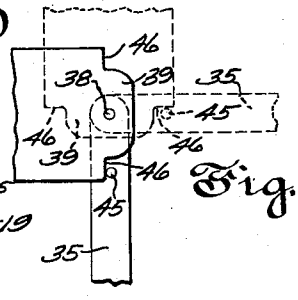
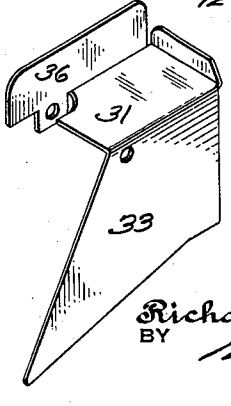


Fig. 8



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2,876,584

ANIMATED TOY FREIGHT HANDLING TRUCK

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Application December 15, 1954, Serial No. 475,529

8 Claims. (Cl. 46—40)

This invention relates to an animated toy station across the platform of which a wheeled station truck rolls to perform repeated excursions between a pick-up locus, where it takes on a toy load article, and a load discharging locus where the truck dumps the load article preparatory to returning to the pick-up locus for taking on the next load article that likewise is to be transferred across the station platform.

One object of the invention is to produce the pick-up and dumping of the load article without actuation of the latter apart from that derived mechanically from the travel of the truck.

Another object is to conceal as fully as possible the means of impulsion of the truck and the means for determining the course of travel to be performed thereby.

Another object is to cause the truck to swing about automatically and shift its angular relation to a swinging arm by which it is impelled so as to head forward in whichever direction it travels back and forth between the terminals of the excursion which it performs.

Another object is to render inconspicuous or invisible the means by which the truck is caused to turn about and face in the opposite direction at each reversal of its direction of travel.

Another object is to store a quantity of load articles in a supply repository that causes them to advance automatically to the pick-up locus of the truck where they become taken away one by one.

Another object is to provide a receiving repository in the nature of a toy railway car into which the station truck will automatically discharge the load articles one by one when dumped thereby.

A further object is to provide the station truck with means to retain and steady the load articles while riding thereon.

These and other objects of the improvements will appear in greater particularity in connection with the following description of a successfully operative embodiment of the invention having reference to the accompanying sheets of drawings, wherein:

Fig. 1 is a plan view of a drum loading toy station embodying the invention.

Fig. 2 is a view taken partially in section on the plane 2—2 in Fig. 1 looking in the direction of the arrows showing a miniature station truck in the act of discharging a drum-like article into a toy railroad flat car.

Fig. 3 is a view taken partially in section on the planes 3—3—3 in Fig. 1 looking in the direction of the arrows.

Fig. 4 is a perspective view of the animated toy.

Fig. 5 is a view drawn on a somewhat enlarged scale taken partially in section on the planes 5—5 in Fig. 3 showing the truck in the act of receiving one of the drums from a supply stored at the station and showing diagrammatically various stages of movement of the drum transferring station truck.

Fig. 6 is a fragmentary view taken in section on the planes 6—6 in Fig. 5 looking in the direction of the arrows.

Fig. 7 is a view similar to Fig. 6 showing the truck approaching the tilting table that delivers a drum to the truck.

Fig. 8 is a perspective view of the tilting table of Figs. 6 and 7 detached.

Fig. 9 is a fragmentary view showing the truck in close approach to the car loading end of its excursion of travel.

Fig. 10 is a perspective view of the tiltable seat for the drum detached from the truck.

Fig. 11 shows the drum transferring truck at opposite limits of its permissible swinging movement relative to an impelling arm.

The main frame of the toy may be fashioned to represent a somewhat elevated track-side station platform whose raised floor 12 is supported by side walls 13 housing a space beneath the floor 12 that accommodates mechanism for animating the toy. Scenic features of the platform such as a ramp 14 and the steps 15 may be supplied at choice and are not concerned in the action of the toy.

In the form of the invention illustrated herein the station platform will rest in a position beside the roadbed 18 of a toy track such that a flange 19 upstanding from the edge of platform floor 12 forms a tripping obstacle and somewhat overlies the roadbed 18 so as to flank rather closely the side wall of a toy gondola car 20 having its chassis supporting wheels 22 resting on track rails 21. As will later appear, the platform flange 19 cooperates in a tripping function whereby a three-wheeled toy truck 25 is enabled to discharge its conveyed load, such as the oil drum imitating article 26, by dumping such article into the flat car 20 when the truck arrives at the platform flange 19 at one end of an arcuate course of travel across the top surface of platform 12.

Truck 25 performs repeated excursions in such course of travel which curves circularly about a pivotal center 29 as indicated by the broken line 24 in Figs. 1 and 4. The arc of travel extends from the drum discharging position of the truck shown in Figs. 2 and 4 and at 25e in Fig. 5 to the drum receiving position of the truck shown in broken lines in Figs. 1 and 5. There is caused to be delivered to the truck in its drum receiving position a single drum of a group of drums temporarily stored and resting on a runway including an inclined chute 30 incorporated in the station platform structure that is elevated above the level of platform floor 12.

The individual drum in the runway at the lower end of the chute-supported group of stored drums rests on a tiltable trap table 31 that is hinged to swing crosswise of the runway in a gap 28 therein on a pivot pin 32 spanning such gap and removably lodged in bearings in spaced apart walls 27 of the stationary runway structure flanking the gap. Table 31 has an upstanding obstacle wall 36 that blocks the automatic rolling of the drums down the chute and fixedly carries a depending acuating spur 33 that extends through a slot 34 in the platform floor 12 and swings freely therein. Spur 33 serves as an actuatable cam by means of which the table is caused to tilt on pivot pin 32 when the sloping top edge of the spur is engaged and thrust counterclockwise in Figs. 6 and 7 by the advancing edge of the swinging arm 35.

As arm 35 sweeps slowly back and forth in an arc of less than 180° extent across the top surface of the platform floor 12 about the stationary pivot 29 the truck 25 is impelled thereby through various angular positions represented in broken lines in Fig. 5. Arm 35 is motivated so to swing by link-work mechanism most clearly shown in Figs. 3 and 5 located in the concealed platform space beneath floor 12.

Particulars of the construction of the 3-wheeled truck 25 are best explained by reference to Figs. 2, 3 and 5 to 10, inclusive. The free end of arm 35 carries an up-

standing stud 38 that pivotally engages a hole opening downward in the front end 39 of the truck chassis. This hole is located forward of the front two traction wheels 40 of the truck. Wheels 40 are coaxial and turn freely and independently on a cross axle 41 fixed in the chassis of the truck. The rear end of the truck is supported by a trailing caster that comprises a caster yoke 42 freely swingable on a vertical hinge post 43 that is rigid with and depends from the chassis of the truck. Yoke 42 pivotally carries the rear traction wheel 44 that is thus free both to roll and to swing bodily in an orbit about the hinge post 43. This manner of impelling the truck causes its rear end to be flung about through a limited range of different angular relationships to the impelling arm 35 indicated in Figs. 5 and 11 during its arcuate course of travel. A stop stud 45 is carried by arm 35 in position to intercept shoulder notches 46 at opposite corners of the front of the truck chassis and thereby acts to limit the permissible swinging movement of the truck chassis relative to arm 35 to an angle of one hundred eighty degrees.

Fig. 5 delineates in broken lines various momentary angular relationships of truck body 25, caster 42 and the impelling arm 35 during excursions of the truck between its load article pick-up locus and its load article discharging locus for explaining the swiveling action of the trailing caster that enables the truck to swing about its impelling pin 38 whereby it is coupled to arm 35.

In the full-line position of truck chassis 25 in Fig. 5 the caster 42, after having trailed the forward movement of the truck during approach of the latter to the tilting trap table 31, is shown to extend rearward from its shank pivot 43. In this position of the truck a load article 26 is shown in process of being transferred to the dump seat 71 of the truck automatically. After receiving its load article, and as arm 35 begins to swing counterclockwise about stationary pivot 29, there can be no counterclockwise swinging of truck chassis 25 about its pivotal connection 38 to arm 35 because one of the chassis shoulders 46 then abuts the stop pin 45 on arm 35. Hence the effect of the leftward sweep of pivot pin 38 in Fig. 5 is first to cause the truck chassis 25 to back-up. This abruptly swings caster 42 counterclockwise about its shank pivot 43 so that the caster at first trails the backward travel of the rear end of the chassis to truck position 25*a* whereupon the caster with its wheel 44 comes to occupy the broken-line position shown in Fig. 5. As the truck pin 38 continues its leftward truck impelling movement the point of contact of trailing wheel 44 with the surface of platform 12 serves somewhat as a pivot point about which the caster 42 swings into its position shown by broken lines relative to truck position 25*b* ready to trail any subsequent forward advance travel of the truck from its position 25*b* to the article discharging locus 25*e*.

On return of the truck, and as arm 35 reverses its direction of swing and starts to sweep clockwise about stationary pivot 29, caster 42 first abruptly swings about its shank pivot 43 into its position in relation to chassis position 25*d* shown by broken lines in Fig. 5 and thereby is able by rolling of wheel 44 to trail the initial backing-up movement of the rear end of the truck chassis. Swinging of the chassis clockwise about pin 38 in arm 35 meanwhile has been precluded by abutment of chassis shoulder 46 with stop pin 45. At about the chassis position 25*d* the point of contact between caster wheel 44 and the floor surface of platform 12 serves somewhat as a pivot about which the front end of the chassis swings to position 26*c* as it continues to be impelled toward the right by pin 38. Here the caster 42 has wheeled into its position in relation to truck position 26*c* shown by broken lines and is ready to trail any further impelled travel of the chassis toward the right to its full line, load article pick-up position in Fig. 5.

The mechanism that motivates arm 35 comprises a link 55 connected at one of its ends to a side branch 56 of arm 35 and pivotally connected at its other end to a power crank 57 fixed on the bottom of shaft 58 which is motor rotated continually during the operation of the toy through a speed reduction mechanism inside the gear box 59. The speed reduction gearing comprises a worm gear 60 on shaft 58 in mesh with and driven by a worm 61 journaled crosswise of the gear box 59 and fixed on the same shaft 68 with another worm gear 62 that is driven by the worm thread 63 on shaft 64 of the electric motor 65.

The motor is mounted atop the platform floor 12 within an imitation building structure 66 that serves to house motor 65 and also the speed reduction gearing in box 59. The house 66, including its side walls 67, is preferably removable by merely lifting it off from the platform floor when suitable fastening screws (not shown) are removed, thereby to give access to the motor and the reduction gear. Figs. 1 and 3 may be referred to for particulars of the housing structure. The outside walls 67 of the house do not reach fully down into contact with the platform floor 12 but their bottom edges are elevated somewhat thereabove to provide a horizontal gap 69 through which the impelling arm 35 can extend and is free to swing. Fig. 3 shows that arm 35 has an offset at 70 enabling it to underlie the coupling link 55.

One drum 26 at a time is delivered by the tiltable table 31 to a tiltable seat 71 that rests on and is hinged to the front end of the truck chassis by means of a cross spindle 72. See Figs. 1, 2, 9 and 10. Dump seat 71 comprises a sheet metal member bent to provide a base 73 normally lying flat against the horizontal top surface of the truck chassis, a guard lip 74 tending to keep the drum 26 or other article to be conveyed from sliding off from base 73 during the drum transferring travel of the truck, and tripper legs 75 projecting forward from the truck chassis for encountering and receiving backward thrust from the tripper flange 19 on the platform structure. Surrounding the tiltable drum seat 71 there is fixed on the chassis of the truck a stationary upstanding curved wall 76 that braces the drum against displacement from its seat 71 rearward or laterally of the truck.

There has been described in the foregoing certain characteristics of operation of component parts of the toy which therefore need not be repeated in the following summary of the overall operation. In the complete cycle of animated action a supply of the drums 26 or other load articles is placed on the chute 30. If tilting table 31 happens at that time to be up-lifted by the presence of truck 25 no load article can advance down the chute any farther than the table tilting spur 33 which in this position of the table forms a barrier against dropping of the load article into the empty gap 28 in the chute that is bridged by the tilting table.

When the loaded truck 25 leaves the tilting table the latter drops back into its position shown in Figs. 1, 2, 4 and 7 so that the end load article 26 rolls onto the table 31 until it encounters the upstanding table wall 36. Subsequent tilting of the table will dump its carried load article onto the dump seat 71 of the truck as shown in Figs. 5 and 6 and hereinbefore described.

When current is supplied to motor 65 continuous running of the motor rotates the shaft 58 through the medium of speed reduction gears in transmission case 59 causing slow speed continuous rotation of the actuating crank 57 from its full line position to its broken line position in Fig. 5. This causes impelling arm 35 to swing slowly from its full-line position in Fig. 5 whereupon the truck 25 is impelled away from load receiving locus at the tilting table 31 to its broken-line position 25*e* while carrying the load article 26 steadied upon the dump seat 71 of the truck by means of the curved wall 76 fixed on the truck chassis. Upon arrival of the truck at its load discharging locus in position 25*e* tripping legs 75 of the

dump seat **71** are thrust against the tripper flange **19** that upstands from the edge platform **12** thereby causing the dump seat to swing about its pivot **72** from its position in Fig. 9 to its load discharging position in Figs. 1 and 2. Thus the load article **26** becomes dumped automatically into the gondola freight car **20**.

As power crank **57** continues its rotation from its broken-line position to its full-line position in Fig. 5 arm **35** is swung slowly clockwise about its stationary pivot **29** in Figs. 1 and 5 This impels the now emptied truck, with its dump seat **71** restored by gravity to load retaining position, back to the tilting table **31** where the action of impelling arm **35** against the cam spur **33** of the tilting table causes the next load article **26** to be delivered from the table **31** to the dump seat **71** of the truck and the cycle is repeated as long as the motor runs and there are load articles to be received from the tilting table.

Since many variations are possible in the forms herein shown as to body style of truck and as to the fanciful configuration of truck attendant, station structure and load without departing from the essential mechanical principles underlying the invention, the following claims are directed to and intended to cover all departures from and substitutes for the quantity and shapes and arrangements of parts herein proposed as fall within a broad interpretation of the wording of the claims.

I claim:

1. An animated toy comprising the combination with a toy vehicle body to be impelled headfirst in reversible directions of, a substantially horizontal floor surface on which said vehicle body is impelled, at least one caster having its yoke pivotally connected to a trailing portion of said vehicle body and having its traction wheel rollable on said floor surface, a vehicle actuator confined to a predetermined course of vehicle impelling travel in reversible directions along said floor surface, a pivotal connection coupling the head portion of said vehicle body in swingable relation to said actuator, whereby said vehicle is wheeled into and maintains a headfirst disposition when impelled by said actuator in each of its opposite directions of travel, the said vehicle being fashioned to simulate a station truck for conveying a load article, and the said course of travel of the said actuator being arcuate, together with a substantially horizontal station platform incorporating said floor surface, a simulated building structure on said platform adjacent the concave side of said arcuate course of travel having angularly related sides, a load repository located on said platform at one end of the said arcuate course of vehicle travel adjacent one side of said building structure, vehicle loading mechanism including a device constructed and arranged to transfer a load from said repository to said vehicle and operably positioned to be met and actuated by said vehicle while nearing said repository, vehicle unloading means including an obstacle on said platform at the opposite end of the said course of vehicle travel adjacent another side of said building structure, and a load discharging element carried by the said head portion of the said vehicle body in position to encounter and be actuated by said obstacle while said vehicle is nearing the same, whereby said vehicle travels and conveys a load away from said repository round about said building sides and toward said obstacle.

2. An animated toy as defined in claim 1, together with motivating means located within and concealed by said building structure connected to power the said actuator to move in its said course of travel, said actuator extending past the said building sides at a level above the said floor surface of the said station platform.

3. An animated toy as defined in claim 1, in which the said vehicle loading mechanism includes a load article feeding runway having a gap extending crosswise a portion thereof, a table spanning said gap mounted to tilt crosswise of said runway, and a cam-shaped spur projecting from said table into the said course of travel of the vehicle to be actuated thereby, said table being disposed to block advance of load articles along said runway when said table is in tilted position.

4. An animated toy as defined in claim 3, in which the said platform structure contains a slot in the said course of vehicle travel through which the said cam-shaped table spur extends and can descend when actuated by approach of the said vehicle, thereby to swing the said table to its said tilted position for delivering a load article to the truck.

5. An animated toy as defined in claim 3, in which the said load discharging element includes a dump seat pivotally mounted on the said head portion of the said vehicle in position to receive a load article from the said vehicle loading mechanism.

6. An animated toy as defined in claim 5, together with a concavely curved load constraining wall upstanding from the said head portion of the said vehicle and at least partially encompassing the said dump seat for steadying a load article being conveyed by the said vehicle.

7. An animated toy as defined in claim 1, in which the said load discharging element includes a dump seat pivotally mounted on the said head portion of the said vehicle in position to receive a load article from the said vehicle loading mechanism.

8. An animated toy as defined in claim 7, together with a concavely curved load constraining wall upstanding from the said head portion of the said vehicle and at least partially encompassing the said dump seat for steadying a load article being conveyed by the said vehicle.

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