This invention relates to a toy railroad accessory in the nature of an animated freight loading station to be located close beside a toy or model railroad track and adapted to operate automatically to convey toy load articles, such as pseudo drums, from a supply repository on the freight station platform to a relatively elevated position and then discharge them onto an inclined chute along which the drums will roll downward into a toy railroad car standing on its track.

One object of the invention is to cause the toy drums to parade automatically one by one from a source of supply to such elevated position.

Another object for compactness is to so arrange a drum elevating, endless conveyor belt that it flanks and runs parallelly with the toy track, and to arrange a short discharge chute to lead at right angles from the upper end of the conveyor to a drum discharging location directly over the toy car.

Another object is to motivate the conveyor belt by means of a prime mover that is concealed within an adjacent toy housing structure which is fashioned to represent the natural appearing shape of a warehouse for freight.

Another object is to cause an abrupt automatic pirouette, or swinging about, of rolling toy keys so as to accommodate them to an abrupt change in their direction of rolling.

Another object is so to provide means for causing such automatic swinging about of the toy drums constructed and arranged to function in a wholly or nearly concealed location.

Another object is to retain each drum at the top end of an inclined discharge chute until automatically released to roll down the chute, and to effect such release before the transfer of the next following drum from the conveyor belt to the top of the chute.

Another object is to utilize the shifting in bodily position of a retaining magnet so that it will on occasion attract and on another occasion cease to attract one of the drums for respectively first detaining the drum and then releasing it for coasting or rolling down the chute.

These and other objects of the invention will be clearer in fuller particular from the following description of a toy railroad station embodying the improvements, such description having reference to the appended drawings wherein:

FIG. 1 is a perspective view of a toy, animated, car loading freight station incorporating the present invention together with a toy freight car being automatically loaded thereby.

FIG. 2 is a plan view of the station showing the roof and certain other parts partially broken away to expose details of the motivating mechanism.

FIG. 3 is a front elevation of the station and is taken partially in section on the plane 3–3 in FIG. 2.

FIG. 4 is a fragmentary view taken partially in section on the plane 4–4 in FIG. 3, looking in the direction of the arrows.

FIG. 5 is an enlarged view of the drum discharging upper end of the conveyor showing the drum receiving chute and magnetic devices which control transfer of the drum from conveyor to chute, some of the parts appearing in section on the plane 3–3 in FIG. 2.

FIG. 6 is a fragmentary view like FIG. 4, enlarged as is FIG. 5, taken partially in section on the plane 6–6 in FIG. 5, looking in the direction of the arrows.

FIG. 7 is like FIG. 5, showing the drum being transferred onto the chute.

FIG. 8 is like FIG. 6, showing the drum positioned as in FIG. 7.

FIG. 9 is like FIG. 7, showing the drum swung about by magnetic action and ready to roll down the chute.

FIG. 10 is like FIG. 8, showing the drum positioned as in FIG. 9.

FIG. 11 is like FIG. 9, showing the drum detaining magnet lowered to release the drum from its magnetic field for rolling freely down the chute.

FIG. 12 is like FIG. 10 with the magnet positioned as in FIG. 11, the drum having rolled part way down the chute.

FIG. 13 is a fragmentary view taken in section on the plane 13–13 in FIG. 5, looking in the direction of the arrows.

In FIG. 1 a typical gondola type of toy freight car 13 is shown standing idle on a toy or model railroad track 12. A series of discrete toy cylindrical load articles 14, are fashioned to represent oil drums each having external outstanding circular ribs 15 on which the drums 14 can roll or can freely swing about for changing the direction in which they will roll. Drums 14 may be machined from solid cold-rolled steel or other ferrous metal that is responsive attractable by a magnetic field.

The framework of a trackside loading station comprises a platform 16 and a superimposed hollow toy structure 17 simulating a warehouse. Adjacent thereto is an auxiliary structure 18 whose top is configured to define an inclined discharge chute 21. A portion 22 of structure 18 is reduced in height and carries an upstanding support 28, on which rests the top end of an inclined conveyor framework 30. Support 28 may be integral with framework 30 if the parts are molded plastic. An endless traveling conveyor belt 19 extends parallel with the track 12 and at right angles to the chute 21 and is supported to travel at an incline upward away from a load article supply source or repository platform 16 and has its top end closely adjacent to the point of travel reversal of belt 19 in line with the direction of belt travel.

The oil drums 14 are automatically fed to the conveyor belt by an inclined repository or article feeding channel 26 incorporated in the station platform 16 and which slopes mildly downward to meet the bottom end of the conveyor belt. The inner surface of the conveyor belt is ribbed at 23 and trained about power pulley 27 correspondingly toothed at 24 for positive driving mesh with the belt ribs 23 at the higher end of the belt. At its lower end belt 19 is trained about and supported by idler pulley 28. Pulley 28 has trunnions 29 and pulley 27 has a similar trunnion 33 journalized in the side walls 30 of the framework of the conveyor which may be an integral part of a molded plastic structure in which the side walls 30 are braced by connecting cross struts 36. The outer surface of the conveyor belt 19 is equipped with three traveling cleats 39 equally spaced along the full double length of the conveyor belt. Cleats 39, as heretofore explained, are to engage and impel the drums 14 one by one up the incline of the conveyor.

Power pulley 27 is driven by an electric motor 40 through a speed reducing gear transmission 41 whose output shaft 42 is drivingly coupled to the trunnion 33 of power pulley 27 by a removable tubular coupling 43 that extends through a small aperture in the upright wall of building 17 inside of which the motor 40 is located and concealed. The motor, nevertheless, is conveniently accessible because the building structure 17 is fastened to the platform 16 by means of catch prongs 44 which...
depend from the lower edges of opposite walls of the building. Owing to the resilient flexibility of the building walls, prongs 44 automatically spring apart into catching relation to the platform when cammed downward through apertures 45 therein. This enables the hollow building structure 17 to be released and removed as a unit by squeezing inward on its side walls having the prongs 44 apart and defact the catch of the prong 43 on holding relation to the aperture edges, whereupon the holding prongs 44 can be lifted freely upward through aperture 45.

For controlling the performance of the oil drum 14 when it is discharged from the top of the conveyor belt 19 into the channel of the inclined chute 21, a permanent magnet 50 is employed. This magnet has in plan view a shape that is elongated in the direction of movement of the conveyor belt and is relatively narrow lengthwise of chute 21. Magnet 50 is lodged on the swinging head 51 of a roller arm 52 which head and arm may comprise an integral piece of molded plastic material. Arm 52 is provided with depending lugs 53 each having a vertical groove 54 in its outer surface open at its top end.

The lower dead end of groove 54 engages pivotally with a stubby pin 55 stationery on the conveyor framework 30 so that the magnet 50 is permitted limited downward swinging movement from actual contact with the under surface of the nonmagnetic floor of the molded plastic chute 21 to a slightly depressed position shown in FIG. 11. Roller arm 52 is yieldingly maintained in its uppermost position shown in FIGS. 3 and 5 to 10, inclusive, by the bias of a spring 56 which hooks under the edges of the conveyor framework walls 30 and bears constantly upward against the under surface of roller arm 52, tending always to lift it and to maintain groove 54 pivotally engaged with the stub pin 55. As shown in FIG. 11, each of the three clients carried by conveyor belt 19, in passing the roller arm 52, momentarily rubs against the top surface thereof and slightly depresses the roller arm. This swings the arm a little in a counterclockwise direction about the pivot 55 so that the magnet 50 is lowered sufficiently to release the drum 14 from the holding attraction of its magnetic field.

The parts described are examples of a disabling device so operatively related to such magnetic field as to reduce the magnetic attraction of said field for the drum or other load article intermittently in synchronism with the speed of travel of the conveyor belt.

Prior to this release of the drum, the magnet receives the drum into its field immediately upon discharge of the drum from the traveling conveyor belt 19. This causes the drum instantaneously to pirouette, or perform a 90° turn-about, so that the length of the drum becomes lined up with the length of the permanent magnet. Thus the drum is automatically prepared to change its direction of rolling into accord with the downward slope of chute 21.

To enable spring 56 to be assembled in preformed condition without resorting to separable parts in the construction of the roller arm 52 and its depending lugs 53, each of these lugs is provided with a short stud 59 molded integrally with the lugs in coaxial relation so that the studs 59 extend toward each other but leave sufficient space between their adjacent ends to introduce the preformed spring 56 through said space into operative position pivotally anchored on both of the studs 59.

The station platform 56 may carry insulated binding posts 57 for the attachment of electric current supply wires and from these binding posts internal wiring (not shown) extends to motor 40 for electrically energizing it to animate the toy. Current to binding posts 57 can be supplied and cut off at any remote point by any suitable electric switch. Thus the regressive loading of the drums can be stopped when there is no car or other depository such as 13 in condition to receive them. Any toy load article capable of rolling and magnetically attractable can be substituted for the drums 14. Preferably it should be axially longer than its own diameter.

Summarizing the operation of the toy, the feeder channel 26 is loaded with a quantity of the pseudo oil drums 14 which constantly tend to roll down the incline of the channel until the leading drum comes to rest against the traveling belt 19. The drums in the channel remain stationary until one of the clients 39 on the belt revolves around the pulley 28 and picks up the leading drum and begins to convey it up the incline of the traveling belt, after which the drum next to the thus departing drum rolls downward to take its place, all of the other drums simultaneously advancing down the feeder channel a corresponding small distance.

When the drum being conveyed reaches the highest point on the traveling belt 19, as in FIGS. 5 and 6, it topples off toward the left as in FIGS. 7 and 8 and lands on the inclined surface of the discharge chute 21 where it is within the attracting field of magnet 50. Because the length of the drum at that moment is disposed crosswise the length of the magnet, the action of the magnetic field is instantly and automatically effective to swing the drum about so that its length accords in direction with the length of the magnet. This changed position of the drum is shown in FIGS. 9 and 10. The client 39 that has conveyed the drum then revolves about pulley 27 and as it continues its travel with belt 19 wipes downward against rocker arm 52 which forces magnet 50 to lower to its position in FIGS. 11 and 12 against the constant upward urge of spring 56. Client 35 then proceeds to pass arm 52 and the magnet becomes returned by spring 56 to its position in FIGS. 5 to 10. A following drum 14 has been carried to the top of the conveyor by the next following client 39.

If the slope of the feeder channel 26 and chute 21 is sufficiently steep, the load articles need not be of a shape to roll, that is, the load articles could otherwise coast down the inclines. These and other changes in the precise shapes and arrangements of parts herein illustrated to explain the improvements can be made within the novel principles of the invention, wherefore the appended claims are directed to and intended to cover all variations as come within a broad interpretation of the terminology of the claims.

I claim:

1. An animated toy for automatically transferring ferrous toy load articles successively from a source of supply to a load depository in oriented relation to the latter, comprising in combination with the source of load articles, an endless belt having a load article conveying surface and supported for advancing travel away from said source to a point of belt travel reversal, a chute extending downward from said point of belt travel reversal in laterally branching relation to the line of travel of said belt and located to receive load articles discharged from said belt by one at said point of reversal, means to generate a magnetic field at said chute beyond the point of belt travel reversal in the direction of travel of said article conveying belt, said magnetic field being operative to orient and retain each of said ferrous load articles after discharge thereof one by one from said belt and from the discharged article coasts down said chute, and a disabiling device operatively related to said magnetic field in a manner to reduce the attraction thereof for said work article to an extent to release said oriented work article for conveyance.

2. An animated toy station as defined in claim 1, in which the said means to generate a magnetic field comprises a magnet located beneath and close to the said chute.

3. An animated toy as defined in claim 1, together with mechanism operatively associating the said disabling device with the said conveyor belt in such manner that successive releases of the said oriented load articles are synchronized with the speed of travel of said belt.
4. An animated toy as defined in claim 1, together with spaced apart actuators carried by the said conveyor belt, and motion transmitting mechanism in operative relation to said disabling device arranged to be intermittently engaged and passed by said actuators during continuous travel of said belt in a manner to synchronize the frequency of intermittent release of load articles with the speed of travel of said belt.

5. An animated toy station as defined in claim 1, in which the said magnet is a permanent magnet whose length substantially exceeds its width and is aligned with the said direction of travel of the said conveyor.

6. An animated toy station as defined in claim 2, together with means to lower and raise the said magnet with respect to the said chute.

7. An animated toy station as defined in claim 2, together with an arm carrying the said magnet pivotally mounted to swing about a horizontal axis.

8. An animated toy station as defined in claim 2, together with a spring constantly biasing the said arm to swing upward about the said horizontal axis.

9. An animated toy station as defined in claim 8, together with housing structure sufficiently enclosing the said arm and the said magnet to substantially conceal it from sight when the toy station is viewed in a downward direction.

10. An animated toy station as defined in claim 2, together with lugs spaced apart lengthwise of the said belt on the said load article conveying surface thereof and projecting from said surface so as to travel with said belt in a path enabling said lugs successively to engage and cam past the said arm in a manner to cause magnet motivating swinging movement thereof.

11. In a toy mechanism for automatically transferring rollable articles of ferrous metal and of generally cylindrical shape from a first direction of rolling travel to a different direction of rolling travel the combination of, a traveling conveyor equipped to carry said articles disposed thereon to be rollable in the direction of conveyor travel, a discharge chute leading away from a delivery end of said conveyor in a direction angularly related to said direction of conveyor travel, a support of non-magnetic material located at the junction of said conveyor and said chute and receptive to articles deposited thereon by said conveyor, a movable magnet supported in a predetermined location under said support, and means mechanically actuated by said traveling conveyor operative to shift said magnet to and away from sufficiently close proximity to said support respectively to arrest and release said load article on said support whereby to time the discharge of successive load articles down said chute.

12. In a toy mechanism as described in claim 11, the combination defined in said claim in which a straight line intersecting opposite poles of said magnet is aligned with the path of conveyor travel whereby to generate a magnetic field operative to orient the axis of the rollable load article into parallelism with said straight line.

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