G. E. LLOYD.

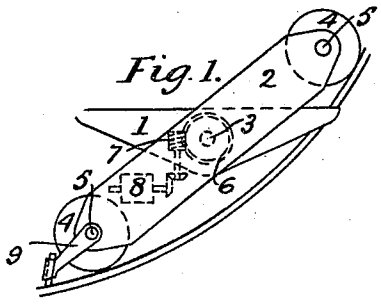
MEANS OF HANDLING, SORTING, AND DISTRIBUTING PARCELS, BALES, AND LOADS OF GOODS AND THE LIKE.

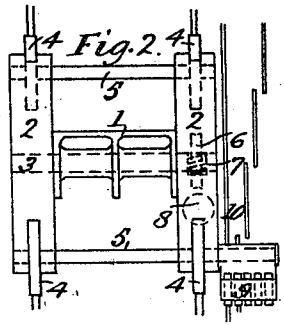
APPLICATION FILED SEPT. 8, 1919.

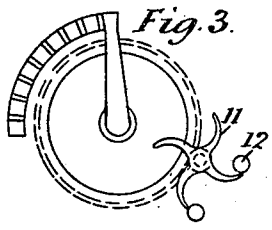
1,380,988.

Patented June 7, 1921.

3 SHEETS—SHEET 1.







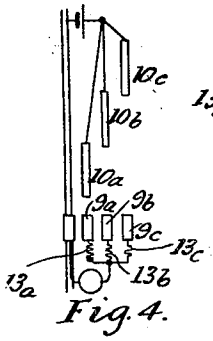


Fig. 4.

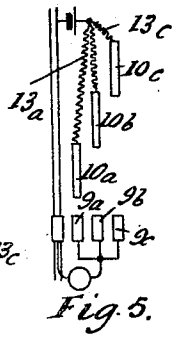
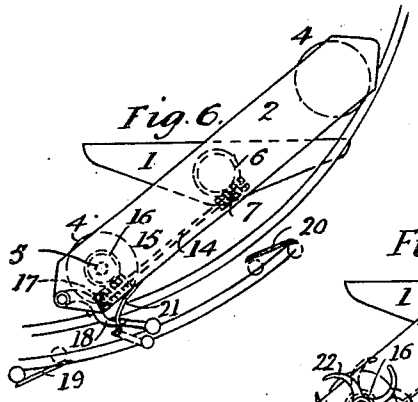
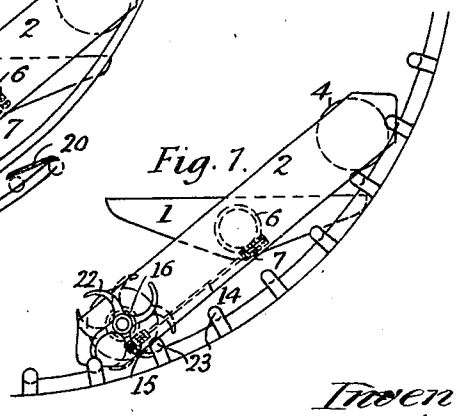


Fig. 5.





Witnesses.

Norris L. Lumby.

Inventor
Guy Ernest Lloyd
by Norris L. Norris,
Attorneys.

G. E. LLOYD.

MEANS OF HANDLING, SORTING, AND DISTRIBUTING PARCELS, BALES, AND LOADS OF GOODS AND THE LIKE.

APPLICATION FILED SEPT. 8, 1919.

1,380,988.

Patented June 7, 1921.

3 SHEETS—SHEET 2.

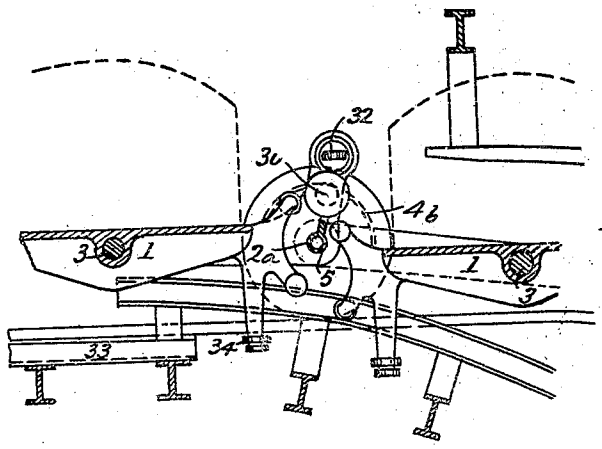


Fig. 9.

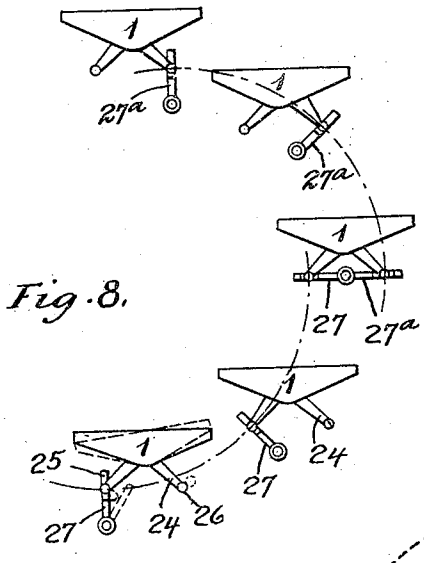
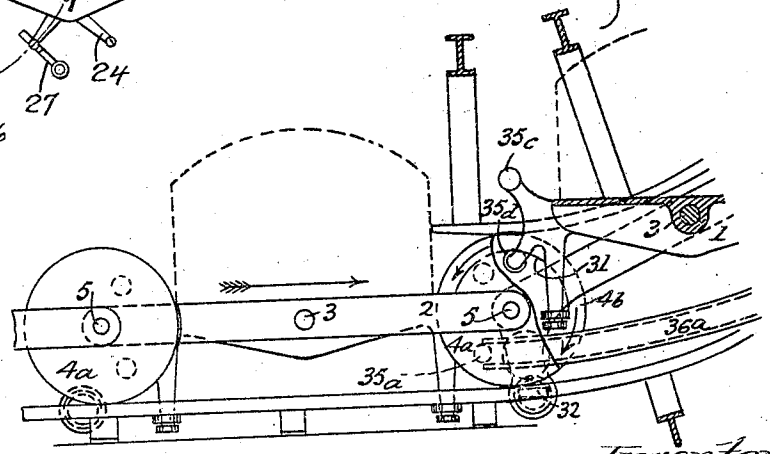


Fig. 8.



Witnesses:
C. D. Fraker
Morris L. Dumby.

Inventor
Guy Ernest Lloyd
By James L. Norris
Attorney

G. E. LLOYD.

MEANS OF HANDLING, SORTING, AND DISTRIBUTING PARCELS, BALES, AND LOADS OF GOODS AND THE LIKE.

APPLICATION FILED SEPT. 8, 1919.

1,380,988.

Patented June 7, 1921.

3 SHEETS—SHEET 3.

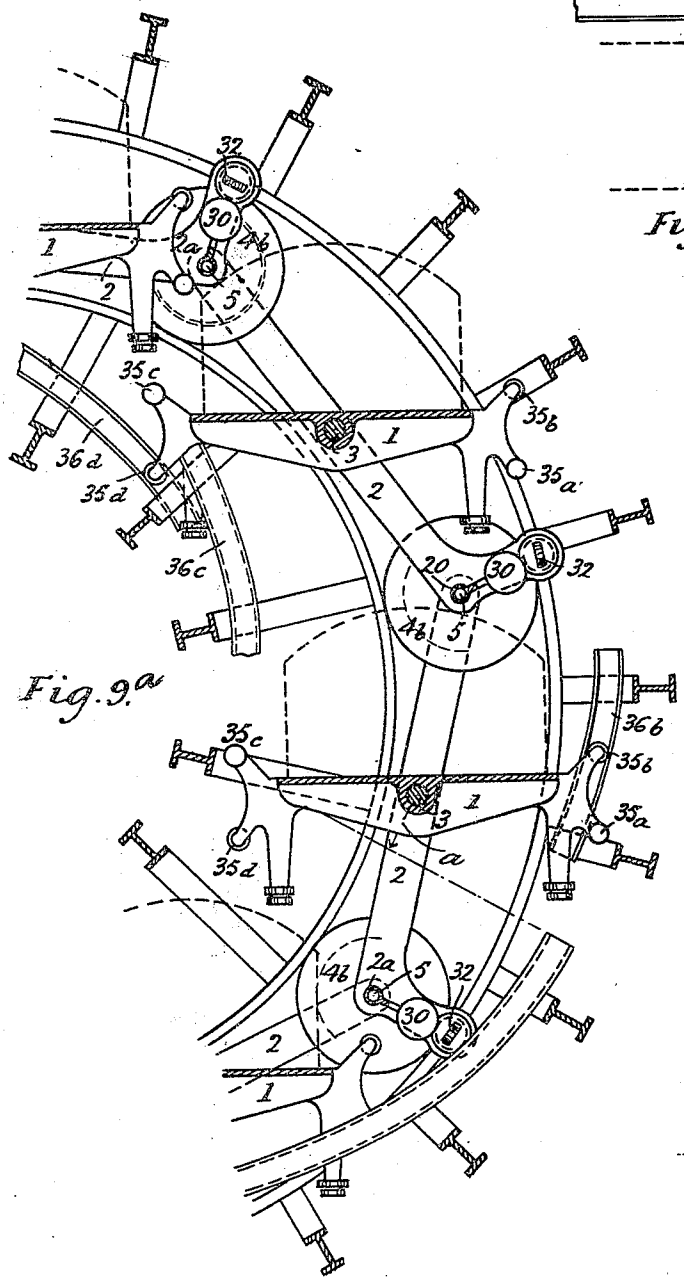


Fig. 9a.

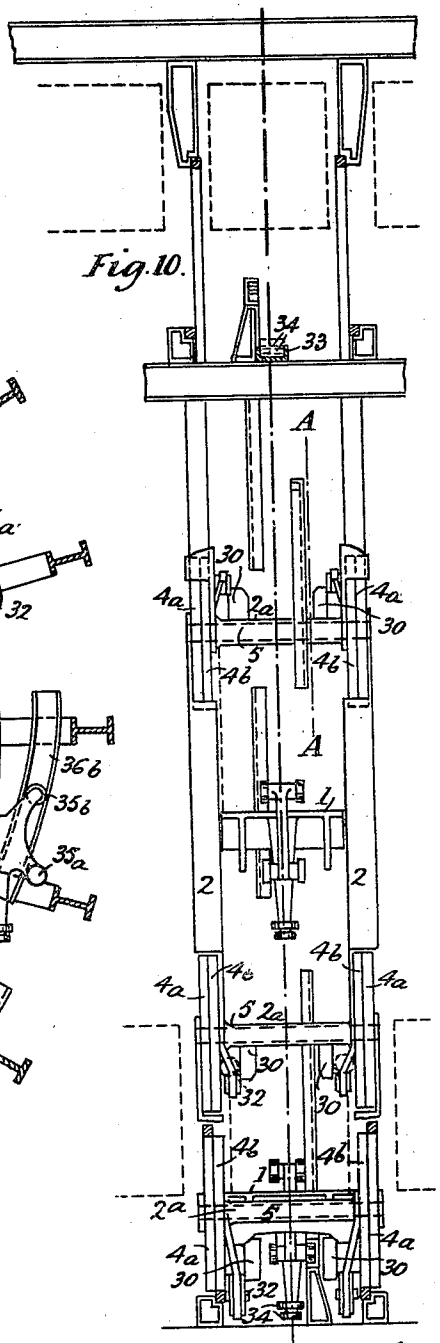


Fig. 10.

Witnesses:
Norris R. Crumby.

Inventor
Guy Ernest Lloyd
by James L. Norris
Attorney.

UNITED STATES PATENT OFFICE.

GUY ERNEST LLOYD, OF BANSTEAD, ENGLAND.

MEANS OF HANDLING, SORTING, AND DISTRIBUTING PARCELS, BALES, AND LOADS OF GOODS AND THE LIKE.

1,380,988. Specification of Letters Patent. Patented June 7, 1921.

Application filed September 8, 1919. Serial No. 322,469.

To all whom it may concern:

Be it known that I, GUY ERNEST LLOYD, a subject of the King of Great Britain, residing in Banstead, England, have invented certain new and useful Improved Means of Handling, Sorting, and Distributing Parcels, Bales, and Loads of Goods and the like, of which the following is a specification.

In apparatus for sorting, handling and distributing parcels, bales, loads of goods or the like such as is described in specifications to British Letters Patent Nos. 17344 of 1908, 3979 of 1913 and 21056 of 1913, it is sometimes necessary that the carriages called truckers should travel on inclined tracks, or tracks which are not only inclined to the horizontal but become vertical and return over themselves at a higher level, and in some cases lie entirely in a vertical plane.

It is necessary that the platform which carries the goods should remain level, whatever may be the angle of the track and my invention consists in providing on the trucker and on the track devices which cooperate to maintain this level position of the platform when the track becomes inclined or changes in inclination.

For this purpose the platform is movably mounted on the frame and preferably pivoted to turn about a horizontal axis and is caused to turn on this axis by the aforesaid coöperating devices.

According to one arrangement there is a spur or worm wheel attached to the platform and this is engaged by a pinion or worm mounted on the trucker frame and driven by an electric motor whose starting, stopping and speed are determined by a suitable rheostat on the trucker or track and brushes on the trucker making contact with rails or strips on the track. The resistance in the motor circuit may be varied by shifting mechanically a contact carried on the trucker, as for example by a star wheel engaging successive pins fixed to the track; or it may be varied by different brushes in turn making contact with strips placed in different transverse positions on the track. By either arrangement the resistance is varied so that the speed of the motor maintains the platform as nearly level as possible; thus when such a trucker is passing from a horizontal track to one inclined upward the motor is required to run while the inclination is changing only; and when changing again to horizontal, the motor requires to run in the reverse direction, or to drive through a reversing gear. When the trucker is following a track which is circular in a vertical plane, the speed of the motor requires to be uniform so long as both axles of the trucker are on the circular portion of the track.

According to another arrangement the rotation of the wheels carrying the trucker on the track is used to drive the spur- or worm-wheel attached to the platform, being connected therewith by friction or dog clutches thrown in or out of gear when required by stops or cams fixed to the track, or by electromagnets energized from the track by strips and wipers.

According to another arrangement a star wheel geared to the platform pivot is turned one way or the other as required by pins fixed to the track so as to engage it on one side of its center or the other; such star wheel may be kept by friction or by a detent in the position in which it is left. The arms of the star are preferably cams for smooth working.

As a safeguard against failure of the proper operation of the devices I arrange that the motive power shall be cut off the truckers if any platform ceases to be level, by placing along the track suitable electric brushes, cut-outs, or mechanical strikers which shall be cleared by all level platforms but shall be engaged by any platforms not level.

In cases where the greatest reliability is required I prefer to maintain the trucker platform level by means of cam pins upon it engaging cams fixed to the track. The location and number of these cam pins depend upon the greatest angle which the trucker frame makes with the horizontal, and upon the minimum distance within which the normal to the cam may approach the platform pivot for satisfactory working. In cases where the trucker track describes a semi-circle in a vertical plane there may be used four cam pins upon the platform successively engaging four cams fixed to the trucker track. The cam pins are symmetrically arranged, equidistant from the pivot, two at one end and two at the other end of the platform, and those of each pair equidistant above and below the level of the pivot.

When a trucker is entering the lower end of the semi-circle the lower of the two leading cam pins engages a cam on the outside of the track; when this engagement comes to an end the upper leading pin enters a second cam; thereafter the upper cam pin at the other end of the platform engages a third cam on the inside of the track; then finally the cam pin below that engages a fourth cam also on the inside of the track. This arrangement permits the cam pins to clear the trucker axles as the trucker frame revolves around the level platform, and also permits the cams to clear the said axles. It leaves both sides of the platform clear for transfer of the load from right to left.

The sides of the trucker frame have two faces each of which is in turn flush with the platform when the frame is level and when trays are transferred to and from the pivoted platform their casters roll over the said faces.

Where trucker tracks become vertical I use four wheels on each axle; two run on an inner pair of rails, that is the pair nearer to the center around which the track curves from the horizontal, and two run on an outer pair of rails. For either pair a single wheel and rail may be substituted if convenient, but not for both pairs. As the trucker proceeds one pair takes the weight less and less, as the vertical is attained, and then the other pair takes it more and more, the two pairs of wheels revolving in opposite directions.

In the accompanying drawings Figure 1 is a side elevation and Fig. 2 a front elevation of a trucker in which the platform is kept level on an inclined track by an electric motor driven by current brought through brushes rubbing on bars or rails on the track. Fig. 3 shows a star wheel engaging pins on the track and thereby turning a rheostat on the trucker for varying the speed of the motor as required. Figs. 4 and 5 show diagrammatically two ways of varying the resistance in the motor circuit by resistance on the trucker and on the track respectively. Fig. 6 shows a side view of a trucker in which the platform is turned through a clutch connection to the track wheels. Fig. 7 shows a star wheel which turns the platform by engaging pins on the track. Fig. 8 shows safety strikers on the track which are engaged only if a trucker platform ceases to be level from any cause, so that the motive power can be cut off. Figs. 9 and 9^a, read together, are a side view, and Fig. 10 is a partial front view of the semi-circular portion of a track for truckers and wherein the platforms of the truckers are kept level by four cams fixed to the track, with which four cam pins on the pivoted platform successively engage.

In Figs. 1 and 2 the platform 1 is pivoted on the shaft 3 in the frame 2. The frame is carried by the track wheels 4 whose axles 5 clear the platform as it revolves. The platform 1 is kept level by being rotated relatively to frame 2 by a worm- or spur-wheel 6 driven by a worm- or spur-pinion 7 from an electric motor 8. The intermediate bevel gearing shown is purely for convenience of arrangement. Electric current is conveyed to the motor by brushes 9 wiping live and return rails 10 on the track. If the track is circular and both ends of the carriage are on the same circle the motor requires to run at constant speed; but if the frame 2 is becoming more inclined at a faster rate, the motor should run faster and if frame 2 is becoming more inclined at a slower rate, the motor should run less fast. The speed may be varied by a rheostat adjusted mechanically as in Fig. 3, where the contact arm is geared to a star wheel 11 engaged by pins 12 fixed on the track. A similar star wheel adapted to engage pins so as to be rotated in the opposite direction reverses the adjustment of this rheostat. In Fig. 4, which is diagrammatic, the resistance is varied by having a number of brushes 9_a, 9_b, 9_c, etc. wiping in turn lengths of conductor 10_a, 10_b, 10_c, and each brush connected with the motor through a different resistance 13_a, 13_b, 13_c. In Fig. 5 the different resistances 13 are placed, not on the trucker between the brushes and the motor as in Fig. 4, but on the track between the conductors 10 and the source of current.

In Fig. 6 the worm 7 is turned when required by connection with the track wheels 4 through a clutch. On the shaft 14, keyed to worm 7, is mounted free a skew wheel 15 engaging skew wheel 16 on the axle of wheel 4. On the end of shaft 14 slides a dog or friction clutch 17 turned by a feather on the shaft 5 caused to engage skew wheel 15 by a pivoted fork 18 which is moved one way by a cam such as 19 on the track and the other way by a cam such as 20 on the track, and is held in the position in which the cams leave it by a spring detent 21. Where rotation of shaft 14 is to begin, a cam 19 is fixed to the track; where it is to cease, a cam 20 is placed. For reversing the rotation of shaft 14 any reversing gear may be similarly thrown into action.

In Fig. 7 the skew gear 15 is keyed to the shaft 14 turned when required by a gear wheel carrying a star wheel 22 engaging pin 23 on the track, the arms of the star, as in Fig. 3, being cams adapted to engage smoothly so that rotation starts gradually. If the platform 1 is to be turned uniformly the pins 23 are evenly spaced if the turning is to be slower they are spaced farther apart; and if the turning is to be reversed pins are placed so as to engage another

star wheel having arms curved the other way, shown dotted, and on the opposite side of its pivot.

In Fig. 8 are shown only the platforms of five truckers in different positions on a semi-circular track. Each has two arms 24 at right angles to each other, carrying pins 25 and 26 in different planes. Strikers 27, 27_a are mounted at suitable intervals along the track, each having a gap permitting pin 25 or pin 26 to pass it when the platform is level, in which case the paths of the pins 25 and 26 are those shown chain-dotted. In the upper quadrant variations in the inclination of the platform I do not cause the pin 25 to leave this path sufficiently for certain operation of a striker and consequently strikers 27_a are placed for similar action with pin 26. When a striker is engaged by the pin 25 or the pin 26 it is moved, the arrangement being such that this movement cuts off the motive power of the truckers.

Instead of pins 25 and 26 and strikers 27 and 27_a there may be brushes adapted to make contact with terminals on either side of the path so as to complete a relay electric circuit to cause the motive power to be cut off.

Figs. 9 and 9^a, read together, show a vertical section, and Fig. 10 shows an end view of one semi-circular end of a track and truckers, the platforms of the truckers having cam pins engaging cams on the track. The lowest trucker is shown in elevation in Figs. 9 and 9^a and Fig. 10. The other truckers in Figs. 9 and 9^a and the track are shown in section on line A—A of Fig. 10 which gives a view of the track looking from left to right in Figs. 9 and 9^a, with many features omitted for clearness, including all truckers except the lowest and the next but one.

Each trucker consists of a platform 1 mounted on a pivot shaft 3 which is carried in two side members 2, each supported at each end by an axle 5 provided with two outer track wheels 4_a and two inner track wheels 4_b. With motion as shown by the arrow the wheels 4_a run counter clockwise, and 4_b run clockwise on the rails with which they are in contact as shown in Fig. 10. The inner wheels are fixed on the axle 5 running in a sleeve 2_a which forms part of the frame with the side members 2. The outer wheels may run loosely, preferably on ball bearings of large diameter attached to the inner wheels so that they are well controlled against side play. The inner wheels may be driven by electric motors 30 and gearing 31, while these wheels are bearing the weight on the bottom straight track. On the top straight track the outer wheels bear the weight and can be driven by reversing gear from the motors if necessary.

The wheels may be kept from sidewise motion by flanges, but I usually prefer to use rollers 32 which run on the inside of the rails farthest from the center, but on the upper straight track these rails are removed to permit of transfers to and from the trucker platforms and here I provide a channel 33 in which run rollers 34 depending from each end of the platform 1. The upper of these is of large diameter and each touches only one side of the channel, one revolving one way, and the other the opposite way.

Each platform 1 carries 4 cam pins 35_a, 35_b, 35_c, 35_d, each preferably having an anti-friction roller, and four cams 36_a, 36_b, 36_c, 36_d are fixed to the track so as to be engaged successively by the cam pins. Cam pin 35_a first engages cam 36_a and in so doing maintains the platform 1 level. Cam 36_a ends at a point where the normal to it passes within the distance (a) of the pivot 3, and then cam pin 35_b engages cam 36_b; when this ends for the same reason cam pin 35_c engages cam 36_c and similarly later cam pin 35_d engages cam 36_d.

The dotted arcs over the platforms in Fig. 9, and the rectangles in Fig. 10 show the limits of loads which will clear the axles and side members as these revolve around the platform. In Fig. 10 the supports of the track rails are shown clearing these limits as well.

The rollers 32 are shown mounted in cradles which can be turned by any suitable device so that the axis of the roller is always normal to the track rail, for example by gearing from a star wheel turned by pins on the track as in Fig. 3. This adjustment is required near the beginning and end of a circular portion of the track.

Having thus described the nature of the said invention and the best means I know of carrying the same into practical effect, I claim:—

1. Apparatus for handling, sorting and distributing parcels, bales and loads of goods and the like by truckers running on a track of varying inclination, wherein a frame carried by wheels follows the inclination of the track, a platform bearing the goods is mounted to turn on an axis on the frame, and means on the trucker coöperating with means on the track are provided whereby the platform is maintained level whatever the inclination of the frame.

2. Apparatus according to claim 1, wherein the platform is pivoted to the frame on a horizontal axis.

3. Apparatus according to claim 1, wherein the platform pivot is supported by the frame on both sides of the platform and wherein the faces of the trucker frame are flush with the platform on a horizontal track, for the purpose set forth.

4. Apparatus according to claim 1, wherein the leveling means comprise parts on the platform mounted in driving engage-

ment with parts on the frame which in turn are operated by parts on the track.

5. Apparatus according to claim 1, wherein the leveling means comprise bodies such as cam pins on the platform directly engaging bodies such as cams fixed to the track.

6. Apparatus for handling, sorting and distributing parcels, bales and loads of goods and the like by truckers running on a track of varying inclination, wherein a frame carried by wheels follows the inclination of the track, a platform bearing the goods is mounted to turn on an axis on the frame, an electric motor carried by the trucker, means whereby the electric motor turns the platform on the frame, a rheostat in the circuit of the said motor, brushes on the trucker in the said circuit, and conductors on the track adapted to make electrical contact with the said brushes, for the purpose set forth.

7. Apparatus for handling, sorting and distributing parcels, bales and loads of goods and the like by truckers running on a track of varying inclination, wherein a frame carried by wheels follows the inclination of the track, a platform bearing the goods is mounted to turn on an axis on the frame, an electric motor carried by the trucker, means whereby the electric motor turns the platform in the frame, a rheostat mounted on the trucker in the circuit of the said motor and means carried by the trucker and on the track adapted to engage mechanically and to operate the rheostat, for the purpose set forth.

8. Apparatus for handling, sorting and distributing parcels, bales and loads of goods and the like by truckers running on a track of varying inclination, wherein a frame carried by wheels follows the inclination of the track, a platform bearing the goods is mounted to turn on an axis on the frame, an electric motor carried by the trucker, means whereby the electric motor turns the platform in the frame, electrical contact strips placed in different transverse positions on the track and brushes carried by the trucker in the circuit of the said motor and in different transverse positions of the trucker so that they engage the said contact strips, for the purpose set forth.

9. For turning the platform as referred to in claim 1, a gear between the platform and the running wheels of the trucker and means on the track for mechanically operating the said gear.

10. For turning the platform as referred to in claim 1, a gear between the platform and the running wheels of the trucker, an electromagnet on the trucker for operating the said gear and means on the track for completing the circuit of the said electromagnet.

11. In combination with the means referred to in claim 1, means carried by the trucker for cutting off the power which drives it and means on the track in such positions that they are engaged by the said cutting-off means to operate the latter when the platform passing them is not level.

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

GUY ERNEST LLOYD.