I. KIRALFY.

AMUSEMENT OR TRANSPORTING DEVICE.

APPLICATION FILED JUNE 28, 1912.

1,043,846.

Patented Nov. 12, 1912.

6 SHEETS—SHEET 1.

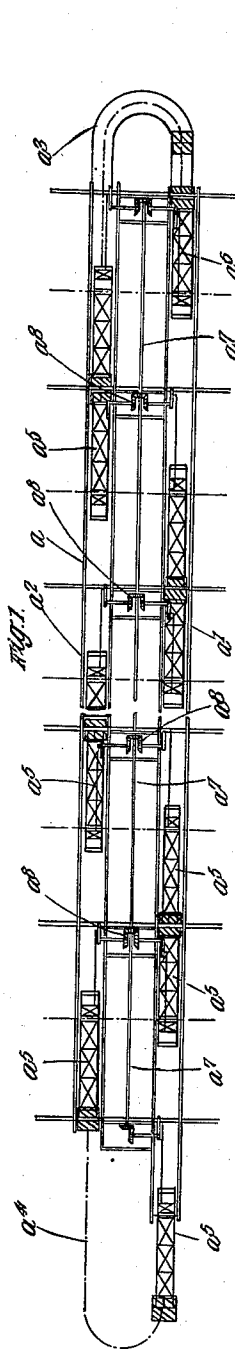

Fig. 1.

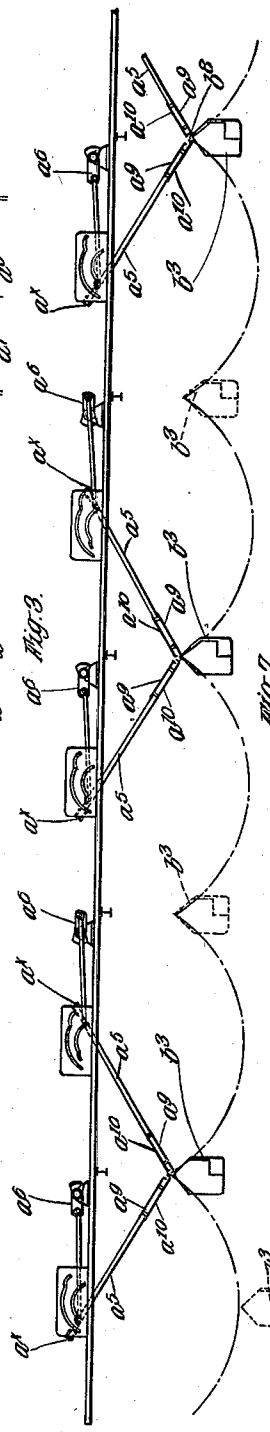

Fig. 3.

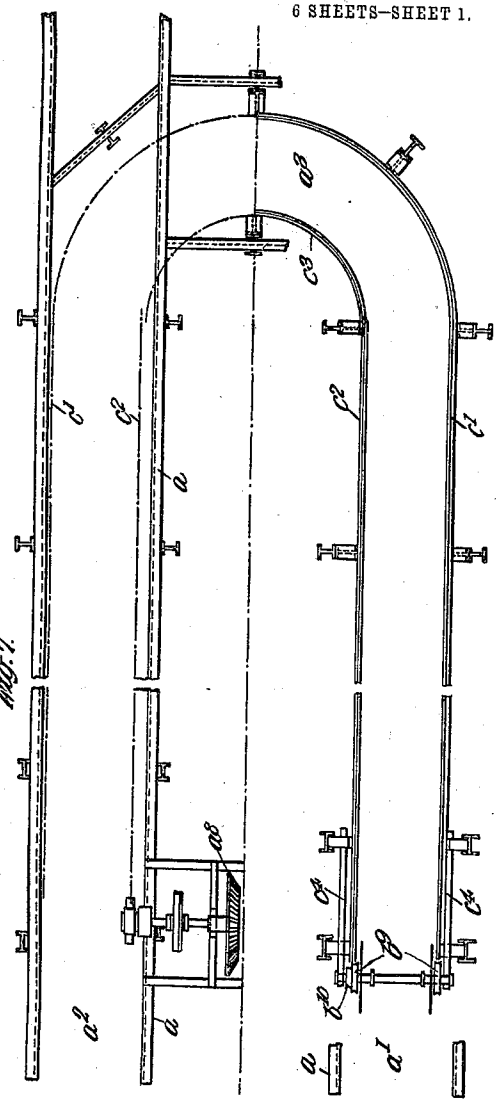

Fig. 4.

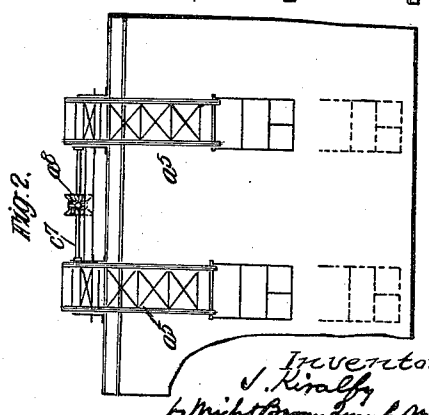

Fig. 2.

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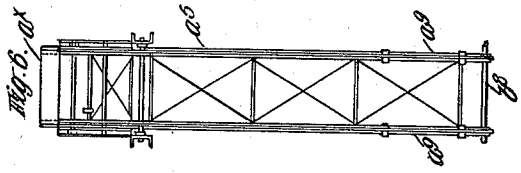

Fig. 6.

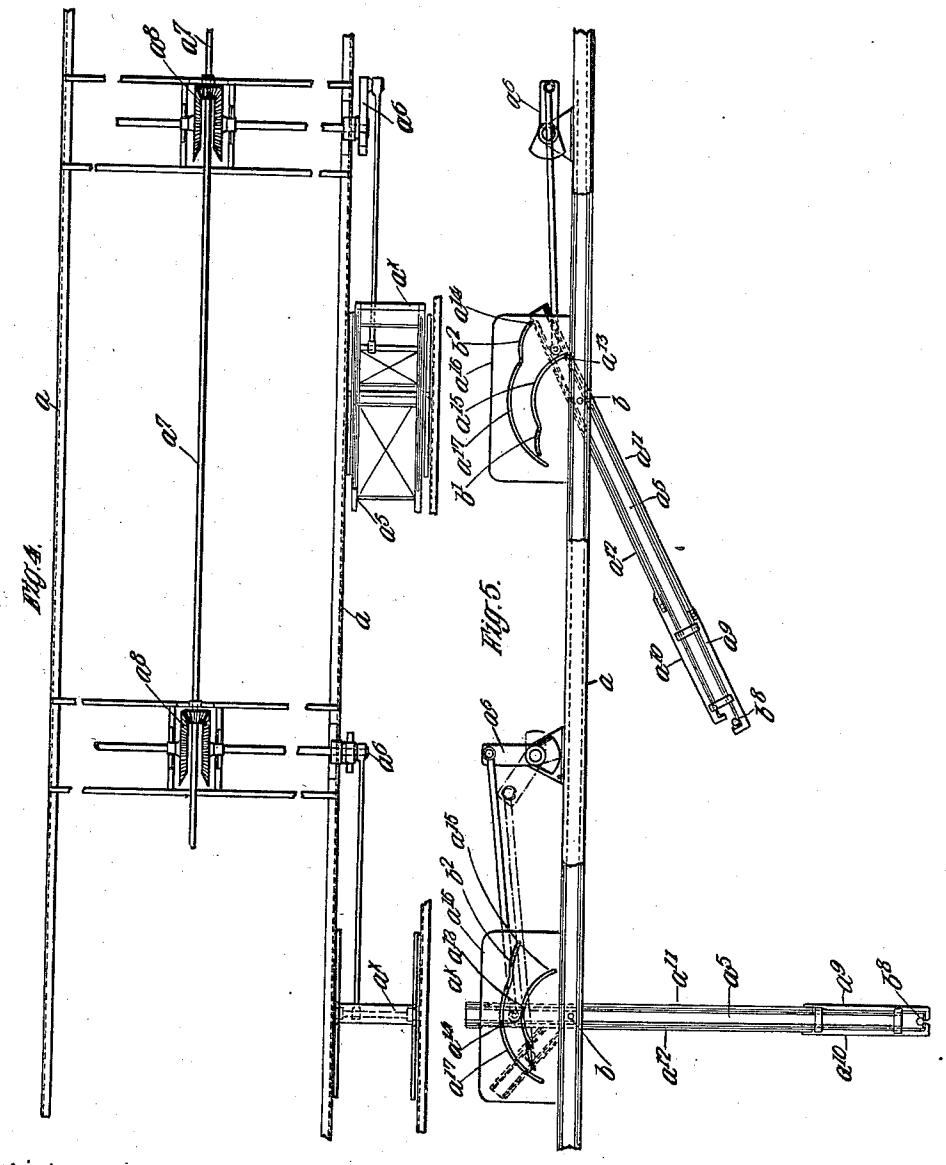

Fig. 4.

Fig. 5.

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Fig. 24.

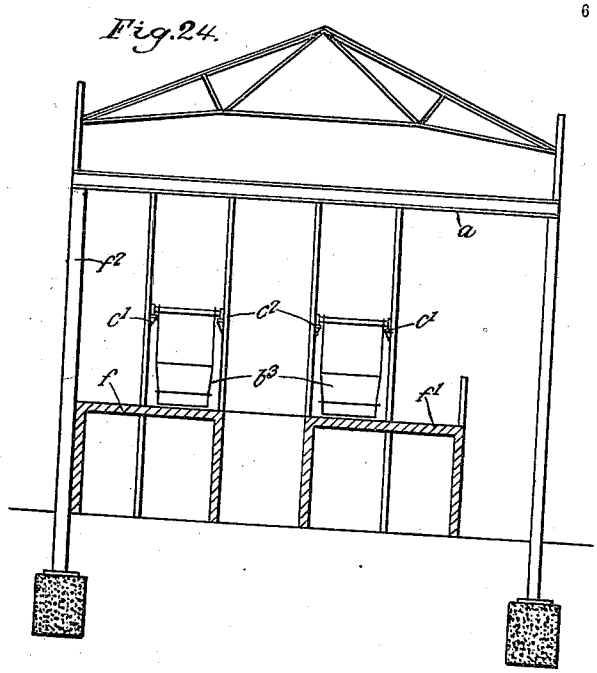

Fig. 8.

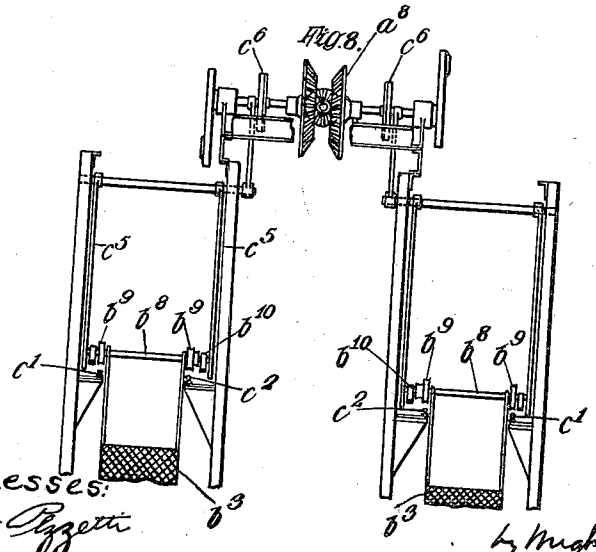

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Fig. 22.

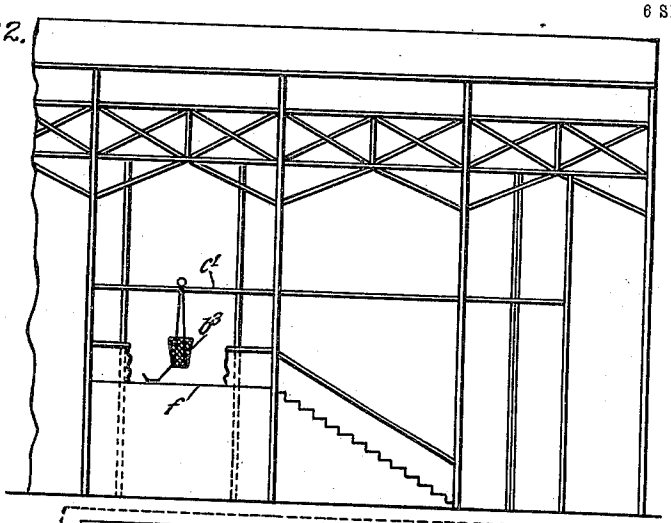

Fig. 23.

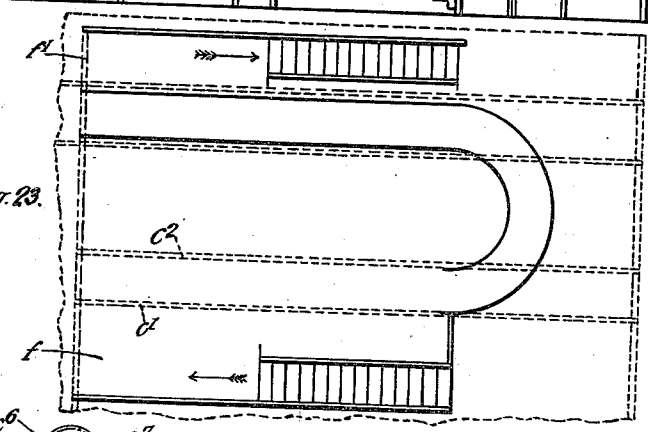

Fig. 9.

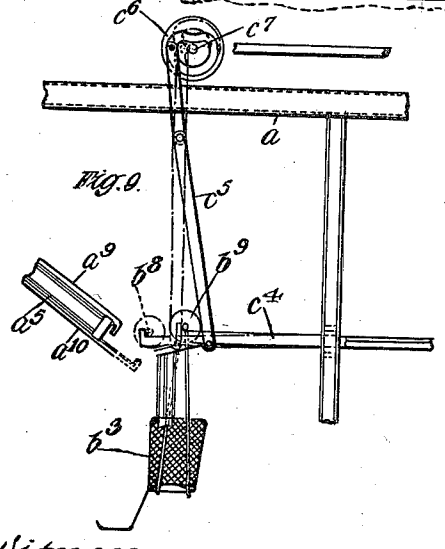

Fig. 10.

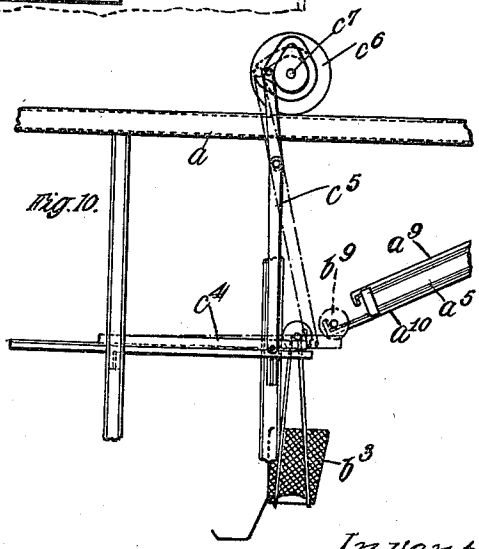

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Fig. 14.

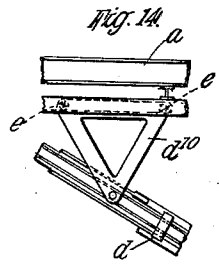


Fig. 13.

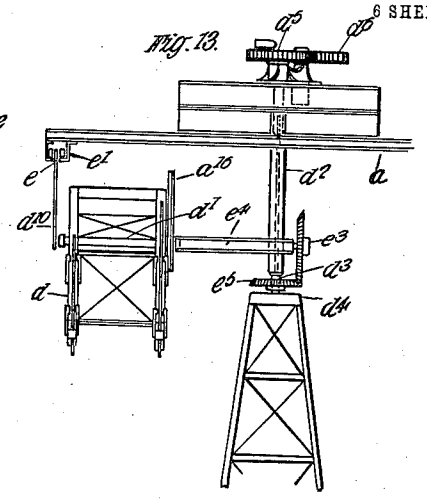


Fig. 11.

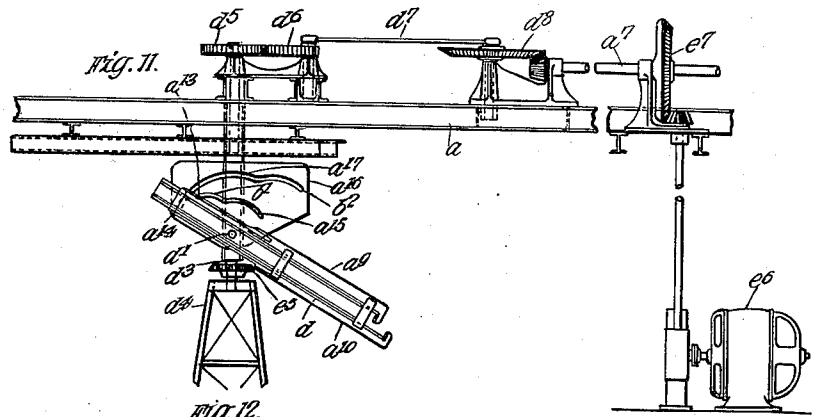
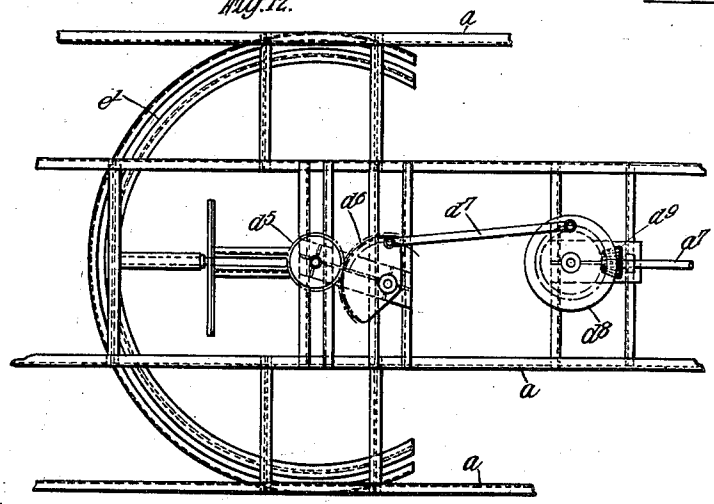


Fig. 12.



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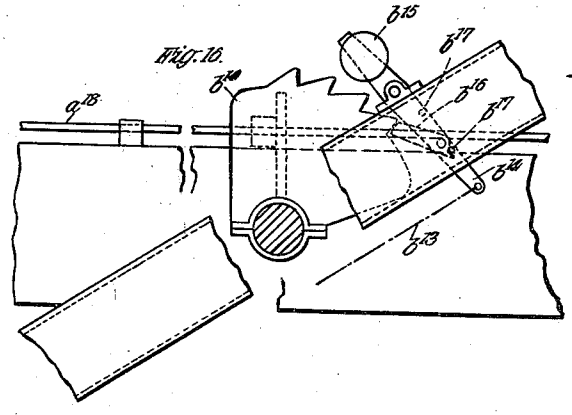
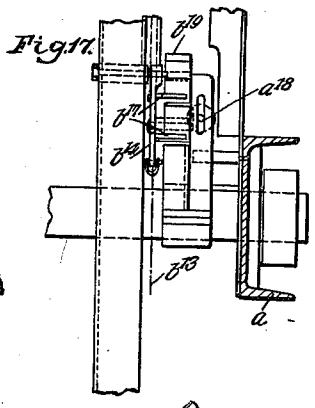
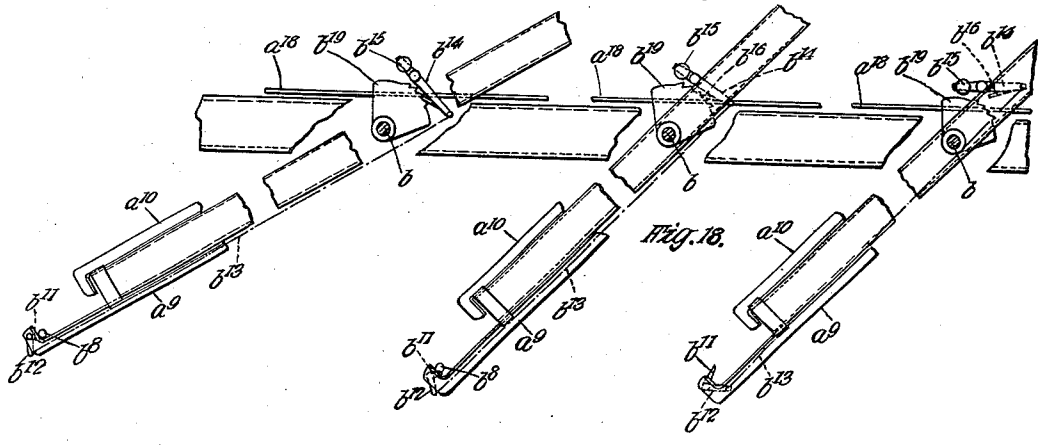
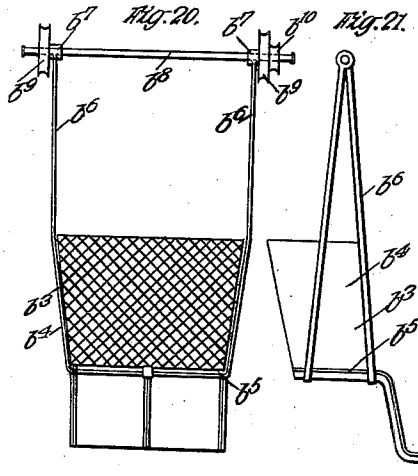
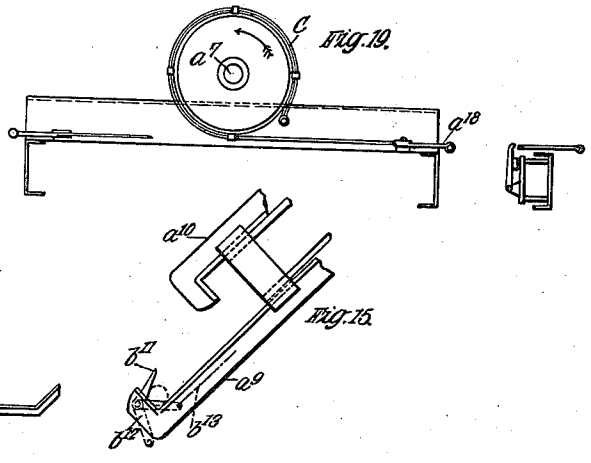
6 SHEETS—SHEET 6.











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UNITED STATES PATENT OFFICE.

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AMUSEMENT OR TRANSPORTING DEVICE.

1,043,846. Specification of Letters Patent. Patented Nov. 12, 1912.

Application filed June 28, 1912. Serial No. 706,469.

To all whom it may concern:

Be it known that I, IMRE KIRALFY, a subject of the King of Great Britain, residing at "Tower House," Cromwell Road, South Kensington, in the county of London, England, have invented certain new and useful Improvements in Amusement or Transporting Devices, of which the following is a specification.

This invention relates to an improved amusement or transporting device comprising a number of pivotally mounted or swinging arms or cantalivers adapted to cooperate to convey cars or bodies from one place to another, said arms or cantalivers being provided with grips or clutches adapted for operation in such a manner as to engage and release the car so that the same is passed from one arm or cantaliver to the next in the series for the purpose of being conveyed from one end to the other of a course or track.

In order that the said invention may be clearly understood and readily carried into effect I will proceed to describe the same with reference to the accompanying drawings in which:

Figure 1 is a plan view of a track provided with the swinging arms or cantalivers. Fig. 2 is a cross sectional elevation. Fig. 3 is a partial side elevation drawn to an enlarged scale. Fig. 4 is a partial plan view of the driving gear for the swinging arms, and Fig. 5 an elevation thereof. Fig. 6 is an end view of one of the swinging arms. Fig. 7 is an enlarged plan view of a track for conveying the cars from one set of swinging arms to an adjacent set. Fig. 8 is a cross section thereof. Figs. 9 and 10 are detail views of the ends of the aforesaid track showing the means for transferring the cars to the swinging arms and for receiving the cars from said arms. Fig. 11 is an elevation of a modified form of swinging arm which is adapted to receive a supplementary movement and the gearing for imparting such movement to the same. Fig. 12 is a plan of the arrangement and Fig. 13 an end view thereof. Fig. 14 is a detail view of the modified arm. Fig. 15 is an enlarged view of the lower end of one of the swinging arms showing the clutches and safety device. Figs. 16 and 17 are respectively a front elevation and end view of the other end of the swinging arm and safety device. Fig. 18 is a view showing a swinging arm with the safety device in three different positions. Fig. 19 shows a band brake pertaining to the safety devices. Figs. 20 and 21 are respectively a front and side elevation of one of the cars employed in the device. Figs. 22 and 23 respectively an elevation and plan of a platform and staging for loading and unloading said cars. Fig. 24 is a cross section of Fig. 22.

According to the embodiment of the invention illustrated, the device comprises a framework a which is arranged so as to constitute an endless track for the passage of the cars, said track having two straight side portions a', a^2 which are connected by end portions a^3, a^4. It will of course be understood that the framework a may be arranged in any other way to suit requirements. The straight portions a' a^2 of the framework a support a number of pivotally mounted swinging arms or cantalivers a^5 which are adapted to be operated by crank mechanism a^6 connected to the upper ends of said arms, suitable counterweights a^x being provided on said arms to facilitate the operation thereof. A main driving shaft a^7 extends along the length of the framework a and is provided with double bevel gears a^8 for actuating the crank mechanism a^6 pertaining to each pair of swinging arms. The swinging arms a^5 may be formed as a kind of trellis or open ironwork and be constructed in the main of iron or steel, of angle, girder, bar or other section. On the lower end of each arm a^5 a suitable clutch is provided and this member is formed of two hooks a^9, a^{10} Fig. 5 which are arranged so as to be capable of relative movement, the respective movements being imparted to said hooks so that they may engage and release a car and pass the same from one arm a^5 to the next in the series for the purpose of conveying the same from one end to the other of the course or track. The hooks a^9, a^{10} are connected to rods a^{11}, a^{12} which extend to the upper end of the swinging arm and which are provided with rollers a^{13}, a^{14}. The roller a^{13} on the rod a^{11} engages with a cam groove a^{15} formed in a plate or member a^{16} fixed to the framework a and the roller a^{14} on the rod a^{12} with a cam groove a^{17} formed in the same plate or member. As the arm a^5 swings on its pivot or shaft b the rollers a^{13}, a^{14} traverse the respective cam

grooves and through the rods a^{11}, a^{12} impart movement to the hooks a^9 a^{10} causing the same to slide along the arm a^5. The major portions of the cam grooves a^{15} and a^{17} are formed to curves struck from the pivot b of the swinging arm but one end of each groove is extended outwardly as shown at b' and b^2, the extended portion b' of the cam groove a^{15} being situated at the opposite end to the extended portion b^2 of the cam groove a^{17}. When the rollers a^{13} a^{14} are in the concentric curved portions of the cam grooves the hooks a^9, a^{10} are closed but when one or other of the rollers enters the outwardly extending portion of its cam groove it serves to move its hook away from the other coacting hook. Owing to the disposition of the outwardly extending portions on the respective cam grooves it will be seen that the respective hooks are actuated at the opposite end positions of the swinging arm, the hook a^9 being operated when the arm a^5 is at the right hand end of its swing, Fig. 3, and the hook a^{10} when the arm a^5 is at the other end of its swing. The arms a^5 are pivoted on the framework a at such a distance apart that their lower depending ends are adapted to cross or overlap, each arm overlapping one or other of its two adjacent arms at the respective limit positions of displacement or swing thereof.

In order to obtain the correct position of the pairs of coacting arms a^5 it is necessary that each arm of the series lags behind the preceding arm in its swinging movement, so that when the first arm has reached the end of its swinging movement the second arm is just approaching the end of its swinging movement, this difference of position or lag extending throughout the consecutive arms of the series. The necessary lag may readily be obtained when the device is assembled by setting the bevel gears a^8 of the respective arms one or two teeth in advance of the gear pertaining to the preceding arm.

The arms a^5 are adapted to convey cars b^3 Figs. 20 and 21 which comprise a body portion b^4 provided with a seat b^5 and a foot rest or support for the passenger or passengers. The car has side members b^6 which are provided at their upper ends with bearings b^7; a shaft b^8 is journaled in these bearings and has secured thereto a number of wheels b^9, b^{10} which are adapted to engage with a rail or track when the car is disengaged from the swinging arms as will be hereinafter described. If desired the cars may be constructed as cages, tubs or drums or any other shape to suit the use to which they are put. The hooks on the lower end of the swinging arms a^5 are adapted to engage with the shaft b^8 of the car as shown in Fig. 3, so that the car may preserve a vertical attitude the car however being free to swing when subjected to the movement incidental to the operation of the arms a^5 and its transference from one arm to another of the series in succession.

Referring to Fig. 3 it will be seen that the arm a^5 on the extreme right of the figure is supporting a car b^3 and that its hook a^{10} has been drawn away from the coacting hook a^9 of the clutch. The arm is in fact just starting on its return swing and is about to transfer the car b^3 to the adjacent arm a^5 which is approaching the end of its swing and which has its hook a^9 drawn away from the hook a^{10}. The car will thus be transferred from the hook a^9 on the first arm to the hook a^{10} on the second arm and so on throughout the series of arms. It will be seen that the hooks a^9, a^{10} on the swinging arms a^5 are only opened or separated at the ends of the swinging movement of the said arms when the car is received from or transferred to an adjacent arm. During the main portion of the swinging movement of the arm the hooks a^9, a^{10} are closed or kept together so that there is no danger of the car leaving or falling from the arm, the car only becoming disengaged from the swinging arm when the adjacent arm is in position to receive the same.

To avoid any risk of accident arising from the failure to transfer a car from one arm to another and the car on the returning arm colliding with the car on the forwardly moving arm a safety attachment is applied to each arm. The arrangement is shown in Figs. 15 to 18, and comprises a catch or trigger b^{11} of bell crank formation which is pivoted to the hook a^9, of the swinging arm a^5. One arm b^{12} of the trigger is connected by a rod b^{13} with a lever b^{14} pivoted to the upper end of the swinging arm a^5 and is adapted to actuate the same as hereinafter described. The lever b^{14} is provided with a counterweight b^{15} and a pawl b^{16} which is adapted to engage with a segmental ratchet b^{19} loosely mounted on the pivot b of the swinging arm so as to be capable of angular movement thereon. Suitable stop pins b^{17} are provided on the swinging arm a^5 to control the extent of the movement of the pawl b^{16} and to keep the same in working relationship with the segmental ratchet b^{19}. Each arm a^5 is provided with a safety attachment and the several segmental ratchets are connected by a sliding rod a^{18}, Figs. 16 and 18, this rod being arranged to operate a band brake c, Fig. 19, on the main driving shaft a^7 when movement is imparted thereto by one or more of the segmental ratchets. In this way the motion of the swinging arms is retarded or stopped when the segmental ratchets are displaced by the pawls pertaining thereto. Instead of controlling a band brake or similar device the rod a^{18} may be arranged to control a switch or valve pertaining to the electric motor or other prime mover em-

ployed to actuate the device. The safety device is operated by the shaft b^8 of the car b^3 when it is engaged by the hooks a^9, a^{10} at the lower extremity of the swinging arm. When the car is transferred to the swinging arm it is received by the hook a^{10}, Fig. 3, and as the arm is performing its forward swinging movement the hook a^9 is brought up to the hook a^{10}. After the arm a^5 has passed the vertical position the shaft b^8 of the car b^3 will roll from the hook a^{10} to the hook a^9 and will engage with and depress the trigger b^{11}, causing the same to turn about its pivot and draw down the rod b^{13}, and with it, the lever b^{14} and pawl b^{16}. The pawl b^{16} however will not engage with the segmental ratchet b^{19} as the teeth of the latter are so arranged that during the forward swinging movement of the arm a^5 the pawl will ride freely over the same. If the car b^3 is transferred from the arm a^5 to the adjacent arm at the end of its forward swinging movement the trigger b^{11} will be returned to its normal position by the counterweight, b^{15} on the lever b^{14}. The lever b^{14} will then assume the position shown on the arm a^5 at the right hand side of Fig. 18, and the pawl b^{19} will be drawn or turned away from the ratchet b^{19} so that it will be out of engagement with the same when the arm a^5 is performing its return swinging movement. Should the arm a^5 fail to transfer the car b^3 to the adjacent arm at the end of its forward movement, the shaft b^8 will retain the trigger b^{11} in its depressed position during the return swing of the arm and the pawl b^{16} will engage with and operate the segmental ratchet b^{19} as shown on the middle arm a^5 in Fig. 18. Consequently the brake c, Fig. 19, or a switch or valve pertaining to the actuating motor will be operated to stop the swinging arms. The arrangement is such that all the arms will be stopped if one or more of the same fail to transfer the car or cars in the manner described.

The end portion a^3 of the track, Figs. 1 and 7 is provided with rails c' c^2 which are adapted to engage with the wheels b^9, on the shaft b^8 of the car when this latter is to be brought from the last swinging arm on the straight portion a^2 of the track to the first swinging arm on the portion a' of the track. In order to prevent the wheels b^9 binding on the curve of the end portion a^3 of the track a supplementary rail c^3, Fig. 7, is provided which is adapted to engage with the wheel b^{10} of the car. As the inner wheel b^{10} is of smaller diameter than the outer wheel b^9 the necessary differential movement for compensating for the curvature of the track is obtained and all danger of the car becoming locked between the rails avoided.

As the car has to be transferred from one end of the portion a^3 of the track to the first of the swinging arms a^5 on the straight portion a' of the track suitable means are provided for effecting the transference. The outgoing end of the portion a^3 of the track is finished with a sliding arm or rail c^4, Fig. 9, which is adapted to receive the car b^3 and carry the same into the path of the first swinging arm a^5 as shown in the dotted position Fig. 9. The sliding or reciprocating movement is imparted to the arm or rail c^4 by a pivoted lever c^5 which is operatively connected to a cam c^6 carried by the shaft c^7 of one of the bevel gears a^8 imparting the swinging movement to the first arm a^5. The cam c^6 has to be set so that the movements of the sliding arm c^4 correspond with those of the arm a^5 and when this latter is approaching its highest altitude the arm c^4 slides out so that the hook a^{10} may take the car therefrom, the arm c^4 is also withdrawn before the swinging arm a^5 commences its return movement. All the movements are timed to effect the automatic transference of the cars and this is readily effected by suitably adjusting and setting the cam c^6. A similar sliding arm c^4 is provided on the incoming end of the portion a^3 of the track, Fig. 10, and this rail is adapted to receive the car from the last swinging arm on that side of the track. The arm c^4 is operated in a similar manner to that previously described but its movements are timed so that it is moved out to engage with the car when the arm a^5 has reached its highest altitude and is not withdrawn until the said arm has commenced its return or downward movement and is out of the path of the sliding arm.

The end portion a^4 of the track remote from the starting point is provided with a swinging arm d Figs. 11 to 14 which in addition to the ordinary swinging movement is adapted to receive a supplementary movement or angular displacement between the two series of arms a^5 on the straight portions a', a^2 of the track so as to transfer the car from one series to the other. This arm d is pivoted or swung on a shaft d' which in turn is rigidly connected with a vertical shaft d^2 mounted in a footstep bearing d^3 formed on a pedestal or support d^4. The upper end of the shaft d^2 is provided with a gear wheel d^5 which is in engagement with a toothed sector d^6 pivoted adjacent to said shaft d^2. One end of a rod or link d^7 is connected to the sector d^6 and the other end of the said rod is secured to a bevel wheel d^8 which meshes with a bevel pinion d^9 carried by the main driving shaft a^7. As the driving shaft rotates an angular movement is imparted to the sector d^6 through the intervention of the bevel wheels d^8, d^9 and the link d^7. A corresponding angular movement will be imparted to the wheel d^5 and through this latter to the arm d, the movement being of such an amplitude as to swing

the arm from one series of arms a^5 to the other. The shaft d' carrying the arm d is supported at its outer end by a carriage d^{10} which is provided with wheels or rollers e for engaging with a semi-circular rail or course e' secured to the main frame-work of the device. The arm d is provided at its lower end with hooks a^9, a^{10} which are operated in a similar manner to the corresponding hooks on the arms a^5; the cam plate or member a^{16} is fixed to the shaft d' and actuates the hooks when the arm d swings on the shaft d'. The swinging movement is imparted to the arm d by a gearing arranged at the end of the shaft d'. This gearing comprises a toothed wheel e^3 secured to the inner end of said shaft the inner end passing through a hollow shaft or tubular member e^4 secured to the vertical shaft d^2. The wheel a^3 is adapted to engage with a stationary wheel e^5 fixed to the pedestal or support d^4 and as the semi-circular movement is imparted to the arm d the wheel e^3 rotates over the wheel e^5 and through the shaft d' imparts the desired swinging movement to the arm d.

Motion may be imparted to the main driving shaft a^7 by means of the motor e^6 and gearing e^7 shown in Fig. 11.

The end a^3 of the track may be provided with platforms f and f' for effecting the loading and unloading of the cars when they are suspended from the stationary rails c', c^2 as shown in Figs. 22 to 24.

The device may be arranged in a suitable structure f^2 or be placed in the open.

It will be understood that the track may be arranged as hereinbefore described or the same may be of a continuous or endless character if the space at disposal will allow of such an arrangement being adopted. The course may, in some cases, be straight, bent, curved, sinuous or other desired forms so as to afford the greatest sensations to those engaging in the amusement.

The device may be constructed to any desired scale and if required it may be in the form of a toy for affording amusement in the house or otherwise.

What I claim and desire to secure by Letters Patent of the United States is:—

1. An amusement or transporting device comprising a car and a number of swinging arms which are adapted to carry said car and to successively coöperate in such a manner as to effect the transit of said car from one place to another.

2. An amusement or transporting device comprising a car and a number of moving arms which are adapted to carry said car and to coöperate in sequence to effect the transit of said car from one place to another.

3. An amusement or transporting device comprising in combination a car, a number of coöperating moving arms, and clutches on said arms adapted to engage and release the car so that the same is passed from one arm to the next in the series.

4. An amusement or transporting device comprising in combination a car, a number of coöperating swinging arms, clutches on said arms and cams for operating said clutches so that they may be in condition for receiving and transferring the car when the arms are at the respective limit positions of displacement.

5. In an amusement or transporting device the combination of a number of cars, a number of swinging arms which are adapted to coöperate in sequence to successively receive convey and transfer the cars and safety devices on said swinging arms which are adapted to retard or stop the movement of the arms if one or more of the same fails or fail to transfer or deliver a car to the adjacent arm or device for receiving the same.

6. In an amusement or transporting device the combination of a number of cars, a plurality of coöperating swinging arms, clutches on said arms, cams for operating said clutches for receiving and transferring the cars and safety devices on said swinging arms for retarding or stopping the movement of the arms if one or more of the same fails or fail to transfer or deliver a car to the adjacent arm or device for receiving the same.

7. In an amusement or transporting device the combination of a number of cars, a plurality of coöperating swinging arms, clutches on said arms, cams for operating said clutches for receiving and transferring the cars and a number of interconnected safety devices which are adapted to retard or stop the movement of the arms if one or more of the same fails or fail to transfer or deliver a car to the adjacent arm or device for receiving the same.

8. In an amusement or transporting device the combination of a number of cars, a plurality of coöperating swinging arms, clutches on said arms, cams for operating said clutches for receiving and transferring the cars and a safety device on each of the swinging arms comprising a ratchet and pawl mechanism which is adapted to effect the stoppage of the same if the car is not transferred at the end of the forward movement thereof.

9. In an amusement or transporting device the combination of a car, a number of swinging arms which are adapted to cooperate in sequence to convey the car and a swinging arm which receives a supplementary movement by the displacement of its pivot or support so as to change the line of motion of the car.

10. In an amusement or transporting device the combination of a car, a number of

swinging arms which are adapted to engage and release the car so that the same is passed from one arm to the next in the series and a number of swinging arms which receive a supplementary movement so as to change the line of motion of the car.

11. In an amusement or transporting device the combination of a car, a number of swinging arms which are adapted to engage and release the car so that the same is passed from one arm to the next in the series, a number of swinging arms which receive a supplementary movement so as to change the line of motion of the car, a track for supporting the car during the loading and discharging operations and reciprocating end rails on said track, adapted to transfer the car to or receive the same from the swinging arms.

12. In an amusement or transporting device the combination of a car, a number of coöperating swinging arms, clutches on said arms, cams for operating said clutches so that they may be in condition for receiving and transferring the car, a swinging arm which receives a supplementary movement so as to change the line of motion of the car, a track for supporting the car during the loading and discharging operations and reciprocating end rails on said track adapted to transfer the car to or receive the same from the swinging arms.

13. In an amusement or transporting device the combination of a car, a number of coöperating swinging arms, a main driving shaft, gearing for actuating said swinging arms so that they lag behind each other in their swinging movements, clutches on the swinging arms, cams for operating said clutches so that they may be in condition for receiving and transferring the car, a swinging arm which receives a supplementary movement so as to change the line of motion of the car a track for supporting the car during the loading and discharging operations and reciprocating end rails on said track adapted to transfer the car to or receive the same from the swinging arms.

14. In an amusement or transporting device the combination of a car, a shaft rotatably mounted thereon, a number of wheels of different diameters on said shaft, a number of coöperating swinging arms, a driving shaft, gearing for actuating said swinging arms, so that they lag behind each other in their swinging movements, clutches on the swinging arms, cams for operating said clutches so that they may be in condition for receiving and transferring the car, a swinging arm which receives a supplementary movement so as to change the line of motion of the car, a track for supporting the car during the loading and discharging operations and reciprocating end rails on said track adapted to transfer the car to or receive the same from the swinging arms.

In testimony whereof I affix my signature in presence of two witnesses.

IMRE KIRALFY.

Witnesses:
EUSTACE H. BURKE,
ARTHUR T. WAGHORN.