Jan. 5, 1926.

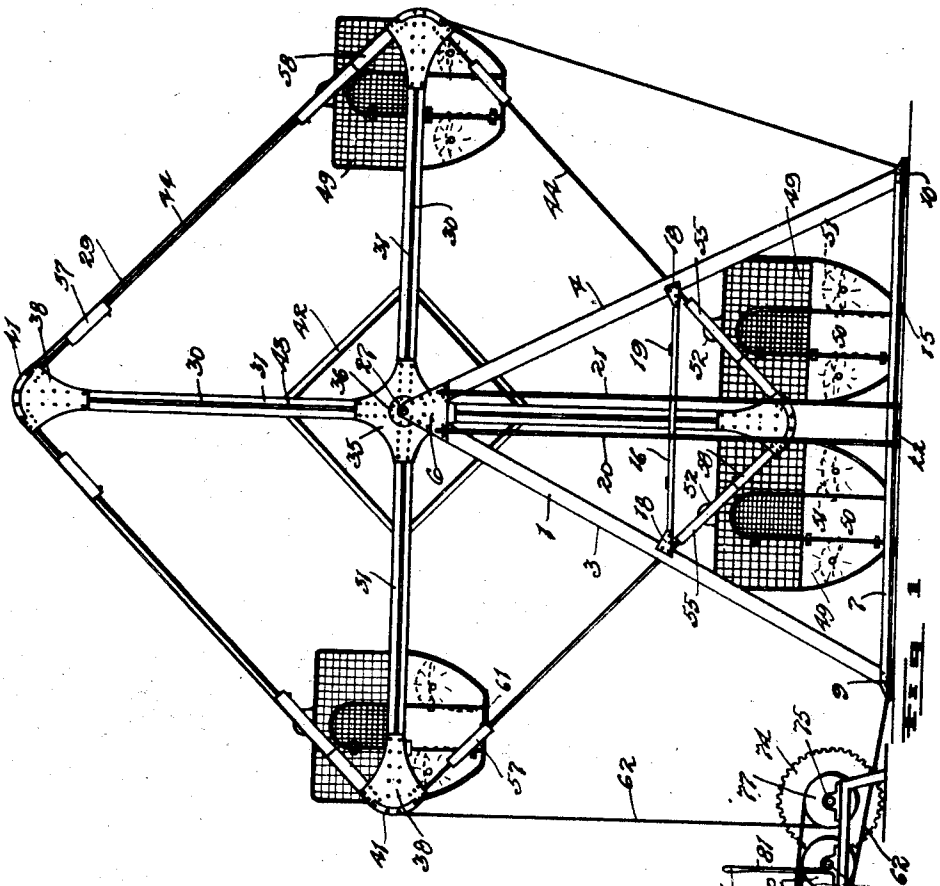
1,568,424

J. P. SMITH

FERRIS WHEEL

Filed Feb. 12, 1925

3 Sheets-Sheet 1



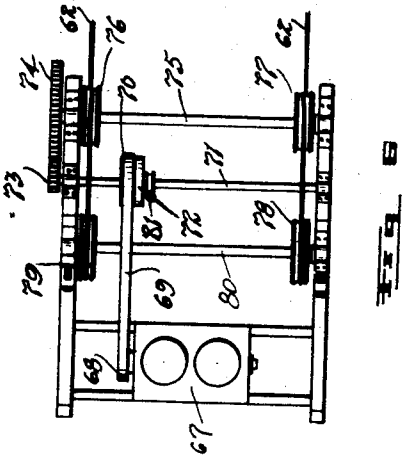


Fig. 5

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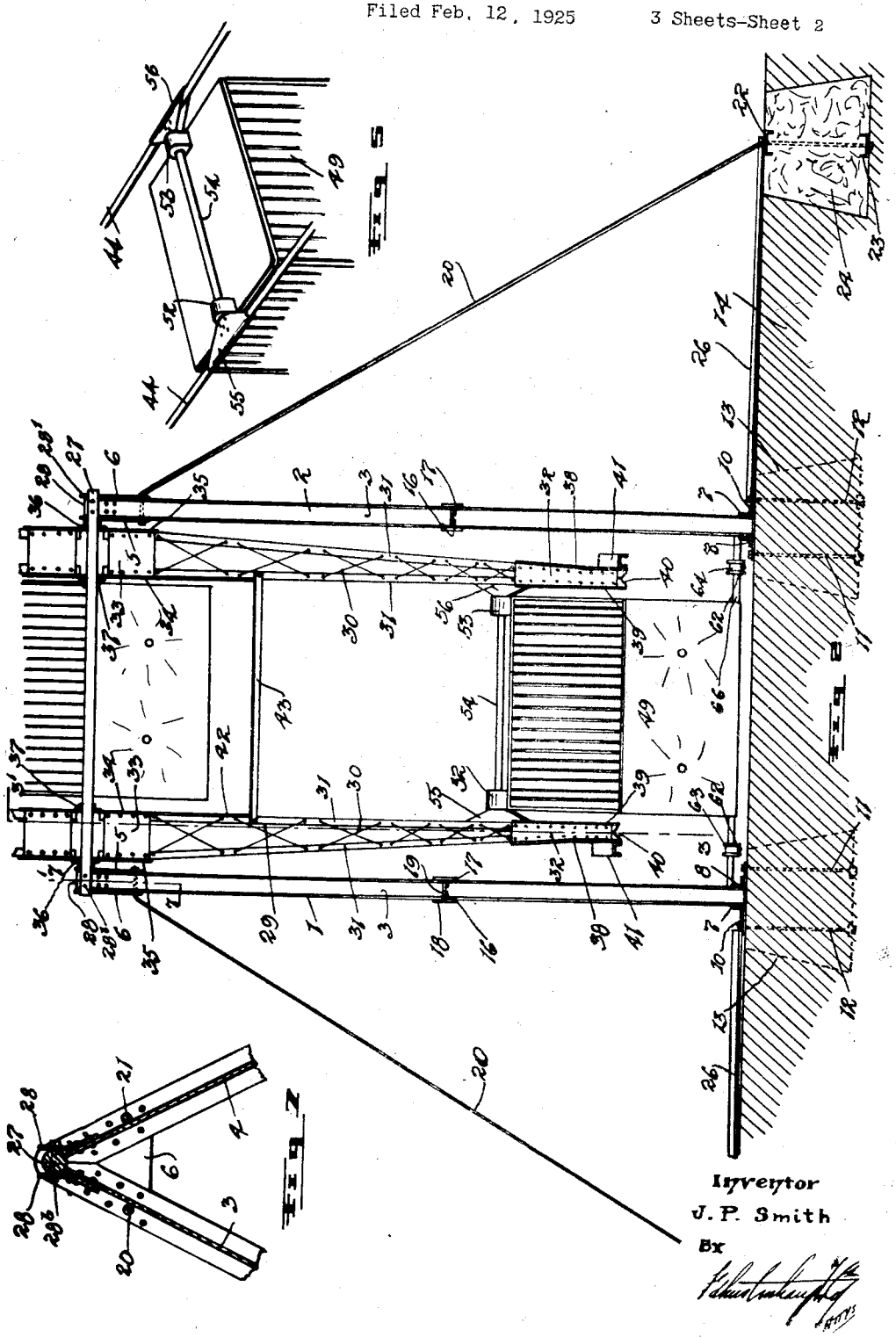

Fig. 5

Fig. 7

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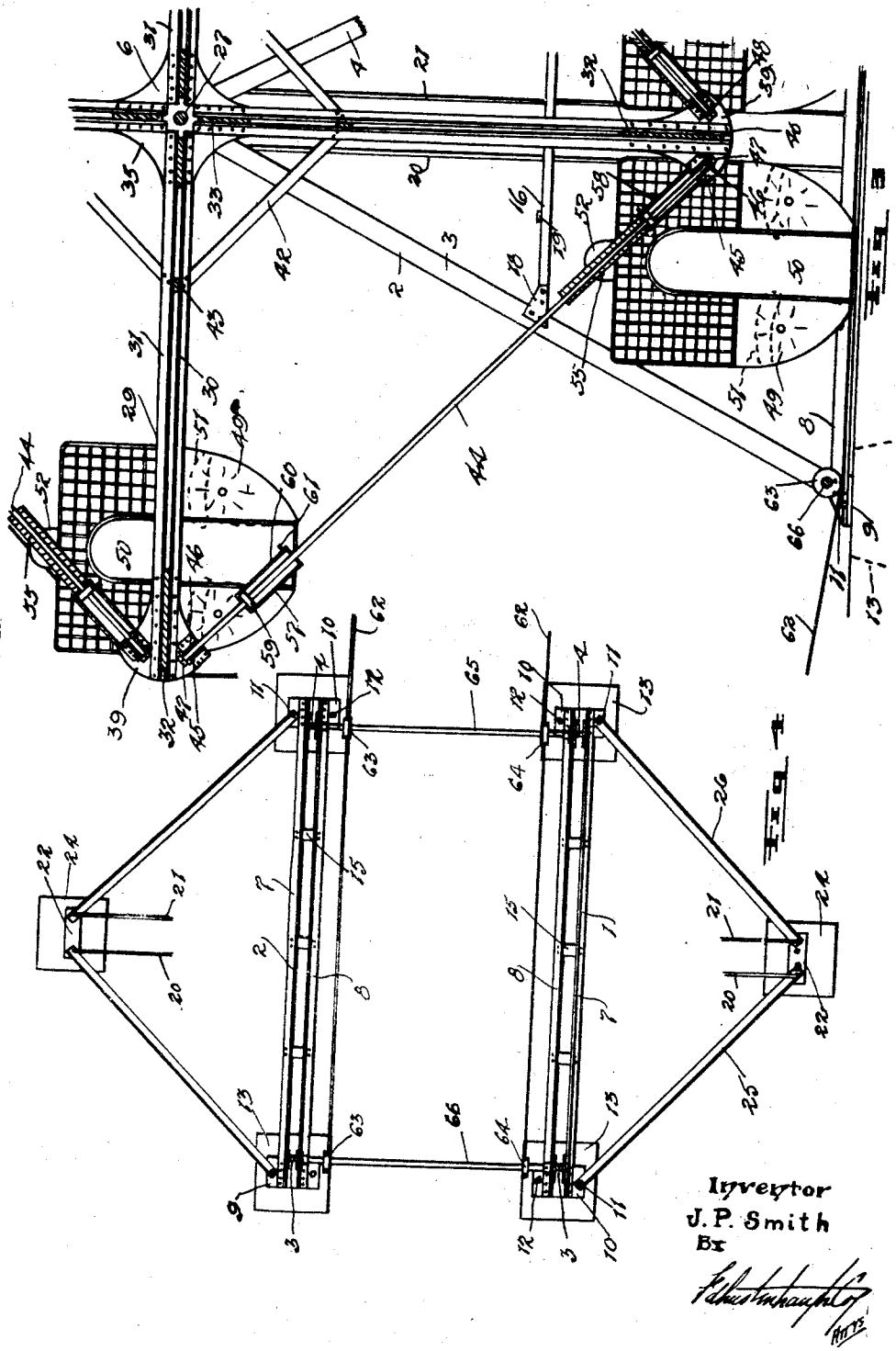

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UNITED STATES PATENT OFFICE.

JEHIEL P. SMITH, OF WINNIPEG, MANITOBA, CANADA.

FERRIS WHEEL.

Application filed February 12, 1925. Serial No. 8,777.

To all whom it may concern:

Be it known that I, JEHIEL P. SMITH, a subject of the King of Great Britain, of the city of Winnipeg, in the Province of Manitoba, Canada, have invented certain new and useful Improvements in Ferris Wheels, of which the following is the specification.

The invention relates to improvements in Ferris wheels and an object of the invention is to provide a Ferris wheel having passenger carriages which rotate with the wheel and which also, during such rotation, take a slide or a glide, thereby making the ride much more exciting and thrilling as well as having the other well known features of the customary Ferris wheel.

A further object is to construct a Ferris wheel with the above special feature wherein the carriage can be gradually brought to a stop at the end of its sliding travel so as to avoid any possibility of an accident, and further to construct the entire machine in a rigid and durable manner.

A further object of the invention is to construct the machine so that a plurality of carriages can be readily brought to loading position by rotating the wheel, a pre-determined distance.

With the above more important objects in view, the invention consists essentially in the arrangement and construction of parts hereinafter more particularly described, reference being had to the accompanying drawings in which:

Fig. 1 is a side view of the Ferris wheel.

Fig. 2 is a vertical sectional view centrally through the lower part of the machine.

Fig. 3 is a vertical sectional view at 3—3′ Figure 2.

Fig. 4 is a plan view of the bottom structure of the machine.

Fig. 5 is a perspective view showing the manner in which the carriages are suspended

Fig. 6 is a plan view of the engine and associated parts.

Fig. 7 is a vertical sectional view at 7—7′ Figure 2.

In the drawings like characters of reference indicate corresponding parts in the several figures.

The wheel is rotatably supported by two similar legs 1 and 2 of an A-frame construction and the lower ends of the legs are very firmly mounted on the ground and the legs are amply braced and reinforced. As the legs are similarily constructed, I will only describe the details of one of them.

Each leg presents a pair of upwardly converging H-bars 3 and 4, to the upper ends of which I firmly fasten similar opposing side plates 5 and 6. The lower ends of the bars 3 and 4 are connected by a horizontal lying pair of angle bars 7 and 8 and the angle bars have their ends permanently riveted to base plates 9 and 10. These base plates are firmly bolted as indicated at 11 and 12 to cement or such like blocks 13 firmly embedded in the ground as indicated at 14. The angle bars 7 and 8 are suitably reinforced by cross bars 15 and the H-bars are connected mid-way of their length by angle bars 16 and 17 fastened to the legs by tie plates 18 and connected one to the other by cross reinforcing plates 19. Similar, angularly disposed guide or truss rods 20 and 21 are passed through and fastened to the opposing plates 5 and 6 and have their outer ends passing through short lengths of channel bars 22 and 23 located at the upper and undersides of cement or such like blocks 24 embedded in the ground. Horizontal lying angle bars 25 and 26 extend between the plates 9 and 10 and the bars 22. The legs are suitably spaced and directly opposed, and the base structure is such that they are firmly anchored to the ground, amply reinforced and effectively trussed.

The main axle 27 of the wheel passes through the plates 5 and 6 at the upper ends of the legs, and the H-bars carry short pairs of opposing plates 28 which are firmly riveted to the webs thereof and have their upper ends spanning the end of the shaft or axle and firmly fastened thereto by cross bolts 28′. The shaft accordingly is non-rotatable. The Ferris wheel, which is indicated generally by the reference numeral 29, is rotatably mounted on the shaft between the legs and the opposite sides of the wheel are a duplication, one of the other, so that the description of one will suffice.

Four similar arms 30, herein shown as ninety degrees apart, radiate from the shaft, being carried by a suitable hub rotatably mounted on the shaft. Each arm comprises four angle bars 31, 31 grouped in inner and outer pairs and having the ends of the pairs, remote from the shaft, converging and fastened together by a tie plate 32 riveted to the flanges of the pairs of angle

bars. The inner ends of the inner and outer pairs of angle bars are connected also by a tie plate 33 firmly riveted to the flanges thereof, and the inner ends of the inner pairs of angle bars are all firmly riveted to an inner side plate 34, whilst those of the outer pairs of angle bars are riveted to a similar, opposing, outer side plate 35. The shaft 27 passes centrally through the plates 34 and 35 and to the said latter plates I permanently secure collars 36 and 37 which are rotatably mounted on the shaft and form, together with other associated parts, a hub for the wheel at each side.

To the outer end of each arm 30 I permanently fasten fan-shaped side plates 38 and 39 and between these latter side plates the ends of the angle bars, forming the arms, are cut away at an angle as indicated best at 40, Figure 2, to permit of the withdrawal of the guide rods later referred to. To the outer sides of the outer fan shaped plates I secure curved cable guides 41, 41. Brace bars 42 extend angularly between the inner angle bars of the adjacent arms 30 and brace bars 43 extend between the inner pairs of angle bars forming the arms at the points where these later braces appear. The outer ends of the arms 30 are connected together by combination tie and guide rods 44 forming tracks which in the present instance, appear in square formation. The ends of the rods 44 are herein shown as passing between a pair of bars 45 and 46 having the ends thereof flanged and permanently riveted to the fan shaped plates 38 and 39, and the ends of the rods are fitted with nuts 47 which screw up against suitable washers 48 engaging the outer edges of the bars 45 and 46. In this way I can readily tension the rods 44.

From the above arrangement, it will be seen that I provide four spaced pair of guide rods positioned ninety degrees apart and each pair or set of rods carries slidably, a carriage indicated generally by the reference numeral 49 in which the passengers are seated. The details of the carriage are not herein enlarged upon as any convenient carrier for the rider can be used.

In the present instance the carriage is provided with end doors 50 to permit of the entrance of the riders into the carriage and internally it is provided with opposing seats indicated at 51. The top of each carriage, in the present instance, is provided with a pair of opposing hangers 52 and 53 which are rotatably mounted on a cross shaft 54, and the ends of the cross shaft are provided with end carriers 55 and 56 slidably mounted on the pair or set of guide rods 44. The carriers 55 and 56 are given ample bearing surface on the rods 44 so that the shaft is always properly aligned and the carriage will slide freely.

The ends of the pairs of guide rods 44 are provided with bumpers or buffers 57 and 58 against which the carriers 55 and 56 strike when approaching the end of their travel. In the present instance I have shown air bumpers, but it will be readily understood that I do not desire to be limited to this type of bumper or shock absorber as various other devices could be provided to take their place and without departing from the spirit of the invention, as hereinafter claimed.

The air operating bumper or shock absorber comprises in each instance, a piston 59 permanently secured to the rod in a location adjacent the end thereof and this piston operates within a cylinder 60 slidably mounted on the rod 44. The cylinder is closed with the exception of an air valve 61 which limits the passage of air to and from the interior of the cylinder.

In the rotation of the Ferris wheel, the cylinders are adapted to slide down the rods under the action of gravity and when they are struck by the moving carriage, the air previously drawn into the cylinder, is compressed and acts as an air cushion to arrest the moving carriage. The air valve limits the escape of the air from the cylinder and consequently the air in the cylinder is compressed and can only gradually escape, being controlled by the extent of the opening in the valve.

By referring to Figure 1, it will be observed that all the carriages have moved to their lowermost positions on the guide rods and that two of the carriages are in the position where passengers can be conveniently admitted. By rotating the wheel, the other two carriages can be brought to loading position.

The wheel is rotated by similar endless cables or such like 62 which are passed over the guides 41 and around suitable pairs of pulleys 63 and 64 carried by cross shafts 65 and 66 located between the lower ends of the legs.

In the present instance I have shown the wheel as driven by an internal combustion engine 67, but obviously any type of prime mover can be utilized to operate the same. The driving pulley 68 of the internal combustion engine is connected by a belt 69 to a pulley 70 on a suitably mounted counter shaft 71 and a clutch 72 of any approved design is provided so that the counter shaft can be driven at will.

One end of the counter shaft is fitted with a pinion 73 which meshes continuously with a gear 74 located at the end of a suitably mounted cross shaft 75. The cross shaft carries two pulleys 76 and 77 and the cables 62 coming from the wheel are wrapped once around the pulleys 76 and 77 and then passed around two further pulleys 78 and

79 carried by a further cross shaft 80. From the latter pulleys 78 and 79, the cables pass under the pulleys 63 and 64 and then to the wheel. This forms a very positive drive and the arrangement is such that the clutch lever 81 controls the manipulation of the machine.

I have not considered it necessary to enter into the details of the clutch mechanism as any well known type of lever operated clutch can be used to effect the driving of the shaft 71 as desired.

When this wheel is in action it will be seen that each carriage rotates with the wheel and is given intermittently, a sliding movement on the rods 44. Obviously as each carriage, in the rotation of the wheel, is brought to the position where it is free to slide down the rods 44 under the action of gravity, it will start sliding and will gradually increase its momentum until the carriers 55 and 56 strike the bumpers or shock absorbers. This sliding movement of each carriage will give the occupants therein a sensational thrill and will accordingly make the machine very attractive as an amusement appliance in public places.

The shock absorbers or bumpers will be gauged so that they will not abruptly stop the carriages, as such might cause the carriages to rotate around the shafts 54 and cause an accident. It is desirable, however, that the carriages be given a limited rocking movement around these shafts as such will also add to the thrill experienced in riding the machine.

Whilst the various parts have herein been described in detail, it will be readily understood that I do not wish to be limited to such precise construction, as the important part of the invention resides more particularly in a Ferris wheel construction wherein the carriages are not only rotated with the wheel, but are also given a sliding movement during such rotation and does not reside in the structural details of the various parts.

What I claim as my invention is:

1. In a Ferris wheel, a carrier for the rider travelling with the wheel completely around the wheel axis and having a sliding movement during such rotation.

2. In a Ferris wheel, a carrier for the rider travelling with the wheel completely around the wheel axis and having an intermittent sliding movement in the rotation of the wheel.

3. In a Ferris wheel, a carrier for the rider travelling with the wheel completely around the wheel axis and having an intermittent sliding movement under the action of grivity in the rotation of the wheel.

4. In a Ferris wheel, a carrier for the rider pivotally carried by the wheel and travelling with the wheel completely around the wheel axis and mounted to have intermittent sliding movements of pre-determined length as the wheel rotates, the carrier sliding under the action of grivity and maintaining its upright position under such force.

5. In a Ferris wheel, a plurality of pivoted carriers for the riders, said carriers operating at the periphery of the wheel and rotating therewith and each having limited sliding movements under the action of gravity in the rotation of the wheel.

6. In a Ferris wheel, a plurality of slides located at the periphery of the wheel and a pivoted passenger carrier slidably carried by each slide.

7. A Ferris wheel having a plurality of tracks situated adjacent the periphery of the wheel and a pivoted passenger carrier slidably carried by each track.

8. In a Ferris wheel, a plurality of independently mounted passenger carriers situated at the periphery of the wheel and mounted such that in the rotation of the wheel each carrier is alternately rotated with the wheel and then given a limited sliding movement.

9. A Ferris wheel having a plurality of pairs of tracks situated at the periphery of the wheel, a pivoted carriage slidably carried by each pair of tracks and shock absorbers located at the ends of the tracks to arrest the sliding movement of the carriages.

10. A Ferris wheel presenting a plurality of equal length, radiating arms, a pair of parallel tracks connecting the outer ends of adjacent arms, a pivoted carriage slidably mounted on each pair of tracks and shock absorbers located at the ends of the tracks to arrest the sliding movement of the carriages.

11. A rotatably mounted and driven Ferris wheel presenting a plurality of equal length, outstanding arms, pairs of tracks connecting the outer ends of adjacent arms, a pivoted carriage slidably mounted on each pair of tracks and means for arresting the sliding movement of the carriages on the tracks as they approach the ends of the tracks.

12. A rotatably mounted and driven Ferris wheel having a plurality of slides arranged in multi-sided formation around the periphery of the wheel and pivoted passenger carriers carried by the slides.

13. A rotatably mounted and driven Ferris wheel having a plurality of tracks grouped around the periphery thereof in the form of a multi-sided figure with the sides of equal length and containing equal angles, and pivoted carriages slidably mounted on the tracks.

14. A rotatably mounted and driven Ferris wheel presenting a plurality of equispaced, equal length, outstanding arms,

guides connecting the outer ends of adjacent arms, carriers slidably mounted on the guides, passenger carriages pivotally carried by the carriers and shock absorbers located at the ends of the guides.

15. A rotatably mounted and driven Ferris wheel presenting a plurality of equispaced, equal length, outstanding arms, a pair of tracks connecting the outer ends of adjacent arms, a pair of carriers slidably mounted on each pair of tracks, a pivoted carriage carried by each pair of carriers and shock absorbers located at the ends of the tracks.

16. A rotatably mounted and driven Ferris wheel presenting a plurality of equispaced, equal length, outstanding arms, a plurality of tracks connecting the outer ends of adjacent arms, a pivoted carriage slidably carried by each pair of tracks, shock absorbers located at the ends of the tracks and adapted to arrest the sliding movement of the carriage thereon, cable guides secured to the outer ends of the arms and continuous driving cables passing around the cable guides.

17. In a Ferris wheel, a carrier for the rider travelling with the wheel completely around the wheel axis and having alternating gliding and non-gliding periods during such rotation.

18. In a Ferris wheel, a plurality of independently mounted passenger carriers travelling with the wheel completely around the wheel axis and having alternating gliding and non-gliding periods during such rotation.

19. In a Ferris wheel, a plurality of independently mounted and pivoted passenger carriers travelling with the wheel completely around the wheel axis and having alternating gliding and non-gliding periods during such rotation.

20. In a rotating Ferris wheel, a carrier for the rider carried by the wheel and having movements concentric to the wheel alternated with movements in a direction tangential to the wheel in the rotation thereof.

Signed at Winnipeg this 8th day of September 1924.

JEHIEL P. SMITH.