

April 26, 1927.

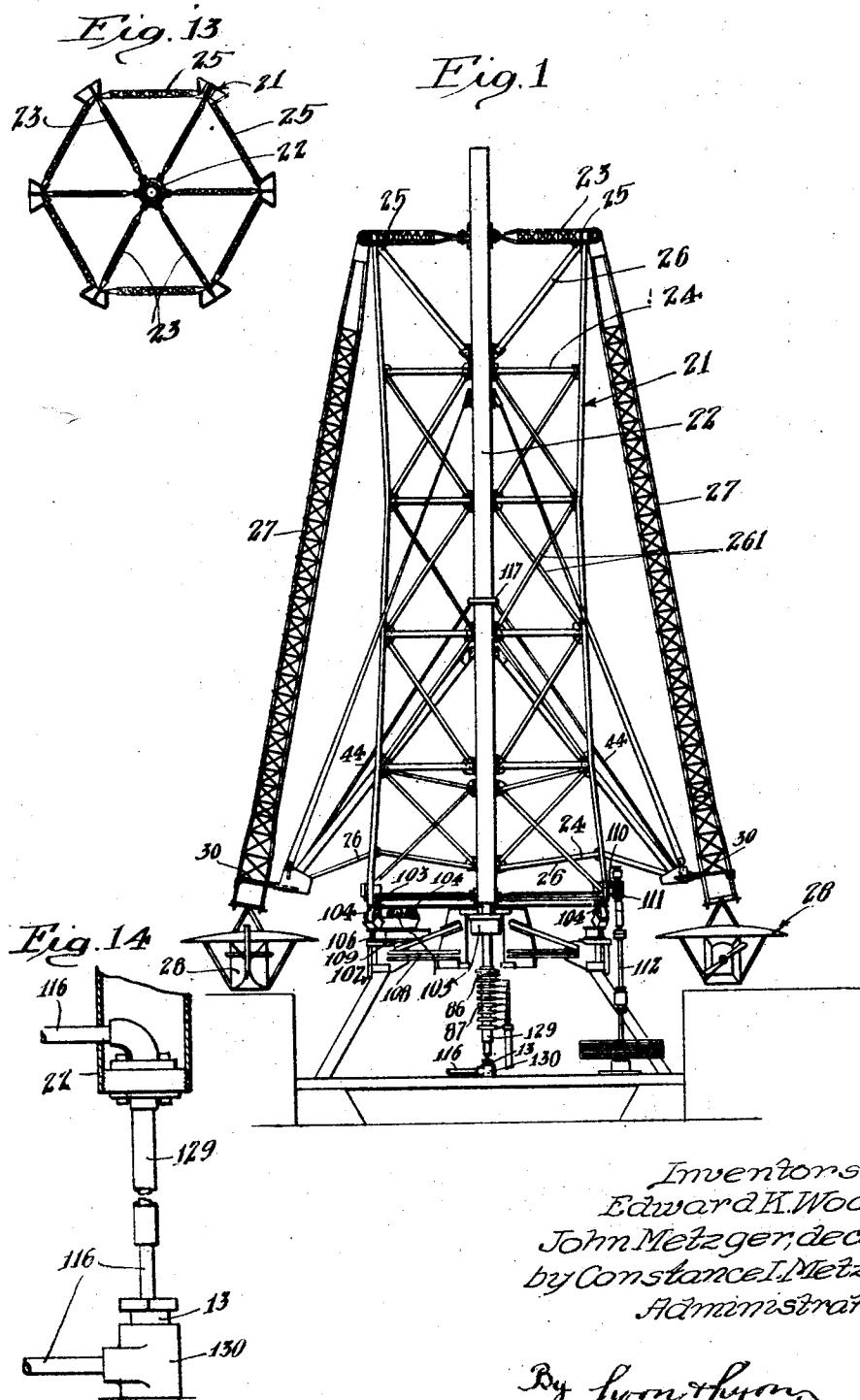
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E. K. WOOD ET AL

AMUSEMENT APPARATUS

Filed Nov. 10, 1925

6 Sheets-Sheet 1



April 26, 1927.

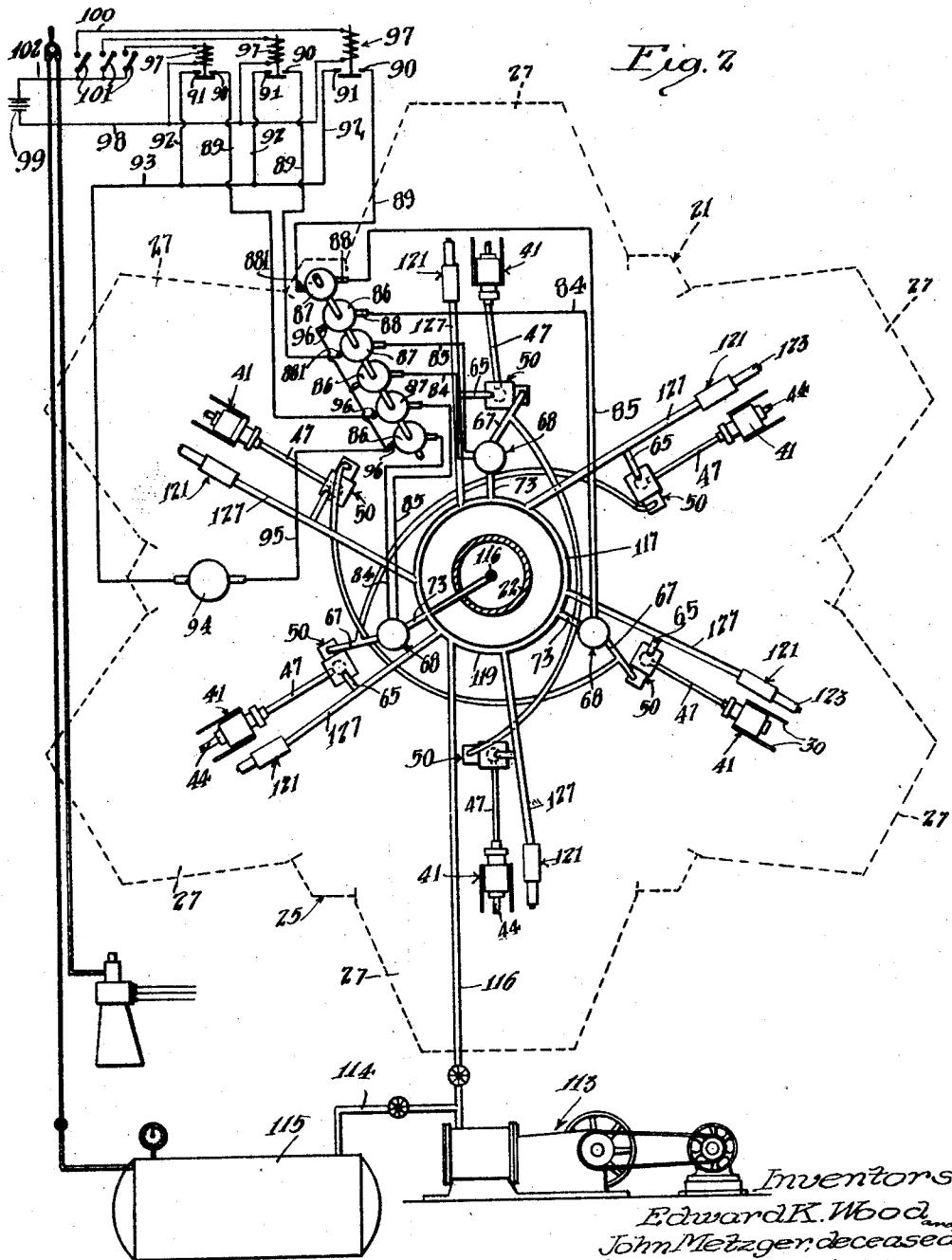
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AMUSEMENT APPARATUS

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6 Sheets-Sheet 2



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April 26, 1927.

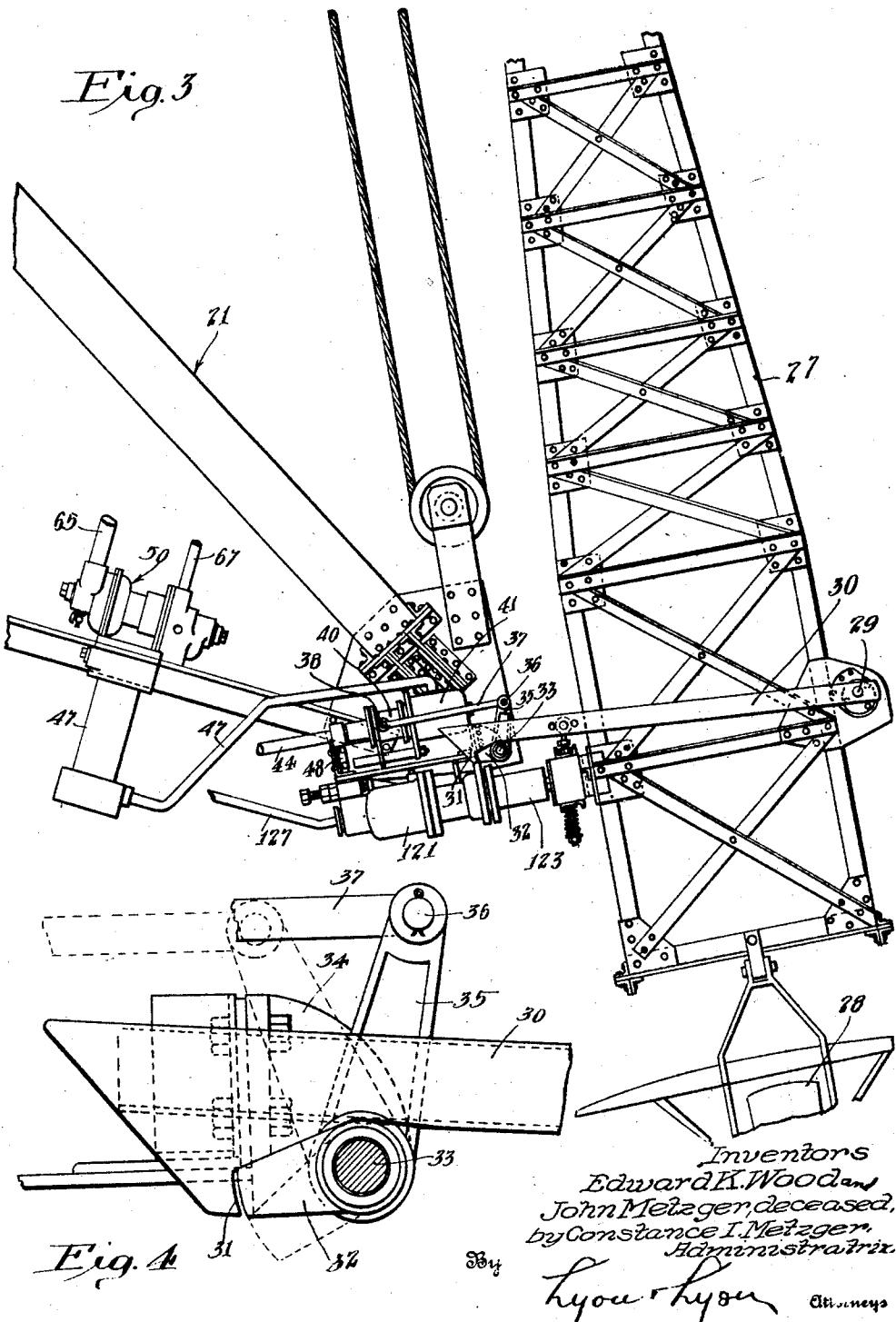
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AMUSEMENT APPARATUS

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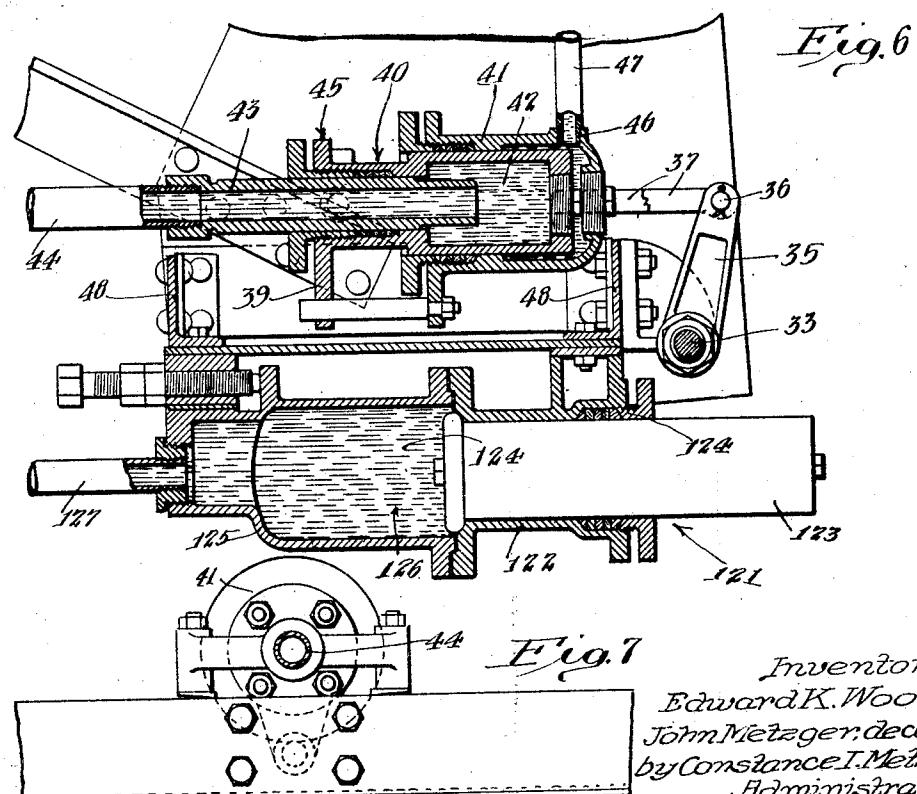
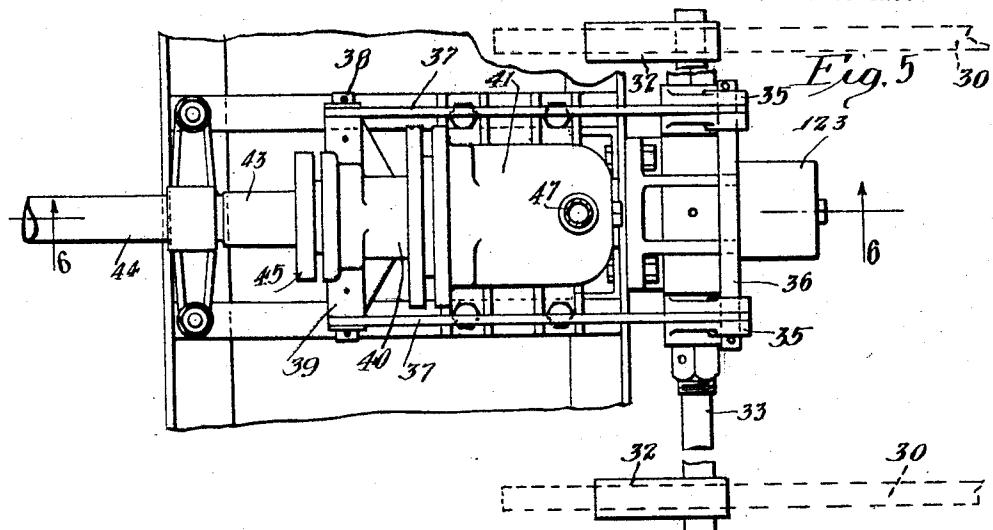
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AMUSEMENT APPARATUS

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6 Sheets-Sheet 4



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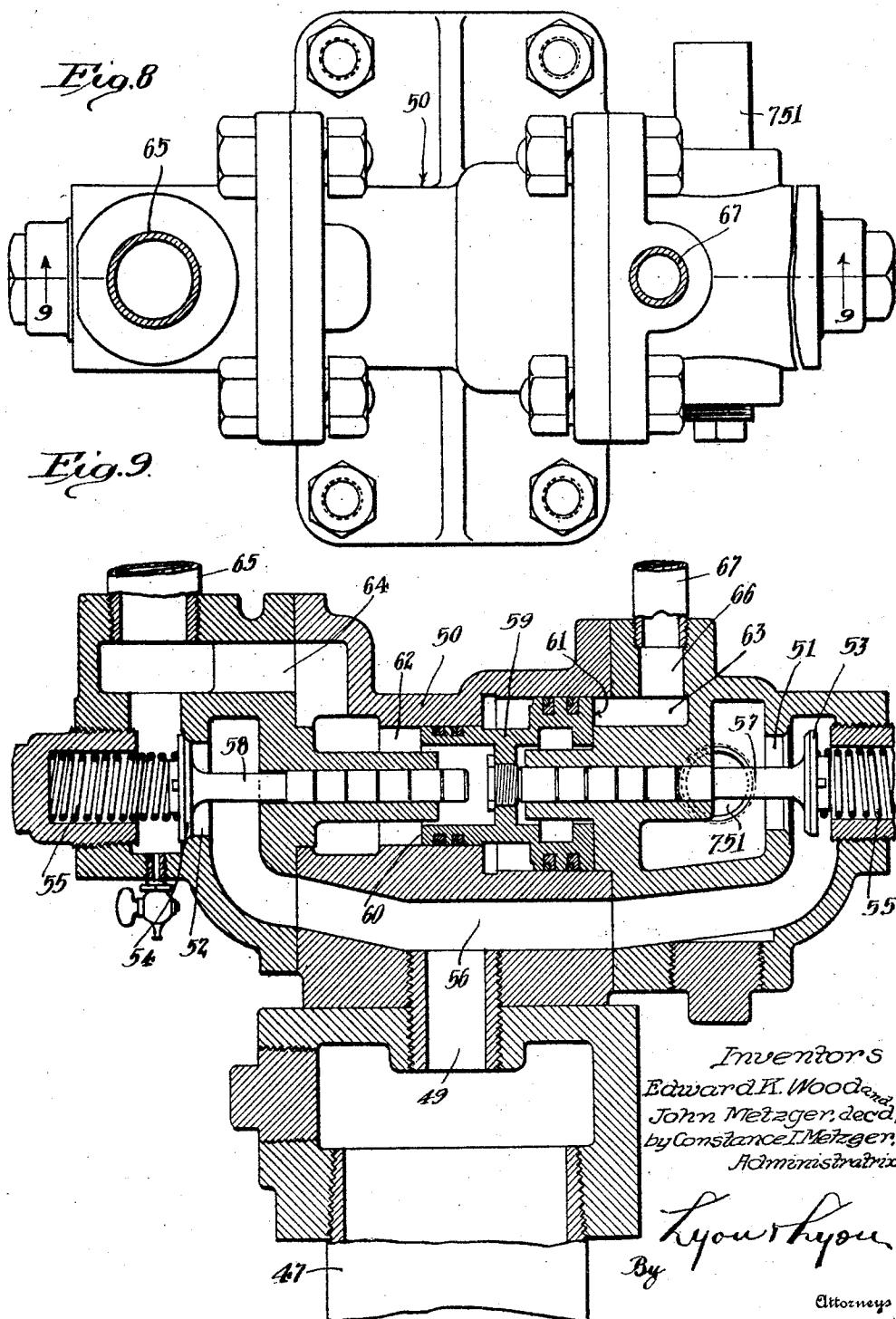
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E. K. WOOD ET AL

AMUSEMENT APPARATUS

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April 26, 1927.

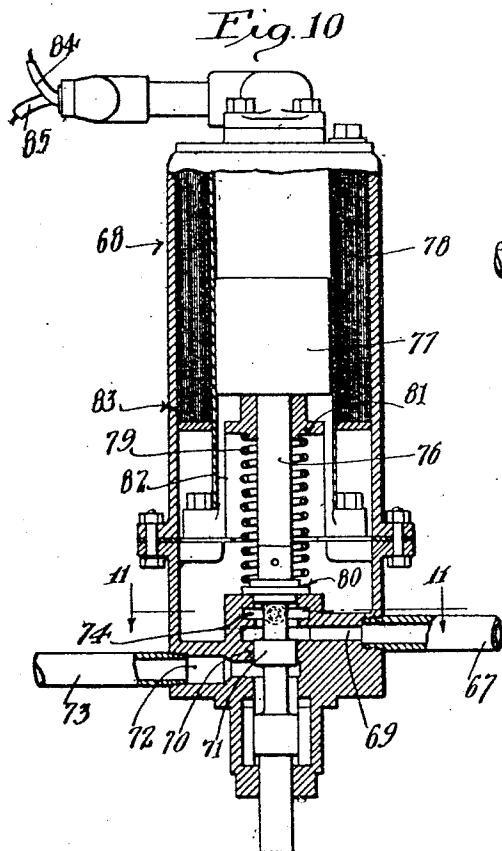
E. K. WOOD ET AL

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AMUSEMENT APPARATUS

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6 Sheets-Sheet 6.



Patented Apr. 26, 1927.

1,625,877

UNITED STATES PATENT OFFICE.

EDWARD K. WOOD, OF WILMINGTON, AND JOHN METZGER, DECEASED, LATE OF VENICE, CALIFORNIA; BY CONSTANCE I. METZGER, ADMINISTRATRIX, OF VENICE, CALIFORNIA, ASSIGNEES TO AMUSEMENT ENGINEERING CORPORATION OF CALIFORNIA, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

AMUSEMENT APPARATUS.

Application filed November 10, 1925. Serial No. 68,077.

This invention relates to amusement apparatus of the type having a number of arms mounted for rotation around a common axis, and provided at their outer ends with passenger-carrying devices.

An object of the invention is to make provision for holding the arms against being swung outwardly by centrifugal force during acceleration of the passenger-carrying devices, and for releasing the arms so that centrifugal force will swing them, together with the passenger-carrying devices, outwardly, thus giving a sense of relatively great lateral motion to the passengers on board.

Another object of this invention is to make provision for simultaneously releasing diametrically opposite arms of the apparatus, thus to minimize eccentric loading of the apparatus.

Another object is to provide for effective control of the arm release means.

A further object is to make provision for yieldingly bringing the arms to rest at the inner ends of their arcs of movement, or, in other words, when said arms move into position for latching.

Other objects and advantages will appear in the subjoined detailed description.

The accompanying drawings illustrate the invention:

Fig. 1 is a side elevation of an amusement apparatus constructed in accordance with the provisions of this invention, some of the arms and their associated passenger-carrying devices being omitted, and those shown being in their latched positions.

Fig. 2 is a diagrammatic view illustrating the fluid and electrical connections for operating the various latches.

Fig. 3 is an enlarged edge view of the lower portion of one of the arms and the associated passenger-carrying device, together with the latch and a portion of the mechanism for releasing said latch.

Fig. 4 is an enlarged fragmental detail of the latch mechanism shown in Fig. 3.

Fig. 5 is an enlarged plan view of a portion of the latch releasing mechanism shown in Fig. 3.

Fig. 6 is a sectional elevation on a line indicated by 6-6, Fig. 5.

Fig. 7 is an end view of Fig. 5 from the left thereof.

Fig. 8 is an enlarged plan view of the 55 relay air control shown in Fig. 3.

Fig. 9 is a sectional elevation on the line indicated by 9-9, Fig. 8.

Fig. 10 is a sectional elevation of the electrically controlled air valve, the parts being 60 in position to shut off air from the air supply and to exhaust air from the relay valve induction pipe.

Fig. 11 is a plan section on the line indicated by 11-11, Fig. 10.

Fig. 12 is a fragmental sectional elevation similar to Fig. 10, showing the parts in position to admit air to the relay air valve induction pipe.

Fig. 13 is a plan view of the upper end 70 of the tower.

Fig. 14 is an enlarged view of the lower end portion of the standard showing the air line connections, a portion of the standard being in section.

Fig. 15 is a plan view of the roller bearings and their mounting.

Fig. 16 is an enlarged detail of one of the roller supporting beams and its rollers and a fragment of the race that rides upon 80 said rollers.

Referring to the drawings, there is provided a suitable tower or frame which is indicated in general by the character 21. In this instance, the tower or frame 21 is 85 mainly of structural steel or iron with a central vertical tubular standard or member 22 from which radiate members 23, 24 of the frame. The outer ends of the arms 23 are tied together by members 25 arranged 90 in the form of a hexagon. The frame also comprises braces 26 secured at their lower ends to the tubular standard 22, and extending aslant upwardly and outwardly and secured at their outer ends to the members 95 25. The tower also has other cross braces 261.

Hinged to the members 23 are arms 27 which may be of latticed steel construction so that they will be relatively light and strong. The arms 27 are hinged so that their upper ends are positioned alongside of the members 25. Thus, in this instance, there are six of the arms 27 and said arms are

arranged in pairs consisting of diametrically opposed arms. This position of the arms 27 is preferred so that diametrically opposed arms 27 will balance each other and not produce eccentric strains on the tower.

The tower is rotatably mounted and driving mechanism is provided to rotate the tower, all of which will be described more in detail hereinafter.

From the foregoing it will appear that when the tower 21 is rotated the arms 27 will turn with the tower and centrifugal force will tend to swing the arms 27 outwardly. Pivotally suspended from the lower ends of the arms 27 are passenger-carrying devices or carriages 28, there being, in this instance, one such carriage associated with each arm 27. Because of the pivotal connection between the carriages 28 and the arms 27, said carriages can swing at different angles relative to the arms 27 and will remain horizontal when the tower is stationary and will tend to swing into alignment with the arms when the tower is turned. In this particular instance the carriages 28 are preferably in the form of aeroplanes.

Releasable latching means are provided for holding the arms against being swung outwardly by centrifugal force when the tower is rotating, and such means are constructed, in this instance, as follows: The latching means for the different arms are alike and, therefore, only one of such means will be described in detail. Referring more particularly to Figs. 3 and 4, the arm 27 carries a pivot 29 on its outer face and connected with the pivot 29 is a latch arm or arms 30 which are longer than the thickness of the arm 27, so as to project inwardly past the inner face of the arm. The latch arms 30 have downwardly projecting shoulders 31 near their inner ends adapted to be respectively engaged by the arms 32 of latching levers which are fulcrumed at 33 on a bracket 34 bolted or otherwise secured to the tower. Each of said levers also comprises an arm 35, and means are provided to operate the arms 35 into position to latch or unlatch the latching arms 30.

In this instance the means for operating the levers 32, 35, is constructed as follows: To each of the lever arms 35 is pivoted at 36 a connecting rod 37, and the connecting rods are pivoted by pins 38 to a cross-head 39 on the outer end of a plunger 40. The plunger 40 works in a cylinder 41 and is hollow so as to contain a fluid 42, preferably a liquid such as water. The interior of the plunger 42 communicates through a tubular member 43 with a stand-pipe 44, said stand-pipe supplying the hydrostatic head against which the plunger 40 must be driven on its out stroke. The outer end of the plunger 40 is provided with a packing gland 45 to minimize leakage between the tubular member

43 and the plunger. The cylinder 41 is provided with an air inlet port 46 which communicates with a fluid supply pipe 47. As clearly shown in Fig. 6, the cylinder 41 is supported by a bracket 48 which is secured to one of the members of the tower 21.

The latch operating mechanism just described is provided for each latching lever 32, 35, six in this instance, and the air supply pipes 47 of the cylinder 41 communicate, as clearly shown in Fig. 2, with relay air valves, respectively, which will now be described. The relay air valves are of like construction and, accordingly, only one of them needs to be described in detail. Referring more particularly to Fig. 9, the pipe 47 communicates with a port 49 in a cylinder 50. At opposite ends of the cylinder 50 are ports 51, 52, respectively controlled by valves 53, 54. Springs 55 tend to close the valves 53, 54. Leading from the port 49 to the ports 51, 52 is a duct 56. Both of the valves 53, 54 open outwardly and close inwardly, and the duct 56 communicates with the outer end of the port 51 and with the inner end of the port 52. The valves 53, 54 are provided with valve stems 57, 58 which extend toward each other, and the inner ends of the stems are spaced apart on opposite sides of a plunger 59 which works in the cylinder 50. The plunger 59 is provided with two pressure areas, a lower pressure area 60 and a higher pressure area 61. That is to say, the area 61 is greater than the area 60. The pressure area 60 works in the smaller cylinder chamber 62, and the larger pressure area 61 works in the larger cylinder chamber 63. Communicating with the cylinder chamber 62 is an air inlet 64 with which communicates a compressed air supply pipe 65 that extends to a suitable source of supply. Communicating with the cylinder chamber 63 is an air inlet 66 with which communicates an air supply pipe 67.

From the foregoing it will appear that the air pressure is constant in the air chamber 62 against the smaller pressure area 60, thus tending to move the plunger 59 to the right in Fig. 9 and holding it in the position shown in said figure, thus permitting the valve 54 to close and opening the valve 53. Opening of the valve 54 permits air to pass from the chamber 64 through the port 52, duct 56, port 49 into the pipe 47. Preferably, the fluid in the pipe 47, at least in part, is a liquid such as water and the air thus admitted to the pipe 47 will create pressure against the liquid and thus produce pressure in the associated cylinder 41 so as to actuate the plunger 42 to the left in Fig. 6 to thus release the latch arm 30 from the lever arm 32 to free the arm 27.

In order to operate the plunger 61 to the left in Fig. 9 so as to open the valve 54 and permit closing of the valve 53, the admission

of air to the chamber 63 is effected by the following described means, said means, in this instance, consisting of an electrically operated valve 68 shown in detail in Figs. 10, 11 and 12. In Fig. 2 it will be observed that each pair of relay valves is connected to one of the electrically operated valves 68. For this reason the pipes 67 of each two relay valves connects with one of the electrically operated valves 68. It will be seen in Fig. 2 that each pair of relay valves associated with a single electrically operated valve is arranged so that the relay valves of each pair control the operation of diametrically opposite latch operating plungers 40 so as to effect simultaneous release of diametrically opposed arms 27.

Since all of the electrically operated valves 68 are of like construction, only one need be described in detail, and the construction is as follows: The pipe 67 communicates with a port 69 opening into a valve chamber 70 in which is a slide valve 71 adapted when moved upward in Fig. 10 to open the port 69 and admit air from the valve chamber to said port and to open another port 72 and admit air through the port 72 to the valve chamber 70. Communicating with the port 72 is an air supply pipe 73. When the valve 71 is in position to close the port 69 from the valve chamber 70, as in Fig. 10, a port 74 in the periphery of the valve 71 communicates with the port 69 and with another port 75 that opens to the atmosphere. When the valve 71 is in the position shown in Fig. 12, air is passed to the associated relay valves so as to simultaneously operate said relay valves. When the valve 71 is in the position shown in Fig. 10 pressure is released from the chamber 63 of each of the associated relay valves through the pipe 67, ports 69, 74, 75 to the atmosphere so that the air pressure can throw each relay valve plunger 59 into position to shut off the air from the pipe 47 and permit air to exhaust from the pipe 47 through the port 49, duct 56, port 51, chamber 63 and thence to the atmosphere through a port 751 in the cylinder 50.

Downward movement of the valve 71 in Fig. 10 is effected by reason of a stem 76, the said valve being connected with an armature 77 operated by a solenoid 78. Upward movement of the armature 77 compresses a coil spring 79 that rests at one end against a shoulder 80 on the stem 76, and at its other end against a shoulder 81 of a bracket 82 which is secured to a housing 83 enclosing the solenoid 78. When the solenoid is deenergized, expansion of the spring 79 will move the valve 71 into its closed position.

Now referring more particularly to Fig. 2, it will be seen that the wires 84, 85 leading from each solenoid connect respectively

with brushes 88 engaging electric contact rings 86, 87. Engaging the contact rings 86 are other brushes 881 which are connected by wires 89 to relay switch contacts 90. The other contacts 91 of the relay switches are connected by wires 92 to a main line 93 which receives the electric current from a source indicated at 94, said source being also connected by a wire 95 to brushes 96 that engage the rings 87. The coils 97 of the relay switches are connected by a wire 98 to a source of electric current 99 and the coils 97 are connected by wires to manual switches 101 which are mounted at any desired location outside of and free from the tower. The switches 101 are connected by a wire 102 to the source 99 of electric current.

The mounting for the tower 21, whereby it may rotate, is constructed as follows: The lower end of the tower 21 is provided with a race 103 which rests upon rollers 104, 105. In this instance the rollers 104 are mounted in pairs on beams 106, and the rollers 105 are mounted in pairs on the beams 106 intermediate of the rollers 104. In this instance there are six beams 106 arranged at the corners of a hexagonally shaped support 107. Preferably the beams 106 are rockably supported at their centers as indicated at 108. The advantage of this construction is that, when the apparatus is first constructed, the rollers 105 are temporarily omitted so that the race 103 rides only on the bearings 104, the race 103 is so large in diameter that it does not have a true bearing face when first installed and the tower will be rotated while a cutting tool is held in position to make a cut in the race so as to true it. During this truing operation, the rollers 104 will be accommodated to the irregularities in the race by rocking of the beams 106. After the race has been thus trued the rollers 105 will be installed. It is to be noted that the rollers 105 are preferably rotatably mounted in boxes 109, which rest upon the beams 106, and that the clearance between the upper face of said box and the race 103 is very slight so that if breaking down of the bearing occurs at any point, the race will drop upon one of the boxes 109 which thus prevents such tilting of the tower as might tend to cause it to upset.

The race 103 is provided on its periphery with a gear 110 which is in mesh with a pinion 111 on a shaft 112. The shaft 112 will be driven by any suitable power and, since this is well understood in the mechanic arts, it is not necessary to describe in detail the connections between the shaft 112 and the prime mover, not shown.

Now referring more particularly to Fig. 2, there is an air compressor, indicated at 113, and a valved pipe 114 connects said

compressor with a compressed air receiver 115. Connected with the pipe 114 is a valved pipe line 116 which extends through a portion of the hollow standard 22 and which connects at its upper end with a circular manifold pipe 117 to which are connected the pipes, 65, 73. The circular pipe 117 is suitably secured to the standard 22 and rotates with the tower.

10 There is provided a buffer for each of the arms 27 to yieldingly limit inward swinging of said arms, and since the buffers are all of the same construction, only one of them need be described in detail. 15 Each buffer is constructed as follows: There is provided a cylinder 122 which is connected with the bottom of one of the boxes 48. In the cylinder 122 is a plunger 123 which projects beyond the outer end of the cylinder in position to engage the arm 27 when said arm swings inwardly toward the latched position shown in Fig. 1. The arm engages the plunger 123 prior to engagement of the latch arm 30 with the latching lever arm 32. The plunger 123 works through a stuffing box 124 at the outer end of the cylinder, and the rear end of the plunger 123 projects into an enlarged portion 124 of the cylinder. The cylinder chamber 125 is provided with a body of water 126, and said chamber 125 is in communication with an extension 127 of the pipe 65. Since the pipe 65 communicates with the compressed air supply, it will be clear that the water body 126 is backed by compressed air so as to yieldingly hold the plunger 123 outwardly as in Fig. 6.

The standard 22 turns in a bearing 128 and the standard extends below said bearing with a reduced portion or shaft 129 on which the ring contacts 86, 87 are mounted. The pipe line 116 passes through the shaft 129 and is provided with an elbow 130, a stuffing box 131 on the elbow 130 permitting relative rotation between different sections of the pipe line 116.

The apparatus described above operates as follows:

50 Assuming that passengers have entered the carriages 28, that the arms 27 are latched to the tower, power will be applied to the shaft 112 so as to rotate the tower and with it the arms 27 and carriages 28. At any 55 time thereafter at the will of the operator, he will effect release of the arms by operating one or more of the switches 101. Preferably the switches 101 will be operated in succession so as to minimize strain on the tower when the arms are released and fly outwardly. Assuming then that the operator closes one of the switches 101, this will energize one of the relay switches so as to supply an electric current to one of the electrically operated valves 68, thus moving the

slide valve 71 from the closed position in Fig. 10 to the open position in Fig. 11. This permits compressed air to flow from the pipe 73 through pipe 67 to the pair of relay valves associated with said electrically operated valve. The air admitted to the chamber 63 of each relay valve causes the plunger 59 to slide to the left in Fig. 9 so as to open the valve 54, thus permitting compressed air to flow from the pipe 65 into the pipe 47. The air pressure in the pipe 47 is admitted to the cylinder 41, thus driving the plunger 40 to the left in Fig. 6 to rock the lever arm 32 from the full line position in Fig. 4 to the broken line position, thus releasing the latch arms 30 associated with two of the diametrically opposed arms 27. Centrifugal force instantly swings the arms 27 outwardly and upwardly, carrying the carriages with them. The carriages will swing on their pivots so as to remain upright, though they will tilt at different angles to the horizontal according to the speed of rotation and the outward swinging of the arms.

After the operator has closed the switch 101 to effect the results just described, he will open or allow said switch to open, thus cutting off the electric current from the electrically operated switch, and the spring 79 will operate to close the valve 71, thus exhausting air from the chamber 63 through the pipe 67. This permits the plunger 59 to move to the right so as to close the valve 54 and open the valve 53, as in Fig. 9, whereupon air will exhaust from the cylinder 41 through pipe 47, port 49, duct 56, port 51, chamber 63 and the port 751 to the atmosphere. As soon as the air exhausts from the cylinder 41, the water pressure forces the plunger 42 to the position shown in Fig. 6, thus moving the lever arm 32 to the latching position. The other arms 27 will be released in the same manner by operating the other manual switches, preferably one at a time.

After the apparatus has been operated as long as the operator desires, he will gradually reduce the speed of the prime mover so as to slow down the rotation of the tower and the other rotating parts, whereupon the arms 27 will be caused to swing downwardly and inwardly by gravity until, engaging the plungers 123, they force said plungers inwardly against the water bodies 126 which gradually yield so that the plungers 123 can retract to positions that will permit the latch arms 30 to ride over the lever arms 32 and become latched against said lever arms. Preferably the pipes 44 connect, as shown in Fig. 2, with the manifold air pipe 117 so that a pressure greater than atmospheric is upon the water in the pipes 44.

We claim:

1. An amusement apparatus comprising

a rotatably mounted frame, means to rotate said frame, an arm hinged to the frame, a carriage swingingly suspended from the arm, releasable means to latch the arm 5 against swinging when the frame is rotating, and means to release the latching means while the frame is rotating including fluid pressure actuated mechanism and electrically operated mechanism controlling the 10 fluid pressure actuated mechanism.

2. An amusement apparatus comprising a rotatably mounted frame, means to rotate said frame, an arm hinged to the frame, a carriage connected with the arm, releasable 15 means to latch the arm against swinging when the frame is rotating, and means to release the latching means while the frame is rotating including fluid pressure actuated mechanism and electrically operated mechanism controlling the 20 fluid pressure actuated mechanism.

3. An amusement apparatus comprising a rotatably mounted tower, means to rotate the tower, an arm hinged to the upper part 25 of the tower, a carriage connected with the arm, cooperating means on the arm and on the lower part of the tower to latch the arm against swinging when the tower is rotating, fluid pressure mechanism mounted on 30 the tower operable to release the latching means, an electric switch positioned outside of and free from the tower, and electrically operated means on the tower operable to release the latching means and electrically 35 connected with the switch.

4. An amusement apparatus comprising a rotatably mounted frame, means to rotate said frame, arms hinged diametrically opposite each other to the frame, a carriage 40 connected with each arm, releasable means to latch each of the arms against swinging when the frame is rotating, and means including a single manually operated member to simultaneously release the latching means 45 for both arms.

5. An amusement apparatus comprising a rotatably mounted frame, means to rotate the frame, arms hinged to the frame, there being a plurality of pairs of said arms and 50 the arms of each pair being positioned diametrically opposite each other, a carriage connected with each arm, releasable means to hold each of the arms against swinging, and means including a single manually operated member for each of said pairs of arms to successively release the latching means 55 for the arms of different pairs.

6. An amusement apparatus comprising a rotatably mounted frame, means to rotate 60 the frame, arms hinged to the frame, there being a plurality of pairs of said arms and the arms of each pair being positioned diametrically opposite each other, a carriage connected with each arm, releasable means

to hold each of the arms against swinging, 65 and means including a single manually operated member for each of said pairs of arms to simultaneously release the latching means for both arms of one pair independently of another pair of the arms. 70

7. An amusement apparatus comprising a rotatably mounted frame, means to rotate the frame, an arm hinged to the frame, a carriage connected with the arm, a cylinder mounted on the frame, a plunger in the cylinder, means to produce fluid pressure in the cylinder on one side of the plunger to move the plunger in one direction and to thereafter relieve said pressure, means to move the plunger in the opposite direction 80 when the pressure is released, a latch member on the arm, a second latch member to releasably engage the first mentioned latch member, and means operably connecting the second latch member to the plunger. 85

8. An amusement apparatus comprising a rotatably mounted frame, means to rotate the frame, an arm hinged to the frame, a carriage connected with the arm, a latch member on the arm, a second latch member to releasably engage the first mentioned latch member, fluid pressure operated means operably connected with the second mentioned member, means operated by fluid pressure to control the flow of fluid to the first mentioned means, and electrically operated means to control the flow of fluid to the second mentioned means. 90

9. An amusement apparatus comprising a rotatably mounted frame, means to rotate the frame, an arm hinged to the frame, a carriage connected with the arm, a latch member on the arm, a second latch member to releasably engage the first mentioned latch member, fluid pressure operated means 100 operably connected with the second mentioned member, valve means to control the flow of fluid to and from the first mentioned means, a cylinder, a plunger in the cylinder to operate the first mentioned valve means, 105 valve means to control the flow of fluid to and from the cylinder, an armature to operate the second mentioned valve means, and a solenoid to operate the armature. 110

10. An amusement apparatus comprising a support, rollers mounted on the support, a tower having an axial standard and having a race resting on the rollers, a bearing on the support for the standard to rotate in, means to rotate the tower, means to convey compressed air through the standard, a manifold pipe mounted on the tower connected with said means, arms hinged to the upper portion of the tower, a carriage connected with each arm, means to releasably hold each arm against swinging when the tower rotates, an air operated means on the tower operably connected to each of the 115 120 125

arm-holding means, and a plurality of electrically controlled valve means on the tower connected with the manifold pipe, each of the electrically controlled valve means controlling the flow of air to and from a plurality of the air operated means.

11. An amusement apparatus comprising a rotatably mounted frame, means to rotate the frame, an arm hinged to the frame, a carriage connected with the arm, releasable means to latch the arm against outward swinging when the frame rotates, and means yieldingly resisting the arm as it swings inward into latching position.

12. An amusement apparatus comprising a support, beams rockably mounted at intervals in a circle on the support, rollers rotatably mounted on each beam, a frame having a circular race resting on the rollers,

carriages connected with the frame, and means to rotate the frame.

13. An amusement apparatus comprising a rotatably mounted frame, means to rotate the frame, an arm hinged to the frame, a carriage connected with the arm, releasable means to latch the arm against swinging when the frame is rotating, a manually operated member mounted independently of the rotating parts, and means operably connecting said member with the latch means.

Signed at Los Angeles, California, in the county of Los Angeles, and State of California, this 2d day of November, 1925.

EDWARD K. WOOD.

CONSTANCE I. METZGER.

Administratrix of the Estate of John Metzger, Deceased.