

April 27, 1937.

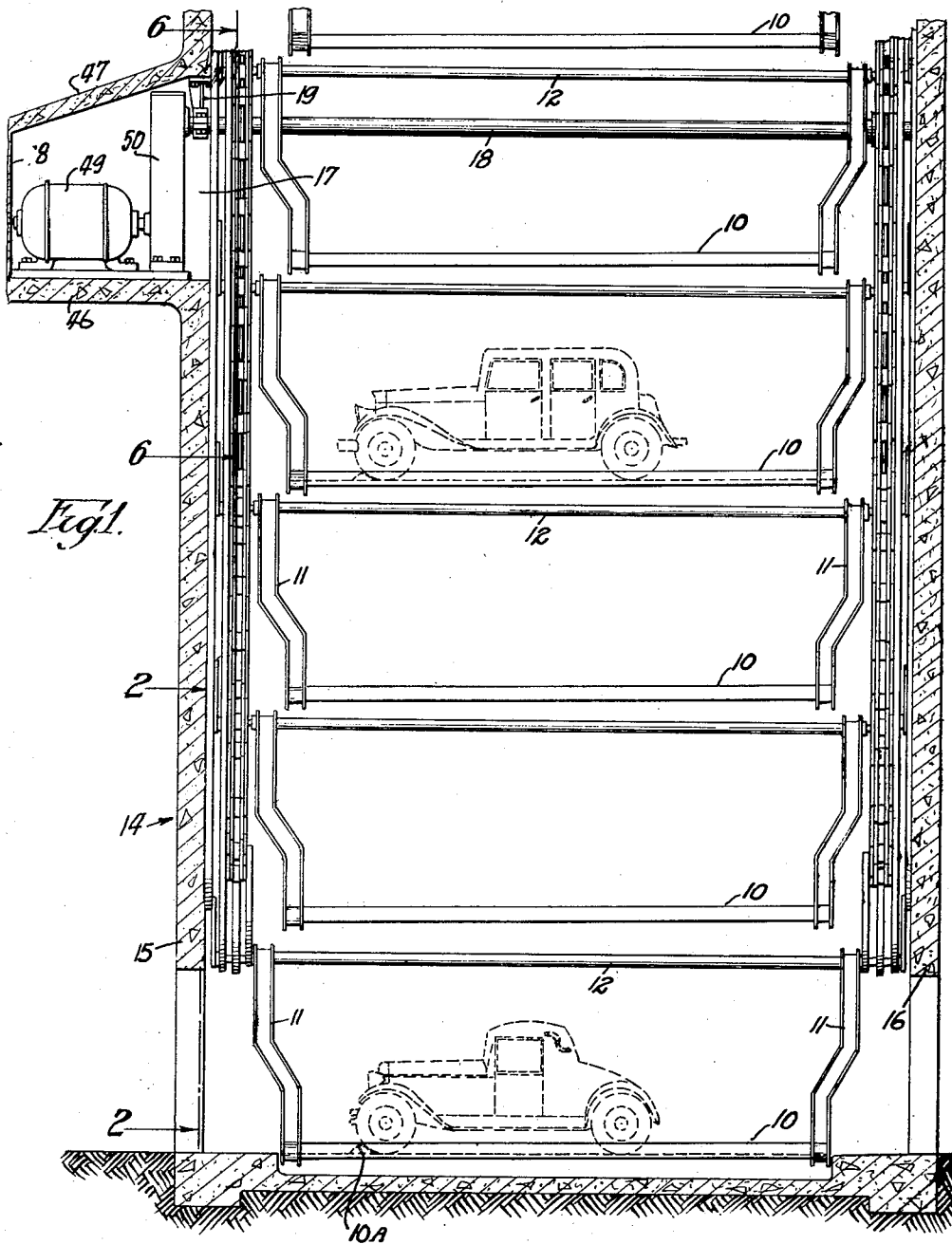
J. E. MORTON

2,078,770

PARKING TOWER

Original Filed Aug. 12, 1933

6 Sheets-Sheet 1



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6 Sheets-Sheet 2

Fig. 2.

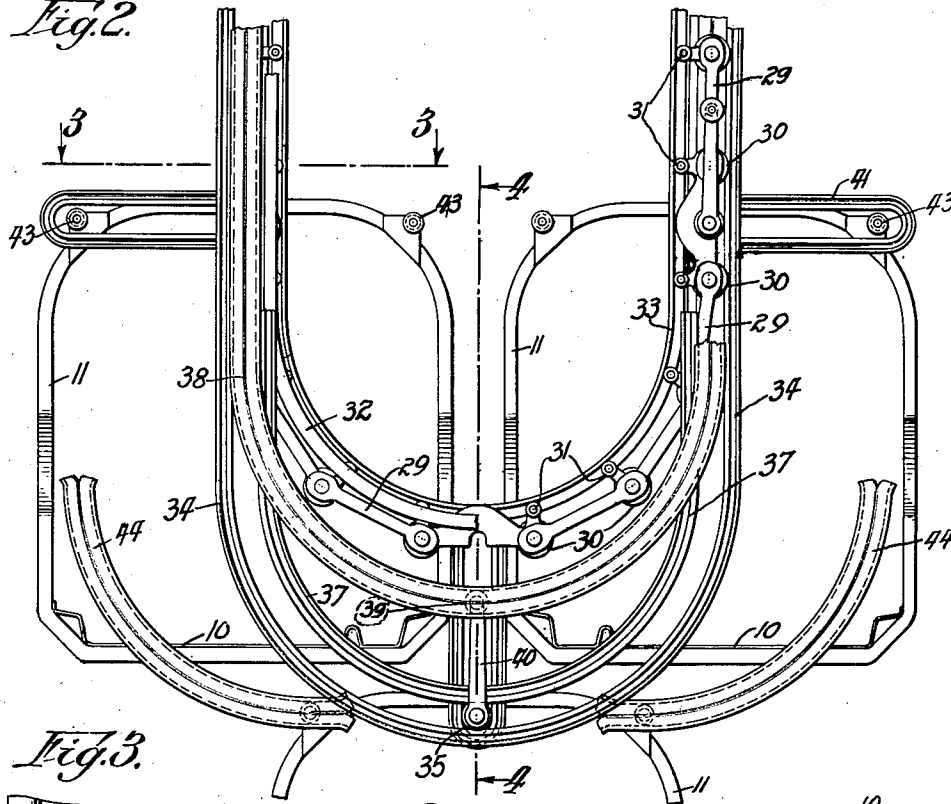
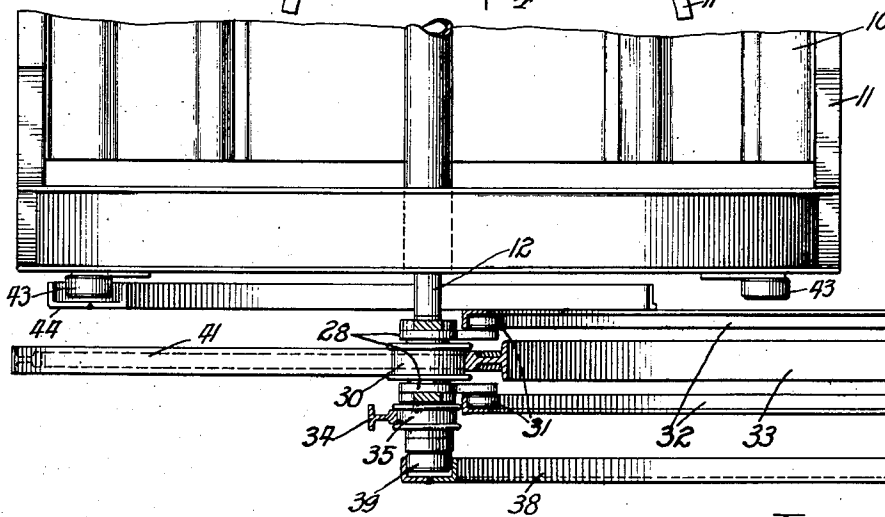


Fig. 3.



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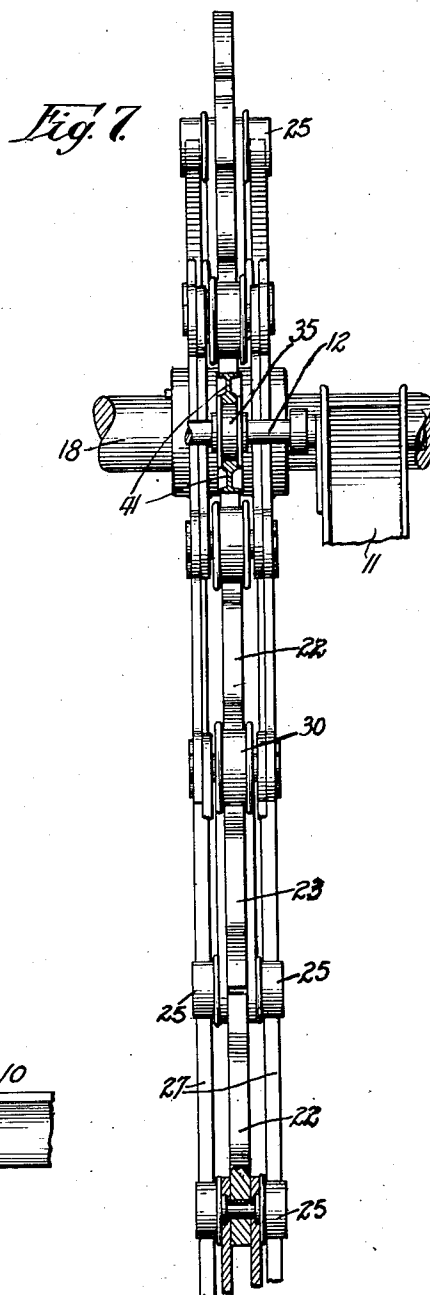
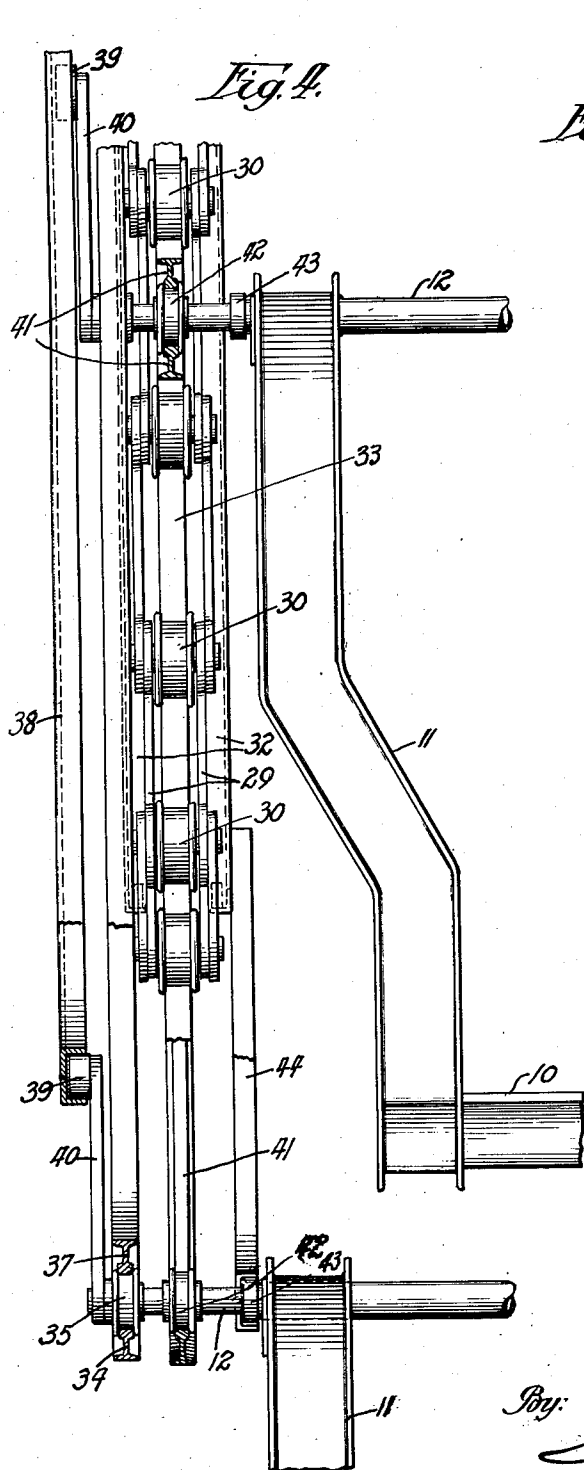
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6 Sheets-Sheet 3



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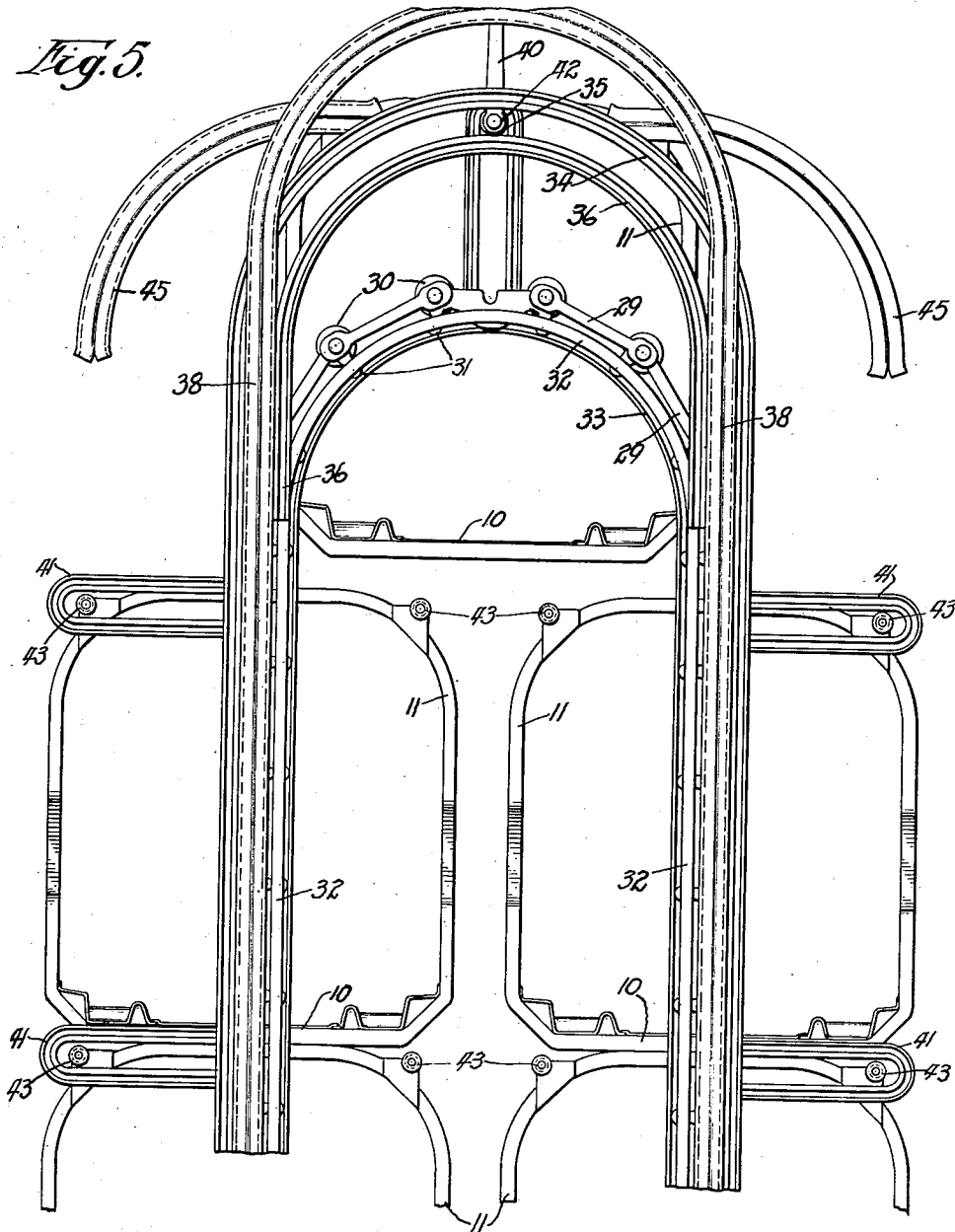
2,078,770

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Original Filed Aug. 12, 1933

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Fig. 5.



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2,078,770

PARKING TOWER

Original Filed Aug. 12, 1933

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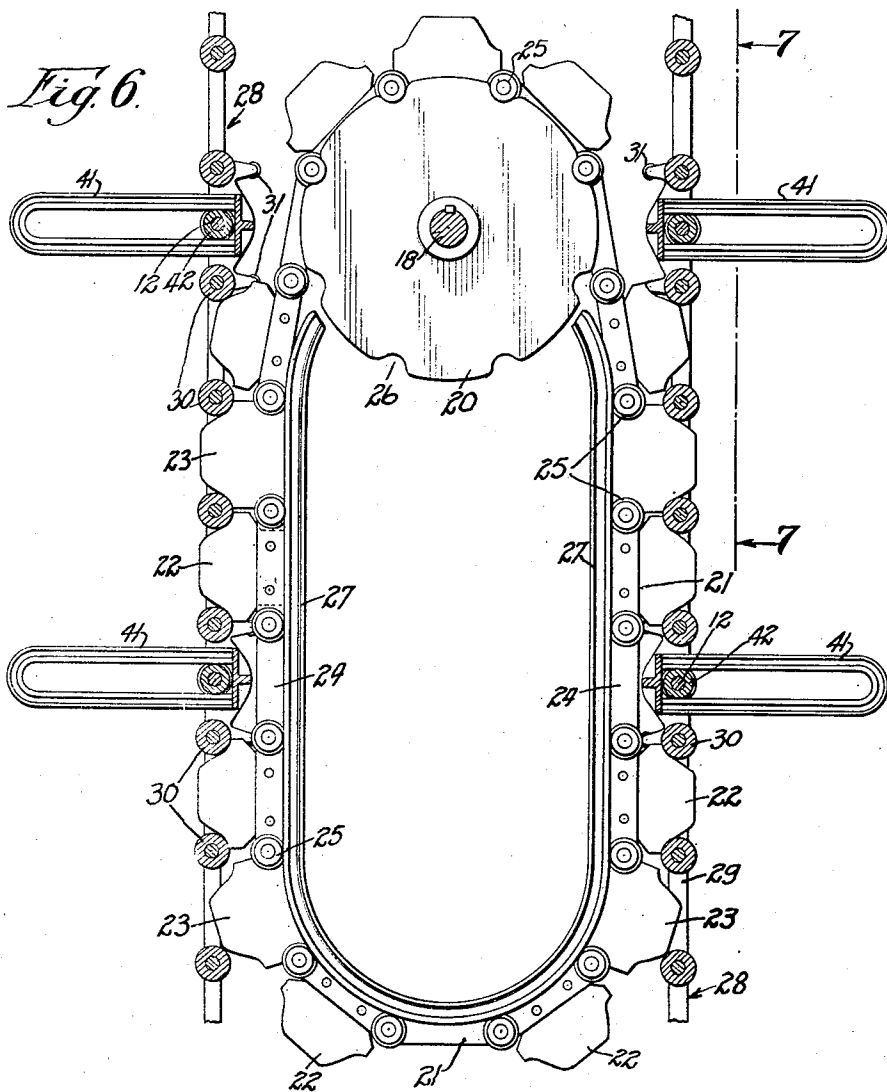


Fig. 8.

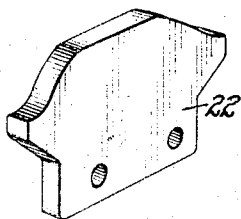
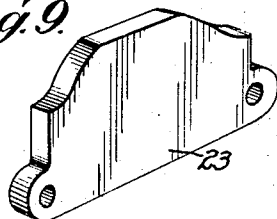


Fig. 9.



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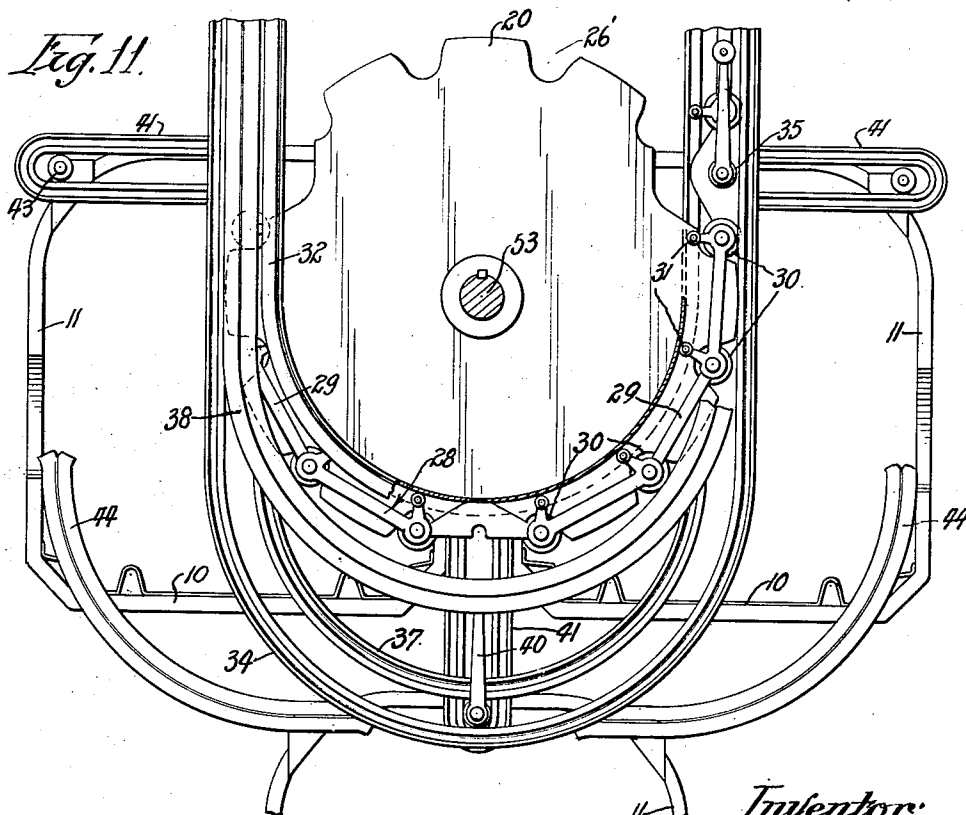
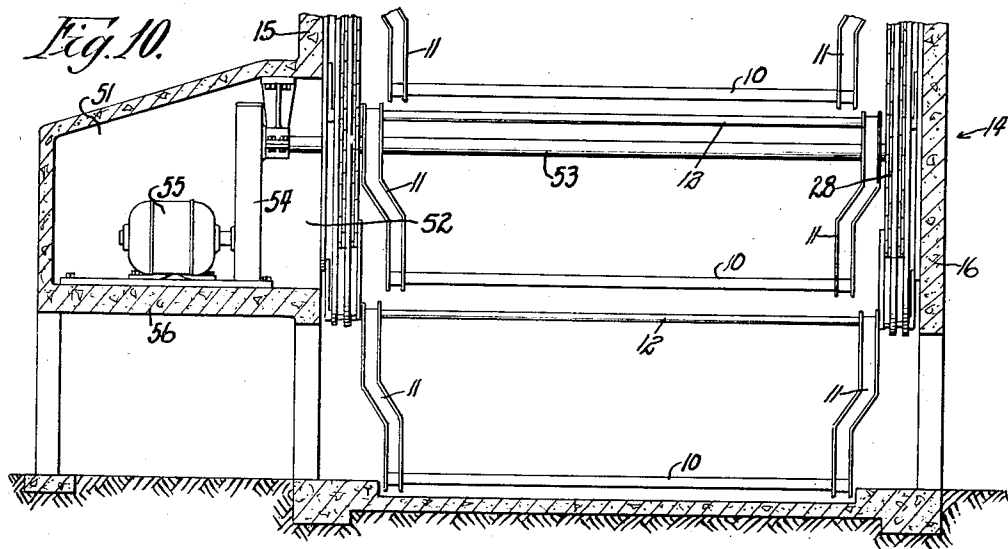
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Original Filed Aug. 12, 1933

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,078,770

PARKING TOWER

James E. Morton, Dallas, Tex., assignor of one-fourth to Mechanical Parking Patents, Inc., Chicago, Ill., a corporation of Illinois

Application August 12, 1933, Serial No. 684,780
Renewed September 22, 1936

9 Claims. (Cl. 214-16.1)

The invention relates to automobile parking towers of a type in which a plurality of parking platforms are attached to endless conveyor chains disposed in two vertical tiers and adapted to be passed from one tier to the other upon reaching the top and bottom of the tower.

It is an object of the invention to provide an automobile parking tower which is simple and comparatively inexpensive in construction, and which occupies a comparatively small ground area.

It is a further object of the invention to provide a tower in which the passing of the movable storage platforms from one tier to the other is affected with a progressive acceleration and deceleration.

A still further object aims at providing a tower in which the load is normally kept fixed on a center line of the vertically disposed portions of the conveyor chains.

It is a further object of the invention to provide a continuous track for the conveyor chains so as to eliminate the pulsating effect of the supporting platforms and of the driving means actuating such a conveyor.

A still further object of the invention aims at providing a tower in which all of the mechanical driving parts are provided at the bottom of the tower so that servicing of parts liable to need repairs or replacement may be effected conveniently at the bottom of the tower.

Another object constitutes the provision of means whereby the conveyor chains are relieved from the supporting load of the platforms during their passing from one tier to the other to insure thereby smooth acceleration and deceleration.

A still further object aims at providing stabilizing means for the parking platforms throughout their travel so as to prevent swaying of the platforms.

A further object aims at providing means for preventing the chains from collapsing and dropping the load in the event the chain breaks.

It is also an object of the invention to provide certain details of construction and arrangement tending to enhance the reliability and efficiency of machines of the character described.

With these and many other equally important objects in view the invention comprises the means described in the following specification, particularly pointed out in the claims forming a part thereof and illustrated in the drawings in which,

Fig. 1 is a side elevation of the lower end of

the parking tower wherein the lowermost platform is shown in loading or unloading position.

Fig. 2 is a section on the line 2-2 of Fig. 1 with parts of the lowermost platform broken away.

Fig. 3 is an enlarged section on the line 3-3 of Fig. 2.

Fig. 4 is an enlarged section on the line 4-4 of Fig. 2.

Fig. 5 is a front elevation of the upper part of the tower with one parking platform in central position while in the act of passing from one tier to the other.

Fig. 6 is an enlarged section on the line 6-6 of Fig. 1.

Fig. 7 is a section on the line 7-7 of Fig. 6.

Fig. 8 is a perspective detailed view of a link of the drive chains.

Fig. 9 is a view similar to Fig. 8 showing another link of the drive chains.

Fig. 10 is a side elevation of the lower part of the tower showing a modified drive for the conveyor.

Fig. 11 is a front view of the parts shown in Fig. 10.

Referring to the drawings 10 generally designates a platform supported on substantial rectangular frames 11 which are suspended from and rigidly fixed to a horizontal hangshaft 12. The platforms are superposed in two vertical adjacent tiers and means are provided at the upper and lower ends to permit the platforms to be shifted or transferred from one tier to the other. A tower 14 having walls 15 and 16 constitutes a housing for the platforms and associated parts. The wall 15 is provided with an opening 17 at an intermediate position as shown in Fig. 1. A horizontal drive shaft 18 is provided at one end in a drop bearing 19 secured to the wall 15 in the opening 17 and the other end of the shaft is suitably journaled in the wall 16. Drive sprockets 20 are secured to the drive shaft, one sprocket being adjacent to each wall 15 and 16 and around said sprockets are trained endless drive chains generally indicated by 21 which comprise links 22 and 23 (Figs. 8 and 9) and connecting members 24, provided with two rollers 25 at each pivotal point which are adapted to be seated in recesses 26 of the sprocket wheels 20 and thereafter to travel on guide tracks 27, defining the path of the drive chain. The platform propelling means includes a pair of endless lifting chains 28 including links 29 and rollers 30 which are provided at opposite ends of the tower, and the rollers 30 are adapted to enter the recesses formed

by adjacent sides of the drive chain links 22 and 23 (Fig. 6) so that the lift chains participate in the movement of the drive chains. The platform propelling or lift chains are provided with spaced pairs of retaining rollers 31 (Fig. 3) which bear against the inner flange of the spaced tracks 32 so as to prevent outward movement of the lift chain with respect to said tracks. The platform-propelling chain rollers 30 ride on a continuous track 33 which conforms to the path of the lift chains, is oblong and is provided with rounded ends.

Co-operating with the tracks 34 are tracks 36 at the top and tracks 37 at the bottom of the tower for a purpose hereafter described. A circuitous channel stabilizing track 38 receives a roller 39 (Fig. 4) mounted on the free end of an arm 40 which is rigidly secured to, preferably, one end of the suspension shaft 12.

The lift chains 28 have secured thereto at equal intervals, elongated U-shaped members 41 which extend at right angles and outwardly from the chains. The hangshaft 12 extends through said members 41 and is provided with rollers 42 adapted to ride on the juxtaposed faces of the parallel spaced arms of said members 41. The platforms 10 are also equipped with rollers 43 which are adapted to enter stabilizing tracks 44 at the bottom and similar stabilizing tracks 45 at the top of the tower so as to prevent sideways of the platforms during the transfer movement through the arcuate parts of the path-defining tracks 34.

In operation, the drive chains 21 cause movement of the lift chains 28 which propel the platforms. As already stated the lift chains 28 encompass the tracks 33. In reaching the upper end of the track just before entering the arcuate portion thereof, the rollers 35 enter the interspace between tracks 34 and 36 causing the hangshaft 12 to describe an arc defined by tracks 34 and 36, whereby the shaft 12 and its platform will be caused to move with a progressively accelerated speed up to the center of such arc and then will be progressively decelerated to the normal speed of the platforms in their vertical runs. The shifting of the hangshaft 12 occurs in the U-member 41 by means of the roller 35, so that in passing from one vertical tier to the other, the load of the platform is supported in variable degrees by both the U-member 41 and the track 34 at the bottom of the tower, and by the U-member 41 and the track 36 at the top of the tower; at the extreme bottom position the load is supported entirely by track 34 and at the extreme top position the load is supported entirely by track 36. Thus in such transfer movements the platforms move with a progressive acceleration as compared to the constant speed of the lift chains until they reach the highest or lowest points at the center of the tower whereupon the speed is progressively decelerated to normal speed as the platforms assume their positions in the other tier.

Around the opening 17, is built a compartment on the outside of the wall 15 which comprises a bottom, 46, a top wall 47 and end walls (not shown) which compartment is closed by a front wall or cover 48. A reversible motor 49 secured to the bottom wall 46 is connected to the drive shaft 18 through a speed reducer 50.

A modification of the drive is shown in Figures 10 and 11 which provides for the drive mechanism at the bottom instead of at the interme-

diate part of the tower. To this end an enclosed compartment 51, similar to the compartment shown in Fig. 1, is provided opposite the opening 52 at the bottom of the tower walls. A drive shaft 53 also arranged near the bottom of the tower is actuated through a speed reducer 54 and a motor 55 secured to the floor 56 of the compartment. In the modification shown in Figures 10 and 11 the shaft 53 drives sprockets 20; recesses 26¹ are provided in the sprockets 20¹ to receive chain rollers 30, other intermediate recesses are provided in the sprockets 20¹ to receive the attached ends of members 41. In the event of breakage of lift chains 28, the rollers 31 which are in contact with tracks 32 will prevent the outward movement of the chains 28 and the rollers 30 which are in contact with track 33 will prevent the inward movement of the chains 28; the chain links would in such event of breakage act as a series of short superposed confined columns to support the load of the platforms.

In such modified drive arrangement no machinery or moving parts are arranged at the top of the tower so that servicing of the same is convenient and may be easily arranged.

In the event, cars are to be placed into and removed from storage from only one end of the tower, the parking platforms 10 may so be suspended from the hangshaft 12 that they slightly slope, in which case they are equipped with stops 10a to arrest the movement of a car when in proper parking position on the platform.

While the drawings show preferred embodiments of the invention numerous changes and alterations may be made without departing from the spirit of the invention. I, therefore, do not limit myself to the details of construction and arrangement, as shown, but wish to include all changes, alterations, revisions and modifications falling within the scope of the invention as defined in the appended claims.

I claim:

1. The combination with a vertically disposed elevator including a plurality of platforms, a shaft forming a suspension for each platform, said shafts being rigidly connected to and movable with said platforms, endless chains for propelling said platform suspension shafts, stationary guiding means for said chains, and power-driven means for imparting movement to said chains, of means for stabilizing said platforms during their travel in a circuitous path comprising an arm rigidly connected to each of said platform suspension shafts, and stationary circuitous means separate from said chain guiding means for guiding said arms.

2. The combination with a vertically disposed elevator including a plurality of platforms, a shaft forming a suspension for each platform, said shafts being rigidly connected to said platforms, endless chains for propelling said platform suspension shafts, stationary guiding means for said chains, and power-driven means for imparting movement to said chains, of means for stabilizing said platforms in their circuitous travel comprising an arm rigidly connected to each of said platform suspension shafts, a roller on the end of each of said arms, and stationary circuitous means separate from said chain guiding means for guiding said rollers.

3. An elevator, including an endless conveyor arranged to travel in opposite directions in two vertical columns which are inter-connected at their ends by curved paths, a plurality of platforms movable by said conveyor, a single support-

ing shaft for each platform, and means for causing said platform shafts to move in curved guiding supports independent of said curved conveyor paths with progressive acceleration and deceleration while the platforms are passing from one vertical column to the other, said curved guiding supports being in the same plane as said curved conveyor paths and not coinciding with one another but both being formed with radii of the same length, said means and said curved guiding supports co-operating to progressively transfer the loads of said platform shafts from and to the conveyor during the movement of the supporting shafts around said guiding supports.

4. An elevator, including a pair of endless conveyor chains arranged to travel in opposite directions in two vertical columns which are interconnected at their ends by curved paths, a plurality of platforms movable by said conveyor chains, supporting means for each platform, means for causing said platform supporting means to move through supporting paths, disposed eccentrically to said curved conveyor chain paths with a variable speed while passing from one vertical column to the other vertical column, the lengths of said curved conveyor chain paths and said eccentrically disposed supporting paths being equal, and means for progressively releasing the weight of said platforms from said chains to said eccentrically disposed supporting paths, and from said eccentrically disposed supporting paths to the conveyor chains during the movement of said platforms from one vertical column to the other.

5. An elevator, including a plurality of endless conveyor chains arranged to travel in opposite directions in two vertical columns which are interconnected at their ends by curved paths, a plurality of platforms propelled by said chains, means for maintaining the support of said platforms on the center line of said conveyor chains during their vertical travel in said vertical columns, means fixed to said chains for permitting a progressive release of the weight of said platforms from and to said conveyor chains during the movement of said platforms from one vertical column to the other, and stationary curved members extending beyond and eccentrically to said curved chain paths, co-operating with said means fixed to said chains for supporting said platforms during their movement from one column to the other.

6. A motor-vehicle parking tower, including a

conveyor comprising a pair of spaced endless chains each arranged with portions traveling in opposite directions in two vertical paths which are inter-connected at their ends with curved paths, a plurality of platforms, suspension means for said platforms, the load of said platforms and their suspension means being adapted to be carried directly on said chains during their movement in said vertical chain paths, curved stationary supports for said platform suspension means extending beyond said curved chain paths, said curved stationary supports for said platform suspension means and said curved end paths for said chains being disposed eccentrically to one another but formed with radii of the same length, power-driven means for propelling said chains, and means connected to said chains for imparting movement to said platform suspension means during their movement around and on said curved stationary supports.

7. A parking tower as embodied in claim 6, and including means for stabilizing said platforms during their travel in a circuitous path, and independent auxiliary means for stabilizing said platforms during their movements throughout the entire length of said curved chain paths.

8. The combination with a power-driven elevator which includes a plurality of endless roller-equipped chains and a plurality of supports propelled by said chains in a circuitous path, of a single circuitous guide rail for each of said chains on which the chain rollers travel, a plurality of spaced arms fixed to and extending from said chains, and stationary circuitous members for retaining said arms in the event of chain breakage to thereby prevent lateral displacement of the chain substantially from its guide rail.

9. The combination with a power-driven elevator which includes a plurality of endless roller-equipped chains and a plurality of supports propelled by said chains in a circuitous path, of a single continuous guide rail for each of said chains on which the chain rollers travel, a plurality of spaced arms extending from said chains, a roller on each of said arms, and stationary circuitous guides for said arm rollers adapted for retaining said arm rollers and said chains in the event of chain breakage to thereby prevent lateral displacement of the chains substantially from their guide rails.

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