

April 23, 1929.

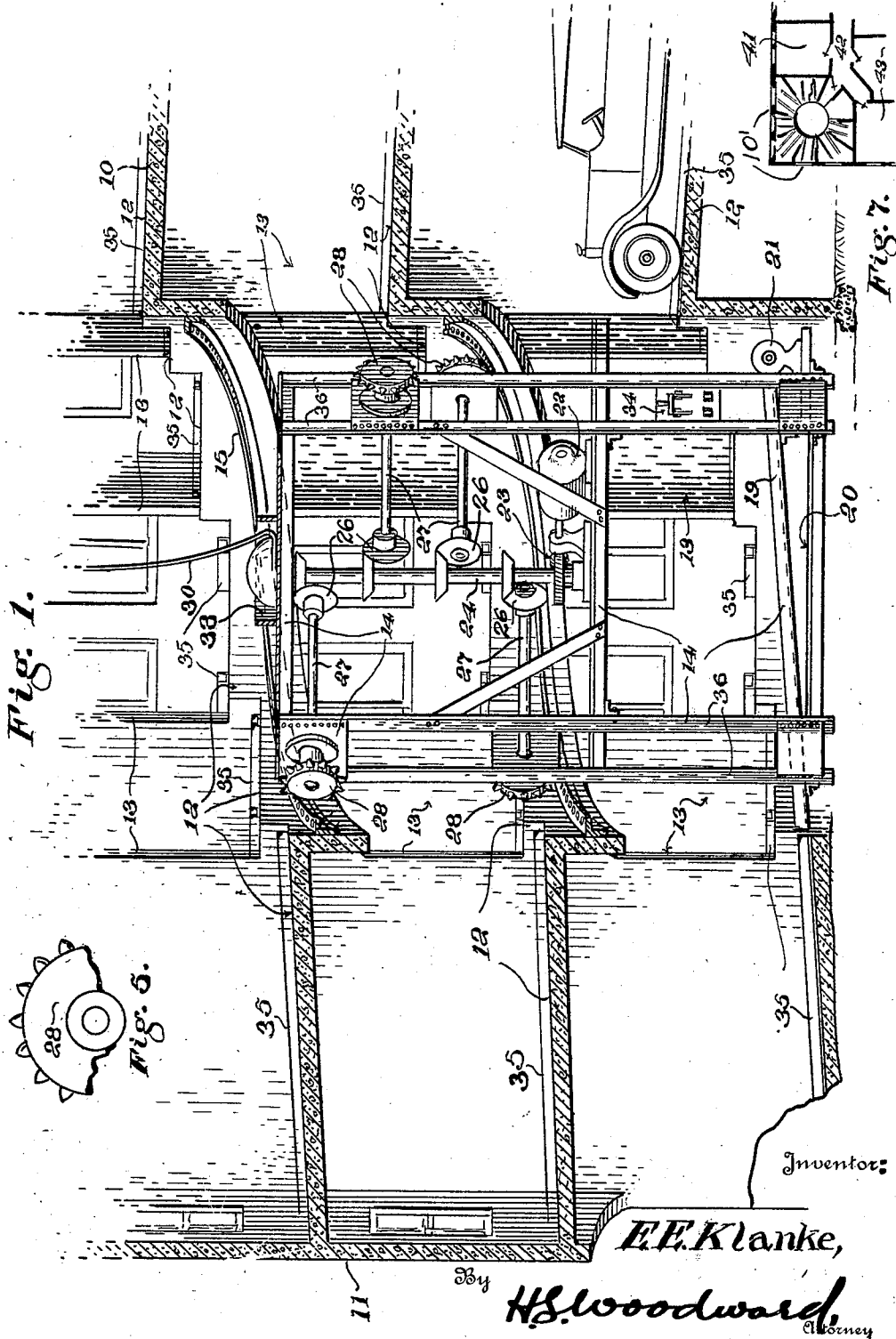
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1,709,914

BUILDING AND ELEVATOR STRUCTURE

Filed March 11, 1927

2 Sheets-Sheet 1



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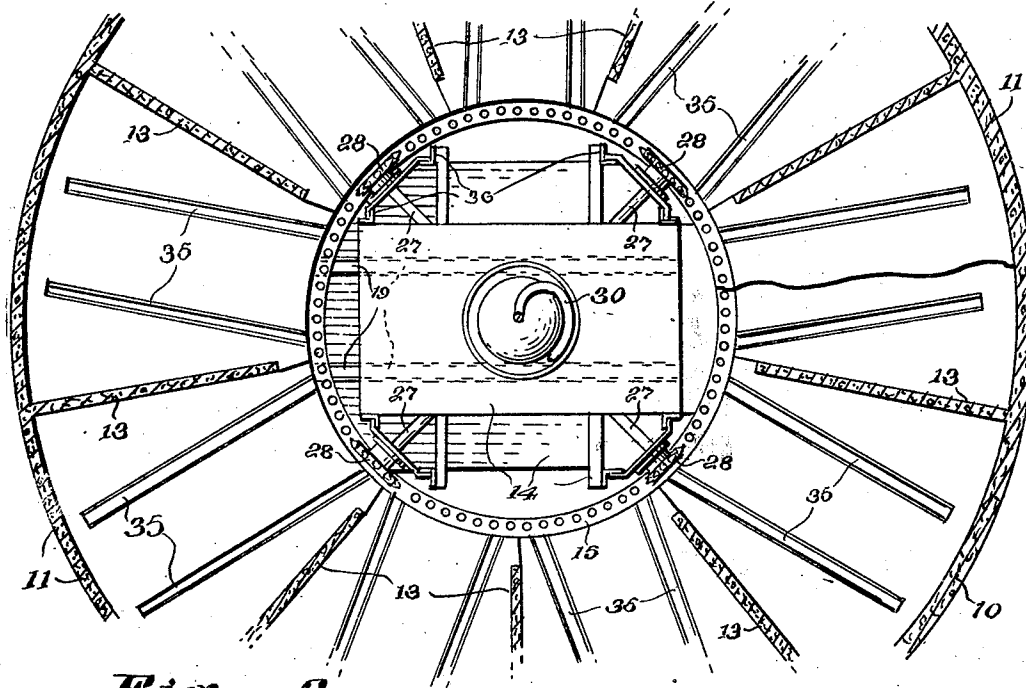


Fig. 2.

Fig. 3.

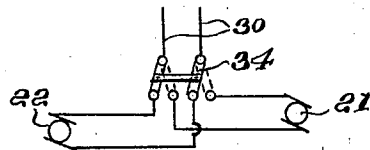
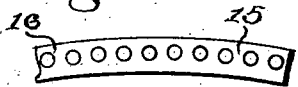
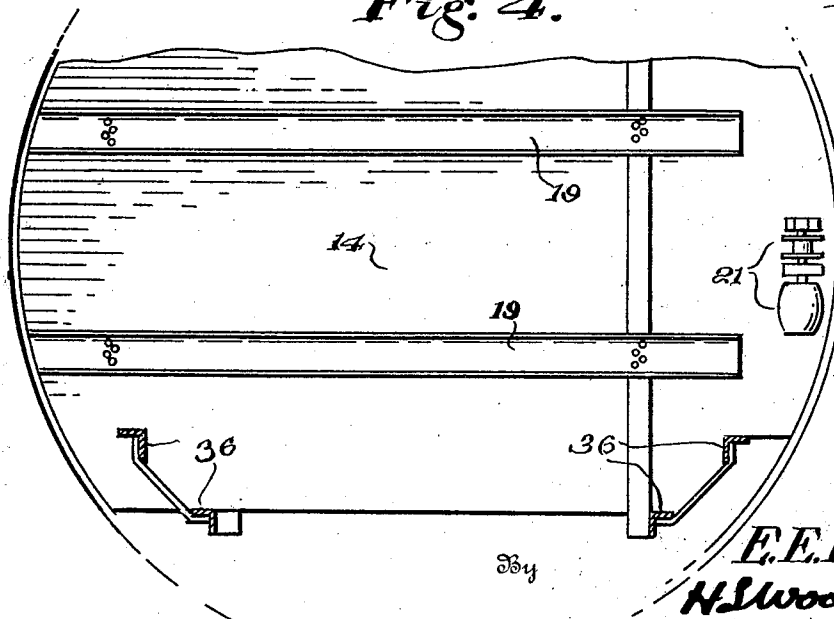


Fig. 6.

Fig. 4.



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BUILDING AND ELEVATOR STRUCTURE.

Application filed March 11, 1927. Serial No. 174,643.

The invention relates to building and elevator constructions, and particularly to a novel coordination of a building and elevator. The present embodiment is especially adapted to the storage of motor vehicles and other uses which will be readily understood from the following disclosure. The invention has for a special purpose to enable the efficient utilization of a limited area of ground for the efficient storage of motor vehicles, particularly. Another aim is to enable the storage of motor vehicles in individual garage units in a building of this type, in a practical way. A further aim is to present a novel type of elevator device coordinated with the building construction.

While I am familiar with elevators such as shown in the Patent No. 374,442, December 5, 1887, and inclined ramp structures suitable for storing motor vehicles in some of which the floor has been in helicoidal form, still it is an aim of my invention to effect improvements in the uses of such structures.

Additional objects, advantages and features of invention reside in the particular construction, arrangement and combination of parts, as will be understood from the following description and accompanying drawings wherein,

Figure 1 is a vertical cross sectional view of a building constructed in accordance with my invention, the elevator being shown in side elevation;

Figure 2 is a horizontal section thereof;

Figure 3 is a detail of the trackway;

Figures 4 and 5 are details of the elevator structure.

Figure 6 is a diagram of the motor control circuits.

Figure 7 is a plan of a modified building.

There is illustrated a garage building 10, adapted to be erected as a monolithic masonry structure by the use of plastic concrete, in which there may be incorporated any usual method of reinforcement and other practices approved in this work. The building consists of a cylindrical exterior wall 11 within which there is arranged a helicoidal series of slabs 12 (that is, like a spiral stairway, in which the slabs 11 correspond to the treads), the pitch of the series convolutions being equal to the desired height of a motor storage compartment. That is to say, beginning with the lowermost slab, each succeeding one is arranged a step higher, so that

considering a complete circle of slabs the next higher slab in the continuation of the series is at a height above the first slab to afford sufficient clearance for a vehicle storage compartment. At the sides of the slabs vertical radial walls 13 joining two floors may be incorporated, if desired. After one method the slabs extend inwardly from the wall 11 a distance, and terminate in such manner as to form a circular well at the center of the building of sufficient size to accommodate an elevator 14 vertically movable and rotatable within the well for the elevation of vehicles to the compartments as required. A continuous spiral, single rail track 15 is mounted at the inner edge of the series of slabs. The rail in the present instance is shown as made of angle iron which may be suitably bent to conform to the path required. The track flange 16 being provided with a closely spaced longitudinal series of apertures so arranged that when two or more rails are arranged in abutment end to end as a part of a continuous spiral, the openings of one will form a proper continuation of the series in another.

The elevator 14 consists of a platform 20, upon which a motor vehicle may be driven at the ground level or other floor, this platform being in the present instance inclined upwardly from the entrance side. It is also important to note that in the present embodiment of the building structure the floor that is, each slab is inclined downwardly from the inner edge at the well toward the peripheral wall 11. Transversely to a medial line through the slab radial to the axis of the well, each slab is horizontal, as indicated in Figure 1 in the central part, the downward slope of each slab from the well toward the outer part being shown at each side in this view. An electric winch 21 is provided on the elevator from which a cable may be extended to the front axle or other part of a motor vehicle to draw it upon the elevator. The frame work of the elevator is extended above the platform in the present instance a distance, and has mounted thereon an elevator motor 22, having a worm-shaft 23 meshed with a corresponding gear on a vertical shaft 24 mounted concentrically upon the elevator frame work. The shaft 24 has four bevelled gears spaced longitudinally thereon and keyed thereto, meshed with corresponding gears 26 at the inner ends of an equal number of radial horizon-

tal shafts 27, which are suitably journaled upon the frame work of the elevator, and preferably arranged on respective radii of the shaft 24 having such angles to each other, as well as being spaced vertically so that their outer ends may project over the rail 15 at properly spaced distances for support and centering of the elevator. The shafts 27 carry at their outer ends spurred wheels 28, the spurs of which are spaced to mesh or fit in the apertures of the rail 15. The bearings at the outer ends of the shafts 27 are especially adapted to enable these to support the weight of the elevator and should also have thrust bearings to center the elevator in the well.

Electrical connections for the elevator motor and winch are preferably made by means of a flexible cable 30, hung from the center of the uppermost part of the building over the well, this cable having as much slack as is desired to accommodate the maximum movement of the elevator. Upon the top of the elevator there is formed an annular trough 33, the inner side of which is inclined toward the axis of the trough, and by this means, as the elevator moves upwardly the cable will be laid and ordered in the trough in such manner that the minimum wear on the cable will occur, and necessity for any special take-up obviated. It is preferable that a two-way double pole switch be used for controlling the elevator motor and the motor of the winch, after the diagram shown in Figure 6, so that it is impossible to operate the elevator motor when the winch is operated, and similarly the winch can not be operated when the elevator motor is in operation.

By the construction shown, upon operation of the elevator-motor the elevator will be raised by the travel of the spur-wheels upon the track 15, and at the same time the elevator will be bodily rotated so that as it moves upwardly through each stage of height of the building the entrance and exit side of the elevator will be alined with each succeeding respective chamber and slab. Motor vehicles may be run off of the platform of the elevator by reversing the winch to allow the vehicle to move by gravity owing to the inclination of the platform and the building floor.

It will be seen that necessity for continuous vertical guides is obviated by my elevator construction, and the mounting of the elevator made unusually secure, as well as manner of lifting simplified, obviating the element of excessive wear involved by the use of hoisting cables and providing a construction which is liable in the minimum degree to deterioration or damage by wear or handling by untrained operatives. The construction may be varied in various ways within the scope of the invention, but it is

evident that an extremely simple structure only is required.

The manner of construction of the building and elevator mounting is adapted to permit very simple manufacturing and building construction methods, involving a minimum of liability of fault in design. In addition, only ordinary experience in concrete building construction is required to enable this type of building to be readily designed and erected. The elevator construction also is of a simple character which is liable in a minimum degree to failure and may be made proof against dropping, or objectionably rapid descent by ordinary precautionary measures.

While the building has been shown as circular, this is not essential as will be readily understood and it may be made in various other shapes and of greater area, as may be desired for the uses contemplated.

In the embodiment shown, tracks 35 are shown on each slab 12 so that vehicles being moved from the elevator will be guided properly into positions on the floors of the building. The tracks may be formed of channel iron of proper size laid with the flanges projected upwardly to serve as guides for the wheels of the vehicles.

The elevator shown includes uprights 36, two adjacent each of four radii of the elevator shaft spaced 90 degrees apart, and on these the bearings for the shafts 27 are mounted. The elevator may however be of any approved construction. The bearings for the inner ends of the shafts 27 being thus of optional construction are omitted in order to enable simpler representation of the essential mechanical features.

The spiral slab-series structure may be combined with a building having horizontal floors of standard construction, as indicated in Figure 7, which illustrates an upper floor plan of a building 41. Here 10' indicates a structure corresponding to that of Figures 1 and 2 with a square ground plan, and forming part of the larger building 41 which has horizontal floors which are alined with a vertically alined series of slabs of the structure 10', preferably an inner series so that they may be used as vehicle entrances from the floors of the building 41 or as halls, as indicated at 42. The structure 10' may be used for the storage of motor vehicles or for other purposes in connection with the building 41. The horizontal floors may be either sub-divided as offices 43 as shown, or otherwise used. The elevator 14 may be used solely as a freight and vehicle elevator, and other approved forms of elevators used for passenger service in the building 41.

This method of construction meets a much felt need in commercial districts of large cities where the accommodation of motor vehicles of occupants of office buildings is

a serious problem. With my invention occupants of a floor may be assigned one tier of cells or slabs in the part 10' of the structure, and pass to the offices directly from their cars after the latter are put in place. It is to be noted that the radial walls 13 stop a distance back from the well or shaft 40 for the elevator 14 so that the slabs 12 may be readily used as a stairway. Various modifications of the elevator constructions may be made within the scope of the claims, especially in the nature of the transmission of power to the wheels 28, the number and form of which may be varied.

While a building such as may be built of Portland cement concrete is represented, the structure may also be constructed of various other materials in accordance with approved architectural methods.

I claim:

1. In a construction of the character described, including a spiral track a concentric elevator structure and tractive means on the elevator to travel the track; a building associated with the track way having a floor structure corresponding to a helix of similar direction as the track, said elevator being mounted to bodily rotate with said tractive means within the spiral track way, and having an entrance side arranged to aline with spirally successive portions of the said floor under operation of the traction means.

2. The structure of claim 1 in which the said floor consists of a spiral series of slabs in stepped relation.

3. The structure of claim 1 in which said floor is inclined downwardly from adjacent the trackway, and said elevator is provided with a floor having one edge adapted to aline with the first named floor, being upwardly inclined from said edge, a winch device operative at the upper edge of the elevator floor, electrical means to operate the winch, electrical means to operate said traction device, an electrical source, a service circuit from said source, lead circuits to the two, said operating means including a switch device constructed to connect the two lead circuits alternatively to the service circuit.

4. The structure of claim 1 in which the building structure has the spiral track coincident with the mean spiral course of the floor structure.

5. The structure of claim 1 in which the

track is formed with a longitudinal series of apertures, and said traction means includes wheels journaled on the elevator frame formed with spurs to enter the apertures of the rail for traction and centering of the elevator within the track.

6. An improved building structure comprising a series of horizontal floors, and a spirally arranged series of slabs having formed coaxially therethrough a well for an elevator, certain slabs in said series being alined with respective floors, and an elevator in the well having an entrance and being movable vertically and rotatable to aline the entrance with the slabs as required.

7. A structure of the character described comprising a helicoidal series of floor elements, stopping short of the axis of the series to form a well, and each floor element of said series comprising an individual storage space, a spiral track fixed upon the structure in the well, of the same pitch as the said series of floor elements, an elevator vertically movable and revoluble in the well, wheels carried by the elevator tracking on said track, and said elevator having an entrance arranged to aline with successive floor elements as it moves, whereby the elevator entrance may be alined selectively with any individual storage space by a single movement.

8. A storage device comprising a building having a helicoidal series of floor elements stopping short of the axis of the series to form a well and adapted to form individual storage compartments, an elevator in the well having an entrance and being mounted for vertical and revoluble movement, and means to cause the elevator to move vertically and revolubly on the well axis in a relation to the floor elements to cause the entrance to aline successively with the individual floor elements.

9. The structure of claim 8 in which a guide means for the elevator is included comprising a stationary part and a part on the elevator, one of the last named parts including a helicoidal track coordinated in pitch with the pitch of the helicoidal series of floors, to cause the entrance of the elevator to become alined with successive floor units incident to its vertical movement.

In testimony whereof I affix my signature.
ELMER E. KLANKE.