June 9, 1931. C. F. ALT 1,808,741

VEHICLE PARKING STRUCTURE

Filed May 7, 1929 2 Sheets-Sheet 1

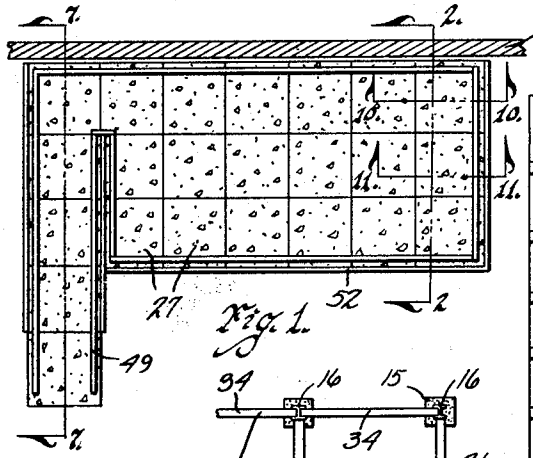


Fig. 1.

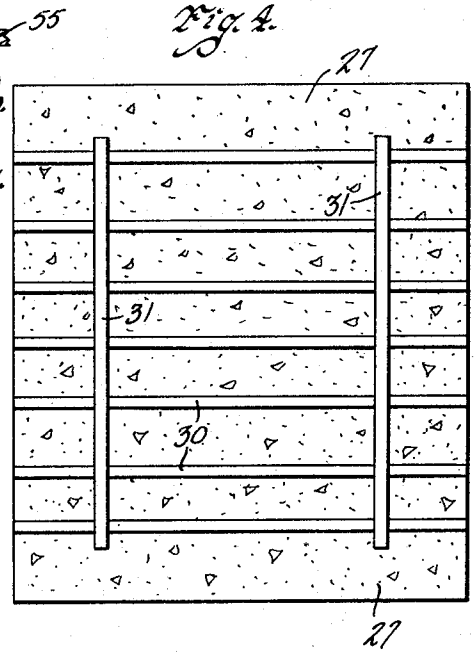


Fig. 4.

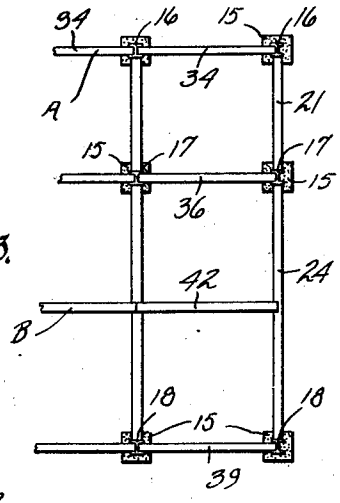


Fig. 3.

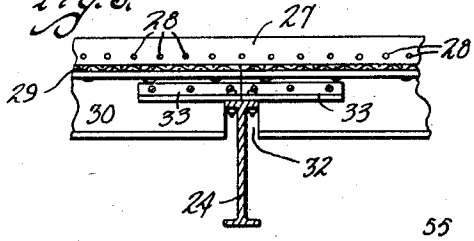


Fig. 5.

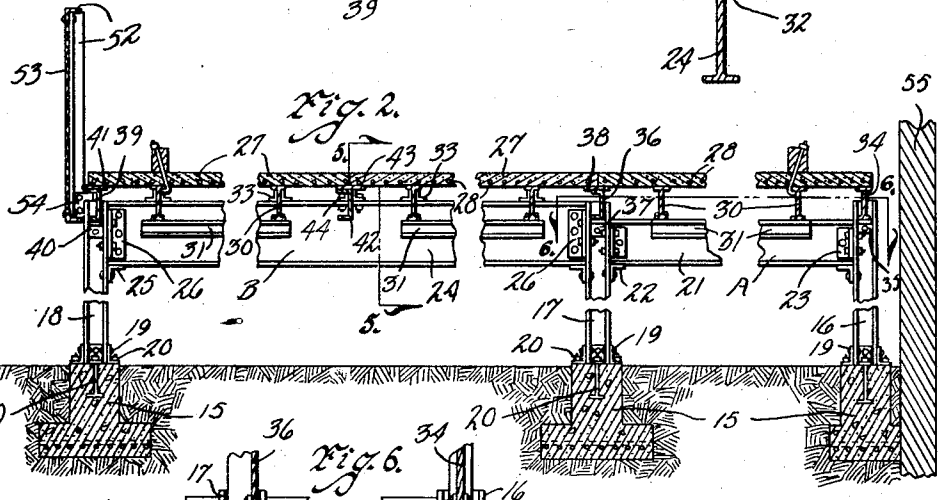


Fig. 2.

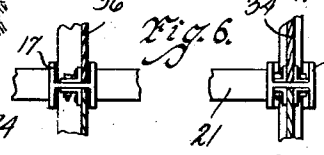


Fig. 6.

Witness
Linton Read.

Inventor
Charles F. Alt
By Bair, Freeman & Sinclair
Attorneys

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VEHICLE PARKING STRUCTURE

Filed May 7, 1929 2 Sheets-Sheet 2

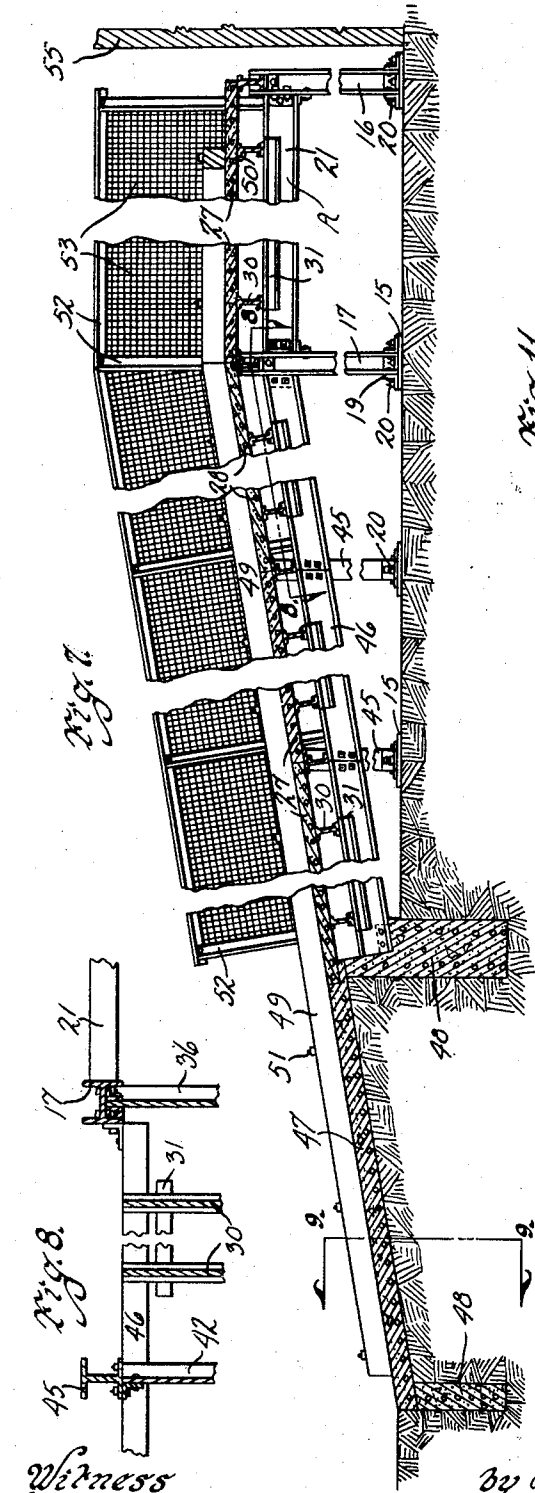


Fig. 7.

Fig. 8.

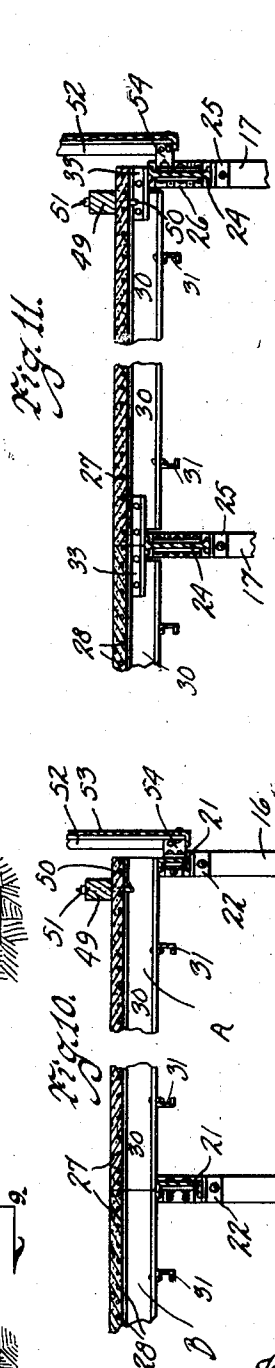


Fig. 11.

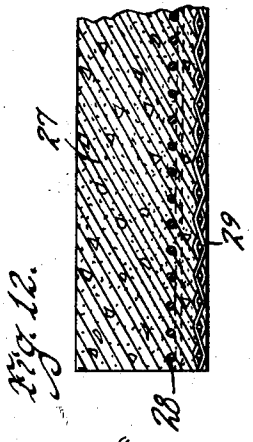


Fig. 12.

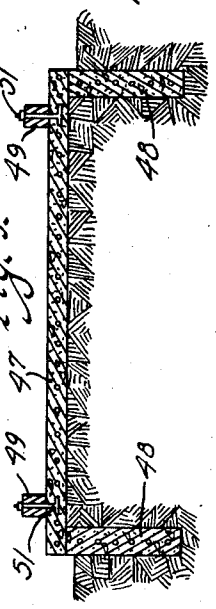


Fig. 9.

Fig. 10.

Witness
Vinton Read.

Inventor
Charles F. Alt
By Bair, Freeman & Sinclair
Attorneys

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UNITED STATES PATENT OFFICE

CHARLES F. ALT, OF DES MOINES, IOWA

VEHICLE PARKING STRUCTURE

Application filed May 7, 1929. Serial No. 361,155.

The object of this invention is to provide an improved structure designed for the parking of vehicles on one or more levels.

A further object of the invention is to provide an improved parking structure which is of permanent character and yet is built in sections which are detachably connected so that they may be disassembled and moved from one location to another.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of a parking structure embodying my improvements.

Figure 2 is a transverse section on the line 2—2 of Figure 1, portions being broken away.

Figure 3 is a plan view of a portion of the steel framework.

Figure 4 is a bottom plan view of one of the reinforced concrete slabs and the structural steel grid for supporting it.

Figure 5 is a detail vertical section on the line 5—5 of Figure 2.

Figure 6 is a detail horizontal section on the line 6—6 of Figure 2.

Figure 7 is a vertical section longitudinally of the ramp on the line 7—7 of Figure 1, portions being broken away.

Figure 8 is a detail horizontal section on the line 8—8 of Figure 7.

Figure 9 is a detail vertical section on the line 9—9 of Figure 7.

Figure 10 is a detail vertical section on the line 10—10 of Figure 1.

Figure 11 is a detail vertical section on the line 11—11 of Figure 1.

Figure 12 is a cross section through one end portion of one of the reinforced concrete slabs employed to constitute the upper floor or parking level of the structure.

The question of providing adequate parking facilities for vehicles is one of the most acute problems connected with the use of automobiles in the present day, particularly in the congested portions of our cities.

This problem is not fully met by providing vacant lots or other spaces having no means for protection of the vehicles or even by the provision of temporary sheds, which are more or less unsightly and usually of restricted capacity.

My present invention relates to a parking structure which is of a permanent character and which is not objectionable because of its appearance, being constructed mainly of structural steel and reinforced concrete.

Furthermore, this structure is designed to substantially double the capacity of a given area, inasmuch as it provides for parking on two levels, one above the other, and the floor of the upper level provides a covering and protection for vehicles parked on the lower level.

Moreover, this structure is of knock-down form, being composed of sections which are detachably connected. This permits the structure to be disassembled at times and moved from one location to another to meet the changing demands incident to the growth of a city or because of other reasons.

The structure rests upon a plurality of reinforced concrete footings 15, which are set in the ground at suitably spaced intervals.

Erected upon the footings 15 are posts 16, 17 and 18, which, preferably, are composed of H beams set on end and secured to the footings by means of angle brackets 19 bolted to the posts and engaging bolts 20 set in the footings.

As here shown, the rows of posts 16 and 17 are arranged fairly close together and equally spaced apart in the rows, and a third row of posts 18 is parallel with the other two rows, but spaced from the intermediate row 17 a distance substantially twice as great as the distance between the rows 16 and 17.

This arrangement of posts provides in the lower level of the parking structure, a relatively narrow bay indicated at A and a relatively wide bay indicated at B.

It is to be understood that any desired arrangement or combination of narrow and wide bays may be employed to suit the convenience of the builder or to provide the de-

sired capacity or to occupy a given plot of ground.

The rows of posts 16 and 17 are connected transversely in pairs by means of channel beams 21. The channel beams are placed near the upper ends of the posts and rest on angle brackets 22 bolted to the posts. The channel beams are further connected to the posts by means of angle connecting bars 23 bolted to both members.

The posts 17 and 18 are connected transversely in pairs by means of I beams 24, which preferably are of greater width and strength as well as of greater length than the channel beams 21. The I beams 24 are arranged at the upper ends of the posts, rest on angle brackets 25, and are further secured to the posts by means of angle connecting members 26.

The structural framework thus provided is covered by a plurality of reinforced concrete slabs 27. The slabs 27 preferably are of uniform size and each is just large enough to cover the space inclosed by four adjacent posts 16 and 17 of the narrow bay A. It therefore requires two of the slabs 27 to cover the space inclosed by four adjacent posts 17 and 18 of the bay B.

Each of the slabs 27 preferably is reinforced by parallel rods 28 and a recticulated member 29 near its lower surface.

The slabs 29 rest upon and are supported by a structural grid, as shown in Figure 4, which grid is composed of a plurality of parallel I beams 30 and two or more channel beams 31 arranged at right angles to and beneath the I beams and securely bolted thereto.

The slabs 27 are arranged to cover the bays A and B and are supported by the I beams 30, which rest upon the upper edges of the transverse beams 21 and 24 of the structural framework.

As here shown and illustrated particularly in Figure 2, the structural beams 21 and 24 are arranged with their lower edges in the same horizontal plane and their upper edges in different horizontal planes because of their different widths.

I have here shown the I beams 30 resting directly upon the upper edges of the channel beams 21. The ends of some of the I beams 30 are formed with notches 32, as shown in Figure 5, to receive the upper parts of the wider I beams 24 so that the slabs 27 are all supported in the same horizontal plane.

In cases where the I beams 30 are notched, the notched portions of the webs preferably are provided with angle supporting members 33 securely bolted thereto and resting upon the upper edges of the beams 24, as shown in Figure 5.

I beams 34 (see Figure 2) are arranged longitudinally between the pairs of posts in the row 16 to support the outer side margins of some of the slabs 27. The I beams 34 extend within the open sides of the H beams 16 and are supported on angle brackets 35 bolted thereto.

In a similar manner, channel beams 36 are mounted on brackets 37 carried by the posts 17 and serve to support the inner edges of some of the slabs 27. A plate 38 preferably is mounted on each channel beam 36 to bridge the joint between adjacent slabs 27.

Channel beams 39 are also arranged between posts in the row 18 and supported on brackets 40 bolted thereto. Plates 41 are also mounted on the upper edges of the channel beams 39 for receiving the outer edges of some of the slabs 27.

To support the adjacent edges of the two rows of slabs 27 covering the bay B I have provided channel beams 42 upon which are mounted bridging plates 43. The channel beams 42 are bolted to angle brackets 44, which are mounted on and bolted to the upper edges of the I beams 24. The slabs 27 serve as a covering for the bays A and B of the lower level and they also constitute a floor for the storage of vehicles on an upper level.

Access is had to the upper level by means of a ramp or inclined driveway preferably located at one end of the structure.

The ramp is composed of reinforced concrete slabs 27 of the type previously described with supporting grids composed of I beams 30 and channel beams 31. The ramp is supported by additional posts 45 of different heights carrying beams 46 on which the I beams 30 and slabs are supported.

The ramp also includes, as shown in Figure 7, an approach consisting of an inclined slab 47 of reinforced concrete resting on suitable foundation members 48 embedded in the ground.

Curb members 49 are arranged on opposite sides of the ramp and also around the marginal portions of the upper level. These curb members are here shown as formed of wooden beams which are held in place by means of hook bolts 50 extending through the respective slabs and engaging upper flanges of structural members such as the I beams 30. Those curb members 49 which rest on the slab 47 are shown as being held in place by means of headed bolts 51, partially embedded in the slab.

Any suitable superstructure may be mounted on the upper level and in this instance, such superstructure takes the form of a fence composed of frame members 52 and reticulated members 53 carried thereby. The vertical frame members of the fence are supported by vertically arranged angle brackets 54 bolted to structural members such as the beams 21 and 24, as shown in Figures 10 and 11.

The structure is here shown as being located adjacent a wall 55 and for that reason, the fence is omitted on one side of the upper level.

This structure provides convenient means for affording facilities for the parking or storage of a maximum number of vehicles on a given area of ground and which is of relatively permanent construction.

In the event it is desired to move the structure from one location to another the fence or other superstructure may be removed by taking out the fastening bolts. The reinforced slabs 27 may then be removed one at a time by the use of lifting jacks mounted on trucks or portable platforms. Then the several members of the structural framework shown in Figure 3 are detached and removed. In fact, all of the parts may be transported with the exception of such members as the footings 15, approach slab 47 and foundation members 48.

I claim as my invention:

1. A vehicle parking structure comprising posts, beams removably connecting said posts longitudinally and transversely in pairs, and reinforced concrete slabs supported loosely on said beams to form an upper level parking floor and also to provide a covering for a lower level.

2. A vehicle parking structure comprising posts, beams connecting said posts longitudinally and transversely in pairs, and reinforced concrete slabs supported loosely on said beams to form an upper level parking floor and also to provide a covering for a lower level, said posts and beams being detachably connected so that the entire structure is of knock-down construction.

3. A vehicle parking structure comprising posts, beams connecting said posts longitudinally and transversely in pairs, and reinforced concrete slabs supported loosely on said beams to form an upper level parking floor and also to provide a covering for a lower level, together with a ramp leading from the lower level to the upper level.

4. A vehicle parking structure comprising posts, beams connecting said posts longitudinallly and transversely in pairs, reinforced concrete slabs supported loosely on said beams to form an upper level parking floor and also to provide a covering for the lower level, and a superstructure mounted on some of said beams and extending above the surface of said slabs, said superstructure, posts and beams being detachably connected whereby they may be disassembled and removed from one location to another.

5. A vehicle parking structure, comprising posts detachably mounted in suitably spaced positions, beams detachably connected to said posts to form a structural framework, a plurality of reinforced concrete slabs, and a structural grid supporting each slab, said grids being mounted on and detachably supported by the structural framework so that the slabs together provide a covering therefor and also constitute an upper parking level.

6. A vehicle parking structure comprising a plurality of longitudinally and laterally spaced footings, structural steel posts resting on said footings, angle iron brackets by means of which the posts are bolted to the footings, angle brackets secured to said posts near their upper ends, structural steel beams resting on the last named brackets, angle connecting members bolted to the beams and to the adjacent posts, a structural grid work resting on the beams above each space between said posts, and reinforced concrete slabs mounted above said beams and resting on said grid work, said slabs serving as a covering for the spaces between said posts and also as a floor for the parking of vehicles.

7. A vehicle parking structure comprising posts, beams removably connecting said posts longitudinally and transversely in pairs, and flooring elements supported loosely on said beams to form an upper level parking floor and also to provide a covering for a lower level.

8. A vehicle parking structure comprising posts, beams connecting said posts longitudinally and transversely in pairs, and flooring elements detachably mounted on said beams to form an upper level parking floor and also to provide a covering for a lower level, said posts and beams being detachably connected so that the entire structure is of knock-down construction.

Des Moines, Iowa, April 26, 1929.

CHARLES F. ALT.