Aug. 14, 1923.

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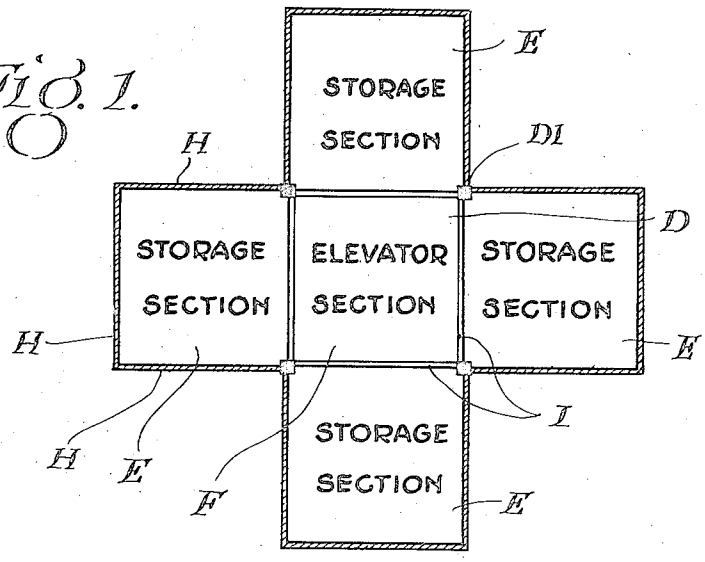
C. KEHR

STORAGE BUILDING

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FIG. 1.



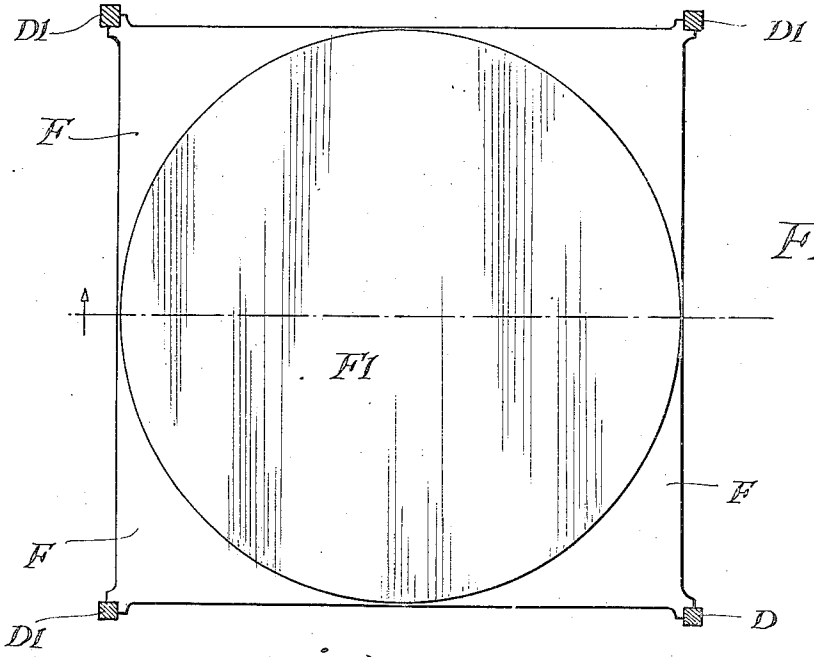
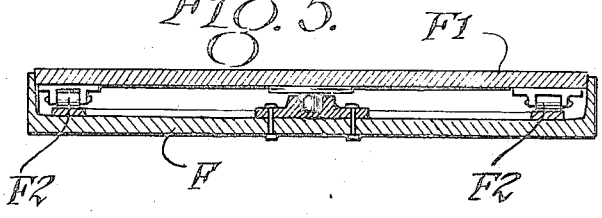


FIG. 4.

FIG. 5.



Inventor

Cyrus Kehr

Aug. 14, 1923.

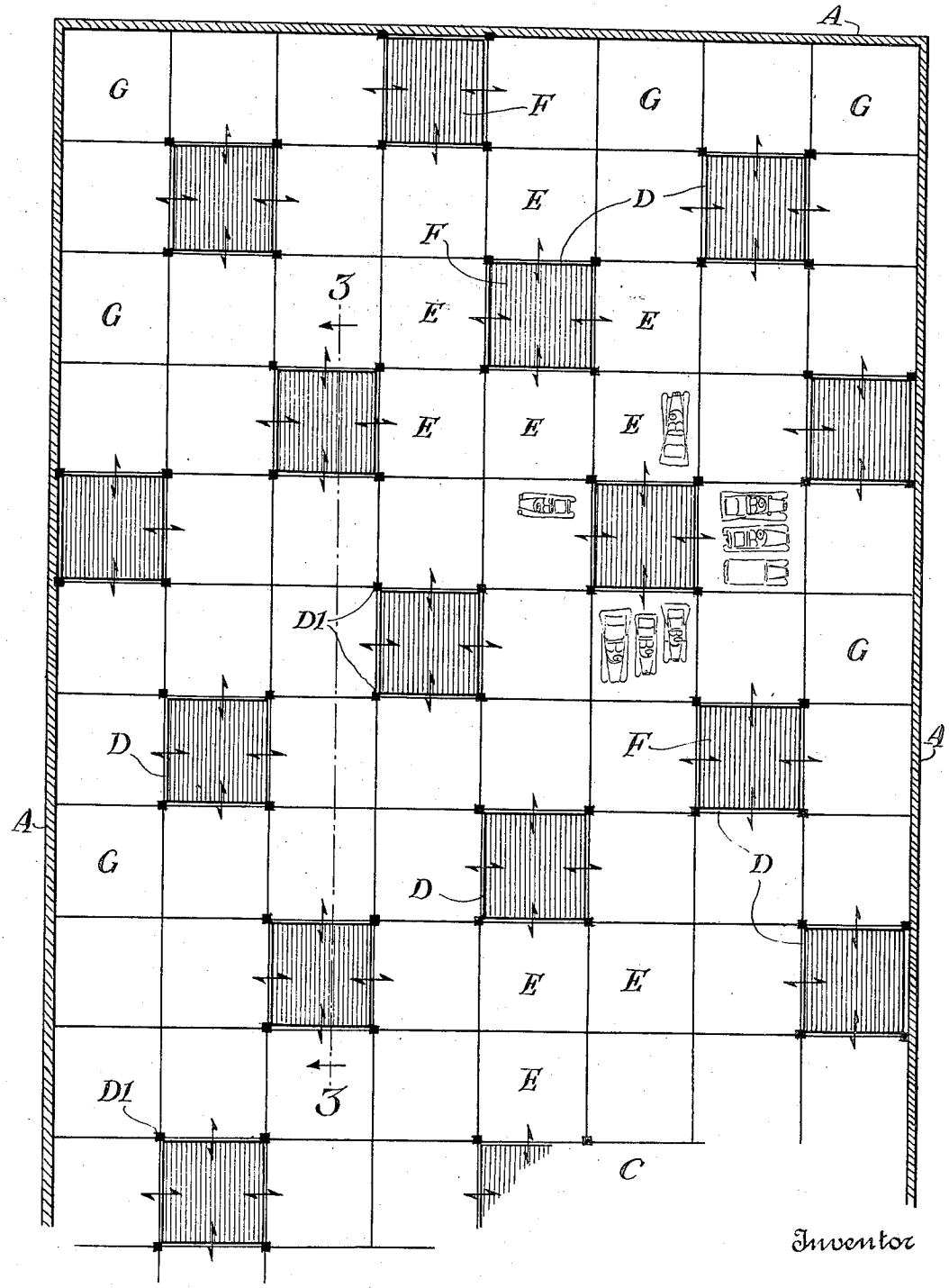
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Inventor

FIG. 2.

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FIG. 3.

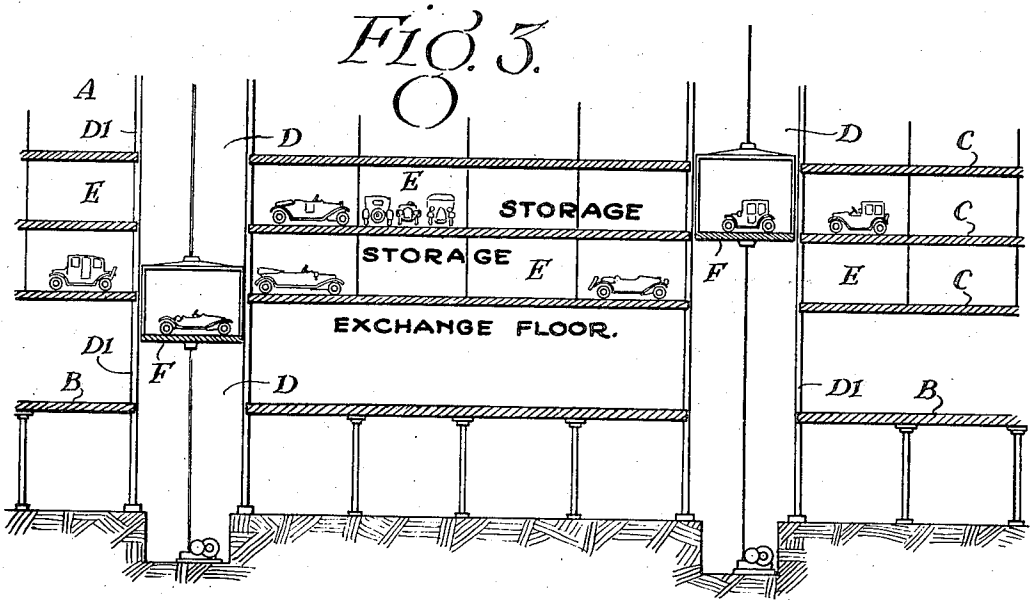
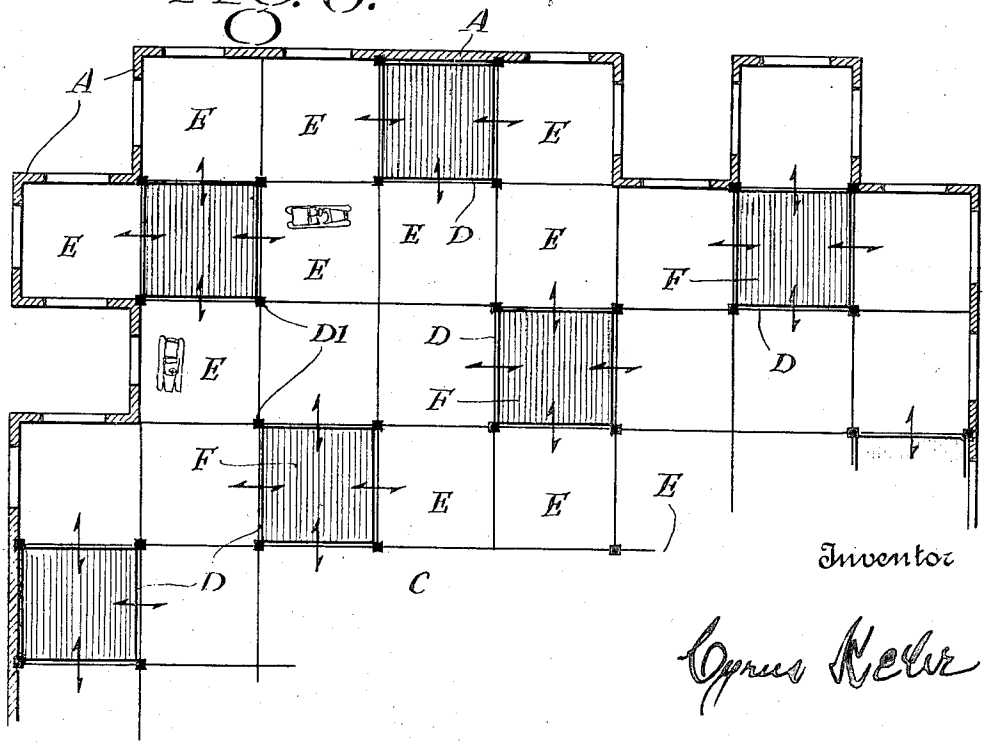


FIG. 8.



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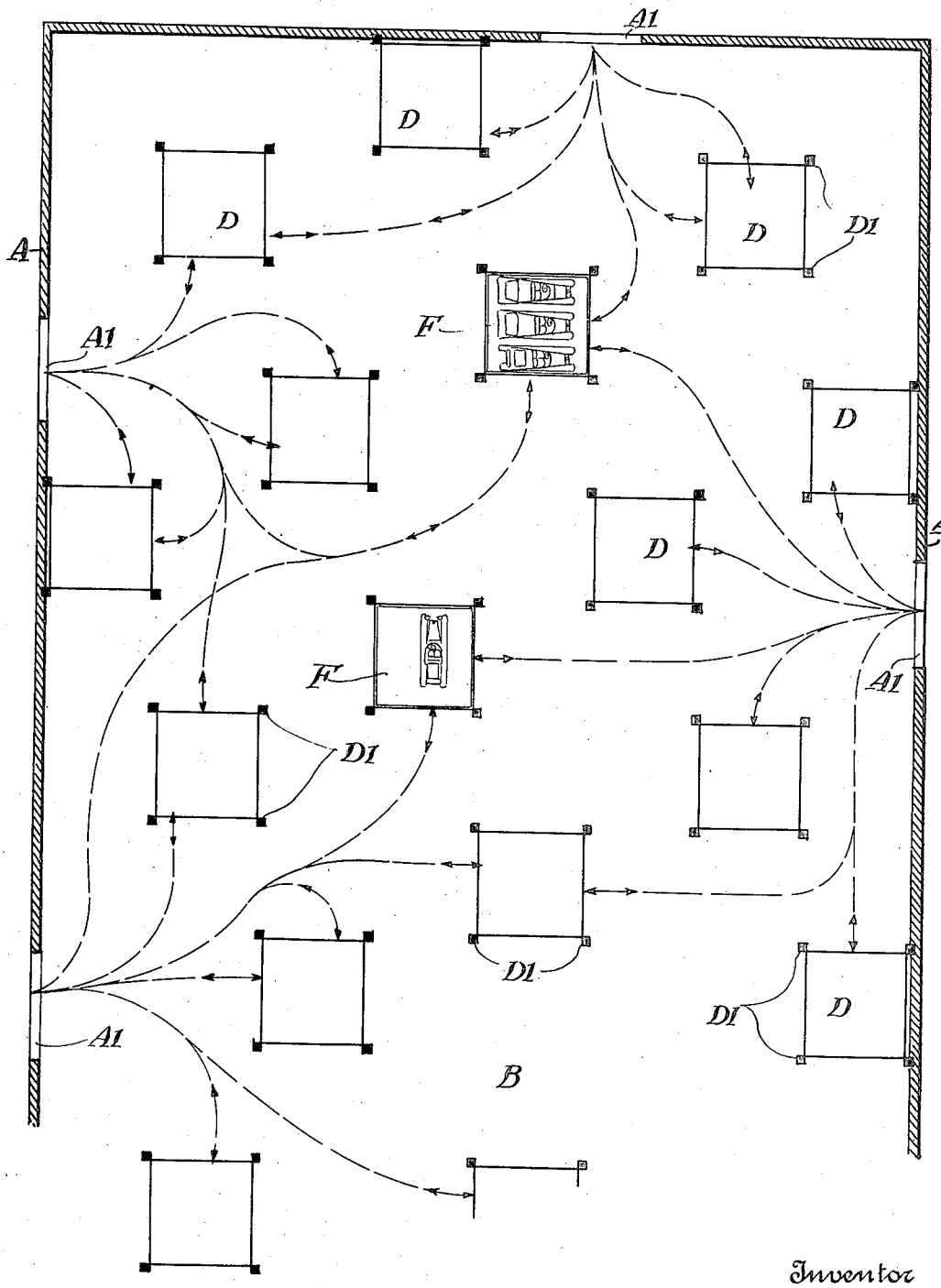


FIG. 6.

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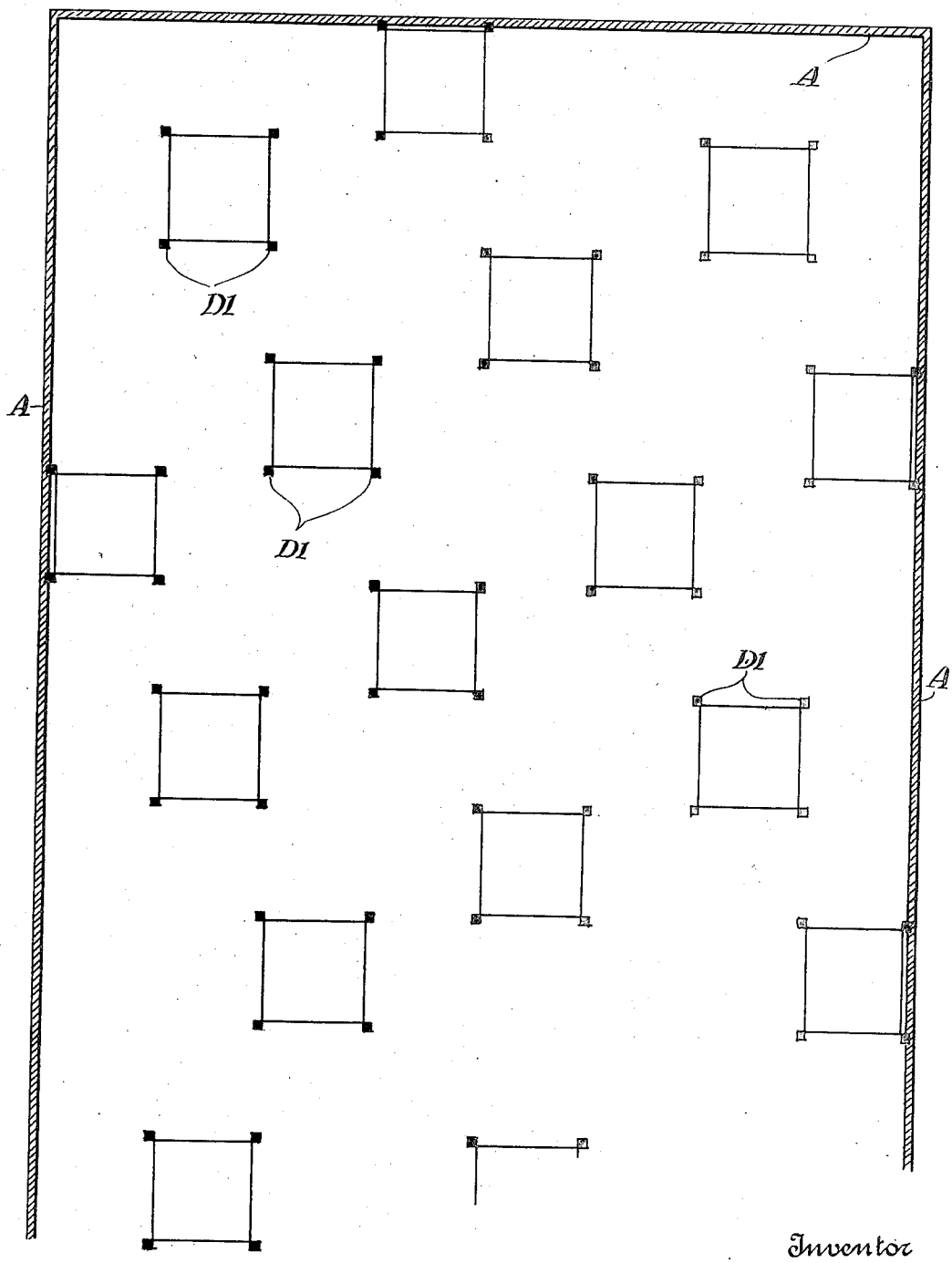
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Inventor

FIG. 7.

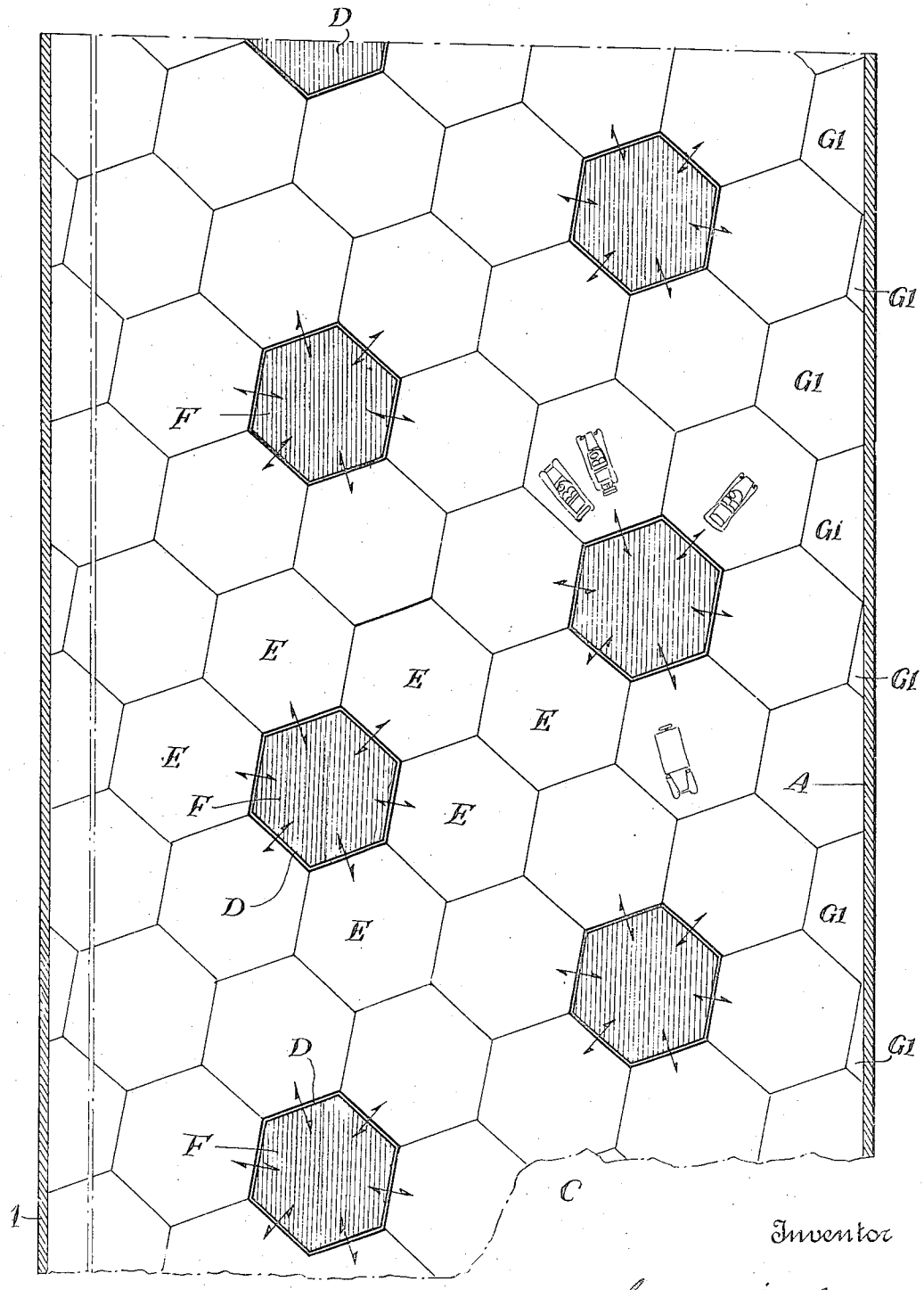
Cyrus Kehr

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C. KEHR

STORAGE BUILDING

Filed Nov. 3, 1922 6 Sheets-Sheet 6



Inventor

Cyrus Kehr

FIG. 9.

Patented Aug. 14, 1923. 1,465,135

UNITED STATES PATENT OFFICE.

CYRUS KEHR, OF WASHINGTON, DISTRICT OF COLUMBIA.

STORAGE BUILDING.

Application filed November 3, 1922. Serial No. 598,617.

To all whom it may concern:

Be it known that I, CYRUS KEHR, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a new and useful Improvement in Storage Buildings, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates generally to buildings used for storing various commodities and particularly to buildings having a plurality of superposed horizontal floors on which commodities are stored. My improved building is suitable for the storing of merchandise and household goods and particularly for the storing of automobiles and other road vehicles.

The object of this invention is to provide a storage building in which a large proportion of the floor space is made available for storage. A further object of the invention is to provide a structure in a form permitting the construction of storage sections or compartments which are small relative to the entire floor space, and which are arranged in relatively small groups served by individual elevators, whereby access to the sections or compartments of any group may ordinarily be had only by means of the elevator for that group. But it is to be understood that the storage spaces or sections need not be separated by walls.

By way of introduction it may be stated that the building comprises a plurality of horizontal, superposed floors and a plurality of upright elevator shafts extending through said floors, the floors affording or comprising storage areas or sections or compartments radiating from each elevator shaft. The groups of storage areas or sections surrounding the elevator shafts are nested or inter-locked or inter-meshed, every section extending between two sections of an adjoining group, excepting at places along the walls of the main compartment, whereby excepting along said walls, all the floor space is occupied by elevator shafts and storage areas or spaces radiating from and communicating with the elevator shafts. In other words, it may be said that storage sections of every group of storage sections, excepting a part of the groups along the walls, is fitted to or into adjoining groups in such manner as to leave no unoccupied space.

The elevator shafts occupy floor spaces or sections corresponding to the storage sections. Hence it may be said that an elevator section and the storage sections radiating from that elevator section constitute a section group.

In the first form herein described, each complete section group comprises an elevator section and four storage sections arranged on horizontal axes crossing each other at right angles in the upright axial line of the elevator shaft, the group being in the form of a cross having four equal arms. In the second form herein shown, every complete section group consists of an elevator section and six storage sections.

In the accompanying drawings,

Fig. 1 is a diagrammatic plan of a group comprising an elevator space and four storage sections;

Fig. 2 is a diagrammatic plan of a part of a floor in a building having a plurality of section groups, four storage areas or sections or compartments being grouped around each elevator shaft, excepting that the incomplete groups have fewer than four storage sections;

Fig. 3 is an upright section on the line, 3—3, of Fig. 2, looking toward the left;

Figs. 4 and 5 are details of one of the elevators comprising a turn-table;

Fig. 6 is a plan of a part of the main or receiving and discharging floor of said building;

Fig. 7 is a plan of the basement;

Fig. 8 is a view similar to Fig. 2, with a modification of the outer walls;

Fig. 9 is a plan illustrating section groups consisting of an elevator section and six storage sections, the elevator section and the storage sections being hexagonal.

Referring first to Figs. 1, 2, 3, 4, 5, 6 and 7 of said drawings, A, A, are upright walls of the main storage room or compartment. These walls may be the outside walls of the building. B is the exchange floor, the floor on which the vehicles or other articles to be stored are received into the building and over which they are discharged from the building. C, C, are the storage floors. Said floors may be above or below the exchange floor. Usually the exchange floor will be on a level with the ground and the storage floors will be located above the exchange floor. Elevator openings or sections, D, are formed in the storage floors on upright lines which are so spaced from each other

and arranged in such relationship to each other as to permit placing four storage areas or sections or compartments, E, around each such opening, D, said sections, E, and the elevator sections together forming a cross having four arms of equal length. The elevator sections are on upright lines and on horizontal lines which are parallel to each other in directions which are at right angles to each other, the shafts on two adjacent lines alternating uniformly, whereby all the elevator sections are also brought on diagonal lines which cross each other at angles of ninety degrees.

Excepting as stated below, the space between any two storage sections of the same group is occupied by one of the sections of an adjacent group. Thus every complete section group consists of four storage sections and an elevator section of approximately the same horizontal area as each of the storage sections.

In places along the walls, A, fewer than four storage areas or sections are associated with the same elevator section, whereby incomplete section groups are formed.

From the foregoing it will be seen that the elevator section, the space used for bringing the storage articles to and taking them from the storage sections, is only one-fifth of the horizontal space occupied by a complete section group.

It will also be seen, by reference to Fig. 2, that at intervals along the walls, A, there are spaces which are equal to a storage section or an elevator section, but are not an elevator section and are not so associated with an elevator section as to constitute a storage section. These unoccupied areas are herein termed blank areas and are designated by the letter G. Said blank areas or spaces may be treated or utilized as hereinafter described.

Columns, D^1, extend along the corners of the elevator sections and form supports for the floors and guides for the elevators.

Elevators, F, with suitable accessories are placed into the shafts formed by the elevator sections, D, and columns, D^1.

Theoretically, the storage sections and the elevator sections are substantially square and substantially equal. It is also to be noted that if the building is to be used for the storage of automobiles or other vehicles, the sections are to be large enough to make room on the elevators and in the storage sections for at least one such vehicle, the vehicle being first placed on the elevator and the elevator then moved to one of the floors and the vehicle then moved horizontally outward into one of the storage sections.

If the building is to be used for the storage of passenger automobiles of ordinary sizes, such automobiles being approximately twice as long as their width, two automobiles may be placed side by side into each storage section, thus making one complete group of storage sections contain eight automobiles. And, if desired, the sections made be made large enough to receive three automobiles placed side-by-side, thus making one complete group of storage sections contain twelve automobiles.

The exchange floor, the floor to and from which the commodities or vehicles are to be delivered, is to be left sufficiently clear to permit easy access, on that floor, to the elevators.

On the storage floors, the storage sections are preferably separated from each other by dividing structures, which may be railings, screens or solid partitions, H. (See Fig. 1.) Furthermore, each storage section may be separated from its elevator section by any desired form of elevator shaft guard, which may be a movable railing, gate, or door, I. Such a door may be a curtain door adapted to extend from the floor to the ceiling, when closed, and to be drawn upward and horizontally along the ceiling in the adjacent storage section. Thus each storage section may be made a closed compartment which need not be disturbed during the placing of articles into or taking them out of other sections.

It is especially to be observed, that if such a building is used for the storage of automobiles or other road vehicles, any vehicle may be put into its storage section or removed therefrom without the necessity of moving any other vehicle, and substantially all the floor space, excepting where there are elevator shafts, may be occupied by automobiles, and the floor space occupied by the elevator shafts is relatively small.

On the storage floors, the blanks, G, may be used for storing articles or commodities to which ready access is not necessary, such blanks being reached from an adjoining group section.

Where blanks, G^1, would occur, the exterior wall, A, may be indented to follow the lines of the adjacent storage sections or elevator section, whereby more windows may be placed into the wall, A, and the external architectural design is modified. (See Fig. 8.)

In Figs. 4 and 5, a turn-table, F^1, is placed on the elevator, F. The perimeter of the turn-table is supported on rollers, F^2. By means of the turn-table a vehicle on the elevator may be turned in any direction, as may be desired when the vehicle is to be moved from the elevator.

Referring now to Fig. 9, every complete section group comprises an elevator section and six storage sections. The sections of these groups are hexagonal, and the groups are fitted together or inter-meshed. These

sections are to be made of such size as will best adapt them to what is to be stored in the storage sections If the storage sections are made large enough to receive three automobiles each, one complete section group will receive eighteen automobiles. This form will leave partial blanks, G^1, along the walls, A.

The basement, Fig. 7, will have the elevator shafts as in Fig. 6. The space not occupied by said shafts in the basement may be used in any desired manner, preferably for matters related to the storage business for which the main part of the building is used.

To the extent that there will be no interference with the movement of vehicles to and from the elevator shafts on the exchange floor, spaces on that floor may be occupied by administration offices and for other purposes.

Conception of the capacity of such a building may be attained by noting that if the building contains ten storage floors and ten elevator shafts and there is space for placing twelve automobiles around every shaft on every floor, those ten floors may receive twelve hundred automobiles at the same time.

Freight elevators of various forms for use in buildings being well known, it is deemed unnecessary to herein illustrate and describe in detail the construction of elevators to be used in the storage building herein described.

I claim as my invention,

1. In a building, the combination of a plurality of superposed floors, one of which floors is divided into a plurality of section groups each comprising an elevator section and storage sections radiating from the elevator section and said section groups being nested or inter-meshed, and elevators associated with said elevator sections, substantially as described.

2. In a building, the combination of a plurality of superposed floors, one of which floors is divided into a plurality of section groups each comprising an elevator section and storage sections radiating from the elevator section and said group sections being nested or inter-meshed, columns at the elevator sections, and elevators associated with said columns and sections, substantially as described.

3. In a building, the combination of a plurality of superposed floors, a plurality of which floors are divided into a plurality of section groups each comprising an elevator section and storage sections radiating from the elevator section and said section groups being nested or inter-meshed, and elevators associated with said elevator sections, substantially as described.

4. In a building, the combination of a plurality of superposed floors, one of which floors is divided into a plurality of section groups each comprising an elevator section and storage sections radiating from the elevator section and said section groups being nested or inter-meshed, elevators associated with said elevator sections, and dividing structures between the storage sections, substantially as described.

5. In a building, the combination of a plurality of superposed floors, one of which floors is divided into a plurality of section groups each comprising an elevator section and storage sections radiating from the elevator section and said sections being substantially square and said sections groups being nested or inter-meshed, and elevators associated with said elevator sections, substantially as described.

6. In a building, the combination of a plurality of superposed floors, one of which floors is divided into a plurality of section groups each comprising an elevator section and four storage sections radiating from the elevator section and said section groups being nested or inter-meshed, and elevators associated with said elevator sections, substantially as described.

7. In a building, the combination of a plurality of superposed floors, one of which floors is divided into a plurality of section groups each comprising an elevator section and storage sections radiating from the elevator section and of size suited to receive a plurality of automobiles and said section groups being nested or inter-meshed, and elevators associated with said elevator sections, substantially as described.

8. In a building, the combination of a plurality of superposed floors, one of which floors is divided into a plurality of section groups each comprising an elevator section and four storage sections radiating from the elevator section and of size suited to receive a plurality of automobiles and said section groups being nested or inter-meshed, and elevators associated with said elevator sections, substantially as described.

9. In a building, the combination of a plurality of superposed floors, one of which floors has a plurality of elevator sections, said elevator sections being arranged in alternation on parallel lines which are suitably separated from each other and the elevator sections on the same lines being separated a distance suited to provide storage floor sections radiating from each elevator section, the storage sections surrounding one elevator section extending between the radiating storage sections of adjacent elevator sections, and elevators associated with said elevator sections, substantially as described.

10. In a building, the combination of a plurality of superposed floors, having a plu-

rality of elevator sections surrounded by radial floor areas reaching into spaces between the floor areas of adjacent elevator sections, elevators associated with said elevator sections and another of said floors, and elevators associated with said elevator sections, substantially as described.

11. In a building, the combination of a plurality of superposed floors, one of said floors having elevator sections and groups of storage areas surrounding said elevator sections and nesting or inter-meshing with adjacent groups of such areas, the areas of each such group being long enough to receive an automobile moved radially and endwise from the adjoining elevator section, and elevators associated with said elevator sections, substantially as described.

12. In a building, the combination of a plurality of superposed floors, one of which floors has a plurality of elevator sections so grouped and so spaced from each other as to leave around each four storage floor areas of a size suited to receive an automobile endwise from the elevator section of that group, the storage areas of that group extending between and adjoining the storage areas of adjacent groups, and elevators associated with said elevator sections, substantially as described.

13. In a building, the combination of a plurality of superposed floors, one of which floors has parallel and adjoining rows composed of storage sections and elevator sections, said sections being arranged in adjoining rows extending at right angles to each other and the elevator sections in the rows extending in either direction being separated by four storage sections, whereby section groups are formed consisting of an elevator section and storage sections radiating from the elevator section between said storage sections of adjacent section groups, and elevators associated with said elevator sections, substantially as described.

14. In a building, the combination of a plurality of superposed floors, one of which floors has a plurality of elevator sections and storage sections arranged in rows crossing each other at right angles and adjoining each other, the elevator sections of one row being staggered relative to the elevator sections of adjoining rows, the elevator sections of the same rows being separated by four storage sections, whereby section groups are formed in the shape of a cross and comprising an elevator section and storage sections extending laterally from the elevator section and between storage sections of adjacent section groups, and elevators associated with said elevator sections, substantially as described.

15. In a building, the combination of a plurality of superposed floors, one of which floors has a plurality of elevator sections and storage sections arranged in adjoining rows crossing each other at right angles checkerboard fashion, the elevator sections in any row, extending in either direction being staggered with reference to the elevator sections of other adjoining rows, whereby cross-shape section groups are formed which comprise an elevator section and storage sections reaching laterally from the elevator section and into spaces between the storage sections of adjacent section groups, and elevators associated with said elevator sections, substantially as described.

16. In a building, the combination of a plurality of superposed floors, one of which floors has a plurality of section groups each comprising an elevator section and storage sections reaching laterally from the elevator section into spaces between the storage sections of adjoining section groups, and elevators associated with said elevator sections, substantially as described.

17. In a building, the combination of a plurality of superposed floors, one of which floors has a plurality of section groups of indented outline, the exteriors of the section groups inter-meshing, and elevators associated with the elevator sections of said section groups, substantially as described.

18. In a building, the combination of a plurality of superposed floors, one of which floors is divided into storage sections and elevator sections, said sections joining each other and being arranged in inter-meshing groups, every group comprising an elevator section and a plurality of storage sections, whereby all the storage sections adjoin an elevator section, and elevating and lowering means associated with the elevator sections, substantially as described.

19. In a building, the combination of a floor divided into a plurality of inter-meshing section groups each comprising a middle section and other sections radiating from said middle section, and elevating and lowering means associated with said middle sections, substantially as described.

20. In a building, the combination of a floor having elevator sections so placed relative to each other as to allow the placing of vehicles next to and radiating from said sections with angle spaces at intervals between said vehicles and vehicles next to other elevator sections extending into said angle spaces, whereby all said vehicles are next to elevator sections and substantially all floor space not occupied by elevator sections may be occupied by vehicles, and elevating and lowering means associated with said elevator sections, substantially as described.

21. In a building, the combination of a floor having elevator sections so placed relative to each other as to allow the placing of

vehicles next to the elevator sections and radiating therefrom to produce a cross-form grouping, the groups of said vehicles surrounding one of the elevator sections extending into the angle spaces between similar groups surrounding other elevator sections, and elevating and lowering means associated with said elevator sections, substantially as described.

22. In a building, the combination of a floor having elevator sections so placed relative to each other as to afford space for the inter-meshed grouping of automobiles endwise around and next to said elevator sections, and elevating and lowering means associated with said elevator sections, substantially as described.

23. The herein described method of storing automobiles, which method consists in moving the automobiles on a plurality of upright courses and then placing the automobiles next to and in inter-meshing radial groups around said courses, substantially as described.

24. In a building, the combination of a plurality of storage floors having elevator openings on a common upright axis, means forming guide-ways extending from floor to floor along said openings, dividing structures forming storage sections arranged in cross-form around and meeting said openings, whereby floor spaces between the storage sections are separated from the storage sections and an elevator engaging said guide-ways, substantially as described.

25. In a building, the combination of a plurality of storage floors having elevator openings on a common upright axis, means forming guide-ways extending from floor to floor along said openings, dividing structures forming storage sections arranged around and meeting said openings and meeting each other at said openings and each having approximately the area of one of said openings, and an elevator engaging said guide-ways, substantially as described.

26. In a building, the combination of a plurality of storage floors having angular elevator openings on a common upright axis, means forming guide-ways extending from floor to floor along angles in said openings, dividing structures forming storage sections arranged around and meeting the sides of said openings and meeting each other at said openings, and an elevator engaging said guide-ways, substantially as described.

27. In a building, the combination of a plurality of storage floors having quadrangular elevator openings on a common upright axis, means forming guide-ways extending from floor to floor along angles in said openings, dividing structures forming storage sections arranged around and meeting the sides of said openings and meeting each other at said openings, and an elevator engaging said guide-ways, substantially as described.

28. In a building, the combination of a plurality of storage floors having angular elevator openings on a common upright axis, means forming guide-ways extending from floor to floor along said openings, dividing structures forming storage sections arranged around and meeting the sides of said openings and meeting each other at said openings and each having approximately the area of one of said openings, and an elevator engaging said guide-ways, substantially as described.

29. In a building, the combination of a plurality of storage floors having quadrangular elevator openings on a common upright axis, means forming guide-ways extending from floor to floor along said openings, dividing structures forming storage sections arranged around and meeting the sides of said openings and each having approximately the area of one of said openings, and an elevator engaging said guide-ways, substantially as described.

30. In a building, the combination of a plurality of storage floors having quadrangular elevator openings on a common upright axis, means forming guide-ways extending from floor to floor along said openings, dividing structures forming quadrangular sections arranged around and meeting the sides of said openings and each having approximately the area of one of said openings, and an elevator engaging said guide-ways, substantially as described.

31. In a building, the combination of a plurality of superposed storage floors having elevator openings on a common upright axis, means forming guide-ways extending from floor to floor along said openings, dividing structures forming storage sections arranged in cross-form around and meeting said openings, and an elevator engaging said guide-ways and comprising as a part of its floor structure a turn-table, substantially as described.

32. In a building, the combination of a plurality of superposed storage floors having polygonal elevator openings on a common upright axis, means forming guide-ways in angles of said openings and extending from floor to floor, dividing structures forming storage sections arranged in cross-form around and meeting said openings and an elevator engaging said guide-ways and comprising a turn-table, substantially as described.

33. In a building, the combination of a plurality of superposed storage floors having angular elevator openings on a common upright axis, means forming guide-ways from floor to floor along said openings, dividing structures forming storage sections arranged in cross-form around and meeting

said openings and an elevator of angular outline conforming to said openings and comprising as a part of its floor structure a turn-table, substantially as described.

34. In a building, the combination of a plurality of superposed storage floors having angular elevator openings on a common upright axis, means forming guide-ways from floor to floor along said openings, dividing structures forming storage sections arranged in cross-form around and meeting said openings and an elevator of angular outline conforming to said openings and comprising as a part of its floor structure a circular turn-table, substantially as described.

35. In a building, the combination of a plurality of superposed storage floors having angular elevator openings on a common upright axis, means forming guideways from floor to floor along said openings, dividing structures forming storage sections arranged in cross-form around and meeting said openings and an elevator of angular outline conforming to said openings and comprising as a part of its floor structure a circular turntable having its upper surface substantially even with the other parts of the upper floor surface of the elevator, substantially as described.

36. In a building, the combination of a plurality of superposed storage floors having quadrangular elevator openings on a common upright axis, means forming guide-ways from floor to floor along said openings, dividing structures forming storage sections arranged in cross-form around and meeting said openings and an elevator of angular outline conforming to said openings and comprising as a part of its floor structure a circular turn-table having its upper surface substantialy even with the other parts of the upper floor surface of the elevator, substantially as described.

37. In a building, the combination of a main or exchange floor, a plurality of superposed storage floors having elevator openings on a common upright axis, means forming guideways extending from the exchange floor upward along said openings, an elevator engaging said guide-ways, the exchange floor having space permitting the movement of vehicles on said floor to and from the elevator, and dividing structures on the storage floors forming storage sections arranged in cross-form around and meeting said openings, whereby floor spaces between the storage sections are separated from the storage sections, substantially as described.

38. In a building, the combination of an exchange floor, superposed storage floors divided into a plurality of section groups each comprising an elevator section and storage sections radiating from the elevator section and said section groups being nested or inter-meshed, and elevators associated with said elevator sections and adapted to travel from the exchange floor through the storage floors, substantially as described.

39. In a building, the combination of an exchange floor, superposed storage floors having elevator openings on a plurality of upright axes and said storage floors comprising storage sections radiating from the elevator openings, and the storage sections around one elevator opening being nested or inter-meshed with the storage sections of another elevator opening, means forming guide-ways from the exchange floor through the elevator openings of the storage floors whereby elevator shafts are formed, and elevators associated with said guide-ways, the exchange floor having spaces permitting movement on said floor of vehicles to and from any of a plurality of elevator shafts, substantially as described.

40. In a building, the combination of an exchange floor, a plurality of superposed storage floors having elevator openings so spaced relative to each other as to afford space for the inter-meshed cross-form grouping of automobiles around and endwise toward and next to said openings, means forming guideways from the exchange floor through said openings, whereby elevator shafts are formed, and elevators associated with said shafts, substantially as described.

41. In a building, the combination of a plurality of floors one of which has a square elevator opening of size to receive the below-mentioned elevator, means forming guideways along angles of said opening, a square elevator of size to support a plurality of automobiles placed side-by-side and parallel to the elevator sides, whereby the floor space at each side of and meeting the elevator opening is adapted to receive and support the same number of automobiles placed side-by-side with ends at the elevator opening in position to be moved endwise individually into position on the elevator, substantially as described.

42. In a building, the combination of a plurality of floors one of which has a square elevator opening of size to receive the below-mentioned elevator, means forming guideways along angles of said opening, a square elevator of size to adapt it to support a plurality of automobiles placed side-by-side and said automobiles having an aggregate width approximately equal to the length of one automobile, whereby the floor space at each of the four sides of and adjoining the elevator opening is adapted to support the same number of automobiles placed side-by-side with ends toward said opening in

position to be moved endwise and individually into position on the elevator, substantially as described.

43. In a building, the combination of a plurality of floors one of which has a square elevator opening of size to receive the below-mentioned elevator, means forming guide-ways along angles of said opening, a square elevator including a turn-table and of size to adapt it to support a plurality of automobiles placed side-by-side and said automobiles having an aggregate width approximately equal to the length of one automobile, whereby the elevator and the floor space at each of the four sides of and adjoining the elevator opening is adapted to support the same number of automobiles placed side-by-side with ends toward said opening in position to be moved endwise and individually into position on the elevator, substantially as described.

In testimony whereof I have signed my name, this second day of November, in the year one thousand nine hundred and twenty-two.

CYRUS KEHR.