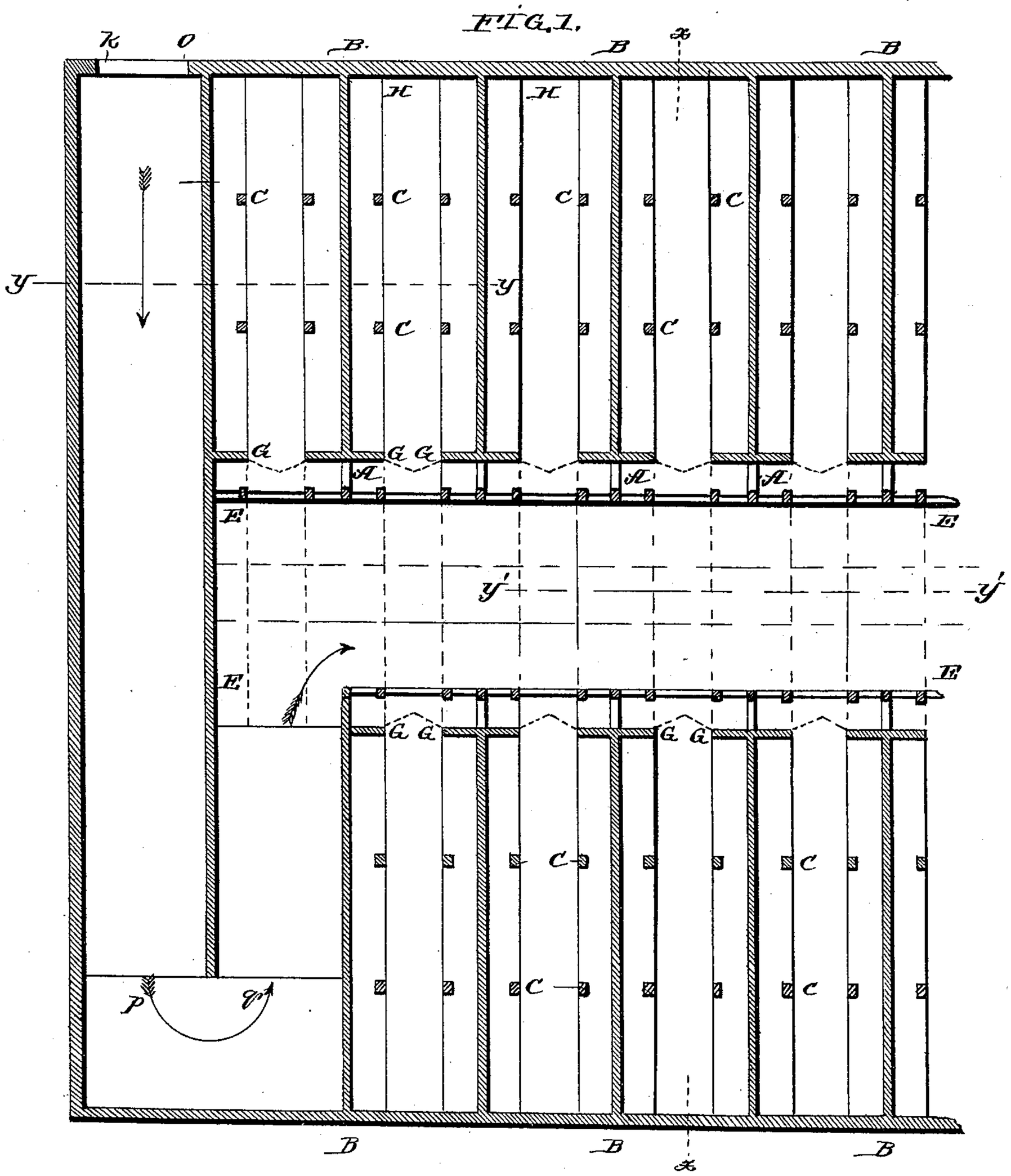
(No Model.) 3 Sheets—Sheet 1.

H. P. McDONALD.

WAREHOUSE.

No. 372,549. Patented Nov. 1, 1887.

FIG. 1.



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3 Sheets—Sheet 2.

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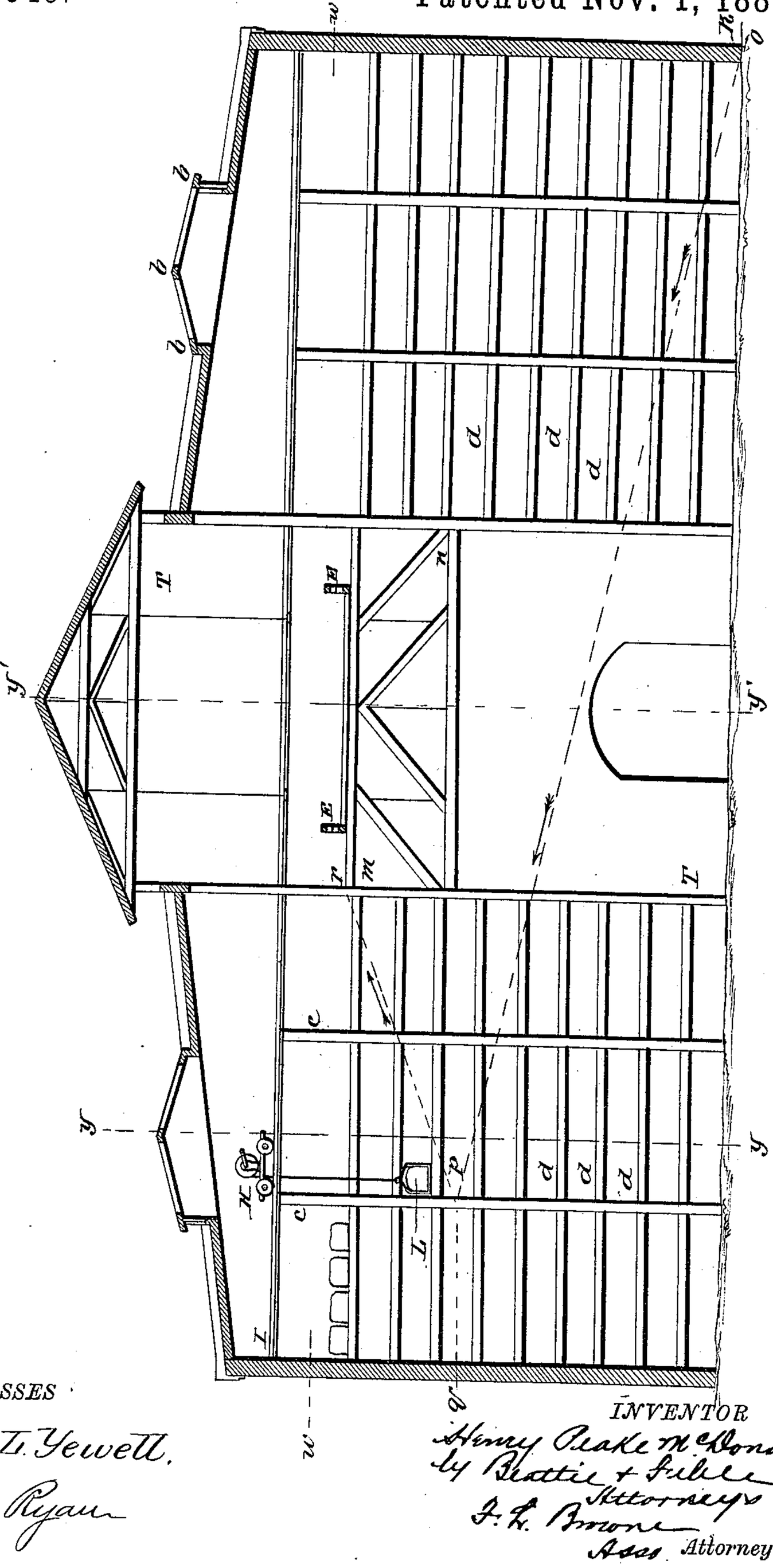

FIG. 2.

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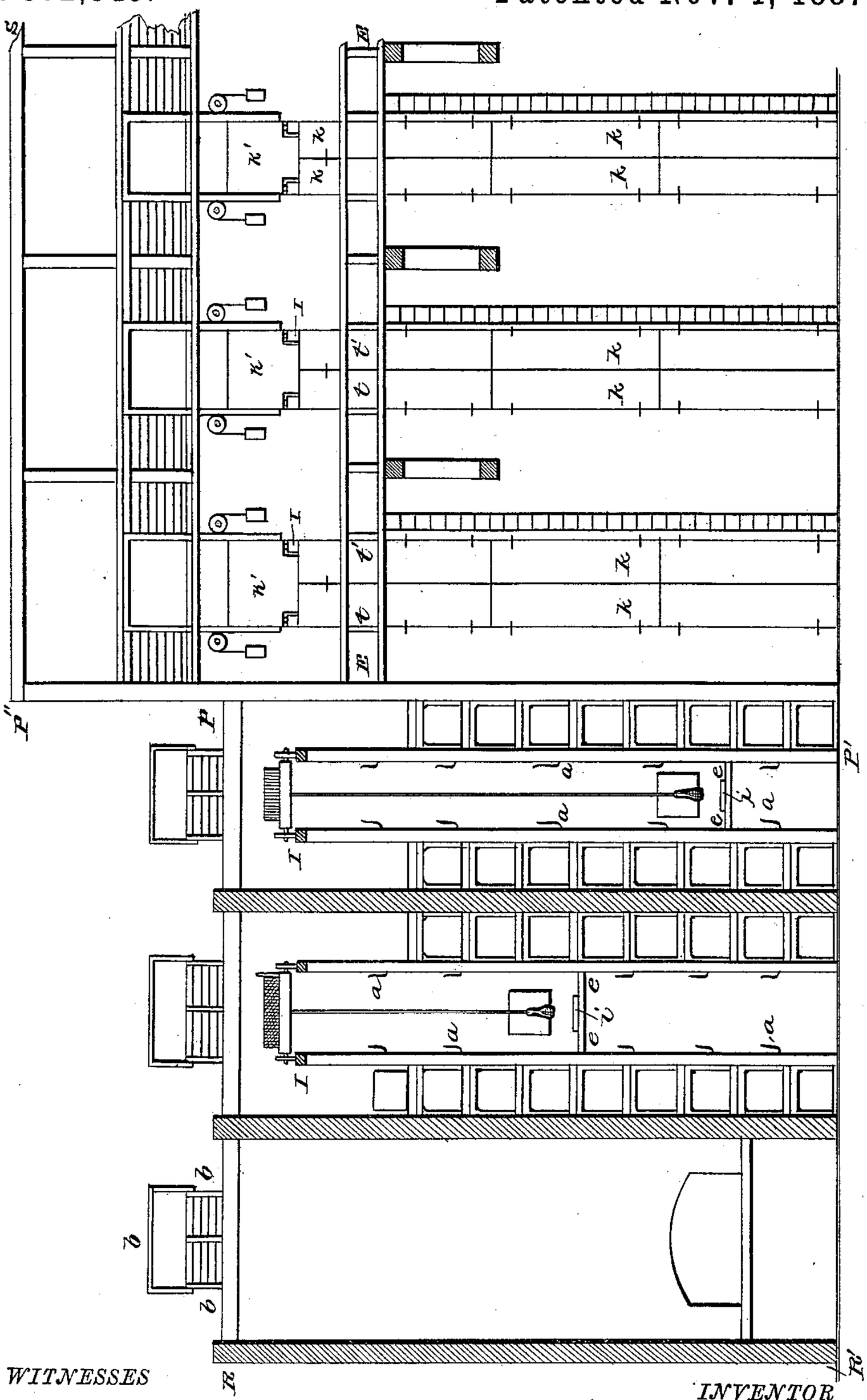

FIG. 3.

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UNITED STATES PATENT OFFICE.

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WAREHOUSE.

SPECIFICATION forming part of Letters Patent No. 372,549, dated November 1, 1887.

Application filed January 18, 1887. Serial No. 224,728. (No model.)

To all whom it may concern:

Be it known that I, HARRY PEAKE McDONALD, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Warehouses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to improvements in warehouses in which the construction and appliances used in connection therewith are such that the storage and removal of the goods warehoused are accomplished with a minimum of lifting after the goods have been delivered on an elevated bridge by vehicles driving up an incline or raised by an elevator to the bridge, that the space of the warehouse is utilized and economized to the utmost, that fire may be prevented or its spread checked by fireproofing devices made possible by the construction, that the individual packages of the goods warehoused may be stored independently of other packages, rest independently, and be independently removable, that the location of any individual package or package-space may be readily determined by the enumeration of the compartments and subdivisions springing out of the construction, and that the packages may be locked in their package spaces and in the compartments.

Figure 1 is a projection of the warehouse on the horizontal plane *w w*, Fig. 2. Fig. 2 is a projection of the warehouse on the vertical plane *x x*, Fig. 1.

R R′ P P′ of Fig. 3 is a transverse section through the incline and two compartments on the line *y y*, Figs. 1 and 2, and P″ P′ S S is a projection of part of the interior of the warehouse on the vertical plane *y′ y′*, Figs. 1 and 2.

The warehouse, as shown in Fig. 1, is divided into compartments, of suitable size, on either side of the passage running through its length. The spaces A A B B are the compartments.

A B are partition walls separating the compartments.

G G are walls, which, with doors attached, close each compartment at its inner end.

The spaces A G B H are storage-sections. The spaces between the storage-sections are passages.

c c are posts or uprights dividing the storage-sections longitudinally into sub-sections.

T T is a passage running through the length of the warehouse and extending, except as intersected by a bridge at E E, Figs. 2 and 3, from the floor to the roof of the warehouse. The floor of this passage, which is on a level with the floor of the passages between the storage-sections, is a roadway leading at either or both of its ends out of the warehouse.

E E E E is a bridge, as viewed from *w w*, Fig. 2, showing spaces between the railing on each side of the bridge and the walls G G.

o p q r is an incline leading in the direction of the arrows from K (an outer door of the warehouse) to the bridge. The dotted lines extended from *c c* G across the main passage, and the dotted lines intersecting these at right angles, represent a system of tracks or railways on which the truck or car H, Figs. 2 and 3, operates.

In Fig. 2, T T is the main passage. E E is the bridge, carried by the truss *m n*, so as to leave the space below free of posts.

The dotted line *o p q r*, accompanied by arrows, indicates the incline and platform leading from the outer door, K, to the bridge.

d d d d are stringers fastened to the posts or uprights *c c* and the walls B B and G G, Fig. 1, at suitable distances above one another to admit the packages to be stored. The spaces between the partition-walls and the stringers on each side of the walls are floored or provided with open grating or frame-work, and constitute racks or shelves for the reception of the goods to be stored. The floors of the racks or shelves are slightly pitched downward toward the partition-walls. Ladders are placed on each of the posts *c c*, that access may be obtained to any tier. At the intersections of the posts and stringers bars are so arranged that they may be slipped across the passages between the storage-sections and rest supported by the posts and stringers, as shown at *e e*, in Fig. 3. Across the bars and parallel with the stringers running boards are laid, so as to give a footway to a man desiring to stand at any point, as shown at *i i*, in Fig. 3. The running boards, when not in use, are placed out of the way by slipping them into stirrups, *a*, Fig. 3, secured to the posts in such a manner as to permit them to lie along the string-

ers. The passages between the storage-sections are free when the bars and running boards are not in use.

b b b is a skylight over the passage between the storage-sections, similar skylights being placed over each of such passages shown at *b b b*, Fig. 3.

I I is a track or railway, located a suitable distance above the bridge E E and the racks or shelves, carried on the upward prolongation of the posts *c c*, and running transversely through the warehouse from main wall to main wall over the passage between the storage-sections, as shown further at I I, in Fig. 3.

H is a truck or car operating on the track. In addition to its propelling-power, this truck or car carries a crab, by means of which a weight may be lowered or raised.

R R′ P P′ of Fig. 3 is a transverse section through the incline and two compartments.

I I are the tracks or railways running longitudinally over the passages between the storage-sections.

H H are the trucks or cars with crabs operating on the tracks. Two packages in the act of being lowered are shown suspended at the ends of the lines reaching from the crabs on the trucks.

e e are the sliding bars at the intersections of the posts and stringers, now in place across the passages between the storage-sections for use.

i are the running boards, which, when not in use, rest in the stringers, but which are now laid on the bars for use.

b b b are the skylights over each passage between the storage-sections and over the incline.

P″ P′ S S of Fig. 3 is a projection of part of the interior of the warehouse on the vertical plane *y′ y′*, Figs. 1 and 2.

K K K K and K′ are doors closing the passages between the storage-sections. The doors K′ are notched at their lower corners in such a way as to obviate interference with the tracks or railways which run through the notches, and, being hung in guides or otherwise connected at the top, they can be raised as the trucks or cars pass through, their raising being aided by weights and pulleys, as shown.

At the right of each door is shown a ladder, by which communication between the floor and bridge is facilitated and access to the doors is given.

Whether a warehouse of this description is built of fire-proof material throughout, partially so, or not at all the construction is such as to diminish the chances of fire, or, when arising, to check or prevent its spread. This is accomplished by the system of walled and closed compartments, each constituting a separating and independent warehouse of itself. These compartments are so arranged that closed subdivisions may be made in each, as by doors at each set of posts or uprights corresponding to the doors closing the ends of the compartments, and by doors or sliding shelves running parallel with the stringers and extending, when closed, across the passages between the storage-sections, thus further decreasing the chances of fire, or, when arising, its power to spread, by increasing the number of closed sub-compartments.

The stringers may be fastened to the posts or uprights by a bolted joint or other suitable connection.

The tracks or railways running from side to side of the warehouse over the passages between the storage-sections may be connected with those running with the length of the warehouse over the main passage by switches, turn-wheels, or other device. By this system of railways and means of transfer from track to track the trucks or cars may be taken from one part of the warehouse to another on the plane of the tracks. The tracks are located at a sufficient distance above the bridge to enable a loaded vehicle on the bridge to drive under the tracks.

The construction of the racks or shelves is such that each package is stored independently of every other, rests independently of every other, and is removable independently of every other. By classifying the different compartments and the different storage-sections and sub-sections and numbering the package-spaces on the racks or shelves in each, any package space or package in any part of the warehouse may be located, and a register may thus be readily kept of the empty and stored spaces.

The truck or car, which may be of any suitable sort, may be propelled by a man on it, who may also operate the crab carried on the truck or car, or both may be operated by machinery or otherwise.

The incline leading to the bridge, adapted to a locality where great economy of space is not required, and to a warehouse for goods the character of which renders the use of steam undesirable, may under suitable circumstances be replaced by an elevator. The incline or elevator may be duplicated at opposite ends of the warehouse, or elsewhere in the warehouse.

The sides or railing of the bridge are at a requisite distance from the walls closing the compartments and bounding longitudinally the main passage through the warehouse, to leave space enough for packages to be lowered from the trucks or cars directly into vehicles standing on the edges of the shipment-floor, or deposited on the edges of the floor.

The dispatch of business in an unusually large or high warehouse may require additional bridges at different heights with additional tracks or railways and appliances for each. By putting the truss *m n* in the top of the warehouse the several bridges could be suspended from it, or they may be carried on trusses resting on the walls.

Suitable bracing is introduced, in order to stiffen the warehouse throughout.

In practice my improvements operate as follows: A dray loaded, say, with bales of cot-

ton, enters the door K, moves up the incline *o p q r* in the direction of the arrows, and lands on the bridge E E, or is lifted to the bridge by an elevator. On the bridge, opposite any passage between the storage-sections, its load may be deposited, being prevented from falling by the railing, which is provided with sliding gates *t t* or bars opposite the passages. The man on the truck H propels the truck to a point over the bale he wishes to take. The hooks on the line from the crab are attached to the bale. By means of the crab the man raises the bale until it hangs just clear of the floor of the bridge. Then, by the use of the propelling appliance on the truck, he moves to any desired point—say to the position under the skylight, (shown in Fig. 2,)—the bale having passed through the opened passage-way *t t* in the railing of the bridge, and now hanging in the passage between the storage-sections. Let it be supposed that the space L is to be occupied by this bale. The desired point having been reached, the man on the truck, by means of the crab, lowers the bale until a man on the running board *e e*, Fig. 3, signals or hails to stop. Then as the man above slacks off, the man on the board, shoves the bale into its space, the slight pitch given to the floor of the rack assisting him to do so. When for shipment, sampling, or other purpose the bale L is to be removed, the truck is brought to the position shown and the line lowered, whereupon the man on the running board, reaching into the rack, attaches the hooks to the bale and signals or hails the man above to hoist away. As the strain comes on the line, the man on the board is enabled to draw the bale from the rack, when it swings in the passage. The man above then propels the truck to the end of the passage, and there lowers the bale to the shipment-floor, or upon a dray backed to the edge of the roadway to receive it, or upon a truck for transportation to another part of the warehouse. It will be observed that in accomplishing the storage and removal of this bale, and what is true of the one instance applies generally without regard to the number or characters of the packages stored, practically the only lifting done was done at the outset when the bale was hauled up the incline or raised by the elevator to the bridge. After the bale reaches the bridge, the lifting consists, first, of the minimum necessary to clear the bale of the floor of the bridge, and, second, the minimum necessary to clear the bale of the floor of the rack. Otherwise, from the moment the bale is delivered by the dray to its final shipment from the warehouse, the course of the bale is downward from the delivery-bridge to the shipment-floor. This feature is a great and novel advantage, which my warehouse possesses over all others with which I am familiar or of which I have heard.

Another great and novel advantage of my warehouse consists in the facility with which any particular package-space of any particular tier of racks of any particular storage-section or sub section of any particular compartment may be reached, whether for the purpose of storing or removing a package or for other purpose, and the readiness with which this feature will enable a register to be kept, showing the exact whereabouts in the warehouse of every package or article stored and of every vacant package-space, the exact condition of the warehouse as to spaces filled, and remaining capacity, cannot fail to make this feature a valuable contribution to the business of warehousing.

A still further new, important, and useful feature of my warehouse is found in the plan of construction by which the utmost economy of space consistent with the unimpeded handling of the goods is achieved, in area and from floor to roof, by the use of partition-walls having storage sections on either side and of the passages between the sections, the economy being made practical by the devices for reaching all parts of the storage-sections, of the delivery-bridge, system of railways, truck, with crab, ladders, bars, and running boards.

Again, by virtue of the construction of my warehouse that part of the business of warehousing relating to warehouse-receipts may be put on a greatly improved and sounder basis. When warehouse-receipts are issued on the contents of an entire compartment, the compartment may be locked and the key attached to the batch of receipts, or deposited with the holder of the receipts or a trustee; or a system of duplicate keys to be held by the several parties to the transaction may be used, one set passing, it may be, with assignments of the receipts. The separate tiers of package-spaces may also be closed by doors or rods and locked, and warehouse-receipts on a small number of packages, or on individual packages, may thus be protected, keys being used in one of the ways pointed out.

Another striking superiority of my warehouse consists in the facilities it offers for delivering to a patron of the warehouse, or to the patron's consignee, the same goods which the patron warehoused, the absence of such facilities in the warehouses now in use rendering this practically impossible during busy seasons in those classes of goods put up in heavy packages, the general similarity of package to package in such goods making the deception easy or serving as an excuse in the hurry of business.

The advantages of the construction of my warehouse in the prevention and check of fires I have already stated.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A warehouse embracing a main passage from which lead passages into separate compartments with storage-sections, an elevated delivery-bridge with means—such as an incline or elevator—for conveying a vehicle from the

ground floor to the bridge, and railways above the bridge and passages, substantially as and for the purposes described.

2. A warehouse embracing an elevated delivery-bridge with suitable means—such as an incline or elevator—for reaching the bridge with vehicles, a shipment-floor, and compartments with storage-sections opening on passages communicating with a main passage in which are located the delivery-bridge and shipment-floor, substantially as and for the purposes described.

3. A warehouse consisting of independent compartments with walls and doors for closing and locking each to itself, the partition-walls separating the compartments forming the brace and back of storage-sections, each compartment having a passage giving access to the storage-sections, the storage-sections being subdivided by intersecting posts and stringers into separate tiers of package spaces, substantially as and for the purposes described.

4. A warehouse consisting of independent compartments with walls and doors for closing and locking each to itself, the partition walls separating the compartments having a passage giving access to storage-sections, the storage-sections being subdivided by intersecting posts and stringers into separate tiers of package-spaces, each tier of package-spaces being provided with suitable means—such as a door or rod—for closing and locking the tier to itself, substantially as and for the purposes described.

5. A warehouse consisting of independent compartments with storage-sections and with passages giving access to the storage sections, the storage-sections being subdivided by intersecting posts and stringers into separate tiers of package-spaces, the tiers being provided with adjustable bars and running boards for aiding the handling of warehoused goods, in connection with railways overhead, on which operates a car carrying a crab for handling warehoused goods, substantially as and for the purposes described.

6. A warehouse embracing an elevated delivery-bridge with suitable means—such as an incline or elevator—for reaching the bridge with vehicles, a shipment-floor, independent compartments with storage sections and with passages giving access to the storage sections, and railways overhead, on which operates a car carrying a crab for handling warehoused goods, substantially as and for the purposes described.

7. A warehouse embracing a main passage containing an elevated delivery-bridge with suitable means—such as an incline or elevator—for reaching the bridge with vehicles, and a shipment-floor, independent compartments with storage-sections and with passages giving access to the storage-sections, the storage-sections being subdivided by intersecting posts and stringers into separate tiers of package-spaces, the tiers being provided with adjustable bars and running boards for aiding the handling of warehoused goods, in connection with railways overhead, on which operates a car carrying a crab for handling warehoused goods, substantially as and for the purposes described.

8. A warehouse consisting of independent compartments with walls and doors for closing and locking each to itself, the partition-walls separating the compartments forming the brace and back of storage-sections, each compartment having a passage giving access to the storage-sections from above and from a main passage through the warehouse, the bottom of which passage forms the shipment-floor of the warehouse, and the upper part of which is crossed lengthwise by a delivery-bridge reached by suitable means—such as an incline or elevator—and a system of railways overhead for handling warehoused goods, substantially as and for the purposes described.

9. A warehouse embracing a main passage from which through doors lead passages into compartments with storage sections on either side of the passages, the main passage being intersected lengthwise by an elevated delivery-bridge with spaces on either side of the bridge between the sides and the adjacent walls, from which bridge packages to be stored are carried by means of a car and crab operating on a system of railways located above the bridge and passages leading from the main passage to any given points in such passages opposite the package-spaces which are to receive the packages, the packages being put in the package-spaces by the aid of running boards taken from stirrups on the posts and laid across bars slipped over the passages from intersection to opposite intersection of the posts and stringers, and being removed from the package-spaces by the same aid and carried by the same appliances to the shipment-floor of the warehouse constituting the bottom of the main passage, the storage-sections being separated by partition-walls and subdivided by intersecting posts and stringers into independent package spaces, the package-spaces being so constructed that packages in them rest altogether independent of other packages and of one another, and the compartments containing the storage-sections being independent of other compartments and capable of being closed up without communication with the rest of the warehouse, substantially as and for the purposes described.

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Witnesses:
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