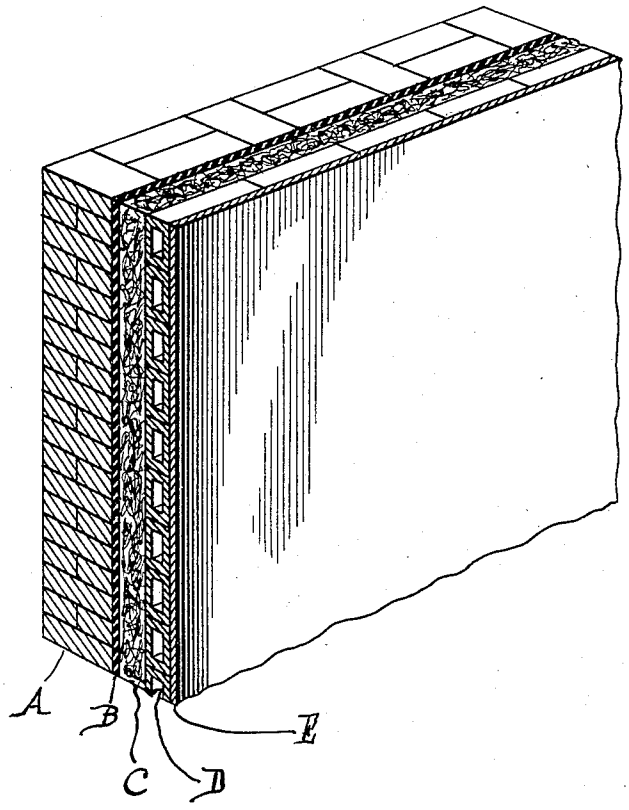
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J. WILLS.

BUILDING CONSTRUCTION.

APPLICATION FILED MAY 19, 1904.

NO MODEL.



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No. 774,545. Patented November 8, 1904.

UNITED STATES PATENT OFFICE.

JAMES WILLS, OF NEW YORK, N. Y.

BUILDING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 774,545, dated November 8, 1904.

Application filed May 19, 1904. Serial No. 208,640. (No model.)

To all whom it may concern:

Be it known that I, JAMES WILLS, a citizen of the United States, residing in the borough of Manhattan, city of New York, county and State of New York, have invented a new and useful Improvement in Building Construction, of which the following is a specification.

My invention has particular reference to structures intended to be employed as storage-houses for perishable merchandise and what is specifically known as "cold-storage" warehouses, in which means of cooling and refrigeration, partial or otherwise, are maintained and a constant and predetermined temperature secured irrespective of exterior atmospheric conditions.

Heretofore many difficulties have been encountered in the proper maintenance of cold-storage warehouses, and the difficulties in combating the many agencies of destruction both to the containing building and its contents have never been fully overcome. One difficulty which has always attached itself to structures of this class has been the lack of means of regulating or dispensing with moisture. It is highly desirable (and, indeed, generally incumbent) to render a properly-organized refrigerating-warehouse moisture-proof; but heretofore and before I devised, constructed, and began the operation of my present cold-storage warehouse this problem had never been solved.

In my present structure the building is absolutely moisture-proof. The advantages of this qualification are too apparent to need rehearsing; but it may be mentioned that it is highly detrimental to the contents of such a building to permit moisture-laden air to enter the rooms even in the smallest quantity or even to permit the oozing in or percolation of moisture onto the inside walls. The existence of such a factor imperils the maintenance of the proper and predetermined quality of the interior atmospheric conditions. These tendencies and drawbacks I absolutely in my present invention eliminate.

Secondly. My structure is entirely air-tight. This is important and indeed necessary in two respects. In the first place I prevent the bodily transfer of exterior atmospheres and temperatures into the interior as well as prevent the transfer of the interior air outwardly through the structure. The mechanical flow or percolation of air in either direction through the structure is absolutely by my construction prohibited. It is well known that the flow or leakage of air through the walls, ceilings, or floors of ordinarily-well-constructed buildings is extensive—that is to say, that while their apparency is not in one sense great, yet in another sense the actual leakage year in and year out, and especially during violent movements of the exterior atmosphere, is very considerable—great enough to modify the temperature, the purity, and, indeed, the general atmospheric conditions of any well-constructed building. The possibility of this transfer of air outwardly and inwardly is in my present invention eliminated, and I provide an element or section of my structure whose texture and finish is of such a nature as to prevent leakage of any kind or nature whatsoever and at all times. In another way also my structure is air-tight, as it prevents the passage of local air-currents in the wall itself, which heretofore in refrigerating plants has been a source of great loss of cold, as such local currents operated to transfer the exterior heat inwardly and by so doing raised the temperature and impaired the efficiency of the cold-storage structure. My building is so constructed that these local currents cannot possibly occur, and I will dwell on this phase of the invention in another part of the specification.

Thirdly. By reason of the fact that my structure is moisture-proof and air-proof—that is to say, that it resists the ingress of the moisture and air from the exterior absolutely and at all times—prevents also the possibility of the entrance of unwholesome odors into the interior of the building. This is very often quite important, as in the vicinity of large cities the currents of air blowing from certain quarters laden with foul and noisome qualities, such as emanate from oil-factories and gas-manufacturing plants, percolating through the walls of the cold-storage warehouses impair their right and otherwise wholesome conditions. Therefore the fact

that my structure is absolutely moisture-proof and absolutely air-tight renders it impervious also to exterior malodorous influences, and I claim this as a valuable condition which attaches to my structure by reason of the two foregoing qualities.

Fourthly. In former cold-storage warehouses, owing to their flimsy and unscientific structures, it was possible and usual for vermin of all kinds to exist, more especially in the large quantities of sawdust or other packing employed. These vermin were not only a menace to the building itself, but to the contained merchandise. In my improved structure, owing to its hardness and solidity, the possibility of vermin of any kind obtaining a lodgment does not exist.

Fifthly. Heretofore in the construction of cold-storage houses materials have been employed which disintegrated or were rendered obnoxious and unwholesome by reason of their becoming moisture-soaked—such as sawdust, flax, tow, wood, and paper, for instance—and in themselves odorous, and these conditions have operated to imperil and sometimes destroy the contents; furthermore, air-currents through cracks or interstices in insulation deposit moisture and cause speedy decay, and the insulating materials heretofore employed being ready absorbents odors were stored therein. In other words, the protecting medium instead of insuring the merchandise against deterioration acted as a medium of destruction itself. All of these detrimental factors I eliminate. All the materials I use are non-odorous, non-absorbent, and indestructible. Cleanliness, safety, and wholesomeness are thereby guaranteed.

Sixthly. The old form of cold-storage warehouse also was highly inflammable owing to the large amount of wood and other combustible materials employed, as well as to the extensive air-spaces which were permitted to exist for the purpose of providing additional means of heat insulation. My structure is absolutely fireproof and only fireproof materials are employed, and the extensive air-spaces are eliminated.

Seventhly. The advantage in respect to the employment of these extensive air-spaces was more theoretical than practical owing to the imperfect structure of the walls and the drafts and air-currents resulting therefrom. As above stated, in my improved structure I eliminate these free and extensive air-chambers, they, as heretofore employed, being undesirable and detrimental. In lieu of these free air-spaces I employ such air-spaces as are provided by the use of hollow blocks. These, I find, serve the purpose of insulation, as aforesaid, and prevent the extensive movement of air in the air-spaces. As I employ them they will not only not act in any way as flues for the passage of fire, but will not be extensive enough to set up local currents. As air-spaces, however, they will retain their important office as acting as heat-insulators.

Referring to the accompanying drawing, which forms a part of this specification, the figure therein shown illustrates a section of the wall of one of my improved refrigerating structures.

In the drawing, A indicates the exterior wall of my improved structure, and it may be employed by itself or in combination with a steel frame (not shown) according to the well-known present methods of building combined brick and steel structures. On the completed exterior brick or masonary wall and on its inside face I place a heavy coat or section of tar or other moisture-resisting material B, and immediately contiguous to the tar or other moisture-resisting material a section of mineral wool or other heat-insulating material C, and next to this I place a wall of hollow blocks D, and upon the completion of this cover the hollow blocks on their inner face with a heavy coating of cement E. The hollow blocks are formed of fireproof materials, such as plaster or plaster in combination with other materials, and can be located upon one or both sides of the heat-insulating section C. In some cases I only employ the hollow blocks upon one side of the heat-insulating material such as shown in the drawing; but in other cases I place the hollow blocks both inside and outside the heat-insulating section. Both of these arrangements are eminently satisfactory in every respect as to the requisites and conditions hereinbefore rehearsed. In the first place the outer wall, a frame of brick or masonry or other suitable fireproof material and supplemented or not as the occasion may require by a steel frame, acts as the principal retaining part of my structure. This part I preferably locate on the exterior of the building and prefer to build up with my other elements on the interior. I prefer placing immediately upon the inside of the wall A the moisture-resisting element B. I found the best results to flow from this. Immediately next to this I place the heat-insulating material. In the present instance I employ mineral wool; but other suitable heat-insulating material may be used. This element in cross-section will vary in bulk according to results required. As above stated, I do not limit myself to mineral wool in this connection, but prefer to employ it; but any non-combustible heat-insulating material may be used. Next and finally I locate the section E of cement. This section extends over the entire interior of the walls, completely covering up the section next contiguous thereto. By reason of its hardness and its refractory qualities it presents an element and a surface which is impervious to air and absolutely proof against the attacks of vermin. These are the five principal elements of my structure—to wit, the outer or retaining wall, the moisture-re-

sisting elements suitably applied and immediately contiguous to the outer wall on its inner face, a non-combustible heat-insulating material, the hollow insulating-blocks of fireproof material on one or both sides of the heat-insulating section, and the air-tight and vermin-proof section of cement.

The element B besides operating as a moisture-resisting part assists materially in making my structure air-tight. Currents of air are prevented from passing in and bad odors and dust are also kept out.

The hollow blocks which I employ provide air spaces or chambers in the walls; but these air spaces or chambers are individually small, and while on the one hand they act as heat-insulators they do not furnish a means for drafts of air in case of fire. Also by reason of the fact that they may be segregated local currents cannot set up in them, neither will they serve as the abode of vermin. Nevertheless I do not limit myself in all cases to small air spaces or chambers; but in all instances they must be confined and sealed. By reason also of the nature of the materials employed by me and the particular arrangements of these materials the other advantage hereinbefore rehearsed will attach. Although I have shown and described a specific arrangement of parts, I may assemble and construct the sections somewhat differently without departing from the spirit of my invention. It is essential, however, in the best embodiment of my present invention to use only fireproof and heat-insulating material.

My present structure is not only possessed of the many advantages hereinbefore recited, but it is actually cheaper to construct.

Wherever in the specification I employ the word "wall" it is to be understood that I refer either to the vertical part or wall proper of the building or to the horizontal part—to wit, either the floor or the ceiling—as it is obvious that in some structures the same combinations of elements can be advantageously employed in these horizontal parts as in the vertical parts.

Although I have dwelt herein of the particular applicability of my invention to cold-storage buildings, it is manifest that many of its features and advantages can be utilized in buildings for storing ice, and I wish it to be understood that, broadly speaking, my invention can be applied to that end.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. A building having a brick or masonry exterior, and an interior section of refractory cement, in combination with moisture, fire and heat proof sections, located between said exterior and the interior section.

2. A building having a brick or masonry section forming the main support of the said building, a waterproofing section coextensive with the main section, and a fibrous heat and fireproof section also coextensive with the main section, and means for retaining the said fibrous section in position, as and for the purposes set forth.

3. A building having a wall composed of the following elements: first, a brick or masonry section; second, a section composed of a water-resisting material located against the first element; third, a section formed of fibrous heat-resisting material located against the second element; fourth, an air-inclosing section located against the third element; said sections being closely joined together and being vertically coextensive.

4. A building whose walls are composed of the following elements: first, a brick or masonry section; second, a waterproofing section located against the first element; third, a section composed of non-combustible fibrous material located against the second element; and fourth, a section composed of hollow blocks located against the third element; all of said sections being closely joined together and being vertically coextensive.

5. A structure for cold-storage purposes having a brick or masonry exterior, an interior lining formed as follows: first, and contiguous to the brick or masonry wall a moisture-resisting compound; second, a non-combustible heat-insulating material; and third, means for retaining the latter in position.

6. A structure for cold-storage purposes having a brick or masonry exterior, lined with coal-tar or other moisture-resisting compound, a section of non-combustible heat-insulating material, and a section of hollow blocks suitably supported and cemented, as and for the purposes set forth.

7. A structure for cold-storage warehouses consisting of a brick or masonry exterior, lined with tar, a mineral-wool lining to the tar lining, an interior casing or wall of hollow blocks immediately contiguous to the mineral-wool lining, and an interior finish of cement, all constructed substantially as and for the purposes set forth.

8. A building having a brick or masonry section forming the outer wall of said building, a moisture-proof section located thereagainst, an interior finishing section, and means for retaining bodies of air between the outer wall and said interior finishing section.

9. A building having a brick or masonry section forming the main support of said building, a moisture-proof section located thereagainst, and a section formed of segregated air-spaces, all arranged substantially as and for the purposes set forth.

10. A structure for cold-storage purposes consisting of a main supporting-section, an interior and finishing section or lining of hard and impervious cement to render the struc-

ture air-tight and vermin-proof from the inside, and intermediate sections to render the structure moisture, fire, and heat proof.

11. A structure for cold-storage purposes consisting of a main supporting-section, an interior and finishing section or lining of hard and impervious cement to render the structure air-tight and vermin-proof from the inside, and sections intermediate of these consisting of fibrous heat-resisting material, and air-inclosing spaces, all arranged substantially as and for the purposes set forth.

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