

June 9, 1953

J. C. ANTONY

2,641,449

BUILDING CONSTRUCTION

Filed Nov. 14, 1947

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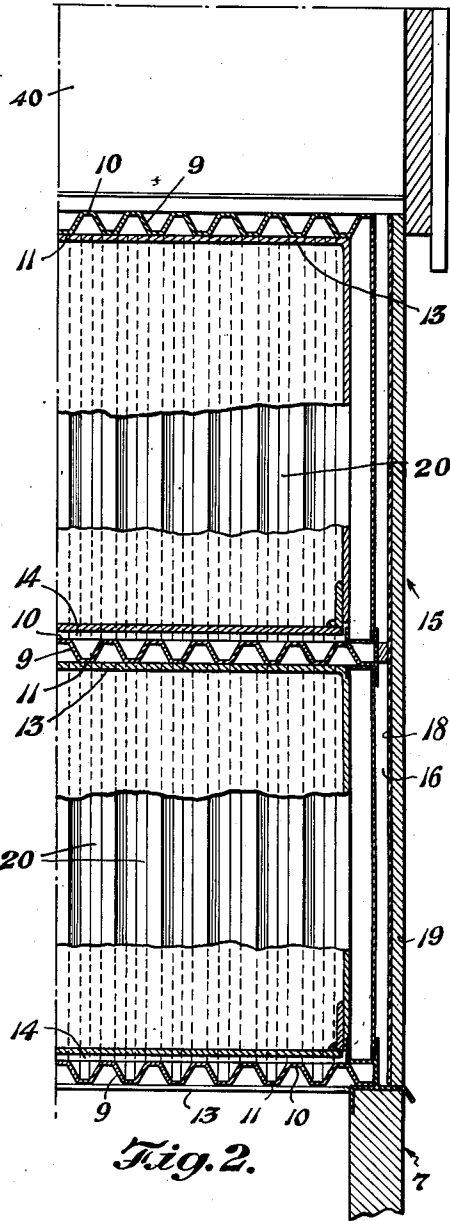
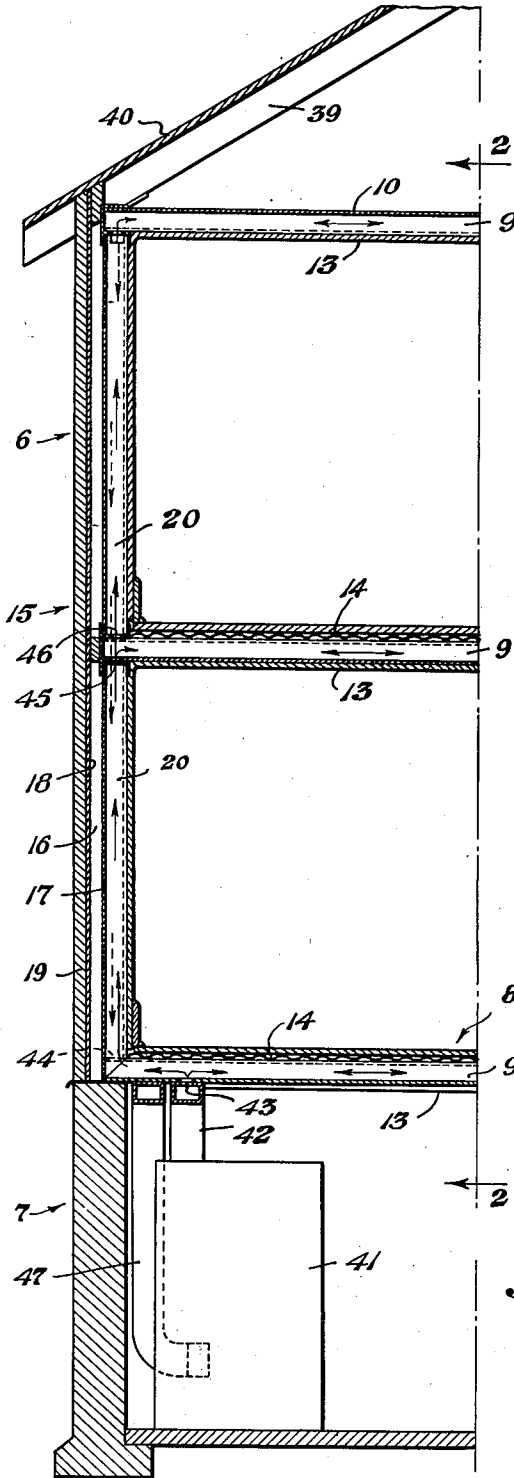


Fig. 2.

Fig. 1

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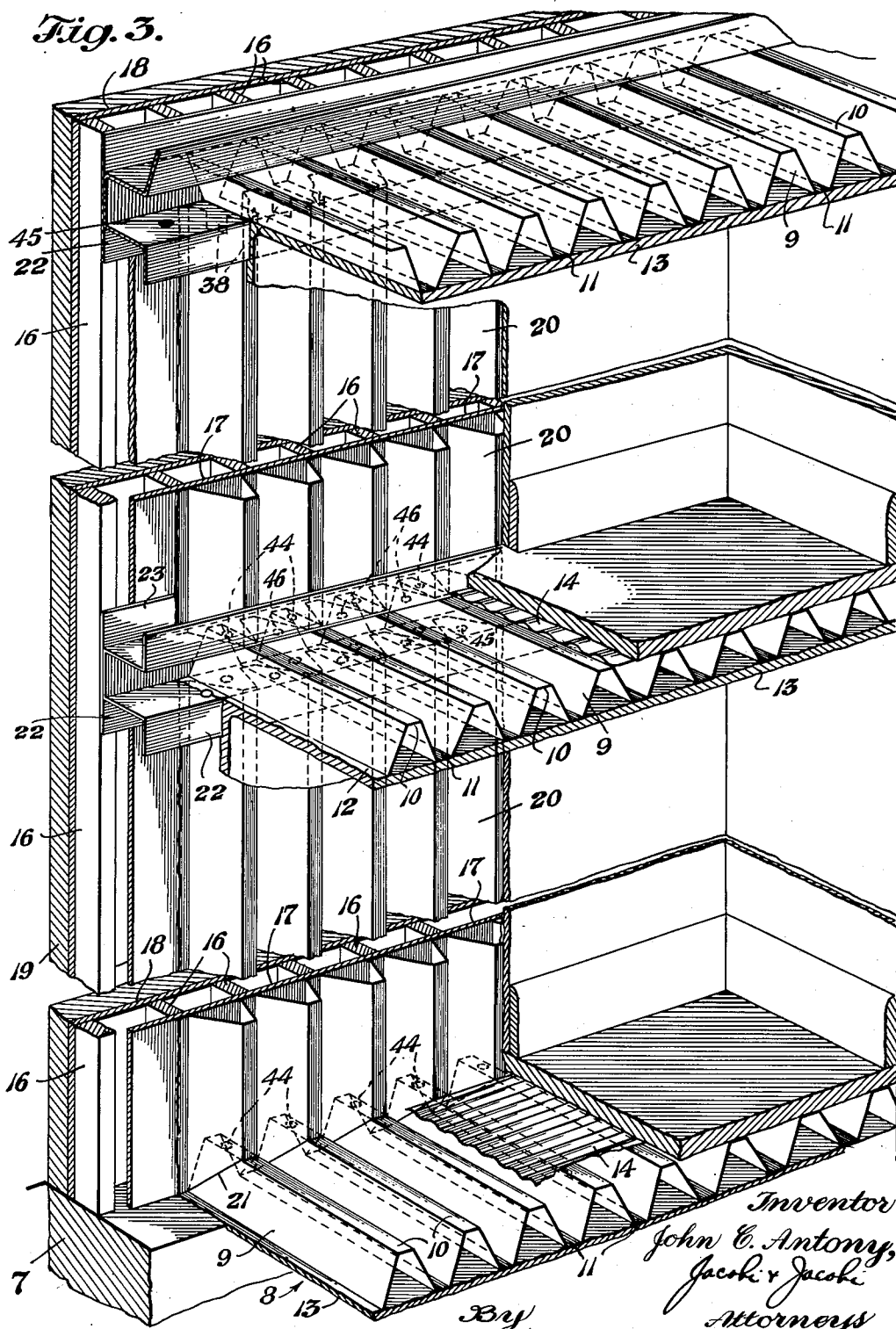
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Fig. 3.



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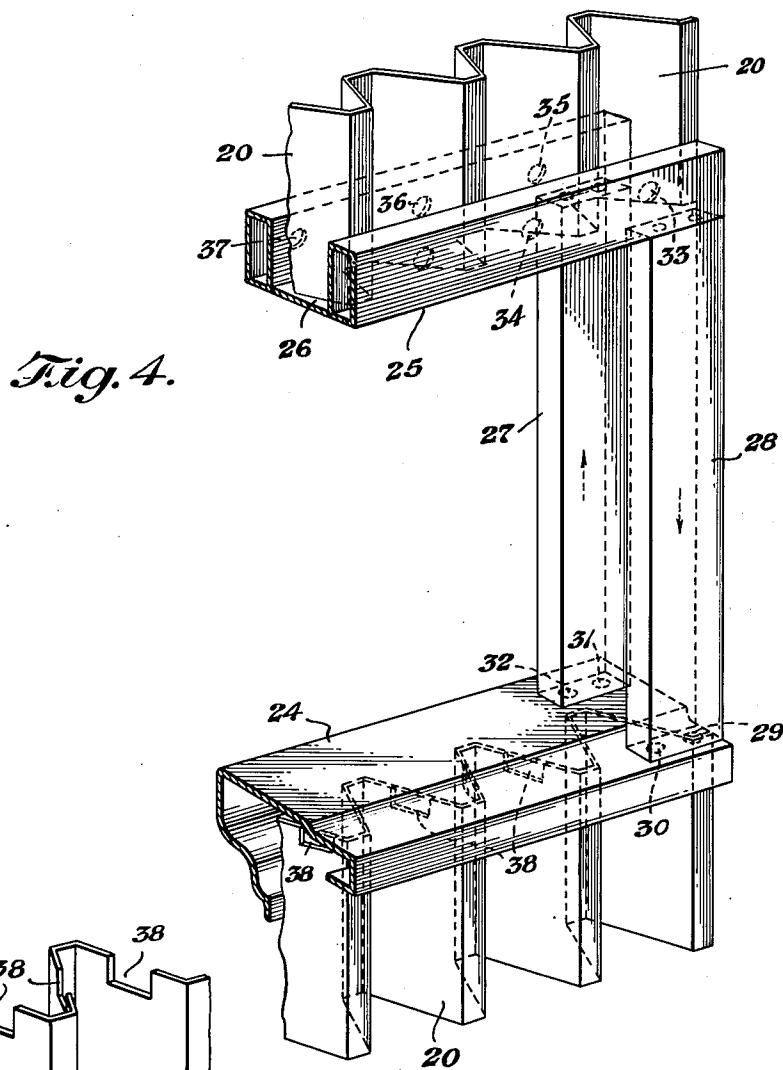


Fig. 4.

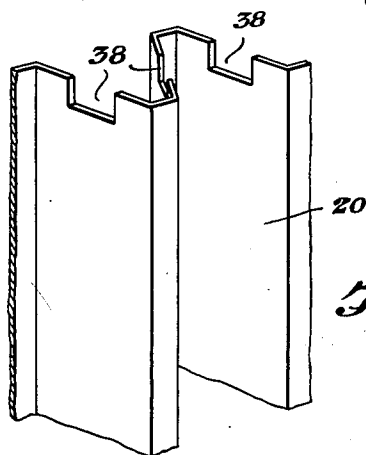


Fig. 5.

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UNITED STATES PATENT OFFICE

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BUILDING CONSTRUCTION

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3 Claims. (Cl. 257—8)

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My invention relates to building construction in which the major portion of the construction includes particularly shaped units made from channelled steel members which are adapted to conduct heated or chilled air along and within the channelled members to maintain the building in a comfortable warm condition in winter and a comfortably cool condition in summer.

It is an object of my invention to provide means comprising an association of assembled steel channel members for maintaining the room or rooms in a comfortable air conditioned working or living quarters. My construction is also available as a storage place for the preservation or treatment of commodities that require a substantially constant temperature.

It is an object of my invention to construct a building or house principally of sheet metal or sheet metal units and to provide tubular or channel units to convey air hot or cool about the enclosed room and to air condition the same by substantially pure radiation directly from the floor, ceiling and side walls of the room and thereby eliminate space occupying radiators and open flues carrying convection currents of air directly into and out of the room.

It is also an object of my invention to provide a substantially fireproof building construction having clear uninterrupted floors, ceilings and side walls, except for doors, windows and skylights that may be necessary for the room or rooms.

Other objects and advantages will be revealed in the detailed description of the drawings, which constitute a part of this application.

In the drawings:

Figure 1 is a vertical section of a minor portion of my building construction,

Figure 2 is a vertical section at right angles to the section, as shown in Figure 1, as indicated by the line 2—2 of Figure 1, looking in the direction of the arrows,

Figure 3 is a foreshortened perspective view partly in section in which the assemblage illustrates the relation of steel channel units comprising my building construction,

Figure 4 is a perspective view of a portion of a window frame disclosing the channel construction of one of the window frame units, and

Figure 5 is a perspective view of a portion of a channel unit having recess openings in the ends of the channel units instead of apertured openings in the channels, as shown in other figures of the drawings.

The drawings are merely illustrative of a pre-

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ferred form of my invention and are not definitive thereof, except as claimed herein.

The reference characters identify the details disclosed on the drawings and described in this specification.

The contemplated building construction 6 disclosed herein is provided with a foundation 7 which directly supports both the first floor 8 and the side and end upright walls of the building construction. Other supports such as girders (not shown) are to be used in buildings of large size when the building is two or more spacious rooms wide. Such girdage support is common practice in building construction, and I contemplate that ample support shall be used in accordance with the safest and tested engineering instructions and specifications now used in the building trade or industry.

In making the floors, I use for joists heavy gauge sheet steel 9 made up in sections suitable to handle. If the rooms contemplated are not exceedingly large, a single section may cover an entire room floor. In handling large single sections, it is contemplated that the workman will be provided with suitable equipment, such as cranes and derricks and whatever other equipment may be necessary.

It is preferred that the joist construction be made up in smaller sections that may be joined together along their edges wherever necessary. The sections are to be made up into definite lengths, such as 10, 12, 14, 16 or 18, etc., feet, and preferably (counting one side only) including 3, 4, 5 or more channels extending the full length of each section.

The channel sheet steel 9 comprises a series of hollow truncated prism shaped members disposed in parallel relation so that the truncated portions define planes common to the base planes of the tops and bottoms of the prisms. The truncated portions may be approximately 2, 3, 4 or more inches wide and the altitude of the prone prisms may be approximately 6, 8, 10 or more inches. The prism shaped members are hollow regular three sided prisms.

The channel walls plus the truncated portions 10 and 11 constitute a series of joists for supporting the floors of the building as previously pointed out. These series of channel members or joists constitute means for conveying or conducting a conditioning fluid about and around the outside of the inner shell of the wall which defines the room.

When the joist material is made up in narrow sections, the meeting edges of the sections or, at

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least, half of the number of edges are off-set sufficiently to maintain the truncated top portions in a common plane.

The slope of the sides of the joist channels are about sixty degrees more or less to the horizontal plane of the floor.

The ceiling sheets of material 13 are preferably of metal lath such as cut and expanded sheet metal securely fastened to the lower flat sides of the channel members by suitable fastening means such as bolts or lag bolts, etc. Suitable plaster is applied to the expanded metal lath and thereby provides a fireproof cover for the under side of the channel member or joists.

It is also contemplated that imperforate sheet metal or ornamented sheet metal may be used in place of the metal lath and plaster. The sheet metal would be secured to the lower portions of the joists by suitable fastenings such as bolts, screws, etc.

In order to provide for the floor, I prefer to use sections of heavy gauge corrugated sheet metal 14 preferably spot welded to the plane faces of the upper truncated portions 10 of the joists.

The corrugated sheet metal is covered with a mixture of cement sand and finely crushed stone or any other suitable composition that is substantially fireproof and can be smoothed to make a smooth level floor surface of sufficient strength to support any contemplated load without cracking or breaking.

The outside walls 15 comprise corner posts and vertical studs 16 resting on the foundation 7. The studs are preferably two inches by four inches in cross section and as tall as the building is high. The aligned inner surfaces of the studs constitute supports for sheet metal 17 secured thereto by suitable fastenings preferably galvanized nails to resist rusting. The aligned outer surfaces are covered with any variety of suitable sheeting 18 secured to the studs 16. The sheeting is covered with building paper (not shown) which in turn is covered with sheet metal 19 of suitable design. It is also contemplated that metal lath or expanded metal may be secured directly to the outer surfaces of the studs and finished with stucco or pebbledashing applied directly thereto.

The interior portion of the side and end walls of the building is provided with sheet metal channel sections 20 similar to the floor channel sections but preferably of lighter gauge material. On the first floor the upright channel sections are cut away on their lower ends as shown at 21 to accurately fit over the channel sections 9. The lower ends of the upright channels not cut away rest on the foundation 7. The upright channel sections are secured to the studs 16 by means of suitable fastenings such as nails, screws or lag bolts. These fastenings (not shown) pass also through the sheet metal 17.

The second floor is provided with triple channel supports 22 and 23. The intermediate channel is open laterally and horizontally to receive the adjacent end portions of the second floor channels to support the same. The upper and lower channels open upwardly and downwardly to receive the adjacent ends of the upright channels 20. The triple channel supports 22 and 23 are secured to the sheet 17 and the studs or studding 16 by suitable fastenings such as nails, screws, bolts, etc. (not shown).

The window construction comprises a special channel and tubular structure. The window sill 24 is a special channel construction open on its

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lower side to receive the adjacent ends of the upright channels 20. The upper portion 25 of the frame is provided with a central channel 26 opening upwardly and receiving the lower end portions of the channels 20. The channel 26 is flanked on each of its sides with a tubular channel rectangular in cross section. The upright members 27 and 28 are rectangular in cross section to form tubes for circulation of fluid about the window frames. In order to provide for this circulation of fluid both the tubes and channels are apertured or provided with openings as indicated at 29, 30, 31, 32, 33, 34, 35, etc., to place all of the adjacent tubes and channels in communication.

The channels 20 may be provided with apertured openings or with recessed openings as shown at 38 of Figure 5.

The rafters 39 of the roof 40 are channel type similar to the joists 9 and are secured in place by spot welding or other fastening means.

The furnace 41 is shown in the basement, Figure 1, and the hot air flue 42 is shown extending along the ceiling of the basement and is secured thereto by spot welding or other fastening means or both varieties of fastening means may be used.

The hot air flue 42 is in fluid communication with the joists 9 as indicated by the aligned apertures 43. These apertures 43 extend through the upper wall of the flue 42 the ceiling finish of sheet metal 13 and the truncated lower portions of the channel joists 9, thus the hot air flue is placed in direct communication with the channel joists 9. The end portions of the joists 9 are provided with large apertures 44 to place them in direct communication with the upright studs or studding 20 of the side walls.

The triple channel supports are also provided with apertures 45 and 46 to place the upright channels in direct communication with each other and also with the joists of the second floor.

The cold air flue 47, leading to the furnace 41, is also provided with apertured portions placing it in direct communication with the joists of the first floor. The cold air flue 47 is secured to the basement ceiling and to the joists by spot welding and/or other suitable fastening means.

If desired, suitable baffles, not shown, may be disposed in the channels to direct the flow of hot and cold air and provide proper circulation thereof thus assuring efficient temperature conditioning of the various rooms in the building.

The furnace 41 is provided with the conventional chimney flue (not shown) to carry away inert gas, such as carbon dioxide and the poisonous carbon monoxide and other impurities.

In my air conditioning construction, the room spaces are entirely separate from each other, that is, the air conditioning fluid merely circulates through the channel walls, floors and ceilings without entering the rooms so that the rooms are temperature conditioned by substantially pure radiation.

The circulation of hot or warm air takes place under the principles of gravity stratification of the air whereby the heavier cold or cool air settles downwardly and thereby forces the hot or warm air upwardly.

In order to accelerate the circulation of air, if conditions require it, a blower fan is to be installed in the warm or hot air flue 42, or a suction fan is to be installed in the cool or cold flue 47. Of course, in extremely cold climates both blower and suction fans may be used to facilitate

the circulation of air throughout the channel walls, floors, etc.

During the hot weather season when air conditioning for comfort, etc., is required, then it is preferred to facilitate the circulation of cool air by the use of, at least, one fan which will be required to propel the air throughout the floors, walls and ceilings.

In order to maintain replacement of air within the rooms exits may be provided at the top of the windows (not shown). It is preferred to admit fresh air through air filters located at the bottom of the windows (not shown).

From the foregoing description of my improved building construction, the method of assembly and the application to use thereof will be readily understood and it will be seen that I have provided a comparatively simple, inexpensive and efficient means for carrying out the various objects of the invention.

While I have particularly described the elements best adapted to perform the functions set forth, it is apparent that various changes in form, proportion and in the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the principles of the invention.

Having thus described my invention, what I claim is:

1. In a building construction comprising upright channels, a combined floor and ceiling, triple channel supports, said channel supports, individually, comprising three connected channels, one of said three channels extending laterally and horizontally to receive one edge portion of said combined floor and ceiling, said other channels of each triple channel support comprising upper and lower channels, respectively, directly above and below said lateral and horizontal channel, said upper and lower channels receiving the end portions of upright channels, said combined floor and ceiling being provided with horizontal channel members located therein and extending transversely and partly into the laterally and horizontally extending channel of one of the triple channel supports, the horizontal channel members being provided with openings therein in both its top and bottom portions adjacent the ends thereof, said triple channel supports having openings therein communicating, respectively, with the openings in the horizontal channel members, said horizontal channel members being devoid of openings leading through said combined floor and ceiling, whereby said combined floor and ceiling can be air conditioned solely by direct radiation.

2. In a building construction comprising a combined floor and ceiling, side walls, upright channel members, and a three-channel support secured to the side wall, said side wall and said combined floor and ceiling being provided with upright and horizontal channel members, respectively, said three-channel support having one channel opening laterally and horizontally and receiving the adjacent ends of the horizontal

channel members, said three-channel support also having channels opening upwardly and downwardly, respectively, and receiving the adjacent ends of the upright side wall channels, said three channels of the three-channel support being arranged substantially in superposed relation, said horizontal channel members having openings therein in both the top and bottom portions thereof, said three-channel support also having openings therein communicating with both horizontal and upright channel members whereby a conditioning fluid may be propelled through all of said channel members and said three-channel supports, all of said channel members and the three channel support being of sheet steel, in combination with an air conditioning unit, said channel members being otherwise closed whereby said building construction may be air conditioned solely by direct radiation from said channel members.

3. In a building construction including upright channels, at least one combined floor and ceiling, supports comprising a plurality of connected channels, at least one of said connected channels extending laterally and horizontally to receive one edge portion of said combined floor and ceiling, at least two of said connected channels above and below said one channel receiving the end portions of said upright channels, said combined floor and ceiling being provided with horizontal channel members located therein and extending transversely and partly into said one channel, said horizontal channel members being provided with openings therein in both the top and bottom portions adjacent the ends thereof, said one channel having openings communicating with the openings in said horizontal channel members, said horizontal channel members being devoid of openings leading through said combined floor and ceiling whereby said combined floor and ceiling can be air conditioned solely by direct radiation.

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