Aug. 18, 1942. J. F. O'BRIEN ET AL 2,293,267

BUILDING CONSTRUCTION

Filed July 27, 1940 4 Sheets-Sheet 1

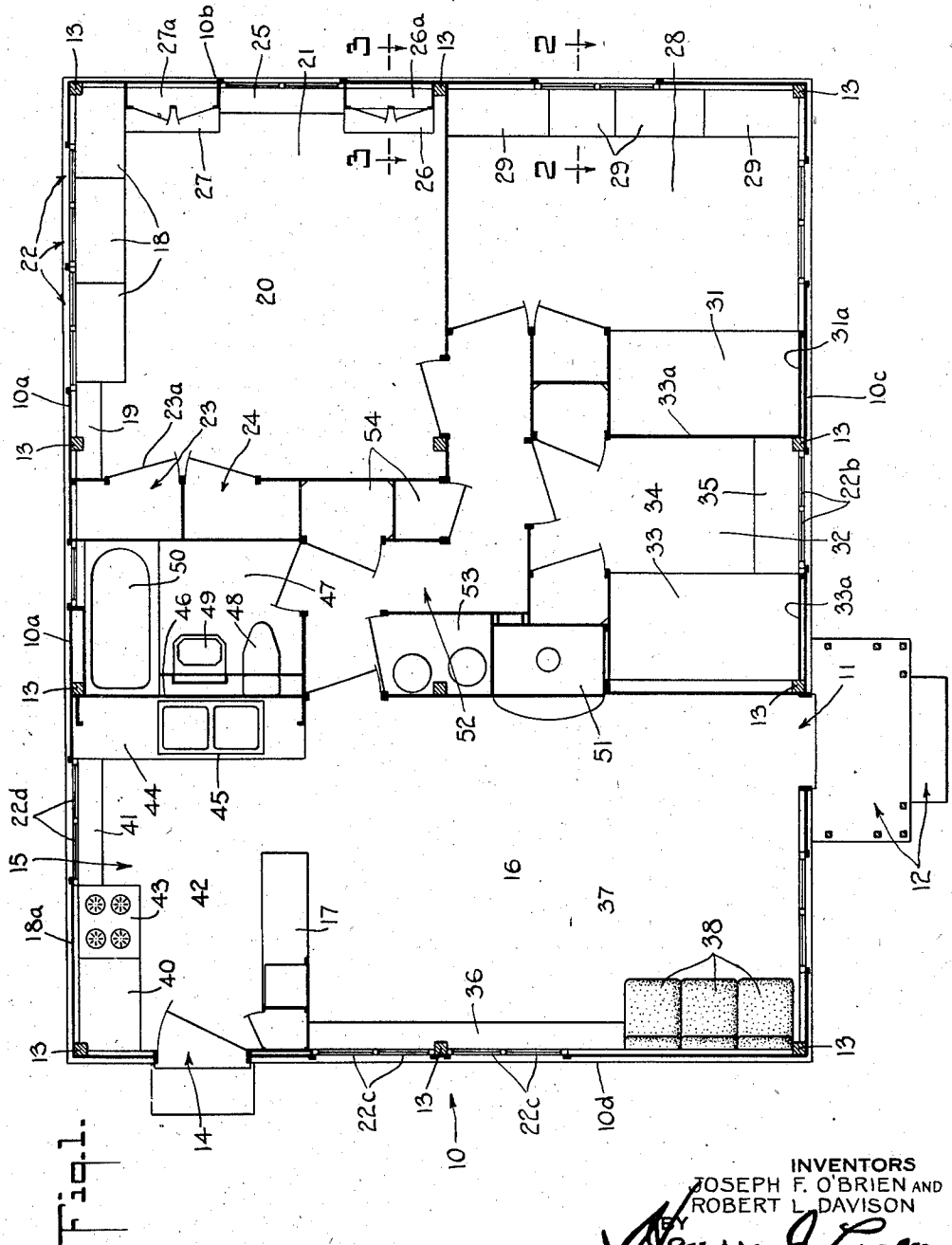


Fig. 1.

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BUILDING CONSTRUCTION

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Fig. 2.

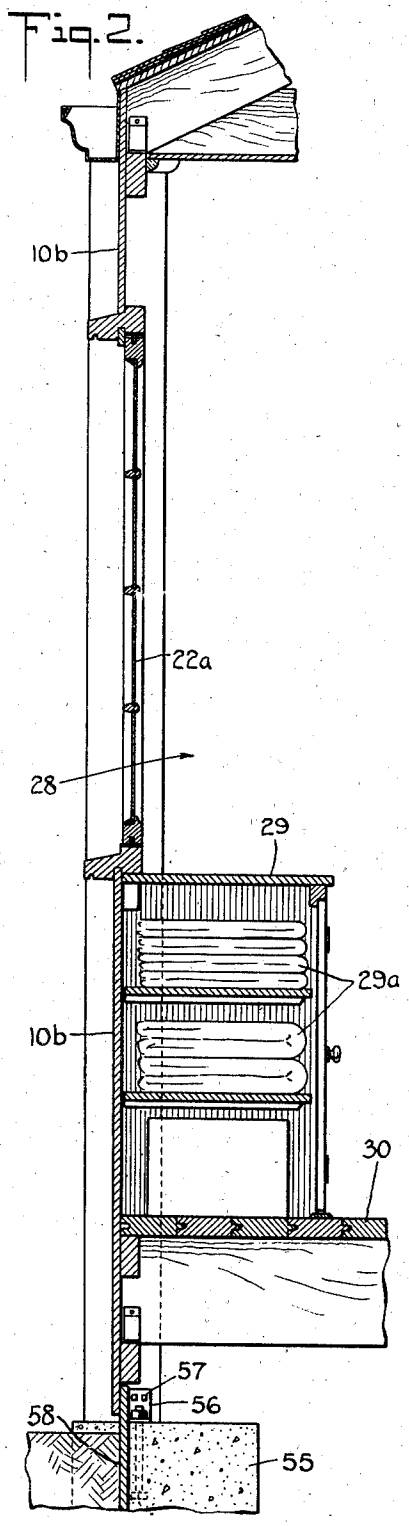
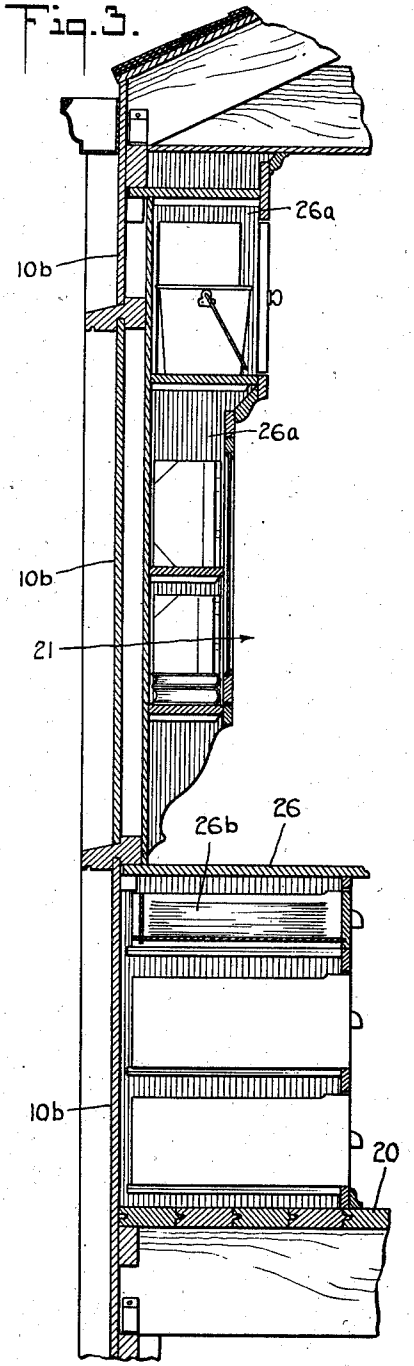


Fig. 3.



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BUILDING CONSTRUCTION

Filed July 27, 1940 4 Sheets-Sheet 3

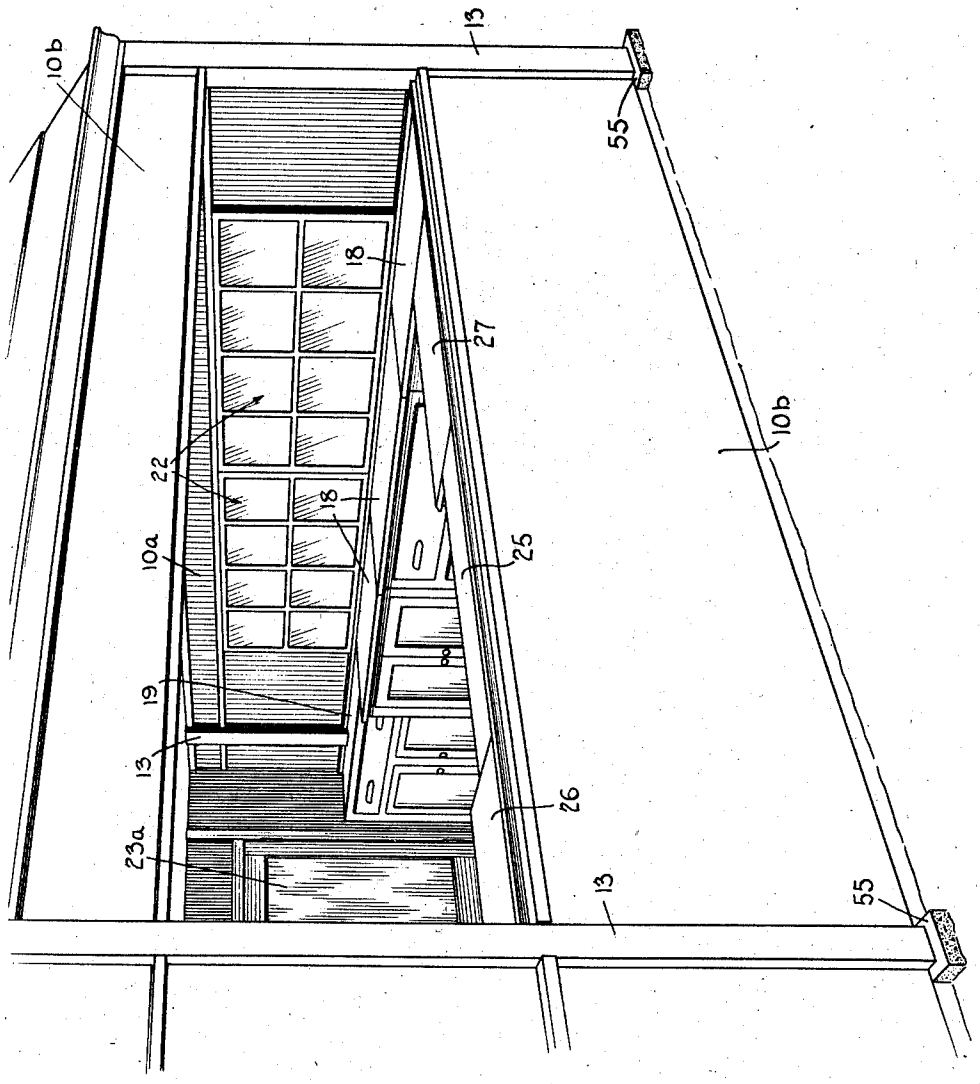


Fig. 4.

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BUILDING CONSTRUCTION

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Fig. 5.

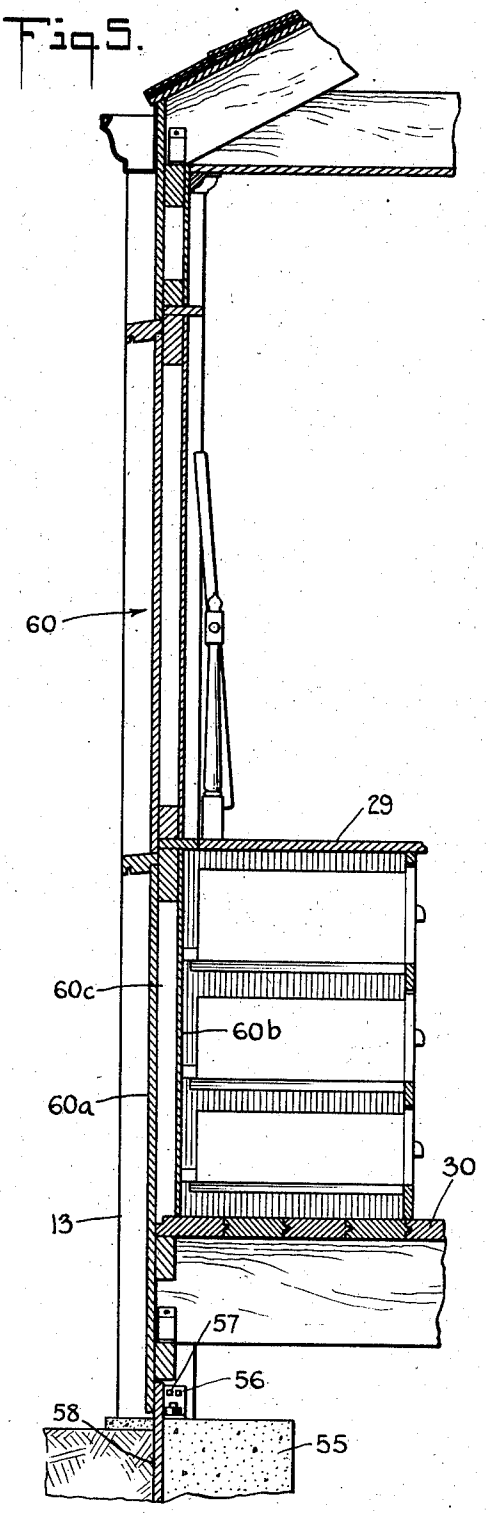
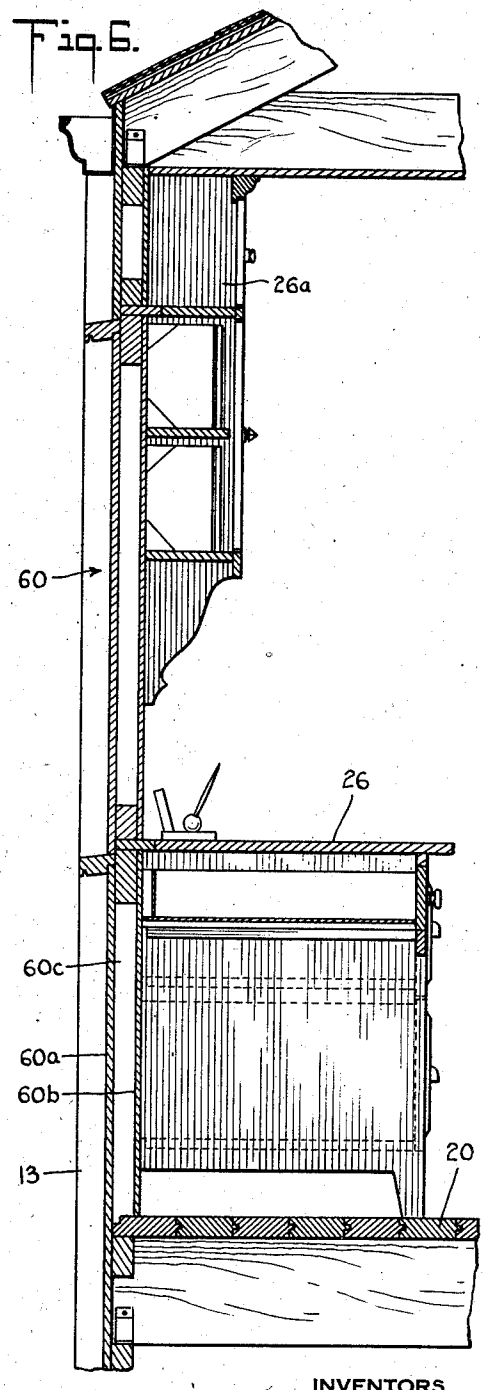


Fig. 6.



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Patented Aug. 18, 1942

2,293,267

UNITED STATES PATENT OFFICE

2,293,267

BUILDING CONSTRUCTION

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Application July 27, 1940, Serial No. 348,058
Serial No. 348,058

3 Claims. (Cl. 20—2)

The invention relates to improved building construction.

An object of the invention is the provision of means for supplementing the thermal insulation afforded by the wall material, i. e., the material per se of the walls, particularly the outer walls, of a building structure by the combination therewith of furniture for the building, such building furniture mechanically secured to the inner face of such wall material, to combinedly form the outer wall or walls of the building.

The term "wall material" herein defined includes a plurality of different materials forming a part of any wall of a building structure. The term "furniture" as employed herein includes cases of the types utilized for the storing of books or other articles of utility to the occupants of the building structure, closets for clothes and other articles of wear, for linen, brooms, carpet sweepers, vacuum cleaners and the like, for china, kitchen utensils, etc., also wardrobes for garments, high-boys, chests of drawers, utility boxes and so forth, said "furniture" having the characteristic that air within the interior of such furniture is not subject to convection current and that the interiors of such furniture function as "dead air spaces."

One feature of the invention resides in installing as a permanent structural component interiorly of a room or other space of a building structure such articles of furniture disposed in substantial contiguous horizontal relationship to one another and extending from the floor level upwardly. Desirably, the vertical extension of such articles of furniture is as great as may be desired in specific instances. The vertical extension from the floor level to window-sill height has been found highly practical for attaining the objectives of reinforced thermal insulation for reducing heat losses in the periods of low ranges of outer atmospheric temperatures, as in the winter seasons and during chilly and windy seasons, and during the seasons of high outer atmospheric temperatures. These advantages are gained particularly in the type of building pursuant to the construction set forth in the United States Letters Patent No. 2,075,338, dated March 30, 1937, and/or Letters Patent No. 2,235,811, dated March 25, 1941, and/or Serial No. 393,498, filed May 15, 1941, Robert L. Davison, assignor to John B. Pierce Foundation, in which construction a continuous wall structural unit extends horizontally from vertical column to vertical column and from floor level to at least window sill height.

Pursuant to the present invention such assembly of substantially contiguously arranged furniture forms an inwardly disposed component of the outer wall or walls of the room or rooms or other space which face the direction or directions encountering the more severe outer atmospheric conditions.

The advantages, above referred to, are realized in greater measure by application of the invention to all rooms or other spaces on any given floor level of the building structure, and further enlarged by utilizing the invention as stated on all floor levels of the building structure.

By the invention, assuming proper air-tight fitting of windows, doors and the like of such room or rooms or other spaces of any given floor level and of the respective floor levels of a given building structure, the consumption of fuel required to maintain comfortable interior temperature through the intermediation of the heating system during the heating season, is minimized; as a corollary, the invention enables wall material of lesser thermal insulation determined by geographical location and/or barometrical conditions to be employed while maintaining comfortable interior temperature during the heating season. Corresponding advantageous results are availed of during the summer season, due precaution of closing of windows, doors and the like being taken.

The invention affords sociological advantages in that all essential articles of furniture are component parts of the house, thus relieving the occupants of having furniture of their own; and in enhancing the financial rating of the purchaser of such house in avoiding the expense of purchase of furniture. The available floor space of a building embodying the invention is enlarged for social uses, in that all essential furniture is located at the walls, leaving the centers of the rooms free.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawings.

In the drawings:

Fig. 1 is a horizontal sectional view taken approximately at window sill level, largely diagrammatic, illustrating in plan a preferred embodiment of the invention.

Fig. 2 is a detail vertical sectional view on line 2—2 of Fig. 1.

Fig. 3 is a detail vertical sectional view on line 3—3 of Fig. 1.

Fig. 4 is a detail perspective elevation of the interior of one room of Fig. 3, as viewed from the exterior adjacent one corner of the building, the middle panel of the outer wall through which the view is afforded, being removed to expose otherwise hidden parts.

Fig. 5 is a detail vertical sectional view, similar to that of Fig. 3, but showing the invention applied to a double wall building.

Fig. 6 is a detail vertical sectional view similar to that of Fig. 3, illustrating the invention as applied to a double wall building structure.

As indicated above, the building structure per se is preferably that set forth in the aforesaid U. S. Patent No. 2,075,338, pursuant to which the wall structure is substantially constituted of panels extending horizontally from one vertical column to adjacent vertical column thereby providing in each instance a substantially integral panel unit extending from floor level upwardly preferably to window sill height. As one feature of such building construction, the outer wall unit on any given floor may be constituted of the referred to substantially integral panel extending from floor level to window sill height, and a similar substantially integral panel extending from vertical column to vertical column, from window lintel height to the next floor level, filling panels being interposed between the sill level and lintel level at the intervals between window and columns and/or between window and window, as the case may be. The stated construction affords an added advantage to the essentials of the instant invention in that substantial continuity of material of the outer walls of the building per se, from floor level upwardly, coordinates with the substantially contiguous horizontal relationship of the thermal insulating articles of furniture, above defined.

Specifically, as is illustrated in Figs. 1, 2 and 3, the building construction is indicated generally 10. The front door appears at 11 at which a porch and steps, jointly designated 12 may be provided, if preferred. Vertical columns are indicated at the four corners of the illustrated building structure at 13, 13, 13, 13, and also at locations at front, rear and opposite sides intermediate corner columns. A rear door is shown at 14, for affording entry into the kitchen 15.

A dining and/or living room is indicated at 16 which is shown spaced from the kitchen by a serving table 17, which may have partitions, shelves or the like on its opposite sides, as for concealing a dining or utility table, storing books, kitchen utensils, etc.

18, 19 are indicated as cabinets, cases, or the like, for storing wearing apparel, books or the like, a desk, etc., which may be and preferably are of wood or similar material, each of which is mechanically secured to the flooring 20 of the bedroom 21, or equivalent room, and also secured to the inner face of the material of the outer wall 10*a* of the building. These stated articles of "furniture" defined as above, are shown disposed adjacent a series of windows, indicated at 22, and preferably extend from the floor level to window-sill height. Adjacent these articles of "furniture," within the room 21 is also indicated a closet 23, suitable for storing clothing or the like, which may be of room height, the side wall material of which is disposed adjacent the inner face of the outer wall 10*a* of the building to which the stated articles of "furniture" 19, 18 are also adjacent and secured, the material of the closet 23 being similarly mechanically secured to the flooring 20 of the room 21 and to the inner face of the stated outer wall building material 10*a*. The closet 23 is indicated as having a door 23*a* for closing the same and the stated articles of furniture are preferably provided with doors for closing the same, to afford dead air space therewithin, the factor of dead air space being enhanced by locating the stated articles of "furniture" in immediate contiguous horizontal relation to one another.

The closet 24, if desired, may be employed and disposed adjacent the closet 23, as indicated in Fig. 1.

In the room 21 is also indicated in Fig. 1 a book case 25, and also two cabinets 26, 27, see also Fig. 3, and upwardly arranged cases 26*c* (and similarly 27*a*) for books and sundry articles, said cases 25, 26, 27 being arranged in immediate adjacency to one another and with respect to the inner face of outer wall 10*b*, the same serving as articles of "furniture" as above defined, and mechanically secured to the flooring 21 and to the inner face of the stated outer wall 10*b*.

Adjacent the stated room 21 is indicated in Fig. 1 a room 28, which may be a bedroom, in which may be disposed, as shown, in immediate adjacency the articles of "furniture" 29, 29, etc., which may be cases for books, cabinets or the like for wearing apparel, toys, etc., each mechanically secured to the flooring 30 of the room 28, and also to the inner face of the material of the outer wall 10*b*. A window is indicated at 22*a*. The stated articles of "furniture" 29 are shown having a height extending from the floor level and preferably to the sill height of the window 22*a*.

As is indicated in Figs. 3 and 4, with relation to the cases or cabinets 26, 29, when articles such as wearing apparel, see 26*b*, and/or blankets or the like, see 29*a*, are placed in such "furniture," such articles per se function to create "dead" air within the "furniture" or within the compartments thereof, independently and additional to the doors or the like of such "furniture."

At 31 is indicated in Fig. 1, a bed, the head or foot board of which is preferably mechanically secured to the flooring 30 and in dead air-spaced relation to the inner face of and mechanically secured to the outer wall 10*c* of the building. To enhance the dead air relationship of the bed 31 as an entirety and to accommodate more than one person, the bed is preferably in the form of a double berth bed.

Adjacent the room 28 is indicated in Fig. 1 another room 32 in which is disposed a bed 33 which may be of the type as the stated bed 31, the head or foot piece 33*a* of which is mechanically secured to the flooring 34 of the room 32 and in dead air-spaced relation with and mechanically secured to the inner face of the outer wall 10*c* of the building. Also in the room 32 is indicated an article of "furniture" 35 being mechanically secured to the flooring 32 and also to the inner face of the outer wall 10*c*, and extending from the partition 32*a* to the bed 33.

In the dining-living room, or equivalent, are indicated a book case 36, or a set of immediately disposed book cases, the material of which is mechanically secured to the flooring 37 of the room 16 and also to the inner face of the outer wall 10*d* of the building; the case or cases 36 may, and preferably, have a vertical height extending to

the sill of the indicated window 22c. Adjacent the inner face of the outer wall 10d, in the room 16, are also indicated a series of seats 38, or which may be a settee, the lower parts of which are substantially closed and mechanically secured to the flooring 37 of the room 16 and the material at the rear of the stated "furniture" 38 being mechanically secured to the inner face of the outer wall 10d of the building.

40, 41 are indicated as utility or other cabinets for storing cooking utensils and other kitchen paraphernalia or the like, secured mechanically at the bottom to the flooring 42 of the kitchen 15 and also to the inner face of the outer wall 10a of the building, functioning as "furniture" defined as above. 43 indicates a kitchen range or equivalent, which may be of the electric, gas or other type as preferred, preferably having a lower baking and/or broiling or otherwise closed compartment; such kitchen range or equivalent is desirabley secured mechanically to both the floor and to the inner face of the outer wall 10a of the building, and similarly serving as an article of "furniture."

An icebox, refrigerator or the like is indicated at 44 similarly secured to the flooring 42 and to the outer building wall 10a; 45 indicates a kitchen sink, desirably including a laundry tub, and advantageously combined as a unit with the refrigerator or icebox 44. The rear face of such icebox or refrigerator 44 and sink and laundry tub 45 is shown abutting the partition 46, separating the kitchen 15 from the bathroom 47. In the bathroom 47 are indicated a toilet bowl 48, lavatory 49, and bathtub 50, the last-named desirably having an encasing vertical wall at the rear, installed adjacent and mechanically secured relative to the inner face of the outer wall 10a of the building and also mechanically secured to the bathroom flooring.

To complete the utility of the stated rooms on the common floor shown in Fig. 1, there is indicated as located in the room 16 a heater 51 preferably having the Fireplace stove and heater set forth in U. S. Patent No. 2,028,088, dated January 14, 1936, Robert L. Davison and Edgar V. Ludwig, assignors to John B. Pierce Foundation, and combined with the Duct heating system set forth by the copending application Ser. No. 34,353, filed August 2, 1935, now U. S. Patent No. 2,209,234, dated July 30, 1940, Robert L. Davison, assignor to John B. Pierce Foundation, adapted to provide heating for the various rooms, to wit, the kitchen 15, bathroom 47, bed rooms 21, 28, 32, etc., hallway 52, etc. At 53 is indicated a closet adapted to enclose a heater and storage tank for hot water supply or the like. At 54 are indicated closets or the like.

As appears from the above, the stated articles of "furniture" perform structurally dual functions of mechanically reinforcing the building structure and affording thermal insulation relative to the interior of the building structure under conditions of high and low outer atmospheric temperatures. The mechanical function thus performed by such assembly of the respective articles of "furniture" with the outer wall material of the building, is particularly advantageous in that the mechanical cooperation is carried out between the flooring of any given floor and the thereto adjacent outer wall material of the building, thereby reinforcing the stability of the combined mechanical structure, including adding permanence to the mechanical connection immediately between the floor and wall material, preventing sagging of the floor and mechanical resistance against wind pressure, etc. Any desirable fastening devices such as brackets, angle pieces, etc. may be employed for effecting the required mechanical connections between the material of the "furniture" and the flooring and the inner faces of the appurtenant wall materials of the building.

The principle of construction of the outer walls of the building, pursuant to the disclosures of the aforesaid U. S. Patent No. 2,075,338, and/or U. S. Patent No. 2,235,811, dated March 25, 1941, and aforesaid co-pending application Serial No. 393,498, affords optimum facility in attaining such mechanical securement with the inner faces of the outer wall material in that such construction provides for each outer wall a panel which extends continuously from vertical column to vertical column and from the floor level to a given height, preferably to windowsill height, with which the stated "furniture" particularly when assembled in immediate adjacency to one another combines to maximum degree the advantages of the stated dual functions of mechanical reinforcement and thermal insulation.

As appears from the drawings, and particularly from Figs. 4, 5 and 6, the vertical columns 13 to which the outer wall material of the building structure are secured, are shown resting upon and secured to piers 55, as by means of angle pieces 56, anchored in the concrete piers 55. Such angle pieces 56 may be secured to the columns 13 such as by bolts 57 or equivalent. If desired, a shield 58 may be employed, suitably secured to the lower edges of the lowermost panel of each outer wall, to conceal the under-foundation of the building, and also protect the under surface of the lowermost floor from the elements.

The instant invention has especial merit in the construction of buildings of outer wall materials such as laminated plywood, bonded by insulating bonding medium, which embodies marked physical and thermal qualities in combination with the stated articles of furniture, which may be made of wood or the like. The stated materials in the commercial production of embodiments of the invention have brought into realization houses possessing a high degree of interior as well as exterior ornamentation as well as outstanding degree of utility as a home for human habitation.

The principle of construction as set forth in the aforesaid U. S. Patent No. 2,028,088, contributes the further advantage of affording a high percentage of the component parts of the outer building structure to be produced under shelter at a common location of manufacture, thereby enabling the erection on the location of the building of the exterior of the building in a minimal period, repeatedly carried out in practice within the working hours of a single day.

In addition to the aforesaid outstanding advantages, the present invention constitutes a marked contribution in social advancement, in providing maximal clear space at the center of each room thus affording physical comfort to a relatively large number of individuals of a family or any other group, occupying the house. From the economic-social viewpoint, the invention marks an epoch, particularly for newlyweds, in that the problem of acquiring furniture for a home is simultaneously attained when acquiring the home.

The embodiment shown in Figs. 5 and 6—as appears from the comparison of Figs. 2 and 3—follows largely the embodiment shown in Figs. 1 through 4, and like parts are designated by like

reference characters. The embodiment shown in Figs. 5 and 6 is characterized particularly by the employment of double wall panels as the outer wall material of the building structure. In Figs. 5 and 6, the double outer wall material is designated generally 60, the outer sheet material thereof being designated 60*a* and the inner sheet material being designated 60*b*, the clearance 60*c* between the same being either "dead air," or suitably filled with suitable insulating material, such as glass wool or the like, or fully filled with solid insulating material such as gypsum blocks or the like, or other conventional insulating materials. In such construction the outer wall material 60*a* may be laminated plywood and the inner wall material 60*b* of wood or equivalent, to which latter the articles of furniture, such as the indicated "furniture" 26, 26*a*, 29, shown in Figs. 5 and 6, are mechanically secured as well as to the indicated flooring 20, 30.

If preferred the detailed structure of the various types of "furniture," as shown in the drawings, may incorporate the outer wall material as an integral part of such articles of furniture.

Embodiments of the invention utilizing a single wall as the outer wall material in whole or in part of the building afford full attainment of the objectives of the invention in the more temperate climates whereas the embodiments utilizing double wall units for the entirety of the outer walls of the building are advantageous for the more rigorous climates.

Whereas, we have described our invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

We claim:

1. In a building structure, the combination of structural units forming an outer wall structure of a room of the building, said structural units including outer wall panel means which extend upwardly from a floor level, and terminate substantially at an adjacent window sill level, of said wall structure, flooring disposed at said floor level of the building, articles of furniture mechanically secured to the inner face of said outer wall panel means and to the said flooring, said articles of furniture extending at least to substantially window sill height and embodying hollow storage portions and means normally closing said hollow storage portions, said articles of furniture being disposed substantially contiguous with the said inner face of said outer wall panel means, comprehending substantially the entire area thereof, whereby said articles of furniture serve as elements of thermal insulation and mechanically reinforce the connections of said flooring with said outer wall structural units.

2. In a building structure, the combination of structural units forming a multiple walled outer wall structure of a room of the building, said structural units including inwardly disposed wall panel means which extend upwardly from a floor level, and terminate substantially at an adjacent window sill level, of said wall structure, flooring disposed at said floor level of the building, articles of furniture mechanically secured to the inner wall face of the said inwardly disposed wall panel means and to the said flooring, said articles of furniture extending at least to substantially window sill height and embodying hollow storage portions and means normally closing said hollow storage portions, said articles of furniture being disposed substantially contiguous with the inner wall face of said inwardly disposed wall panel means, comprehending substantially the entire area thereof, whereby said articles of furniture serve as elements of thermal insulation and mechanically reinforce the connections of said flooring with said outer wall structural units.

3. A building structure comprising mutually spaced vertical columns, outer wall panels each extending from vertical column to vertical column, said outer wall panels providing for a window opening and including panels extending upwardly from floor level to the sill height of said window opening, flooring for such floor level, and articles of furniture mechanically secured to the inner faces of said wall panels which extend from floor level to window sill height, and being further secured to said flooring, the said articles of furniture being disposed substantially contiguous with the said inner faces of said wall panels to which they are secured and comprehending substantially the entire area thereof, wherby said articles of furniture serve as elements of thermal insulation and mechanically reinforce the connections of said flooring with said outer wall structural units.

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