

April 14, 1953

C. TILLERY

2,634,601

BUILDING WALL CONSTRUCTION

Filed Sept. 9, 1949

2 SHEETS—SHEET 1

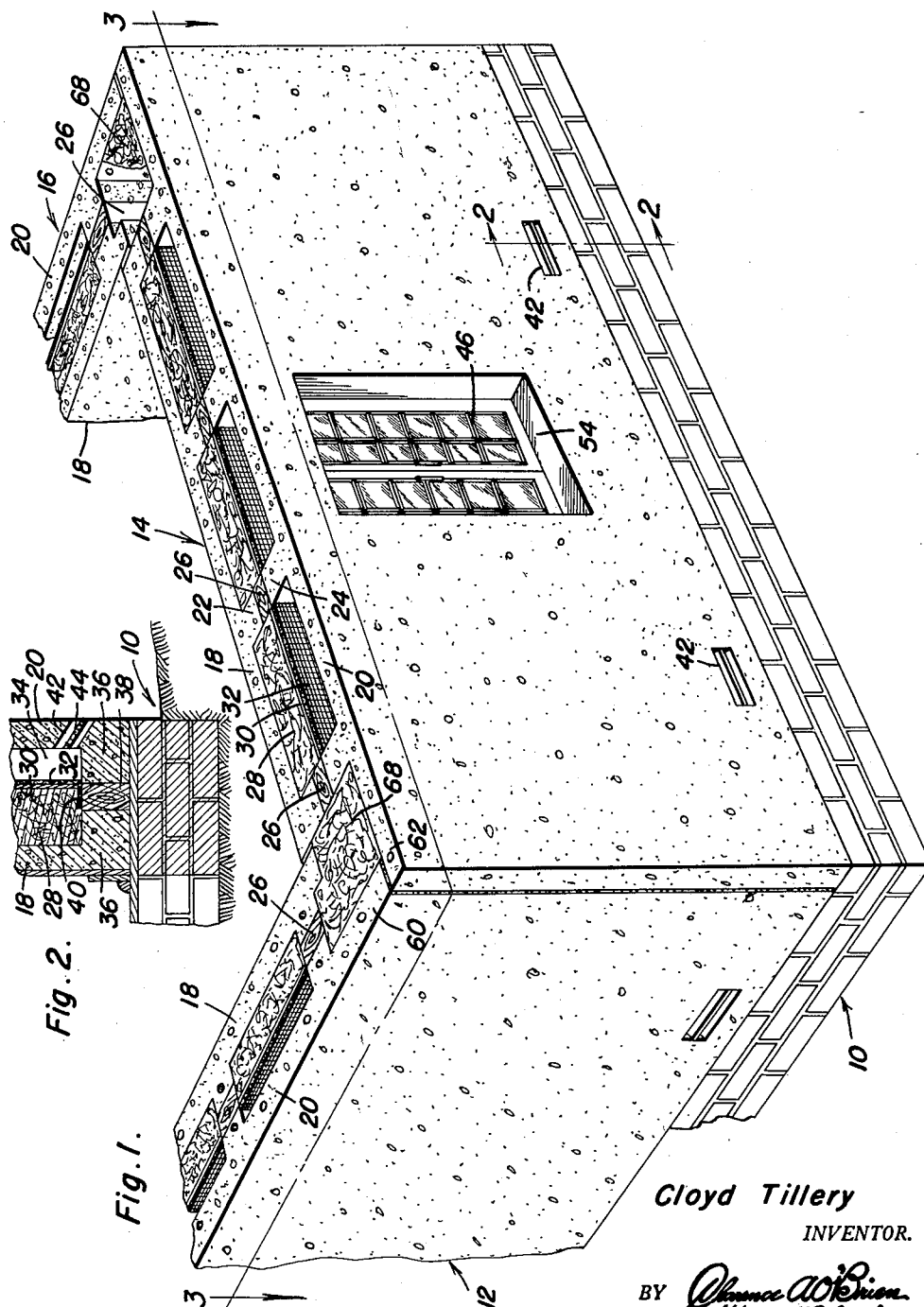


Fig. 2.

Fig. 1.

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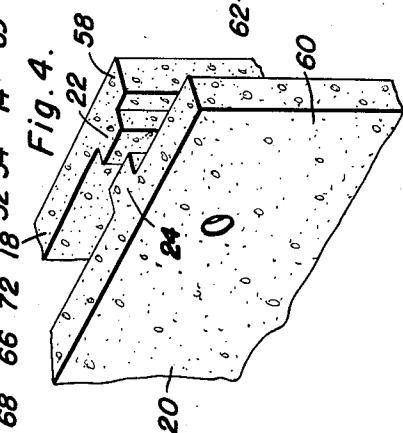
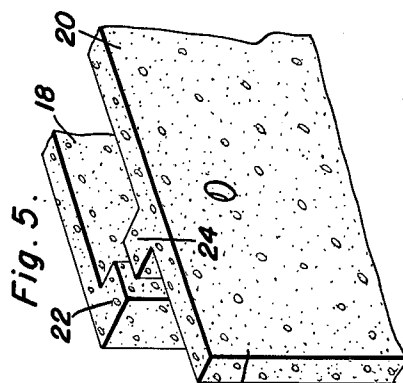
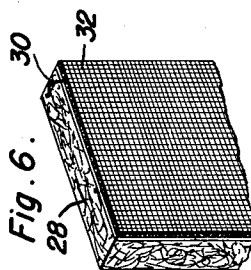
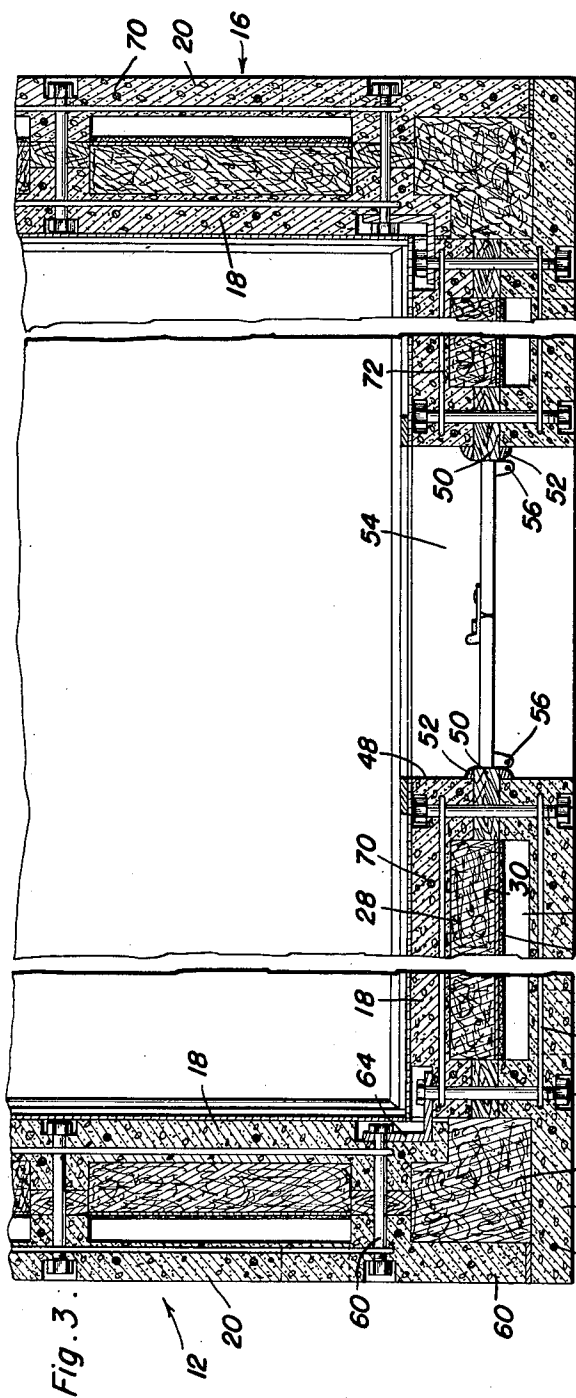
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BUILDING WALL CONSTRUCTION

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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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BUILDING WALL CONSTRUCTION

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5 Claims. (Cl. 72-16)

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This invention relates to improvements in wall construction and pertains more particularly to walls having insulation continuous throughout and which extends to enclose windows or the like.

The primary object of this invention is to reduce the thermal conductivity of walls and make the same impervious to moisture, and to aircool the interior of the same.

Another important object of this invention is to retard the transmission of radiant energy through a hollow wall.

A further object of this invention is to insulate a wall continuously through a joint between angularly inclined joining sections.

The meritorious feature of the present invention resides in the insulating spacers between the inner and outer walls extending into the window opening to abut the window.

Another meritorious feature of the present invention resides in the provision of air shafts between the wall elements communicating through vents along the lower edge of the outer wall element with the outside atmosphere.

Still another important feature resides in the corner joint between adjacent wall sections which permits continuous insulation therethrough.

A final feature of the present invention to be specifically enumerated herein resides in the provision of sheets of reflecting material and other insulation between the inner and outer walls for retarding the transmission of radiant energy as well as conducted heat, and the novel means of retaining the reflecting sheets and the other insulation in position.

These, together with various ancillary features and objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which has been illustrated by way of example only, in the accompanying drawings, wherein:

Figure 1 is a perspective view of a house wall constructed in accordance with the principles of the present invention;

Figure 2 is a fragmentary vertical transverse sectional detail view taken upon the plane of the section line 2-2 of Figure 1;

Figure 3 is a horizontal sectional view of the construction shown in Figure 1, being taken substantially upon the plane of the section line 3-3 of Figure 1, with parts being broken away;

Figure 4 is a fragmentary perspective view illustrating the jointing construction at one end of the wall section;

Figure 5 is a fragmentary perspective view il-

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lustrating the jointing construction of the wall section that joins the construction shown in Figure 4; and

Figure 6 is a fragmentary perspective view of the insulation between the inner and outer wall elements.

Reference is now made more specifically to the accompanying drawings, wherein like numerals designate like parts throughout the various views, and in which the numeral 10 indicates a suitable foundation for wall sections 12, 14 and 16.

The wall sections each include inner elements or walls 18 and outer elements or walls 20, which are spaced by vertical opposed ribs 22 and 24 on the inner and outer walls respectively. Received between the ribs 22 and 24 are vertical members or spacers 26 which are made of suitable insulating material such as wood, packed fibrous material, plastics or the like.

Insulation is provided between the inner and outer walls 18 and 20 which includes insulating material 28 such as rock wool or the like, which is covered by a sheet of reflecting material 30 with the insulating material 28 and the sheets 30 being held in place and spaced from the outer walls 20 by wire mesh 32. In the preferred construction, as shown in Figures 1 and 3, the insulating material 28 is positioned between adjacent ribs 22 and the spacers 26 so that the insulating material 28 and the insulating spacers 26 form a continuous zone of heat insulation throughout the length of the wall sections. The wire mesh 32 may be attached to adjacent spacers 26 or as in the preferred construction shown in Figures 1 and 3, the mesh 32 may extend substantially the entire length of the wall sections being retained between the spacers 26 and the ribs 24. It will be understood that the reflecting sheets 30 will be preferably of metallic nature, preferably aluminum foil or the like, and impervious to water. It is thus seen that the reflecting sheets 30 not only serve to prevent the passage of moisture through the walls, but in providing a bright reflecting surface will reflect the long wave heat radiation that is transmitted across the air space 34 from the outer wall 20 to the sheet 30 while emitting only a very small proportion of the heat energy which may be received from the inner wall 18 as radiant energy.

As shown in Figure 2, opposed horizontal ribs 36 are provided along the lower edges of the walls 18 and 20 and receive a horizontal insulating spacer 38 therebetween, the arrangement being such that the bottom of the air space or air shaft 34 is closed off with the lower edge of the mesh

32 being suitably secured to the spacer 38 as at 40. A downwardly and outwardly sloping vent 42 is provided along the lower portion of the outer walls 20 which communicate between the air shaft 34 and the outside of the outer wall 20. The purpose of the vent 42 is to permit a vertical circulation of air in the air shaft 34 upon there being a temperature differential between the outside air and the air within the air shaft 34 thus permitting a cooling of the interior of the wall sections. The vent 42 is downwardly sloping to prevent the ingress of rain and may be provided with a louver plate 44 therefor if desired.

As shown in Figures 1 and 3, portions of the inner and outer walls are cut away to form an opening or passage for a window 46. The vertical spacers 26 adjacent the window passage 48 extend into the passage as at 50 with fillets 52, preferably of water-proof and insulating character, provided between the extended portion 50 of the spacers 26 and the adjacent ribs. The top and bottom of the window passage 48 are provided with a lintel (not shown) and a sill 54, which are also preferably of suitable insulating material and to which the casement window 46 is suitably pivoted as at 56. It will thus be seen that the continuous insulation through the wall sections of the insulating material 28 and the spacers 26 continues to the very edges of the window 46. It will be understood that other types of windows other than the casement window 46 may be employed with this wall construction wherein the extended portions 50 of the spacers 26 may be secured directly to the window or serve as guides for the conventional sash-type window.

Since the wall section 14 is joined to the wall sections 12 and 16 in a similar fashion, it will suffice to illustrate only the manner to which the wall sections 12 and 14 are joined. The inner wall element 18 of the wall section 14 terminates at the rib 22 and directly abuts at a 90 degree angle a slightly extended portion 58 of the inner wall element of the wall section 12 as shown in Figures 1 and 2. The outer wall elements 20 of the wall sections 12 and 14 are extended from the ribs 24 as at 60 and 62, respectively, the arrangement being such that the portion 60 abuts the side of the portion 62 since the portion 62 extends relatively further. It will be seen that the inner wall element of the wall section 14 abuts the inner wall element of the wall section 12, while the outer wall element of the wall section 12 abuts the outer wall element of the wall section 14 so that each wall section tends to prevent longitudinal movement of the other wall section.

The inner wall elements of the wall sections 12 and 14 are connected by an angle plate 64 and the joint made secure by bolts 66 extending through the inner and outer wall elements, the opposed ribs, and the insulating spacers 26, with recesses being provided in the wall sections to receive the ends of the bolts 66 and the angle plate 64.

Insulation 68 is provided within the space between the inner and outer wall sections at the joint so that continuous insulation is provided between the spacers 26 of the adjacent wall sections 14 and 12. The inner and outer wall elements 18 and 20 are otherwise secured by bolts 69 which extend through the inner and outer wall elements, the ribs 22 and 24, and the insulating spacers 26.

It will be understood that the wall construction so far described readily lends itself to prefabrica-

tion in which the inner and outer wall elements will be preformed of concrete or suitable plastic material which will be preferably provided with reinforcing rods 70 and 72, the latter being provided with eyes to receive the bolts 66 and 69 to thereby strengthen the assembled wall construction. As will be readily apparent, the ends of the bolts 66 and 69 may be readily covered with suitable caulking material as well as seams between adjacent wall sections after the wall construction is assembled.

The advantages of the wall construction herein disclosed resides in the provision of a wall of great structural strength which is provided with continuous heat insulation throughout which may be used adjacent to window passages for securing windows thereto. The structure is so simple that the various components may be readily precast and assembled without necessitating the use of skilled labor. Although it is evident that the disclosed construction will result in great fuel economies during winter months, its special advantage resides in the comfort it will afford during summer months. The wall construction is especially adapted to keep heat out in that the interior of the wall will be cooled by convection currents of air in the air shafts 34, which in conjunction with the insulating material 28 will greatly reduce any heat which may be conducted through the walls. Thus, it will be seen that heat in order to pass in substantial amounts through the wall must cross the air space 34 in the form of radiant energy. However, radiant energy is substantially denied passage through the wall by the reflecting qualities of the sheet 34.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not desired to limit the invention to the exact construction shown and described, but all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims. Having described the invention, what is claimed as new is:

1. A wall construction comprising angularly disposed wall sections, each of said wall sections including spaced inner and outer walls having opposed ribs thereon, insulating spacers between said opposed ribs, each of said inner walls terminating adjacent one of said ribs, each of said outer walls having a portion extending beyond said ribs, said inner walls of said wall sections abutting each other and forming a joint therebetween, said extending portions on said outer walls abutting each other, a plate positioned over said joint, fastening means extending through said plate, ribs, spacers and inner and outer walls, insulation received between said extending portions and ribs and said joint, sheets of reflecting material connecting said spacers in each of said wall sections, and insulating material received between said sheets and said inner walls.

2. The combination of claim 1, including mesh secured to said spacers retaining said sheets spaced from said outer walls, one of said wall sections having registering openings in said inner and outer walls defining a passage therethrough, said spacers adjacent said passage extending therein for receiving a window therebetween, said spacers, said sheets, said insulation and said in-

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insulating material combining to make a substantial continuous thermal barrier through said wall construction.

3. A wall construction comprising angularly disposed wall sections, each of said wall sections including spaced inner and outer walls having opposed ribs thereon, insulating spacers between said opposed ribs, each of said inner walls terminating adjacent one of said ribs, each of said outer walls having a portion extending beyond said ribs, said inner walls of said wall sections abutting each other and forming a joint therebetween, said extending portions on said outer walls abutting each other, a plate positioned over said joint, fastening means extending through said plate, ribs, spacers and inner and outer walls, insulation received between said extending portions and ribs and said joint, wire mesh connecting said spacers in each of the wall sections, and insulating material received between said mesh and the inner walls.

4. A wall construction comprising angularly disposed wall sections, each of said wall sections including spaced inner and outer walls having opposed ribs thereon, insulating spacers between said opposed ribs, each of said inner walls terminating adjacent one of said ribs, each of said outer walls having a portion extending beyond said ribs, said inner walls of said wall sections abutting each other and forming a joint therebetween, said extending portions on said outer walls abutting each other, a plate positioned over said joint, fastening means extending through said plate, ribs, spacers and inner and outer walls, insulation received between said extending portions and the ribs and said joint, wire mesh connecting said spacers in each of the wall sections, sheets of reflecting material positioned between the mesh and the inner walls, and insulating material disposed between the sheet of reflecting material and the inner walls.

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5. In a wall structure, inner and outer walls, means on said walls spacing the same apart comprising vertical opposed ribs on said walls, respectively, and horizontal opposed bottom ribs on said walls, respectively, said vertical opposed ribs having vertical insulation spacers therebetween, and said bottom opposed ribs having a horizontal insulation spacer between the same coextensive therewith, wire mesh connected to the horizontal insulation spacer and to vertical insulation spacers in spaced relation to said walls, insulation material between said mesh and the inner wall, and a sheet reflecting material between said mesh and insulation material connected to the vertical insulation spacers.

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