Sept. 23, 1958 E. R. AMUNDSON 2,852,934

INSULATED HOLLOW BUILDING BLOCKS

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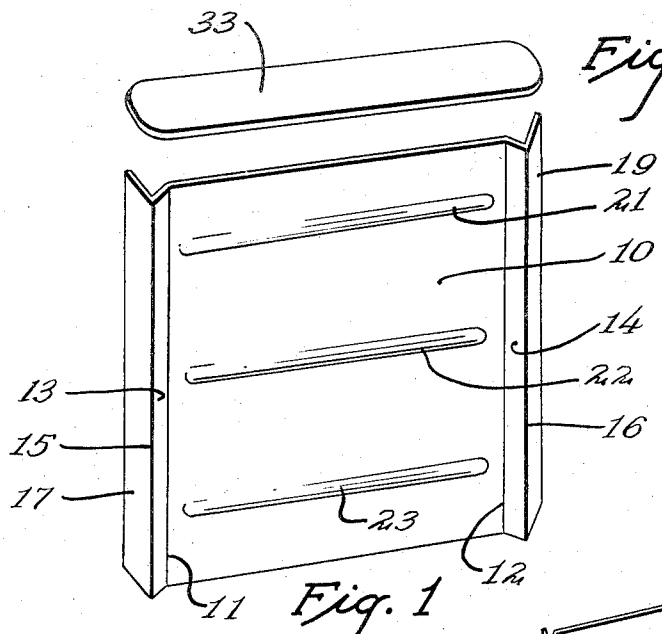

Fig. 2

Fig. 1

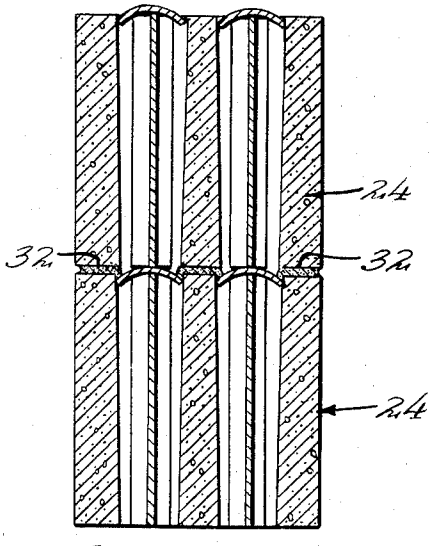

Fig. 5

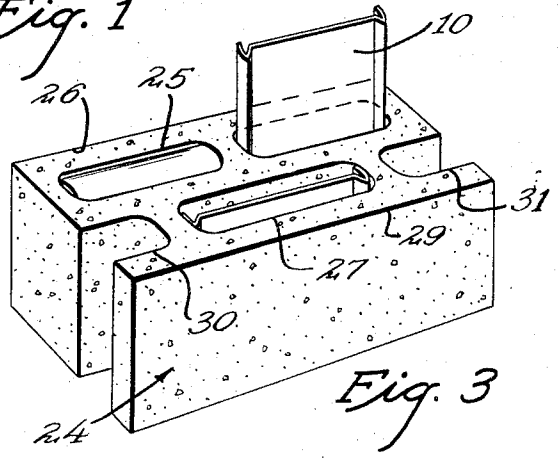

Fig. 3

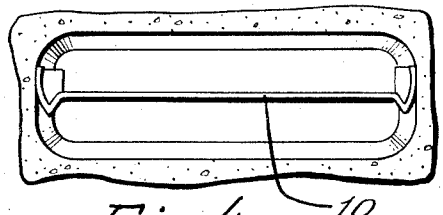

Fig. 4

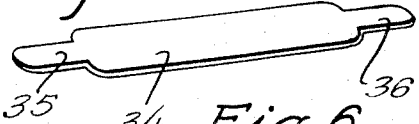

Fig. 6

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INSULATED HOLLOW BUILDING BLOCKS

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2 Claims. (Cl. 72—41)

This invention relates to an improvement in building blocks and deals particularly with a block containing insulating properties.

Building blocks of concrete, as well as combinations of other material such as vermiculite, possess varying degrees of insulating properties. I have found that by producing an insulating block incorporating light and heat reflective elements, the insulation qualities of most such blocks can be greatly improved. This is particularly true if the reflective members extend throughout the area of the block or else are arranged so that the heat rays can not pass directly through the blocks.

A feature of the present invention resides in the provision of a building block having apertures therein which are preferably arranged in staggered relationship. Within these recesses, I provide panels of reflective material such as metal foil which tend to reflect outwardly light and heat rays from the sun and which reflect inwardly heat rays emanating from within the house. In my previous application for patent, Serial No. 164,557, filed May 26, 1950, for "Concrete Block Wall," I described a wall composed of concrete blocks, tile or other masonry units having staggered apertures to accommodate reflective panels. While the previous construction has been found very satisfactory for its purpose, certain slight disadvantages have been encountered. The present application forms a continuation-in-part of my copending application, Serial No. 164,557, noted above. Concrete blocks, tiles, and the like, when cast, contain apertures which must be slightly tapered toward the top or bottom surface of the block. When such masonry units are formed, a mold is filled with concrete or other suitable unit forming material. In order to remove the finished unit from the mold, the walls of the block and the walls of the apertures in the block must taper slightly so as to permit the aperture cores to be withdrawn from the apertures and to permit the walls of the block to be disengaged from the mold walls. As a result rectangular sheets of reflective material will not properly fit into the block apertures. The difficulty is aggravated by the fact that in many instances certain of the building blocks are inverted relative to the other blocks so that trapezoidal sheets of reflective material can not always be inserted from the top of the block.

It is an object of the present invention to provide a sheet of reflective material with a pair of oppositely directed folds near two opposed edges thereof. As a result the material forming the reflective panel is folded first in one direction and then in the other to form a somewhat resilient edge along two opposite sides of the sheet. Due to the tendency for the material forming the panel to return to a common plane, the folded opposed edges of the panel will engage opposite ends of the recesses and snugly engage these walls regardless of the direction of taper. In other words, the edges of the sheet will fold to a greater extent at the smaller end of the apertures and will spread apart more near the larger end

of the apertures, thus snugly fitting against the ends of the apertures throughout the length of each panel.

A feature of the present invention lies in the provision of a masonry unit embodying reflective panels which are provided with expandable and contractable edges which tend to fit the contour of apertures into which they are inserted. In preferred form the reflective panels are approximately equal in depth to the apertures.

An added feature of the present invention resides in the provision of a reflective sheet which, in preferred form, may comprise foil such as aluminum foil laminated onto a sheet of paperboard. The panel thus formed may be transversely stiffened in any desired manner such as by embossed ribs extending transversely of the panel. The panel is reinforced vertically by a pair of hinged flaps connected in series along two opposite edges of the panel. One flap is folded in one direction from the panel surface while the other flap is preferably folded in the opposite direction from the edge of the first flap. Thus the panel is reinforced both horizontally and vertically and will remain in shape over extended periods of time.

An added feature of the present invention resides in the provision of a cap sheet designed to fit over the reflective panel in each core aperture of the masonry unit. This cap sheet is designed to prevent mortar and other material from falling down into the core apertures of the masonry unit during the building of a wall therewith. The cap sheets are preferably slightly wider than the larger end of the core aperture and are flexed sightly before insertion into the aperture. The pads rest upon the top of the reflected panels and are particularyl well supported by the folded ends thereof and are thus held at a proper level. In the event the cap strips are inserted into the small end of the core apertures, the cap strips may be merely flexed to a greater extent.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

Figure 1 is a perspective view of a reflective panel showing the construction thereof.

Figure 2 is a perspective view of a cap strip which may be used in conjunction with the reflector panel.

Figure 3 is a perspective view of a concrete block having staggered apertures therein, one reflective panel being inserted in place therein.

Figure 4 is a top plan view of a masonry unit core aperture showing the arrangement of the reflective panel therein.

Figure 5 is a sectional view through a pair of superimposed blocks showing the manner in which the panels and cap strips are arranged.

Figure 6 is a perspective view of a modified form of construction of cap strip.

The reflective unit is preferably composed of paperboard having metal foil laminated on both surfaces thereof. Benefits are obtained by having the foil on one side only, but it is preferred that the foil be on both sides so as to more readily reflect the heat in opposite directions.

The reflective panels comprise a central body portion **10** which is connected along parallel fold lines **11** and **12** to flanges of flaps **13** and **14**. These flanges or flaps **13** and **14** are foldably connected along fold lines **15** and **16** respectively to flanges or flaps **17** and **19**.

The panels are preferably folded in such a way that the flanges **13** and **14** fold in one direction from the body portion **10** of the panel, while the outer flaps or flanges **17** and **19** fold in a reverse direction. In the formation of the panels, the score lines **11**, **12**, **15** and **16** are formed in the panels and are preferably reversely arranged. The

forming operation also tends to permit relative resilient zig-zag fold of the flanges out of the plane of the body **10** so as to train the flanges in the desired direction to resiliently engage opposite wall ends of an aperture, as hereinafter described. The natural tendency for the material to assume a flat sheet reduces the angle between the flaps and between the inner flaps and the body, but the sheets after the scoring operation preferably remain partially folded.

Two flaps or flanges are illustrated attached to each edge of the sheet. In some instances it may be desirable to increase the number of flaps and in such an event the third flaps would be hingedly connected to the marginal edges of the second flaps and the third flap would be folded substantially parallel to the inner flaps.

The resultant panel is preferably moisture resistant and the paperboard may comprise a water resistant panel containing asphalt or some other such filler. The foil may be laminated through the use of waxes or asphalt so as to provide a moisture-proof barrier and to prevent the deterioriation of the reflective panels.

In the preferred form of construction, reinforcing ribs are provided transversely of the panels to stiffen the panels in this direction. Three such ribs are indicated at **21**, **22** and **23** and are shown extending in parallel relation across the major portion of the body portion **10** of the sheet, these ribs terminating at or closely adjacent to the fold lines **11** and **12**.

The manner in which the reflective sheets are inserted into a masonry unit such as a concrete block or tile structure is illustrated in Figure 3 of the drawings. It will be noted that in this figure, the block **24** is provided with two rows of core apertures arranged in staggered relationship. Two apertures **25** are positioned near one wall surface **26** of the block while a single core aperture **27** is provided near the opposite wall surface **29**. Aligned with the aperture **29** are two half apertures **30** and **31** which are in the form of notches extending into opposite ends of the block. Thus when two blocks are placed in alignment, apertures of approximately the size of the apertures **27** are formed by the half apertures **30** and **31** of the two adjoining blocks.

In inserting the panels into the block **24** the ends of the panel are folded together sufficiently to permit insertion into the desired aperture. The panel is then slid downwardly into the aperture until it is flush with the bottom surface of the block or until the lower edge of the panel strikes a cap strip overlying the reflective panel of the block beneath. It will be obvious that the apertures of one tier of blocks will overlap with the apertures of the next tier even though the blocks are off-set one from another in the formation of the wall.

Figure 5 illustrates two blocks **24** resting in superimposed relation with mortar or cement interposed therebetween. The mortar is indicated by the numeral **32** and acts to hold the blocks **24** in slightly spaced relation.

In the formation of a wall, the first tier of blocks **24** is put into place or at least two blocks are arranged in alignment and the reflector panels **10** are inserted into all of the apertures formed therebetween. The flaps or flanges at opposite edges of the panel have a spring effect which tend to urge the edge of the panel against the ends of the apertures. The manner in which the panels are supported in the tapered apertures is indicated in Figure 4 of the drawings. In spite of the fact that one end of the apertures is wider than the other, the panels **10** will still fit snugly in position with their folded edges sprung against the ends of the aperture.

After each panel **10** has been inserted into its aperture, cap strips **33** may be inserted thereover. The cap strips **33** are of a length substantially equal to the length of the smaller end of the tapered recesses and the strips are slightly wider than the larger ends of the apertures. Thus in inserting the cap strips into place, they are bent or curved somewhat between their edges so as to cause the edges of the strips to fit snugly against the opposite sides of the core apertures. These cap strips tend to divide the apertures of each block into two parts and tend to restrict circulation both between the two compartments in each aperture and also between the superimposed apertures forming the walls. The cap strips also prevent mortar or cement from dropping into the apertures and forming a continuous concrete connection directly from one surface of the block to the other.

After the cap strips have been applied a second tier of blocks may be mounted on the first tier, the second tier being off-set if preferred. As each block or series of blocks is added the reflective panels are inserted in place and the cap strips applied thereover.

It will be noted that the apertures of one row are offset from the apertures of the other so that there is no direct line through which heat rays may pass through the block without encountering a reflective panel. Thus much of the heat is reflected back to the hotter surface of the blocks. Tests have proven the high degree of effectiveness of the panels and the insulating qualities of the blocks have been remarkably improved by the addition of the reflective panels.

In Figure 6 of the drawings I disclose a modified form of cap strip. The member **34** comprises an elongated body of flexible material having a pair of ears or tabs **35** and **36** secured to opposite ends thereof. The body portion **34** is similar to the body **33** and is properly proportioned to be inserted after being flexed or curved slightly in cross section. The ears **35** and **36** may be bent downwardly from the body portion **34** to form ears at each end of the cap strip which form a snug fit against the ends of the aperture and help to prevent the cap strips from being disturbed or accidentally moved out of place in the application of the next row of blocks.

The cap strips **33** and **34** may be formed of material similar to the panel **10** or may be formed of any moisture resistant sheet material. If the cap strips are formed of foil laminated material the heat rays passing through the wall are reflected downwardly or upwardly thereby. However, good results have been obtained through the use of water resistant paper as most of the light rays travel through the wall nearer a horizontal direction.

In accordance with the patent statutes, I have described the principles of construction and operation of my building blocks, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A masonry unit designed to form a part of a wall including in combination a reversible cement block having opposed outer sidewall surfaces and having an aperture extending therethrough intermediate said surfaces with the longitudinal axis of said aperture generally parallel to said surfaces, and a unitary reflective panel of foil material resiliently supported within said aperture and dividing said aperture into two parts with each part being intermediate the panel and one of said sidewall surfaces, said panel having its top and bottom edges substantially coinciding with the top and bottom faces of said block body, said reflective panel comprising an independently mounted sheet of heat and light reflective material having resilient zig-zag flanges as an integral portion extending from oppositely disposed side edges thereof, said flanges slidably engaging against said block body under spring tension at opposite generally longitudinally extending side surfaces of the aperture.

2. A masonry unit comprising in combination a concrete block having opposed outer sidewall surfaces and a tapered aperture extending therethrough intermediate said surfaces with the longitudinal axis of the aperture generally parallel to said surfaces, and a thin laminated heat reflective, stiffened foil panel resiliently supported in said

aperture, said panel extending generally parallel to said sidewall surfaces in spaced relationship with the inner sidewall surfaces of said aperture and extending substantially the length of the aperture and said panel having integral resilient relatively foldable edge portions engageable in freely sliding relationship with opposite side surfaces defining a taper of said aperture, each of said resilient edge portions being formed of two flanges folded at an acute angle to one another and foldably connected to one of the opposite edges of the panel.

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