

[54] **INSULATED CONCRETE BLOCK**

[76] Inventor: **David Adrian Selby**, 2430 O'Brien Blvd., St. Laurent, 381 Quebec, Canada

[22] Filed: **Aug. 26, 1971**

[21] Appl. No.: **175,185**

[52] U.S. Cl. **52/437, 52/404, 52/570, 52/612**

[51] Int. Cl. **E04c 2/29, E04c 1/40**

[58] Field of Search 52/272, 379, 286, 412, 52/415, 419, 424, 425, 426, 436, 437, 438, 428, 570, 574, 594, 503, 505, 612

[56] **References Cited**

UNITED STATES PATENTS

584,865	6/1897	Fisher	52/412 X
800,875	10/1905	Palmer	52/437
802,903	10/1905	Anderson	52/503 X
877,997	2/1908	Henry	52/503 X
1,587,500	6/1926	Blackman	52/412
2,016,382	10/1935	McBurney	52/594 X

2,208,589	7/1940	Leemhuis	52/438 X
2,293,569	8/1942	Sonino	52/403 X
2,306,556	12/1942	Neuhaus	52/570 X
3,449,879	6/1969	Bloom	52/437 X

Primary Examiner—Price C. Faw, Jr.

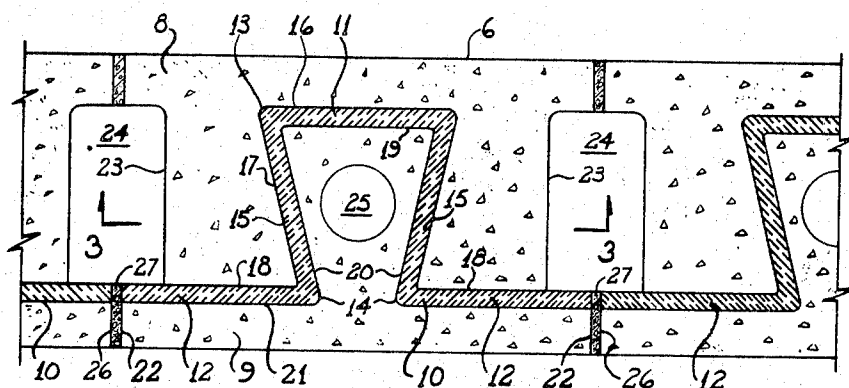
Attorney, Agent, or Firm—Fetherstonhaugh & Co.

[57]

ABSTRACT

In unit masonry construction a building wall usually consists of one or two wythes of masonry with or without either an air space or an insulation layer. The use of a concrete building block unit that contained within it an insulation insert, would permit the construction of a single wythe wall. Such an insulated block could have satisfactory strength and thermal insulation characteristics by the design form of the insulation insert. Sound insulation characteristics could be improved by the inclusion of a lead sheet on the insulation insert. The use of an insulation strip in the joints and a specially designed corner block would result in a single wythe wall of improved insulation characteristics.

10 Claims, 5 Drawing Figures



PATENTED JUN 18 1874

3,817,013

SHEET 1 OF 4

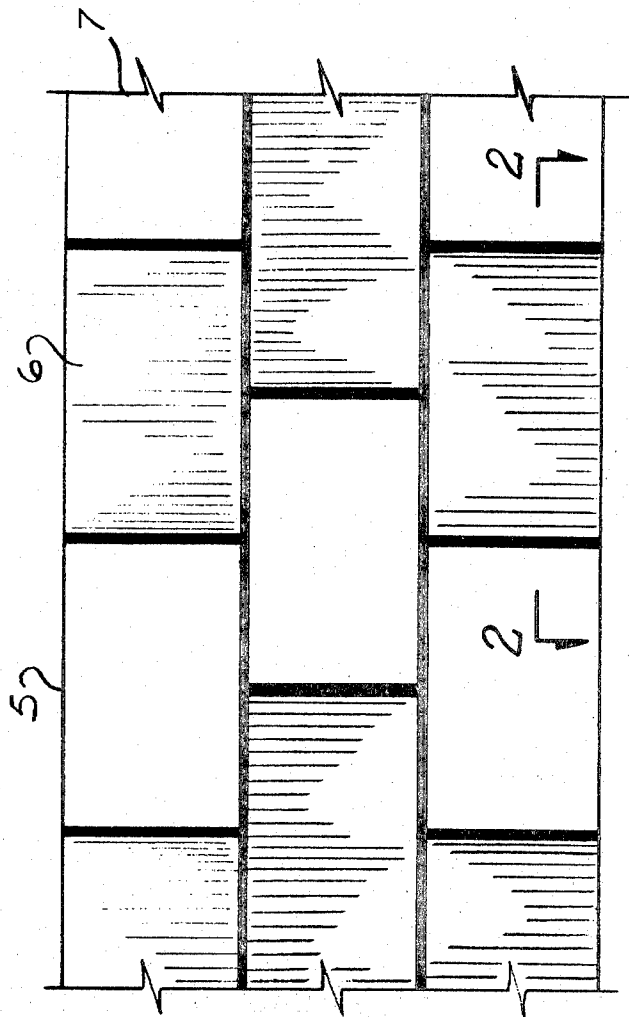


FIG. 1

INVENTOR
David Adrian SELBY

Fetthurstons & Co.
PATENT AGENTS

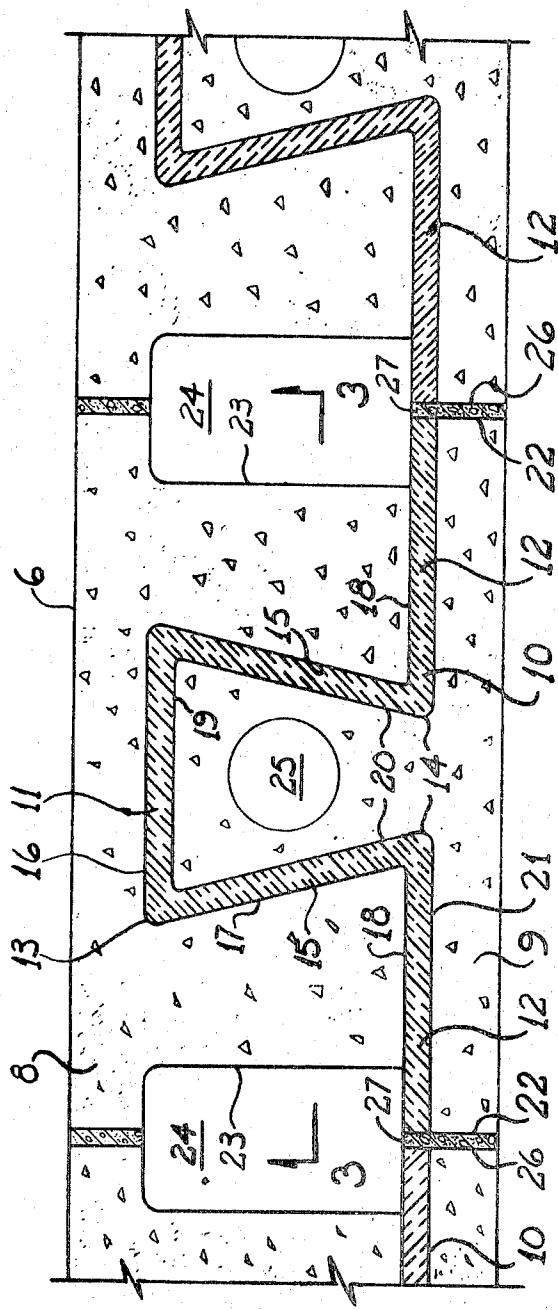


FIG. 2

INVENTOR
David Adrian SELBY

Fetthurstons & Co.
PATENT AGENTS

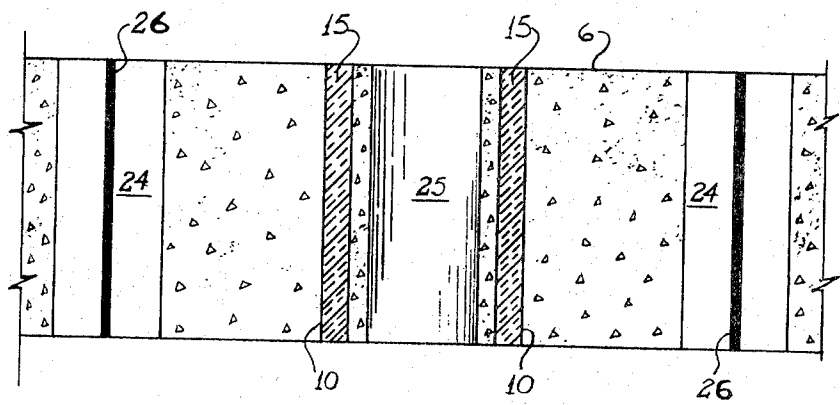


FIG. 3

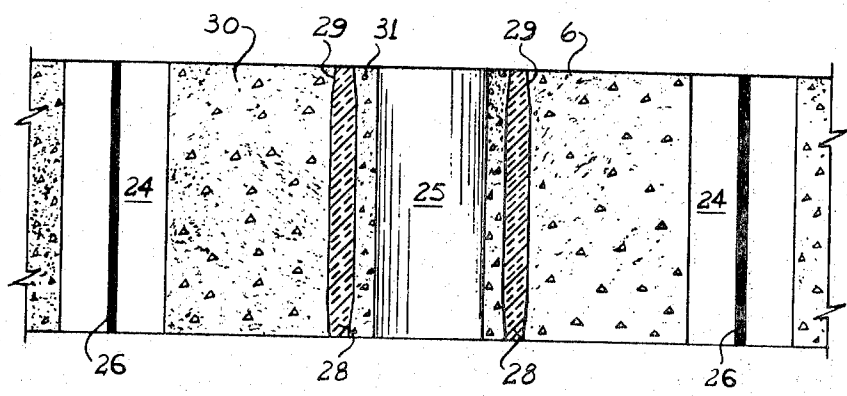


FIG. 4

INVENTOR
David Adrian SELBY

Fetthurstonshaugh & Co.
PATENT AGENTS

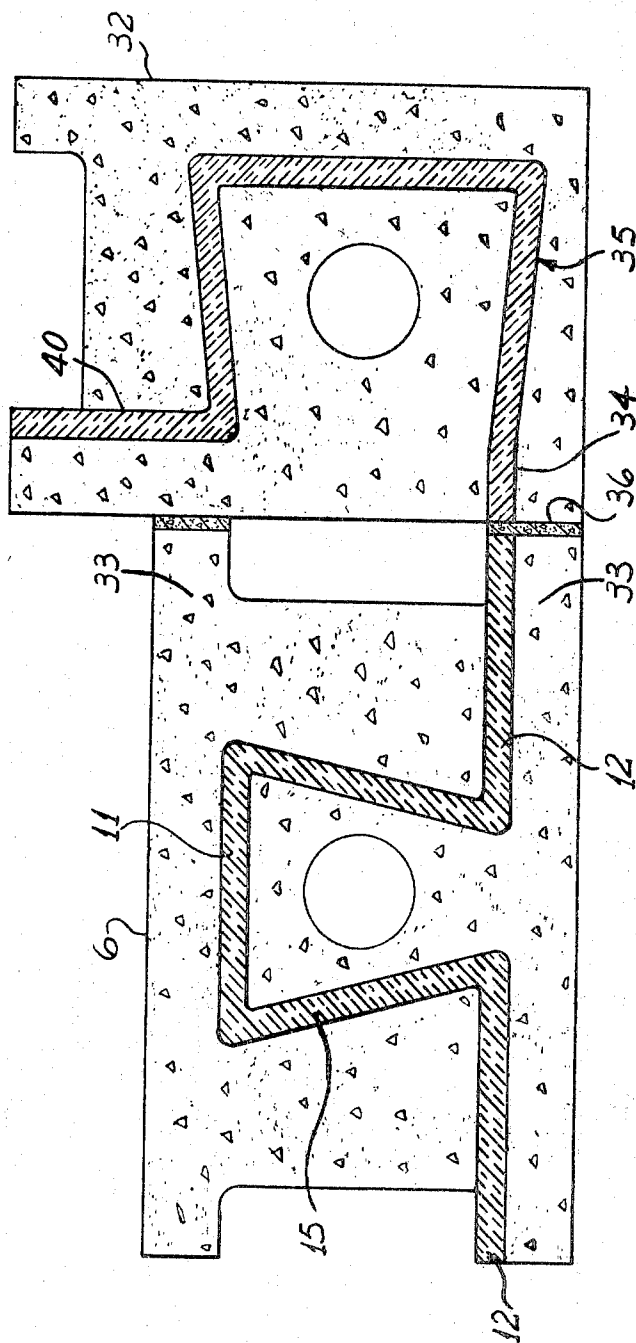


FIG. 5

INVENTOR
David Adrian SELBY

Fetthurstons & Co.
PATENT AGENTS

INSULATED CONCRETE BLOCK

This invention relates to a concrete building block unit in which is incorporated an insulation insert. The assemblage of such blocks with an insulation strip in the mortar joint and with a corner block of similar but modified design would constitute a wall system.

It is common that masonry walls are built of two wythes of masonry. These wythes may be separated by an air space in a so-called cavity wall, or the wythes may be separated by an insulation layer, or the insulation may be applied to the face of the wall on the interior of the building. Such a wall construction has an excessive total thickness and requires two, three, or four successive labour operations. If the strength of the two wythes combined is to be used, then masonry ties must pass through the cavity or insulation layer. These ties are difficult to install and pierce the thermal insulation barrier. The use of a single wythe of conventional concrete block masonry produces a wall having unacceptably low thermal and sound insulation characteristics.

In another system premoulded hollow blocks made of an insulating material are used. These blocks are set up in the shape of the wall and are then filled with concrete. In such a system the insulation has no mechanical or fire protection and does not present a satisfactory architectural finish. Also the concrete is difficult and expensive to place.

The development of a masonry unit, as in the present invention, containing an insulation insert would avoid many of the disadvantages described. The inclusion of an insulation strip within the mortar joint and the use of a particularly designed corner block would permit the construction of a single wythe wall having thermal and sound insulation characteristics that would be satisfactory for residential, institutional, and commercial construction.

The particular design of the form of the insulation insert would result in a block having adequate strength and insulation properties. The use of such an insulated block would result in the possible erection of a finished wall by a single labour operation.

The primary object of the invention is to provide building blocks having adequate insulation and structural strength properties for use in wall structures.

A further object of the invention is to provide building blocks which, when set in a wall structure, will provide for continuous thermal insulation throughout the whole area of the wall.

A further object of the invention is to provide an insulated building block which will permit the insulation of the wall to be continuous around corners.

A further object of the invention is to provide a composite building block comprising outer and inner concrete members affixed by interlocking shape to an internal layer of insulating material.

These and other objects of the invention will be apparent from the attached drawings in which:

FIG. 1 is a partial front elevation of a section of wall incorporating the building blocks of the present invention.

FIG. 2 is an enlarged sectional plan view of a building block in one course, taken on the line 2—2 of FIG. 1.

FIG. 3 is a sectional elevational view taken on the line 3—3 of FIG. 2.

FIG. 4 is a sectional elevational view taken on the line 3—3 of FIG. 2 showing a modified form of insulation affixed to the concrete members of the building block.

FIG. 5 is a sectional plan view of adjacent building blocks forming the corner wall structure.

Referring to the drawings, FIG. 1 shows a wall 5 built up of a series of building blocks 6, set in courses 7, preferably with the blocks 6 of one course being offset with the blocks of adjacent courses in well known manner.

Each of the blocks 6 are composed of an outer concrete member 8 and an inner concrete member 9 as shown in FIGS. 2 and 3 and separated from each other by an inner insulation insert 10.

The three members 8, 9 and 10 forming the blocks 6 are cast together by placing the insulation insert 10 in the mould of a conventional concrete block machine and filling the mould in well known manner or, the insulation insert 10 could be formed in place between precast inner and outer concrete members 8 and 9. Alternately, the concrete members 8 and 9 could be formed by extrusion on both sides of the insulation insert 10, and the blocks 6 cut to size by sawing.

The insulation insert 10 is keystone shaped, having one member 11 spaced inwardly of and parallel with an outer surface of the block 6, and having a pair of members 12 spaced inwardly of and parallel with an opposite outer surface of the block 6, with the outer ends 13 of the member 11 being joined to the inner ends 14 of the members 12 by the members 15 which are set at an angle relative to the planes of the members 11 and 12.

The outer, or first, concrete member 8 has its inner surfaces 16, 17 and 18 moulded to fit the adjacent surfaces of the members 11, 12 and 13 of the insulation insert 10, while the inner surfaces 19, 20 and 21 of the inner, or second, concrete member 9 are moulded to fit the adjacent surfaces of the members 11, 12 and 13 of the insulation insert 10.

The members 12 of the insulation insert 10 extend outwardly into line with the end surfaces 22 of the inner concrete member 9 to align with the members 12 of adjacent blocks 6.

The end surfaces 23 of the outer concrete members 8 are recessed inwardly to reduce the weight of the blocks 6 and to form an air space 24 between adjacent blocks. Thus, it will be seen that the outwardly facing surfaces of the members 8 and 9 together with the ends 23 form a lateral outer periphery and the insert 10 extends from a first point on this outer periphery to a second point on this outer periphery.

Each of the inner concrete members 9 of the blocks 6 are provided with an internal cavity 25 formed in that portion of the member which is bounded by the members 11 and 15 of the insulation insert 10.

As will be seen in FIG. 2 the blocks 6 are mortar joined by the mortar 26. The resulting gap between adjacent ends of the members 12 of the insulation inserts 10 are filled by a compressed insulation filler 27 to ensure continuous insulation throughout the wall 5.

In FIG. 4 there is shown a modification of the cross-section of the concrete members shown in FIG. 3 and the insulation insert whereby the bond between them is more secure. In this modification the insulation 28 has its top and bottom edges chamfered at 29 and the

concrete members 30 and 31 are moulded to the surfaces of the insulation insert.

Referring now to FIG. 5, there is shown a corner block 31 set against a block 6. The block 31 has been modified by cutting along the line 33-33 in the adjacent block 6 and the 10 is arranged differently during the block forming procedure such that end portion 34 of the insulation insert 35 has been turned at right angles relative to the other end portion 40 towards the inner surface 36 of the block. With this arrangement, the insulation between the block 6 and the corner block 32 is made continuous.

By inverting the corner block 32, as shown in FIG. 5, the block can be used at opposite corners of a wall without further modification.

In practice, it is intended that the insulated blocks above described would be laid with member 8 on the exterior of the wall 5 in stack bond and with member 8 alternately on the exterior and interior in successive courses in regular bond.

In stack bond the cavity 25 would be continuous from course to course and would create a continuous vertical duct on the warm side of the insulation insert 10, thereby permitting in-the-wall heating.

In regular bond, as shown in FIG. 1, the cavity 25 in one course would coincide with the interblock cavity 24.

In the construction of the wall, a strip of insulation may be laid in the horizontal mortar joint parallel to the wall face and behind the mortar which is adjacent to the front and back faces of the block. This insulation strip would be contiguous with the insulation inserts in the blocks above and below it.

While the cavity 25 has been shown as circular, this is for illustrative purposes only. For instance, this cavity could be rectangular in shape to coincide more with the cavity 24 where the blocks are laid in regular bond, or it may be keystone shaped with three of its sides being parallel with the members 11 and 15 of the insulation insert 10.

If a wall of improved sound insulation property was desired, either the inner or outer face of the insulation insert could be faced with a sheet of lead foil.

Special architectural finishes could be applied to either or both of the faces of the concrete members 8 and 9. Where desired, lightweight concrete could be used to decrease the weight of the insulated blocks and the insulated blocks could also be combined into fabricated panels for use as room dividers or partitions.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Building blocks for walls or like structures, each of said blocks being a complete integral composite building unit comprising:

a top, a bottom and a lateral outer periphery defining sides and ends,

first and second concrete members, each being one piece and having an outwardly facing surface forming at least the said sides of the outer periphery of the block and an inwardly facing surface, which inwardly facing surfaces face each other,

an insulating insert occupying the entire space between the said inner facing surfaces from one point on the outer periphery of the block to another point on the outer periphery thereof and from the

top of the block to the bottom thereof so as to form a continuous insulating member in the block, said space and its respective insulating member, when viewed from above, forming the shape of a keystone interlock including a mid-portion which is parallel with and spaced slightly inwardly from the outward facing surface of the first member and closer to said outer facing surface of the first concrete member than to the outer facing surface of the second concrete member, end portions closer to the said outer facing surface of the second concrete member than to the outer facing surface of the first concrete member and at least one of said end portions being parallel to the mid-portion, and intermediate portions extending from the ends of the mid-portion and converging towards each other to form said keystone shape and connected to the two inner ends of said end portions, the two outer ends of the said end portions extending from their connections with said intermediate portions to said outer periphery of the block, the first member thus including the recess of the keystone and the second member including the projection of the keystone,

and wherein the top and bottom edges of the insulating insert are chamfered, and the adjacent top and bottom edges of the first and second concrete members are moulded to conform with the chamfered edges of the insulating insert.

2. Building blocks as set forth in claim 1, both of said end portions being parallel to said mid-portion and being aligned with each other and extending to the said ends of the said outer periphery of the block.

3. Building blocks as set forth in claim 2, wherein both ends of each block are recessed from top to bottom so as to form with the adjacent blocks vertical recesses at both ends thereof.

4. Building blocks as set forth in claim 1, in which the extreme ends of the insulating inserts are aligned with the ends of the insulating inserts in adjacent blocks to form an essentially continuous insulating member in a wall.

5. Building blocks as set forth in claim 1, in which the inner facing surface of said first concrete member is moulded to the shape of the adjacent surface of said insulating insert and the inner facing surface of said second concrete member is moulded to the shape of the adjacent surface of the said insulating insert.

6. Building blocks as set forth in claim 1, in which that portion of the second concrete member forming the projection of the keystone interlock includes a vertical aperture therethrough.

7. Building blocks as set forth in claim 1, in which one of the end portions of the insulating insert extends from its connection with its respective intermediate portion to the outer facing surface of the second concrete member and perpendicular thereto.

8. Building blocks as set forth in claim 7, wherein the end portion of the insert which is perpendicular to the mid-portion is spaced from its adjacent end of its block the same distance as the other said end portion which is parallel to the mid-portion is spaced from the outer facing surface of the second concrete member.

9. Building blocks as set forth in claim 1, in which the ends of the adjacent blocks in a wall are mortar joined and include an insulating strip between exposed facing end portions of the insulating insert.

10. Building blocks as set forth in claim 1, in which a sheet of lead foil is inserted between the surface of the said insulating insert and the adjacent surface of one of said concrete members.

* * * * *