June 2, 1959 C. L. SANFORD 2,888,820

BUILDING BLOCKS

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Fig. 1.

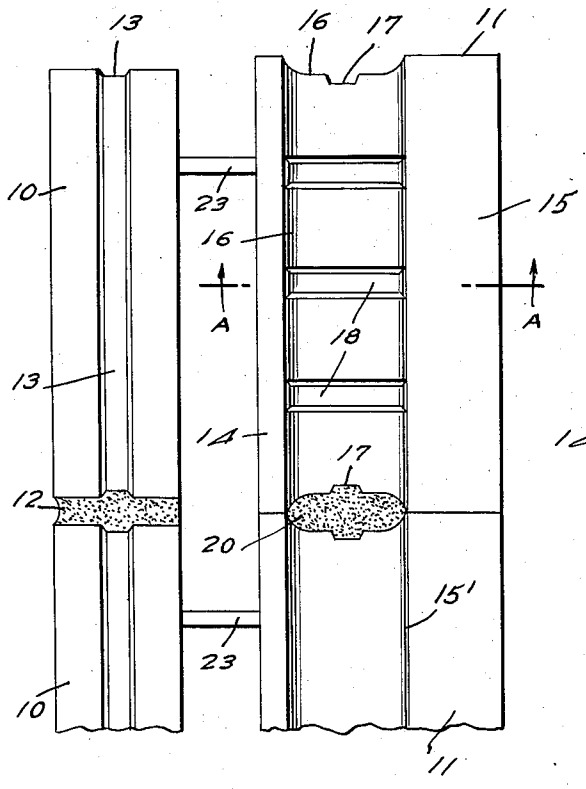


Fig. 3.

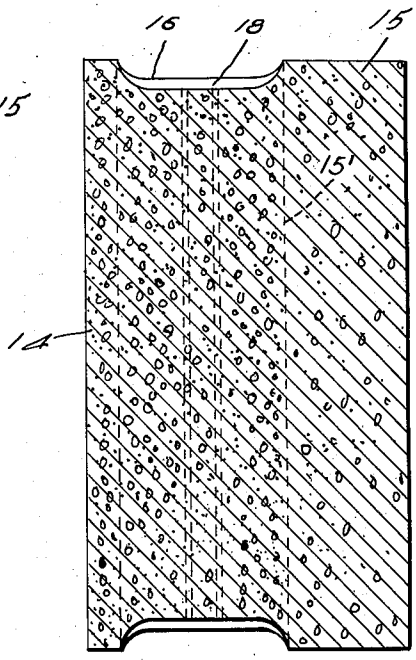
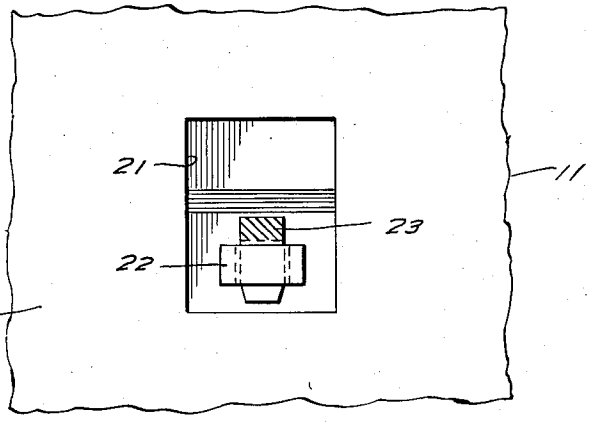


Fig. 5.



Inventor

Charles L. Sanford

By Herbert J. Jacobi

ATTY.

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Fig. 2

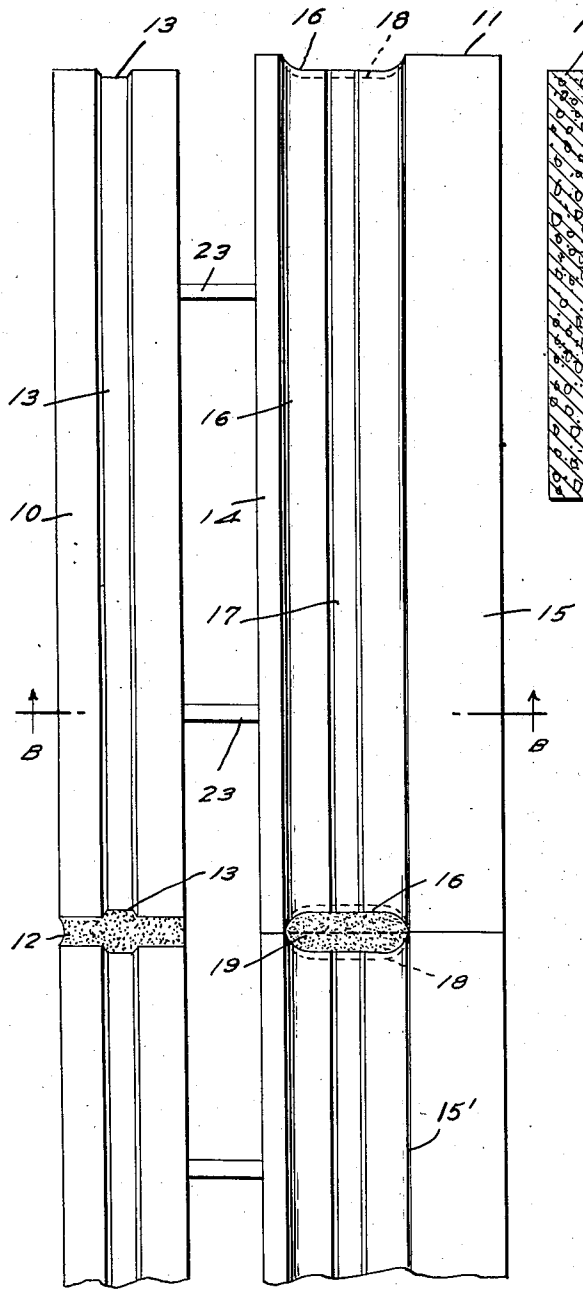


Fig. 4.

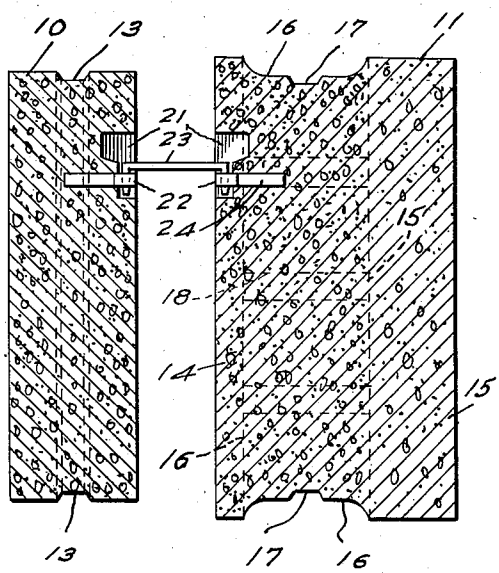


Fig. 6.

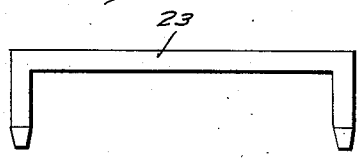
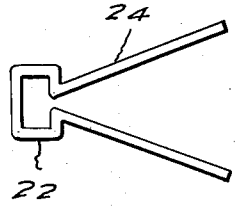


Fig. 7.



Inventor
Charles L. Sanford

By Herbert J. Jacobi

ATTY.

United States Patent Office

2,888,820

Patented June 2, 1959

2,888,820

BUILDING BLOCKS

Charles L. Sanford, Meadville, Pa.

Application March 25, 1954, Serial No. 418,566

2 Claims. (Cl. 72—44)

This invention relates to a building block designed specifically for outside walls and is especially designed for houses and other buildings of from medium to small size.

It is primarily an object of the invention to provide an outside wall block which is efficient and durable and which is substantially fire resistant, moisture proof, vermin proof and particularly termite proof, without resort to expensive materials.

A principal object of the invention is to provide a building block which can be easily and inexpensively manufactured in high speed machines which turn out seven or eight sections of a block per minute without the use of any hand work for assembling or adding any parts thereto, except the laying up of the sections in a wall.

Another object of the invention is to provide a wall block whose construction and features eliminate entirely the use of any expensive parts and which enable the laying up of a wall with comparative ease and at the same time with extraordinary precision.

Another object of the invention is to provide a wall block which is practical in its cost of production and in its cost of wall construction, whereby the masses of people can afford its use.

A still further object of the invention is to provide a block comprising a front and a rear section, together with inexpensive means for tying the said sections in spaced relation in a manner to provide an unbroken intervening space; the rear section being of much greater thickness than the front section, for load carrying purposes and much better wall construction and ease of assembly in a wall.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my new and improved block whereby important advantages are obtained, as will be hereinafter set forth.

In the drawings:

Fig. 1 is a vertical end view of one block laid upon another, showing mortar joints and lateral grooves within an end mortar channel;

Fig. 2 is a top or plan view of a block laid end to end of another block and showing mortar as used in mortar joints;

Fig. 3 is a top bisected sectional view taken through A—A of Fig. 1 and showing the depth of the lateral grooves within the end mortar channel;

Fig. 4 is a bi-section through B—B of Fig. 2, showing the varied depths of the recess for receiving and housing the eye portion of the eye receiving member and an end of a tie member;

Fig. 5 is a full size view of a recess, looking into a recess containing the eye portion of an eye receiving member and the end of a tie member;

Fig. 6 is a view of a full size tie member, the metal for making the tie member is a strip one-eighth inch by one-quarter inch;

Fig. 7 is a view in full size of an eye receiving member, the metal for making this member is one-sixteenth inch by one-quarter inch.

The block comprises an outside section **10** and an inside section **11**. These sections are held in spaced relation to each other throughout their length by tie members to provide an unbroken air space therebetween. The outside section **10** for general use is composed of dense or hard concrete but may be of stone or any suitable material for outside use and exposure.

Because of the simplicity of the sections and the ease with which they are made by machine, a mere change of die provides for the production of a different outside face design in section **10**. Section **10** also contains a mortar anchoring groove **13** in all of its edge faces to assure firm and lasting joints.

The inside section **11** is of various features and is composed of dense or hard concrete for inside portion **14** next to the air space, and of a less dense concrete portion **15** for the outside or room surface of the block. The inside section **11** is double in thickness of the outside section **10** and is so produced for carrying the load of the floor and ceiling joists and the greater part of the roof load. Because of the composition and nature of the less dense portion **15**, it has almost as great compression strength as the dense or hard portion **14**. That feature will be more fully considered as the description proceeds.

The inside section **11** is wider and longer than the section **10** by the difference of the thickness of a mortar joint, to provide for mortar joint trim **12** between sections **10** when laid up in a wall, there being no mortar joints to cut when sections **11** are laid up. This portion **15** is also of a thickness to provide requisite nailing depth.

The less dense concrete portion **15** of section **11** has all of its edge faces flat and smooth for abutting like edge faces of adjoining sections in a wall. There are no mortar joints between the less dense portions **15** of a wall in order to avoid interference with driving nails or screws into any portion or fractional part of the portions **15**.

The total thickness of the section **11** provides ample space for the less dense portion **15** and a large mortar channel **16** within all of the edges of the dense or hard concrete portion **14**. The mortar channel **16** is provided with a mortar anchoring groove **17** in the top and bottom edges of portion **14**. In the opposite end edges of portion **14** of section **11** the mortar channel **16** is provided with a plurality of well spaced lateral grooves **18** to prevent the fresh mortar from sagging when the sections are being laid up in a wall.

By reference to the mortar joint **19**, Fig. 2, the dotted line through the mortar indicates that half of the mortar is trowled into the end mortar channel of a section in a wall and the other half of the mortar of the joint is trowled into a like end channel of a section to be laid against the first mentioned section, thus completing the full mortar joint **19**. A small amount of extra mortar trowled downward against the top of this mortar joint will insure a full and compact mortar joint of extraordinary bonding strength. Good mortar joints are of utmost importance in a wall, as they both seal the wall and greatly determine the total lateral strain or thrust a wall will withstand. At present, there is too little mortar in many of the joints of a standard cement block wall, as some of the mortar intended for the joints is displaced by laying up the block; the joints not being uniform and not sealing the wall.

By reference to mortar joint **20**, Fig. 1, section **11**, it will be noted that in laying up section **11** upon another or others in a wall, mortar is ricked in the top mortar channel **16** of the wall section and the section to be laid thereon is tapped into position, the top of the mortar joint **20** being forced into the mortar anchoring groove **17** as shown. No mortar is wasted and no mortar joint is cut in laying up the sections **11** and all end and side

edges thereof abut the edges of adjoining sections. This is an advanced step, far superior to present methods employed.

It is of outstanding importance and a long sought after accomplishment that the thicker section **11** of my invention can be laid up several courses high before the outside section **10** is laid up and secured thereto by the tie member means I employ together with the varied depth recess provided which makes possible the insertion of the tie members under just such circumstances. In addition to other advantages this avoids having to lift both sections at the same time, and enables increasing the length or width dimension of the outside section **10** for architectural effect, without the risk of too great weight problem.

In order to provide an inside section **11** which would have suitable thickness for its general purposes and for ample strength for carrying any loads to which it might be subjected, I have provided a composite block formed with an inside portion **14** with a standard hard concrete mixture, composed of cement, one part; sand, two parts; and gravel, crushed stone or the like, four parts; and an outer portion **15** of a concrete mixture of sufficiently less density than that of hard or standard concrete to permit the driving of nails or screws therein with any degree of holding strength required and with a compression strength approximating the compression strength of standard or hard concrete, said inner portion **14** preferably having a substantially greater thickness than that of the outer portion **15**, as shown in Figure 4. This block form involves a slight extra cost of production, as two chutes provide measured amounts of materials for the two portions **14** and **15** in the machine in which the section **11** is made. This requires no hand work or after application of material. The line of demarkation between the dense and less dense portion is shown at **15'** in Figs. 1 to 4.

For the less dense portion **15** of the section **11** I employ aggregates and bonding materials in the following proportions by volume; mortar sand, 4 parts; ground cork—1 to 1½ parts; hydrated lime,—one fifth of one part; and standard Portland cement one and one-quarter parts.

The variable amounts of ground cork used determine the degree of density and nailing quality produced as required. The matter of the degree of coarseness of the mortar and aggregate used naturally causes a slight variation in the amount of cement used, and I desire not be restricted in this particular.

In order to make possible the laying up of several courses of section **11** in a wall before laying up any of the outside section **10**, I provide a novel and new tie member receiving means. It is unique in its construction and simplicity of parts while providing maximum efficiency.

In the confronting faces of the two sections **10** and **11**, I provide two recesses **21** in each, as shown in Figs. 4, 5 and 6 and indicated in Fig. 2. The recesses **21** are located a substantial distance down from the top edge of the sections and a greater distance in from the opposite end edges of the sections, this latter to provide oppositely disposed recesses when joints are broken in succeeding courses. The recesses are within easy access from the top of section **10** even though several courses of section **11** have been laid up, one upon another. It will be noted that each recess has distinct varied depths, the top portion of the recess having double the depth of that of the bottom portion.

Within the bottom portion of the recess is located the eye **22** of the receiving clip member **24** for reception of one end of the tie member. The top deep portion of the recess is connected to the bottom shallower portion by a downward and outward sloping portion which makes easier the insertion of the tie member and its being

lowered into position within the eyes of the opposite receiving members.

The extra depth from the face of the section of the top portion of the recess, enables insertion of one end of a tie member **23** sufficiently to let the other end of the tie member pass into an opposite recess and the ends of the tie members inserted in the eyes of the receiving members.

As may be clearly seen in Fig. 4, a small amount of mortar on the point of a trowel can be pressed into the top portion of a recess to seal the tie member in position in the eyes of the eye receiving members if desired.

The combination of the various features disclosed and their purposeful advantageous arrangement provide a unique building block which has long been needed and is in great demand. This invention fully meets the requirements of millions of people who are in the lower income brackets, but require better homes within their price range than are now obtainable. Even at excessive prices it is now quite difficult to obtain homes properly constructed.

It has been proven that this invention enables the construction of far superior houses and other relatively small buildings at two-thirds the cost of a frame house or building of the same size and arrangement. The ease with which precision wall laying can be done with no mortar joints to cut of the inside section, and the no requirement or use of a rough or brown coat of plaster for the inside finish, except a white skim coat, or texture paint, and the no plaster cracks and small upkeep of a wall made of blocks, clearly indicate how a better wall can be produced at reduced cost. From basement to roof every room can be readily and properly vented through the air space of the wall by use of metal vent sections set up as the outside section of the wall is laid up.

I claim:

1. A concrete composite building block comprising an outer section providing an outer wall surface, an inner section spaced from said outer section to provide an unbroken air space therebetween, said inner section providing an inner wall surface, said outer section being of less width and length than said inner section to provide for a mortar joint between adjacent outer sections and a mortar receiving groove in the periphery of said outer section, said inner section being composed of concrete of two different densities, there being a layer of concrete of normal density extending from the face confronting said outer section to a point intermediate the thickness of said inner section, the remainder of said inner section including said inner wall surface comprising a layer of concrete of less density to provide for the reception of driven fastening means, the peripheral edges of the second mentioned layer being plane surfaces to abut similar surfaces of adjacent blocks to provide an inner wall surface unbroken by mortar joints, a peripheral mortar receiving groove in the first mentioned layer of said inner section to bond adjacent inner sections together with a blind mortar joint, opposed pairs of recesses in the confronting faces of said inner and outer sections, each recess having a relatively deep upper portion and an inclined bottom wall merging into a relatively shallow lower portion, a clip member imbedded in the concrete of each section and having an eye disposed in said shallow lower portion with the axis of said eye being vertical and tie members for connecting said inner and outer sections, each tie member comprising a straight portion and down turned end portions with said end portions received in the eyes of said clip members, said inclined bottom walls serving to guide said end portions into said eyes during construction of a wall.

2. A concrete composite building block comprising an outer section providing an outer wall surface, an inner section spaced from said outer section to provide an unbroken air space therebetween, said inner section provid-

ing an inner wall surface, a mortar receiving groove in the periphery of said outer section, said inner section being composed of concrete of two different densities, there being a layer of concrete of normal density extending from the face confronting said outer section to a point intermediate the thickness of said inner section, the remainder of said inner section including said inner wall surface comprising a layer of concrete of less density to provide for the reception of driven fastening means, the peripheral edges of the second mentioned layer being plane surfaces to abut similar surfaces of adjacent blocks to provide an inner wall surface unbroken by mortar joints, a peripheral mortar receiving groove in the first mentioned layer of said inner section to bond adjacent inner sections together with a blind mortar joint, opposed pairs of recesses in the confronting faces of said inner and outer sections, each recess having a relatively deep upper portion and an inclined bottom wall merging into a relatively shallow lower portion, a clip member imbedded in the concrete of each section and having an eye disposed in said shallow lower portion with the axis of said eye being vertical and tie members for connecting said inner and outer sections, each tie member

comprising a straight portion and downturned end portions with said end portions received in the eyes of said clip members, said inclined bottom walls serving to guide said end portions into said eyes during construction of a wall.

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