Oct. 19, 1926. 1,604,097

J. M. HEWLETT

WALL STRUCTURE

Filed Feb. 16, 1926

FIG. 1.

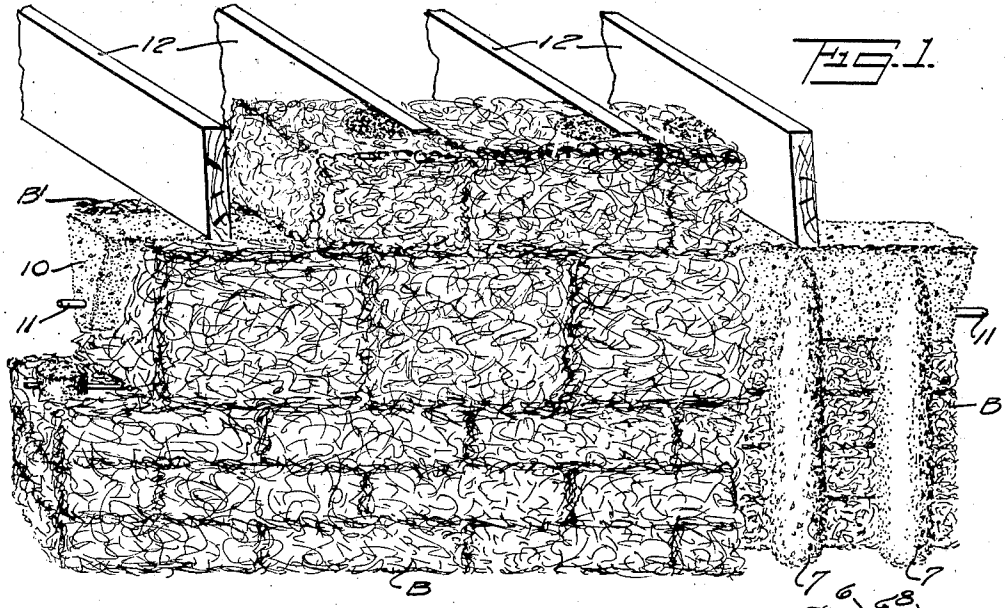


FIG. 2.

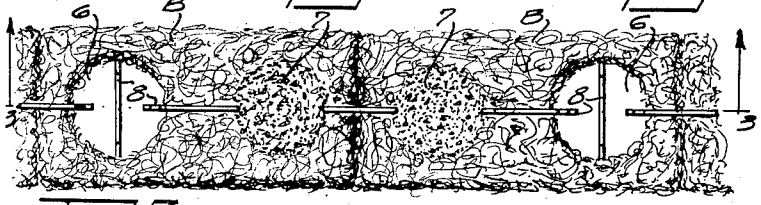


FIG. 4.

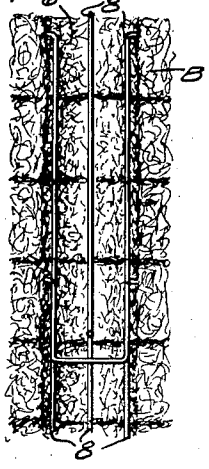


FIG. 3.

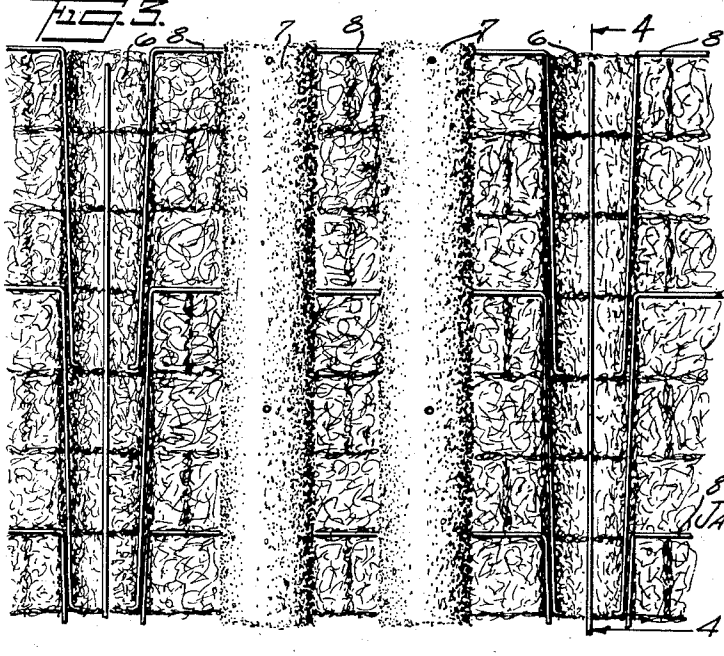
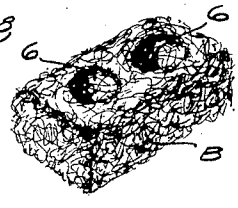


FIG. 5.



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WALL STRUCTURE.

Application filed February 16, 1926. Serial No. 88,522.

In my earlier Patent No. 1,450,724 dated April 3, 1923, I described a wall structure in which I use somewhat massive blocks solidly formed of fibrous material and plaster. The blocks are held together by concrete columns that are formed by pouring concrete into openings formed in the blocks. The blocks of the type described in my earlier patent will give some strength to the wall owing to their solidity.

I have found that I can build a wall which is actually stronger than the wall shown in my earlier patent if instead of using solidly formed blocks such as those previously described, I use blocks of an open fibrous nature which are full of air holes. When the blocks are made solid (except for the openings in which the concrete is to be poured), the plaster material used as a binder for the excelsior or other fibrous material will tend to withdraw moisture from the newly poured concrete and thereby dry the concrete out so rapidly that it will not set properly. On the other hand, if an open fibrous block is used, there will be no capillary action to absorb the moisture from the wet columns and the columns will stay moist for a relatively long time, so that the full strength of the concrete is obtained. It is a known fact that concrete continues to gain strength for a period of at least sixty days, provided it is kept in proper moist condition.

In order that the wall may be built evenly, it is highly essential that the blocks which I use be of a uniform definite size and so formed that they will not expand or contract appreciably with changes in their moisture content. A block made up simply by baling fibrous material will swell appreciably between the bales, if it becomes wet, and will not serve the purpose.

I find that blocks that are highly efficient for use in constructions of the type referred to can be made from fibrous material of either animal, vegetable or mineral origin by combining such fibrous material in the proper manner with one of the common plaster ingredients. However, in making up the blocks, the procedure is very different from that which would be followed in making up a solid block such as is described in my earlier patent where the semi-liquid plaster solution is loaded with the maximum amount of excelsior which it will carry and then poured or tamped into a mold.

In making the block of the present invention, the fibrous material such as excelsior, bagasse or the like is mixed with the binder (which may be a lime plaster or preferably magnesite cement) in such a way that the fibres are lightly coated with the plaster, but are not compacted into a solid mass. During the mixing the fibres should be so handled that they will be kept fluffed up and not permitted to become matted. The mixing should be continued until the fibres appear to be almost dry with just enough moisture left in the surface coating so that the coatings will adhere if the fibres are permitted to stand in one position. The material thus prepared is put into molds and pressed down very lightly, only enough pressure being used to be sure that the mold corners are filled out. The block is then allowed to set.

In order to assure absolute uniformity of block thicknesses, I prefer first to form a large block of a size equal to that which would be had if four or five of the finished blocks were piled one on top of the other. After the large block has been set, and been taken from its mold, it can be readily sawed or cut into blocks of the desired thickness. A block made in this way is of definite size, is very light and open, and while it has no appreciable strength to resist crushing strains, it has ample strength for handling and shipping and will not swell appreciably if it should become wet by exposure to the elements. Also the coating treatment which has been given to the individual fibres renders them highly fire-resistant. The block will have very little tendency to absorb moisture and will have a surface appearance so rough that it will interlock with a plaster coating on its exterior and also will interlock very strongly with concrete poured in the registering openings.

In the accompanying drawings, I show a way in which my block may be used, though these drawings also include certain detailed inventions made by others. In the illustration, Fig. 1 is a perspective view of a portion of a wall built according to my invention, with parts broken away; Fig. 2 is a plan

view of a portion of wall in the course of construction; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a section detail on line 4—4 of Fig. 3, and Fig. 5 is a perspective view on a reduced scale of one block.

The blocks designated by the letter B, as shown in Fig. 5 are preferably made 16 inches long, 4 inches thick and 8 inches wide, or of the size equal to that of eight ordinary bricks. In the block B are two openings 6 which are spaced in the exact centers of the respective halves of the block. The opening 6 may for example be 4 inches in diameter.

In building a wall, the blocks B are laid dry without the use of plaster or cement, and as is usual, the joints are broken in every course. If the blocks are laid properly in line, this will cause the opening 6 to form vertical passages extending the height of the wall. These passages are to receive concrete to form the stockade-like vertical weight supporting columns 7.

In order that the concrete may be properly packed into these openings, the wall should be built up progressively, that is, concrete should be poured after a relatively small number of courses are laid. In Figs. 2, 3 and 4, I show a system of reinforcing rods particularly adapted for use in building a wall progressively in this manner. The rods designated by the numeral 8 are of a U-shape with relatively long legs. Here they are illustrated as having legs slightly shorter than the combined thickness of four courses; in other words, the legs are about 15 inches long. A similar effect could be had if the legs were about 11 inches long. At the tip of each leg a small point is bent outward. The member joining the two legs is flat and of a length slightly less than the diameter of the hole 6. If the blocks B are 16 inches long and the holes 6 are made 4 inches in diameter, the distance between any two adjacent holes 6 will be 4 inches. The reinforcing rods 8 are inserted after the first four courses are laid and thereafter after each three courses are laid, so that they overlap for one course. At each course where reinforcing rods are inserted, I prefer to put in one reinforcing rod 8 with the legs extending down into adjacent opening 6. Since the bar which connects these legs is slightly shorter than the distance between the openings, the legs will be spread apart towards the center of the column when the member 8 is pushed down into place. At the same time, other members 8 are put in with the legs pointing upward and the tips springing out against the sides of the openings. This is illustrated in Fig. 4. In building the wall, four courses are laid, a set of reinforcing rods 8 is then put in place and concrete poured in to the height of about three courses, or somewhat less. Three additional courses are then laid and another set of reinforcing rods is put in place, and concrete is once more poured up to a point slightly less than one course from the top.

Since the blocks B have no strength to resist compression strains, it is necessary that the cement columns 7 be connected together at the top in order to distribute the load beween these columns. In Fig. 1, I show one manner in which this can be done. This involves the use of a special form of block B′ which is formed with a groove in its upper face which will serve as a mold for a key-shaped concrete stringer 10. Extending down from this groove are openings of the same diameter as the openings 6 and so positioned that they will register with the opening 6 in the blocks B. These openings are now shown in the drawings but at the right hand side of Fig. 1 the shape of the concrete formed by filling these openings is illustrated. Tie-rods 8 can be put in place through the circular openings formed in blocks B′ and longitudinal tie-rods 11 can be laid in the groove formed in the blocks B′. I prefer to unite the columns 7 with a stringer 10, at each story in height to which the wall goes, as this will give a support for the joists 12. A similar stringer will serve as a lintel over all openings, windows, doors, etc., as well as joining adjacent columns.

The wall may be finished by applying a coat of stucco or brick veneer or in any manner desired. The rough surface of the blocks B and B′ will make an excellent base for the application of stucco and no lath is needed. Also since these blocks contain no capillaries there will be no tendency for moisture to work in through the wall from the outside, and the inside wall can be plastered direct to the blocks without the use of furring strips and lath.

Since the blocks will not withdraw any moisture from the concrete structure for which they serve as permanent molds, this concrete structure will continue to gain in strength for some time after the concrete is poured. Also since the blocks do not expand from the application of moisture, there will be no tendency for the blocks to contract as the plaster and concrete finally dry out, which would cause the plaster surfaces to crack.

It is apparent that the detailed assembly of the wall may be arranged in various different ways and that the blocks may be made of different materials without departing from the spirit of my invention.

What I claim is:

1. In a wall made up of blocks and a stockade-like concrete structure formed within the same, a substantially non-absorbent block of loosely assembled fibrous material held together by a binding agent which extends throughout the block but does not fill the interstices between the fibres.

2. A block of the type used in building systems in which a wall is formed of blocks and a stockade-like concrete structure is formed within the blocks, which block is substantially non-absorbent and formed of loosely assembled fibrous material held together by a binding agent which does not fill the interstices between the fibres but which substantially coats the fibres and renders them fire-resistant.

3. In a wall structure comprising a plurality of courses of blocks with registering openings through the courses adapted to act as molds for a stockade-like concrete weight carrying structure, blocks formed of loosely compacted substantially non-absorbent material so assembled that the blocks remain of substantially constant size under varying atmospheric conditions, and are adapted to serve as a substantially damp-proof wall filling between the concrete elements of the finished structure and are adapted to serve as molds for the concrete which will maintain the concrete in a moist condition for a relatively long time after it is poured, so that it may attain its maximum strength.

JAMES MONROE HEWLETT.